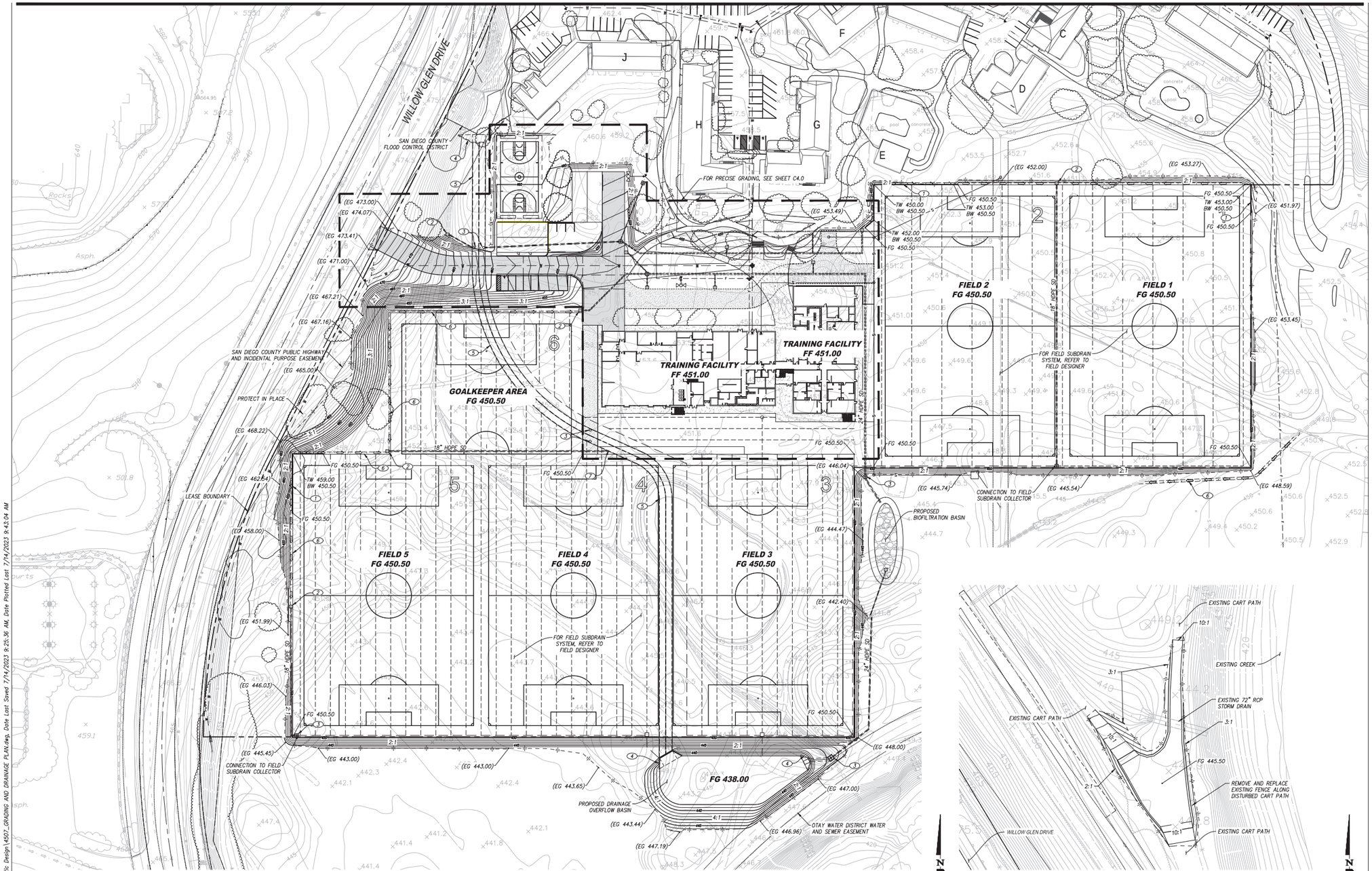
Appendix A

Grading and Drainage Information

Appendix A-1

Preliminary Grading and Drainage Plan



LEGEND:

- LEASE BOUNDARY
- GRADING DAYLIGHT
- GRADE BREAK
- RETAINING WALL
- DOUBLE 4'X8' BOX CULVERT
- PROPOSED STORM DRAIN LINE
- PROPOSED TYPE-F CATCH BASIN
- PROPOSED TYPE-A CLEAN OUT
- PROPOSED BOX CULVERT HEADWALL
- PROPOSED BROW DITCH
- PROPOSED FIELD SUBDRAIN PER FIELD DESIGNER

EARTHWORK QUANTITIES:

GRADED AREA	17.38 [ACRES]	MAX. CUT DEPTH	13.2 [FT]
CUT QUANTITIES	41,275 [CYD]	MAX CUT SLOPE RATIO (2:1MAX)	2:1
FILL QUANTITIES	43,231 [CYD]	MAX. FILL DEPTH	10.5 [FT]
IMPORT	1,956 [CYD]	MAX FILL SLOPE RATIO (2:1MAX)	2:1

NOTE: ABOVE QUANTITIES DO NOT INCLUDE VOLUME REQUIRED FOR CONSTRUCTION OF DOUBLE BOX CULVERT, BUILDING FOUNDATIONS OR BIOFILTRATION BASIN.

QUANTITIES SHOWN ARE FOR ESTIMATION PURPOSES ONLY AND ARE NOT TO BE USED FOR FINAL PAY QUANTITY. QUANTITIES ARE GEOMETRIC ONLY AND DO NOT REFLECT SHRINKAGE OR BULKING FACTORS.

THIS PROJECT PROPOSES TO IMPORT 2,435 CUBIC YARDS OF MATERIAL TO THIS SITE. ALL EXPORT MATERIAL SHALL BE DISCHARGED TO A LEGAL DISPOSAL SITE. THE APPROVAL OF THIS PROJECT DOES NOT ALLOW PROCESSING AND SALE OF THE MATERIAL. ALL SUCH ACTIVITIES REQUIRE A SEPARATE CONDITIONAL USE PERMIT.

CONSTRUCTION NOTES

1. EXPOSED MASONRY RETAINING WALL PER COUNTY OF SAN DIEGO REGIONAL STANDARD DRAWINGS, HEIGHT PER PLAN
2. PROPOSED TYPE-F CATCH BASIN PER COUNTY OF SAN DIEGO RSD D-29
3. PROPOSED A-4 STORM DRAIN CLEAN OUT PER COUNTY OF SAN DIEGO RSD D-09
4. PROPOSED BOX CULVERT WINGWALL PER COUNTY OF SAN DIEGO RSD D-79
5. PROPOSED DOUBLE 4'X8' BOX CULVERT PER COUNTY OF SAN DIEGO RSD D-77
6. PROPOSED DRAINAGE DITCH PER COUNTY OF SAN DIEGO RSD D-75
7. CONNECTION TO BOX CULVERT

Gensler

1011 South Congress Avenue
Building 1, Suite 200
Austin, TX 78704
United States
Tel 512.867.8100

Walter P Moore - Structural
8910 University Center Lane
Suite 400
San Diego, CA 92122
USA

Project Design Consultants, a Bowman Company - Civil
701 B Street
Suite 800
San Diego, CA 92101
USA

Date	Description
07/13/2023	100% SCHEMATIC DESIGN

Seal / Signature

NOT FOR CONSTRUCTION

Project Name
SYCUAN TRAINING FACILITY

Project Number
25.1857.000

Description
Unnamed

Scale
GRADING AND DRAINAGE PLAN

C1.0

Last save by CARMEN SUTHERLAND, File Name: P:\45071\Engr\DWG_Plans\Schematic Design\45071_GRADING AND DRAINAGE PLAN.dwg, Date Last Saved 7/14/2023 9:25:36 AM, Date Plotted Last 7/14/2023 9:43:04 AM

Appendix A-2

Preliminary Drainage Report

PRELIMINARY DRAINAGE REPORT
Singing Hills
Sycuan Reservation, CA
August 16, 2023

Prepared For:

The Sycuan Band of Kumeyaay Nation
1 Kwaaypaay Court
El Cajon, CA 92019

Prepared By:

PROJECT DESIGN CONSULTANTS
a Bowman company

701 B Street, Suite 800
San Diego, CA 92101
619.235.6471

PDC Job No. 4507

Prepared by: J. Maynard
Under the supervision of

_____
Chelisa Pack, PE RCE 71026
Registration Expires 06/30/25

TABLE OF CONTENTS

TABLES

APPENDICES

1. INTRODUCTION

This preliminary drainage report has been prepared in support of the TEIR submittal for the Singing Hills development (the Project), which is located within Sycuan Tribe's Reservation within San Diego County, California. The project is located within the existing Singing Hills Golf Resort, near the intersection of Willow Glen Drive and Dehesa Road. Refer to the Vicinity Map in Figure 1.

The Singing Hills Project is a proposed redeveopment of the existing Singing Hills Golf Resort on the Sycuan Reservation. The project proposes a new soccer Training Facility and Academy. It includes three natural and two synthictic fields, a goal keep area, a basketball court, training facility and an additional driveway entrance from Willow Glen Drive.

The purpose of this report is to determine the hydrologic impact, if any, to the existing storm drain facilities or natural drainage, and to provide peak 100-year discharge values for the project. The drainage analysis presented herein reflects a TEIR level-of-effort, which includes peak 100-year storm event hydrologic analyses using preliminary grades. Hydraulic analyses for inlets, pipe sizes and inverts, and HGL's will be provided during final engineering. Therefore, the purpose of this submittal is to demonstrate the proposed storm drain layout, show the methodology used in the evaluation of the project storm drain system hydrology, and identify critical path drainage issues that need to be addressed during final engineering. The project is currently still in the conceptual design phase.

Furthermore, treatment of onsite storm water from buildings, parking, and driveway prior to discharging into the downstream system will be facilitated by a single biofiltration basin. For a detailed discussion of the project's stormwater quality BMP approach, refer to the Preliminary Stormwater Summary Report.

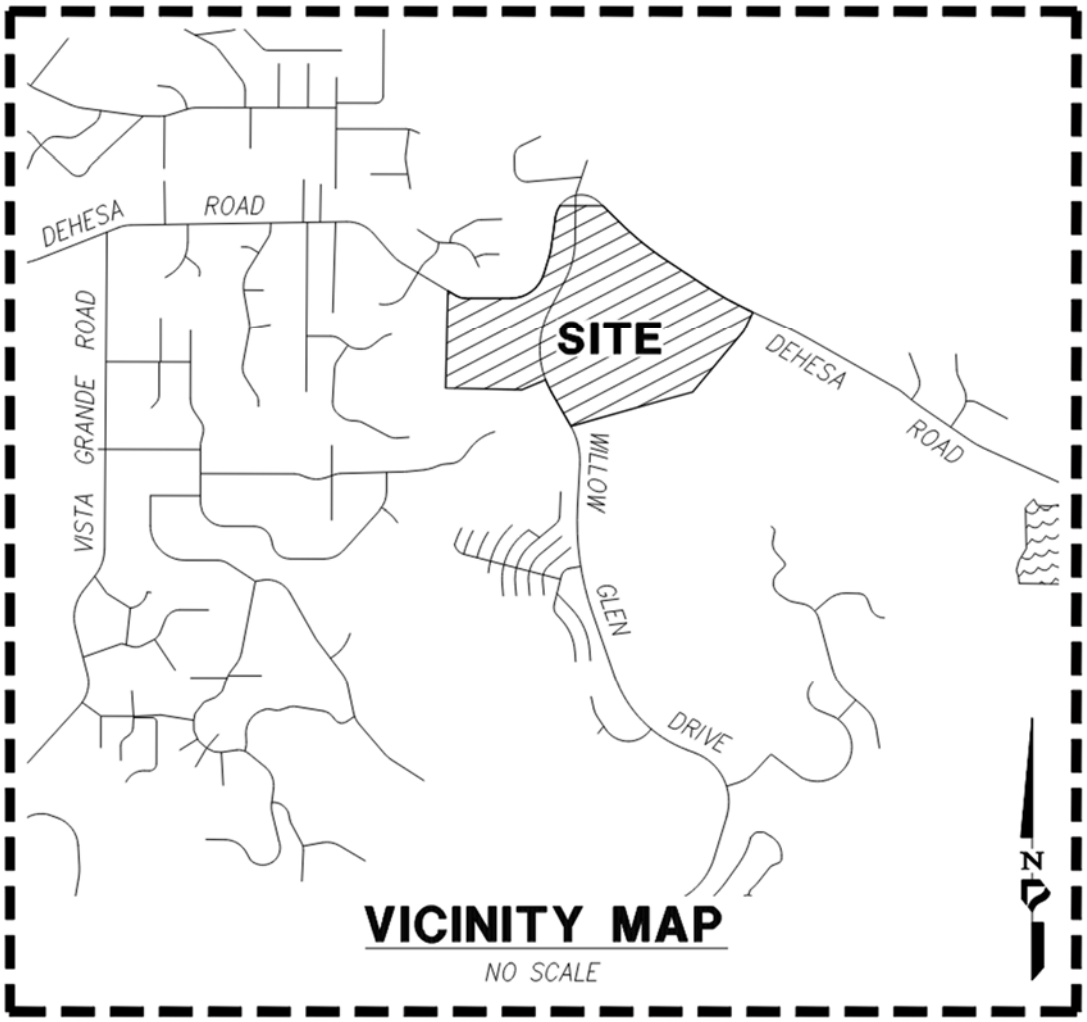


Figure 1: Vicinity Map

2. EXISTING AND PROPOSED DRAINAGE PATTERNS AND IMPROVEMENTS

The following sections provide descriptions of the existing and proposed drainage patterns and improvements for the project.

2.1 Existing Drainage Patterns

The site is currently a golf course, with drainage generally discharging south of the boundary of Singing Hills. Generally most of the site drains south via sheetflow through the parking lot or

through multiple drainage ditches located throughout the golf course. Along the southerly edge of project, the drainage outlets to the southern golf course that eventually flows towards Sweetwater River to the east.

There are several existing storm drain systems near the project site. The first major system to the north is an existing triple barrel 60" RCP storm drain (per TM 04494-1) that collects water from mostly undisturbed hills to the north. This storm drain outlets at the northwest corner of the Singing Hills golf course and flows south, through the golf course, towards and an existing 48" CMP storm drain.

The second major existing storm drain system collects offsite water from the northwest, including a portion of Willow Glen Drive, via sheet flow and brow ditches to an existing 54" RCP storm drain (Per TM 04494-4) which discharges on the southwest side of the site. This water flows through a graded swale in the golf course and exits south of the site per an existing 72" RCP storm drain. Futhermore, the existing 48" CMP storm drain cannot fully convey the flow from the existing triple barrel 60" RCP storm drain (per TM 04494-1). Therefore, the remaining water flows west towards the existing 72" RCP storm drain as well. Both the existing 48" CMP and the existing 72" RCP discharge water to the south of the Sweetwater River.

See Exhibit A in Appendix 5 for an existing conditions drainage map.

2.2 Proposed Drainage Improvements

The proposed drainage patterns will mostly mimic the existing conditions. Under proposed conditions, all the existing buildings and parking north of the site will remain and connect into a proposed box culvert that collects the flow from the existing triple barrel 60" RCP storm drain (per TM 04494-1). This proposed box culvert will be conveyed underneath the proposed natural soccer fields to a proposed detention basin south of the site.

The proposed synthetic soccer fields, training facility, basketball court, and new driveway entrance from Willow Glen Drive will be collected in a new proposed storm drain and treated in a proposed bioretention basin before entering the proposed detention basin. The proposed detention basin connects to the existing 48" RCP storm drain and exits the site.

See Proposed Conditions Drainage Map in Appendix 5 (Exhibit B).

3. HYDROLOGY CRITERIA, METHODOLOGY, AND RESULTS

3.1 Hydrology Criteria

Table 1 summarizes the key assumptions and criteria used for the hydrologic modeling. See Table 1 below.

Table 1: Hydrology Criteria

Proposed Hydrology:	100-year storm frequency
Soil Type:	Hydrologic Soil Group A, B, C and D
Land Use / Runoff Coefficients:	Based on criteria presented in the 2003 San Diego County Hydrology Manual
Rainfall intensity:	Based on intensity duration frequency relationships presented in the 2003 San Diego County Hydrology Manual

3.2 Hydrologic Methodology

Hydrology calculations were completed for existing and proposed conditions accounting for all areas draining to the onsite storm drain systems. Drainage areas were defined from existing and proposed topographic maps of the area. Hydrologic analysis was completed utilizing the Rational Method, outlined in the 2003 San Diego County Hydrology Manual. The goal of the Rational Method analysis was to determine the peak 100-year flow rates for the storm drain pipes by developing a node link model of the contributing drainage area and the intensity to the areas. See Appendix 1 for the San Diego County Hydrology Manual Rainfall Isopluvial Maps.

The project drainage areas are represented with two systems draining to the same ultimate outfall. For the proposed condition, System 1000 represents both the northern offsite runon flow and the project site conveyed to the proposed bioretention basin and detention basin. System 1000 basin discharges per the existing existing 48” CMP storm drain.

System 2000 represents both the northwestern offsite flow and the existing project site flow. System 2000 discharges to an existing 72" RCP storm drain.

(See Exhibits in Appendix 5 for details).

For comparison purposes, existing condition drainage systems are named similarly to the post-project drainage systems. System 100 for existing conditions corresponds to System 1000 for proposed conditions and System 200 for existing conditions corresponds to System 2000 for proposed conditions. County of San Diego Hydrology Manual runoff coefficients, based on land use and anticipated imperviousness for each subarea, were assigned for each drainage sub-basin within Civil-D.

3.3 Description of Hydrologic Modeling Software

The Civil-D Rational Method Program was used to perform the Rational Method hydrologic calculations. This section provides a brief explanation of the computational procedure used in the computer model.

The Civil-D Modified Rational Method Hydrology Program is a computer-aided design program where the user develops a node link model of the watershed. Developing independent node link models for each interior watershed and linking these sub-models together at confluence points creates the node link model. The intensity-duration-frequency relationships are applied to each of the drainage areas in the model to get the peak flow rates at each point of interest.

3.4 Hydrology Results

The Rational Method was used to determine the peak 100-year storm flow rates for the design of the proposed onsite storm drain system. Table 2 below summarizes the Rational Method results. The hydrology results indicate that proposed flows are higher than the previously established flow rates for the existing conditions. Therefore, it is expected that detention is required for the total proposed condition flows to be less than the total existing flow rates. With detention, there is not expected to be adverse impacts. See Table 2 next page.

Table 2: Hydrology Results

EXISTING CONDITION				PROPOSED CONDITION (UNDETAINED)			
SYSTEM	AREA (ac)	Q100 (cfs)	TC (min)	SYSTEM	AREA (ac)	Q100 (cfs)	TC (min)
100	602.2	681.0	18.0	1000	606.5	685.0	18.3
200	177	283.5	13.9	2000	172.7	282.2	15.3
TOTAL	***779.2***	***964.5***	***/***	***TOTAL***	***779.2***	***967.2***	***/***

4. DETENTION AND HYDRAULIC ANALYSIS

For an TEIR level-of-effort submittal, hydraulic analyses for inlets, pipe sizes and inverts, and HGL's are not provided.

However, due to the unique hydraulic challenges in the pre-project condition as well as the need for detention, basic preliminary detention/hydraulic calculations are included as a part of this TEIR report to confirm that the post-project condition storm drain does not exacerbate existing conditions.

As mentioned in Section 2.1 above, the existing 48" CMP storm drain serving the site is undersized. The 48" CMP cannot fully convey the flow from the existing triple barrel 60" RCP storm drain (per TM 04494-1). Therefore, under pre-project conditions, the remaining water flows west across the existing golf course towards the existing 72" RCP storm drain as well. With the 48" CMP being under sized there are three ways water can flow: through the existing 48" CMP, across the ridge at approximately 443.40', and towards the existing 72" storm drain. See Existing Detention Exhibit C in Appendix 5.

Furthermore, in the existing conditions, the site is a rolling golf course with existing detention capabilities within its slopes. With the removal of these slopes to propose flat fields, this volume is removed, and the site's detention capabilities is reduced without additional grading south of the proposed fields. The concern is that with the removal of the these slopes the water will not be

detained as much as it is detained in pre-project conditions, and it could affect drainage flows and velocities downstream.

To address these concerns the project proposes a detention basin, and the southwestern corner of the site will be further graded to serve as additional detention volume. See Detention Map Exhibit D in Appendix 5 for location.

A calculation has been provided from the Pond Pack Program to show the detention withing the existing golf course topography mentioned above: the 48" CMP storm drain, the overflow weir exit into the river, and the 72" storm drain. The model is set up with all three components and both Systems 100 and 200 are routed towards these outlets. From this model, a max water surface elevation was determined to be 444.53. From this water surface elevation, the respective flows and velocities were determined. These calculations will be used to determine how much volume for detention will be required.

See Pond Pack Program in Attachment 4 and Detention Map in Appendix 5 for flows, velocities, and intended detention areas.

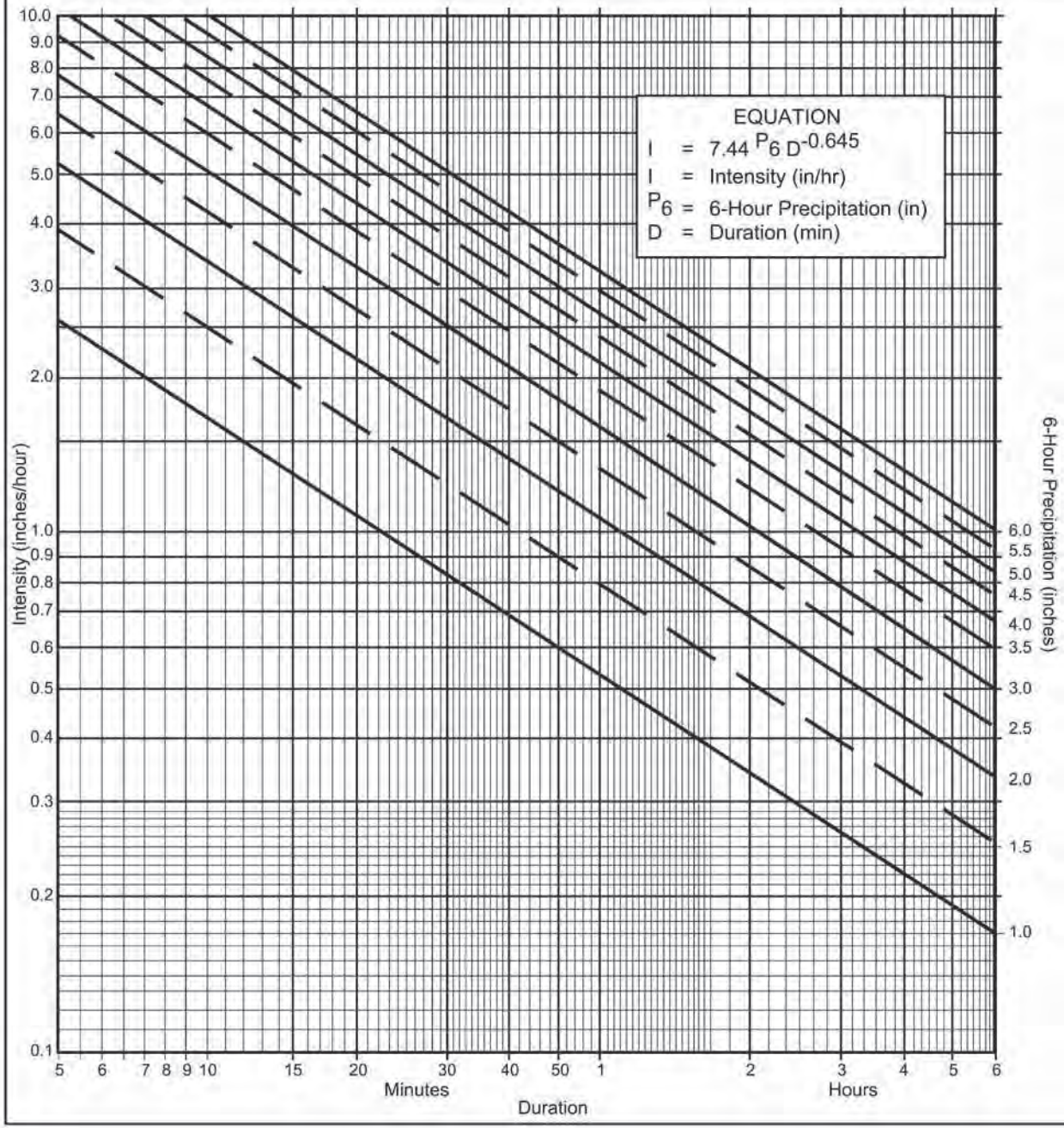
5. CONCLUSION

This drainage report supports the TEIR for the proposed Singing Hills development. This report was prepared to ensure that project development would not adversely affect existing drainage patterns. Hydrology calculations indicate that redevelopment will result in an overall slight increase in flows from the site but with proposed detention, flow will be decreased. As such, the project redevelopment should not have an adverse effect on local or global drainage patterns.

APPENDIX 1

Rainfall Isopluvial Maps, Runoff Coefficients and FEMA Firmette, Web Soil Survey

100 YEAR



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 100 year

(b) P_6 = 2.75 in., P_{24} = 5.75, $\frac{P_6}{P_{24}}$ = 48 %(2)

(c) Adjusted P_6(2) = _____ in.

(d) t_x = _____ min.

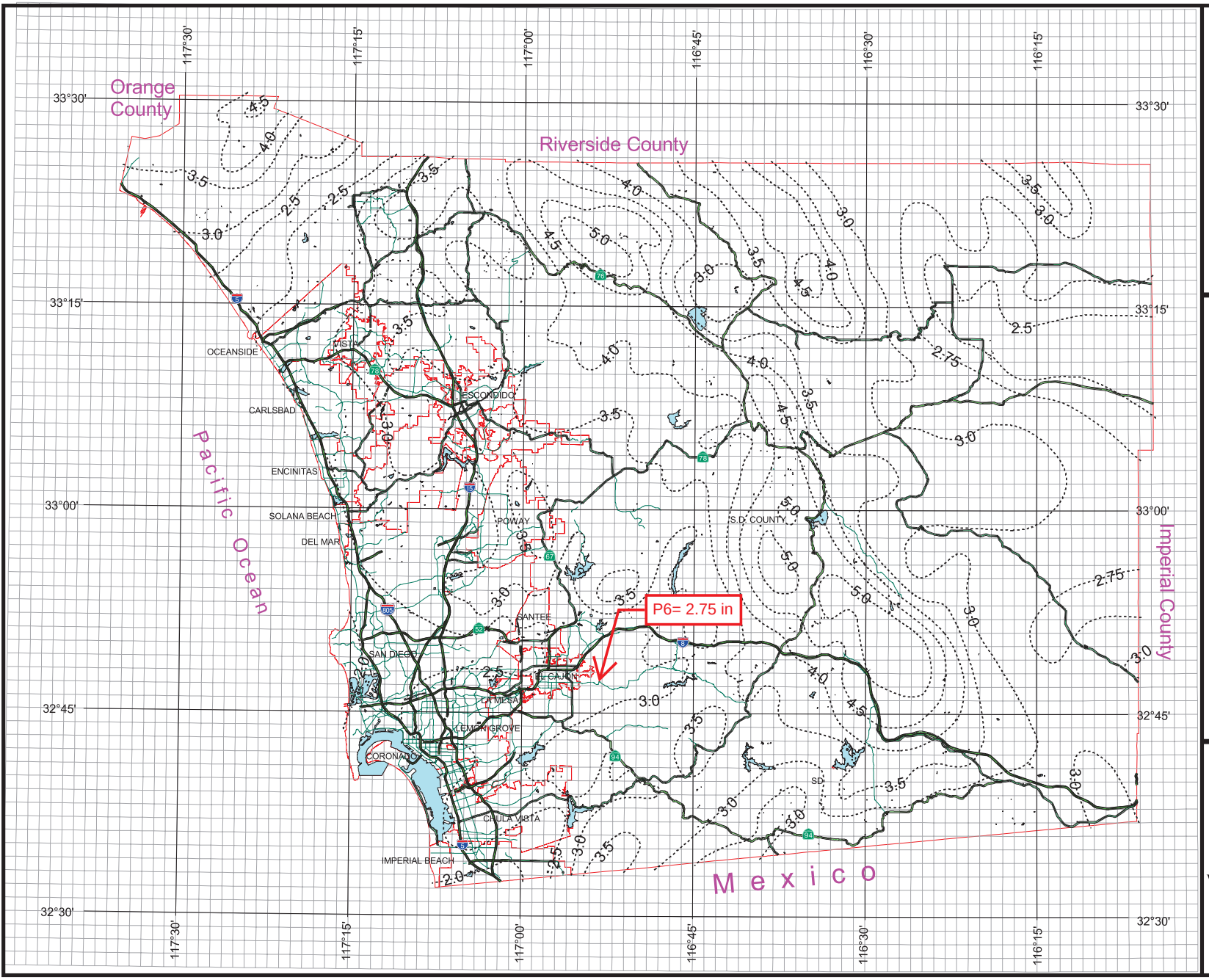
(e) I = _____ in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE 3-1



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)

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Geographic Information Services

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W E
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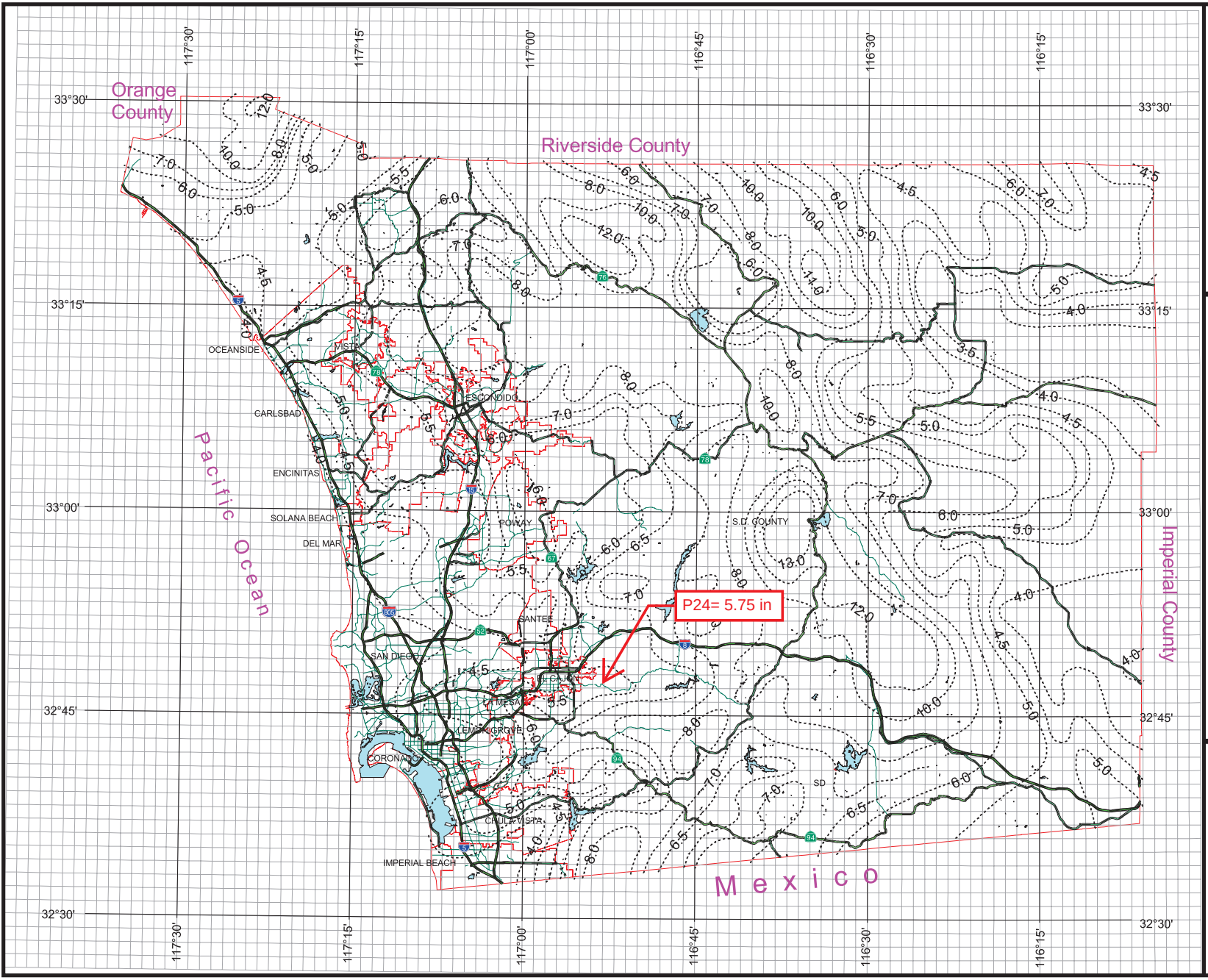
3 0 3 Miles

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)



DPW GIS
Department of Public Works
Geographic Information Services

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N
W E
S

3 0 3 Miles

Note that the Initial Time of Concentration should be reflective of the general land-use at the upstream end of a drainage basin. A single lot with an area of two or less acres does not have a significant effect where the drainage basin area is 20 to 600 acres.

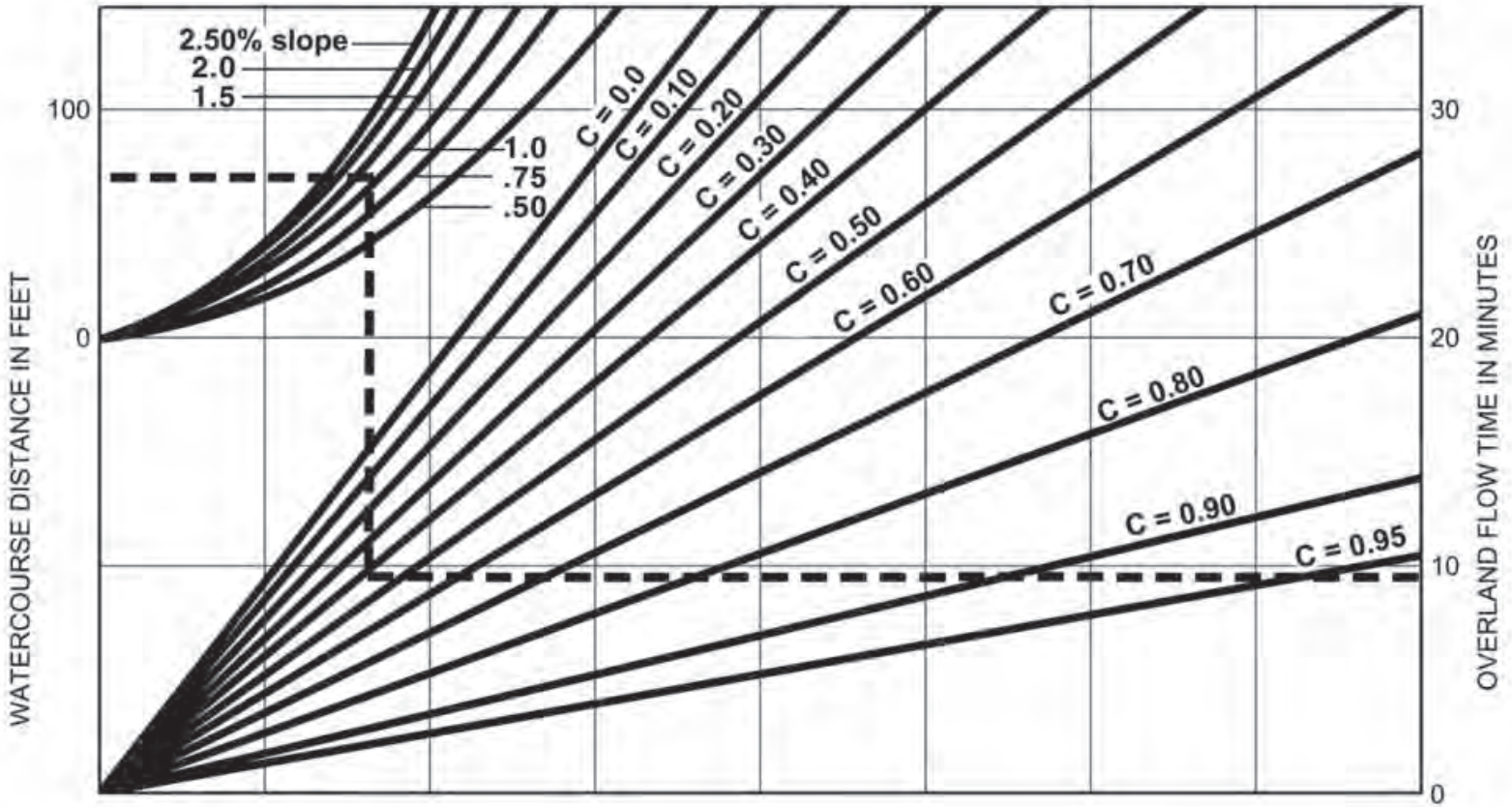
Table 3-2 provides limits of the length (Maximum Length (L_M)) of sheet flow to be used in hydrology studies. Initial T_i values based on average C values for the Land Use Element are also included. These values can be used in planning and design applications as described below. Exceptions may be approved by the "Regulating Agency" when submitted with a detailed study.

Table 3-2

MAXIMUM OVERLAND FLOW LENGTH (L_M) & INITIAL TIME OF CONCENTRATION (T_i)

Element*	DU/ Acre	.5%		1%		2%		3%		5%		10%	
		L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i
Natural		50	13.2	70	12.5	85	10.9	100	10.3	100	8.7	100	6.9
LDR	1	50	12.2	70	11.5	85	10.0	100	9.5	100	8.0	100	6.4
LDR	2	50	11.3	70	10.5	85	9.2	100	8.8	100	7.4	100	5.8
LDR	2.9	50	10.7	70	10.0	85	8.8	95	8.1	100	7.0	100	5.6
MDR	4.3	50	10.2	70	9.6	80	8.1	95	7.8	100	6.7	100	5.3
MDR	7.3	50	9.2	65	8.4	80	7.4	95	7.0	100	6.0	100	4.8
MDR	10.9	50	8.7	65	7.9	80	6.9	90	6.4	100	5.7	100	4.5
MDR	14.5	50	8.2	65	7.4	80	6.5	90	6.0	100	5.4	100	4.3
HDR	24	50	6.7	65	6.1	75	5.1	90	4.9	95	4.3	100	3.5
HDR	43	50	5.3	65	4.7	75	4.0	85	3.8	95	3.4	100	2.7
N. Com		50	5.3	60	4.5	75	4.0	85	3.8	95	3.4	100	2.7
G. Com		50	4.7	60	4.1	75	3.6	85	3.4	90	2.9	100	2.4
O.P./Com		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
Limited I.		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
General I.		50	3.7	60	3.2	70	2.7	80	2.6	90	2.3	100	1.9

*See Table 3-1 for more detailed description



EXAMPLE:

Given: Watercourse Distance (D) = 70 Feet
Slope (s) = 1.3%
Runoff Coefficient (C) = 0.41
Overland Flow Time (T) = 9.5 Minutes

$$T = \frac{1.8\,(1.1-C)\sqrt{D}}{\sqrt[3]{s}}$$

SOURCE: Airport Drainage, Federal Aviation Administration, 1965

FIGURE

Rational Formula - Overland Time of Flow Nomograph

3-3

Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

Land Use		Runoff Coefficient "C"				
			Soil Type			
NRCS Elements	County Elements	% IMPER.	A	B	C	D
Undisturbed Natural Terrain (Natural)	Permanent Open Space	0*	0.20	0.25	0.30	0.35
Low Density Residential (LDR)	Residential, 1.0 DU/A or less	10	0.27	0.32	0.36	0.41
Low Density Residential (LDR)	Residential, 2.0 DU/A or less	20	0.34	0.38	0.42	0.46
Low Density Residential (LDR)	Residential, 2.9 DU/A or less	25	0.38	0.41	0.45	0.49
Medium Density Residential (MDR)	Residential, 4.3 DU/A or less	30	0.41	0.45	0.48	0.52
Medium Density Residential (MDR)	Residential, 7.3 DU/A or less	40	0.48	0.51	0.54	0.57
Medium Density Residential (MDR)	Residential, 10.9 DU/A or less	45	0.52	0.54	0.57	0.60
Medium Density Residential (MDR)	Residential, 14.5 DU/A or less	50	0.55	0.58	0.60	0.63
High Density Residential (HDR)	Residential, 24.0 DU/A or less	65	0.66	0.67	0.69	0.71
High Density Residential (HDR)	Residential, 43.0 DU/A or less	80	0.76	0.77	0.78	0.79
Commercial/Industrial (N. Com)	Neighborhood Commercial	80	0.76	0.77	0.78	0.79
Commercial/Industrial (G. Com)	General Commercial	85	0.80	0.80	0.81	0.82
Commercial/Industrial (O.P. Com)	Office Professional/Commercial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (Limited I.)	Limited Industrial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (General I.)	General Industrial	95	0.87	0.87	0.87	0.87

*The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient, Cp, for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).
DU/A = dwelling units per acre
NRCS = National Resources Conservation Service

National Flood Hazard Layer FIRMette

FEMA

116°53'32"W 32°47'25"N

116°52'55"W 32°46'55"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

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

Legend

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

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

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

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

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

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

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

N

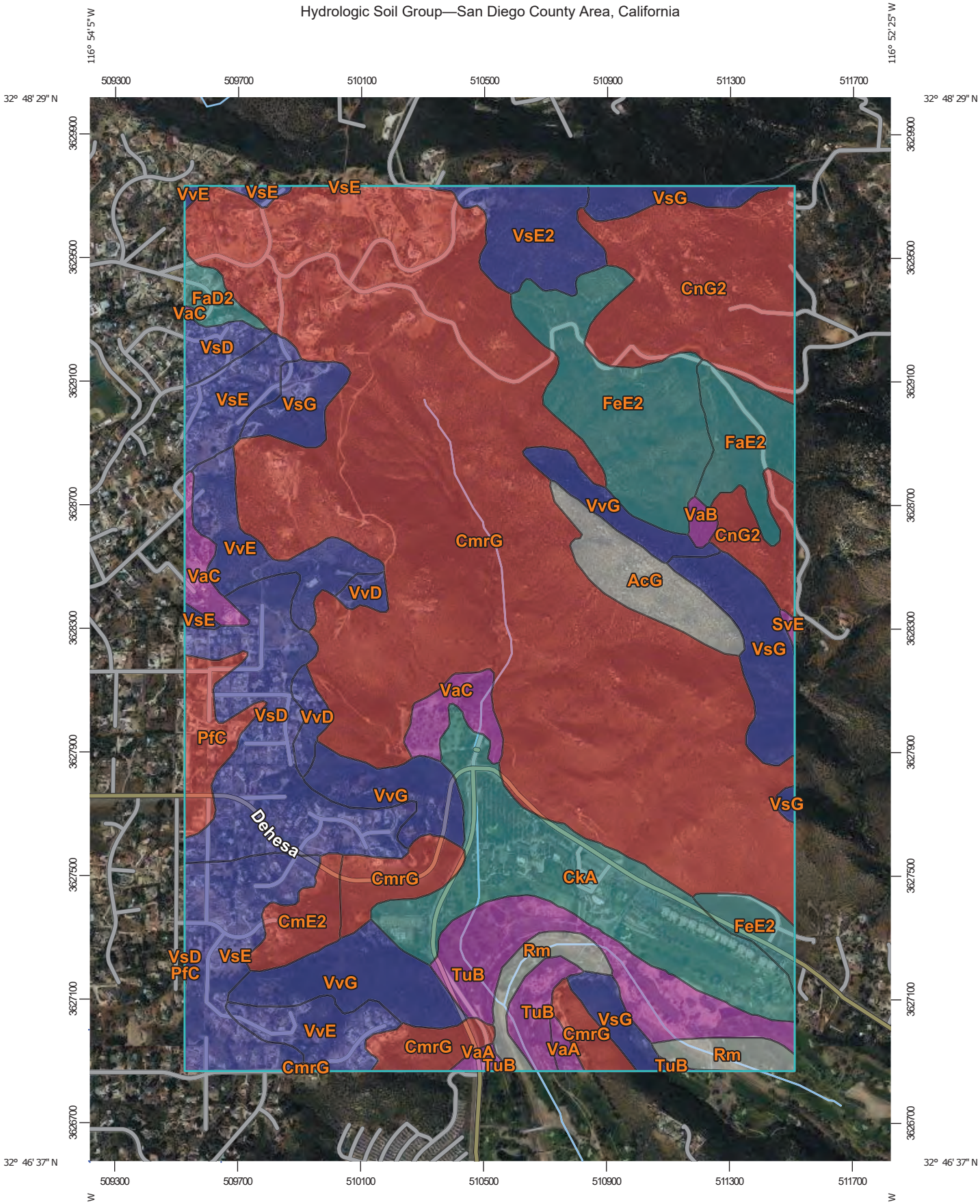
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/8/2023 at 4:05 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

WEB SOIL SURVEY



Map Scale: 1:16,800 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 200 400 800 1200

Feet
0 500 1000 2000 3000

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

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.

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

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

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

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

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 18, Sep 14, 2022

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

Date(s) aerial images were photographed: Mar 24, 2022—Apr 29, 2022

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AcG	Acid igneous rock land		27.2	1.9%
CkA	Chino silt loam, saline, 0 to 2 percent slopes	C	94.3	6.7%
CmE2	Cieneba rocky coarse sandy loam, 9 to 30 percent slopes, eroded	D	15.4	1.1%
CmrG	Cieneba-Rock outcrop complex, 30 to 75 percent slopes, very stony	D	555.0	39.3%
CnG2	Cieneba-Fallbrook rocky sandy loams, 30 to 65 percent slopes, eroded	D	102.0	7.2%
FaD2	Fallbrook sandy loam, 9 to 15 percent slopes, eroded	C	7.5	0.5%
FaE2	Fallbrook sandy loam, 15 to 30 percent slopes, eroded	C	27.6	2.0%
FeE2	Fallbrook rocky sandy loam, 9 to 30 percent slopes, eroded	C	77.2	5.5%
PfC	Placentia sandy loam, thick surface, 2 to 9 percent slo pes	D	18.5	1.3%
Rm	Riverwash		23.0	1.6%
SvE	Stony land	A	0.8	0.1%
TuB	Tujunga sand, 0 to 5 percent slopes	A	59.1	4.2%
VaA	Visalia sandy loam, 0 to 2 percent slopes	A	4.5	0.3%
VaB	Visalia sandy loam, 2 to 5 percent slopes	A	2.8	0.2%
VaC	Visalia sandy loam, 5 to 9 percent slopes	A	22.3	1.6%
VsD	Vista coarse sandy loam, 9 to 15 percent slopes, MLRA 20	B	82.8	5.9%
VsE	Vista coarse sandy loam, 15 to 30 percent slopes, MLRA 20	B	70.0	5.0%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
VsE2	Vista coarse sandy loam, 15 to 30 percent slopes, eroded	B	30.0	2.1%
VsG	Vista coarse sandy loam, 30 to 65 percent slopes, MLRA 20	B	64.1	4.5%
VvD	Vista rocky coarse sandy loam, 5 to 15 percent slopes	B	9.9	0.7%
VvE	Vista rocky coarse sandy loam, 15 to 30 percent slopes	B	48.4	3.4%
VvG	Vista rocky coarse sandy loam, 30 to 65 percent slopes	B	68.1	4.8%
Totals for Area of Interest			**1,410.5**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Table A-5

Table A-5 Average Manning Roughness Coefficients for Natural Channels

Minor Streams (Surface Width at Flood Stage < 100 ft)

Fairly Regular Section

(A) Some Grass and Weeds, Little or No Brush 0.030

(B) Dense Growth of Weeds, Depth of Flow Materially Greater Than Weed Height 0.040

(C) Some Weeds, Light Brush on Banks 0.040

(D) Some Weeds, Heavy Brush on Banks 0.060

(E) For Trees within Channel with Branches Submerged at High Stage, Increase All Above Values By 0.015

Irregular Section, with Pools, Slight Channel Meander

Channels (A) to (E) Above, Increase All Values By 0.015

Mountain Streams; No Vegetation in Channel, Banks Usually Steep, Trees and Brush along Banks Submerged at High Stage

(A) Bottom, Gravel, Cobbles and Few Boulders 0.050

(B) Bottom, Cobbles with Large Boulders 0.060

Flood Plains (Adjacent To Natural Streams)

Pasture, No Brush

(A) Short Grass 0.030

(B) High Grass 0.040

Cultivated Areas

(A) No Crop 0.040

(B) Mature Row Crops 0.040

(C) Mature Field Crops 0.050

Heavy Weeds, Scattered Brush 0.050

Light Brush and Trees 0.060

Medium To Dense Brush 0.090

Dense Willows 0.170

Cleared Land with Tree Stumps, 100-150 Per Acre 0.060

Heavy Stand of Timber, Little Undergrowth

(A) Flood Depth below Branches 0.110

(B) Flood Depth Reaches Branches 0.140

APPENDIX 2

Existing Conditions Rational Method Computer Output

EXISTING 100

```
        San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2004 Version 7.4

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
    Rational Hydrology Study        Date: 06/21/23
--------------------------------------------------------------------------
SINGING HILLS
EXISTING CONDITIONS
100 YEAR
100E100.rd3
--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

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


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour,  precipitation(inches) =  2.750
24 hour precipitation(inches) =  5.750
P6/P24 =    47.8%
San Diego hydrology manual 'C' values used




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      101.000
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
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
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation = 1658.000(Ft.)
Lowest elevation = 1640.000(Ft.)
Elevation difference =   18.000(Ft.) Slope = 18.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  18.00 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   5.15 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(  18.000^(1/3)]=   5.15
```



```
Rainfall intensity (I) =      7.108(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.224(CFS)
Total initial stream area =        0.090(Ac.)




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________________
Estimated mean flow rate at midpoint of channel =     78.183(CFS)
Depth of flow =   1.383(Ft.), Average velocity =   9.418(Ft/s)
    ******* Irregular Channel Data ***********
----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00            124.00
    2            400.00             74.00
    3            650.00             50.00
    4            900.00              0.00
    5           1150.00             68.00
    6           1400.00            132.00
    7           1800.00            192.00
Manning's 'N' friction factor =   0.050
----------------------------------------------------------------
Sub-Channel flow  =     78.183(CFS)
  '     '    flow top width =     12.002(Ft.)
  '     '    velocity=    9.418(Ft/s)
  '     '    area =      8.301(Sq.Ft)
  '     '    Froude number =     1.996

Upstream point elevation =  1640.000(Ft.)
Downstream point elevation =   942.000(Ft.)
Flow length =  4103.800(Ft.)
Travel time  =    7.26 min.
Time of concentration =   12.41 min.
Depth of flow =   1.383(Ft.)
Average velocity =   9.418(Ft/s)
Total irregular channel flow =    78.183(CFS)
Irregular channel normal depth above invert elev. =   1.383(Ft.)
Average velocity of channel(s) =   9.418(Ft/s)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.110
Decimal fraction soil group C = 0.280
Decimal fraction soil group D = 0.610
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.325
Rainfall intensity =      4.030(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.325  CA =     38.720
Subarea runoff =    155.832(CFS) for    119.040(Ac.)
Total runoff =    156.056(CFS)  Total area =     119.130(Ac.)
Depth of flow =   1.793(Ft.), Average velocity =  11.195(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      104.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =    328.194(CFS)
Depth of flow =   2.835(Ft.), Average velocity =  12.738(Ft/s)
    ******* Irregular Channel Data ***********
--------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00            418.00
    2            350.00            218.00
    3            600.00             88.00
    4            850.00              0.00
    5           1100.00             70.00
    6           1350.00            116.00
    7           1855.00            284.00
Manning's 'N' friction factor =   0.050
--------------------------------------------------------------------
Sub-Channel flow  =    328.194(CFS)
  '     '    flow top width =     18.178(Ft.)
  '     '    velocity=   12.738(Ft/s)
  '     '    area =     25.765(Sq.Ft)
  '     '    Froude number =     1.885

Upstream point elevation =   942.000(Ft.)
Downstream point elevation =   482.630(Ft.)
Flow length =  3740.000(Ft.)
Travel time  =    4.89 min.
Time of concentration =   17.31 min.
Depth of flow =   2.835(Ft.)
Average velocity =  12.738(Ft/s)
Total irregular channel flow =   328.194(CFS)
Irregular channel normal depth above invert elev. =   2.835(Ft.)
Average velocity of channel(s) =  12.738(Ft/s)
 Adding area flow to channel
Decimal fraction soil group A = 0.030
Decimal fraction soil group B = 0.050
Decimal fraction soil group C = 0.120
Decimal fraction soil group D = 0.800
[UNDISTURBED NATURAL TERRAIN                  ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.334
Rainfall intensity =      3.253(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.332  CA =    153.794
Subarea runoff =    344.205(CFS) for    344.020(Ac.)
Total runoff =    500.260(CFS)  Total area =     463.150(Ac.)
Depth of flow =   3.320(Ft.), Average velocity =  14.153(Ft/s)
```



```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** SUBAREA FLOW ADDITION ****
____________________________________________________________________
Decimal fraction soil group A = 0.060
Decimal fraction soil group B = 0.320
Decimal fraction soil group C = 0.020
Decimal fraction soil group D = 0.600
[LOW DENSITY RESIDENTIAL                     ]
(1.0 DU/A or Less       )
Impervious value, Ai = 0.100
Sub-Area C Value = 0.372
Time of concentration =    17.31 min.
Rainfall intensity =      3.253(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.335  CA =    170.075
Subarea runoff =     52.959(CFS) for     43.790(Ac.)
Total runoff =    553.219(CFS)  Total area =     506.940(Ac.)

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      110.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
____________________________________________________________________
Upstream point/station elevation =   482.630(Ft.)
Downstream point/station elevation =   480.100(Ft.)
Pipe length  =    62.00(Ft.)   Manning's N = 0.013
No. of pipes = 2  Required pipe flow  =   553.219(CFS)
Elliptical pipe dimensions:   Ratio A/B =   1.636
 Height B =    44.00(In.)     Width A =    72.00(In.)
Calculated individual pipe flow  =   276.610(CFS)
Normal flow depth in pipe =   25.31(In.)
Flow top width inside pipe =   71.18(In.)
Critical depth could not be calculated.
Pipe flow velocity =     26.80(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =    17.35 min.

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      111.000
**** SUBAREA FLOW ADDITION ****
____________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.270
Decimal fraction soil group C = 0.060
Decimal fraction soil group D = 0.670
[MEDIUM DENSITY RESIDENTIAL                  ]
(4.3 DU/A or Less       )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.499
Time of concentration =    17.35 min.
Rainfall intensity =      3.248(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
```

```
(Q=KCIA) is C = 0.341  CA =    178.877
Subarea runoff =     27.797(CFS) for     17.650(Ac.)
Total runoff =    581.016(CFS)  Total area =     524.590(Ac.)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      111.000 to Point/Station      112.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
________________________________________________________________________
Upstream point/station elevation =   469.000(Ft.)
Downstream point/station elevation =   457.320(Ft.)
Pipe length  =   285.00(Ft.)   Manning's N = 0.013
No. of pipes = 3  Required pipe flow  =   581.016(CFS)
Given pipe size =     60.00(In.)
Calculated individual pipe flow  =   193.672(CFS)
Normal flow depth in pipe =   25.17(In.)
Flow top width inside pipe =   59.22(In.)
Critical Depth =   47.72(In.)
Pipe flow velocity =     24.79(Ft/s)
Travel time through pipe =    0.19 min.
Time of concentration (TC) =    17.54 min.



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      112.000 to Point/Station      112.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =    524.590(Ac.)
Runoff from this stream =    581.016(CFS)
Time of concentration =   17.54 min.
Rainfall intensity =     3.225(In/Hr)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
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
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation = 1184.000(Ft.)
Lowest elevation = 1142.000(Ft.)
Elevation difference =   42.000(Ft.) Slope = 42.000 %
Top of Initial Area Slope adjusted by User to 30.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
```



```
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  30.00 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   4.34 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(  30.000^(1/3)]=   4.34
Calculated TC of    4.345 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      7.246(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.254(CFS)
Total initial stream area =        0.100(Ac.)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      107.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =     17.384(CFS)
Depth of flow =   0.964(Ft.), Average velocity =   8.987(Ft/s)
    ******* Irregular Channel Data **********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00            185.00
    2            275.00             36.00
    3            350.00              0.00
    4            425.00             36.00
    5            465.00             46.00
Manning's 'N' friction factor =   0.050
------------------------------------------------------------------
Sub-Channel flow  =     17.384(CFS)
  '     '    flow top width =      4.015(Ft.)
  '     '    velocity=    8.987(Ft/s)
  '     '    area =      1.934(Sq.Ft)
  '     '    Froude number =     2.282

Upstream point elevation =  1142.000(Ft.)
Downstream point elevation =   487.000(Ft.)
Flow length =  2356.000(Ft.)
Travel time  =    4.37 min.
Time of concentration =    8.71 min.
Depth of flow =   0.964(Ft.)
Average velocity =   8.987(Ft/s)
Total irregular channel flow =    17.384(CFS)
Irregular channel normal depth above invert elev. =   0.964(Ft.)
Average velocity of channel(s) =   8.987(Ft/s)
 Adding area flow to channel
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
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
```

```
Sub-Area C Value = 0.350
Rainfall intensity =      5.064(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      6.797
Subarea runoff =     34.165(CFS) for     19.320(Ac.)
Total runoff =     34.418(CFS)  Total area =      19.420(Ac.)
Depth of flow =   1.245(Ft.), Average velocity =  10.661(Ft/s)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      108.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =   487.000(Ft.)
Downstream point/station elevation =   480.910(Ft.)
Pipe length  =    90.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    34.418(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
    12.405(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      9.659(Ft.)
 Minor friction loss =      8.836(Ft.)  K-factor =   1.50
Pipe flow velocity =     19.48(Ft/s)
Travel time through pipe =    0.08 min.
Time of concentration (TC) =     8.79 min.



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Decimal fraction soil group A = 0.020
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.650
Decimal fraction soil group D = 0.330
[LOW DENSITY RESIDENTIAL                    ]
(1.0 DU/A or Less       )
Impervious value, Ai = 0.100
Sub-Area C Value = 0.375
Time of concentration =     8.79 min.
Rainfall intensity =      5.035(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.359  CA =     10.836
Subarea runoff =     20.143(CFS) for     10.780(Ac.)
Total runoff =     54.561(CFS)  Total area =      30.200(Ac.)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      109.000 to Point/Station      112.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
```



```
Upstream point/station elevation =   460.120(Ft.)
Downstream point/station elevation =   457.320(Ft.)
Pipe length  =   172.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    54.561(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    54.561(CFS)
Normal flow depth in pipe =   22.50(In.)
Flow top width inside pipe =   30.74(In.)
Critical Depth =   28.90(In.)
Pipe flow velocity =     12.65(Ft/s)
Travel time through pipe =    0.23 min.
Time of concentration (TC) =     9.02 min.



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      118.000 to Point/Station      112.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.440
Decimal fraction soil group D = 0.560
[LOW DENSITY RESIDENTIAL                    ]
(1.0 DU/A or Less       )
Impervious value, Ai = 0.100
Sub-Area C Value = 0.388
Time of concentration =     9.02 min.
Rainfall intensity =      4.953(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.362  CA =     12.384
Subarea runoff =      6.779(CFS) for      3.990(Ac.)
Total runoff =     61.341(CFS)  Total area =      34.190(Ac.)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      112.000 to Point/Station      112.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     34.190(Ac.)
Runoff from this stream =     61.341(CFS)
Time of concentration =    9.02 min.
Rainfall intensity =     4.953(In/Hr)
Summary of stream data:

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


1      581.016     17.54             3.225
2       61.341      9.02             4.953
Qmax(1) =
       1.000 *    1.000 *   581.016) +
       0.651 *    1.000 *    61.341) + =     620.958
```

```
Qmax(2) =
       1.000 *    0.514 *   581.016) +
       1.000 *    1.000 *    61.341) + =     360.101

Total of 2 streams to confluence:
Flow rates before confluence point:
     581.016      61.341
Maximum flow rates at confluence using above data:
      620.958      360.101
Area of streams before confluence:
      524.590       34.190
Results of confluence:
Total flow rate =    620.958(CFS)
Time of concentration =    17.537 min.
Effective stream area after confluence =    558.780(Ac.)




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      112.000 to Point/Station      113.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________________
Depth of flow =   4.989(Ft.), Average velocity =  43.678(Ft/s)
!!Warning: Water is above left or right bank elevations
    ******* Irregular Channel Data ***********
----------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              0.50
    2              1.50              0.00
    3              3.00              0.50
Manning's 'N' friction factor =   0.013
----------------------------------------------------------------------
Sub-Channel flow  =    620.958(CFS)
  '     '    flow top width =      3.000(Ft.)
  '     '    velocity=   43.678(Ft/s)
  '     '    area =     14.217(Sq.Ft)
  '     '    Froude number =     3.536

Upstream point elevation =   460.000(Ft.)
Downstream point elevation =   437.390(Ft.)
Flow length =  1149.000(Ft.)
Travel time  =    0.44 min.
Time of concentration =   17.98 min.
Depth of flow =   4.989(Ft.)
Average velocity =  43.678(Ft/s)
Total irregular channel flow =   620.958(CFS)
Irregular channel normal depth above invert elev. =   4.989(Ft.)
Average velocity of channel(s) =  43.678(Ft/s)
!!Warning: Water is above left or right bank elevations




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      113.000 to Point/Station      113.000
**** CONFLUENCE OF MINOR STREAMS ****
```



```
____________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =    558.780(Ac.)
Runoff from this stream =    620.958(CFS)
Time of concentration =   17.98 min.
Rainfall intensity =     3.174(In/Hr)




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      115.000 to Point/Station      116.000
**** INITIAL AREA EVALUATION ****
____________________________________________________________________________
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation =  862.000(Ft.)
Lowest elevation =  828.000(Ft.)
Elevation difference =   34.000(Ft.) Slope = 34.000 %
Top of Initial Area Slope adjusted by User to 30.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  30.00 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   4.34 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(  30.000^(1/3)]=   4.34
Calculated TC of    4.345 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      7.246(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.152(CFS)
Total initial stream area =        0.060(Ac.)




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      116.000 to Point/Station      117.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      8.216(CFS)
Depth of flow =   0.251(Ft.), Average velocity =   3.913(Ft/s)
    ******* Irregular Channel Data ***********
----------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              6.00
    2            200.00              0.00
    3            400.00              6.00
```

```
Manning's 'N' friction factor =   0.050
-----------------------------------------------------------------
Sub-Channel flow  =      8.216(CFS)
  '     '    flow top width =     16.733(Ft.)
  '     '    velocity=    3.913(Ft/s)
  '     '    area =      2.100(Sq.Ft)
  '     '    Froude number =     1.946

Upstream point elevation =   828.000(Ft.)
Downstream point elevation =   478.000(Ft.)
Flow length =  1268.000(Ft.)
Travel time  =    5.40 min.
Time of concentration =    9.75 min.
Depth of flow =   0.251(Ft.)
Average velocity =   3.913(Ft/s)
Total irregular channel flow =     8.216(CFS)
Irregular channel normal depth above invert elev. =   0.251(Ft.)
Average velocity of channel(s) =   3.913(Ft/s)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.150
Decimal fraction soil group D = 0.850
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.342
Rainfall intensity =      4.711(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.343  CA =      3.443
Subarea runoff =     16.066(CFS) for      9.990(Ac.)
Total runoff =     16.218(CFS)  Total area =      10.050(Ac.)
Depth of flow =   0.324(Ft.), Average velocity =   4.638(Ft/s)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      117.000 to Point/Station      119.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_________________________________________________________________________
Upstream point/station elevation =   478.000(Ft.)
Downstream point/station elevation =   469.300(Ft.)
Pipe length  =    60.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.218(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =    16.218(CFS)
Normal flow depth in pipe =    8.89(In.)
Flow top width inside pipe =   14.74(In.)
Critical depth could not be calculated.
Pipe flow velocity =     21.41(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =     9.79 min.



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
```



```
Process from Point/Station      119.000 to Point/Station      113.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
_________________________________________________________________________
Estimated mean flow rate at midpoint of channel =     47.275(CFS)
Depth of flow =   1.974(Ft.), Average velocity =   8.187(Ft/s)
    ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              3.00
    2             48.25              1.75
    3             50.00              0.00
    4             51.75              1.75
    5            100.00              3.00
Manning's 'N' friction factor =   0.013
-----------------------------------------------------------------
Sub-Channel flow  =     47.275(CFS)
  '     '    flow top width =     20.761(Ft.)
  '     '    velocity=    8.187(Ft/s)
  '     '    area =      5.775(Sq.Ft)
  '     '    Froude number =     2.735

Upstream point elevation =   469.300(Ft.)
Downstream point elevation =   437.390(Ft.)
Flow length =  1032.000(Ft.)
Travel time  =    2.10 min.
Time of concentration =   11.89 min.
Depth of flow =   1.974(Ft.)
Average velocity =   8.187(Ft/s)
Total irregular channel flow =    47.275(CFS)
Irregular channel normal depth above invert elev. =   1.974(Ft.)
Average velocity of channel(s) =   8.187(Ft/s)
 Adding area flow to channel
Decimal fraction soil group A = 0.230
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.760
Decimal fraction soil group D = 0.010
[MEDIUM DENSITY RESIDENTIAL                 ]
(4.3 DU/A or Less       )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.464
Rainfall intensity =      4.143(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.436  CA =     18.922
Subarea runoff =     62.180(CFS) for     33.340(Ac.)
Total runoff =     78.398(CFS)  Total area =      43.390(Ac.)
Depth of flow =   2.102(Ft.), Average velocity =   8.651(Ft/s)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      113.000 to Point/Station      113.000
**** CONFLUENCE OF MINOR STREAMS ****
_________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     43.390(Ac.)
Runoff from this stream =     78.398(CFS)
```

```
Time of concentration =   11.89 min.
Rainfall intensity =     4.143(In/Hr)
Summary of stream data:

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


1      620.958     17.98             3.174
2       78.398     11.89             4.143
Qmax(1) =
       1.000 *    1.000 *   620.958) +
       0.766 *    1.000 *    78.398) + =     681.022
Qmax(2) =
       1.000 *    0.662 *   620.958) +
       1.000 *    1.000 *    78.398) + =     489.262

Total of 2 streams to confluence:
Flow rates before confluence point:
     620.958      78.398
Maximum flow rates at confluence using above data:
      681.022      489.262
Area of streams before confluence:
      558.780       43.390
Results of confluence:
Total flow rate =    681.022(CFS)
Time of concentration =    17.975 min.
Effective stream area after confluence =    602.170(Ac.)
End of computations, total study area =         602.170 (Ac.)
```

EXISTING 200

```
        San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2004 Version 7.4

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
    Rational Hydrology Study        Date: 06/21/23
--------------------------------------------------------------------------
SINGING HILLS
EXISTING CONDITIONS
100 YEAR
200E100.rd3
--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

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


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour,  precipitation(inches) =  2.750
24 hour precipitation(inches) =  5.750
P6/P24 =    47.8%
San Diego hydrology manual 'C' values used




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      200.000 to Point/Station      201.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.250
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation =  804.000(Ft.)
Lowest elevation =  790.000(Ft.)
Elevation difference =   14.000(Ft.) Slope = 14.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  14.00 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   6.35 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.2500)*( 100.000^.5)/(  14.000^(1/3)]=   6.35
```



```
Rainfall intensity (I) =      6.212(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.250
Subarea runoff =      0.124(CFS)
Total initial stream area =        0.080(Ac.)




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________________
Estimated mean flow rate at midpoint of channel =    133.641(CFS)
Depth of flow =   2.378(Ft.), Average velocity =   9.457(Ft/s)
    ******* Irregular Channel Data ***********
--------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00             10.00
    2             25.00              0.00
    3             50.00             10.00
Manning's 'N' friction factor =   0.050
--------------------------------------------------------------------
Sub-Channel flow  =    133.641(CFS)
  '     '    flow top width =     11.888(Ft.)
  '     '    velocity=    9.457(Ft/s)
  '     '    area =     14.131(Sq.Ft)
  '     '    Froude number =     1.529

Upstream point elevation =   790.000(Ft.)
Downstream point elevation =   454.800(Ft.)
Flow length =  3776.000(Ft.)
Travel time  =    6.65 min.
Time of concentration =   13.00 min.
Depth of flow =   2.378(Ft.)
Average velocity =   9.457(Ft/s)
Total irregular channel flow =   133.641(CFS)
Irregular channel normal depth above invert elev. =   2.378(Ft.)
Average velocity of channel(s) =   9.457(Ft/s)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.780
Decimal fraction soil group C = 0.040
Decimal fraction soil group D = 0.180
[LOW DENSITY RESIDENTIAL                     ]
(2.9 DU/A or Less       )
Impervious value, Ai = 0.250
Sub-Area C Value = 0.426
Rainfall intensity =      3.912(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.426  CA =     68.316
Subarea runoff =    267.101(CFS) for    160.320(Ac.)
Total runoff =    267.225(CFS)  Total area =     160.400(Ac.)
Depth of flow =   3.083(Ft.), Average velocity =  11.246(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      203.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =   454.800(Ft.)
Downstream point/station elevation =   453.900(Ft.)
Pipe length  =    60.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   267.225(CFS)
Given pipe size =     36.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
    42.016(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      9.628(Ft.)
 Minor friction loss =     33.289(Ft.)  K-factor =   1.50
Pipe flow velocity =     37.80(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =    13.03 min.



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      204.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =   453.850(Ft.)
Downstream point/station elevation =   446.700(Ft.)
Pipe length  =   130.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   267.225(CFS)
Given pipe size =     54.00(In.)
Calculated individual pipe flow  =   267.225(CFS)
Normal flow depth in pipe =   29.51(In.)
Flow top width inside pipe =   53.77(In.)
Critical depth could not be calculated.
Pipe flow velocity =     30.06(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    13.10 min.



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      204.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =    160.400(Ac.)
Runoff from this stream =    267.225(CFS)
Time of concentration =   13.10 min.
Rainfall intensity =     3.893(In/Hr)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station      206.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
```



```
Decimal fraction soil group A = 0.270
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.730
[HIGH DENSITY RESIDENTIAL                ]
(43.0 DU/A or Less      )
Impervious value, Ai = 0.800
Sub-Area C Value = 0.782
Initial subarea total flow distance  =   90.000(Ft.)
Highest elevation =  480.000(Ft.)
Lowest elevation =  474.500(Ft.)
Elevation difference =    5.500(Ft.) Slope =  6.111 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 95.00 (Ft)
for the top area slope value of   6.11 %, in a development type of
 43.0 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration =   3.05 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7819)*(  95.000^.5)/(   6.110^(1/3)]=   3.05
Calculated TC of    3.053 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      7.246(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.782
Subarea runoff =      0.510(CFS)
Total initial stream area =        0.090(Ac.)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      206.000 to Point/Station      204.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =      4.216(CFS)
Depth of flow =   0.309(Ft.), Average velocity =   5.145(Ft/s)
    ******* Irregular Channel Data **********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              3.40
    2              0.25              3.00
    3             50.00              0.00
    4             50.25              0.40
Manning's 'N' friction factor =   0.013
------------------------------------------------------------------
Sub-Channel flow  =      4.216(CFS)
  '     '    flow top width =      5.310(Ft.)
  '     '    velocity=    5.146(Ft/s)
  '     '    area =      0.819(Sq.Ft)
  '     '    Froude number =     2.308

Upstream point elevation =   480.000(Ft.)
Downstream point elevation =   464.000(Ft.)
Flow length =   625.000(Ft.)
Travel time  =    2.02 min.
Time of concentration =    5.08 min.
Depth of flow =   0.309(Ft.)
```

```
Average velocity =   5.145(Ft/s)
Total irregular channel flow =     4.216(CFS)
Irregular channel normal depth above invert elev. =   0.309(Ft.)
Average velocity of channel(s) =   5.145(Ft/s)
 Adding area flow to channel
Decimal fraction soil group A = 0.550
Decimal fraction soil group B = 0.430
Decimal fraction soil group C = 0.020
Decimal fraction soil group D = 0.000
[HIGH DENSITY RESIDENTIAL                    ]
(43.0 DU/A or Less      )
Impervious value, Ai = 0.800
Sub-Area C Value = 0.765
Rainfall intensity =      7.174(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.766  CA =      1.095
Subarea runoff =      7.347(CFS) for      1.340(Ac.)
Total runoff =      7.856(CFS)  Total area =       1.430(Ac.)
Depth of flow =   0.390(Ft.), Average velocity =   6.012(Ft/s)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      207.000 to Point/Station      204.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.850
Decimal fraction soil group D = 0.150
[HIGH DENSITY RESIDENTIAL                    ]
(43.0 DU/A or Less      )
Impervious value, Ai = 0.800
Sub-Area C Value = 0.782
Time of concentration =     5.08 min.
Rainfall intensity =      7.174(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.776  CA =      2.924
Subarea runoff =     13.120(CFS) for      2.340(Ac.)
Total runoff =     20.976(CFS)  Total area =       3.770(Ac.)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      204.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      3.770(Ac.)
Runoff from this stream =     20.976(CFS)
Time of concentration =    5.08 min.
Rainfall intensity =     7.174(In/Hr)
Summary of stream data:

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



```
1      267.225     13.10             3.893
2       20.976      5.08             7.174
Qmax(1) =
       1.000 *    1.000 *   267.225) +
       0.543 *    1.000 *    20.976) + =     278.606
Qmax(2) =
       1.000 *    0.388 *   267.225) +
       1.000 *    1.000 *    20.976) + =     124.534

Total of 2 streams to confluence:
Flow rates before confluence point:
     267.225      20.976
Maximum flow rates at confluence using above data:
      278.606      124.534
Area of streams before confluence:
      160.400        3.770
Results of confluence:
Total flow rate =    278.606(CFS)
Time of concentration =    13.101 min.
Effective stream area after confluence =    164.170(Ac.)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      208.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________________
Depth of flow =   2.307(Ft.), Average velocity =   8.947(Ft/s)
!!Warning: Water is above left or right bank elevations
    ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              1.50
    2             10.00              0.00
    3             20.00              1.50
Manning's 'N' friction factor =   0.050
------------------------------------------------------------------
Sub-Channel flow  =    278.606(CFS)
  '     '    flow top width =     20.000(Ft.)
  '     '    velocity=    8.947(Ft/s)
  '     '    area =     31.140(Sq.Ft)
  '     '    Froude number =     1.264

Upstream point elevation =   464.000(Ft.)
Downstream point elevation =   443.000(Ft.)
Flow length =   412.000(Ft.)
Travel time  =    0.77 min.
Time of concentration =   13.87 min.
Depth of flow =   2.307(Ft.)
Average velocity =   8.947(Ft/s)
Total irregular channel flow =   278.606(CFS)
Irregular channel normal depth above invert elev. =   2.307(Ft.)
Average velocity of channel(s) =   8.947(Ft/s)
!!Warning: Water is above left or right bank elevations
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      208.000 to Point/Station      208.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =    164.170(Ac.)
Runoff from this stream =    278.606(CFS)
Time of concentration =   13.87 min.
Rainfall intensity =     3.752(In/Hr)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      209.000 to Point/Station      210.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
[UNDISTURBED NATURAL TERRAIN                  ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.300
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation =  468.000(Ft.)
Lowest elevation =  455.000(Ft.)
Elevation difference =   13.000(Ft.) Slope = 13.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  13.00 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   6.12 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3000)*( 100.000^.5)/(  13.000^(1/3)]=   6.12
Rainfall intensity (I) =      6.357(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.300
Subarea runoff =      0.248(CFS)
Total initial stream area =        0.130(Ac.)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      210.000 to Point/Station      208.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =      4.734(CFS)
Depth of flow =   0.239(Ft.), Average velocity =   0.808(Ft/s)
    ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
```



```
Point number      'X' coordinate     'Y' coordinate
    1              0.00              1.25
    2            150.00              0.00
    3            300.00              1.75
Manning's 'N' friction factor =   0.050
------------------------------------------------------------------
Sub-Channel flow  =      4.735(CFS)
  '     '    flow top width =     49.092(Ft.)
  '     '    velocity=    0.808(Ft/s)
  '     '    area =      5.858(Sq.Ft)
  '     '    Froude number =     0.412

Upstream point elevation =   455.000(Ft.)
Downstream point elevation =   443.000(Ft.)
Flow length =   953.000(Ft.)
Travel time  =   19.65 min.
Time of concentration =   25.78 min.
Depth of flow =   0.239(Ft.)
Average velocity =   0.808(Ft/s)
Total irregular channel flow =     4.734(CFS)
Irregular channel normal depth above invert elev. =   0.239(Ft.)
Average velocity of channel(s) =   0.808(Ft/s)
 Adding area flow to channel
Decimal fraction soil group A = 0.850
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.150
Decimal fraction soil group D = 0.000
[LOW DENSITY RESIDENTIAL                      ]
(1.0 DU/A or Less       )
Impervious value, Ai = 0.100
Sub-Area C Value = 0.284
Rainfall intensity =      2.516(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.284  CA =      3.639
Subarea runoff =      8.908(CFS) for     12.700(Ac.)
Total runoff =      9.156(CFS)  Total area =      12.830(Ac.)
Depth of flow =   0.306(Ft.), Average velocity =   0.953(Ft/s)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      208.000 to Point/Station      208.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     12.830(Ac.)
Runoff from this stream =      9.156(CFS)
Time of concentration =   25.78 min.
Rainfall intensity =     2.516(In/Hr)
Summary of stream data:

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


1      278.606     13.87             3.752
2        9.156     25.78             2.516
```

```
Qmax(1) =
       1.000 *    1.000 *   278.606) +
       1.000 *    0.538 *     9.156) + =     283.533
Qmax(2) =
       0.670 *    1.000 *   278.606) +
       1.000 *    1.000 *     9.156) + =     195.957

Total of 2 streams to confluence:
Flow rates before confluence point:
     278.606       9.156
Maximum flow rates at confluence using above data:
      283.533      195.957
Area of streams before confluence:
      164.170       12.830
Results of confluence:
Total flow rate =    283.533(CFS)
Time of concentration =    13.869 min.
Effective stream area after confluence =    177.000(Ac.)
End of computations, total study area =         177.000 (Ac.)
```

APPENDIX 3

Proposed Conditions Rational Method Computer Output

PROPOSED 1000

```
        San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2004 Version 7.4

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
    Rational Hydrology Study        Date: 06/23/23
--------------------------------------------------------------------------
SINGING HILLS
PROPOSED CONDITIONS
100 YEAR
1000E100.rd3
--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

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


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour,  precipitation(inches) =  2.750
24 hour precipitation(inches) =  5.750
P6/P24 =    47.8%
San Diego hydrology manual 'C' values used




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      100.000 to Point/Station      101.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
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
[UNDISTURBED NATURAL TERRAIN                  ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation = 1658.000(Ft.)
Lowest elevation = 1640.000(Ft.)
Elevation difference =   18.000(Ft.) Slope = 18.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  18.00 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   5.15 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(  18.000^(1/3)]=   5.15
```



```
Rainfall intensity (I) =      7.108(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.224(CFS)
Total initial stream area =        0.090(Ac.)




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________________
Estimated mean flow rate at midpoint of channel =     78.183(CFS)
Depth of flow =   1.383(Ft.), Average velocity =   9.418(Ft/s)
    ******* Irregular Channel Data ***********
--------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00            124.00
    2            400.00             74.00
    3            650.00             50.00
    4            900.00              0.00
    5           1150.00             68.00
    6           1400.00            132.00
    7           1800.00            192.00
Manning's 'N' friction factor =   0.050
--------------------------------------------------------------------
Sub-Channel flow  =     78.183(CFS)
  '     '    flow top width =     12.002(Ft.)
  '     '    velocity=    9.418(Ft/s)
  '     '    area =      8.301(Sq.Ft)
  '     '    Froude number =     1.996

Upstream point elevation =  1640.000(Ft.)
Downstream point elevation =   942.000(Ft.)
Flow length =  4103.800(Ft.)
Travel time  =    7.26 min.
Time of concentration =   12.41 min.
Depth of flow =   1.383(Ft.)
Average velocity =   9.418(Ft/s)
Total irregular channel flow =    78.183(CFS)
Irregular channel normal depth above invert elev. =   1.383(Ft.)
Average velocity of channel(s) =   9.418(Ft/s)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.110
Decimal fraction soil group C = 0.280
Decimal fraction soil group D = 0.610
[UNDISTURBED NATURAL TERRAIN                  ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.325
Rainfall intensity =      4.030(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.325  CA =     38.720
Subarea runoff =    155.832(CFS) for    119.040(Ac.)
Total runoff =    156.056(CFS)  Total area =     119.130(Ac.)
Depth of flow =   1.793(Ft.), Average velocity =  11.195(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      102.000 to Point/Station      104.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
____________________________________________________________________
Estimated mean flow rate at midpoint of channel =    328.194(CFS)
Depth of flow =   2.835(Ft.), Average velocity =  12.738(Ft/s)
    ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00            418.00
    2            350.00            218.00
    3            600.00             88.00
    4            850.00              0.00
    5           1100.00             70.00
    6           1350.00            116.00
    7           1855.00            284.00
Manning's 'N' friction factor =   0.050
------------------------------------------------------------------
Sub-Channel flow  =    328.194(CFS)
  '     '    flow top width =     18.178(Ft.)
  '     '    velocity=   12.738(Ft/s)
  '     '    area =     25.765(Sq.Ft)
  '     '    Froude number =     1.885

Upstream point elevation =   942.000(Ft.)
Downstream point elevation =   482.630(Ft.)
Flow length =  3740.000(Ft.)
Travel time  =    4.89 min.
Time of concentration =   17.31 min.
Depth of flow =   2.835(Ft.)
Average velocity =  12.738(Ft/s)
Total irregular channel flow =   328.194(CFS)
Irregular channel normal depth above invert elev. =   2.835(Ft.)
Average velocity of channel(s) =  12.738(Ft/s)
 Adding area flow to channel
Decimal fraction soil group A = 0.030
Decimal fraction soil group B = 0.050
Decimal fraction soil group C = 0.120
Decimal fraction soil group D = 0.800
[UNDISTURBED NATURAL TERRAIN                  ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.334
Rainfall intensity =      3.253(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.332  CA =    153.794
Subarea runoff =    344.205(CFS) for    344.020(Ac.)
Total runoff =    500.260(CFS)  Total area =     463.150(Ac.)
Depth of flow =   3.320(Ft.), Average velocity =  14.153(Ft/s)
```



```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      104.000
**** SUBAREA FLOW ADDITION ****
____________________________________________________________________
Decimal fraction soil group A = 0.060
Decimal fraction soil group B = 0.320
Decimal fraction soil group C = 0.020
Decimal fraction soil group D = 0.600
[LOW DENSITY RESIDENTIAL                     ]
(1.0 DU/A or Less       )
Impervious value, Ai = 0.100
Sub-Area C Value = 0.372
Time of concentration =    17.31 min.
Rainfall intensity =      3.253(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.335  CA =    170.075
Subarea runoff =     52.959(CFS) for     43.790(Ac.)
Total runoff =    553.219(CFS)  Total area =     506.940(Ac.)

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      110.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
____________________________________________________________________
Upstream point/station elevation =   482.630(Ft.)
Downstream point/station elevation =   480.100(Ft.)
Pipe length  =    62.00(Ft.)   Manning's N = 0.013
No. of pipes = 2  Required pipe flow  =   553.219(CFS)
Elliptical pipe dimensions:   Ratio A/B =   1.636
 Height B =    44.00(In.)     Width A =    72.00(In.)
Calculated individual pipe flow  =   276.610(CFS)
Normal flow depth in pipe =   25.31(In.)
Flow top width inside pipe =   71.18(In.)
Critical depth could not be calculated.
Pipe flow velocity =     26.80(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =    17.35 min.

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      110.000 to Point/Station      111.000
**** SUBAREA FLOW ADDITION ****
____________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.270
Decimal fraction soil group C = 0.060
Decimal fraction soil group D = 0.670
[MEDIUM DENSITY RESIDENTIAL                  ]
(4.3 DU/A or Less       )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.499
Time of concentration =    17.35 min.
Rainfall intensity =      3.248(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
```

```
(Q=KCIA) is C = 0.341  CA =    178.877
Subarea runoff =     27.797(CFS) for     17.650(Ac.)
Total runoff =    581.016(CFS)  Total area =     524.590(Ac.)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      111.000 to Point/Station      112.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
________________________________________________________________________
Upstream point/station elevation =   469.000(Ft.)
Downstream point/station elevation =   457.320(Ft.)
Pipe length  =   285.00(Ft.)   Manning's N = 0.013
No. of pipes = 3  Required pipe flow  =   581.016(CFS)
Given pipe size =     60.00(In.)
Calculated individual pipe flow  =   193.672(CFS)
Normal flow depth in pipe =   25.17(In.)
Flow top width inside pipe =   59.22(In.)
Critical Depth =   47.72(In.)
Pipe flow velocity =     24.79(Ft/s)
Travel time through pipe =    0.19 min.
Time of concentration (TC) =    17.54 min.



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      112.000 to Point/Station      112.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =    524.590(Ac.)
Runoff from this stream =    581.016(CFS)
Time of concentration =   17.54 min.
Rainfall intensity =     3.225(In/Hr)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      105.000 to Point/Station      106.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
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
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation = 1184.000(Ft.)
Lowest elevation = 1142.000(Ft.)
Elevation difference =   42.000(Ft.) Slope = 42.000 %
Top of Initial Area Slope adjusted by User to 30.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
```



```
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  30.00 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   4.34 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(  30.000^(1/3)]=   4.34
Calculated TC of    4.345 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      7.246(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.254(CFS)
Total initial stream area =        0.100(Ac.)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      106.000 to Point/Station      107.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =     17.384(CFS)
Depth of flow =   0.964(Ft.), Average velocity =   8.987(Ft/s)
    ******* Irregular Channel Data **********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00            185.00
    2            275.00             36.00
    3            350.00              0.00
    4            425.00             36.00
    5            465.00             46.00
Manning's 'N' friction factor =   0.050
------------------------------------------------------------------
Sub-Channel flow  =     17.384(CFS)
  '      '    flow top width =      4.015(Ft.)
  '      '    velocity=    8.987(Ft/s)
  '      '    area =      1.934(Sq.Ft)
  '      '    Froude number =     2.282

Upstream point elevation =  1142.000(Ft.)
Downstream point elevation =   487.000(Ft.)
Flow length =  2356.000(Ft.)
Travel time  =    4.37 min.
Time of concentration =    8.71 min.
Depth of flow =   0.964(Ft.)
Average velocity =   8.987(Ft/s)
Total irregular channel flow =    17.384(CFS)
Irregular channel normal depth above invert elev. =   0.964(Ft.)
Average velocity of channel(s) =   8.987(Ft/s)
 Adding area flow to channel
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
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
```

```
Sub-Area C Value = 0.350
Rainfall intensity =      5.064(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      6.797
Subarea runoff =     34.165(CFS) for     19.320(Ac.)
Total runoff =     34.418(CFS)  Total area =      19.420(Ac.)
Depth of flow =   1.245(Ft.), Average velocity =  10.661(Ft/s)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      107.000 to Point/Station      108.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =   487.000(Ft.)
Downstream point/station elevation =   480.910(Ft.)
Pipe length  =    90.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    34.418(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
    12.405(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      9.659(Ft.)
 Minor friction loss =      8.836(Ft.)  K-factor =   1.50
Pipe flow velocity =     19.48(Ft/s)
Travel time through pipe =    0.08 min.
Time of concentration (TC) =     8.79 min.



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      108.000 to Point/Station      109.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Decimal fraction soil group A = 0.020
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.650
Decimal fraction soil group D = 0.330
[LOW DENSITY RESIDENTIAL                    ]
(1.0 DU/A or Less       )
Impervious value, Ai = 0.100
Sub-Area C Value = 0.375
Time of concentration =     8.79 min.
Rainfall intensity =      5.035(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.359  CA =     10.836
Subarea runoff =     20.143(CFS) for     10.780(Ac.)
Total runoff =     54.561(CFS)  Total area =      30.200(Ac.)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      109.000 to Point/Station      112.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
```



```
Upstream point/station elevation =   460.120(Ft.)
Downstream point/station elevation =   457.320(Ft.)
Pipe length  =   172.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    54.561(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    54.561(CFS)
Normal flow depth in pipe =   22.50(In.)
Flow top width inside pipe =   30.74(In.)
Critical Depth =   28.90(In.)
Pipe flow velocity =     12.65(Ft/s)
Travel time through pipe =    0.23 min.
Time of concentration (TC) =     9.02 min.



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      118.000 to Point/Station      112.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.440
Decimal fraction soil group D = 0.560
[LOW DENSITY RESIDENTIAL                    ]
(1.0 DU/A or Less       )
Impervious value, Ai = 0.100
Sub-Area C Value = 0.388
Time of concentration =     9.02 min.
Rainfall intensity =      4.953(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.362  CA =     12.384
Subarea runoff =      6.779(CFS) for      3.990(Ac.)
Total runoff =     61.341(CFS)  Total area =      34.190(Ac.)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1000.000 to Point/Station      112.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
[MEDIUM DENSITY RESIDENTIAL                 ]
(4.3 DU/A or Less       )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.480
Time of concentration =     9.02 min.
Rainfall intensity =      4.953(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.391  CA =     17.607
Subarea runoff =     25.867(CFS) for     10.880(Ac.)
Total runoff =     87.208(CFS)  Total area =      45.070(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      112.000 to Point/Station      112.000
**** CONFLUENCE OF MINOR STREAMS ****
_____________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     45.070(Ac.)
Runoff from this stream =     87.208(CFS)
Time of concentration =    9.02 min.
Rainfall intensity =     4.953(In/Hr)
Summary of stream data:

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


1      581.016     17.54             3.225
2       87.208      9.02             4.953
Qmax(1) =
       1.000 *    1.000 *   581.016) +
       0.651 *    1.000 *    87.208) + =     637.802
Qmax(2) =
       1.000 *    0.514 *   581.016) +
       1.000 *    1.000 *    87.208) + =     385.968

Total of 2 streams to confluence:
Flow rates before confluence point:
     581.016      87.208
Maximum flow rates at confluence using above data:
      637.802      385.968
Area of streams before confluence:
      524.590       45.070
Results of confluence:
Total flow rate =    637.802(CFS)
Time of concentration =    17.537 min.
Effective stream area after confluence =    569.660(Ac.)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      112.000 to Point/Station      113.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
_____________________________________________________________________________
Upstream point/station elevation =   455.000(Ft.)
Downstream point/station elevation =   437.800(Ft.)
Pipe length  =  1012.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   637.802(CFS)
Nearest computed pipe diameter  =     78.00(In.)
Calculated individual pipe flow  =   637.802(CFS)
Normal flow depth in pipe =   59.72(In.)
Flow top width inside pipe =   66.08(In.)
Critical depth could not be calculated.
Pipe flow velocity =     23.40(Ft/s)
Travel time through pipe =    0.72 min.
Time of concentration (TC) =    18.26 min.
```



```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      113.000 to Point/Station      113.000
**** CONFLUENCE OF MINOR STREAMS ****
_____________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =    569.660(Ac.)
Runoff from this stream =    637.802(CFS)
Time of concentration =   18.26 min.
Rainfall intensity =     3.142(In/Hr)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      115.000 to Point/Station      116.000
**** INITIAL AREA EVALUATION ****
_____________________________________________________________________________
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
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation =  862.000(Ft.)
Lowest elevation =  828.000(Ft.)
Elevation difference =   34.000(Ft.) Slope = 34.000 %
Top of Initial Area Slope adjusted by User to 30.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  30.00 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   4.34 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(  30.000^(1/3)]=   4.34
Calculated TC of    4.345 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      7.246(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.152(CFS)
Total initial stream area =        0.060(Ac.)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      116.000 to Point/Station      117.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
_____________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      8.216(CFS)
Depth of flow =   0.251(Ft.), Average velocity =   3.913(Ft/s)
    ******* Irregular Channel Data ***********
```

```
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              6.00
    2            200.00              0.00
    3            400.00              6.00
Manning's 'N' friction factor =   0.050
------------------------------------------------------------------
Sub-Channel flow  =      8.216(CFS)
  '     '    flow top width =     16.733(Ft.)
  '     '    velocity=    3.913(Ft/s)
  '     '    area =      2.100(Sq.Ft)
  '     '    Froude number =     1.946

Upstream point elevation =   828.000(Ft.)
Downstream point elevation =   478.000(Ft.)
Flow length =  1268.000(Ft.)
Travel time  =    5.40 min.
Time of concentration =    9.75 min.
Depth of flow =   0.251(Ft.)
Average velocity =   3.913(Ft/s)
Total irregular channel flow =     8.216(CFS)
Irregular channel normal depth above invert elev. =   0.251(Ft.)
Average velocity of channel(s) =   3.913(Ft/s)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.150
Decimal fraction soil group D = 0.850
[UNDISTURBED NATURAL TERRAIN                  ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.342
Rainfall intensity =      4.711(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.343  CA =      3.443
Subarea runoff =     16.066(CFS) for      9.990(Ac.)
Total runoff =     16.218(CFS)  Total area =      10.050(Ac.)
Depth of flow =   0.324(Ft.), Average velocity =   4.638(Ft/s)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      117.000 to Point/Station      119.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   478.000(Ft.)
Downstream point/station elevation =   469.300(Ft.)
Pipe length  =    60.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.218(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =    16.218(CFS)
Normal flow depth in pipe =    8.89(In.)
Flow top width inside pipe =   14.74(In.)
Critical depth could not be calculated.
Pipe flow velocity =     21.41(Ft/s)
Travel time through pipe =    0.05 min.
```



```
Time of concentration (TC) =     9.79 min.



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      119.000 to Point/Station      113.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =     26.522(CFS)
Depth of flow =   1.521(Ft.), Average velocity =  11.460(Ft/s)
    ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              3.00
    2             48.25              1.75
    3             50.00              0.00
    4             51.75              1.75
    5            100.00              3.00
Manning's 'N' friction factor =   0.013
------------------------------------------------------------------
Sub-Channel flow  =     26.522(CFS)
  '     '    flow top width =      3.043(Ft.)
  '     '    velocity=   11.460(Ft/s)
  '     '    area =      2.314(Sq.Ft)
  '     '    Froude number =     2.316

Upstream point elevation =   469.300(Ft.)
Downstream point elevation =   442.000(Ft.)
Flow length =  1188.000(Ft.)
Travel time  =    1.73 min.
Time of concentration =   11.52 min.
Depth of flow =   1.521(Ft.)
Average velocity =  11.460(Ft/s)
Total irregular channel flow =    26.522(CFS)
Irregular channel normal depth above invert elev. =   1.521(Ft.)
Average velocity of channel(s) =  11.460(Ft/s)
 Adding area flow to channel
Decimal fraction soil group A = 0.400
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.590
Decimal fraction soil group D = 0.010
[MEDIUM DENSITY RESIDENTIAL                  ]
(7.3 DU/A or Less       )
Impervious value, Ai = 0.400
Sub-Area C Value = 0.516
Rainfall intensity =      4.229(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.430  CA =      8.724
Subarea runoff =     20.679(CFS) for     10.230(Ac.)
Total runoff =     36.897(CFS)  Total area =      20.280(Ac.)
Depth of flow =   1.722(Ft.), Average velocity =  12.446(Ft/s)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
```

```
Process from Point/Station     1001.000 to Point/Station      113.000
**** SUBAREA FLOW ADDITION ****
____________________________________________________________________
Decimal fraction soil group A = 0.580
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.420
Decimal fraction soil group D = 0.000
[LOW DENSITY RESIDENTIAL                    ]
(1.0 DU/A or Less       )
Impervious value, Ai = 0.100
Sub-Area C Value = 0.308
Time of concentration =    11.52 min.
Rainfall intensity =      4.229(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.393  CA =     11.491
Subarea runoff =     11.703(CFS) for      8.990(Ac.)
Total runoff =     48.600(CFS)  Total area =      29.270(Ac.)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1002.000 to Point/Station      113.000
**** SUBAREA FLOW ADDITION ****
____________________________________________________________________
Decimal fraction soil group A = 0.120
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.880
Decimal fraction soil group D = 0.000
[MEDIUM DENSITY RESIDENTIAL                 ]
(4.3 DU/A or Less       )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.472
Time of concentration =    11.52 min.
Rainfall intensity =      4.229(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.409  CA =     15.033
Subarea runoff =     14.979(CFS) for      7.510(Ac.)
Total runoff =     63.579(CFS)  Total area =      36.780(Ac.)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      113.000 to Point/Station      113.000
**** CONFLUENCE OF MINOR STREAMS ****
____________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     36.780(Ac.)
Runoff from this stream =     63.579(CFS)
Time of concentration =   11.52 min.
Rainfall intensity =     4.229(In/Hr)
Summary of stream data:

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



```
1      637.802     18.26             3.142
2       63.579     11.52             4.229
Qmax(1) =
       1.000 *    1.000 *   637.802) +
       0.743 *    1.000 *    63.579) + =     685.043
Qmax(2) =
       1.000 *    0.631 *   637.802) +
       1.000 *    1.000 *    63.579) + =     466.024

Total of 2 streams to confluence:
Flow rates before confluence point:
     637.802      63.579
Maximum flow rates at confluence using above data:
      685.043      466.024
Area of streams before confluence:
      569.660       36.780
Results of confluence:
Total flow rate =    685.043(CFS)
Time of concentration =    18.258 min.
Effective stream area after confluence =    606.440(Ac.)
End of computations, total study area =         606.440 (Ac.)
```

PROPOSED 2000

```
        San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2004 Version 7.4

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
    Rational Hydrology Study        Date: 06/23/23
--------------------------------------------------------------------------
SINGING HILLS
PROPOSED CONDITIONS
100 YEAR
2000E100.rd3
--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

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


Program License Serial Number 4049

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour,  precipitation(inches) =  2.750
24 hour precipitation(inches) =  5.750
P6/P24 =    47.8%
San Diego hydrology manual 'C' values used




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      200.000 to Point/Station      201.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.250
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation =  804.000(Ft.)
Lowest elevation =  790.000(Ft.)
Elevation difference =   14.000(Ft.) Slope = 14.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  14.00 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   6.35 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.2500)*( 100.000^.5)/(  14.000^(1/3)]=   6.35
```



```
Rainfall intensity (I) =      6.212(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.250
Subarea runoff =      0.124(CFS)
Total initial stream area =        0.080(Ac.)




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________________
Estimated mean flow rate at midpoint of channel =    133.641(CFS)
Depth of flow =   2.378(Ft.), Average velocity =   9.457(Ft/s)
    ******* Irregular Channel Data ***********
--------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00             10.00
    2             25.00              0.00
    3             50.00             10.00
Manning's 'N' friction factor =   0.050
--------------------------------------------------------------------
Sub-Channel flow  =    133.641(CFS)
  '     '    flow top width =     11.888(Ft.)
  '     '    velocity=    9.457(Ft/s)
  '     '    area =     14.131(Sq.Ft)
  '     '    Froude number =     1.529

Upstream point elevation =   790.000(Ft.)
Downstream point elevation =   454.800(Ft.)
Flow length =  3776.000(Ft.)
Travel time  =    6.65 min.
Time of concentration =   13.00 min.
Depth of flow =   2.378(Ft.)
Average velocity =   9.457(Ft/s)
Total irregular channel flow =   133.641(CFS)
Irregular channel normal depth above invert elev. =   2.378(Ft.)
Average velocity of channel(s) =   9.457(Ft/s)
 Adding area flow to channel
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.780
Decimal fraction soil group C = 0.040
Decimal fraction soil group D = 0.180
[LOW DENSITY RESIDENTIAL                     ]
(2.9 DU/A or Less       )
Impervious value, Ai = 0.250
Sub-Area C Value = 0.426
Rainfall intensity =      3.912(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.426  CA =     68.316
Subarea runoff =    267.101(CFS) for    160.320(Ac.)
Total runoff =    267.225(CFS)  Total area =     160.400(Ac.)
Depth of flow =   3.083(Ft.), Average velocity =  11.246(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      203.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =   454.800(Ft.)
Downstream point/station elevation =   453.900(Ft.)
Pipe length  =    60.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   267.225(CFS)
Given pipe size =     36.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
    42.016(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      9.628(Ft.)
 Minor friction loss =     33.289(Ft.)  K-factor =   1.50
Pipe flow velocity =     37.80(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =    13.03 min.



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      204.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =   453.850(Ft.)
Downstream point/station elevation =   446.700(Ft.)
Pipe length  =   130.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   267.225(CFS)
Given pipe size =     54.00(In.)
Calculated individual pipe flow  =   267.225(CFS)
Normal flow depth in pipe =   29.51(In.)
Flow top width inside pipe =   53.77(In.)
Critical depth could not be calculated.
Pipe flow velocity =     30.06(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    13.10 min.



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      204.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =    160.400(Ac.)
Runoff from this stream =    267.225(CFS)
Time of concentration =   13.10 min.
Rainfall intensity =     3.893(In/Hr)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      205.000 to Point/Station      206.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
```



```
Decimal fraction soil group A = 0.270
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.730
[HIGH DENSITY RESIDENTIAL                ]
(43.0 DU/A or Less      )
Impervious value, Ai = 0.800
Sub-Area C Value = 0.782
Initial subarea total flow distance  =   90.000(Ft.)
Highest elevation =  480.000(Ft.)
Lowest elevation =  474.500(Ft.)
Elevation difference =    5.500(Ft.) Slope =  6.111 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 95.00 (Ft)
for the top area slope value of   6.11 %, in a development type of
 43.0 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration =   3.05 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7819)*(  95.000^.5)/(   6.110^(1/3)]=   3.05
Calculated TC of    3.053 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      7.246(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.782
Subarea runoff =      0.510(CFS)
Total initial stream area =        0.090(Ac.)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      206.000 to Point/Station      204.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
------------------------------------------------------------------------------
Estimated mean flow rate at midpoint of channel =      4.216(CFS)
Depth of flow =   0.309(Ft.), Average velocity =   5.145(Ft/s)
    ******* Irregular Channel Data **********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              3.40
    2              0.25              3.00
    3             50.00              0.00
    4             50.25              0.40
Manning's 'N' friction factor =   0.013
------------------------------------------------------------------
Sub-Channel flow  =      4.216(CFS)
  '     '    flow top width =      5.310(Ft.)
  '     '    velocity=    5.146(Ft/s)
  '     '    area =      0.819(Sq.Ft)
  '     '    Froude number =     2.308

Upstream point elevation =   480.000(Ft.)
Downstream point elevation =   464.000(Ft.)
Flow length =   625.000(Ft.)
Travel time  =    2.02 min.
Time of concentration =    5.08 min.
Depth of flow =   0.309(Ft.)
```

```
Average velocity =   5.145(Ft/s)
Total irregular channel flow =     4.216(CFS)
Irregular channel normal depth above invert elev. =   0.309(Ft.)
Average velocity of channel(s) =   5.145(Ft/s)
 Adding area flow to channel
Decimal fraction soil group A = 0.550
Decimal fraction soil group B = 0.430
Decimal fraction soil group C = 0.020
Decimal fraction soil group D = 0.000
[HIGH DENSITY RESIDENTIAL                    ]
(43.0 DU/A or Less      )
Impervious value, Ai = 0.800
Sub-Area C Value = 0.765
Rainfall intensity =      7.174(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.766  CA =      1.095
Subarea runoff =      7.347(CFS) for      1.340(Ac.)
Total runoff =      7.856(CFS)  Total area =       1.430(Ac.)
Depth of flow =   0.390(Ft.), Average velocity =   6.012(Ft/s)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      207.000 to Point/Station      204.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
Decimal fraction soil group A = 0.140
Decimal fraction soil group B = 0.860
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
[MEDIUM DENSITY RESIDENTIAL                  ]
(4.3 DU/A or Less       )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.444
Time of concentration =     5.08 min.
Rainfall intensity =      7.174(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.569  CA =      2.104
Subarea runoff =      7.237(CFS) for      2.270(Ac.)
Total runoff =     15.094(CFS)  Total area =       3.700(Ac.)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2001.000 to Point/Station      204.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
Decimal fraction soil group A = 0.970
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.030
Decimal fraction soil group D = 0.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.203
Time of concentration =     5.08 min.
```



```
Rainfall intensity =      7.174(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.313  CA =      3.852
Subarea runoff =     12.540(CFS) for      8.610(Ac.)
Total runoff =     27.633(CFS)  Total area =      12.310(Ac.)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      204.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =     12.310(Ac.)
Runoff from this stream =     27.633(CFS)
Time of concentration =    5.08 min.
Rainfall intensity =     7.174(In/Hr)
Summary of stream data:

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


1      267.225     13.10             3.893
2       27.633      5.08             7.174
Qmax(1) =
       1.000 *    1.000 *   267.225) +
       0.543 *    1.000 *    27.633) + =     282.218
Qmax(2) =
       1.000 *    0.388 *   267.225) +
       1.000 *    1.000 *    27.633) + =     131.191

Total of 2 streams to confluence:
Flow rates before confluence point:
     267.225      27.633
Maximum flow rates at confluence using above data:
      282.218      131.191
Area of streams before confluence:
      160.400       12.310
Results of confluence:
Total flow rate =    282.218(CFS)
Time of concentration =    13.101 min.
Effective stream area after confluence =    172.710(Ac.)



++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station     2000.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Depth of flow =   2.668(Ft.), Average velocity =   4.627(Ft/s)
    ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              3.50
```

```
      2             50.00              0.00
      3             70.00              7.00
Manning's 'N' friction factor =   0.050
-----------------------------------------------------------------
Sub-Channel flow  =    282.218(CFS)
  '     '    flow top width =     45.729(Ft.)
  '     '    velocity=    4.627(Ft/s)
  '     '    area =     60.991(Sq.Ft)
  '     '    Froude number =     0.706

Upstream point elevation =   446.270(Ft.)
Downstream point elevation =   435.920(Ft.)
Flow length =   617.000(Ft.)
Travel time  =    2.22 min.
Time of concentration =   15.32 min.
Depth of flow =   2.668(Ft.)
Average velocity =   4.627(Ft/s)
Total irregular channel flow =   282.218(CFS)
Irregular channel normal depth above invert elev. =   2.668(Ft.)
Average velocity of channel(s) =   4.627(Ft/s)
End of computations, total study area =         172.710 (Ac.)
```

APPENDIX 4

Preliminary Hydraulic/Detention Calculations

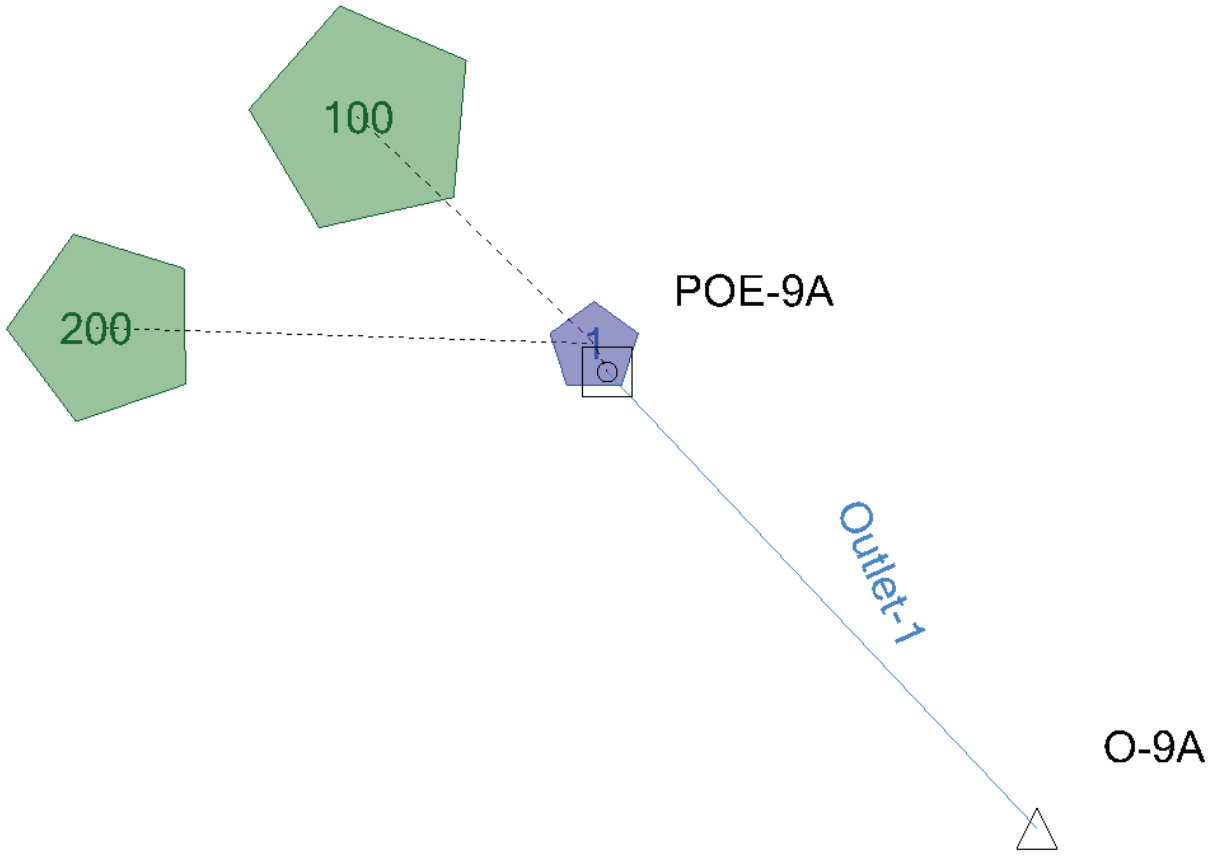
POND PACK

Existing

Project Summary	
Title	Existing
Engineer	PDC
Company	PDC
Date	6/21/2023

Notes

Table of Contents


100
200
POE-9A
Outlet-1
O-9A

Existing

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft³/s)
100	EX10	0	48.821	252.000	681.00
200	EX10	0	17.281	252.000	283.53

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft³/s)
O-9A	EX10	0	66.101	262.000	468.02

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (min)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
1 (IN)	EX10	0	66.101	252.000	964.53	(N/A)	(N/A)
1 (OUT)	EX10	0	66.101	262.000	468.02	444.53	16.069

Existing

Subsection: Read Hydrograph
Label: 100
Scenario: EX10

Return Event: 100 years
Storm Event:

Peak Discharge	681.00 ft³/s
Time to Peak	252.000 min
Hydrograph Volume	48.821 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 18.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.000	0.00	35.50	38.10	39.60	43.00
90.000	45.00	50.00	53.00	60.70	65.90
180.000	80.50	91.70	134.60	188.50	681.00
270.000	108.00	72.20	56.50	47.30	41.20
360.000	36.80	0.00	(N/A)	(N/A)	(N/A)

Existing

Subsection: Read Hydrograph
Label: 200
Scenario: EX10

Return Event: 100 years
Storm Event:

Peak Discharge	283.53 ft³/s
Time to Peak	252.000 min
Hydrograph Volume	17.281 ac-ft

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 14.000 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.000	0.00	12.40	13.10	13.40	14.30
70.000	14.70	15.80	16.40	17.80	18.70
140.000	20.70	22.00	25.20	27.30	33.40
210.000	38.00	55.80	77.00	283.53	44.80
280.000	30.00	23.40	19.60	17.10	15.20
350.000	13.80	12.70	0.00	(N/A)	(N/A)

Subsection: Addition Summary
Label: O-9A
Scenario: EX10

Return Event: 100 years
Storm Event:

Summary for Hydrograph Addition at 'O-9A'

Upstream Link	Upstream Node
Outlet-1	1

Node Inflows

Inflow Type	Element	Volume (ac-ft)	Time to Peak (min)	Flow (Peak) (ft^3/s)
Flow (From)	Outlet-1	66.101	262.000	468.02
Flow (In)	O-9A	66.101	262.000	468.02

Existing

Subsection: Elevation-Area Volume Curve
Label: 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Elevation (ft)	Planimeter (ft²)	Area (ft²)	A1+A2+sqr (A1*A2) (ft²)	Volume (ac-ft)	Volume (Total) (ac-ft)
437.39	0.0	10.000	0.000	0.000	0.000
438.00	0.0	474.000	552.848	0.003	0.003
439.00	0.0	1,351.000	2,625.234	0.020	0.023
440.00	0.0	31,565.000	39,446.261	0.302	0.325
441.00	0.0	66,202.000	143,479.866	1.098	1.422
442.00	0.0	110,820.000	262,675.404	2.010	3.433
443.00	0.0	198,508.000	457,647.441	3.502	6.935
444.00	0.0	278,044.000	711,485.945	5.444	12.379
445.00	0.0	368,893.000	967,200.150	7.401	19.780

Pond Volume Equations

*** Incremental volume computed by the Conic Method for Reservoir Volumes.**

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

Existing

Subsection: Outlet Input Data
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Requested Pond Water Surface Elevations	
Minimum (Headwater)	437.39 ft
Increment (Headwater)	0.01 ft
Maximum (Headwater)	445.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Culvert-Circular	Culvert - 48"	Forward	TW	437.39	445.00
Culvert-Circular	Culvert - 72"	Forward	TW	437.68	445.00
Irregular Weir	Weir - 1	Forward	TW	443.90	445.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

Existing

Subsection: Outlet Input Data
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Structure ID: Culvert - 72" Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	72.0 in
Length	48.74 ft
Length (Computed Barrel)	48.77 ft
Slope (Computed)	0.036 ft/ft

Outlet Control Data	
Manning's n	0.013
Ke	0.200
Kb	0.003
Kr	0.000
Convergence Tolerance	0.00 ft

Inlet Control Data	
Equation Form	Form 1
K	0.0045
M	2.0000
C	0.0317
Y	0.6900
T1 ratio (HW/D)	0.000
T2 ratio (HW/D)	1.179
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.
Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	437.68 ft	T1 Flow	242.40 ft³/s
T2 Elevation	444.75 ft	T2 Flow	277.03 ft³/s

Existing

Subsection: Outlet Input Data
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Structure ID: Culvert - 48" Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	48.0 in
Length	68.87 ft
Length (Computed Barrel)	68.88 ft
Slope (Computed)	0.020 ft/ft

Outlet Control Data	
Manning's n	0.024
Ke	0.900
Kb	0.017
Kr	0.000
Convergence Tolerance	0.00 ft

Inlet Control Data	
Equation Form	Form 1
K	0.0340
M	1.5000
C	0.0553
Y	0.5400
T1 ratio (HW/D)	0.000
T2 ratio (HW/D)	1.415
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.
Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	437.39 ft	T1 Flow	87.96 ft³/s
T2 Elevation	443.05 ft	T2 Flow	100.53 ft³/s

Structure ID: Weir - 1
Structure Type: Irregular Weir

Station (ft)	Elevation (ft)
29.30	445.00
42.20	444.00
62.60	443.90
72.10	444.00
128.10	444.20
161.30	445.00

Lowest Elevation	443.90 ft
Weir Coefficient	3.00 (ft^0.5)/s

Structure ID: TW
Structure Type: TW Setup, DS Channel

Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	100
Tailwater Tolerance (Minimum)	0.00 ft
Tailwater Tolerance (Maximum)	0.10 ft
Headwater Tolerance (Minimum)	0.00 ft
Headwater Tolerance (Maximum)	0.10 ft
Flow Tolerance (Minimum)	0.001 ft³/s
Flow Tolerance (Maximum)	1.000 ft³/s

Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
437.39	0.00	(N/A)	0.00
437.40	0.00	(N/A)	0.00
437.41	0.00	(N/A)	0.00
437.42	0.00	(N/A)	0.00
437.43	0.01	(N/A)	0.00
437.44	0.01	(N/A)	0.00
437.45	0.02	(N/A)	0.00
437.46	0.02	(N/A)	0.00
437.47	0.03	(N/A)	0.00
437.48	0.04	(N/A)	0.00
437.49	0.05	(N/A)	0.00
437.50	0.06	(N/A)	0.00
437.51	0.07	(N/A)	0.00
437.52	0.08	(N/A)	0.00
437.53	0.09	(N/A)	0.00
437.54	0.10	(N/A)	0.00
437.55	0.12	(N/A)	0.00
437.56	0.13	(N/A)	0.00
437.57	0.15	(N/A)	0.00
437.58	0.16	(N/A)	0.00
437.59	0.18	(N/A)	0.00
437.60	0.20	(N/A)	0.00
437.61	0.22	(N/A)	0.00
437.62	0.24	(N/A)	0.00
437.63	0.26	(N/A)	0.00
437.64	0.29	(N/A)	0.00
437.65	0.31	(N/A)	0.00
437.66	0.33	(N/A)	0.00
437.67	0.36	(N/A)	0.00
437.68	0.38	(N/A)	0.00
437.69	0.41	(N/A)	0.00
437.70	0.44	(N/A)	0.00
437.71	0.48	(N/A)	0.00
437.72	0.51	(N/A)	0.00
437.73	0.55	(N/A)	0.00
437.74	0.58	(N/A)	0.00
437.75	0.63	(N/A)	0.00
437.76	0.67	(N/A)	0.00
437.77	0.71	(N/A)	0.00
437.78	0.77	(N/A)	0.00
437.79	0.82	(N/A)	0.00
437.80	0.87	(N/A)	0.00

Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft³/s)	Tailwater Elevation (ft)	Convergence Error (ft)
437.81	0.93	(N/A)	0.00
437.82	0.99	(N/A)	0.00
437.83	1.05	(N/A)	0.00
437.84	1.11	(N/A)	0.00
437.85	1.17	(N/A)	0.00
437.86	1.24	(N/A)	0.00
437.87	1.32	(N/A)	0.00
437.88	1.39	(N/A)	0.00
437.89	1.46	(N/A)	0.00
437.90	1.54	(N/A)	0.00
437.91	1.62	(N/A)	0.00
437.92	1.70	(N/A)	0.00
437.93	1.78	(N/A)	0.00
437.94	1.87	(N/A)	0.00
437.95	1.96	(N/A)	0.00
437.96	2.06	(N/A)	0.00
437.97	2.15	(N/A)	0.00
437.98	2.24	(N/A)	0.00
437.99	2.34	(N/A)	0.00
438.00	2.45	(N/A)	0.00
438.01	2.55	(N/A)	0.00
438.02	2.66	(N/A)	0.00
438.03	2.76	(N/A)	0.00
438.04	2.87	(N/A)	0.00
438.05	2.99	(N/A)	0.00
438.06	3.10	(N/A)	0.00
438.07	3.22	(N/A)	0.00
438.08	3.33	(N/A)	0.00
438.09	3.46	(N/A)	0.00
438.10	3.58	(N/A)	0.00
438.11	3.71	(N/A)	0.00
438.12	3.84	(N/A)	0.00
438.13	3.96	(N/A)	0.00
438.14	4.10	(N/A)	0.00
438.15	4.24	(N/A)	0.00
438.16	4.37	(N/A)	0.00
438.17	4.51	(N/A)	0.00
438.18	4.67	(N/A)	0.00
438.19	4.80	(N/A)	0.00
438.20	4.95	(N/A)	0.00
438.21	5.09	(N/A)	0.00
438.22	5.24	(N/A)	0.00

Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
438.23	5.39	(N/A)	0.00
438.24	5.55	(N/A)	0.00
438.25	5.72	(N/A)	0.00
438.26	5.86	(N/A)	0.00
438.27	6.03	(N/A)	0.00
438.28	6.20	(N/A)	0.00
438.29	6.36	(N/A)	0.00
438.30	6.53	(N/A)	0.00
438.31	6.70	(N/A)	0.00
438.32	6.89	(N/A)	0.00
438.33	7.06	(N/A)	0.00
438.34	7.22	(N/A)	0.00
438.35	7.42	(N/A)	0.00
438.36	7.61	(N/A)	0.00
438.37	7.79	(N/A)	0.00
438.38	7.98	(N/A)	0.00
438.39	8.15	(N/A)	0.00
438.40	8.34	(N/A)	0.00
438.41	8.55	(N/A)	0.00
438.42	8.74	(N/A)	0.00
438.43	8.93	(N/A)	0.00
438.44	9.14	(N/A)	0.00
438.45	9.34	(N/A)	0.00
438.46	9.54	(N/A)	0.00
438.47	9.73	(N/A)	0.00
438.48	9.95	(N/A)	0.00
438.49	10.17	(N/A)	0.00
438.50	10.37	(N/A)	0.00
438.51	10.59	(N/A)	0.00
438.52	10.80	(N/A)	0.00
438.53	11.02	(N/A)	0.00
438.54	11.24	(N/A)	0.00
438.55	11.47	(N/A)	0.00
438.56	11.69	(N/A)	0.00
438.57	11.92	(N/A)	0.00
438.58	12.15	(N/A)	0.00
438.59	12.38	(N/A)	0.00
438.60	12.63	(N/A)	0.00
438.61	12.85	(N/A)	0.00
438.62	13.10	(N/A)	0.00
438.63	13.32	(N/A)	0.00
438.64	13.59	(N/A)	0.00

Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
438.65	13.85	(N/A)	0.00
438.66	14.06	(N/A)	0.00
438.67	14.32	(N/A)	0.00
438.68	14.58	(N/A)	0.00
438.69	14.82	(N/A)	0.00
438.70	15.08	(N/A)	0.00
438.71	15.34	(N/A)	0.00
438.72	15.58	(N/A)	0.00
438.73	15.85	(N/A)	0.00
438.74	16.12	(N/A)	0.00
438.75	16.40	(N/A)	0.00
438.76	16.64	(N/A)	0.00
438.77	16.90	(N/A)	0.00
438.78	17.18	(N/A)	0.00
438.79	17.47	(N/A)	0.00
438.80	17.73	(N/A)	0.00
438.81	18.04	(N/A)	0.00
438.82	18.30	(N/A)	0.00
438.83	18.57	(N/A)	0.00
438.84	18.86	(N/A)	0.00
438.85	19.14	(N/A)	0.00
438.86	19.44	(N/A)	0.00
438.87	19.73	(N/A)	0.00
438.88	20.00	(N/A)	0.00
438.89	20.31	(N/A)	0.00
438.90	20.58	(N/A)	0.00
438.91	20.89	(N/A)	0.00
438.92	21.20	(N/A)	0.00
438.93	21.49	(N/A)	0.00
438.94	21.79	(N/A)	0.00
438.95	22.09	(N/A)	0.00
438.96	22.41	(N/A)	0.00
438.97	22.72	(N/A)	0.00
438.98	23.03	(N/A)	0.00
438.99	23.35	(N/A)	0.00
439.00	23.69	(N/A)	0.00
439.01	24.01	(N/A)	0.00
439.02	24.31	(N/A)	0.00
439.03	24.62	(N/A)	0.00
439.04	24.94	(N/A)	0.00
439.05	25.29	(N/A)	0.00
439.06	25.61	(N/A)	0.00

Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft³/s)	Tailwater Elevation (ft)	Convergence Error (ft)
439.07	25.92	(N/A)	0.00
439.08	26.25	(N/A)	0.00
439.09	26.61	(N/A)	0.00
439.10	26.93	(N/A)	0.00
439.11	27.25	(N/A)	0.00
439.12	27.61	(N/A)	0.00
439.13	27.94	(N/A)	0.00
439.14	28.31	(N/A)	0.00
439.15	28.64	(N/A)	0.00
439.16	29.00	(N/A)	0.00
439.17	29.33	(N/A)	0.00
439.18	29.69	(N/A)	0.00
439.19	30.01	(N/A)	0.00
439.20	30.40	(N/A)	0.00
439.21	30.72	(N/A)	0.00
439.22	31.11	(N/A)	0.00
439.23	31.48	(N/A)	0.00
439.24	31.80	(N/A)	0.00
439.25	32.19	(N/A)	0.00
439.26	32.56	(N/A)	0.00
439.27	32.93	(N/A)	0.00
439.28	33.27	(N/A)	0.00
439.29	33.64	(N/A)	0.00
439.30	34.03	(N/A)	0.00
439.31	34.43	(N/A)	0.00
439.32	34.81	(N/A)	0.00
439.33	35.18	(N/A)	0.00
439.34	35.54	(N/A)	0.00
439.35	35.92	(N/A)	0.00
439.36	36.28	(N/A)	0.00
439.37	36.65	(N/A)	0.00
439.38	37.08	(N/A)	0.00
439.39	37.44	(N/A)	0.00
439.40	37.89	(N/A)	0.00
439.41	38.28	(N/A)	0.00
439.42	38.66	(N/A)	0.00
439.43	39.06	(N/A)	0.00
439.44	39.45	(N/A)	0.00
439.45	39.82	(N/A)	0.00
439.46	40.21	(N/A)	0.00
439.47	40.66	(N/A)	0.00
439.48	41.06	(N/A)	0.00

Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft³/s)	Tailwater Elevation (ft)	Convergence Error (ft)
439.49	41.46	(N/A)	0.00
439.50	41.86	(N/A)	0.00
439.51	42.28	(N/A)	0.00
439.52	42.68	(N/A)	0.00
439.53	43.11	(N/A)	0.00
439.54	43.53	(N/A)	0.00
439.55	43.93	(N/A)	0.00
439.56	44.39	(N/A)	0.00
439.57	44.75	(N/A)	0.00
439.58	45.22	(N/A)	0.00
439.59	45.63	(N/A)	0.00
439.60	46.08	(N/A)	0.00
439.61	46.48	(N/A)	0.00
439.62	46.92	(N/A)	0.00
439.63	47.33	(N/A)	0.00
439.64	47.77	(N/A)	0.00
439.65	48.21	(N/A)	0.00
439.66	48.63	(N/A)	0.00
439.67	49.07	(N/A)	0.00
439.68	49.54	(N/A)	0.00
439.69	49.98	(N/A)	0.00
439.70	50.39	(N/A)	0.00
439.71	50.85	(N/A)	0.00
439.72	51.29	(N/A)	0.00
439.73	51.77	(N/A)	0.00
439.74	52.21	(N/A)	0.00
439.75	52.66	(N/A)	0.00
439.76	53.10	(N/A)	0.00
439.77	53.56	(N/A)	0.00
439.78	54.05	(N/A)	0.00
439.79	54.46	(N/A)	0.00
439.80	54.97	(N/A)	0.00
439.81	55.40	(N/A)	0.00
439.82	55.85	(N/A)	0.00
439.83	56.31	(N/A)	0.00
439.84	56.80	(N/A)	0.00
439.85	57.29	(N/A)	0.00
439.86	57.75	(N/A)	0.00
439.87	58.22	(N/A)	0.00
439.88	58.66	(N/A)	0.00
439.89	59.16	(N/A)	0.00
439.90	59.67	(N/A)	0.00

Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft³/s)	Tailwater Elevation (ft)	Convergence Error (ft)
439.91	60.11	(N/A)	0.00
439.92	60.57	(N/A)	0.00
439.93	61.08	(N/A)	0.00
439.94	61.60	(N/A)	0.00
439.95	62.06	(N/A)	0.00
439.96	62.50	(N/A)	0.00
439.97	63.02	(N/A)	0.00
439.98	63.53	(N/A)	0.00
439.99	63.98	(N/A)	0.00
440.00	64.49	(N/A)	0.00
440.01	64.95	(N/A)	0.00
440.02	65.49	(N/A)	0.00
440.03	65.99	(N/A)	0.00
440.04	66.48	(N/A)	0.00
440.05	67.00	(N/A)	0.00
440.06	67.47	(N/A)	0.00
440.07	67.98	(N/A)	0.00
440.08	68.48	(N/A)	0.00
440.09	69.01	(N/A)	0.00
440.10	69.50	(N/A)	0.00
440.11	70.00	(N/A)	0.00
440.12	70.51	(N/A)	0.00
440.13	71.02	(N/A)	0.00
440.14	71.54	(N/A)	0.00
440.15	72.08	(N/A)	0.00
440.16	72.59	(N/A)	0.00
440.17	73.10	(N/A)	0.00
440.18	73.64	(N/A)	0.00
440.19	74.14	(N/A)	0.00
440.20	74.69	(N/A)	0.00
440.21	75.19	(N/A)	0.00
440.22	75.71	(N/A)	0.00
440.23	76.27	(N/A)	0.00
440.24	76.78	(N/A)	0.00
440.25	77.34	(N/A)	0.00
440.26	77.85	(N/A)	0.00
440.27	78.38	(N/A)	0.00
440.28	78.89	(N/A)	0.00
440.29	79.46	(N/A)	0.00
440.30	80.01	(N/A)	0.00
440.31	80.53	(N/A)	0.00
440.32	81.04	(N/A)	0.00

Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
440.33	81.61	(N/A)	0.00
440.34	82.17	(N/A)	0.00
440.35	82.74	(N/A)	0.00
440.36	83.26	(N/A)	0.00
440.37	83.77	(N/A)	0.00
440.38	84.31	(N/A)	0.00
440.39	84.91	(N/A)	0.00
440.40	85.42	(N/A)	0.00
440.41	86.00	(N/A)	0.00
440.42	86.56	(N/A)	0.00
440.43	87.14	(N/A)	0.00
440.44	87.66	(N/A)	0.00
440.45	88.22	(N/A)	0.00
440.46	88.84	(N/A)	0.00
440.47	89.34	(N/A)	0.00
440.48	89.92	(N/A)	0.00
440.49	90.48	(N/A)	0.00
440.50	91.07	(N/A)	0.00
440.51	91.59	(N/A)	0.00
440.52	92.18	(N/A)	0.00
440.53	92.78	(N/A)	0.00
440.54	93.35	(N/A)	0.00
440.55	93.87	(N/A)	0.00
440.56	94.48	(N/A)	0.00
440.57	95.09	(N/A)	0.00
440.58	95.65	(N/A)	0.00
440.59	96.22	(N/A)	0.00
440.60	96.79	(N/A)	0.00
440.61	97.38	(N/A)	0.00
440.62	97.95	(N/A)	0.00
440.63	98.56	(N/A)	0.00
440.64	99.16	(N/A)	0.00
440.65	99.68	(N/A)	0.00
440.66	100.31	(N/A)	0.00
440.67	100.87	(N/A)	0.00
440.68	101.46	(N/A)	0.00
440.69	102.05	(N/A)	0.00
440.70	102.65	(N/A)	0.00
440.71	103.24	(N/A)	0.00
440.72	103.82	(N/A)	0.00
440.73	104.43	(N/A)	0.00
440.74	105.03	(N/A)	0.00

Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
440.75	105.65	(N/A)	0.00
440.76	106.27	(N/A)	0.00
440.77	106.80	(N/A)	0.00
440.78	107.44	(N/A)	0.00
440.79	108.07	(N/A)	0.00
440.80	108.64	(N/A)	0.00
440.81	109.24	(N/A)	0.00
440.82	109.87	(N/A)	0.00
440.83	110.52	(N/A)	0.00
440.84	111.05	(N/A)	0.00
440.85	111.68	(N/A)	0.00
440.86	112.33	(N/A)	0.00
440.87	112.94	(N/A)	0.00
440.88	113.57	(N/A)	0.00
440.89	114.12	(N/A)	0.00
440.90	114.75	(N/A)	0.00
440.91	115.37	(N/A)	0.00
440.92	116.02	(N/A)	0.00
440.93	116.66	(N/A)	0.00
440.94	117.30	(N/A)	0.00
440.95	117.84	(N/A)	0.00
440.96	118.48	(N/A)	0.00
440.97	119.10	(N/A)	0.00
440.98	119.75	(N/A)	0.00
440.99	120.40	(N/A)	0.00
441.00	121.01	(N/A)	0.00
441.01	121.67	(N/A)	0.00
441.02	122.31	(N/A)	0.00
441.03	122.85	(N/A)	0.00
441.04	123.51	(N/A)	0.00
441.05	124.15	(N/A)	0.00
441.06	124.77	(N/A)	0.00
441.07	125.41	(N/A)	0.00
441.08	126.08	(N/A)	0.00
441.09	126.70	(N/A)	0.00
441.10	127.34	(N/A)	0.00
441.11	128.02	(N/A)	0.00
441.12	128.64	(N/A)	0.00
441.13	129.29	(N/A)	0.00
441.14	129.96	(N/A)	0.00
441.15	130.58	(N/A)	0.00
441.16	131.23	(N/A)	0.00

Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
441.17	131.90	(N/A)	0.00
441.18	132.52	(N/A)	0.00
441.19	133.17	(N/A)	0.00
441.20	133.81	(N/A)	0.00
441.21	134.47	(N/A)	0.00
441.22	135.12	(N/A)	0.00
441.23	135.77	(N/A)	0.00
441.24	136.42	(N/A)	0.00
441.25	137.05	(N/A)	0.00
441.26	137.72	(N/A)	0.00
441.27	138.43	(N/A)	0.00
441.28	139.10	(N/A)	0.00
441.29	139.74	(N/A)	0.00
441.30	140.44	(N/A)	0.00
441.31	141.06	(N/A)	0.00
441.32	141.72	(N/A)	0.00
441.33	142.40	(N/A)	0.00
441.34	143.08	(N/A)	0.00
441.35	143.69	(N/A)	0.00
441.36	144.38	(N/A)	0.00
441.37	145.10	(N/A)	0.00
441.38	145.73	(N/A)	0.00
441.39	146.42	(N/A)	0.00
441.40	147.07	(N/A)	0.00
441.41	147.71	(N/A)	0.00
441.42	148.37	(N/A)	0.00
441.43	149.07	(N/A)	0.00
441.44	149.78	(N/A)	0.00
441.45	150.44	(N/A)	0.00
441.46	151.11	(N/A)	0.00
441.47	151.76	(N/A)	0.00
441.48	152.49	(N/A)	0.00
441.49	153.19	(N/A)	0.00
441.50	153.85	(N/A)	0.00
441.51	154.49	(N/A)	0.00
441.52	155.16	(N/A)	0.00
441.53	155.91	(N/A)	0.00
441.54	156.58	(N/A)	0.00
441.55	157.22	(N/A)	0.00
441.56	157.91	(N/A)	0.00
441.57	158.68	(N/A)	0.00
441.58	159.31	(N/A)	0.00

Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
441.59	159.98	(N/A)	0.00
441.60	160.69	(N/A)	0.00
441.61	161.42	(N/A)	0.00
441.62	162.05	(N/A)	0.00
441.63	162.72	(N/A)	0.00
441.64	163.49	(N/A)	0.00
441.65	164.16	(N/A)	0.00
441.66	164.83	(N/A)	0.00
441.67	165.60	(N/A)	0.00
441.68	166.27	(N/A)	0.00
441.69	166.91	(N/A)	0.00
441.70	167.65	(N/A)	0.00
441.71	168.36	(N/A)	0.00
441.72	169.03	(N/A)	0.00
441.73	169.72	(N/A)	0.00
441.74	170.44	(N/A)	0.00
441.75	171.12	(N/A)	0.00
441.76	171.86	(N/A)	0.00
441.77	172.52	(N/A)	0.00
441.78	173.26	(N/A)	0.00
441.79	174.00	(N/A)	0.00
441.80	174.63	(N/A)	0.00
441.81	175.38	(N/A)	0.00
441.82	176.07	(N/A)	0.00
441.83	176.75	(N/A)	0.00
441.84	177.55	(N/A)	0.00
441.85	178.19	(N/A)	0.00
441.86	178.93	(N/A)	0.00
441.87	179.64	(N/A)	0.00
441.88	180.34	(N/A)	0.00
441.89	181.08	(N/A)	0.00
441.90	181.77	(N/A)	0.00
441.91	182.53	(N/A)	0.00
441.92	183.21	(N/A)	0.00
441.93	183.91	(N/A)	0.00
441.94	184.62	(N/A)	0.00
441.95	185.37	(N/A)	0.00
441.96	186.07	(N/A)	0.00
441.97	186.75	(N/A)	0.00
441.98	187.57	(N/A)	0.00
441.99	188.20	(N/A)	0.00
442.00	188.98	(N/A)	0.00

Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
442.01	189.62	(N/A)	0.00
442.02	190.43	(N/A)	0.00
442.03	191.12	(N/A)	0.00
442.04	191.82	(N/A)	0.00
442.05	192.53	(N/A)	0.00
442.06	193.35	(N/A)	0.00
442.07	193.99	(N/A)	0.00
442.08	194.81	(N/A)	0.00
442.09	195.45	(N/A)	0.00
442.10	196.23	(N/A)	0.00
442.11	196.91	(N/A)	0.00
442.12	197.69	(N/A)	0.00
442.13	198.38	(N/A)	0.00
442.14	199.16	(N/A)	0.00
442.15	199.86	(N/A)	0.00
442.16	200.62	(N/A)	0.00
442.17	201.27	(N/A)	0.00
442.18	202.04	(N/A)	0.00
442.19	202.80	(N/A)	0.00
442.20	203.51	(N/A)	0.00
442.21	204.27	(N/A)	0.00
442.22	204.93	(N/A)	0.00
442.23	205.77	(N/A)	0.00
442.24	206.46	(N/A)	0.00
442.25	207.24	(N/A)	0.00
442.26	207.95	(N/A)	0.00
442.27	208.67	(N/A)	0.00
442.28	209.43	(N/A)	0.00
442.29	210.09	(N/A)	0.00
442.30	210.93	(N/A)	0.00
442.31	211.62	(N/A)	0.00
442.32	212.35	(N/A)	0.00
442.33	213.12	(N/A)	0.00
442.34	213.84	(N/A)	0.00
442.35	214.62	(N/A)	0.00
442.36	215.39	(N/A)	0.00
442.37	216.11	(N/A)	0.00
442.38	216.89	(N/A)	0.00
442.39	217.54	(N/A)	0.00
442.40	218.38	(N/A)	0.00
442.41	219.04	(N/A)	0.00
442.42	219.81	(N/A)	0.00

Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
442.43	220.53	(N/A)	0.00
442.44	221.32	(N/A)	0.00
442.45	222.09	(N/A)	0.00
442.46	222.81	(N/A)	0.00
442.47	223.60	(N/A)	0.00
442.48	224.32	(N/A)	0.00
442.49	225.10	(N/A)	0.00
442.50	225.76	(N/A)	0.00
442.51	226.61	(N/A)	0.00
442.52	227.26	(N/A)	0.00
442.53	228.05	(N/A)	0.00
442.54	228.85	(N/A)	0.00
442.55	229.55	(N/A)	0.00
442.56	230.29	(N/A)	0.00
442.57	231.07	(N/A)	0.00
442.58	231.81	(N/A)	0.00
442.59	232.59	(N/A)	0.00
442.60	233.33	(N/A)	0.00
442.61	234.11	(N/A)	0.00
442.62	234.84	(N/A)	0.00
442.63	235.63	(N/A)	0.00
442.64	236.36	(N/A)	0.00
442.65	237.14	(N/A)	0.00
442.66	237.88	(N/A)	0.00
442.67	238.67	(N/A)	0.00
442.68	239.41	(N/A)	0.00
442.69	240.19	(N/A)	0.00
442.70	240.93	(N/A)	0.00
442.71	241.72	(N/A)	0.00
442.72	242.45	(N/A)	0.00
442.73	243.25	(N/A)	0.00
442.74	243.98	(N/A)	0.00
442.75	244.78	(N/A)	0.00
442.76	245.51	(N/A)	0.00
442.77	246.26	(N/A)	0.00
442.78	247.05	(N/A)	0.00
442.79	247.79	(N/A)	0.00
442.80	248.58	(N/A)	0.00
442.81	249.32	(N/A)	0.00
442.82	250.11	(N/A)	0.00
442.83	250.86	(N/A)	0.00
442.84	251.60	(N/A)	0.00

Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
442.85	252.39	(N/A)	0.00
442.86	253.14	(N/A)	0.00
442.87	253.93	(N/A)	0.00
442.88	254.68	(N/A)	0.00
442.89	255.45	(N/A)	0.00
442.90	256.22	(N/A)	0.00
442.91	256.96	(N/A)	0.00
442.92	257.76	(N/A)	0.00
442.93	258.51	(N/A)	0.00
442.94	259.25	(N/A)	0.00
442.95	260.05	(N/A)	0.00
442.96	260.80	(N/A)	0.00
442.97	261.60	(N/A)	0.00
442.98	262.35	(N/A)	0.00
442.99	263.10	(N/A)	0.00
443.00	263.89	(N/A)	0.00
443.01	264.64	(N/A)	0.00
443.02	265.39	(N/A)	0.00
443.03	266.20	(N/A)	0.00
443.04	266.95	(N/A)	0.00
443.05	267.71	(N/A)	0.00
443.06	268.47	(N/A)	0.00
443.07	269.24	(N/A)	0.00
443.08	270.01	(N/A)	0.00
443.09	270.78	(N/A)	0.00
443.10	271.55	(N/A)	0.00
443.11	272.32	(N/A)	0.00
443.12	273.07	(N/A)	0.00
443.13	273.84	(N/A)	0.00
443.14	274.62	(N/A)	0.00
443.15	275.39	(N/A)	0.00
443.16	276.16	(N/A)	0.00
443.17	276.94	(N/A)	0.00
443.18	277.71	(N/A)	0.00
443.19	278.58	(N/A)	0.00
443.20	279.36	(N/A)	0.00
443.21	280.02	(N/A)	0.00
443.22	280.89	(N/A)	0.00
443.23	281.67	(N/A)	0.00
443.24	282.39	(N/A)	0.00
443.25	283.17	(N/A)	0.00
443.26	283.96	(N/A)	0.00

Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
443.27	284.71	(N/A)	0.00
443.28	285.51	(N/A)	0.00
443.29	286.31	(N/A)	0.00
443.30	287.04	(N/A)	0.00
443.31	287.76	(N/A)	0.00
443.32	288.56	(N/A)	0.00
443.33	289.36	(N/A)	0.00
443.34	290.14	(N/A)	0.00
443.35	290.92	(N/A)	0.00
443.36	291.70	(N/A)	0.00
443.37	292.50	(N/A)	0.00
443.38	293.28	(N/A)	0.00
443.39	294.02	(N/A)	0.00
443.40	294.76	(N/A)	0.00
443.41	295.54	(N/A)	0.00
443.42	296.30	(N/A)	0.00
443.43	297.11	(N/A)	0.00
443.44	298.69	(N/A)	0.00
443.45	299.25	(N/A)	0.00
443.46	299.77	(N/A)	0.00
443.47	300.81	(N/A)	0.00
443.48	301.82	(N/A)	0.00
443.49	302.25	(N/A)	0.00
443.50	303.56	(N/A)	0.00
443.51	304.27	(N/A)	0.00
443.52	304.95	(N/A)	0.00
443.53	305.66	(N/A)	0.00
443.54	306.37	(N/A)	0.00
443.55	307.05	(N/A)	0.00
443.56	307.76	(N/A)	0.00
443.57	308.38	(N/A)	0.00
443.58	309.09	(N/A)	0.00
443.59	309.71	(N/A)	0.00
443.60	310.42	(N/A)	0.00
443.61	311.10	(N/A)	0.00
443.62	311.81	(N/A)	0.00
443.63	312.52	(N/A)	0.00
443.64	313.21	(N/A)	0.00
443.65	313.89	(N/A)	0.00
443.66	314.61	(N/A)	0.00
443.67	315.25	(N/A)	0.00
443.68	315.94	(N/A)	0.00

Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
443.69	316.56	(N/A)	0.00
443.70	317.27	(N/A)	0.00
443.71	317.96	(N/A)	0.00
443.72	318.67	(N/A)	0.00
443.73	319.36	(N/A)	0.00
443.74	320.07	(N/A)	0.00
443.75	320.76	(N/A)	0.00
443.76	321.47	(N/A)	0.00
443.77	322.09	(N/A)	0.00
443.78	322.81	(N/A)	0.00
443.79	323.43	(N/A)	0.00
443.80	324.12	(N/A)	0.00
443.81	324.83	(N/A)	0.00
443.82	325.52	(N/A)	0.00
443.83	326.23	(N/A)	0.00
443.84	326.93	(N/A)	0.00
443.85	327.62	(N/A)	0.00
443.86	328.33	(N/A)	0.00
443.87	328.95	(N/A)	0.00
443.88	329.64	(N/A)	0.00
443.89	330.29	(N/A)	0.00
443.90	330.98	(N/A)	0.00
443.91	331.70	(N/A)	0.00
443.92	332.41	(N/A)	0.00
443.93	333.13	(N/A)	0.00
443.94	333.90	(N/A)	0.00
443.95	334.67	(N/A)	0.00
443.96	335.46	(N/A)	0.00
443.97	336.22	(N/A)	0.00
443.98	337.03	(N/A)	0.00
443.99	337.92	(N/A)	0.00
444.00	338.85	(N/A)	0.00
444.01	339.88	(N/A)	0.00
444.02	340.94	(N/A)	0.00
444.03	342.03	(N/A)	0.00
444.04	343.17	(N/A)	0.00
444.05	344.37	(N/A)	0.00
444.06	345.54	(N/A)	0.00
444.07	346.82	(N/A)	0.00
444.08	348.08	(N/A)	0.00
444.09	349.49	(N/A)	0.00
444.10	350.92	(N/A)	0.00

Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
444.11	352.41	(N/A)	0.00
444.12	353.95	(N/A)	0.00
444.13	355.58	(N/A)	0.00
444.14	357.24	(N/A)	0.00
444.15	358.89	(N/A)	0.00
444.16	360.60	(N/A)	0.00
444.17	362.45	(N/A)	0.00
444.18	364.37	(N/A)	0.00
444.19	366.34	(N/A)	0.00
444.20	368.37	(N/A)	0.00
444.21	370.60	(N/A)	0.00
444.22	372.88	(N/A)	0.00
444.23	375.15	(N/A)	0.00
444.24	377.56	(N/A)	0.00
444.25	379.93	(N/A)	0.00
444.26	382.42	(N/A)	0.00
444.27	384.96	(N/A)	0.00
444.28	387.56	(N/A)	0.00
444.29	390.20	(N/A)	0.00
444.30	392.89	(N/A)	0.00
444.31	395.58	(N/A)	0.00
444.32	398.30	(N/A)	0.00
444.33	401.13	(N/A)	0.00
444.34	404.00	(N/A)	0.00
444.35	406.93	(N/A)	0.00
444.36	409.89	(N/A)	0.00
444.37	412.91	(N/A)	0.00
444.38	415.90	(N/A)	0.00
444.39	419.00	(N/A)	0.00
444.40	422.08	(N/A)	0.00
444.41	425.27	(N/A)	0.00
444.42	428.53	(N/A)	0.00
444.43	431.81	(N/A)	0.00
444.44	435.13	(N/A)	0.00
444.45	438.42	(N/A)	0.00
444.46	441.76	(N/A)	0.00
444.47	445.21	(N/A)	0.00
444.48	448.70	(N/A)	0.00
444.49	452.23	(N/A)	0.00
444.50	455.81	(N/A)	0.00
444.51	459.43	(N/A)	0.00
444.52	463.02	(N/A)	0.00

Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
444.53	466.65	(N/A)	0.00
444.54	470.39	(N/A)	0.00
444.55	474.18	(N/A)	0.00
444.56	478.00	(N/A)	0.00
444.57	481.87	(N/A)	0.00
444.58	485.70	(N/A)	0.00
444.59	489.58	(N/A)	0.00
444.60	493.57	(N/A)	0.00
444.61	497.60	(N/A)	0.00
444.62	501.67	(N/A)	0.00
444.63	505.78	(N/A)	0.00
444.64	509.87	(N/A)	0.00
444.65	513.98	(N/A)	0.00
444.66	518.20	(N/A)	0.00
444.67	522.47	(N/A)	0.00
444.68	526.78	(N/A)	0.00
444.69	531.07	(N/A)	0.00
444.70	535.39	(N/A)	0.00
444.71	539.83	(N/A)	0.00
444.72	544.30	(N/A)	0.00
444.73	548.81	(N/A)	0.00
444.74	553.30	(N/A)	0.00
444.75	557.82	(N/A)	0.00
444.76	562.49	(N/A)	0.00
444.77	567.15	(N/A)	0.00
444.78	571.80	(N/A)	0.00
444.79	576.50	(N/A)	0.00
444.80	581.27	(N/A)	0.00
444.81	586.05	(N/A)	0.00
444.82	590.93	(N/A)	0.00
444.83	595.80	(N/A)	0.00
444.84	600.72	(N/A)	0.00
444.85	605.70	(N/A)	0.00
444.86	610.74	(N/A)	0.00
444.87	615.73	(N/A)	0.00
444.88	620.85	(N/A)	0.00
444.89	625.94	(N/A)	0.00
444.90	631.12	(N/A)	0.00
444.91	636.27	(N/A)	0.00
444.92	641.48	(N/A)	0.00
444.93	646.78	(N/A)	0.00
444.94	652.08	(N/A)	0.00

Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
444.95	657.48	(N/A)	0.00
444.96	662.82	(N/A)	0.00
444.97	668.29	(N/A)	0.00
444.98	673.72	(N/A)	0.00
444.99	679.28	(N/A)	0.00
445.00	684.89	(N/A)	0.00

Contributing Structures
None Contributing
Culvert - 48"
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Culvert - 48"
Culvert - 48"
Culvert - 48" + Culvert - 72"
Culvert - 48" + Culvert - 72"

Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
Culvert - 48" + Culvert - 72"
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Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
Culvert - 48" + Culvert - 72"
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Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
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Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
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Composite Outflow Summary

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Scenario: EX10

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Storm Event:

Composite Outflow Summary

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Storm Event:

Composite Outflow Summary

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Subsection: Composite Rating Curve
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Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
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Subsection: Composite Rating Curve
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Composite Outflow Summary

Contributing Structures
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Existing

Subsection: Composite Rating Curve
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Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
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Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
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Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
Culvert - 48" + Culvert - 72"
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Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
Culvert - 48" + Culvert - 72"
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Existing

Subsection: Composite Rating Curve
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Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
Culvert - 48" + Culvert - 72"
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Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
Culvert - 48" + Culvert - 72"
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Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
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Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

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Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
Culvert - 48" + Culvert - 72"
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Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
Culvert - 48" + Culvert - 72"
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Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
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Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
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Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
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Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
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Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

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Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
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Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
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Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
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Culvert - 48" + Culvert - 72" + Weir - 1

Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
Culvert - 48" + Culvert - 72" + Weir - 1
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Culvert - 48" + Culvert - 72" + Weir - 1
Culvert - 48" + Culvert - 72" + Weir - 1

Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
Culvert - 48" + Culvert - 72" + Weir - 1
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Culvert - 48" + Culvert - 72" + Weir - 1
Culvert - 48" + Culvert - 72" + Weir - 1

Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
Culvert - 48" + Culvert - 72" + Weir - 1
Culvert - 48" + Culvert - 72" + Weir - 1
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Culvert - 48" + Culvert - 72" + Weir - 1
Culvert - 48" + Culvert - 72" + Weir - 1

Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
Culvert - 48" + Culvert - 72" + Weir - 1
Culvert - 48" + Culvert - 72" + Weir - 1
Culvert - 48" + Culvert - 72" + Weir - 1
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Existing

Subsection: Composite Rating Curve
Label: Basin Outlet 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
Culvert - 48" + Culvert - 72" + Weir - 1
Culvert - 48" + Culvert - 72" + Weir - 1
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Existing

Subsection: Elevation-Volume-Flow Table (Pond)
Label: 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	437.39 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	1.000 min

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
437.39	0.00	0.000	10.000	0.00	0.00	0.00
437.40	0.00	0.000	12.022	0.00	0.00	0.00
437.41	0.00	0.000	14.231	0.00	0.00	0.01
437.42	0.00	0.000	16.626	0.00	0.00	0.02
437.43	0.01	0.000	19.207	0.00	0.01	0.03
437.44	0.01	0.000	21.974	0.00	0.01	0.04
437.45	0.02	0.000	24.927	0.00	0.02	0.05
437.46	0.02	0.000	28.066	0.00	0.02	0.07
437.47	0.03	0.000	31.392	0.00	0.03	0.08
437.48	0.04	0.000	34.903	0.00	0.04	0.10
437.49	0.05	0.000	38.601	0.00	0.05	0.12
437.50	0.06	0.000	42.485	0.00	0.06	0.15
437.51	0.07	0.000	46.555	0.00	0.07	0.17
437.52	0.08	0.000	50.811	0.00	0.08	0.20
437.53	0.09	0.000	55.253	0.00	0.09	0.23
437.54	0.10	0.000	59.882	0.00	0.10	0.26
437.55	0.12	0.000	64.696	0.00	0.12	0.30
437.56	0.13	0.000	69.697	0.00	0.13	0.33
437.57	0.15	0.000	74.884	0.00	0.15	0.37
437.58	0.16	0.000	80.257	0.00	0.16	0.42
437.59	0.18	0.000	85.816	0.00	0.18	0.46
437.60	0.20	0.000	91.561	0.00	0.20	0.51
437.61	0.22	0.000	97.492	0.00	0.22	0.56
437.62	0.24	0.000	103.610	0.00	0.24	0.61
437.63	0.26	0.000	109.913	0.00	0.26	0.67
437.64	0.29	0.000	116.403	0.00	0.29	0.73
437.65	0.31	0.000	123.079	0.00	0.31	0.79
437.66	0.33	0.000	129.941	0.00	0.33	0.86
437.67	0.36	0.000	136.989	0.00	0.36	0.93

Existing

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 100 years
Label: 1 Storm Event:
Scenario: EX10

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
437.68	0.38	0.000	144.223	0.00	0.38	1.00
437.69	0.41	0.000	151.644	0.00	0.41	1.08
437.70	0.44	0.000	159.250	0.00	0.44	1.16
437.71	0.48	0.001	167.043	0.00	0.48	1.25
437.72	0.51	0.001	175.022	0.00	0.51	1.34
437.73	0.55	0.001	183.187	0.00	0.55	1.44
437.74	0.58	0.001	191.538	0.00	0.58	1.53
437.75	0.63	0.001	200.075	0.00	0.63	1.65
437.76	0.67	0.001	208.799	0.00	0.67	1.76
437.77	0.71	0.001	217.708	0.00	0.71	1.87
437.78	0.77	0.001	226.804	0.00	0.77	2.00
437.79	0.82	0.001	236.085	0.00	0.82	2.13
437.80	0.87	0.001	245.553	0.00	0.87	2.26
437.81	0.93	0.001	255.207	0.00	0.93	2.40
437.82	0.99	0.001	265.048	0.00	0.99	2.55
437.83	1.05	0.001	275.074	0.00	1.05	2.70
437.84	1.11	0.001	285.286	0.00	1.11	2.86
437.85	1.17	0.001	295.685	0.00	1.17	3.01
437.86	1.24	0.001	306.270	0.00	1.24	3.18
437.87	1.32	0.001	317.041	0.00	1.32	3.36
437.88	1.39	0.001	327.998	0.00	1.39	3.54
437.89	1.46	0.002	339.141	0.00	1.46	3.72
437.90	1.54	0.002	350.470	0.00	1.54	3.92
437.91	1.62	0.002	361.985	0.00	1.62	4.12
437.92	1.70	0.002	373.687	0.00	1.70	4.32
437.93	1.78	0.002	385.575	0.00	1.78	4.53
437.94	1.87	0.002	397.648	0.00	1.87	4.74
437.95	1.96	0.002	409.908	0.00	1.96	4.97
437.96	2.06	0.002	422.354	0.00	2.06	5.21
437.97	2.15	0.002	434.987	0.00	2.15	5.44
437.98	2.24	0.002	447.805	0.00	2.24	5.68
437.99	2.34	0.002	460.809	0.00	2.34	5.93
438.00	2.45	0.003	474.000	0.00	2.45	6.20
438.01	2.55	0.003	480.547	0.00	2.55	6.46
438.02	2.66	0.003	487.139	0.00	2.66	6.73
438.03	2.76	0.003	493.776	0.00	2.76	6.99
438.04	2.87	0.003	500.458	0.00	2.87	7.27
438.05	2.99	0.003	507.185	0.00	2.99	7.55
438.06	3.10	0.003	513.956	0.00	3.10	7.84
438.07	3.22	0.003	520.773	0.00	3.22	8.13
438.08	3.33	0.003	527.634	0.00	3.33	8.42
438.09	3.46	0.004	534.541	0.00	3.46	8.72
438.10	3.58	0.004	541.492	0.00	3.58	9.02

Existing

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 100 years
Label: 1 Storm Event:
Scenario: EX10

Elevation (ft)	Outflow (ft^3/s)	Storage (ac-ft)	Area (ft^2)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
438.11	3.71	0.004	548.488	0.00	3.71	9.33
438.12	3.84	0.004	555.529	0.00	3.84	9.64
438.13	3.96	0.004	562.615	0.00	3.96	9.95
438.14	4.10	0.004	569.746	0.00	4.10	10.28
438.15	4.24	0.004	576.922	0.00	4.24	10.61
438.16	4.37	0.005	584.143	0.00	4.37	10.94
438.17	4.51	0.005	591.408	0.00	4.51	11.27
438.18	4.67	0.005	598.719	0.00	4.67	11.63
438.19	4.80	0.005	606.074	0.00	4.80	11.96
438.20	4.95	0.005	613.475	0.00	4.95	12.32
438.21	5.09	0.005	620.920	0.00	5.09	12.65
438.22	5.24	0.005	628.410	0.00	5.24	13.02
438.23	5.39	0.006	635.945	0.00	5.39	13.38
438.24	5.55	0.006	643.525	0.00	5.55	13.75
438.25	5.72	0.006	651.150	0.00	5.72	14.13
438.26	5.86	0.006	658.820	0.00	5.86	14.50
438.27	6.03	0.006	666.535	0.00	6.03	14.89
438.28	6.20	0.006	674.294	0.00	6.20	15.28
438.29	6.36	0.006	682.099	0.00	6.36	15.67
438.30	6.53	0.007	689.948	0.00	6.53	16.07
438.31	6.70	0.007	697.842	0.00	6.70	16.47
438.32	6.89	0.007	705.782	0.00	6.89	16.89
438.33	7.06	0.007	713.766	0.00	7.06	17.30
438.34	7.22	0.007	721.795	0.00	7.22	17.70
438.35	7.42	0.007	729.869	0.00	7.42	18.13
438.36	7.61	0.008	737.988	0.00	7.61	18.57
438.37	7.79	0.008	746.151	0.00	7.79	19.00
438.38	7.98	0.008	754.360	0.00	7.98	19.43
438.39	8.15	0.008	762.614	0.00	8.15	19.87
438.40	8.34	0.008	770.912	0.00	8.34	20.31
438.41	8.55	0.008	779.256	0.00	8.55	20.78
438.42	8.74	0.009	787.644	0.00	8.74	21.22
438.43	8.93	0.009	796.077	0.00	8.93	21.68
438.44	9.14	0.009	804.555	0.00	9.14	22.16
438.45	9.34	0.009	813.078	0.00	9.34	22.62
438.46	9.54	0.009	821.646	0.00	9.54	23.10
438.47	9.73	0.010	830.259	0.00	9.73	23.57
438.48	9.95	0.010	838.917	0.00	9.95	24.06
438.49	10.17	0.010	847.619	0.00	10.17	24.57
438.50	10.37	0.010	856.367	0.00	10.37	25.05
438.51	10.59	0.010	865.159	0.00	10.59	25.56
438.52	10.80	0.011	873.997	0.00	10.80	26.06
438.53	11.02	0.011	882.879	0.00	11.02	26.56

Existing

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 100 years
Label: 1 Storm Event:
Scenario: EX10

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
438.54	11.24	0.011	891.806	0.00	11.24	27.09
438.55	11.47	0.011	900.778	0.00	11.47	27.61
438.56	11.69	0.011	909.795	0.00	11.69	28.13
438.57	11.92	0.012	918.857	0.00	11.92	28.67
438.58	12.15	0.012	927.964	0.00	12.15	29.20
438.59	12.38	0.012	937.116	0.00	12.38	29.75
438.60	12.63	0.012	946.312	0.00	12.63	30.31
438.61	12.85	0.012	955.554	0.00	12.85	30.85
438.62	13.10	0.013	964.840	0.00	13.10	31.42
438.63	13.32	0.013	974.171	0.00	13.32	31.96
438.64	13.59	0.013	983.548	0.00	13.59	32.56
438.65	13.85	0.013	992.969	0.00	13.85	33.14
438.66	14.06	0.014	1,002.435	0.00	14.06	33.69
438.67	14.32	0.014	1,011.946	0.00	14.32	34.28
438.68	14.58	0.014	1,021.502	0.00	14.58	34.88
438.69	14.82	0.014	1,031.102	0.00	14.82	35.46
438.70	15.08	0.014	1,040.748	0.00	15.08	36.07
438.71	15.34	0.015	1,050.439	0.00	15.34	36.68
438.72	15.58	0.015	1,060.174	0.00	15.58	37.27
438.73	15.85	0.015	1,069.955	0.00	15.85	37.90
438.74	16.12	0.015	1,079.780	0.00	16.12	38.52
438.75	16.40	0.016	1,089.650	0.00	16.40	39.16
438.76	16.64	0.016	1,099.565	0.00	16.64	39.77
438.77	16.90	0.016	1,109.525	0.00	16.90	40.40
438.78	17.18	0.016	1,119.530	0.00	17.18	41.05
438.79	17.47	0.017	1,129.580	0.00	17.47	41.71
438.80	17.73	0.017	1,139.675	0.00	17.73	42.35
438.81	18.04	0.017	1,149.814	0.00	18.04	43.05
438.82	18.30	0.017	1,159.999	0.00	18.30	43.69
438.83	18.57	0.018	1,170.228	0.00	18.57	44.35
438.84	18.86	0.018	1,180.503	0.00	18.86	45.03
438.85	19.14	0.018	1,190.822	0.00	19.14	45.71
438.86	19.44	0.019	1,201.186	0.00	19.44	46.41
438.87	19.73	0.019	1,211.595	0.00	19.73	47.09
438.88	20.00	0.019	1,222.049	0.00	20.00	47.77
438.89	20.31	0.019	1,232.548	0.00	20.31	48.49
438.90	20.58	0.020	1,243.092	0.00	20.58	49.18
438.91	20.89	0.020	1,253.681	0.00	20.89	49.91
438.92	21.20	0.020	1,264.314	0.00	21.20	50.63
438.93	21.49	0.021	1,274.993	0.00	21.49	51.34
438.94	21.79	0.021	1,285.716	0.00	21.79	52.07
438.95	22.09	0.021	1,296.485	0.00	22.09	52.80
438.96	22.41	0.021	1,307.298	0.00	22.41	53.55

Existing

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 100 years
Label: 1 Storm Event:
Scenario: EX10

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
438.97	22.72	0.022	1,318.156	0.00	22.72	54.30
438.98	23.03	0.022	1,329.059	0.00	23.03	55.05
438.99	23.35	0.022	1,340.007	0.00	23.35	55.81
439.00	23.69	0.023	1,351.000	0.00	23.69	56.61
439.01	24.01	0.023	1,456.571	0.00	24.01	57.39
439.02	24.31	0.023	1,566.113	0.00	24.31	58.20
439.03	24.62	0.024	1,679.626	0.00	24.62	59.05
439.04	24.94	0.024	1,797.110	0.00	24.94	59.95
439.05	25.29	0.025	1,918.565	0.00	25.29	60.92
439.06	25.61	0.025	2,043.991	0.00	25.61	61.90
439.07	25.92	0.025	2,173.388	0.00	25.92	62.91
439.08	26.25	0.026	2,306.757	0.00	26.25	63.99
439.09	26.61	0.027	2,444.096	0.00	26.61	65.14
439.10	26.93	0.027	2,585.407	0.00	26.93	66.30
439.11	27.25	0.028	2,730.689	0.00	27.25	67.51
439.12	27.61	0.028	2,879.942	0.00	27.61	68.80
439.13	27.94	0.029	3,033.166	0.00	27.94	70.11
439.14	28.31	0.030	3,190.361	0.00	28.31	71.52
439.15	28.64	0.031	3,351.527	0.00	28.64	72.94
439.16	29.00	0.031	3,516.664	0.00	29.00	74.45
439.17	29.33	0.032	3,685.772	0.00	29.33	75.97
439.18	29.69	0.033	3,858.852	0.00	29.69	77.59
439.19	30.01	0.034	4,035.902	0.00	30.01	79.23
439.20	30.40	0.035	4,216.924	0.00	30.40	80.99
439.21	30.72	0.036	4,401.916	0.00	30.72	82.75
439.22	31.11	0.037	4,590.880	0.00	31.11	84.64
439.23	31.48	0.038	4,783.815	0.00	31.48	86.57
439.24	31.80	0.039	4,980.721	0.00	31.80	88.52
439.25	32.19	0.040	5,181.598	0.00	32.19	90.60
439.26	32.56	0.041	5,386.446	0.00	32.56	92.73
439.27	32.93	0.043	5,595.265	0.00	32.93	94.93
439.28	33.27	0.044	5,808.056	0.00	33.27	97.18
439.29	33.64	0.045	6,024.817	0.00	33.64	99.52
439.30	34.03	0.047	6,245.550	0.00	34.03	101.95
439.31	34.43	0.048	6,470.253	0.00	34.43	104.47
439.32	34.81	0.050	6,698.928	0.00	34.81	107.04
439.33	35.18	0.051	6,931.574	0.00	35.18	109.68
439.34	35.54	0.053	7,168.191	0.00	35.54	112.40
439.35	35.92	0.055	7,408.779	0.00	35.92	115.20
439.36	36.28	0.056	7,653.338	0.00	36.28	118.08
439.37	36.65	0.058	7,901.868	0.00	36.65	121.04
439.38	37.08	0.060	8,154.370	0.00	37.08	124.14
439.39	37.44	0.062	8,410.842	0.00	37.44	127.27

Existing

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 100 years
Label: 1 Storm Event:
Scenario: EX10

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
439.40	37.89	0.064	8,671.286	0.00	37.89	130.56
439.41	38.28	0.066	8,935.700	0.00	38.28	133.89
439.42	38.66	0.068	9,204.086	0.00	38.66	137.29
439.43	39.06	0.070	9,476.443	0.00	39.06	140.80
439.44	39.45	0.072	9,752.770	0.00	39.45	144.40
439.45	39.82	0.075	10,033.069	0.00	39.82	148.07
439.46	40.21	0.077	10,317.340	0.00	40.21	151.85
439.47	40.66	0.079	10,605.581	0.00	40.66	155.79
439.48	41.06	0.082	10,897.793	0.00	41.06	159.77
439.49	41.46	0.084	11,193.976	0.00	41.46	163.84
439.50	41.86	0.087	11,494.131	0.00	41.86	168.03
439.51	42.28	0.090	11,798.256	0.00	42.28	172.33
439.52	42.68	0.092	12,106.353	0.00	42.68	176.72
439.53	43.11	0.095	12,418.421	0.00	43.11	181.23
439.54	43.53	0.098	12,734.460	0.00	43.53	185.85
439.55	43.93	0.101	13,054.469	0.00	43.93	190.55
439.56	44.39	0.104	13,378.450	0.00	44.39	195.41
439.57	44.75	0.107	13,706.403	0.00	44.75	200.28
439.58	45.22	0.110	14,038.326	0.00	45.22	205.38
439.59	45.63	0.114	14,374.220	0.00	45.63	210.52
439.60	46.08	0.117	14,714.086	0.00	46.08	215.82
439.61	46.48	0.120	15,057.922	0.00	46.48	221.19
439.62	46.92	0.124	15,405.730	0.00	46.92	226.70
439.63	47.33	0.127	15,757.508	0.00	47.33	232.30
439.64	47.77	0.131	16,113.258	0.00	47.77	238.05
439.65	48.21	0.135	16,472.979	0.00	48.21	243.93
439.66	48.63	0.139	16,836.671	0.00	48.63	249.90
439.67	49.07	0.143	17,204.334	0.00	49.07	256.01
439.68	49.54	0.147	17,575.968	0.00	49.54	262.28
439.69	49.98	0.151	17,951.573	0.00	49.98	268.64
439.70	50.39	0.155	18,331.150	0.00	50.39	275.10
439.71	50.85	0.159	18,714.697	0.00	50.85	281.73
439.72	51.29	0.163	19,102.216	0.00	51.29	288.47
439.73	51.77	0.168	19,493.705	0.00	51.77	295.38
439.74	52.21	0.172	19,889.166	0.00	52.21	302.39
439.75	52.66	0.177	20,288.598	0.00	52.66	309.54
439.76	53.10	0.182	20,692.001	0.00	53.10	316.80
439.77	53.56	0.186	21,099.375	0.00	53.56	324.23
439.78	54.05	0.191	21,510.720	0.00	54.05	331.82
439.79	54.46	0.196	21,926.036	0.00	54.46	339.47
439.80	54.97	0.201	22,345.324	0.00	54.97	347.36
439.81	55.40	0.207	22,768.582	0.00	55.40	355.31
439.82	55.85	0.212	23,195.812	0.00	55.85	363.42

Existing

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 100 years
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Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
439.83	56.31	0.217	23,627.012	0.00	56.31	371.68
439.84	56.80	0.223	24,062.184	0.00	56.80	380.12
439.85	57.29	0.228	24,501.327	0.00	57.29	388.71
439.86	57.75	0.234	24,944.441	0.00	57.75	397.40
439.87	58.22	0.240	25,391.526	0.00	58.22	406.26
439.88	58.66	0.246	25,842.582	0.00	58.66	415.24
439.89	59.16	0.252	26,297.609	0.00	59.16	424.43
439.90	59.67	0.258	26,756.607	0.00	59.67	433.79
439.91	60.11	0.264	27,219.576	0.00	60.11	443.22
439.92	60.57	0.270	27,686.517	0.00	60.57	452.83
439.93	61.08	0.277	28,157.428	0.00	61.08	462.65
439.94	61.60	0.283	28,632.311	0.00	61.60	472.64
439.95	62.06	0.290	29,111.165	0.00	62.06	482.72
439.96	62.50	0.296	29,593.990	0.00	62.50	492.95
439.97	63.02	0.303	30,080.786	0.00	63.02	503.41
439.98	63.53	0.310	30,571.553	0.00	63.53	514.02
439.99	63.98	0.317	31,066.291	0.00	63.98	524.75
440.00	64.49	0.325	31,565.000	0.00	64.49	535.70
440.01	64.95	0.332	31,848.591	0.00	64.95	546.73
440.02	65.49	0.339	32,133.451	0.00	65.49	557.93
440.03	65.99	0.347	32,419.579	0.00	65.99	569.19
440.04	66.48	0.354	32,706.975	0.00	66.48	580.54
440.05	67.00	0.362	32,995.640	0.00	67.00	592.01
440.06	67.47	0.369	33,285.572	0.00	67.47	603.52
440.07	67.98	0.377	33,576.773	0.00	67.98	615.17
440.08	68.48	0.385	33,869.243	0.00	68.48	626.92
440.09	69.01	0.392	34,162.980	0.00	69.01	638.79
440.10	69.50	0.400	34,457.986	0.00	69.50	650.71
440.11	70.00	0.408	34,754.260	0.00	70.00	662.75
440.12	70.51	0.416	35,051.802	0.00	70.51	674.89
440.13	71.02	0.424	35,350.613	0.00	71.02	687.14
440.14	71.54	0.432	35,650.691	0.00	71.54	699.49
440.15	72.08	0.441	35,952.038	0.00	72.08	711.96
440.16	72.59	0.449	36,254.654	0.00	72.59	724.51
440.17	73.10	0.457	36,558.537	0.00	73.10	737.15
440.18	73.64	0.466	36,863.689	0.00	73.64	749.93
440.19	74.14	0.474	37,170.109	0.00	74.14	762.76
440.20	74.69	0.483	37,477.797	0.00	74.69	775.75
440.21	75.19	0.491	37,786.754	0.00	75.19	788.81
440.22	75.71	0.500	38,096.978	0.00	75.71	801.97
440.23	76.27	0.509	38,408.471	0.00	76.27	815.28
440.24	76.78	0.518	38,721.233	0.00	76.78	828.65
440.25	77.34	0.527	39,035.262	0.00	77.34	842.17

Existing

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 100 years
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Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
440.26	77.85	0.536	39,350.560	0.00	77.85	855.74
440.27	78.38	0.545	39,667.126	0.00	78.38	869.44
440.28	78.89	0.554	39,984.960	0.00	78.89	883.23
440.29	79.46	0.563	40,304.063	0.00	79.46	897.18
440.30	80.01	0.572	40,624.434	0.00	80.01	911.22
440.31	80.53	0.582	40,946.073	0.00	80.53	925.33
440.32	81.04	0.591	41,268.980	0.00	81.04	939.54
440.33	81.61	0.601	41,593.156	0.00	81.61	953.92
440.34	82.17	0.610	41,918.600	0.00	82.17	968.40
440.35	82.74	0.620	42,245.312	0.00	82.74	983.00
440.36	83.26	0.630	42,573.292	0.00	83.26	997.65
440.37	83.77	0.640	42,902.540	0.00	83.77	1,012.41
440.38	84.31	0.649	43,233.057	0.00	84.31	1,027.31
440.39	84.91	0.659	43,564.842	0.00	84.91	1,042.37
440.40	85.42	0.669	43,897.896	0.00	85.42	1,057.46
440.41	86.00	0.680	44,232.217	0.00	86.00	1,072.73
440.42	86.56	0.690	44,567.807	0.00	86.56	1,088.09
440.43	87.14	0.700	44,904.665	0.00	87.14	1,103.58
440.44	87.66	0.710	45,242.792	0.00	87.66	1,119.12
440.45	88.22	0.721	45,582.186	0.00	88.22	1,134.82
440.46	88.84	0.731	45,922.849	0.00	88.84	1,150.69
440.47	89.34	0.742	46,264.780	0.00	89.34	1,166.56
440.48	89.92	0.753	46,607.980	0.00	89.92	1,182.62
440.49	90.48	0.763	46,952.447	0.00	90.48	1,198.77
440.50	91.07	0.774	47,298.183	0.00	91.07	1,215.07
440.51	91.59	0.785	47,645.187	0.00	91.59	1,231.41
440.52	92.18	0.796	47,993.460	0.00	92.18	1,247.94
440.53	92.78	0.807	48,343.000	0.00	92.78	1,264.60
440.54	93.35	0.818	48,693.809	0.00	93.35	1,281.34
440.55	93.87	0.829	49,045.886	0.00	93.87	1,298.15
440.56	94.48	0.841	49,399.232	0.00	94.48	1,315.16
440.57	95.09	0.852	49,753.845	0.00	95.09	1,332.30
440.58	95.65	0.864	50,109.727	0.00	95.65	1,349.51
440.59	96.22	0.875	50,466.877	0.00	96.22	1,366.84
440.60	96.79	0.887	50,825.296	0.00	96.79	1,384.29
440.61	97.38	0.898	51,184.982	0.00	97.38	1,401.88
440.62	97.95	0.910	51,545.937	0.00	97.95	1,419.57
440.63	98.56	0.922	51,908.160	0.00	98.56	1,437.43
440.64	99.16	0.934	52,271.652	0.00	99.16	1,455.39
440.65	99.68	0.946	52,636.412	0.00	99.68	1,473.40
440.66	100.31	0.958	53,002.440	0.00	100.31	1,491.63
440.67	100.87	0.970	53,369.736	0.00	100.87	1,509.92
440.68	101.46	0.983	53,738.300	0.00	101.46	1,528.36

Existing

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 100 years
Label: 1 Storm Event:
Scenario: EX10

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
440.69	102.05	0.995	54,108.133	0.00	102.05	1,546.93
440.70	102.65	1.008	54,479.234	0.00	102.65	1,565.62
440.71	103.24	1.020	54,851.603	0.00	103.24	1,584.44
440.72	103.82	1.033	55,225.240	0.00	103.82	1,603.36
440.73	104.43	1.045	55,600.146	0.00	104.43	1,622.45
440.74	105.03	1.058	55,976.320	0.00	105.03	1,641.64
440.75	105.65	1.071	56,353.762	0.00	105.65	1,660.98
440.76	106.27	1.084	56,732.473	0.00	106.27	1,680.45
440.77	106.80	1.097	57,112.451	0.00	106.80	1,699.96
440.78	107.44	1.110	57,493.698	0.00	107.44	1,719.70
440.79	108.07	1.124	57,876.214	0.00	108.07	1,739.55
440.80	108.64	1.137	58,259.997	0.00	108.64	1,759.48
440.81	109.24	1.150	58,645.049	0.00	109.24	1,779.56
440.82	109.87	1.164	59,031.369	0.00	109.87	1,799.81
440.83	110.52	1.177	59,418.957	0.00	110.52	1,820.20
440.84	111.05	1.191	59,807.814	0.00	111.05	1,840.59
440.85	111.68	1.205	60,197.938	0.00	111.68	1,861.23
440.86	112.33	1.219	60,589.331	0.00	112.33	1,882.01
440.87	112.94	1.233	60,981.993	0.00	112.94	1,902.88
440.88	113.57	1.247	61,375.922	0.00	113.57	1,923.91
440.89	114.12	1.261	61,771.120	0.00	114.12	1,944.98
440.90	114.75	1.275	62,167.586	0.00	114.75	1,966.27
440.91	115.37	1.289	62,565.320	0.00	115.37	1,987.67
440.92	116.02	1.304	62,964.323	0.00	116.02	2,009.24
440.93	116.66	1.318	63,364.593	0.00	116.66	2,030.94
440.94	117.30	1.333	63,766.132	0.00	117.30	2,052.76
440.95	117.84	1.348	64,168.940	0.00	117.84	2,074.63
440.96	118.48	1.362	64,573.015	0.00	118.48	2,096.73
440.97	119.10	1.377	64,978.359	0.00	119.10	2,118.94
440.98	119.75	1.392	65,384.971	0.00	119.75	2,141.32
440.99	120.40	1.407	65,792.851	0.00	120.40	2,163.83
441.00	121.01	1.422	66,202.000	0.00	121.01	2,186.44
441.01	121.67	1.438	66,591.600	0.00	121.67	2,209.23
441.02	122.31	1.453	66,982.342	0.00	122.31	2,232.14
441.03	122.85	1.468	67,374.228	0.00	122.85	2,255.06
441.04	123.51	1.484	67,767.257	0.00	123.51	2,278.25
441.05	124.15	1.500	68,161.428	0.00	124.15	2,301.55
441.06	124.77	1.515	68,556.743	0.00	124.77	2,324.95
441.07	125.41	1.531	68,953.201	0.00	125.41	2,348.51
441.08	126.08	1.547	69,350.802	0.00	126.08	2,372.23
441.09	126.70	1.563	69,749.546	0.00	126.70	2,396.03
441.10	127.34	1.579	70,149.433	0.00	127.34	2,419.99
441.11	128.02	1.595	70,550.463	0.00	128.02	2,444.12

Existing

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 100 years
Label: 1 Storm Event:
Scenario: EX10

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
441.12	128.64	1.611	70,952.636	0.00	128.64	2,468.32
441.13	129.29	1.628	71,355.952	0.00	129.29	2,492.70
441.14	129.96	1.644	71,760.411	0.00	129.96	2,517.21
441.15	130.58	1.661	72,166.013	0.00	130.58	2,541.82
441.16	131.23	1.677	72,572.758	0.00	131.23	2,566.59
441.17	131.90	1.694	72,980.646	0.00	131.90	2,591.52
441.18	132.52	1.711	73,389.678	0.00	132.52	2,616.54
441.19	133.17	1.728	73,799.852	0.00	133.17	2,641.72
441.20	133.81	1.745	74,211.169	0.00	133.81	2,667.03
441.21	134.47	1.762	74,623.630	0.00	134.47	2,692.50
441.22	135.12	1.779	75,037.233	0.00	135.12	2,718.09
441.23	135.77	1.796	75,451.980	0.00	135.77	2,743.82
441.24	136.42	1.814	75,867.869	0.00	136.42	2,769.69
441.25	137.05	1.831	76,284.902	0.00	137.05	2,795.68
441.26	137.72	1.849	76,703.077	0.00	137.72	2,821.84
441.27	138.43	1.866	77,122.396	0.00	138.43	2,848.19
441.28	139.10	1.884	77,542.857	0.00	139.10	2,874.64
441.29	139.74	1.902	77,964.462	0.00	139.74	2,901.20
441.30	140.44	1.920	78,387.210	0.00	140.44	2,927.96
441.31	141.06	1.938	78,811.100	0.00	141.06	2,954.78
441.32	141.72	1.956	79,236.134	0.00	141.72	2,981.78
441.33	142.40	1.974	79,662.311	0.00	142.40	3,008.94
441.34	143.08	1.993	80,089.631	0.00	143.08	3,036.25
441.35	143.69	2.011	80,518.094	0.00	143.69	3,063.63
441.36	144.38	2.030	80,947.700	0.00	144.38	3,091.23
441.37	145.10	2.048	81,378.449	0.00	145.10	3,119.00
441.38	145.73	2.067	81,810.341	0.00	145.73	3,146.82
441.39	146.42	2.086	82,243.376	0.00	146.42	3,174.86
441.40	147.07	2.105	82,677.554	0.00	147.07	3,202.99
441.41	147.71	2.124	83,112.875	0.00	147.71	3,231.27
441.42	148.37	2.143	83,549.339	0.00	148.37	3,259.71
441.43	149.07	2.162	83,986.947	0.00	149.07	3,288.33
441.44	149.78	2.181	84,425.697	0.00	149.78	3,317.11
441.45	150.44	2.201	84,865.590	0.00	150.44	3,345.99
441.46	151.11	2.220	85,306.626	0.00	151.11	3,375.01
441.47	151.76	2.240	85,748.806	0.00	151.76	3,404.17
441.48	152.49	2.260	86,192.128	0.00	152.49	3,433.56
441.49	153.19	2.280	86,636.594	0.00	153.19	3,463.06
441.50	153.85	2.299	87,082.202	0.00	153.85	3,492.68
441.51	154.49	2.320	87,528.954	0.00	154.49	3,522.42
441.52	155.16	2.340	87,976.848	0.00	155.16	3,552.34
441.53	155.91	2.360	88,425.886	0.00	155.91	3,582.49
441.54	156.58	2.380	88,876.066	0.00	156.58	3,612.72

Existing

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 100 years
Label: 1 Storm Event:
Scenario: EX10

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
441.55	157.22	2.401	89,327.390	0.00	157.22	3,643.05
441.56	157.91	2.421	89,779.857	0.00	157.91	3,673.60
441.57	158.68	2.442	90,233.467	0.00	158.68	3,704.37
441.58	159.31	2.463	90,688.219	0.00	159.31	3,735.15
441.59	159.98	2.484	91,144.115	0.00	159.98	3,766.12
441.60	160.69	2.505	91,601.154	0.00	160.69	3,797.30
441.61	161.42	2.526	92,059.336	0.00	161.42	3,828.63
441.62	162.05	2.547	92,518.661	0.00	162.05	3,860.02
441.63	162.72	2.568	92,979.129	0.00	162.72	3,891.61
441.64	163.49	2.590	93,440.740	0.00	163.49	3,923.45
441.65	164.16	2.611	93,903.494	0.00	164.16	3,955.34
441.66	164.83	2.633	94,367.391	0.00	164.83	3,987.39
441.67	165.60	2.654	94,832.431	0.00	165.60	4,019.70
441.68	166.27	2.676	95,298.614	0.00	166.27	4,052.06
441.69	166.91	2.698	95,765.940	0.00	166.91	4,084.54
441.70	167.65	2.720	96,234.410	0.00	167.65	4,117.28
441.71	168.36	2.742	96,704.022	0.00	168.36	4,150.14
441.72	169.03	2.765	97,174.777	0.00	169.03	4,183.13
441.73	169.72	2.787	97,646.676	0.00	169.72	4,216.29
441.74	170.44	2.809	98,119.717	0.00	170.44	4,249.64
441.75	171.12	2.832	98,593.902	0.00	171.12	4,283.10
441.76	171.86	2.855	99,069.229	0.00	171.86	4,316.79
441.77	172.52	2.877	99,545.700	0.00	172.52	4,350.55
441.78	173.26	2.900	100,023.313	0.00	173.26	4,384.55
441.79	174.00	2.923	100,502.070	0.00	174.00	4,418.71
441.80	174.63	2.946	100,981.969	0.00	174.63	4,452.93
441.81	175.38	2.970	101,463.012	0.00	175.38	4,487.41
441.82	176.07	2.993	101,945.198	0.00	176.07	4,522.00
441.83	176.75	3.017	102,428.526	0.00	176.75	4,556.75
441.84	177.55	3.040	102,912.998	0.00	177.55	4,591.77
441.85	178.19	3.064	103,398.613	0.00	178.19	4,626.80
441.86	178.93	3.088	103,885.371	0.00	178.93	4,662.09
441.87	179.64	3.111	104,373.272	0.00	179.64	4,697.50
441.88	180.34	3.135	104,862.316	0.00	180.34	4,733.07
441.89	181.08	3.160	105,352.503	0.00	181.08	4,768.85
441.90	181.77	3.184	105,843.833	0.00	181.77	4,804.74
441.91	182.53	3.208	106,336.306	0.00	182.53	4,840.86
441.92	183.21	3.233	106,829.922	0.00	183.21	4,877.07
441.93	183.91	3.257	107,324.681	0.00	183.91	4,913.46
441.94	184.62	3.282	107,820.583	0.00	184.62	4,950.03
441.95	185.37	3.307	108,317.628	0.00	185.37	4,986.80
441.96	186.07	3.332	108,815.817	0.00	186.07	5,023.69
441.97	186.75	3.357	109,315.148	0.00	186.75	5,060.73

Existing

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 100 years
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Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
441.98	187.57	3.382	109,815.622	0.00	187.57	5,098.07
441.99	188.20	3.407	110,317.240	0.00	188.20	5,135.39
442.00	188.98	3.433	110,820.000	0.00	188.98	5,173.02
442.01	189.62	3.458	111,571.258	0.00	189.62	5,210.73
442.02	190.43	3.484	112,325.053	0.00	190.43	5,248.86
442.03	191.12	3.510	113,081.387	0.00	191.12	5,287.11
442.04	191.82	3.536	113,840.258	0.00	191.82	5,325.64
442.05	192.53	3.562	114,601.667	0.00	192.53	5,364.42
442.06	193.35	3.588	115,365.614	0.00	193.35	5,403.56
442.07	193.99	3.615	116,132.098	0.00	193.99	5,442.79
442.08	194.81	3.642	116,901.121	0.00	194.81	5,482.45
442.09	195.45	3.669	117,672.681	0.00	195.45	5,522.18
442.10	196.23	3.696	118,446.779	0.00	196.23	5,562.31
442.11	196.91	3.723	119,223.415	0.00	196.91	5,602.61
442.12	197.69	3.750	120,002.589	0.00	197.69	5,643.26
442.13	198.38	3.778	120,784.301	0.00	198.38	5,684.08
442.14	199.16	3.806	121,568.550	0.00	199.16	5,725.25
442.15	199.86	3.834	122,355.337	0.00	199.86	5,766.61
442.16	200.62	3.862	123,144.663	0.00	200.62	5,808.28
442.17	201.27	3.890	123,936.525	0.00	201.27	5,850.11
442.18	202.04	3.919	124,730.926	0.00	202.04	5,892.33
442.19	202.80	3.948	125,527.865	0.00	202.80	5,934.80
442.20	203.51	3.977	126,327.341	0.00	203.51	5,977.48
442.21	204.27	4.006	127,129.355	0.00	204.27	6,020.49
442.22	204.93	4.035	127,933.907	0.00	204.93	6,063.66
442.23	205.77	4.064	128,740.997	0.00	205.77	6,107.27
442.24	206.46	4.094	129,550.625	0.00	206.46	6,151.01
442.25	207.24	4.124	130,362.790	0.00	207.24	6,195.11
442.26	207.95	4.154	131,177.494	0.00	207.95	6,239.41
442.27	208.67	4.184	131,994.735	0.00	208.67	6,283.99
442.28	209.43	4.215	132,814.514	0.00	209.43	6,328.89
442.29	210.09	4.245	133,636.831	0.00	210.09	6,373.96
442.30	210.93	4.276	134,461.685	0.00	210.93	6,419.48
442.31	211.62	4.307	135,289.078	0.00	211.62	6,465.13
442.32	212.35	4.338	136,119.008	0.00	212.35	6,511.10
442.33	213.12	4.369	136,951.476	0.00	213.12	6,557.37
442.34	213.84	4.401	137,786.482	0.00	213.84	6,603.88
442.35	214.62	4.433	138,624.026	0.00	214.62	6,650.73
442.36	215.39	4.465	139,464.107	0.00	215.39	6,697.85
442.37	216.11	4.497	140,306.727	0.00	216.11	6,745.20
442.38	216.89	4.529	141,151.884	0.00	216.89	6,792.89
442.39	217.54	4.561	141,999.579	0.00	217.54	6,840.73
442.40	218.38	4.594	142,849.812	0.00	218.38	6,889.05

Existing

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442.41	219.04	4.627	143,702.582	0.00	219.04	6,937.46
442.42	219.81	4.660	144,557.891	0.00	219.81	6,986.28
442.43	220.53	4.693	145,415.737	0.00	220.53	7,035.33
442.44	221.32	4.727	146,276.121	0.00	221.32	7,084.73
442.45	222.09	4.761	147,139.043	0.00	222.09	7,134.40
442.46	222.81	4.794	148,004.503	0.00	222.81	7,184.32
442.47	223.60	4.829	148,872.501	0.00	223.60	7,234.58
442.48	224.32	4.863	149,743.036	0.00	224.32	7,285.08
442.49	225.10	4.897	150,616.109	0.00	225.10	7,335.91
442.50	225.76	4.932	151,491.720	0.00	225.76	7,386.92
442.51	226.61	4.967	152,369.869	0.00	226.61	7,438.42
442.52	227.26	5.002	153,250.556	0.00	227.26	7,490.00
442.53	228.05	5.037	154,133.781	0.00	228.05	7,542.02
442.54	228.85	5.073	155,019.543	0.00	228.85	7,594.35
442.55	229.55	5.108	155,907.843	0.00	229.55	7,646.87
442.56	230.29	5.144	156,798.681	0.00	230.29	7,699.73
442.57	231.07	5.180	157,692.057	0.00	231.07	7,752.92
442.58	231.81	5.217	158,587.971	0.00	231.81	7,806.37
442.59	232.59	5.253	159,486.422	0.00	232.59	7,860.17
442.60	233.33	5.290	160,387.412	0.00	233.33	7,914.22
442.61	234.11	5.327	161,290.939	0.00	234.11	7,968.61
442.62	234.84	5.364	162,197.004	0.00	234.84	8,023.26
442.63	235.63	5.401	163,105.607	0.00	235.63	8,078.26
442.64	236.36	5.439	164,016.747	0.00	236.36	8,133.52
442.65	237.14	5.477	164,930.426	0.00	237.14	8,189.12
442.66	237.88	5.515	165,846.642	0.00	237.88	8,244.99
442.67	238.67	5.553	166,765.396	0.00	238.67	8,301.21
442.68	239.41	5.591	167,686.688	0.00	239.41	8,357.69
442.69	240.19	5.630	168,610.518	0.00	240.19	8,414.53
442.70	240.93	5.669	169,536.885	0.00	240.93	8,471.63
442.71	241.72	5.708	170,465.791	0.00	241.72	8,529.08
442.72	242.45	5.747	171,397.234	0.00	242.45	8,586.79
442.73	243.25	5.786	172,331.215	0.00	243.25	8,644.87
442.74	243.98	5.826	173,267.734	0.00	243.98	8,703.21
442.75	244.78	5.866	174,206.790	0.00	244.78	8,761.91
442.76	245.51	5.906	175,148.385	0.00	245.51	8,820.88
442.77	246.26	5.946	176,092.517	0.00	246.26	8,880.16
442.78	247.05	5.987	177,039.187	0.00	247.05	8,939.81
442.79	247.79	6.028	177,988.395	0.00	247.79	8,999.72
442.80	248.58	6.068	178,940.141	0.00	248.58	9,060.00
442.81	249.32	6.110	179,894.425	0.00	249.32	9,120.55
442.82	250.11	6.151	180,851.246	0.00	250.11	9,181.46
442.83	250.86	6.193	181,810.605	0.00	250.86	9,242.65

Existing

Subsection: Elevation-Volume-Flow Table (Pond)
Label: 1
Scenario: EX10

Return Event: 100 years
Storm Event:

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
442.84	251.60	6.235	182,772.503	0.00	251.60	9,304.16
442.85	252.39	6.277	183,736.937	0.00	252.39	9,366.04
442.86	253.14	6.319	184,703.910	0.00	253.14	9,428.18
442.87	253.93	6.361	185,673.421	0.00	253.93	9,490.71
442.88	254.68	6.404	186,645.469	0.00	254.68	9,553.51
442.89	255.45	6.447	187,620.055	0.00	255.45	9,616.66
442.90	256.22	6.490	188,597.179	0.00	256.22	9,680.13
442.91	256.96	6.534	189,576.841	0.00	256.96	9,743.90
442.92	257.76	6.577	190,559.041	0.00	257.76	9,808.06
442.93	258.51	6.621	191,543.778	0.00	258.51	9,872.49
442.94	259.25	6.665	192,531.054	0.00	259.25	9,937.25
442.95	260.05	6.710	193,520.867	0.00	260.05	10,002.39
442.96	260.80	6.754	194,513.218	0.00	260.80	10,067.81
442.97	261.60	6.799	195,508.107	0.00	261.60	10,133.61
442.98	262.35	6.844	196,505.533	0.00	262.35	10,199.69
442.99	263.10	6.889	197,505.498	0.00	263.10	10,266.11
443.00	263.89	6.935	198,508.000	0.00	263.89	10,332.91
443.01	264.64	6.980	199,237.187	0.00	264.64	10,399.95
443.02	265.39	7.026	199,967.711	0.00	265.39	10,467.24
443.03	266.20	7.072	200,699.572	0.00	266.20	10,534.81
443.04	266.95	7.118	201,432.770	0.00	266.95	10,602.59
443.05	267.71	7.165	202,167.305	0.00	267.71	10,670.61
443.06	268.47	7.211	202,903.176	0.00	268.47	10,738.89
443.07	269.24	7.258	203,640.384	0.00	269.24	10,807.42
443.08	270.01	7.305	204,378.929	0.00	270.01	10,876.19
443.09	270.78	7.352	205,118.811	0.00	270.78	10,945.21
443.10	271.55	7.399	205,860.030	0.00	271.55	11,014.48
443.11	272.32	7.446	206,602.586	0.00	272.32	11,083.99
443.12	273.07	7.494	207,346.478	0.00	273.07	11,153.73
443.13	273.84	7.541	208,091.707	0.00	273.84	11,223.75
443.14	274.62	7.589	208,838.273	0.00	274.62	11,294.00
443.15	275.39	7.637	209,586.176	0.00	275.39	11,364.52
443.16	276.16	7.685	210,335.416	0.00	276.16	11,435.28
443.17	276.94	7.734	211,085.992	0.00	276.94	11,506.29
443.18	277.71	7.782	211,837.905	0.00	277.71	11,577.55
443.19	278.58	7.831	212,591.155	0.00	278.58	11,649.16
443.20	279.36	7.880	213,345.742	0.00	279.36	11,720.92
443.21	280.02	7.929	214,101.666	0.00	280.02	11,792.82
443.22	280.89	7.978	214,858.927	0.00	280.89	11,865.19
443.23	281.67	8.028	215,617.524	0.00	281.67	11,937.71
443.24	282.39	8.077	216,377.458	0.00	282.39	12,010.44
443.25	283.17	8.127	217,138.729	0.00	283.17	12,083.47
443.26	283.96	8.177	217,901.337	0.00	283.96	12,156.76

Existing

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 100 years
Label: 1 Storm Event:
Scenario: EX10

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
443.27	284.71	8.227	218,665.282	0.00	284.71	12,230.27
443.28	285.51	8.277	219,430.563	0.00	285.51	12,304.09
443.29	286.31	8.328	220,197.182	0.00	286.31	12,378.16
443.30	287.04	8.378	220,965.137	0.00	287.04	12,452.42
443.31	287.76	8.429	221,734.429	0.00	287.76	12,526.92
443.32	288.56	8.480	222,505.058	0.00	288.56	12,601.76
443.33	289.36	8.531	223,277.023	0.00	289.36	12,676.86
443.34	290.14	8.583	224,050.326	0.00	290.14	12,752.19
443.35	290.92	8.634	224,824.965	0.00	290.92	12,827.78
443.36	291.70	8.686	225,600.941	0.00	291.70	12,903.63
443.37	292.50	8.738	226,378.254	0.00	292.50	12,979.77
443.38	293.28	8.790	227,156.904	0.00	293.28	13,056.14
443.39	294.02	8.842	227,936.890	0.00	294.02	13,132.73
443.40	294.76	8.895	228,718.213	0.00	294.76	13,209.58
443.41	295.54	8.947	229,500.874	0.00	295.54	13,286.73
443.42	296.30	9.000	230,284.871	0.00	296.30	13,364.11
443.43	297.11	9.053	231,070.204	0.00	297.11	13,441.81
443.44	298.69	9.106	231,856.875	0.00	298.69	13,520.55
443.45	299.25	9.159	232,644.883	0.00	299.25	13,598.53
443.46	299.77	9.213	233,434.227	0.00	299.77	13,676.73
443.47	300.81	9.266	234,224.908	0.00	300.81	13,755.71
443.48	301.82	9.320	235,016.926	0.00	301.82	13,834.93
443.49	302.25	9.374	235,810.281	0.00	302.25	13,913.83
443.50	303.56	9.429	236,604.972	0.00	303.56	13,993.87
443.51	304.27	9.483	237,401.001	0.00	304.27	14,073.58
443.52	304.95	9.538	238,198.366	0.00	304.95	14,153.53
443.53	305.66	9.592	238,997.068	0.00	305.66	14,233.77
443.54	306.37	9.647	239,797.107	0.00	306.37	14,314.28
443.55	307.05	9.702	240,598.483	0.00	307.05	14,395.03
443.56	307.76	9.758	241,401.195	0.00	307.76	14,476.07
443.57	308.38	9.813	242,205.244	0.00	308.38	14,557.29
443.58	309.09	9.869	243,010.631	0.00	309.09	14,638.87
443.59	309.71	9.925	243,817.354	0.00	309.71	14,720.63
443.60	310.42	9.981	244,625.413	0.00	310.42	14,802.75
443.61	311.10	10.037	245,434.810	0.00	311.10	14,885.11
443.62	311.81	10.094	246,245.544	0.00	311.81	14,967.76
443.63	312.52	10.150	247,057.614	0.00	312.52	15,050.69
443.64	313.21	10.207	247,871.021	0.00	313.21	15,133.87
443.65	313.89	10.264	248,685.765	0.00	313.89	15,217.31
443.66	314.61	10.321	249,501.846	0.00	314.61	15,301.05
443.67	315.25	10.379	250,319.263	0.00	315.25	15,385.00
443.68	315.94	10.436	251,138.018	0.00	315.94	15,469.27
443.69	316.56	10.494	251,958.109	0.00	316.56	15,553.74

Existing

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 100 years
Label: 1 Storm Event:
Scenario: EX10

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
443.70	317.27	10.552	252,779.537	0.00	317.27	15,638.57
443.71	317.96	10.610	253,602.302	0.00	317.96	15,723.65
443.72	318.67	10.668	254,426.403	0.00	318.67	15,809.04
443.73	319.36	10.727	255,251.842	0.00	319.36	15,894.67
443.74	320.07	10.785	256,078.617	0.00	320.07	15,980.61
443.75	320.76	10.844	256,906.729	0.00	320.76	16,066.79
443.76	321.47	10.903	257,736.178	0.00	321.47	16,153.28
443.77	322.09	10.963	258,566.964	0.00	322.09	16,239.95
443.78	322.81	11.022	259,399.087	0.00	322.81	16,326.99
443.79	323.43	11.082	260,232.546	0.00	323.43	16,414.22
443.80	324.12	11.142	261,067.342	0.00	324.12	16,501.79
443.81	324.83	11.202	261,903.475	0.00	324.83	16,589.67
443.82	325.52	11.262	262,740.945	0.00	325.52	16,677.80
443.83	326.23	11.322	263,579.752	0.00	326.23	16,766.23
443.84	326.93	11.383	264,419.896	0.00	326.93	16,854.92
443.85	327.62	11.444	265,261.376	0.00	327.62	16,943.89
443.86	328.33	11.505	266,104.193	0.00	328.33	17,033.17
443.87	328.95	11.566	266,948.347	0.00	328.95	17,122.63
443.88	329.64	11.627	267,793.838	0.00	329.64	17,212.45
443.89	330.29	11.689	268,640.666	0.00	330.29	17,302.50
443.90	330.98	11.751	269,488.830	0.00	330.98	17,392.88
443.91	331.70	11.813	270,338.331	0.00	331.70	17,483.57
443.92	332.41	11.875	271,189.169	0.00	332.41	17,574.53
443.93	333.13	11.937	272,041.344	0.00	333.13	17,665.79
443.94	333.90	12.000	272,894.856	0.00	333.90	17,757.39
443.95	334.67	12.062	273,749.705	0.00	334.67	17,849.26
443.96	335.46	12.125	274,605.890	0.00	335.46	17,941.45
443.97	336.22	12.188	275,463.412	0.00	336.22	18,033.88
443.98	337.03	12.252	276,322.271	0.00	337.03	18,126.66
443.99	337.92	12.315	277,182.467	0.00	337.92	18,219.80
444.00	338.85	12.379	278,044.000	0.00	338.85	18,313.26
444.01	339.88	12.443	278,889.024	0.00	339.88	18,407.12
444.02	340.94	12.507	279,735.330	0.00	340.94	18,501.28
444.03	342.03	12.571	280,582.919	0.00	342.03	18,595.76
444.04	343.17	12.636	281,431.789	0.00	343.17	18,690.56
444.05	344.37	12.701	282,281.942	0.00	344.37	18,785.72
444.06	345.54	12.766	283,133.377	0.00	345.54	18,881.12
444.07	346.82	12.831	283,986.093	0.00	346.82	18,976.92
444.08	348.08	12.896	284,840.092	0.00	348.08	19,072.99
444.09	349.49	12.961	285,695.374	0.00	349.49	19,169.48
444.10	350.92	13.027	286,551.937	0.00	350.92	19,266.29
444.11	352.41	13.093	287,409.782	0.00	352.41	19,363.44
444.12	353.95	13.159	288,268.910	0.00	353.95	19,460.93

Existing

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 100 years
Label: 1 Storm Event:
Scenario: EX10

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
444.13	355.58	13.225	289,129.320	0.00	355.58	19,558.79
444.14	357.24	13.292	289,991.012	0.00	357.24	19,656.97
444.15	358.89	13.358	290,853.986	0.00	358.89	19,755.43
444.16	360.60	13.425	291,718.242	0.00	360.60	19,854.24
444.17	362.45	13.492	292,583.780	0.00	362.45	19,953.46
444.18	364.37	13.560	293,450.601	0.00	364.37	20,053.06
444.19	366.34	13.627	294,318.703	0.00	366.34	20,152.99
444.20	368.37	13.695	295,188.088	0.00	368.37	20,253.28
444.21	370.60	13.763	296,058.755	0.00	370.60	20,354.04
444.22	372.88	13.831	296,930.704	0.00	372.88	20,455.15
444.23	375.15	13.899	297,803.935	0.00	375.15	20,556.54
444.24	377.56	13.968	298,678.448	0.00	377.56	20,658.37
444.25	379.93	14.036	299,554.244	0.00	379.93	20,760.45
444.26	382.42	14.105	300,431.321	0.00	382.42	20,862.94
444.27	384.96	14.174	301,309.681	0.00	384.96	20,965.77
444.28	387.56	14.243	302,189.323	0.00	387.56	21,068.94
444.29	390.20	14.313	303,070.247	0.00	390.20	21,172.46
444.30	392.89	14.383	303,952.453	0.00	392.89	21,276.32
444.31	395.58	14.452	304,835.941	0.00	395.58	21,380.48
444.32	398.30	14.522	305,720.712	0.00	398.30	21,484.96
444.33	401.13	14.593	306,606.764	0.00	401.13	21,589.84
444.34	404.00	14.663	307,494.099	0.00	404.00	21,695.07
444.35	406.93	14.734	308,382.716	0.00	406.93	21,800.64
444.36	409.89	14.805	309,272.615	0.00	409.89	21,906.55
444.37	412.91	14.876	310,163.796	0.00	412.91	22,012.80
444.38	415.90	14.947	311,056.259	0.00	415.90	22,119.33
444.39	419.00	15.019	311,950.005	0.00	419.00	22,226.26
444.40	422.08	15.090	312,845.032	0.00	422.08	22,333.48
444.41	425.27	15.162	313,741.342	0.00	425.27	22,441.10
444.42	428.53	15.235	314,638.934	0.00	428.53	22,549.09
444.43	431.81	15.307	315,537.807	0.00	431.81	22,657.39
444.44	435.13	15.379	316,437.964	0.00	435.13	22,766.04
444.45	438.42	15.452	317,339.402	0.00	438.42	22,874.97
444.46	441.76	15.525	318,242.122	0.00	441.76	22,984.24
444.47	445.21	15.598	319,146.125	0.00	445.21	23,093.92
444.48	448.70	15.672	320,051.409	0.00	448.70	23,203.94
444.49	452.23	15.745	320,957.976	0.00	452.23	23,314.31
444.50	455.81	15.819	321,865.825	0.00	455.81	23,425.02
444.51	459.43	15.893	322,774.956	0.00	459.43	23,536.08
444.52	463.02	15.967	323,685.369	0.00	463.02	23,647.42
444.53	466.65	16.042	324,597.065	0.00	466.65	23,759.09
444.54	470.39	16.116	325,510.042	0.00	470.39	23,871.19
444.55	474.18	16.191	326,424.302	0.00	474.18	23,983.63

Existing

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 100 years
Label: 1 Storm Event:
Scenario: EX10

Elevation (ft)	Outflow (ft³/s)	Storage (ac-ft)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
444.56	478.00	16.266	327,339.844	0.00	478.00	24,096.41
444.57	481.87	16.341	328,256.667	0.00	481.87	24,209.54
444.58	485.70	16.417	329,174.774	0.00	485.70	24,322.95
444.59	489.58	16.493	330,094.162	0.00	489.58	24,436.71
444.60	493.57	16.568	331,014.832	0.00	493.57	24,550.88
444.61	497.60	16.644	331,936.785	0.00	497.60	24,665.40
444.62	501.67	16.721	332,860.019	0.00	501.67	24,780.27
444.63	505.78	16.797	333,784.536	0.00	505.78	24,895.49
444.64	509.87	16.874	334,710.335	0.00	509.87	25,010.99
444.65	513.98	16.951	335,637.416	0.00	513.98	25,126.83
444.66	518.20	17.028	336,565.779	0.00	518.20	25,243.08
444.67	522.47	17.106	337,495.424	0.00	522.47	25,359.70
444.68	526.78	17.183	338,426.352	0.00	526.78	25,476.66
444.69	531.07	17.261	339,358.561	0.00	531.07	25,593.91
444.70	535.39	17.339	340,292.053	0.00	535.39	25,711.51
444.71	539.83	17.417	341,226.827	0.00	539.83	25,829.53
444.72	544.30	17.496	342,162.883	0.00	544.30	25,947.90
444.73	548.81	17.574	343,100.221	0.00	548.81	26,066.63
444.74	553.30	17.653	344,038.841	0.00	553.30	26,185.64
444.75	557.82	17.732	344,978.744	0.00	557.82	26,305.00
444.76	562.49	17.812	345,919.928	0.00	562.49	26,424.82
444.77	567.15	17.891	346,862.395	0.00	567.15	26,544.94
444.78	571.80	17.971	347,806.144	0.00	571.80	26,665.37
444.79	576.50	18.051	348,751.175	0.00	576.50	26,786.15
444.80	581.27	18.131	349,697.488	0.00	581.27	26,907.34
444.81	586.05	18.211	350,645.083	0.00	586.05	27,028.84
444.82	590.93	18.292	351,593.961	0.00	590.93	27,150.76
444.83	595.80	18.373	352,544.120	0.00	595.80	27,272.99
444.84	600.72	18.454	353,495.562	0.00	600.72	27,395.58
444.85	605.70	18.535	354,448.286	0.00	605.70	27,518.55
444.86	610.74	18.617	355,402.292	0.00	610.74	27,641.90
444.87	615.73	18.698	356,357.580	0.00	615.73	27,765.51
444.88	620.85	18.780	357,314.150	0.00	620.85	27,889.58
444.89	625.94	18.862	358,272.002	0.00	625.94	28,013.94
444.90	631.12	18.945	359,231.137	0.00	631.12	28,138.70
444.91	636.27	19.027	360,191.554	0.00	636.27	28,263.75
444.92	641.48	19.110	361,153.252	0.00	641.48	28,389.19
444.93	646.78	19.193	362,116.233	0.00	646.78	28,515.04
444.94	652.08	19.276	363,080.497	0.00	652.08	28,641.19
444.95	657.48	19.360	364,046.042	0.00	657.48	28,767.79
444.96	662.82	19.443	365,012.869	0.00	662.82	28,894.63
444.97	668.29	19.527	365,980.979	0.00	668.29	29,021.94
444.98	673.72	19.611	366,950.370	0.00	673.72	29,149.52

Existing

Subsection: Elevation-Volume-Flow Table (Pond) Return Event: 100 years
Label: 1 Storm Event:
Scenario: EX10

Elevation (ft)	Outflow (ft^3/s)	Storage (ac-ft)	Area (ft^2)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
444.99	679.28	19.696	367,921.044	0.00	679.28	29,277.56
445.00	684.89	19.780	368,893.000	0.00	684.89	29,405.97

Subsection: Level Pool Pond Routing Summary
Label: 1 (IN)
Scenario: EX10

Return Event: 100 years
Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	437.39 ft
Volume (Initial)	0.000 ac-ft
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	1.000 min

Inflow/Outflow Hydrograph Summary			
Flow (Peak In)	964.53 ft³/s	Time to Peak (Flow, In)	252.000 min
Flow (Peak Outlet)	468.02 ft³/s	Time to Peak (Flow, Outlet)	262.000 min

Elevation (Water Surface, Peak)	444.53 ft
Volume (Peak)	16.069 ac-ft

Mass Balance (ac-ft)	
Volume (Initial)	0.000 ac-ft
Volume (Total Inflow)	66.101 ac-ft
Volume (Total Infiltration)	0.000 ac-ft
Volume (Total Outlet Outflow)	66.101 ac-ft
Volume (Retained)	0.000 ac-ft
Volume (Unrouted)	0.000 ac-ft
Error (Mass Balance)	0.0 %

Subsection: Pond Inflow Summary
Label: 1 (IN)
Scenario: EX10

Return Event: 100 years
Storm Event:

Summary for Hydrograph Addition at '1'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	100
<Catchment to Outflow Node>	200

Node Inflows

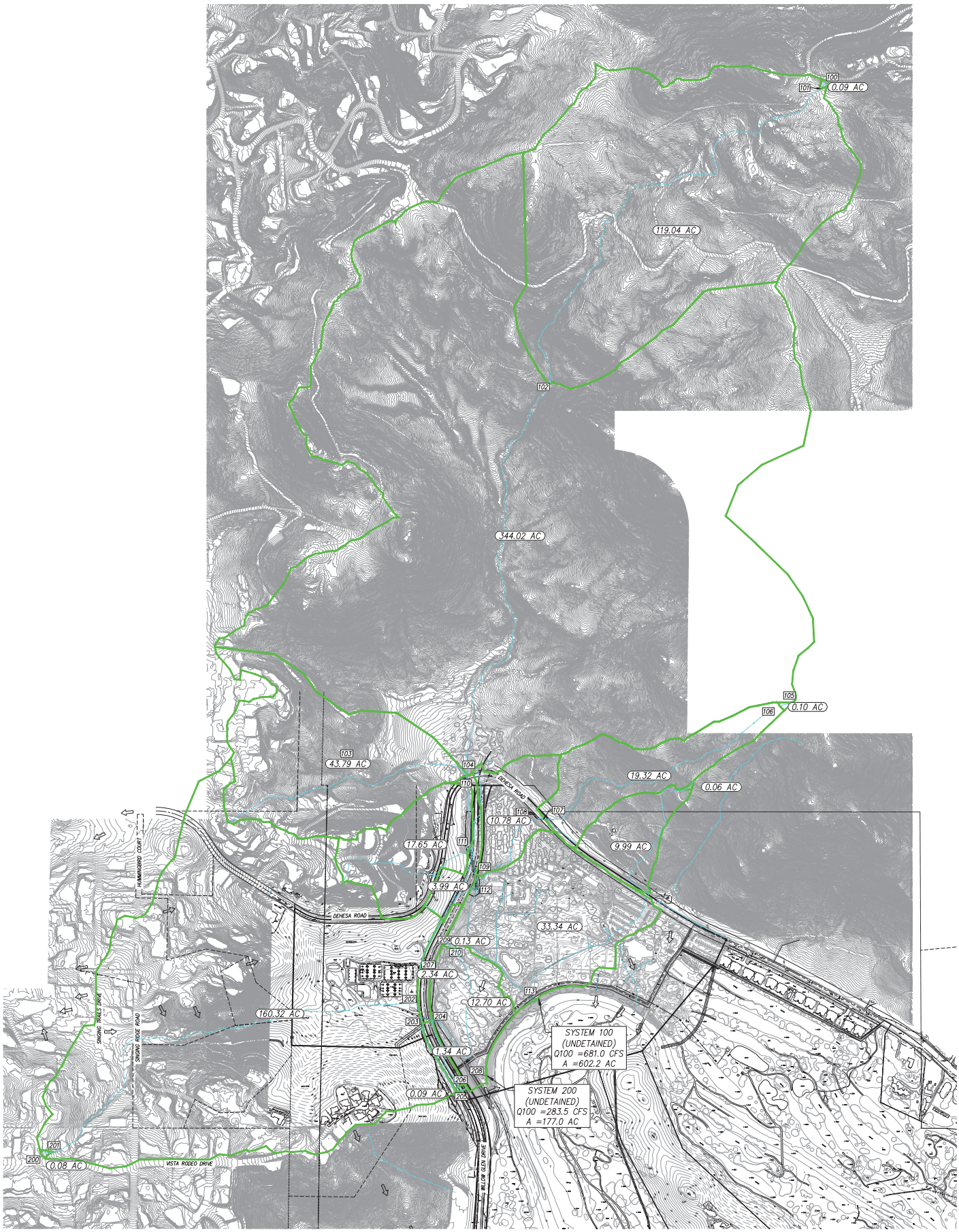
Inflow Type	Element	Volume (ac-ft)	Time to Peak (min)	Flow (Peak) (ft³/s)
Flow (From)	100	48.821	252.000	681.00
Flow (From)	200	17.281	252.000	283.53
Flow (In)	1	66.101	252.000	964.53

Existing

Index

APPENDIX 5

Drainage Exhibits



LEGEND

- DRAINAGE SUBAREA
- FLOW DIRECTION
- HYDROLOGY NODE
- AREA FROM UPSTREAM TO DOWNSTREAM NODE (XXX AC)
- DRAINAGE FLOWPATH

N

250 125 0 250 500 750

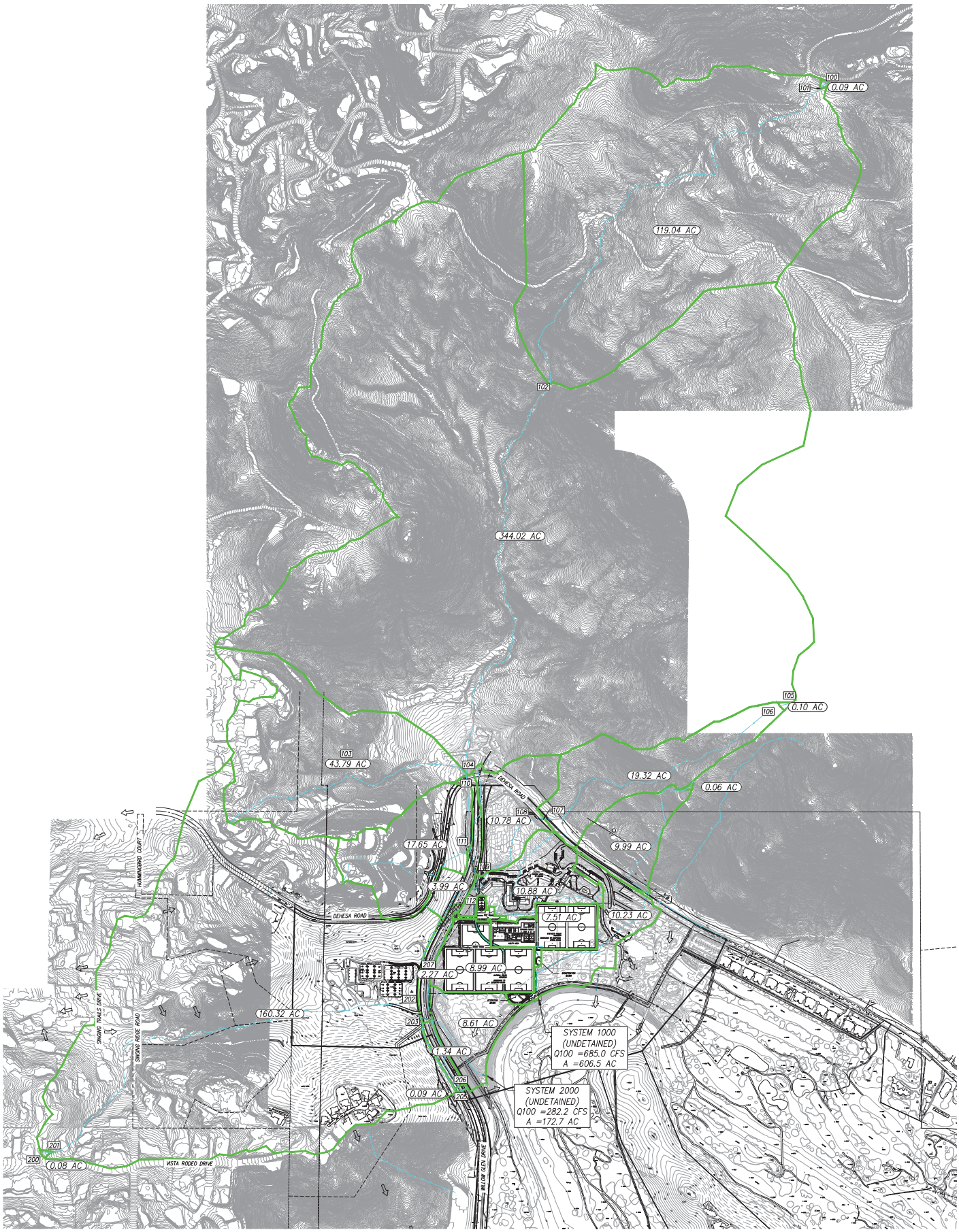
SCALE: 1"=250'

SCALE: 1"=250'
JOB #: 4507
CREATED: 6/15/2023

PREPARED BY:
PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

COUNTY OF SAN DIEGO
SINGING HILLS
DRAINAGE MAP
EXISTING CONDITIONS
EXHIBIT A

Last save by JENNIFER MAYNARD, File Name \\projects\p_drive\4507\Engr\Reports\Drainage\EXH\4507_Existing Conditions.dwg, Date Last Saved 6/23/2023 6:15:19 AM, Date Plotted Last 6/23/2023 10:47:35 AM



LEGEND

- DRAINAGE SUBAREA
- FLOW DIRECTION
- HYDROLOGY NODE
- AREA FROM UPSTREAM TO DOWNSTREAM NODE (XXX AC)
- DRAINAGE FLOWPATH

N

250 125 0 250 500 750

SCALE: 1"=250'

SCALE: 1"=250'
JOB #: 4507
CREATED: 6/15/2023

PREPARED BY:
PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey
701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.0349 Fax

COUNTY OF SAN DIEGO
SINGING HILLS
DRAINAGE MAP
PROPOSED CONDITIONS
EXHIBIT B

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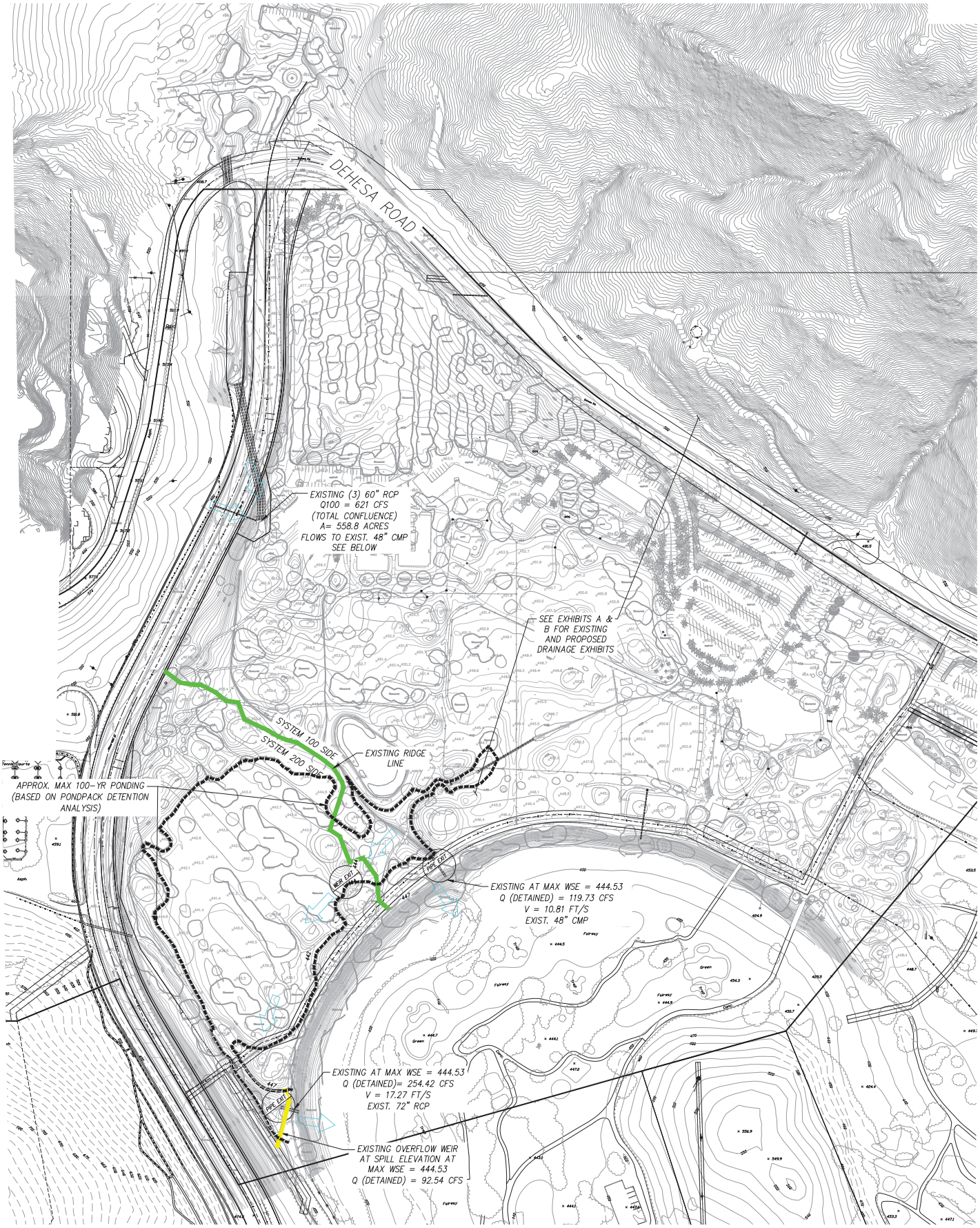

LEGEND

EXISTING DRAINAGE RIDGE

ELEVATION WEIR

FLOW DIRECTION

EXISTING CONDITIONS PATH OF TRAVEL- 3 EXITS (EXIT)

N

SCALE:	1"=250'
JOB #:	4507
CREATED:	6/15/2023

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

COUNTY OF SAN DIEGO

SINGING HILLS

EXISTING DETENTION MAP EXHIBIT C

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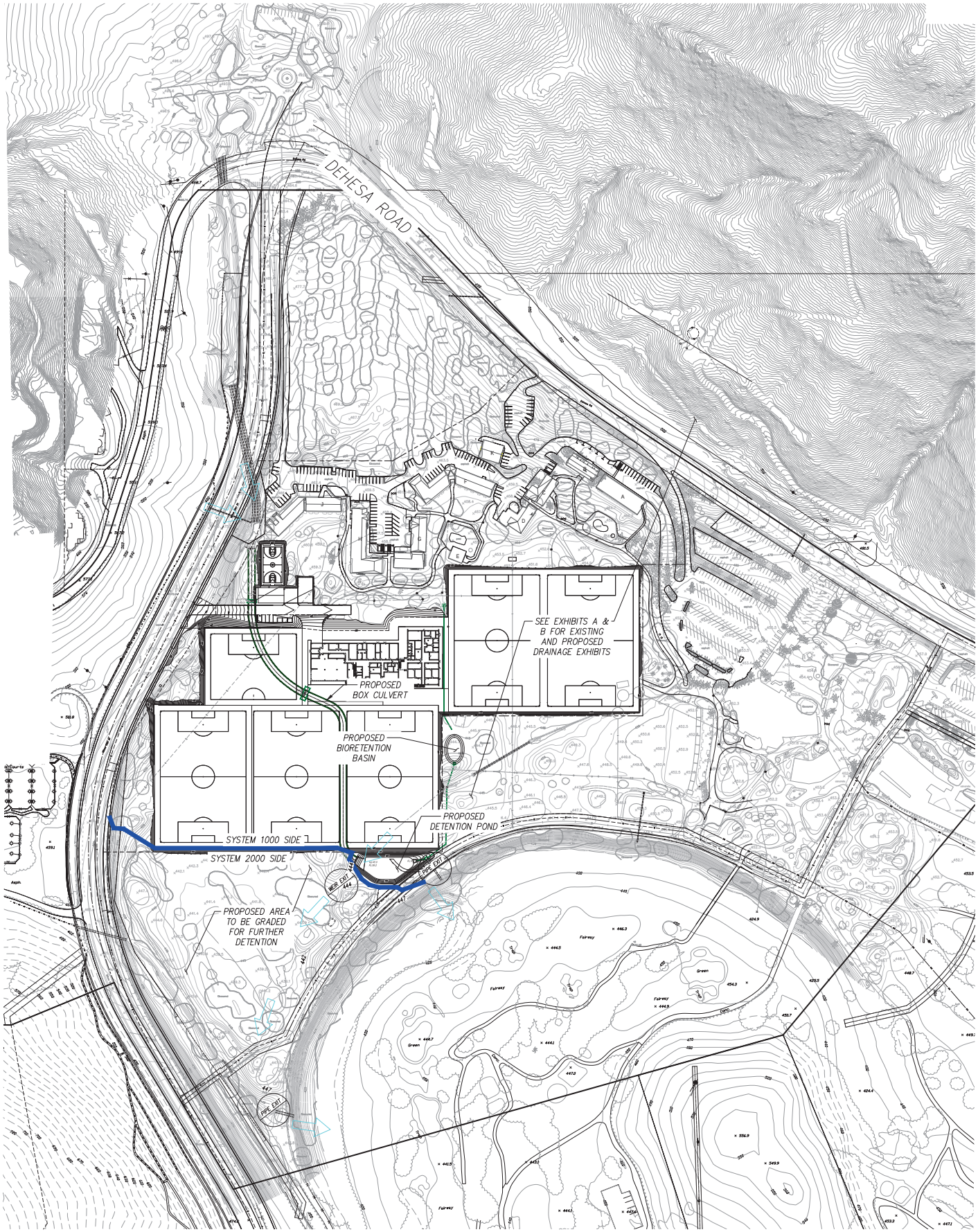

LEGEND

PROPOSED DRAINAGE RIDGE

ELEVATION WEIR

FLOW DIRECTION

EXISTING CONDITIONS PATH OF TRAVEL– 3 EXITS (EXIT)

N

SCALE:	1"=250'
JOB #:	4507
CREATED:	6/15/2023

PREPARED BY:

PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey

COUNTY OF SAN DIEGO

SINGING HILLS

PROPOSED DETENTION MAP EXHIBIT D

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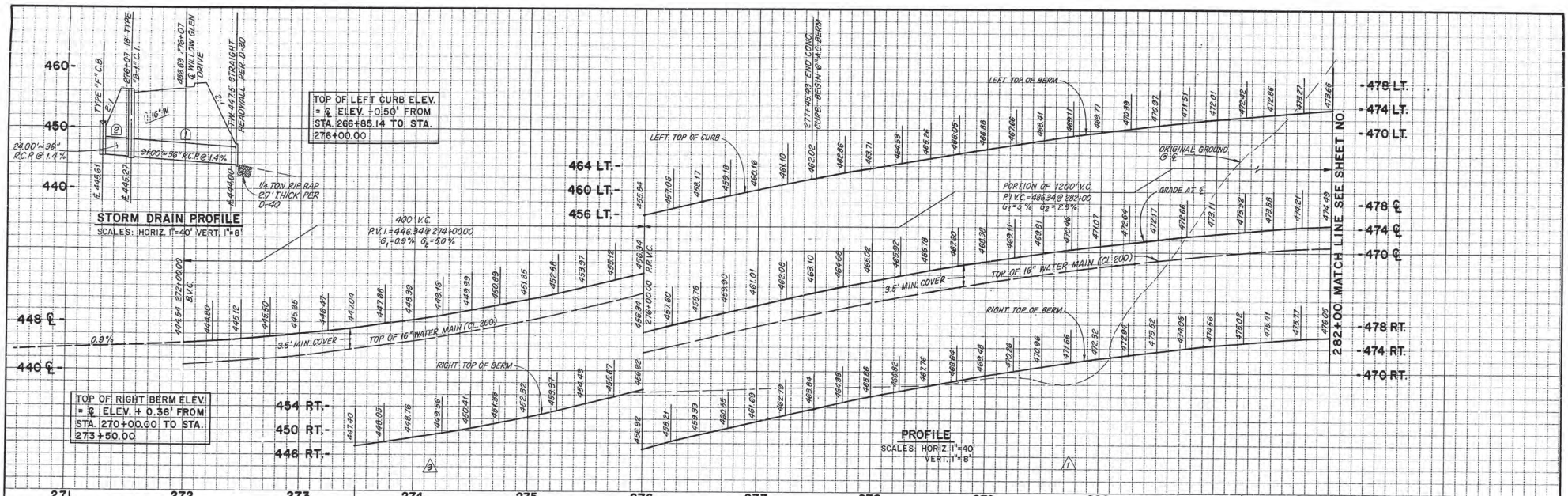
APPENDIX 5

As-Builts



STORM DRAIN DATA

NO.	△/BEARING	RADIUS	LENGTH	REMARKS
1.	N.86°25'15"W.	—	91.00'	36" R.C.P.
2.	N.86°25'15"W.	—	24.00'	36" R.C.P.

WATERLINE AS-BUILT

BRIAN C. REGAN

REGISTERED PROFESSIONAL ENGINEER BRIAN C. REGAN No. 35343 Exp. 9/30/91 CIVIL STATE OF CALIFORNIA

7/2/91
DATE

NOTE: LETTER FOR LANDSCAPING AND MAINTENANCE AGREEMENT BY SINGING HILLS RANCH CO. ON FILE AT THE COUNTY OF SAN DIEGO ENGINEERING DEPARTMENT.

NOTE: LOCATION OF EXISTING UTILITIES TO BE VERIFIED IN THE FIELD.

SEE T.M 4592-1 IMPROVEMENT PLAN, SHEET 3 OF 14, FOR SEWER TIE-IN.

REGISTERED PROFESSIONAL ENGINEER NORMAN C. ARNDT No. 21693 Exp. 7-31-91 CIVIL STATE OF CALIFORNIA

CURB & BERM DATA

NO.	△/BEARING	RADIUS	LENGTH	REMARKS
5.	N.03°34'45"E.	—	574.70'	
4.	Δ=26°46'17"	926'	432.67'	
3.	Δ=26°38'33"	874'	406.41'	(BERM EXCLUDED WHERE X-RAIL INSTALLED)
2.	N.03°34'45"E.	—	29.45'	6" A.C. BERM
1.	N.03°34'45"E.	—	545.49'	6" TYPE "G" CURB & GUTTER

WATER DATA

NO.	△/BEARING	RADIUS	LENGTH	REMARKS
5	Δ=18°49'26"	905'	297.33'	
4	Δ=91°41'46"	200'	110.64'	
3	Δ=21°55'07"	200'	76.96'	
2	N.03°34'45"E.	—	42.09'	
1	N.03°34'45"E.	—	480.01'	16" W.L.

CENTERLINE DATA

NO.	△/BEARING	RADIUS	LENGTH
2	Δ=28°56'06"	900'	454.51'
1	N.03°34'45"E.	—	545.49'

NO.	DESCRIPTION	APP'D	DATE
A	RECORD PLAN		3/9/89

COUNTY APPROVED CHANGES

NO.	DESCRIPTION	APP'D BY	DATE
A	REPLACEMENT SHEET FOR SHT. NO 20 FROM STA. 277+45.49 TO STA. 282+00		6/15/89
A	CHANGE TOTAL NUMBER OF SHEETS		6/27/89
A	REPLACEMENT SHEET FOR SHEET 20 FROM STA. 272+00 TO STA. 277+45.49		12/19/89

BENCH MARK

DESCRIPTION: STD. CONC. MON. WITH DISC STMPD. BM EC158 1988

LOCATION: 0.8 MILE EAST ALONG DEHESA ROAD FROM INTERSECTION WITH WILLOW GLEN ROAD IN FENCE LINE, S. SIDE OF RD. WHERE CHAIN LINK FENCE INTERSECTS WOODEN RAIL FENCE, 28 FT. S. OF C/L AND 48 FT. E. OF POLE NO. 071488.

RECORD FROM: SAN DIEGO COUNTY, SOUTH COUNTY VERTICAL CONTROL DATA

ELEVATION: 478.752 DATUM: N.A.V.D.

PRIVATE CONTRACT

SHEET	COUNTY OF SAN DIEGO DEPARTMENT OF PUBLIC WORKS	SHEETS
31		36

PLANS FOR THE IMPROVEMENT OF:

WILLOW GLEN DRIVE

COUNTY OF SAN DIEGO TRACT NO. 4494-1

CALIFORNIA COORDINATE INDEX 210-1803, 222-1803

RECOMMENDED FOR APPROVAL: _____ DESIGN DIVISION ENGINEER

APPROVED: _____ FOR GRANVILLE R. BOWMAN DIRECTOR OF PUBLIC WORKS

ENGINEER OF WORK: NORMAN C. ARNDT, RCE 21693

Checked by: TM

Approved by: 12/19/89

4494-1

J.N. 975

manitou engineering company

APR - 3 1992

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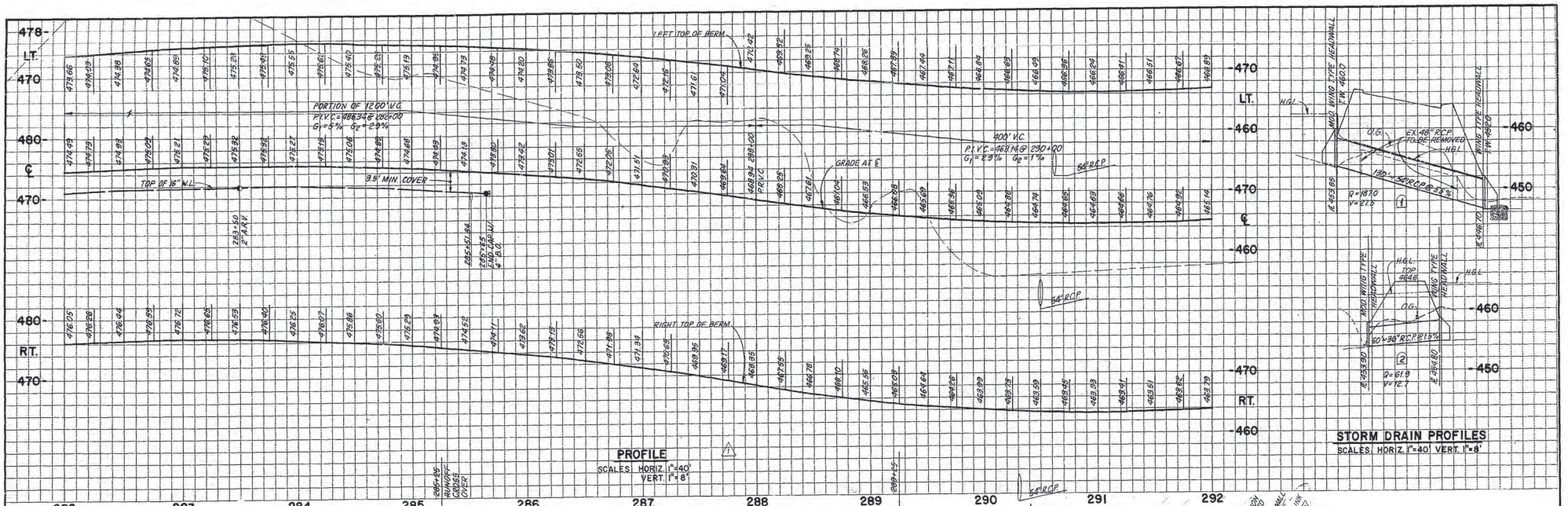

WATERLINE AS-BUILT

BRIAN C. REGAN

DATE 7/2/91

REGISTERED PROFESSIONAL ENGINEER BRIAN C. REGAN No. 35343 Exp. 6/30/91 CIVIL STATE OF CALIFORNIA

WATER DATA

NO.	△/BEARING	RADIUS	LENGTH	REMARKS
1.	Δ=05°31'54"	905'	87.37'	16" W.L.
2.	N.30°53'15"W.		264.95'	16" W.L.

BERM DATA

NO.	△/BEARING	RADIUS	LENGTH	REMARKS
1.	Δ=07°49'27"	874'	119.35'	6" A.C. BERM (BERM EXCLUDED WHERE K-RAIL INSTALLED)
2.	N.30°53'15"W.		457.36'	
3.	Δ=26°47'02"	925'	432.41	
4.				
5.				

BERM DATA (CONT.)

NO.	△/BEARING	RADIUS	LENGTH	REMARKS
6.	NOT USED			6" A.C. BERM
7.	Δ=28°01'52"	874'	427.59'	
8.	N.30°53'15"W.		435.54'	
9.	Δ=7°41'43"	926'	124.37'	

STORM DRAIN DATA

NO.	△/BEARING	RADIUS	LENGTH	REMARKS
1.	N.77°00'00"W.	130.00'	54" R.C.P. (1950-D)	
2.	N.09°56'00"W.	60.00'	36" R.C.P.	

℄ DATA

NO.	△/BEARING	RADIUS	LENGTH
1.	Δ=05°31'54"	905'	87.37'
2.	N.30°53'15"W.		492.99'
3.	Δ=26°47'02"	900'	420.72'

COUNTY APPROVED CHANGES

NO.	DESCRIPTION	APP'D BY	DATE
1	REPLACEMENT SHEET FOR SHEET NO. 21	ZP	10/23/89
2	CHANGE TOTAL NUMBER OF SHEETS	ZP	3/9/92
3	RECORD PLAN		

BENCH MARK

DESCRIPTION: STD. CONC. MON. WITH DISC STMPD. SM EC1SS 1968

LOCATION: 0.8 MILE EAST ALONG GENESA ROAD FROM INTERSECTION WITH WILLOW GLEN ROAD IN FENCE LINE, S. SIDE OF RD. WHERE CHAIN LINK FENCE INTERSECTS WOODEN RAIL FENCE, 28 FT. S. OF C/L AND 48 FT. E. OF POLE NO. 671486.

RECORD FROM: SAN DIEGO COUNTY, SOUTH COUNTY VERTICAL CONTROL DATA

ELEVATION: 478.758 DATUM: N.A.V.D.

PRIVATE CONTRACT

SHEET 32 | COUNTY OF SAN DIEGO DEPARTMENT OF PUBLIC WORKS | 36 SHEETS

PLANS FOR THE IMPROVEMENT OF:

WILLOW GLEN DRIVE

COUNTY OF SAN DIEGO TRACT NO. 4494-1

CALIFORNIA COORDINATE INDEX E -1805, 2m -1803

RECOMMENDED FOR APPROVAL
SUBDIVISION ENGINEER

ENGINEER OF WORK:
NORMAN C. ARNDT, RCE 21693

APPROVED
FOR GRANVILLE R. BOWMAN
DIRECTOR OF PUBLIC WORKS

Checked by TM

Approved by 12/19/89

4494-1

J.N. 975

REGISTERED PROFESSIONAL ENGINEER NORMAN C. ARNDT No. 21693 Exp. 12-31-91 CIVIL STATE OF CALIFORNIA

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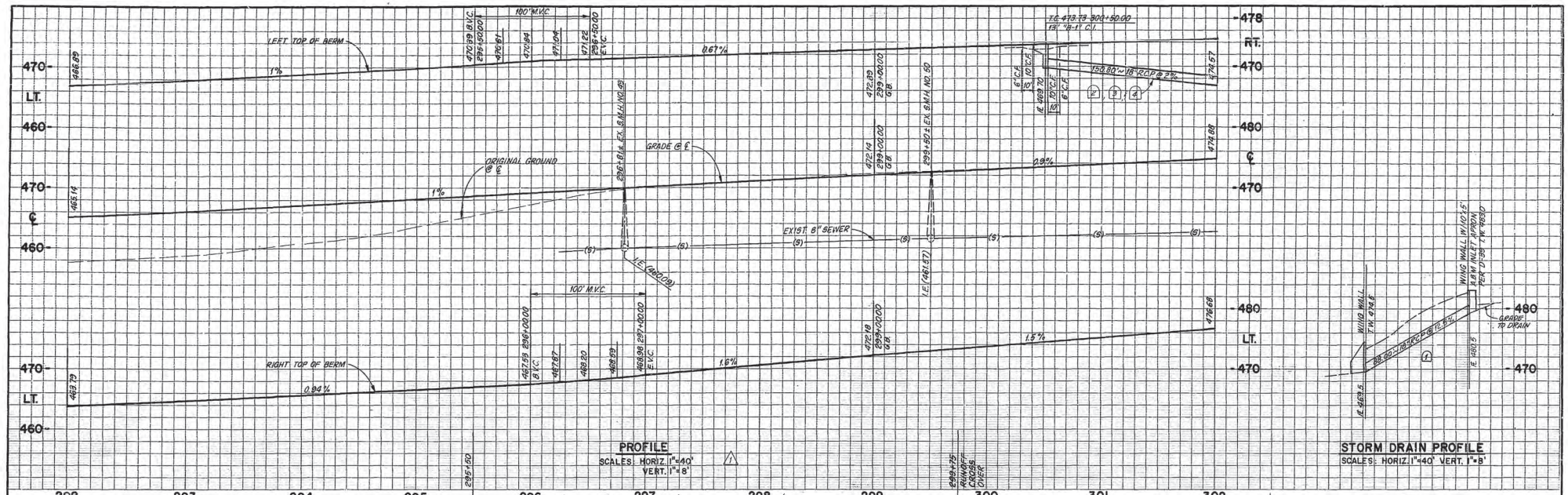

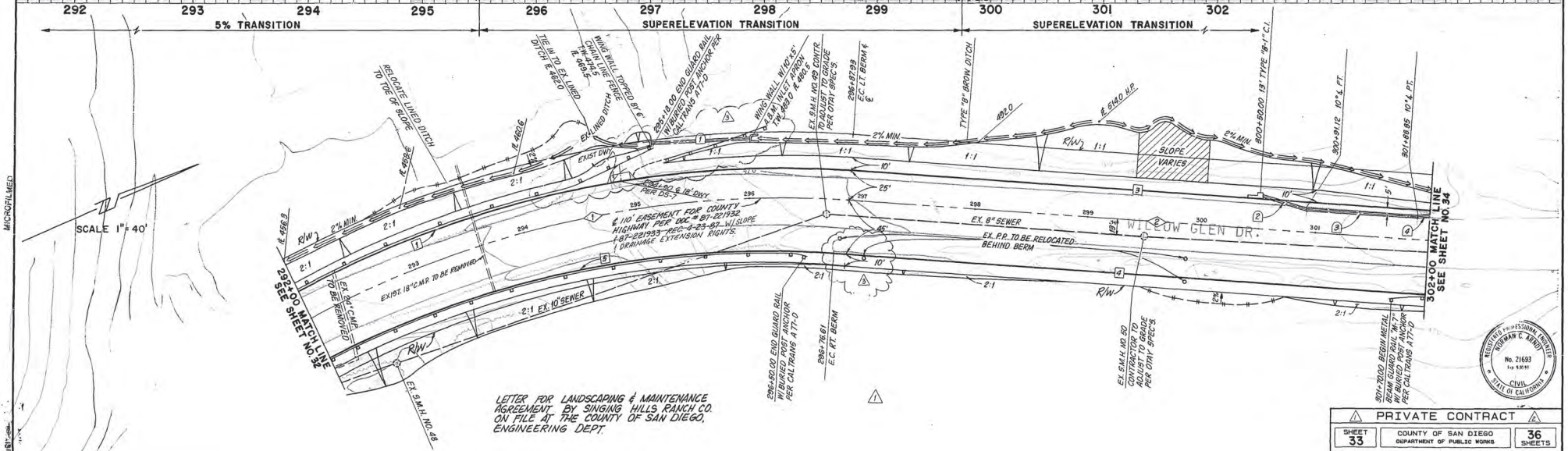

LETTER FOR LANDSCAPING & MAINTENANCE AGREEMENT BY SINGING HILLS RANCH CO. ON FILE AT THE COUNTY OF SAN DIEGO, ENGINEERING DEPT.

NO.	Δ/BEARING	RADIUS	LENGTH	REMARKS
5.	Δ=23°48'56"	674'	454.81'	
4.	N.26°57'33"E.	—	523.39'	
3.	N.26°57'33"E.	—	512.07'	
2.	NOT USED			
1.	Δ=3°03'45"	925'	501.48'	6" A.C. BERM

BERM DATA

NO.	Δ/BEARING	RADIUS	LENGTH	REMARKS
4	N.16°57'33"E.	—	11.32'	
3	N.26°57'33"E.	—	97.79'	
2	N.26°57'33"E.	—	91.75'	
1.	N.20°37'00"E.	—	88.00'	18" R.C.P. (1350-D)

STORM DRAIN DATA

NO.	Δ/BEARING	RADIUS	LENGTH
2	N.26°57'33"E.	—	512.07'
1.	Δ=31°03'45"	900'	487.93'

CENTERLINE DATA

COUNTY APPROVED CHANGES			BENCH MARK
NO.	DESCRIPTION	APP'D BY	DATE
1	REPLACEMENT SHEET FOR SHEET NO. 22	F.D.	10/23/89
2	CHANGE TOTAL NUMBER OF SHEETS	M.	3/9/90
3	RECORD PLAN		

DESCRIPTION: STD. CONC. MON. WITH DISC STMPD. BM EC135 1983
LOCATION: 0.9 MILE EAST ALONG DEHESA ROAD FROM INTERSECTION WITH WILLOW GLEN ROAD IN FENCE LINE, S. SIDE OF RD. WHERE CHAIN LINK FENCE INTERSECTS WOODEN RAIL FENCE, 28 FT. S. OF C/L AND 48 FT. E. OF POLE NO. 571488.
RECORD FROM: SAN DIEGO COUNTY, SOUTH COUNTY VERTICAL CONTROL DATA
ELEVATION: 478.759 DATUM: N.A.V.D.

PRIVATE CONTRACT

SHEET	COUNTY OF SAN DIEGO DEPARTMENT OF PUBLIC WORKS	36 SHEETS
33		

PLANS FOR THE IMPROVEMENT OF:

WILLOW GLEN DRIVE

COUNTY OF SAN DIEGO TRACT NO. 4494-1
CALIFORNIA COORDINATE INDEX 2 -1803.2L -1803

RECOMMENDED FOR APPROVAL: SUBDIVISION ENGINEER

APPROVED: FOR GRANVILLE M. BONMAN DIRECTOR OF PUBLIC WORKS

ENGINEER OF WORK: NORMAN C. ARNOT, RCE 21693

Checked by: TM

Approved by: 12/11/89

4494-1

REGISTERED PROFESSIONAL ENGINEER NORMAN C. ARNOT No. 21693 CIVIL STATE OF CALIFORNIA

J.N. 975

PRECISION MICROFILMED JUN 26 1990

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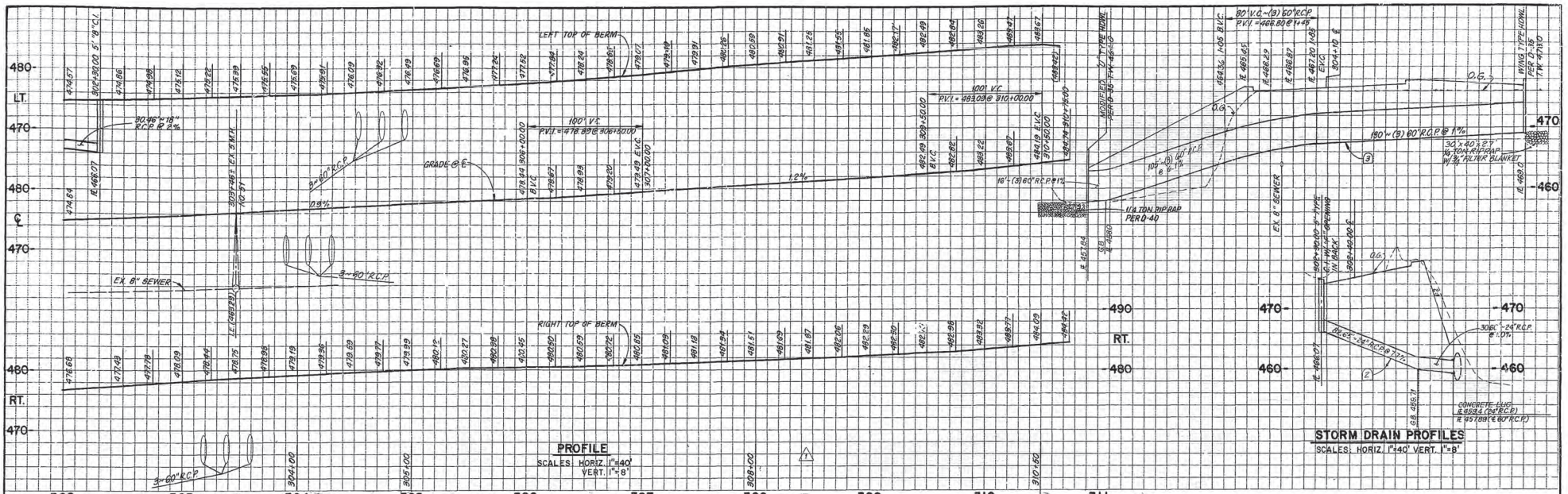

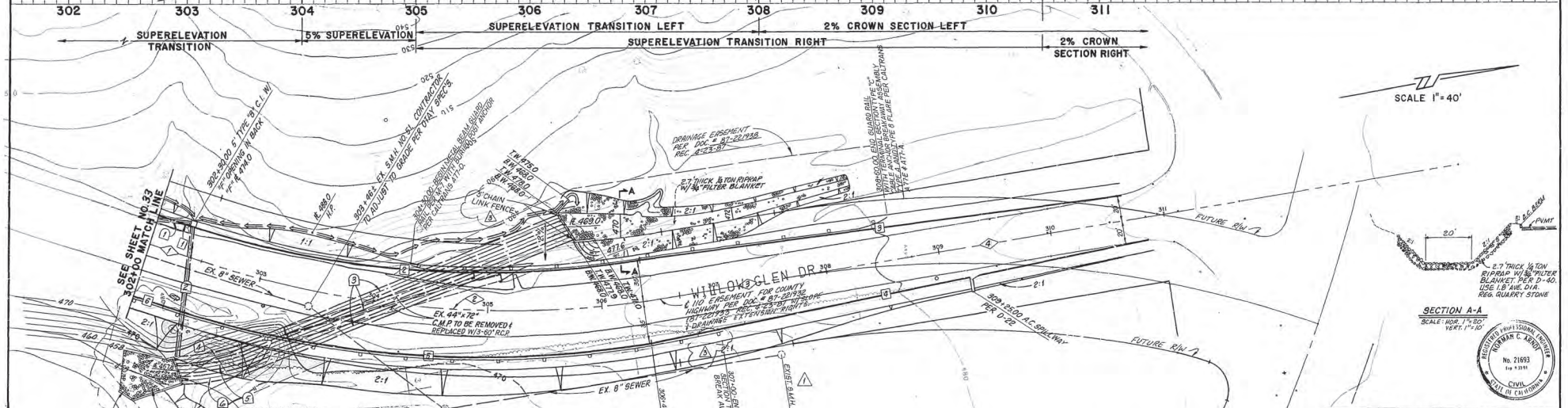

NO.	△/BEARING	RADIUS	LENGTH	REMARKS
6.	N.26°57'33"E.	—	26.82'	
5.	△=26°23'56"	935'	430.80'	
4.	N.01°31'00"W.		442.00'	
3.	N.02°25'00"E.		42.00'	
2.	△=26°23'56"	865'	398.55'	
1.	N.26°57'33"E.		26.82'	6" A.C. BERM

BERM DATA

NO.	△/BEARING	RADIUS	LENGTH	REMARKS
9.				
8.				
7.				
6.	△=12°54'00"	209'	47.06'	
5.	△=12°54'00" ⑧	209'	45.03'	
4.	△=12°54'00"	191'	43.20'	
3.	N11°23'00"W		300.00'	3-60" R.C.P.
2.	N.74°42'00"W.		105.00'	24" R.C.P.
1.	N.16°57'33"E.		30.46'	18" R.C.P. (1350-D)

STORM DRAIN DATA

* IMPROVEMENT CENTERLINE

NO.	△/BEARING	RADIUS	LENGTH
4.	N.00°33'37"E.*		312.96'
3.	N.00°33'37"E.		100.4'
2.	△=26°23'56"	900'	414.67'
1.	N.26°57'33"E.		46.97'

CENTERLINE DATA

LETTER FOR LANDSCAPING & MAINTENANCE AGREEMENT BY SINGING HILLS RANCH CO. ON FILE AT THE COUNTY OF SAN DIEGO, ENGINEERING DEPT.

COUNTY APPROVED CHANGES

NO.	DESCRIPTION	APP'D BY	DATE
1	REPLACEMENT SHEET FOR SHEET NO. 23		10/23/91
2	CHANGE TOTAL NUMBER OF SHEETS		3/9/92
3	RECORD PLAN		

BENCH MARK

DESCRIPTION: STD. CONC. MON. WITH DISC STMPD. BM EC135 1988

LOCATION: 0.8 MILE EAST ALONG DEHESA ROAD FROM INTERSECTION WITH WILLOW GLEN ROAD IN FENCE LINE, S. SIDE OF RD. WHERE CHAIN LINK FENCE INTERSECTS WOODEN RAIL FENCE. 28 FT. S. OF C/L AND 48 FT. E. OF POLE NO. 07148B.

RECORD FROM: SAN DIEGO COUNTY, SOUTH COUNTY VERTICAL CONTROL DATA

ELEVATION: 478.759 DATUM: N.A.V.D.

PRIVATE CONTRACT

SHEET 34 | COUNTY OF SAN DIEGO DEPARTMENT OF PUBLIC WORKS | 36 SHEETS

PLANS FOR THE IMPROVEMENT OF:

WILLOW GLEN DRIVE

COUNTY OF SAN DIEGO TRACT NO. 4494-1

CALIFORNIA COORDINATE INDEX ε -1803, 2α -1803

RECOMMENDED FOR APPROVAL: DEPUTY DIRECTOR OF PUBLIC WORKS

APPROVED: FOR GRANVILLE H. BOWMAN DIRECTOR OF PUBLIC WORKS

ENGINEER OF WORK: NORMAN C. ARNDT, RCE 21693

Checked by: TM

Approved by: 1/10/92

4494-1

REGISTERED PROFESSIONAL ENGINEER NORMAN C. ARNDT No. 21693 Exp. 6-30-93 CIVIL STATE OF CALIFORNIA

J.N. 975

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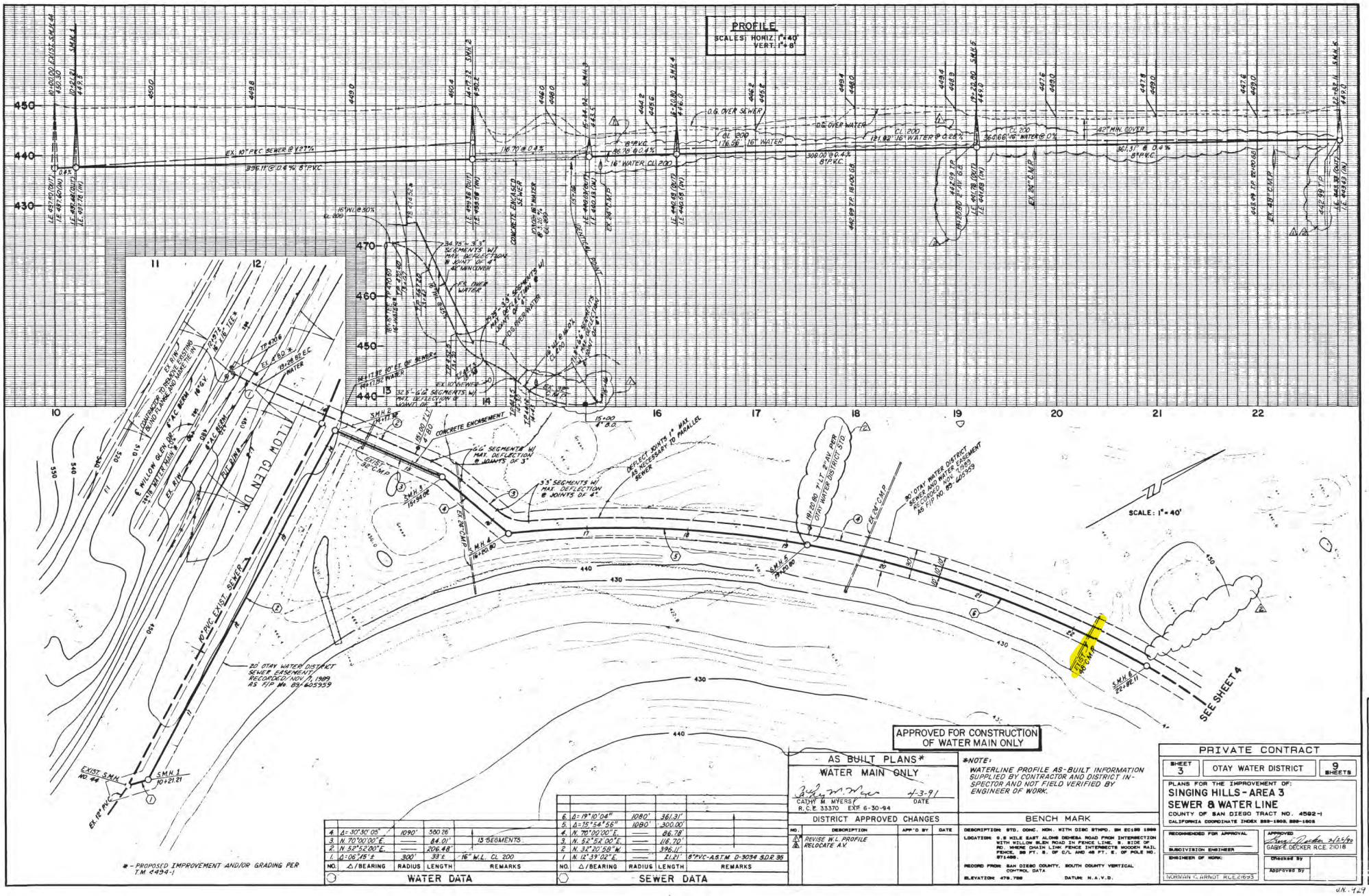


APPROVED FOR CONSTRUCTION
OF WATER MAIN ONLY

NO.	Δ/BEARING	RADIUS	LENGTH	REMARKS
4.	Δ= 30°30'05"	1090'	580.26'	13 SEGMENTS
3.	N. 70°00'00" E.	—	84.01'	
2.	N. 52°52'00" E.	—	206.48'	
1.	Δ=06°15'±	300'	33'±	16" W.L. CL 200

WATER DATA

NO.	Δ/BEARING	RADIUS	LENGTH	REMARKS
6.	Δ= 19°10'04"	1080'	361.31'	
5.	Δ=15°54'56"	1080'	300.00'	
4.	N. 70°00'00" E.	—	86.78'	
3.	N. 52°52'00" E.	—	116.70'	
2	N. 32°20'58" W.	—	396.11'	
1	N. 12°39'02" E.	—	21.21'	8" PVC-A.S.T.M. D-3034 S.D.R. 35

SEWER DATA

* - PROPOSED IMPROVEMENT AND/OR GRADING PER T.M. 4494-1

AS BUILT PLANS*
~~WATER MAIN ONLY~~

Cathy M. Myers 4-3-91
CATHY M. MYERS
R.C.E. 33370 EXP. 6-30-94
DATE

DISTRICT APPROVED CHANGES

NO.	DESCRIPTION	APP'D BY	DATE
1	REVISE W.L. PROFILE		
2	RELOCATE A.V.		

*NOTE:
WATERLINE PROFILE AS-BUILT INFORMATION SUPPLIED BY CONTRACTOR AND DISTRICT INSPECTOR AND NOT FIELD VERIFIED BY ENGINEER OF WORK.

BENCH MARK

DESCRIPTION: STD. CONC. MON. WITH DISC STMPD. SM EC138 1986
LOCATION: 0.5 MILE EAST ALONG DEHESA ROAD FROM INTERSECTION WITH WILLOW GLEN ROAD IN FENCE LINE, S. SIDE OF RD. WHERE CHAIN LINK FENCE INTERSECTS WOODEN RAIL FENCE, 20 FT. S. OF C/L AND 48 FT. E. OF POLE NO. 871466.
RECORD FROM: SAN DIEGO COUNTY, SOUTH COUNTY VERTICAL CONTROL DATA
ELEVATION: 478.758 DATUM: N.A.V.D.

PRIVATE CONTRACT

SHEET 3 | OTAY WATER DISTRICT | 9 SHEETS

PLANS FOR THE IMPROVEMENT OF:
SINGING HILLS - AREA 3
SEWER & WATER LINE
COUNTY OF SAN DIEGO TRACT NO. 4592-1
CALIFORNIA COORDINATE INDEX 222-1803, 222-1802

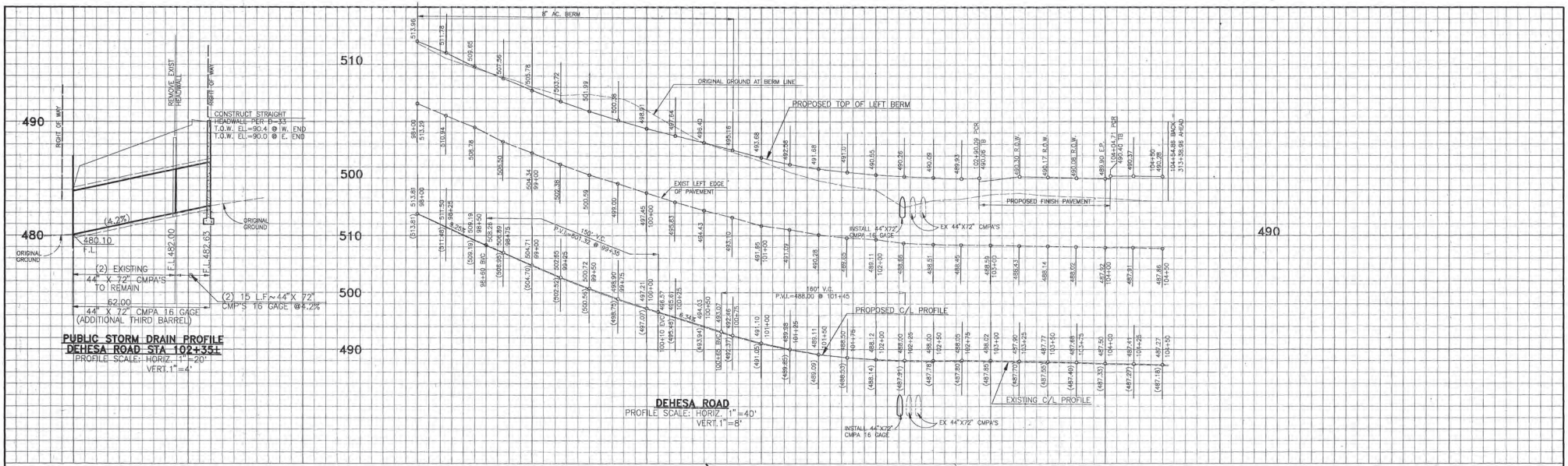
RECOMMENDED FOR APPROVAL
SUBDIVISION ENGINEER
ENGINEER OF WORK:
NORMAN C. ARNDT RCE 21693

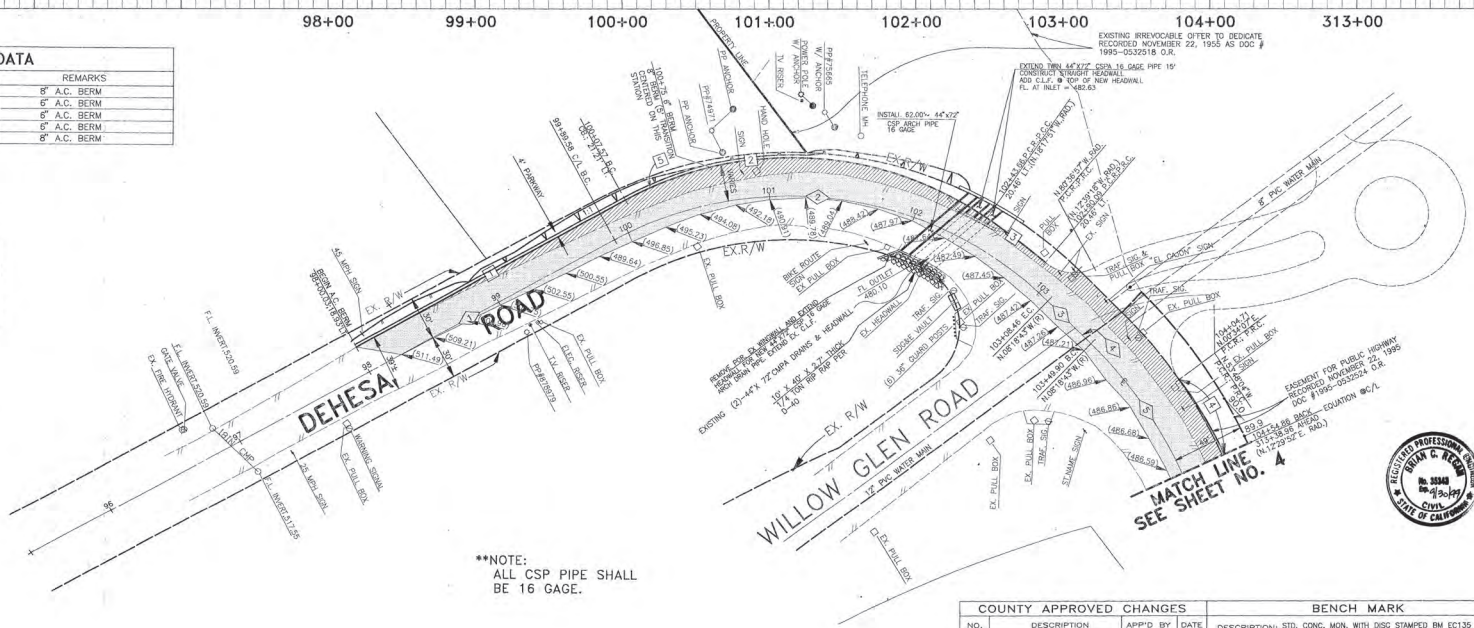
APPROVED
Gary E. Decker 2/26/90
GARY E. DECKER R.C.E. 21018
Checked By
Approved By

manitou engineering company

J.N. 429

79-3-20





CURB DATA

NO.	Δ/BEARING	RADIUS	LENGTH	REMARKS
1	N.08°10'26"E.	–	207.08'	8" A.C. BERM
2	Δ=63°31'43"	234.00'	259.46'	6" A.C. BERM
3	Δ=05°38'33"	508.00'	50.03'	6" A.C. BERM
4	Δ=10°46'04"	318.00'	59.76'	6" A.C. BERM
5	Δ=15°17'16"	234.00'	62.44'	8" A.C. BERM

CENTERLINE DATA

NO.	Δ/BEARING	RADIUS	LENGTH
1	N.08°36'22"E.	–	189.58'
2	Δ=7°04'55"	250.00'	318.88'
3	N.81°41'17"E.	–	41.44'
4	Δ=20°48'35"	300.00'	108.96'

**NOTE:
ALL CSP PIPE SHALL BE 16 GAGE.

COUNTY APPROVED CHANGES

NO.	DESCRIPTION	APP'D BY	DATE

BENCH MARK

DESCRIPTION: STD. CONC. MON. WITH DISC STAMPED BM EC135 1986
LOCATION: 0.9 MI. E. ALONG DEHESA RD. FROM INTERSECTION WITH WILLOW GLEN RD. IN FENCE LINE, S. SIDE OF RD. WHERE CHAIN LINK FENCE INTERSECTS WOODEN RAIL FENCE, 28 FT. S. OF C/L AND 48 FT. E. OF POLE NO. 671488.
RECORD FROM: SOUTH COUNTY VERTICAL CONTROL DATA
ELEVATION: 478.759 DATUM: N.A.V.D.

REGISTERED PROFESSIONAL ENGINEER BRIAN C. REDAM No. 35343 Exp. 6/30/99 CIVIL STATE OF CALIFORNIA

MANITOU ENGINEERING COMPANY
PLANNING • CONSULTING ENGINEERING • SURVEYING
350 WEST NINTH AVENUE, ESCONDIDO, CALIFORNIA 92025 TELEPHONE (619) 741-9921

PRIVATE CONTRACT

SHEET		
3	COUNTY OF SAN DIEGO DEPARTMENT OF PUBLIC WORKS	6 SHEETS

PLANS FOR THE IMPROVEMENT OF:
DEHESA ROAD
COUNTY OF SAN DIEGO MUP NO. P90-013
CALIFORNIA COORDINATE INDEX: 222-1803

Recommended for approval: SUBDIVISION ENGINEER
APPROVED: TOM GARIBAY BY: FOR: DIRECTOR OF PUBLIC WORKS
ENGINEER OF WORK: BRIAN C. REDAM R.C.E. 035343 EXP. 6-30-99
Checked by: CHE
Approval date: 1/4/96
Improvement Plan No. CG 4001

ENGINEER'S NAME: MANITOU ENGINEERING CO. PHONE: (619) 741-9921

1417_103

PRECISION 1417_103 12-20-95
JAN 11 1996
MICROFILMED

Appendix A-3

Preliminary Stormwater Quality Summary Report

PRELIMINARY STORMWATER QUALITY SUMMARY REPORT
Singing Hills
Sycuan Reservation, CA
August 16, 2023

Prepared For:

The Sycuan Band of Kumeyaay Nation
1 Kwaaypaay Court
El Cajon, CA 92019

Prepared By:

PROJECT DESIGN CONSULTANTS
a Bowman company

701 B Street, Suite 800
San Diego, CA 92101
619.235.6471

PDC Job No. 4507

Prepared by:

_____
Chelisa Pack, PE RCE 71026
Registration Expires 06/30/25

TABLE OF CONTENTS

APPENDICES

1. INTRODUCTION

This preliminary storm water quality summary report has been prepared in support of the TEIR submittal for the Singing Hills development (the Project), which is located within Sycuan Tribe's Reservation within San Diego County, California. The project is located within the existing Singing Hills Golf Resort, near the intersection of Willow Glen Drive and Dehesa Road. Refer to the Vicinity Map in Figure 1 below. The Singing Hills Project is a proposed redevelopment of the existing Singing Hills Golf Resort on the Sycuan Reservation. The project proposes a new Soccer Training Facility and Academy. It includes three natural and two synthetic soccer fields, a goal keep area, basketball court, and an additional driveway entrance from Willow Creek Drive.

The purpose of this report is to summarize the stormwater water quality mitigations proposed for the project to support the development of the project's TEIR. The report will summarize permanent storm water quality mitigation measures. The project is currently still in the conceptual design phase.

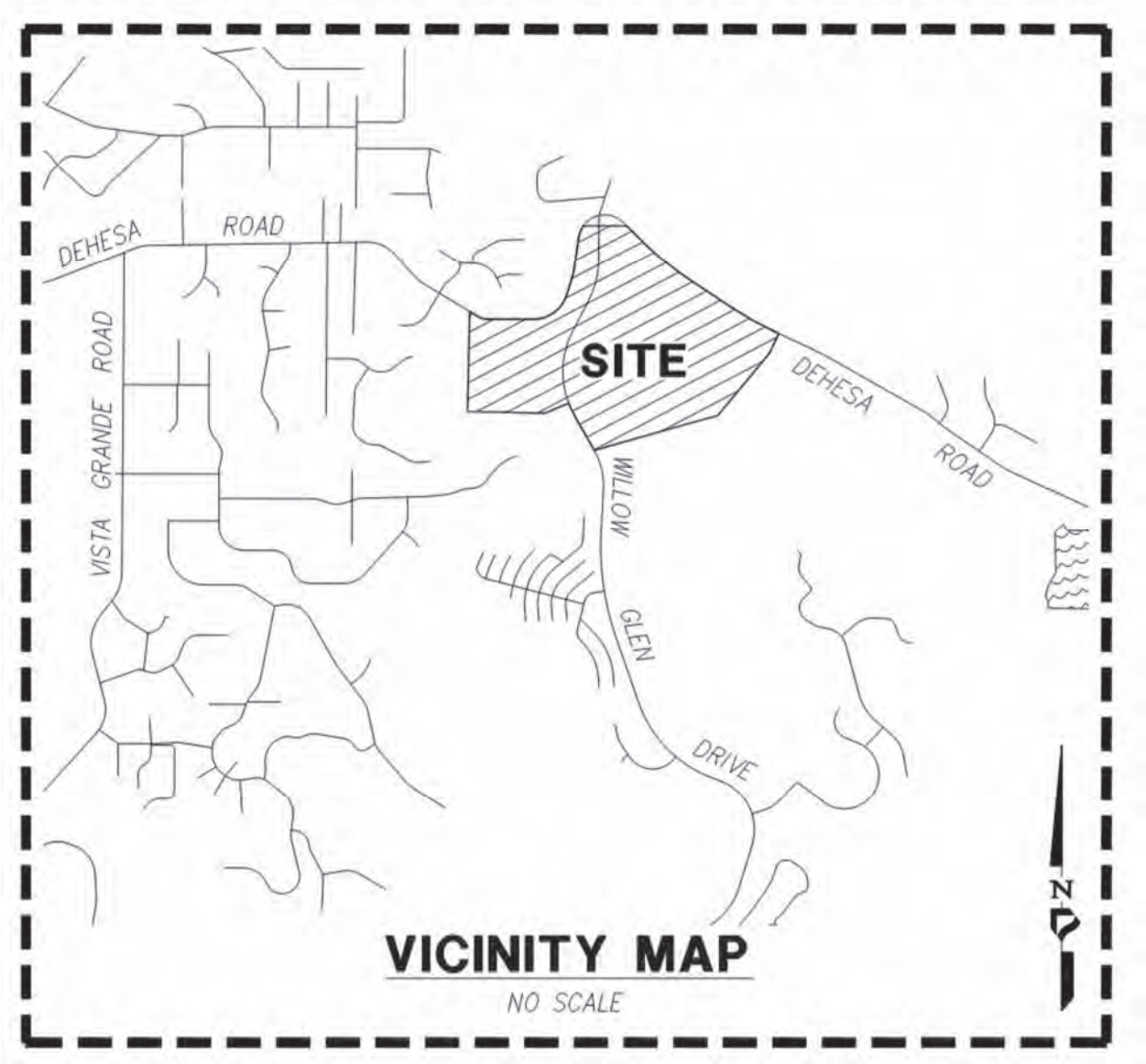


Figure 1: Vicinity Map

2. TEMPORARY STORMWATER STRATEGIES DURING CONSTRUCTION

Construction of the proposed project would take place primarily within the existing footprint of the developed golf course. Construction activities would increase opportunities for surface water runoff to come into contact with various pollutants including dust and sediment that could potentially impact downstream waterbodies, including Sweetwater River to the south of the

project. Mitigation for potential stormwater-related impacts during the construction activity phase will include implementation of the project-specific USEPA-required SWPPP, which will be developed prior to construction. The SWPPP shall make provisions for erosion prevention and sediment control and control of other potential pollutants. As the project is within tribal lands, the SWPPP will be developed according to the Federal EPA 2022 Construction General Permit requirements in lieu of the State Water Resources Control Board's Construction General Permit. Implementation of the SWPPP during construction will mitigate for potential construction-related stormwater impacts in order to mitigate off-Reservation surface water quality.

3. PERMANENT (POST-CONSTRUCTION) STORMWATER MITIGATION STRATEGIES DUE TO DEVELOPMENT

In addition to stormwater impacts during construction, development of the project will change the stormwater condition after construction due to the slight increase in impervious surfaces compared to the pre-project condition. Increased imperviousness is generally associated with an increase in stormwater quality pollution and related impacts, due to the non-point source nature of stormwater pollution. The project is within the Sycuan Tribe's Reservation. As the tribe is not subject to the State Water Resources Control Board's regulations or the local Regional municipal stormwater permit, the post-construction stormwater strategies are not directly related to the San Diego Region Municipal Stormwater Permit. However, other similar projects in the San Diego Region would be subject to San Diego Region Municipal Stormwater Permit, which are developed to minimize impacts to downstream waterbodies within the region. This report uses some of the BMP terminology within the Regional municipal stormwater permit for reference.

Section 402 of the Clean Water Act establishes the National Pollutant Discharge Elimination System (NPDES) permit program to regulate the discharge of pollutants from point sources and discharge pollutants into waters of the United States. The NPDES permit system was established in the Clean Water Act to regulate both point-source discharges (i.e., a municipal or industrial discharge at a specific location or pipe) and nonpoint-source discharges (i.e., diffused runoff of water from adjacent land uses) to surface waters of the United States. For point-source discharges, each NPDES permit contains limits on allowable concentrations and mass emission of pollutants

contained in the discharge. For nonpoint-source discharges, the NPDES program establishes a comprehensive water quality program to manage urban stormwater and minimize pollution of the environment to the maximum extent practicable. The NPDES program consists of characterizing receiving water quality, identifying harmful constituents, targeting potential sources of pollutants, and implementing a comprehensive stormwater management program. The reduction of pollutants in urban stormwater discharge to the maximum extent practicable through the use of structural and nonstructural BMPs is one of the primary objectives of the water quality regulations. BMPs typically used to manage runoff water quality include controlling roadway and parking lot contaminants by installing pollutant control BMPs for passive stormwater treatment, cleaning parking lots on a regular basis, incorporating peak-flow reduction and infiltration features (such as grass swales, infiltration trenches, and grass filter strips) into landscaping, and implementing educational programs.

As a part of the design process, the post-construction stormwater mitigation strategies are implemented to address permanent stormwater quality concerns. The project includes a small increase in impervious surfaces compared to pre-project conditions. With added impervious areas, there is more potential for permanent stormwater impacts downstream. Therefore, in order to mitigate for project-related impacts to stormwater quality, the proposed project grading was evaluated for opportunities and constraints related to stormwater quality, and are summarized below:

- Under existing conditions, there is a significant amount of upstream runon coming onto the property. The runon from upstream areas will be designed to be conveyed through the project separately from onsite areas, so that the onsite runon can be treated separately before discharging offsite.

- Proposed impervious areas (new buildings, driveway, and courts) should be collected and piped separately and conveyed to a separate pollutant-control BMP, or multiple BMPs. The design will minimize commingling with upstream runon as much as possible.

- The proposed fields are all pervious, so they are self-mitigating and don't require treatment.

- Based on preliminary information from the project's geotechnical consultant, Group Delta, the site can be characterized as full infiltration from a BMP infiltration feasibility perspective. The NRCS Web Soil Survey lists the majority of the project area as underlain by Tujunga sand, which is characterized as a Type "A" soil with high infiltration rates. Therefore, the pollutant control BMP can be unlined to allow for infiltration into subgrade soils, which will help mitigate for excess rates and durations, as well as mitigate for pollutant-control. Refer to the exhibit included in Appendix 1 for the web soil survey data.

The following sections provide descriptions of the proposed stormwater quality mitigations for the project.

3.1 Site Design BMPs

Site design BMPs are general design practices that are intended to reduce the rate and volume of stormwater runoff and associated pollutant loads. Site design BMPs include practices that reduce the rate and/or volume of stormwater runoff by minimizing surface soil compaction, reducing impervious surfaces, and/or providing flow pathways that are "disconnected" from the storm drain system, such as by routing flow over pervious surfaces. Site design BMPs may incorporate interception, storage, evaporation, evapotranspiration, infiltration, and/or filtration processes to retain and/or treat pollutants in stormwater before it is discharged from a site. Site design BMP guiding principles include the following:

- Minimize Impervious Footprint
- Disperse Runoff to Adjacent Landscaping
- Design and Implementation of Pervious Surfaces

These concepts can be incorporated into the design of the project. The proposed fields and surrounding areas will be pervious, and the imperviousness will be minimized. The fields will be pervious with subdrains beneath the fields to ensure the proper field conditions for the soccer players.

3.2 Source Control BMPs

Applicable permanent source control BMPs minimize pollutants from everyday activities, such as trash recycling and disposal and the washing of vehicles. Source control reduces the potential for urban runoff to pick up and transport pollutants. Such source control BMPs include permanent, structural features incorporated into the plans as well as operational BMPs, such as regular street sweeping and "good housekeeping" practices, which must be implemented by the site's occupant or user. Source control BMPs are defined as any administrative action, design of a structural facility, usage of alternative materials, and operation, maintenance, and inspection procedures that eliminate or reduce urban runoff pollution. Some of the source control BMP options applicable to the project include the following:

- Use Efficient Irrigation Systems & Landscape Design
- Design Trash Storage Areas to Reduce Pollution Contribution (if applicable)
- Provide Storm Water Conveyance System Stamping and Signage

3.3 Pollutant Control BMPs

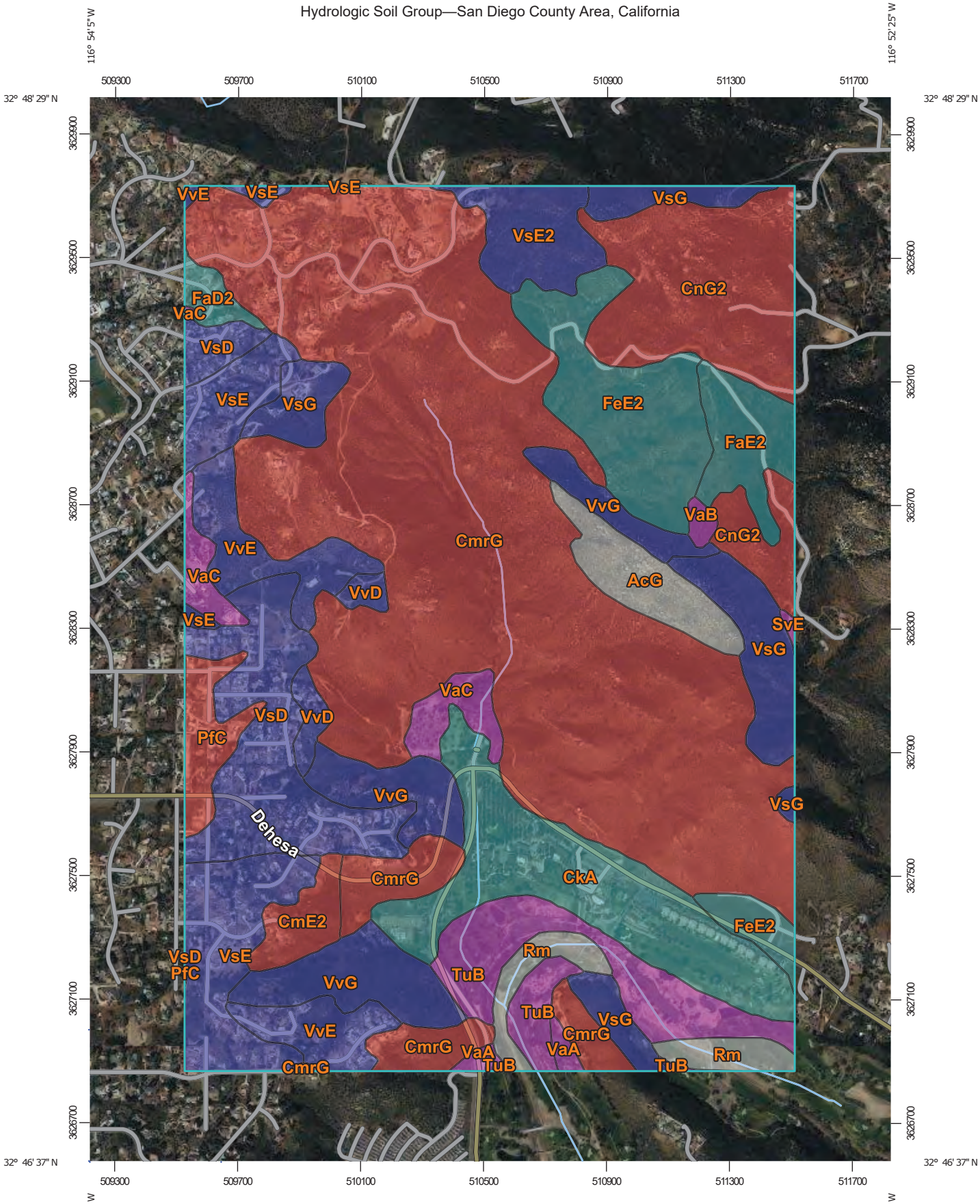
Local San Diego standards prioritize retention (infiltration and/or evapotranspiration) and bioretention or biofiltration for pollutant-control BMPs. To be generally consistent with local requirements, and to take advantage of the permeable soils, the project proposes an unlined bioretention area as a pollutant control BMP. The Drainage Management Area #1 (DMA 1) as shown on the DMA Map is designed to drain to BMP 1 for pollutant control treatment. This area consists of the majority of the proposed impervious surfaces and some additional landscaping areas. The sizing calculations relating to the DMA area and corresponding BMP area are included in Appendix 3. The design of the BMP is subject to change with future grading refinements. Unlined bioretention basins are designed to remove pollutants contained in stormwater runoff by means of sedimentation settling, filtration, plant uptake, adsorption, infiltration into native soil, and/or bacterial decomposition.

4. CONCLUSION

This preliminary storm water quality summary report supports the TEIR for the Singing Hills development. This report was prepared to summarize the stormwater strategies proposed for the site development. The site development will include site design BMPs, source control BMPs, and at least one bioretention basin or other similar BMP for pollutant treatment of the majority of the proposed impervious surfaces for the project.

APPENDIX 1

NRCS Web Soil Survey



Map Scale: 1:16,800 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 200 400 800 1200

Feet
0 500 1000 2000 3000

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

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

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.

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

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

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

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

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 18, Sep 14, 2022

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

Date(s) aerial images were photographed: Mar 24, 2022—Apr 29, 2022

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AcG	Acid igneous rock land		27.2	1.9%
CkA	Chino silt loam, saline, 0 to 2 percent slopes	C	94.3	6.7%
CmE2	Cieneba rocky coarse sandy loam, 9 to 30 percent slopes, eroded	D	15.4	1.1%
CmrG	Cieneba-Rock outcrop complex, 30 to 75 percent slopes, very stony	D	555.0	39.3%
CnG2	Cieneba-Fallbrook rocky sandy loams, 30 to 65 percent slopes, eroded	D	102.0	7.2%
FaD2	Fallbrook sandy loam, 9 to 15 percent slopes, eroded	C	7.5	0.5%
FaE2	Fallbrook sandy loam, 15 to 30 percent slopes, eroded	C	27.6	2.0%
FeE2	Fallbrook rocky sandy loam, 9 to 30 percent slopes, eroded	C	77.2	5.5%
PfC	Placentia sandy loam, thick surface, 2 to 9 percent slo pes	D	18.5	1.3%
Rm	Riverwash		23.0	1.6%
SvE	Stony land	A	0.8	0.1%
TuB	Tujunga sand, 0 to 5 percent slopes	A	59.1	4.2%
VaA	Visalia sandy loam, 0 to 2 percent slopes	A	4.5	0.3%
VaB	Visalia sandy loam, 2 to 5 percent slopes	A	2.8	0.2%
VaC	Visalia sandy loam, 5 to 9 percent slopes	A	22.3	1.6%
VsD	Vista coarse sandy loam, 9 to 15 percent slopes, MLRA 20	B	82.8	5.9%
VsE	Vista coarse sandy loam, 15 to 30 percent slopes, MLRA 20	B	70.0	5.0%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
VsE2	Vista coarse sandy loam, 15 to 30 percent slopes, eroded	B	30.0	2.1%
VsG	Vista coarse sandy loam, 30 to 65 percent slopes, MLRA 20	B	64.1	4.5%
VvD	Vista rocky coarse sandy loam, 5 to 15 percent slopes	B	9.9	0.7%
VvE	Vista rocky coarse sandy loam, 15 to 30 percent slopes	B	48.4	3.4%
VvG	Vista rocky coarse sandy loam, 30 to 65 percent slopes	B	68.1	4.8%
Totals for Area of Interest			**1,410.5**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

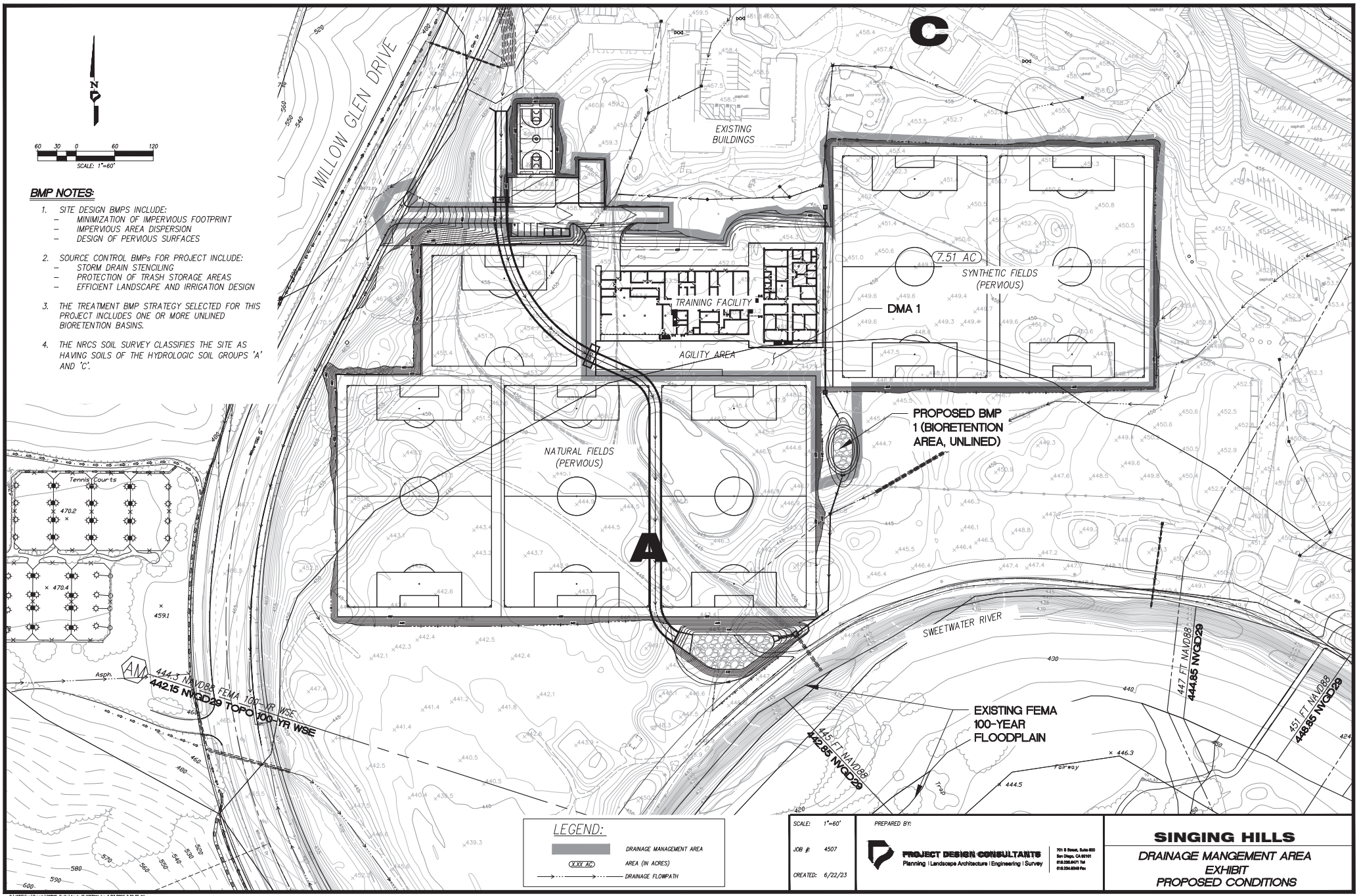
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

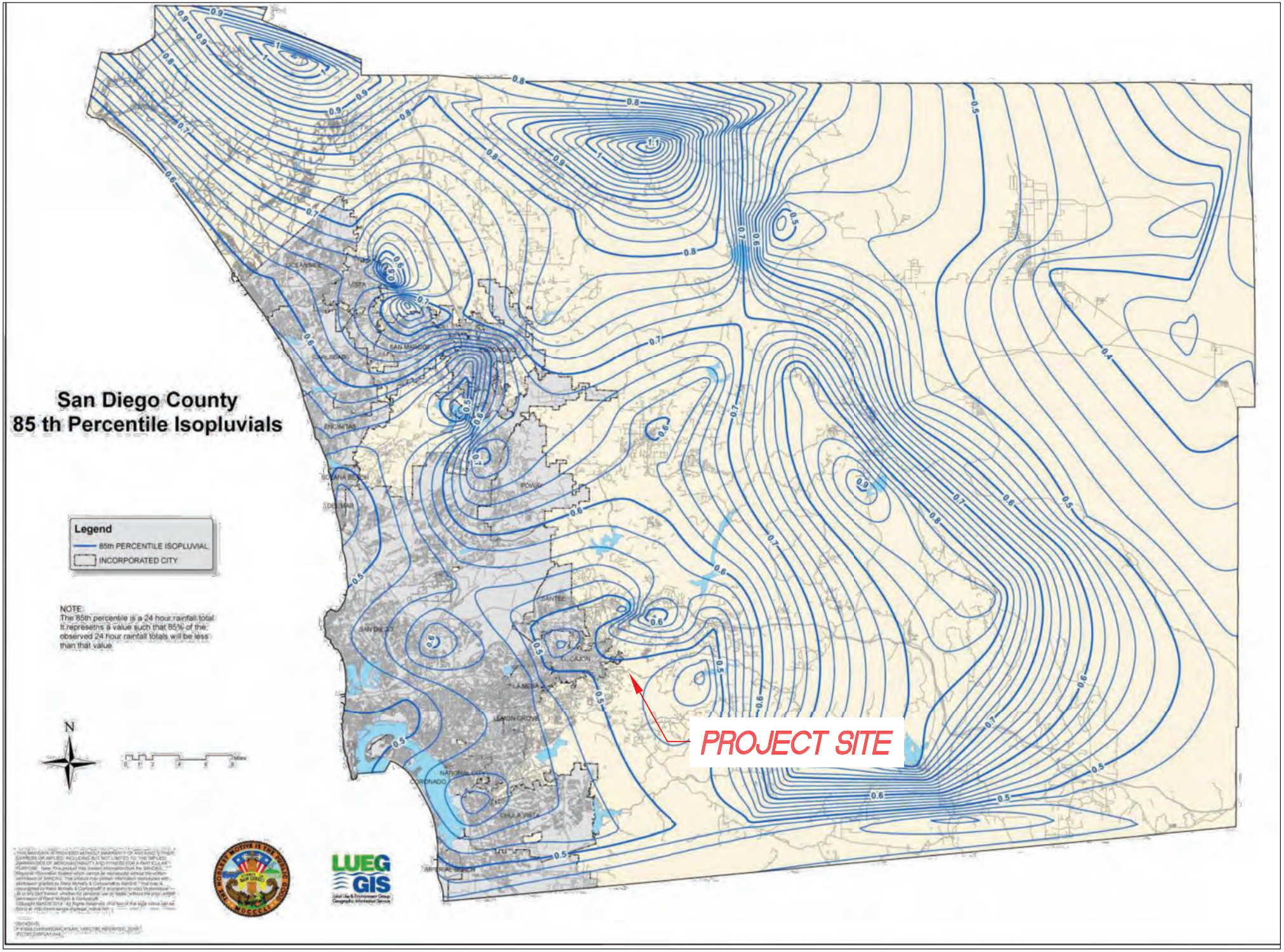
APPENDIX 2

DMA Map Exhibit


N
60 30 0 60 120
SCALE: 1"=60'
BMP NOTES:
1. SITE DESIGN BMPS INCLUDE:
– MINIMIZATION OF IMPERVIOUS FOOTPRINT
– IMPERVIOUS AREA DISPERSION
– DESIGN OF PERVIOUS SURFACES
2. SOURCE CONTROL BMPs FOR PROJECT INCLUDE:
– STORM DRAIN STENCILING
– PROTECTION OF TRASH STORAGE AREAS
– EFFICIENT LANDSCAPE AND IRRIGATION DESIGN
3. THE TREATMENT BMP STRATEGY SELECTED FOR THIS PROJECT INCLUDES ONE OR MORE UNLINED BIORETENTION BASINS.
4. THE NRCS SOIL SURVEY CLASSIFIES THE SITE AS HAVING SOILS OF THE HYDROLOGIC SOIL GROUPS 'A' AND 'C'.
WILLOW GLEN DRIVE
EXISTING BUILDINGS
TRAINING FACILITY
AGILITY AREA
7.51 AC
SYNTHETIC FIELDS (PERVIOUS)
DMA 1
PROPOSED BMP 1 (BIORETENTION AREA, UNLINED)
NATURAL FIELDS (PERVIOUS)
Tennis Courts
SWEETWATER RIVER
EXISTING FEMA 100-YEAR FLOODPLAIN
444.3 NAVD88
442.15 NVGD29
TOPO 100-YR WSE
FEMA 100-YR WSE
445 FT NAVD88
442.85 NVGD29
447 FT NAVD88
444.85 NVGD29
451 FT NAVD88
448.85 NVGD29
Fairway
Trap
Asph.
LEGEND:
DRAINAGE MANAGEMENT AREA
X.XX AC
AREA (IN ACRES)
DRAINAGE FLOWPATH
SCALE: 1"=60'
JOB #: 4507
CREATED: 6/22/23
PREPARED BY:
PROJECT DESIGN CONSULTANTS
Planning | Landscape Architecture | Engineering | Survey
701 B Street, Suite 800
San Diego, CA 92101
619.235.6471 Tel
619.234.6848 Fax
SINGING HILLS
DRAINAGE MANGEMENT AREA
EXHIBIT
PROPOSED CONDITIONS

APPENDIX 3

BMP Information


San Diego County
85 th Percentile Isopluvials
Legend
85th PERCENTILE ISOPLUVIAL
INCORPORATED CITY
NOTE:
The 85th percentile is a 24 hour rainfall total
It represetns a value such that 85% of the
observed 24 hour rainfall totals will be less
than that value
N
PROJECT SITE
LUEG
GIS

Automated Worksheet B.1: Calculation of Design Capture Volume (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Standard Drainage Basin Inputs	1	Drainage Basin ID or Name	1										unitless
	2	85th Percentile 24-hr Storm Depth	0.51										inches
	3	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	101,491										sq-ft
	4	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)											sq-ft
	5	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)											sq-ft
	6	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)	38,103										sq-ft
	7	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)											sq-ft
	8	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)	187,541										sq-ft
	9	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)											sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	10	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	No	No	No	No	No	No	No	No	No	yes/no
	11	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)											sq-ft
	12	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	13	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	14	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)											sq-ft
	15	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)											sq-ft
	16	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)											sq-ft
	17	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)											sq-ft
	18	Number of Tree Wells Proposed per SD-A											#
	19	Average Mature Tree Canopy Diameter											ft
	20	Number of Rain Barrels Proposed per SD-E											#
	21	Average Rain Barrel Size											gal
Initial Runoff Factor Calculation	22	Total Tributary Area	327,135	0	0	0	0	0	0	0	0	0	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	24	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	25	Initial Weighted Runoff Factor	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	26	Initial Design Capture Volume	5,839	0	0	0	0	0	0	0	0	0	cubic-feet
Dispersion Area Adjustments	27	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	0	0	0	sq-ft
	28	Total Pervious Dispersion Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	29	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ratio
	30	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	31	Runoff Factor After Dispersion Techniques	0.42	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	unitless
	32	Design Capture Volume After Dispersion Techniques	5,839	0	0	0	0	0	0	0	0	0	cubic-feet
Tree & Barrel Adjustments	33	Total Tree Well Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
	34	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	35	Final Adjusted Runoff Factor	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	36	Final Effective Tributary Area	137,397	0	0	0	0	0	0	0	0	0	sq-ft
	37	Initial Design Capture Volume Retained by Site Design Elements	0	0	0	0	0	0	0	0	0	0	cubic-feet
	38	Final Design Capture Volume Tributary to BMP	5,839	0	0	0	0	0	0	0	0	0	cubic-feet

No Warning Messages

Automated Worksheet B.2: Retention Requirements (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Basic Analysis	1	Drainage Basin ID or Name	1	-	-	-	-	-	-	-	-	-	unitless
	2	85th Percentile Rainfall Depth	0.51	-	-	-	-	-	-	-	-	-	inches
	3	Predominant NRCS Soil Type Within BMP Location	A										unitless
	4	Is proposed BMP location Restricted or Unrestricted for Infiltration Activities?	Unrestricted										unitless
	5	Nature of Restriction											unitless
	6	Do Minimum Retention Requirements Apply to this Project?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes/no
	7	Are Habitable Structures Greater than 9 Stories Proposed?	No										yes/no
Advanced Analysis	8	Has Geotechnical Engineer Performed an Infiltration Analysis?	No										yes/no
	9	Design Infiltration Rate Recommended by Geotechnical Engineer											in/hr
Result	10	Design Infiltration Rate Used To Determine Retention Requirements	0.300	-	-	-	-	-	-	-	-	-	in/hr
	11	Percent of Average Annual Runoff that Must be Retained within DMA	40.0%	-	-	-	-	-	-	-	-	-	percentage
	12	Fraction of DCV Requiring Retention	0.32	-	-	-	-	-	-	-	-	-	ratio
	13	Required Retention Volume	1868	-	-	-	-	-	-	-	-	-	cubic-feet

No Warning Messages

Automated Worksheet B.3: BMP Performance (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
BMP Inputs	1	Drainage Basin ID or Name	1	-	-	-	-	-	-	-	-	-	sq-ft
	2	Design Infiltration Rate Recommended	0.300	-	-	-	-	-	-	-	-	-	in/hr
	3	Design Capture Volume Tributary to BMP	5,839	-	-	-	-	-	-	-	-	-	cubic-feet
	4	Is BMP Vegetated or Unvegetated?	Vegetated										unitless
	5	Is BMP Impermeably Lined or Unlined?	Unlined										unitless
	6	Does BMP Have an Underdrain?	Underdrain										unitless
	7	Does BMP Utilize Standard or Specialized Media?	Standard										unitless
	8	Provided Surface Area	4,125										sq-ft
	9	Provided Surface Ponding Depth	9										inches
	10	Provided Soil Media Thickness	21										inches
	11	Provided Gravel Thickness (Total Thickness)	15										inches
	12	Underdrain Offset	3										inches
	13	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	8.00										inches
	14	Specialized Soil Media Filtration Rate											in/hr
	15	Specialized Soil Media Pore Space for Retention											unitless
	16	Specialized Soil Media Pore Space for Biofiltration											unitless
	17	Specialized Gravel Media Pore Space											unitless
Retention Calculations	18	Volume Infiltrated Over 6 Hour Storm	619	0	0	0	0	0	0	0	0	0	cubic-feet
	19	Ponding Pore Space Available for Retention	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	unitless
	20	Soil Media Pore Space Available for Retention	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	unitless
	21	Gravel Pore Space Available for Retention (Above Underdrain)	0.00	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	22	Gravel Pore Space Available for Retention (Below Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	23	Effective Retention Depth	2.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	24	Fraction of DCV Retained (Independent of Drawdown Time)	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	25	Calculated Retention Storage Drawdown Time	8	0	0	0	0	0	0	0	0	0	hours
	26	Efficacy of Retention Processes	0.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	27	Volume Retained by BMP (Considering Drawdown Time)	4,289	0	0	0	0	0	0	0	0	0	cubic-feet
	28	Design Capture Volume Remaining for Biofiltration	1,550	0	0	0	0	0	0	0	0	0	cubic-feet
Biofiltration Calculations	29	Max Hydromod Flow Rate through Underdrain	2.9909	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	cfs
	30	Max Soil Filtration Rate Allowed by Underdrain Orifice	31.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	in/hr
	31	Soil Media Filtration Rate per Specifications	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	32	Soil Media Filtration Rate to be used for Sizing	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	in/hr
	33	Depth Biofiltered Over 6 Hour Storm	30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	34	Ponding Pore Space Available for Biofiltration	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	35	Soil Media Pore Space Available for Biofiltration	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	unitless
	36	Gravel Pore Space Available for Biofiltration (Above Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	37	Effective Depth of Biofiltration Storage	18.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	38	Drawdown Time for Surface Ponding	2	0	0	0	0	0	0	0	0	0	hours
	39	Drawdown Time for Effective Biofiltration Depth	3	0	0	0	0	0	0	0	0	0	hours
	40	Total Depth Biofiltered	48.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	inches
	41	Option 1 - Biofilter 1.50 DCV: Target Volume	2,324	0	0	0	0	0	0	0	0	0	cubic-feet
	42	Option 1 - Provided Biofiltration Volume	2,324	0	0	0	0	0	0	0	0	0	cubic-feet
	43	Option 2 - Store 0.75 DCV: Target Volume	1,162	0	0	0	0	0	0	0	0	0	cubic-feet
	44	Option 2 - Provided Storage Volume	1,162	0	0	0	0	0	0	0	0	0	cubic-feet
	45	Portion of Biofiltration Performance Standard Satisfied	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
Result	46	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	-	-	-	-	-	-	-	-	-	yes/no
	47	Overall Portion of Performance Standard Satisfied (BMP Efficacy Factor)	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	48	**Deficit of Effectively Treated Stormwater**	0	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	cubic-feet

No Warning Messages

E.10 INF-2 Bioretention

Photo Credit: Ventura County Technical Guidance Document

MS4 Permit Category
Retention

Manual Category
Infiltration

Applicable Performance Standard
Pollutant Control
Flow Control

Primary Benefits
Volume Reduction
Treatment
Peak Flow Attenuation

Description

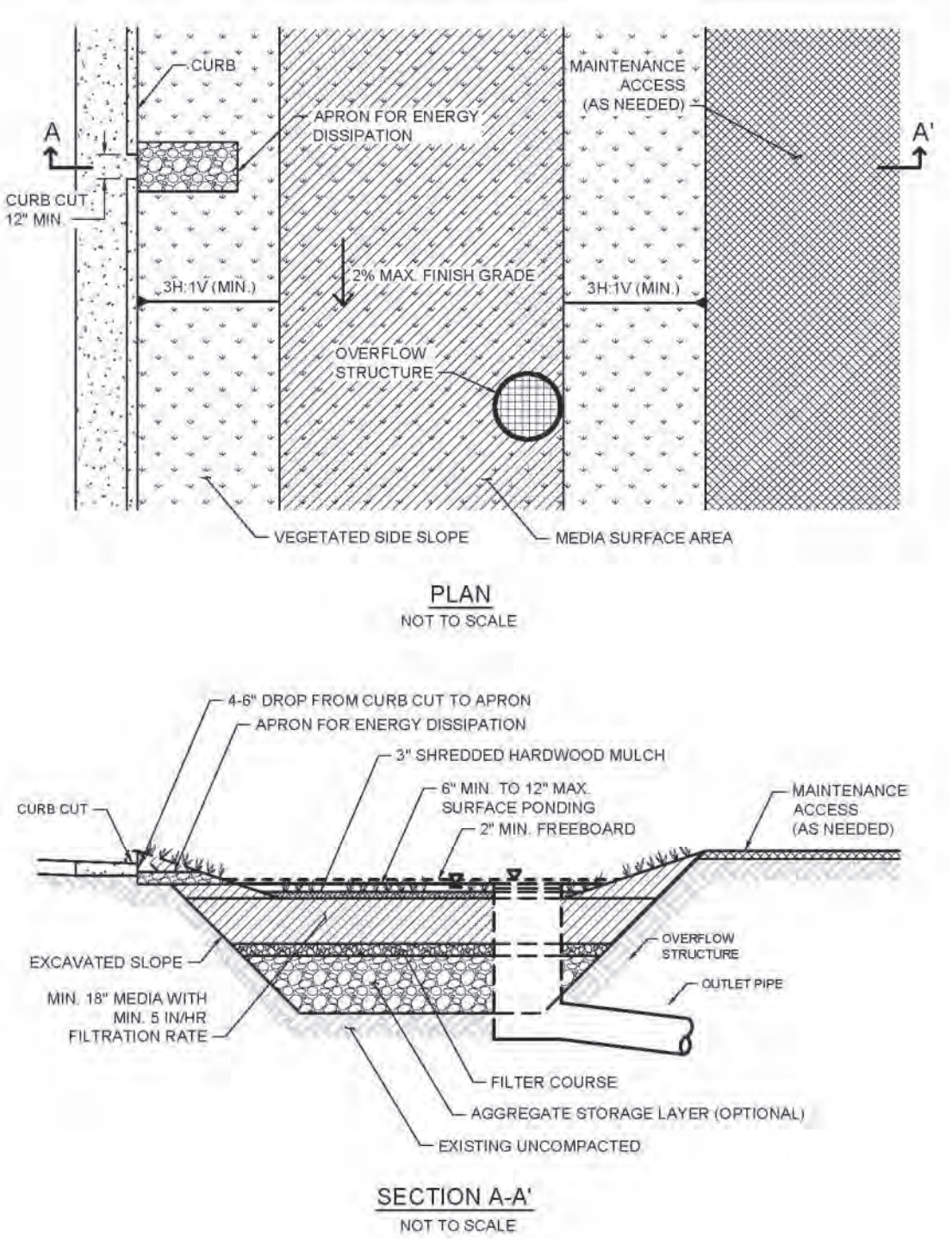
Bioretention (bioretention without underdrain) facilities are vegetated surface water systems that filter water through vegetation and soil, or engineered media prior to infiltrating into native soils. These facilities are designed to infiltrate the full DCV. Bioretention facilities are commonly incorporated into the site within parking lot landscaping, along roadsides, and in open spaces. They can be constructed inground or partially aboveground, such as planter boxes with open bottoms (no impermeable liner at the bottom) to allow infiltration. Treatment is achieved through filtration, sedimentation, sorption, infiltration, biochemical processes and plant uptake.

Typical bioretention without underdrain components include:

- Inflow distribution mechanisms (e.g, perimeter flow spreader or filter strips)
- Energy dissipation mechanism for concentrated inflows (e.g., splash blocks or riprap)
- Shallow surface ponding for captured flows
- Side slope and basin bottom vegetation selected based on expected climate and ponding depth
- Non-floating mulch layer
- Media layer (planting mix or engineered media) capable of supporting vegetation growth
- Filter course layer consisting of aggregate to prevent the migration of fines into uncompacted native soils or the optional aggregate storage layer
- Optional aggregate storage layer for additional infiltration storage
- Uncompacted native soils at the bottom of the facility
- Overflow structure

Design Adaptations for Project Goals

- **Full infiltration BMP for storm water pollutant control.** Bioretention can be used as a pollutant control BMP designed to infiltrate runoff from direct rainfall as well as runoff from adjacent tributary areas. Bioretention facilities must be designed with an infiltration storage volume (a function of the ponding, media and aggregate storage volumes) equal to the full DCV and able to meet drawdown time limitations.
- **Integrated storm water flow control and pollutant control configuration.** Bioretention facilities can be designed to provide flow rate and duration control. This may be accomplished by providing greater infiltration storage with increased surface ponding and/or aggregate storage volume for storm water flow control.



Typical plan and section view of a Bioretention BMP

Recommended Siting Criteria

Bioretention must meet the following design criteria. Deviations from the below criteria may be approved at the discretion of County staff if it is determined to be appropriate:

Siting Criteria		*Intent/Rationale*
☐	Placement observes geotechnical recommendations regarding potential hazards (e.g., slope stability, landslides, liquefaction zones) and setbacks (e.g., slopes, foundations, utilities).	Must not negatively impact existing site geotechnical concerns.
☐	Selection and design of BMP is based on infiltration feasibility criteria and appropriate design infiltration rate presented in Appendix B and D.	Must operate as a full infiltration design and must be supported by drainage area and in-situ infiltration rate feasibility findings.
☐	Contributing tributary area is ≤ 5 acres (≤ 1 acre preferred).	Bigger BMPs require additional design features for proper performance. Contributing tributary area greater than 5 acres may be allowed at the discretion of County staff if the following conditions are met: 1) incorporate design features (e.g. flow spreaders) to minimize short circuiting of flows in the BMP and 2) incorporate additional design features requested by County staff for proper performance of the regional BMP.
☐	Finish grade of the facility is ≤ 2%. In long bioretention facilities where the potential for internal erosion and channelization exists, the use of check dams is required.	Flatter surfaces reduce erosion and channelization within the facility. Internal check dams reduce velocity and dissipate energy.

Design Criteria and Considerations

Bioretention must meet the following design criteria. Deviations from the below criteria may be approved at the discretion of County staff if it is determined to be appropriate:

Siting and Design		*Intent/Rationale*
Surface Ponding		
☐	Surface ponding is limited to a 24-hour drawdown time.	24-hour drawdown time is recommended for plant health. Surface ponding drawdown time greater than 24-hours but less than 96 hours may be allowed at the discretion of County staff if certified by a landscape architect or agronomist.

	Siting and Design	***Intent/Rationale***
		Surface ponding capacity lowers subsurface storage requirements. Deep surface ponding raises safety concerns.
☐	Surface ponding depth is ≥ 6 and ≤ 12 inches.	Surface ponding depth greater than 12 inches (for additional pollutant control or surface outlet structures or flow-control orifices) may be allowed at the discretion of County staff if the following conditions are met: 1) surface ponding depth drawdown time is less than 24 hours; and 2) safety issues and fencing requirements are considered (typically ponding greater than 18" will require a fence and/or flatter side slopes) and 3) potential for elevated clogging risk is considered.
☐	A minimum of 2 inches of freeboard is provided.	Freeboard provides room for head over overflow structures and minimizes risk of uncontrolled surface discharge.
☐	Side slopes are stabilized with vegetation and are ≥ 3H: 1V.	Gentler side slopes are safer, less prone to erosion, able to establish vegetation more quickly and easier to maintain.
Vegetation		
☐	Plantings are suitable for the climate and expected ponding depth. A plant list to aid in selection can be found in Appendix F.	Plants suited to the climate and ponding depth are more likely to survive.
☐	An irrigation system with a connection to water supply is provided as needed.	Seasonal irrigation might be needed to keep plants healthy.
Mulch (Mandatory)		
☐	3 inches of shredded hardwood mulch. Mulch must be non-floating to avoid clogging of overflow structure.	Mulch will suppress weeds and maintain moisture for plant growth.

Siting and Design		*Intent/Rationale*
Media Layer		
☐	Media maintains a minimum filtration rate of 5 in/hr over lifetime of facility. A minimum initial filtration rate of 10 in/hr is recommended.	A high filtration rate through the soil mix minimizes clogging potential and allows flows to quickly enter the aggregate storage layer, thereby minimizing bypass.
☐	Media is a minimum 18 inches deep, meeting either of these two media specifications: Media Specifications listed in Appendix F-3 Biofiltration Soil Media (BSM) **or** County of San Diego Low Impact Development Handbook: Appendix G - Bioretention Soil Specification (June 2014, unless superseded by more recent edition).	A deep media layer provides additional filtration and supports plants with deeper roots. Standard specifications must be followed.
☐	Alternatively, for proprietary designs and custom media mixes not meeting the media specifications contained in the County LID Handbook, the media meets the pollutant treatment performance criteria in Section F.1.1.	For non-standard or proprietary designs, compliance with F.1.1 ensures that adequate treatment performance will be provided.
☐	Media surface area is 3% of contributing area times adjusted runoff factor or greater.	Greater surface area to tributary area ratios decrease loading rates per square foot and therefore increase longevity. Adjusted runoff factor is to account for site design BMPs implemented upstream of the BMP (such as rain barrels, impervious area dispersion, etc.). Refer to Appendix B guidance. If media surface area is under 3% of contributing area, refer to Sediment Loading calculations in Appendix B.
Filter Course Layer (Optional)		
☐	A filter course is used to prevent migration of fines through layers of the facility. Filter fabric is not used.	Migration of media can cause clogging of the aggregate storage layer void spaces or subgrade. Filter fabric is more likely to clog.

Siting and Design		*Intent/Rationale*
☐	Filter course is a minimum of 6 inches thick provided in two separate 3 inch layers. The top layer shall be made of ASTM C33 choker sand and the bottom layer shall be of ASTM No. 8 aggregate. Marker stakes shall be used to ensure uniform lift thickness.	To prevent reduction of the available storage volume that would lead to clogging of the underdrain and native soil beneath the BMP.
☐	Filter course is washed and free of fines.	Washing aggregate will help eliminate fines that could clog the facility and impede infiltration.
☐	Filter course calculations assessing suitability for particle migration prevention have been completed.	Gradation relationship between layers can evaluate factors (e.g., bridging, permeability, and uniformity) to determine if particle sizing is appropriate or if an intermediate layer is needed.
Aggregate Storage Layer (Optional)		
☐	Class 2 Permeable per Caltrans specification 68-1.025 is recommended for the storage layer. Washed, open-graded crushed rock may be used, however a 4-6 inch washed pea gravel filter course layer at the top of the crushed rock is required.	Washing aggregate will help eliminate fines that could clog the aggregate storage layer void spaces or subgrade.
☐	Maximum aggregate storage layer depth is determined based on the infiltration storage volume that will infiltrate within a 36-hour drawdown time.	A maximum drawdown time to facilitate provision of adequate storm water storage for the next storm event. The applicant has an option to use a different drawdown time of up to 120 hours if the volume of the facility is adjusted using the percent capture method in Appendix B.4.1.
Inflow and Overflow Structures		
☐	Inflow and overflow structures are accessible for inspection and maintenance. Overflow structures must be connected to downstream storm drain system or appropriate discharge point.	Maintenance will prevent clogging and ensure proper operation of the flow control structures.

Siting and Design		*Intent/Rationale*
☐	Inflow velocities are limited to 3 ft/s or less or use energy dissipation methods (e.g., riprap, level spreader) for concentrated inflows.	High inflow velocities can cause erosion, scour and/or channeling.
☐	Curb cut inlets are at least 12 inches wide, have a 4-6 inch reveal (drop) and an apron and energy dissipation as needed.	Inlets must not restrict flow and apron prevents blockage from vegetation as it grows in. Energy dissipation prevents erosion.
☐	Overflow is safely conveyed to a downstream storm drain system or discharge point. Size overflow structure to pass 100-year peak flow for on-line basins and water quality peak flow for off-line basins.	Planning for overflow lessens the risk of property damage due to flooding.

Conceptual Design and Sizing Approach for Storm Water Pollutant Control Only

To design bioretention for storm water pollutant control only (no flow control required), the following steps should be taken:

1. Verify that siting and design criteria have been met, including placement and basin area requirements, maximum side and finish grade slope, and the recommended media surface area tributary ratio.
2. Calculate the DCV per Appendix B based on expected site design runoff for tributary areas.
3. Use the sizing worksheet to determine if full infiltration of the DCV is achievable based on the available infiltration storage volume calculated from the bioretention without underdrain footprint area, effective depths for surface ponding, media and aggregate storage layers, and in-situ soil design infiltration rate for a maximum 36-hour drawdown time for the aggregate storage layer (unless percent capture method is used), with surface ponding no greater than a maximum 24-hour drawdown. The drawdown time can be estimated by dividing the average depth of the basin by the design infiltration rate of the underlying soil. Appendix D provides guidance on evaluating a site's infiltration rate. A generic sizing worksheet is provided in Appendix B.4.
4. Where the DCV cannot be fully infiltrated based on the site or bioretention constraints, an underdrain can be added to the design (use biofiltration with partial retention factsheet).

Conceptual Design and Sizing Approach when Storm Water Flow Control is Applicable

Control of flow rates and/or durations will typically require significant surface ponding and/or aggregate storage volumes, and therefore the following steps should be taken prior to determination of storm water pollutant control design. Pre-development and allowable post-project flow rates and durations must be determined as discussed in Chapter 6 of the manual.

1. Verify that siting and design criteria have been met, including placement requirements, maximum side and finish grade slopes, and the recommended media surface area tributary area ratio. Design for flow control can be achieved using various design configurations.
2. Iteratively determine the facility footprint area, surface ponding and/or aggregate storage layer depth required to provide infiltration storage to reduce flow rates and durations to allowable limits while adhering to the maximum drawdown times for surface ponding and aggregate storage. Flow rates and durations can be controlled using flow splitters that route the appropriate inflow amounts to the bioretention facility and bypass excess flows to the downstream storm drain system or discharge point.
3. If bioretention without underdrain facility cannot fully provide the flow rate and duration control required by the MS4 permit, an upstream or downstream structure with appropriate storage volume such as an underground vault can be used to provide additional control.
4. After bioretention without underdrain BMPs have been designed to meet flow control requirements, calculations must be completed to verify if storm water pollutant control requirements to treat the DCV have been met.

Maintenance Overview

Normal Expected Maintenance. Bioretention requires routine maintenance to: remove accumulated materials such as sediment, trash or debris; maintain vegetation health; maintain infiltration capacity of the media layer; replenish mulch; and maintain integrity of side slopes, inlets, energy dissipators, and outlets. A summary table of standard inspection and maintenance indicators is provided within this Fact Sheet.

Non-Standard Maintenance or BMP Failure. If any of the following scenarios are observed, the BMP is not performing as intended to protect downstream waterways from pollution and/or erosion. Corrective maintenance, increased inspection and maintenance, BMP replacement, or a different BMP type will be required.

- The BMP is not drained between storm events. Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health, and surface ponding longer than approximately 96 hours following a storm event poses a risk of vector (mosquito) breeding. Poor drainage can result from clogging of the media layer, filter course, aggregate storage layer, underlying native soils, or outlet structure. The specific cause of the drainage issue must be determined and corrected. If it is determined that the underlying native soils have been compacted or do not have the infiltration capacity expected, the County reviewer shall be contacted prior to any additional repairs or reconstruction.

- Sediment, trash, or debris accumulation greater than 25% of the surface ponding volume within one month. This means the load from the tributary drainage area is too high, reducing BMP function or clogging the BMP. This would require pretreatment measures within the tributary area draining to the BMP to intercept the materials. Pretreatment components, especially for sediment, will extend the life of components that are more expensive to replace

such as media, filter course, and aggregate layers.

- Erosion due to concentrated storm water runoff flow that is not readily corrected by adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, the County reviewer shall be contacted prior to any additional repairs or reconstruction.

Other Special Considerations. Bioretention is a vegetated structural BMP. Vegetated structural BMPs that are constructed in the vicinity of, or connected to, an existing jurisdictional water or wetland could inadvertently result in creation of expanded waters or wetlands. As such, vegetated structural BMPs have the **potential** to come under the jurisdiction of the United States Army Corps of Engineers, SDRWQCB, California Department of Fish and Wildlife, or the United States Fish and Wildlife Service. This could result in the need for specific resource agency permits and costly mitigation to perform maintenance of the structural BMP. Along with proper placement of a structural BMP, routine maintenance is key to preventing this scenario.

Summary of Standard Inspection and Maintenance

The property owner is responsible to ensure inspection, operation and maintenance of permanent BMPs on their property unless responsibility has been formally transferred to an agency, community facilities district, homeowners association, property owners association, or other special district.

Maintenance frequencies listed in this table are average/typical frequencies. Actual maintenance needs are site-specific, and maintenance may be required more frequently. Maintenance must be performed whenever needed, based on maintenance indicators presented in this table. The BMP owner is responsible for conducting regular inspections to see when maintenance is needed based on the maintenance indicators. During the first year of operation of a structural BMP, inspection is recommended at least once prior to August 31 and then monthly from September through May. Inspection during a storm event is also recommended. After the initial period of frequent inspections, the minimum inspection and maintenance frequency can be determined based on the results of the first year inspections.

Threshold/Indicator	Maintenance Action	Inspection and Maintenance Frequency
Accumulation of sediment, litter, or debris	Remove and properly dispose of accumulated materials, without damage to the vegetation or compaction of the media layer.	• Inspect monthly. If the BMP is 25% full* or more in one month, increase inspection frequency to monthly plus after every 0.1-inch or larger storm event. • Remove any accumulated materials found at each inspection.
Obstructed inlet or outlet structure	Clear blockage.	• Inspect monthly and after every 0.5-inch or larger storm event. • Remove any accumulated materials found at each inspection.
Damage to structural components such as weirs, inlet or outlet structures	Repair or replace as applicable.	• Inspect annually. • Maintain when needed.
Poor vegetation establishment	Re-seed, re-plant, or re-establish vegetation per original plans.	• Inspect monthly. • Maintain when needed.

Threshold/Indicator	Maintenance Action	Inspection and Maintenance Frequency
Dead or diseased vegetation	Remove dead or diseased vegetation, re-seed, re-plant, or re-establish vegetation per original plans.	• Inspect monthly. • Maintain when needed.
Overgrown vegetation	Mow or trim as appropriate.	• Inspect monthly. • Maintain when needed.
2/3 of mulch has decomposed, or mulch has been removed	Remove decomposed fraction and top off with fresh mulch to a total depth of 3 inches.	• Inspect monthly. • Replenish mulch annually, or more frequently when needed based on inspection.
Erosion due to concentrated irrigation flow	Repair/re-seed/re-plant eroded areas and adjust the irrigation system.	• Inspect monthly. • Maintain when needed.
Erosion due to concentrated storm water runoff flow	Repair/re-seed/re-plant eroded areas, and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, the County reviewer shall be contacted prior to any additional repairs or reconstruction.	• Inspect after every 0.5-inch or larger storm event. If erosion due to storm water flow has been observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintain when needed. If the issue is not corrected by restoring the BMP to the original plan and grade, the County reviewer shall be contacted prior to any additional repairs or reconstruction.
Standing water in BMP for longer than 24 hours following a storm event Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, or repairing/replacing clogged or compacted soils. If it is determined that the underlying native soils have been compacted or do not have the infiltration capacity expected, the County reviewer shall be contacted prior to any additional repairs or reconstruction.	• Inspect monthly and after every 0.5-inch or larger storm event. If standing water is observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintain when needed.

Threshold/Indicator	Maintenance Action	Inspection and Maintenance Frequency
Presence of mosquitos/larvae For images of egg rafts, larva, pupa, and adult mosquitos, see http://www.mosquito.org/biology	If mosquitos/larvae are observed: first, immediately remove any standing water by dispersing to nearby landscaping; second, make corrective measures as applicable to restore BMP drainage to prevent standing water. If mosquitos persist following corrective measures to remove standing water, or if the BMP design does not meet the 96-hour drawdown criteria because the underlying native soils have been compacted or do not have the infiltration capacity expected, the County reviewer shall be contacted to determine a solution. A different BMP type, or a Vector Management Plan prepared with concurrence from the County of San Diego Department of Environmental Health, may be required.	• Inspect monthly and after every 0.5-inch or larger storm event. If mosquitos are observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintain when needed.

"25% full" is defined as ¼ of the depth from the design bottom elevation to the crest of the outflow structure (e.g., if the height to the outflow opening is 12 inches from the bottom elevation, then the materials must be removed when there is 3 inches of accumulation – this should be marked on the outflow structure).

BL-7: Management of Non-Storm Water Discharges

TYPICAL STORM DRAIN SIGNAGE

MS4 Permit Category
Source Control (SC)
BMP IDs
SC-F: Storm Drain Signage SC-G: Educational BMP Signage

Applicable Site Features

County Watershed Protection Ordinance (WPO) Section 67.811(a)(4) requires baseline BMPs for the management of non-storm water discharges to prevent illicit discharges from entering the storm drain system. This Fact Sheet describes baseline BMPs for the labeling of all storm drain inlets and catch basins; educational signage; and practices for interior work surfaces, floor drains and sumps, drain lines, and fire sprinkler test water.

SWQMP Baseline BMP Requirements

The following baseline BMPs are required where applicable and feasible for the features described above:

a. Storm Drain Inlets and Catch Basins (SC-F)

See BMP ID SC-F: Storm Drain Signage (SC-F) below.

b. Educational BMP signage (SC-G)

See BMP ID SC-G: Educational BMP Signage (SC-G) below.

c. Interior work surfaces, floor drains & sumps

All interior work surfaces, floor drains and sumps shall not be directly connected to the MS4 or receiving waters. All discharges should be directed to sanitary sewer, if feasible, and with approvals by the Sanitary Sewer Agency with authority over the proposed receiving sanitary sewer.

d. Drain lines (e.g., air conditioning, boiler, etc.)

All drain lines shall not be directly connected to the MS4 or receiving waters. All discharges should be directed to sanitary sewer, if feasible, and with approvals by the Sanitary Sewer Agency with authority over the proposed receiving sanitary sewer, or discharge to landscaped areas on site.

e. Fire sprinkler test water

Fire sprinkler test water shall not be directly connected to the MS4 or receiving waters. Please click on the following fact sheet for additional information:

https://www.sandiegocounty.gov/content/dam/sdc/dpw/WATERSHED_PROTECTION_PROGRAM/watershedpdf/IndustComm/English/Fire_Sprinkler_Maintenance.pdf

These baseline BMPs are documented in Table 2, Section B of the PDP and Standard SWQMP template as shown below:

B. Prevention of Non-stormwater Discharges (See Worksheet III-7)

Select one option for each feature below:

• **Storm drain inlets and catch basins ...**	☐ are not proposed	☐ will be labeled with stenciling or signage to discourage dumping **(SC-F)**
• **Educational BMP Signage...**	☐ are not proposed	☐ will be labeled with educational signage for BMP **(SC-G)**
• **Interior work surfaces, floor drains, & sumps ...**	☐ are not proposed	☐ will not discharge directly or indirectly to the MS4 or receiving waters
• **Drain lines (e.g., air conditioning, boiler, etc.) ...**	☐ are not proposed	☐ will not discharge directly or indirectly to the MS4 or receiving waters
• **Fire sprinkler test water ...**	☐ are not proposed	☐ will not discharge directly or indirectly to the MS4 or receiving waters

SC-F: STORM DRAIN SIGNAGE

Description

Storm drain signs and stencils are visible source controls typically placed adjacent to inlets. Posting notices regarding discharge prohibitions at storm drain inlets can prevent waste dumping. Storm drain signage must be provided for all storm water conveyance system inlets and catch basins within the project area. Storm drain signage may include concrete stamping, concrete painting, placards, or other methods approved by the County. These may be modified and used as educational pieces promoting improved water quality. In addition to storm drain signage at storm water conveyance system inlets and catch basins, applicants are encouraged to post signs and prohibitive language (with graphical icons) which prohibit illegal dumping at trailheads, parks, building entrances, and public access points along channels and creeks within the project area.

Design Considerations

Storm drain stenciling and signage may be implemented using a painted stencil or a sign or placard affixed to the structure. Signage should be located in plain sight of someone observing a storm drain inlet. The signage may include a combination of graphics and prohibitive language that identifies the inlet as a storm drain, prohibits dumping, and explains that storm drains discharge directly to receiving waterbodies.

Stencils and placards can be purchased from a number of suppliers. In the San Diego area, the non-profit organization, I Love A Clean San Diego, loans out stencil sets for labeling storm drains. They can be contacted at (619) 291-0103 or found online at https://ilacsd.org.

Plan Requirements

SC-F: STORM DRAIN SIGNAGE
Plan View Requirements
• Label each storm drain with BMP ID: SC-F
Detail Sheets
• Provide details on grading or improvement plans associated with the construction of applicable inlet or drainage feature.
Typical Construction Notes
• MARK ALL INLETS WITH THE WORDS "NO DUMPING DRAINS TO WATERWAYS" OR SIMILAR. SEE STENCIL TEMPLATE PROVIDED ON THE SHEET.

Maintenance Considerations

Signage should be repainted or replaced if it is damaged or begins to deteriorate.

Appendix B

Water Demand and Sewer Generation Evaluation

DEXTER WILSON ENGINEERING, INC.

DEXTER S. WILSON, P.E.
ANDREW M. OVEN, P.E.
NATALIE J. FRASCHETTI, P.E.
STEVEN J. HENDERSON, P.E.
FERNANDO FREGOSO, P.E.
KATHLEEN L. HEITT, P.E.
WILLIAM W. TODD, P.E.

MEMORANDUM **537-024**

TO: **Jennifer Wade, Acorn Environmental**

FROM: **Fernando Fregoso, P.E., Dexter Wilson Engineering, Inc.**

DATE: **August 8, 2023**

SUBJECT: **Water Demand and Sewer Generation Evaluation for the Sycuan Lease and Training Facility Project**

Introduction

The Sycuan Band of the Kumeyaay Nation (Tribe) is considering entering into a land lease for the development of a professional soccer training facility and youth academy (project or Campus) within Tribal trust land currently developed with the Pine Glen Golf Course and Singing Hills Golf Resort. The project would consist of retrofitting the existing Singing Hills Hotel into classroom, dormitory facilities and offices, and construction of a new approximately 50,000-square foot training facility building, five soccer fields, one goalkeeper training field, other open air training areas, and ancillary circulation and infrastructure improvements.

Water service to the existing Singing Hills Golf Resort is provided by a private potable water storage and distribution system fed by connections to the Otay Water District public water system. Water service to the existing Pine Glen Golf Course is provided by Sycuan through a groundwater supply and distribution system. Wastewater service is provided by an onsite collection that coneys sewage into the Otay Water District public sewer system.

The purpose of this memorandum is to address potable and non-potable water demands and sewer generation for the proposed project.

Land Use Plan

The Sycuan Lease and Training Facility project will utilize approximately 28 acres of the existing site. Attachment 1 presents a conceptual site plan that includes key numbering of proposed campus facilities. Buildings A through K refer to existing buildings that will be repurposed for Sycuan Lease and Training Facility project uses. Numbers 1 through 8 refer to new facilities that will be constructed for the Sycuan Lease and Training Facility project and Numbers 9 through 12 represent site/entrance locations. Existing/repurposed buildings, new buildings, and new site amenities and their proposed uses are summarized below.

New Buildings

- Facilities 1 and 2 – Academy and Training Facility
- Facilities 5, 6, and 7 – Groundskeeping and Maintenance Facilities

Existing/Repurposed Buildings

- Building A – Classrooms
- Building B – Offices, Administration
- Building C – Hoteling, School Program
- Building D – Library, Other Areas
- Building E – Active Lounge, Gaming
- Building F – Junior Girls Dorms
- Building G – Junior Boys Dorms
- Building H – Senior Boys Dorms
- Building J – Other Dorms
- Building K – Laundry, Security

New Site Amenities

- Facilities 3 and 4 – Agility Area and Sprint Track: Synthetic Turf
- Facility 8 – Play Zones (Multipurpose Sport Court for Basketball and Futsal)
- One (1) Half-sized Goalie Training Pitch: Natural Turf
- Three (3) Full-sized Training Pitches: Natural Turf
- Two (2) Full-sized Training Pitches: Synthetic Turf

The existing driving range and tee boxes will be relocated south of their current location to accommodate the proposed project. The approximate area of the driving range is four acres. The driving range is currently outside of the Sycuan Lease and Training Facility project boundary.

Potable and Non-Potable Water Planning Criteria

The planning criteria used to estimate existing and proposed potable and non-potable water demands are summarized below.

- Hotel average water use – 100 gpd/room
- Campus average water use – 80 gpd/bed (Metcalf & Eddy, 5th Edition)
- Non-residential average water use – 1,785 gpd/acre (Otay Water District)
- Irrigation water use – 1,900 gpd/acre (Otay Water District)
- Factor to convert potable average demand to maximum day demand – 3.0 (SDWAS)
- Factor to convert potable average demand to peak hour demand – 7.0 (SDWAS)
- Factor to convert non-potable average demand to maximum day demand – 2.25
- Factor to convert non-potable maximum day demand to peak hour demand – 3.0 (based on an 8 hour irrigation window)

The Singing Hills Golf Resort is served by potable water and the Pine Glen Golf Course is served by non-potable water. First potable water demands are presented, and then non-potable water demands are presented.

Projected Potable Water Demands

Table 1 summarizes the existing potable water demands for the hotel at the existing Singing Hills Golf Resort. The hotel will be repurposed for the Sycuan Lease and Training Facility project.

TABLE 1
HOTEL AT SINGING HILL GOLF RESORT
EXISTING POTABLE WATER DEMANDS

Land Use	Quantity	Demand Factor	Average Demand, gpd
Hotel	115 rooms	100 gpd/room	11,500
TOTAL			**11,500**

For the proposed Sycuan Lease and Training Facility project, Table 2 summarizes the projected average daily potable water demand.

TABLE 2
SYCUAN LEASE AND TRAINING FACILITY PROJECT
PROJECTED POTABLE WATER DEMANDS

Land Use [1]	Quantity	Demand Factor	Average Demand, gpd
Campus	185 beds	80 gpd/bed	14,800
New Training Facility	50,000 sqft (1.15 acres)	1,785 gpd/acre	2,053
TOTAL			**16,853**

1. Irrigation of new fields is not accounted for in the potable water demand estimates because the new fields are proposed to be irrigated with non-potable water.

Based on the information presented in Table 1 and 2, Table 3 summarizes the change in average potable water demand due to the proposed change in land use for the project. The proposed project is estimated to increase the potable water use for this site by 5,353 gpd or 46.5 percent. This increase in demand is not expected to change offsite public backbone water line sizing in the vicinity of the project as offsite public water lines are sized based primarily on fire flow requirements, which are substantially higher than the total demand for the project.

TABLE 3
COMPARISON OF POTABLE WATER DEMANDS

Land Use	Average Demand	Maximum Day Demand	Peak Hour Demand
Current	11,500 gpd	34,500 gpd	80,500 gpd
	8.0 gpm	24.0 gpm	55.9 gpm
Proposed	16,853 gpd	50,559 gpd	117,971 gpd
	11.7 gpm	35.1 gpm	81.9 gpm
Difference	5,353 gpd	16,059 gpd	37,471 gpd
	3.7 gpm	11.2 gpm	26.0 gpm

Projected Non-Potable Water Demands

Table 4 summarizes the existing non-potable water demands for the hotel at the existing Singing Hills Golf Resort. The hotel will be repurposed for the Sycuan Lease and Training Facility project.

TABLE 4
HOTEL AT SINGING HILL GOLF RESORT
EXISTING NON-POTABLE WATER DEMANDS

Land Use	Quantity	Percent Irrigated	Demand Factor	Average Demand, gpd
Golf Course Irrigation	16.7 acres	100%	1,900 gpd/acre	31,730
TOTAL				**31,730**

For the proposed Sycuan Lease and Training Facility project, Table 5 summarizes the projected average daily non-potable water demand.

TABLE 5
SYCUAN LEASE AND TRAINING FACILITY PROJECT
PROJECTED NON-POTABLE WATER DEMANDS

Land Use	Quantity	Percent Irrigated	Demand Factor	Average Demand, gpd
New Field Irrigation	12.5 acres	100%	1,900 gpd/acre	23,750
New Landscape Irrigation	0.5 acres	100%	1,900 gpd/acre	950
TOTAL				**24,700**

Based on the information presented in Table 4 and 5, Table 6 summarizes the change in average non-potable water demand due to the proposed change in land use for the project. The proposed project is estimated to decrease the non-potable water use for this site by 7,030 gpd or 22.2 percent. This decrease in demand is not expected to change backbone water line sizing of the irrigation system.

TABLE 6
COMPARISON OF NON-POTABLE WATER DEMANDS

Land Use	Average Demand	Maximum Day Demand	Peak Hour Demand
Current	31,730 gpd	71,393 gpd	214,178 gpd
	22.0 gpm	49.6 gpm	148.7 gpm
Proposed	24,700 gpd	55,575 gpd	166,725 gpd
	17.1 gpm	38.6 gpm	115.8 gpm
Difference	7,030 gpd	15,818 gpd	47,453 gpd
	4.9 gpm	11.0 gpm	32.9 gpm

Sewer Planning Criteria

The planning criteria used to estimate existing and proposed sewer generation are summarized below.

- Hotel average sewer flow – 95 gpd/room
- Campus average sewer flow – 68 gpd/bed (Metcalf & Eddy, 5th Edition)
- Non-residential average sewer flow – 1,607 gpd/ac (based on 90 percent of projected water use)
- Factor to convert average sewer flow to peak sewer flow – 3.5 (SDWAS)

Projected Sewer Flows

Table 7 summarizes the existing sewer generation for the hotel at the existing Singing Hills Golf Resort. The hotel will be repurposed for the Sycuan Lease and Training Facility project.

TABLE 7
HOTEL AT SINGING HILL GOLF RESORT
EXISTING SEWER GENERATION

Land Use	Quantity	Generation Factor	Average Sewer Generation, gpd
Hotel	115 rooms	95 gpd/room	10,925
TOTAL			**10,925**

For the proposed Sycuan Lease and Training Facility project, Table 8 summarizes the projected average sewer generation.

TABLE 8
SYCUAN LEASE AND TRAINING FACILITY PROJECT
PROJECTED SEWER GENERATION

Land Use	Quantity	Generation Factor	Average Sewer Generation, gpd
Campus	185 beds	68 gpd/bed	12,580
New Training Facility	50,000 sqft (1.15 acres)	1,607 gpd/acre	1,848
TOTAL			**14,428**

Based on the information presented in Table 7 and 8, Table 9 summarizes the change in average sewer generation due to the proposed change in land use for the project. The proposed project is estimated to increase the sewer generation for this site by 3,503 gpd or 32.0 percent. This increase in sewer generation is not expected to change offsite public backbone sewer line sizing downstream of the project as the increase in sewer generation is estimated to be insignificant relative to the existing flows within the sewer basin.

TABLE 9
COMPARISON OF SEWER GENERATION

Land Use	Average Sewer Generation	Peak Sewer Generation
Current	10,925 gpd	38,238 gpd
	7.6 gpm	26.6 gpm
Proposed	14,428 gpd	50,498 gpd
	10.0 gpm	35.1 gpm
Difference	3,503 gpd	12,260 gpd
	2.4 gpm	8.5 gpm

If you have any questions regarding the information presented in this memorandum, please do not hesitate to call.

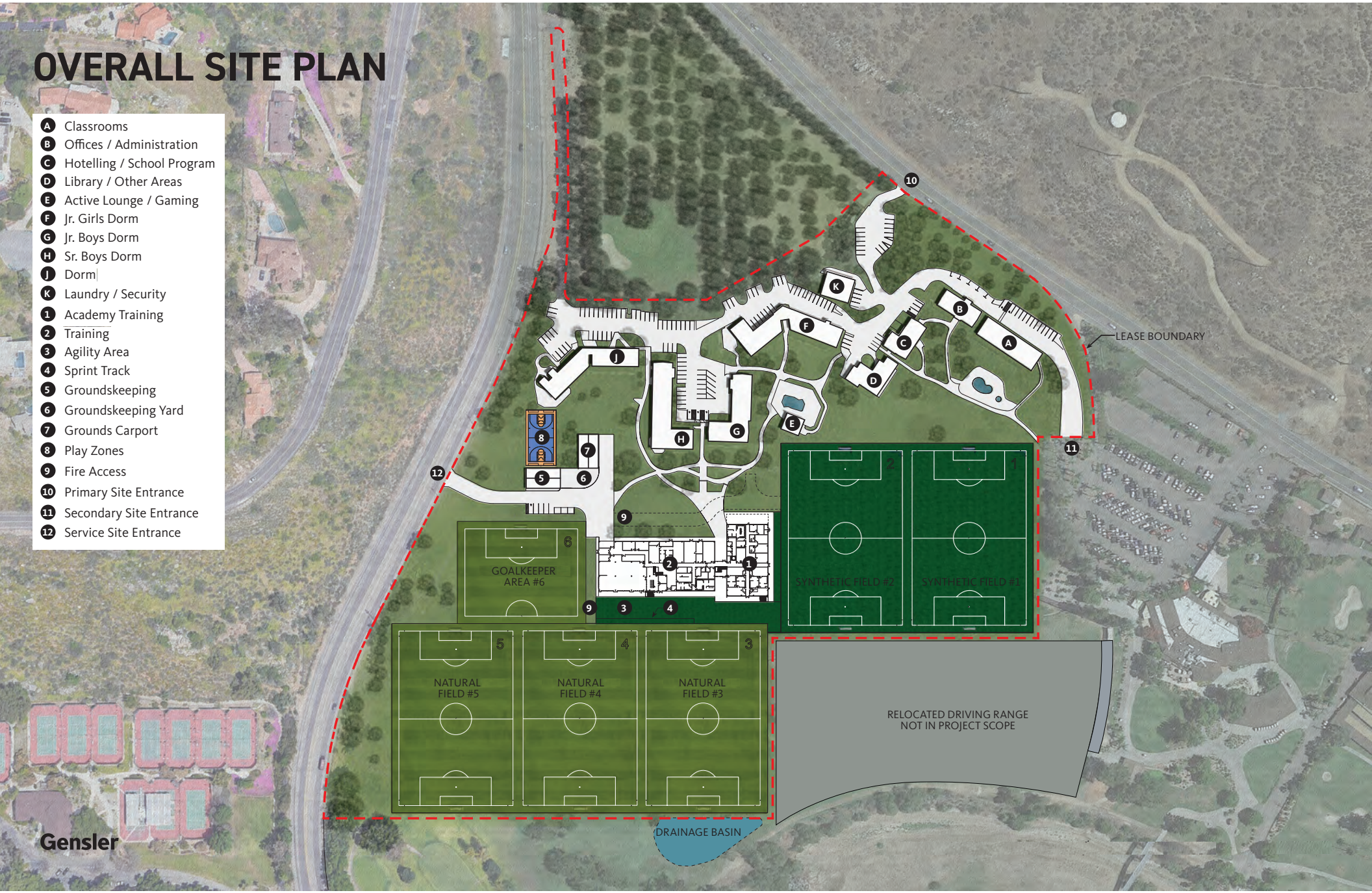
FF:ah

Attachment

ATTACHMENT 1

CONCEPTUAL SITE PLAN

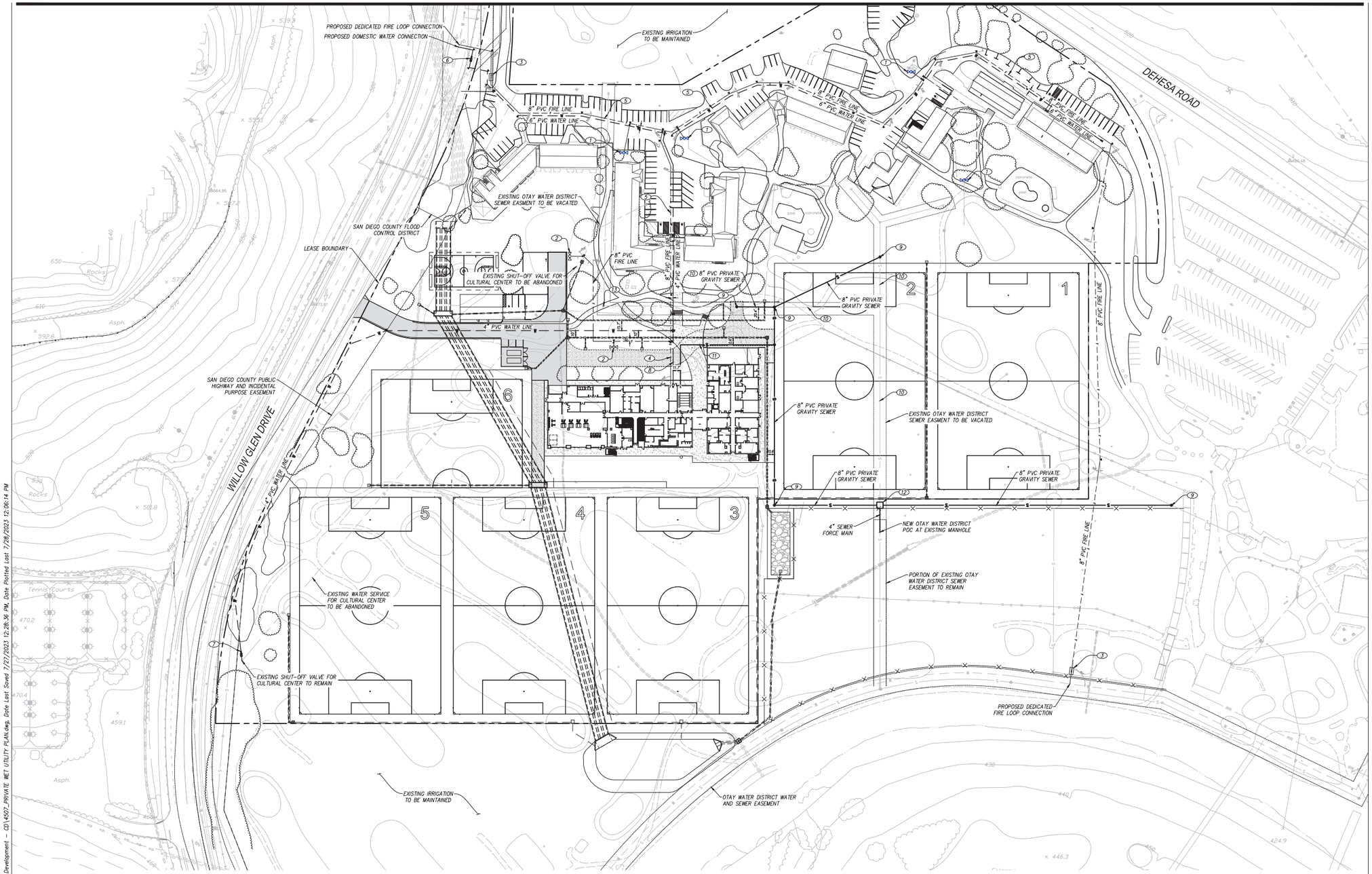
OVERALL SITE PLAN



Gensler

Appendix C

Preliminary Water and Wastewater Infrastructure Plan



LEGEND:

- LEASE BOUNDARY
- PROPOSED STORM DRAIN LINE
- PROPOSED DEDICATED FIRE LINE
- W — PROPOSED DOMESTIC WATER LINE
- S — PROPOSED PRIVATE SEWER LINE
- W — PROPOSED DOMESTIC WATER METER AND BACKFLOW PREVENTER ASSEMBLY
- F — PROPOSED FIRE BACKFLOW PREVENTER ASSEMBLY
- PROPOSED FIRE HYDRANT
- PROPOSED GATE VALVE
- PROPOSED THRUST BLOCK
- PROPOSED 5' DIA. SEWER MANHOLE
- PROPOSED SEWER PUMP STATION
- F — PROPOSED FIRE LATERAL AND POC
- W — PROPOSED WATER LATERAL AND POC
- S — PROPOSED SEWER LATERAL AND POC

CONSTRUCTION NOTES

1. CONNECT EXISTING FIRE HYDRANT TO PROPOSED DEDICATED FIRE LOOP
2. PROPOSED FIRE HYDRANT
3. INSTALL 8" FIRE BACKFLOW PREVENTOR
4. INSTALL 8" FIRE SERVICE LATERAL
5. 5" WATER-FIRE JOINT TRENCH WITH MIN. 4' SEPARATION
6. INSTALL 2" DOMESTIC WATER METER AND BACKFLOW PREVENTOR PER OTAY WATER DISTRICT STD. DWG
7. INSTALL 1.5" DOMESTIC WATER SUBMETER AND BACKFLOW PREVENTOR
8. INSTALL 4" DOMESTIC WATER SERVICE LATERAL
9. PROPOSED 5' DIA. SEWER MANHOLE PER OTAY WATER DISTRICT STD. DWG. SM-01
10. EXISTING SEWER TO BE REMOVED OR ABANDONED IN PLACE PER WHITE BOOK STANDARDS
11. INSTALL 6" SEWER SERVICE LATERAL
12. PROPOSED SEWER PUMP STATION
13. LOWER EXISTING SEWER MANHOLE RIM PER GRADING PLAN

60 30 0 60 120 180
SCALE: 1"=60'

N

Gensler
1011 South Congress Avenue
Building 1, Suite 200
Austin, TX 78704
United States
Tel 512.867.8100

Walter P Moore - Structural
8910 University Center Lane
Suite 400
San Diego, CA 92122
USA

Project Design Consultants, a Bowman Company - Civil
701 B Street
Suite 800
San Diego, CA 92101
USA

△ Date	Description
07/13/2023	100% SCHEMATIC DESIGN

Seal / Signature

NOT FOR CONSTRUCTION

Project Name
SYCUAN TRAINING FACILITY

Project Number
25.1857.000

Description
Unnamed

Scale

PRIVATE WATER AND SEWER PLAN

C5.0

Appendix D

CalEEMod Output Files

Sycuan Training Facility - San Diego County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Sycuan Training Facility

San Diego County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Junior College (2yr)	50.00	1000sqft	0.77	50,000.00	0
Other Asphalt Surfaces	76.85	1000sqft	1.76	76,850.00	0
User Defined Recreational	12.70	User Defined Unit	12.70	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	40
Climate Zone	13			**Operational Year**	2025
Utility Company	San Diego Gas & Electric				
CO2 Intensity (lb/MWhr)	539.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Land uses based on site plan.

Construction Phase - Based on proposed schedule.

Grading -

Architectural Coating - Compliance with SDAPCD Rule 67.0.1.

Area Coating - Compliance with SDAPCD Rule 67.0.1.

Water And Wastewater - Water use for natural grass soccer fields based on Water and Sewer Study (Dexter Wilson, July 2023).

Land Use Change -

Sequestration -

Construction Off-road Equipment Mitigation -

Sycuan Training Facility - San Diego County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Water Mitigation -

Vehicle Trips - Trip generation based on traffic impact analysis.

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	50.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	50.00
tblArchitecturalCoating	EF_Parking	250.00	100.00
tblArchitecturalCoating	EF_Residential_Exterior	250.00	50.00
tblArchitecturalCoating	EF_Residential_Interior	250.00	50.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	250	50
tblAreaCoating	Area_EF_Nonresidential_Interior	250	50
tblAreaCoating	Area_EF_Parking	250	100
tblConstructionPhase	NumDays	20.00	30.00
tblConstructionPhase	NumDays	300.00	210.00
tblConstructionPhase	PhaseEndDate	4/11/2025	12/20/2024
tblConstructionPhase	PhaseEndDate	2/14/2025	10/11/2024
tblConstructionPhase	PhaseEndDate	3/14/2025	11/8/2024
tblConstructionPhase	PhaseStartDate	3/15/2025	11/9/2024
tblConstructionPhase	PhaseStartDate	2/15/2025	10/12/2024
tblGrading	MaterialImported	0.00	5,000.00
tblLandUse	LotAcreage	1.15	0.77
tblLandUse	LotAcreage	0.00	12.70
tblVehicleTrips	ST_TR	11.23	4.00
tblVehicleTrips	SU_TR	1.21	4.00
tblVehicleTrips	WD_TR	20.25	4.00
tblWater	OutdoorWaterUseRate	0.00	9,015,500.00

2.0 Emissions Summary

Sycuan Training Facility - San Diego County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0923	0.9522	0.7765	1.8200e-003	0.2478	0.0398	0.2876	0.1084	0.0368	0.1452	0.0000	162.3907	162.3907	0.0439	3.2500e-003	164.4572
2024	0.3093	1.5961	1.9858	3.8500e-003	0.0604	0.0693	0.1297	0.0164	0.0651	0.0815	0.0000	339.2164	339.2164	0.0652	7.1000e-003	342.9622
Maximum	**0.3093**	**1.5961**	**1.9858**	**3.8500e-003**	**0.2478**	**0.0693**	**0.2876**	**0.1084**	**0.0651**	**0.1452**	**0.0000**	**339.2164**	**339.2164**	**0.0652**	**7.1000e-003**	**342.9622**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0923	0.9522	0.7765	1.8200e-003	0.1176	0.0398	0.1574	0.0504	0.0368	0.0872	0.0000	162.3906	162.3906	0.0439	3.2500e-003	164.4570
2024	0.3093	1.5961	1.9858	3.8500e-003	0.0604	0.0693	0.1297	0.0164	0.0651	0.0815	0.0000	339.2161	339.2161	0.0652	7.1000e-003	342.9619
Maximum	**0.3093**	**1.5961**	**1.9858**	**3.8500e-003**	**0.1176**	**0.0693**	**0.1574**	**0.0504**	**0.0651**	**0.0872**	**0.0000**	**339.2161**	**339.2161**	**0.0652**	**7.1000e-003**	**342.9619**

Sycuan Training Facility - San Diego County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**42.24**	**0.00**	**31.20**	**46.46**	**0.00**	**25.57**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**10-2-2023**	**1-1-2024**	1.0458	1.0458
2	**1-2-2024**	**4-1-2024**	0.5235	0.5235
3	**4-2-2024**	**7-1-2024**	0.5216	0.5216
4	**7-2-2024**	**9-30-2024**	0.5216	0.5216
		Highest	1.0458	1.0458

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.2130	1.0000e-005	1.2800e-003	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.4900e-003	2.4900e-003	1.0000e-005	0.0000	2.6600e-003
Energy	9.7100e-003	0.0883	0.0742	5.3000e-004		6.7100e-003	6.7100e-003		6.7100e-003	6.7100e-003	0.0000	201.4552	201.4552	8.2800e-003	2.5400e-003	202.4198
Mobile	0.0911	0.0980	0.8270	1.7300e-003	0.1900	1.3500e-003	0.1913	0.0507	1.2600e-003	0.0520	0.0000	159.5326	159.5326	0.0118	7.4200e-003	162.0372
Waste						0.0000	0.0000		0.0000	0.0000	13.1944	0.0000	13.1944	0.7798	0.0000	32.6886
Water						0.0000	0.0000		0.0000	0.0000	0.7781	42.7924	43.5705	0.0825	2.2000e-003	46.2904
Total	**0.3138**	**0.1863**	**0.9025**	**2.2600e-003**	**0.1900**	**8.0600e-003**	**0.1981**	**0.0507**	**7.9700e-003**	**0.0587**	**13.9725**	**403.7827**	**417.7552**	**0.8824**	**0.0122**	**443.4387**

Sycuan Training Facility - San Diego County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.2130	1.0000e-005	1.2800e-003	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.4900e-003	2.4900e-003	1.0000e-005	0.0000	2.6600e-003
Energy	9.7100e-003	0.0883	0.0742	5.3000e-004		6.7100e-003	6.7100e-003		6.7100e-003	6.7100e-003	0.0000	201.4552	201.4552	8.2800e-003	2.5400e-003	202.4198
Mobile	0.0911	0.0980	0.8270	1.7300e-003	0.1900	1.3500e-003	0.1913	0.0507	1.2600e-003	0.0520	0.0000	159.5326	159.5326	0.0118	7.4200e-003	162.0372
Waste						0.0000	0.0000		0.0000	0.0000	13.1944	0.0000	13.1944	0.7798	0.0000	32.6886
Water						0.0000	0.0000		0.0000	0.0000	0.7781	42.7924	43.5705	0.0825	2.2000e-003	46.2904
Total	**0.3138**	**0.1863**	**0.9025**	**2.2600e-003**	**0.1900**	**8.0600e-003**	**0.1981**	**0.0507**	**7.9700e-003**	**0.0587**	**13.9725**	**403.7827**	**417.7552**	**0.8824**	**0.0122**	**443.4387**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.3 Vegetation

Vegetation

	CO2e
Category	MT
Vegetation Land Change	-27.7500
Total	**-27.7500**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	10/2/2023	10/27/2023	5	20	
2	Site Preparation	Site Preparation	10/28/2023	11/10/2023	5	10	
3	Grading	Grading	11/11/2023	12/22/2023	5	30	
4	Building Construction	Building Construction	12/23/2023	10/11/2024	5	210	
5	Paving	Paving	10/12/2024	11/8/2024	5	20	
6	Architectural Coating	Architectural Coating	11/9/2024	12/20/2024	5	30	

Acres of Grading (Site Preparation Phase): 15

Acres of Grading (Grading Phase): 90

Acres of Paving: 1.76

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 75,000; Non-Residential Outdoor: 25,000; Striped Parking Area: 4,611 (Architectural Coating – sqft)

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Cranes	1	7.00	231	0.29
Demolition	Excavators	3	8.00	158	0.38
Grading	Excavators	2	8.00	158	0.38
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Grading	Graders	1	8.00	187	0.41
Paving	Pavers	2	8.00	130	0.42
Paving	Paving Equipment	2	8.00	132	0.36
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	625.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Building Construction	9	53.00	21.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	11.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0227	0.2148	0.1964	3.9000e-004		9.9800e-003	9.9800e-003		9.2800e-003	9.2800e-003	0.0000	33.9921	33.9921	9.5200e-003	0.0000	34.2301
Total	**0.0227**	**0.2148**	**0.1964**	**3.9000e-004**		**9.9800e-003**	**9.9800e-003**		**9.2800e-003**	**9.2800e-003**	**0.0000**	**33.9921**	**33.9921**	**9.5200e-003**	**0.0000**	**34.2301**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.1000e-004	2.8000e-004	3.4200e-003	1.0000e-005	1.2000e-003	1.0000e-005	1.2100e-003	3.2000e-004	1.0000e-005	3.3000e-004	0.0000	0.9518	0.9518	3.0000e-005	3.0000e-005	0.9605
Total	**4.1000e-004**	**2.8000e-004**	**3.4200e-003**	**1.0000e-005**	**1.2000e-003**	**1.0000e-005**	**1.2100e-003**	**3.2000e-004**	**1.0000e-005**	**3.3000e-004**	**0.0000**	**0.9518**	**0.9518**	**3.0000e-005**	**3.0000e-005**	**0.9605**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0227	0.2148	0.1964	3.9000e-004		9.9800e-003	9.9800e-003		9.2800e-003	9.2800e-003	0.0000	33.9920	33.9920	9.5200e-003	0.0000	34.2300
Total	**0.0227**	**0.2148**	**0.1964**	**3.9000e-004**		**9.9800e-003**	**9.9800e-003**		**9.2800e-003**	**9.2800e-003**	**0.0000**	**33.9920**	**33.9920**	**9.5200e-003**	**0.0000**	**34.2300**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.1000e-004	2.8000e-004	3.4200e-003	1.0000e-005	1.2000e-003	1.0000e-005	1.2100e-003	3.2000e-004	1.0000e-005	3.3000e-004	0.0000	0.9518	0.9518	3.0000e-005	3.0000e-005	0.9605
Total	**4.1000e-004**	**2.8000e-004**	**3.4200e-003**	**1.0000e-005**	**1.2000e-003**	**1.0000e-005**	**1.2100e-003**	**3.2000e-004**	**1.0000e-005**	**3.3000e-004**	**0.0000**	**0.9518**	**0.9518**	**3.0000e-005**	**3.0000e-005**	**0.9605**

3.3 Site Preparation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0983	0.0000	0.0983	0.0505	0.0000	0.0505	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0133	0.1376	0.0912	1.9000e-004		6.3300e-003	6.3300e-003		5.8200e-003	5.8200e-003	0.0000	16.7254	16.7254	5.4100e-003	0.0000	16.8606
Total	**0.0133**	**0.1376**	**0.0912**	**1.9000e-004**	**0.0983**	**6.3300e-003**	**0.1046**	**0.0505**	**5.8200e-003**	**0.0563**	**0.0000**	**16.7254**	**16.7254**	**5.4100e-003**	**0.0000**	**16.8606**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4000e-004	1.7000e-004	2.0500e-003	1.0000e-005	7.2000e-004	0.0000	7.3000e-004	1.9000e-004	0.0000	2.0000e-004	0.0000	0.5711	0.5711	2.0000e-005	2.0000e-005	0.5763
Total	**2.4000e-004**	**1.7000e-004**	**2.0500e-003**	**1.0000e-005**	**7.2000e-004**	**0.0000**	**7.3000e-004**	**1.9000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**0.5711**	**0.5711**	**2.0000e-005**	**2.0000e-005**	**0.5763**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0442	0.0000	0.0442	0.0227	0.0000	0.0227	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0133	0.1376	0.0912	1.9000e-004		6.3300e-003	6.3300e-003		5.8200e-003	5.8200e-003	0.0000	16.7253	16.7253	5.4100e-003	0.0000	16.8606
Total	**0.0133**	**0.1376**	**0.0912**	**1.9000e-004**	**0.0442**	**6.3300e-003**	**0.0506**	**0.0227**	**5.8200e-003**	**0.0286**	**0.0000**	**16.7253**	**16.7253**	**5.4100e-003**	**0.0000**	**16.8606**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4000e-004	1.7000e-004	2.0500e-003	1.0000e-005	7.2000e-004	0.0000	7.3000e-004	1.9000e-004	0.0000	2.0000e-004	0.0000	0.5711	0.5711	2.0000e-005	2.0000e-005	0.5763
Total	**2.4000e-004**	**1.7000e-004**	**2.0500e-003**	**1.0000e-005**	**7.2000e-004**	**0.0000**	**7.3000e-004**	**1.9000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**0.5711**	**0.5711**	**2.0000e-005**	**2.0000e-005**	**0.5763**

3.4 Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1384	0.0000	0.1384	0.0549	0.0000	0.0549	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0498	0.5177	0.4208	9.3000e-004		0.0214	0.0214		0.0197	0.0197	0.0000	81.8028	81.8028	0.0265	0.0000	82.4642
Total	**0.0498**	**0.5177**	**0.4208**	**9.3000e-004**	**0.1384**	**0.0214**	**0.1598**	**0.0549**	**0.0197**	**0.0745**	**0.0000**	**81.8028**	**81.8028**	**0.0265**	**0.0000**	**82.4642**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.9000e-004	0.0424	0.0113	1.9000e-004	5.3500e-003	3.5000e-004	5.7000e-003	1.4700e-003	3.3000e-004	1.8000e-003	0.0000	18.7545	18.7545	9.4000e-004	2.9800e-003	19.6669
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.1000e-004	5.6000e-004	6.8400e-003	2.0000e-005	2.4100e-003	1.0000e-005	2.4200e-003	6.4000e-004	1.0000e-005	6.5000e-004	0.0000	1.9037	1.9037	6.0000e-005	5.0000e-005	1.9209
Total	**1.5000e-003**	**0.0430**	**0.0181**	**2.1000e-004**	**7.7600e-003**	**3.6000e-004**	**8.1200e-003**	**2.1100e-003**	**3.4000e-004**	**2.4500e-003**	**0.0000**	**20.6582**	**20.6582**	**1.0000e-003**	**3.0300e-003**	**21.5879**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0623	0.0000	0.0623	0.0247	0.0000	0.0247	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0498	0.5177	0.4208	9.3000e-004		0.0214	0.0214		0.0197	0.0197	0.0000	81.8027	81.8027	0.0265	0.0000	82.4641
Total	**0.0498**	**0.5177**	**0.4208**	**9.3000e-004**	**0.0623**	**0.0214**	**0.0837**	**0.0247**	**0.0197**	**0.0444**	**0.0000**	**81.8027**	**81.8027**	**0.0265**	**0.0000**	**82.4641**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.9000e-004	0.0424	0.0113	1.9000e-004	5.3500e-003	3.5000e-004	5.7000e-003	1.4700e-003	3.3000e-004	1.8000e-003	0.0000	18.7545	18.7545	9.4000e-004	2.9800e-003	19.6669
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.1000e-004	5.6000e-004	6.8400e-003	2.0000e-005	2.4100e-003	1.0000e-005	2.4200e-003	6.4000e-004	1.0000e-005	6.5000e-004	0.0000	1.9037	1.9037	6.0000e-005	5.0000e-005	1.9209
Total	**1.5000e-003**	**0.0430**	**0.0181**	**2.1000e-004**	**7.7600e-003**	**3.6000e-004**	**8.1200e-003**	**2.1100e-003**	**3.4000e-004**	**2.4500e-003**	**0.0000**	**20.6582**	**20.6582**	**1.0000e-003**	**3.0300e-003**	**21.5879**

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.9300e-003	0.0360	0.0406	7.0000e-005		1.7500e-003	1.7500e-003		1.6500e-003	1.6500e-003	0.0000	5.7951	5.7951	1.3800e-003	0.0000	5.8296
Total	**3.9300e-003**	**0.0360**	**0.0406**	**7.0000e-005**		**1.7500e-003**	**1.7500e-003**		**1.6500e-003**	**1.6500e-003**	**0.0000**	**5.7951**	**5.7951**	**1.3800e-003**	**0.0000**	**5.8296**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.0000e-005	2.3300e-003	8.2000e-004	1.0000e-005	3.5000e-004	1.0000e-005	3.6000e-004	1.0000e-004	1.0000e-005	1.1000e-004	0.0000	1.0534	1.0534	3.0000e-005	1.5000e-004	1.0997
Worker	3.6000e-004	2.5000e-004	3.0200e-003	1.0000e-005	1.0600e-003	1.0000e-005	1.0700e-003	2.8000e-004	1.0000e-005	2.9000e-004	0.0000	0.8408	0.8408	2.0000e-005	2.0000e-005	0.8484
Total	**4.2000e-004**	**2.5800e-003**	**3.8400e-003**	**2.0000e-005**	**1.4100e-003**	**2.0000e-005**	**1.4300e-003**	**3.8000e-004**	**2.0000e-005**	**4.0000e-004**	**0.0000**	**1.8942**	**1.8942**	**5.0000e-005**	**1.7000e-004**	**1.9481**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.9300e-003	0.0360	0.0406	7.0000e-005		1.7500e-003	1.7500e-003		1.6500e-003	1.6500e-003	0.0000	5.7951	5.7951	1.3800e-003	0.0000	5.8296
Total	**3.9300e-003**	**0.0360**	**0.0406**	**7.0000e-005**		**1.7500e-003**	**1.7500e-003**		**1.6500e-003**	**1.6500e-003**	**0.0000**	**5.7951**	**5.7951**	**1.3800e-003**	**0.0000**	**5.8296**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.0000e-005	2.3300e-003	8.2000e-004	1.0000e-005	3.5000e-004	1.0000e-005	3.6000e-004	1.0000e-004	1.0000e-005	1.1000e-004	0.0000	1.0534	1.0534	3.0000e-005	1.5000e-004	1.0997
Worker	3.6000e-004	2.5000e-004	3.0200e-003	1.0000e-005	1.0600e-003	1.0000e-005	1.0700e-003	2.8000e-004	1.0000e-005	2.9000e-004	0.0000	0.8408	0.8408	2.0000e-005	2.0000e-005	0.8484
Total	**4.2000e-004**	**2.5800e-003**	**3.8400e-003**	**2.0000e-005**	**1.4100e-003**	**2.0000e-005**	**1.4300e-003**	**3.8000e-004**	**2.0000e-005**	**4.0000e-004**	**0.0000**	**1.8942**	**1.8942**	**5.0000e-005**	**1.7000e-004**	**1.9481**

3.5 Building Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1508	1.3780	1.6571	2.7600e-003		0.0629	0.0629		0.0591	0.0591	0.0000	237.6453	237.6453	0.0562	0.0000	239.0502
Total	**0.1508**	**1.3780**	**1.6571**	**2.7600e-003**		**0.0629**	**0.0629**		**0.0591**	**0.0591**	**0.0000**	**237.6453**	**237.6453**	**0.0562**	**0.0000**	**239.0502**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.4300e-003	0.0949	0.0329	4.3000e-004	0.0143	5.7000e-004	0.0149	4.1300e-003	5.4000e-004	4.6700e-003	0.0000	42.4377	42.4377	1.3400e-003	6.1500e-003	44.3033
Worker	0.0138	9.1400e-003	0.1157	3.6000e-004	0.0436	2.3000e-004	0.0438	0.0116	2.1000e-004	0.0118	0.0000	33.3435	33.3435	9.3000e-004	9.0000e-004	33.6346
Total	**0.0162**	**0.1041**	**0.1486**	**7.9000e-004**	**0.0579**	**8.0000e-004**	**0.0587**	**0.0157**	**7.5000e-004**	**0.0165**	**0.0000**	**75.7812**	**75.7812**	**2.2700e-003**	**7.0500e-003**	**77.9379**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1508	1.3780	1.6571	2.7600e-003		0.0629	0.0629		0.0591	0.0591	0.0000	237.6451	237.6451	0.0562	0.0000	239.0500
Total	**0.1508**	**1.3780**	**1.6571**	**2.7600e-003**		**0.0629**	**0.0629**		**0.0591**	**0.0591**	**0.0000**	**237.6451**	**237.6451**	**0.0562**	**0.0000**	**239.0500**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Building Construction - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.4300e-003	0.0949	0.0329	4.3000e-004	0.0143	5.7000e-004	0.0149	4.1300e-003	5.4000e-004	4.6700e-003	0.0000	42.4377	42.4377	1.3400e-003	6.1500e-003	44.3033
Worker	0.0138	9.1400e-003	0.1157	3.6000e-004	0.0436	2.3000e-004	0.0438	0.0116	2.1000e-004	0.0118	0.0000	33.3435	33.3435	9.3000e-004	9.0000e-004	33.6346
Total	**0.0162**	**0.1041**	**0.1486**	**7.9000e-004**	**0.0579**	**8.0000e-004**	**0.0587**	**0.0157**	**7.5000e-004**	**0.0165**	**0.0000**	**75.7812**	**75.7812**	**2.2700e-003**	**7.0500e-003**	**77.9379**

3.6 Paving - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.8800e-003	0.0953	0.1463	2.3000e-004		4.6900e-003	4.6900e-003		4.3100e-003	4.3100e-003	0.0000	20.0265	20.0265	6.4800e-003	0.0000	20.1885
Paving	2.3100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0122**	**0.0953**	**0.1463**	**2.3000e-004**		**4.6900e-003**	**4.6900e-003**		**4.3100e-003**	**4.3100e-003**	**0.0000**	**20.0265**	**20.0265**	**6.4800e-003**	**0.0000**	**20.1885**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Paving - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.8000e-004	2.5000e-004	3.1900e-003	1.0000e-005	1.2000e-003	1.0000e-005	1.2100e-003	3.2000e-004	1.0000e-005	3.3000e-004	0.0000	0.9207	0.9207	3.0000e-005	2.0000e-005	0.9287
Total	**3.8000e-004**	**2.5000e-004**	**3.1900e-003**	**1.0000e-005**	**1.2000e-003**	**1.0000e-005**	**1.2100e-003**	**3.2000e-004**	**1.0000e-005**	**3.3000e-004**	**0.0000**	**0.9207**	**0.9207**	**3.0000e-005**	**2.0000e-005**	**0.9287**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.8800e-003	0.0953	0.1463	2.3000e-004		4.6900e-003	4.6900e-003		4.3100e-003	4.3100e-003	0.0000	20.0265	20.0265	6.4800e-003	0.0000	20.1884
Paving	2.3100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0122**	**0.0953**	**0.1463**	**2.3000e-004**		**4.6900e-003**	**4.6900e-003**		**4.3100e-003**	**4.3100e-003**	**0.0000**	**20.0265**	**20.0265**	**6.4800e-003**	**0.0000**	**20.1884**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Paving - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.8000e-004	2.5000e-004	3.1900e-003	1.0000e-005	1.2000e-003	1.0000e-005	1.2100e-003	3.2000e-004	1.0000e-005	3.3000e-004	0.0000	0.9207	0.9207	3.0000e-005	2.0000e-005	0.9287
Total	**3.8000e-004**	**2.5000e-004**	**3.1900e-003**	**1.0000e-005**	**1.2000e-003**	**1.0000e-005**	**1.2100e-003**	**3.2000e-004**	**1.0000e-005**	**3.3000e-004**	**0.0000**	**0.9207**	**0.9207**	**3.0000e-005**	**2.0000e-005**	**0.9287**

3.7 Architectural Coating - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1266					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.7100e-003	0.0183	0.0272	4.0000e-005		9.1000e-004	9.1000e-004		9.1000e-004	9.1000e-004	0.0000	3.8299	3.8299	2.2000e-004	0.0000	3.8353
Total	**0.1293**	**0.0183**	**0.0272**	**4.0000e-005**		**9.1000e-004**	**9.1000e-004**		**9.1000e-004**	**9.1000e-004**	**0.0000**	**3.8299**	**3.8299**	**2.2000e-004**	**0.0000**	**3.8353**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.2000e-004	2.8000e-004	3.5100e-003	1.0000e-005	1.3200e-003	1.0000e-005	1.3300e-003	3.5000e-004	1.0000e-005	3.6000e-004	0.0000	1.0127	1.0127	3.0000e-005	3.0000e-005	1.0216
Total	**4.2000e-004**	**2.8000e-004**	**3.5100e-003**	**1.0000e-005**	**1.3200e-003**	**1.0000e-005**	**1.3300e-003**	**3.5000e-004**	**1.0000e-005**	**3.6000e-004**	**0.0000**	**1.0127**	**1.0127**	**3.0000e-005**	**3.0000e-005**	**1.0216**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1266					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.7100e-003	0.0183	0.0272	4.0000e-005		9.1000e-004	9.1000e-004		9.1000e-004	9.1000e-004	0.0000	3.8299	3.8299	2.2000e-004	0.0000	3.8353
Total	**0.1293**	**0.0183**	**0.0272**	**4.0000e-005**		**9.1000e-004**	**9.1000e-004**		**9.1000e-004**	**9.1000e-004**	**0.0000**	**3.8299**	**3.8299**	**2.2000e-004**	**0.0000**	**3.8353**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Architectural Coating - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.2000e-004	2.8000e-004	3.5100e-003	1.0000e-005	1.3200e-003	1.0000e-005	1.3300e-003	3.5000e-004	1.0000e-005	3.6000e-004	0.0000	1.0127	1.0127	3.0000e-005	3.0000e-005	1.0216
Total	**4.2000e-004**	**2.8000e-004**	**3.5100e-003**	**1.0000e-005**	**1.3200e-003**	**1.0000e-005**	**1.3300e-003**	**3.5000e-004**	**1.0000e-005**	**3.6000e-004**	**0.0000**	**1.0127**	**1.0127**	**3.0000e-005**	**3.0000e-005**	**1.0216**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0911	0.0980	0.8270	1.7300e-003	0.1900	1.3500e-003	0.1913	0.0507	1.2600e-003	0.0520	0.0000	159.5326	159.5326	0.0118	7.4200e-003	162.0372
Unmitigated	0.0911	0.0980	0.8270	1.7300e-003	0.1900	1.3500e-003	0.1913	0.0507	1.2600e-003	0.0520	0.0000	159.5326	159.5326	0.0118	7.4200e-003	162.0372

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Junior College (2yr)	200.00	200.00	200.00	507,907	507,907
Other Asphalt Surfaces	0.00	0.00	0.00		
User Defined Recreational	0.00	0.00	0.00		
Total	200.00	200.00	200.00	507,907	507,907

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Junior College (2yr)	9.50	7.30	7.30	6.40	88.60	5.00	92	7	1
Other Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
User Defined Recreational	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Junior College (2yr)	0.561854	0.062428	0.177046	0.117565	0.023832	0.006317	0.008949	0.006298	0.000705	0.000577	0.028723	0.000955	0.004751
Other Asphalt Surfaces	0.561854	0.062428	0.177046	0.117565	0.023832	0.006317	0.008949	0.006298	0.000705	0.000577	0.028723	0.000955	0.004751

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

User Defined Recreational	0.561854	0.062428	0.177046	0.117565	0.023832	0.006317	0.008949	0.006298	0.000705	0.000577	0.028723	0.000955	0.004751

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	105.3203	105.3203	6.4400e-003	7.8000e-004	105.7137
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	105.3203	105.3203	6.4400e-003	7.8000e-004	105.7137
NaturalGas Mitigated	9.7100e-003	0.0883	0.0742	5.3000e-004		6.7100e-003	6.7100e-003		6.7100e-003	6.7100e-003	0.0000	96.1349	96.1349	1.8400e-003	1.7600e-003	96.7062
NaturalGas Unmitigated	9.7100e-003	0.0883	0.0742	5.3000e-004		6.7100e-003	6.7100e-003		6.7100e-003	6.7100e-003	0.0000	96.1349	96.1349	1.8400e-003	1.7600e-003	96.7062

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Junior College (2yr)	1.8015e+006	9.7100e-003	0.0883	0.0742	5.3000e-004		6.7100e-003	6.7100e-003		6.7100e-003	6.7100e-003	0.0000	96.1349	96.1349	1.8400e-003	1.7600e-003	96.7062
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**9.7100e-003**	**0.0883**	**0.0742**	**5.3000e-004**		**6.7100e-003**	**6.7100e-003**		**6.7100e-003**	**6.7100e-003**	**0.0000**	**96.1349**	**96.1349**	**1.8400e-003**	**1.7600e-003**	**96.7062**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Junior College (2yr)	1.8015e+006	9.7100e-003	0.0883	0.0742	5.3000e-004		6.7100e-003	6.7100e-003		6.7100e-003	6.7100e-003	0.0000	96.1349	96.1349	1.8400e-003	1.7600e-003	96.7062
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**9.7100e-003**	**0.0883**	**0.0742**	**5.3000e-004**		**6.7100e-003**	**6.7100e-003**		**6.7100e-003**	**6.7100e-003**	**0.0000**	**96.1349**	**96.1349**	**1.8400e-003**	**1.7600e-003**	**96.7062**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Junior College (2yr)	430000	105.3203	6.4400e-003	7.8000e-004	105.7137
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000
Total		**105.3203**	**6.4400e-003**	**7.8000e-004**	**105.7137**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Junior College (2yr)	430000	105.3203	6.4400e-003	7.8000e-004	105.7137
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000
Total		**105.3203**	**6.4400e-003**	**7.8000e-004**	**105.7137**

6.0 Area Detail

6.1 Mitigation Measures Area

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.2130	1.0000e-005	1.2800e-003	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.4900e-003	2.4900e-003	1.0000e-005	0.0000	2.6600e-003
Unmitigated	0.2130	1.0000e-005	1.2800e-003	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.4900e-003	2.4900e-003	1.0000e-005	0.0000	2.6600e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0127					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.2002					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.2000e-004	1.0000e-005	1.2800e-003	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.4900e-003	2.4900e-003	1.0000e-005	0.0000	2.6600e-003
Total	**0.2130**	**1.0000e-005**	**1.2800e-003**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.4900e-003**	**2.4900e-003**	**1.0000e-005**	**0.0000**	**2.6600e-003**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0127					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.2002					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.2000e-004	1.0000e-005	1.2800e-003	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.4900e-003	2.4900e-003	1.0000e-005	0.0000	2.6600e-003
Total	**0.2130**	**1.0000e-005**	**1.2800e-003**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.4900e-003**	**2.4900e-003**	**1.0000e-005**	**0.0000**	**2.6600e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	43.5705	0.0825	2.2000e-003	46.2904
Unmitigated	43.5705	0.0825	2.2000e-003	46.2904

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Junior College (2yr)	2.45245 / 3.83589	19.0377	0.0810	2.0200e-003	21.6660
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
User Defined Recreational	0 / 9.0155	24.5328	1.5000e-003	1.8000e-004	24.6245
Total		**43.5705**	**0.0825**	**2.2000e-003**	**46.2905**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Junior College (2yr)	2.45245 / 3.83589	19.0377	0.0810	2.0200e-003	21.6660
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
User Defined Recreational	0 / 9.0155	24.5328	1.5000e-003	1.8000e-004	24.6245
Total		**43.5705**	**0.0825**	**2.2000e-003**	**46.2905**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Sycuan Training Facility - San Diego County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	13.1944	0.7798	0.0000	32.6886
Unmitigated	13.1944	0.7798	0.0000	32.6886

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Junior College (2yr)	65	13.1944	0.7798	0.0000	32.6886
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000
Total		**13.1944**	**0.7798**	**0.0000**	**32.6886**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Junior College (2yr)	65	13.1944	0.7798	0.0000	32.6886
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
User Defined Recreational	0	0.0000	0.0000	0.0000	0.0000
Total		**13.1944**	**0.7798**	**0.0000**	**32.6886**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

11.0 Vegetation

	Total CO2	CH4	N2O	CO2e
Category	MT			
Unmitigated	-27.7500	0.0000	0.0000	-27.7500

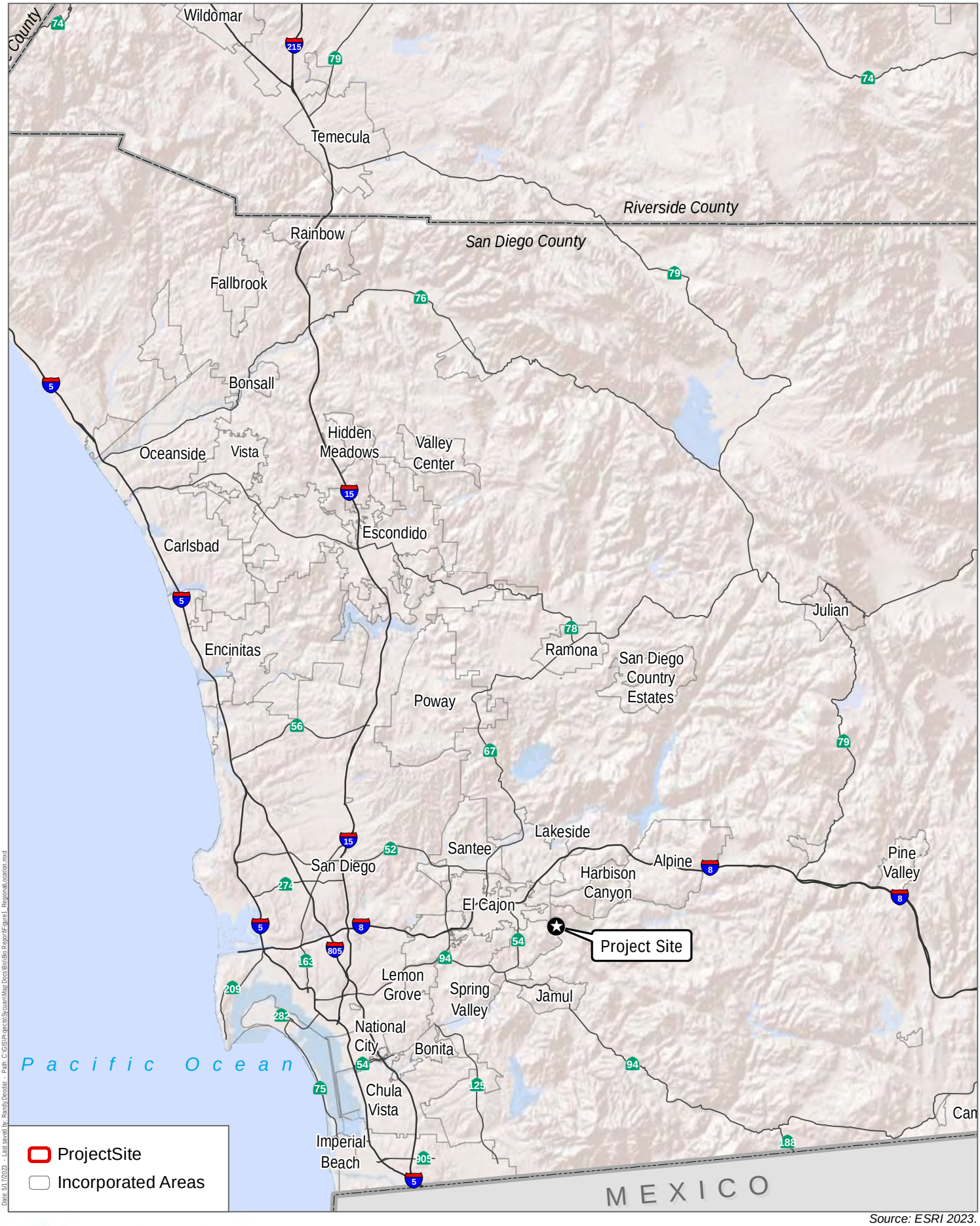
11.1 Vegetation Land Change

Vegetation Type

	Initial/Final	Total CO2	CH4	N2O	CO2e
	Acres	MT			
Trees	0.25 / 0	-27.7500	0.0000	0.0000	-27.7500
Total		**-27.7500**	**0.0000**	**0.0000**	**-27.7500**

Appendix E

Biological Resources Information



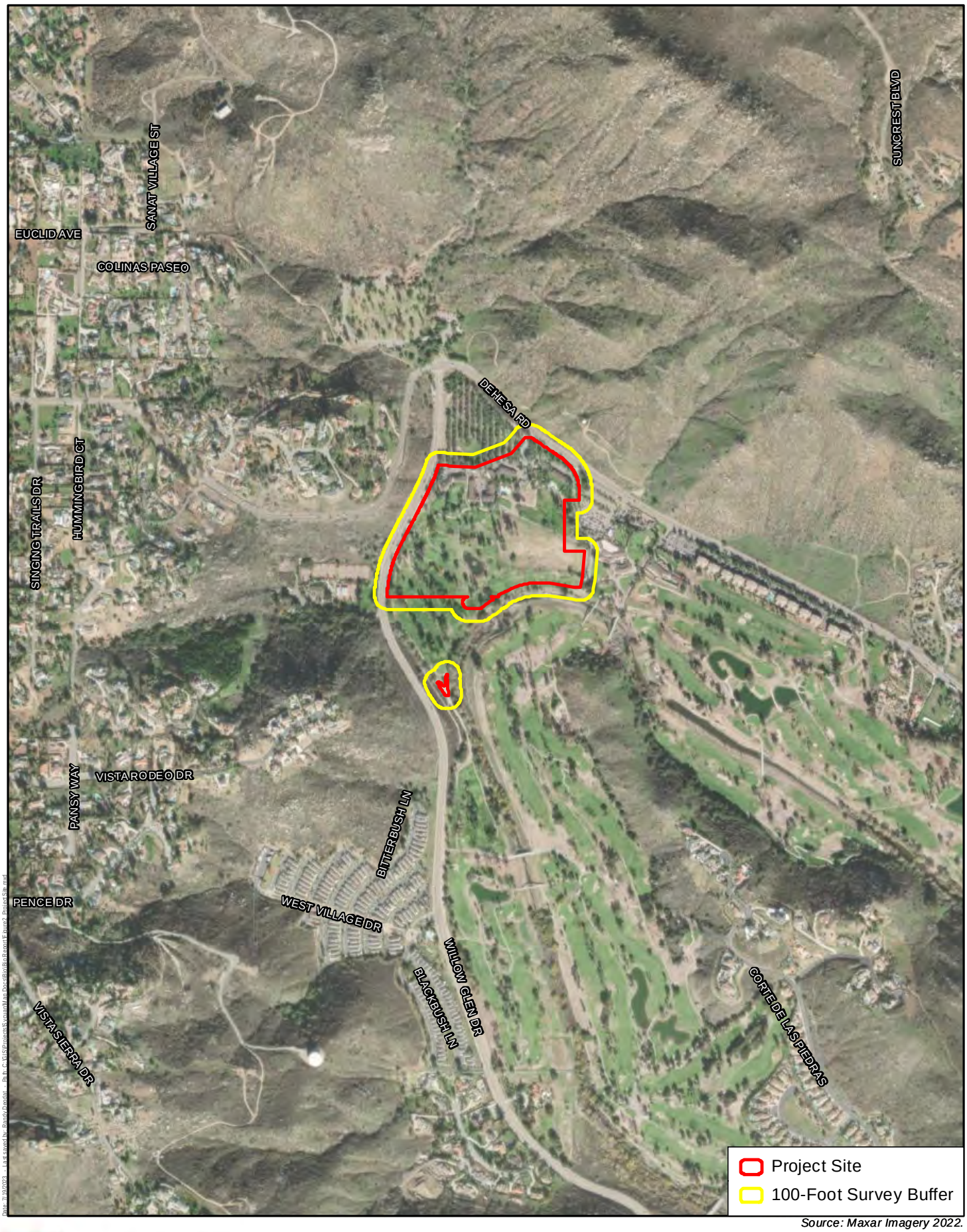
Source: ESRI 2023.

Harris & Associates

Figure 1

Regional Location

Sycuan Project



Source: Maxar Imagery 2022.

Harris & Associates

N

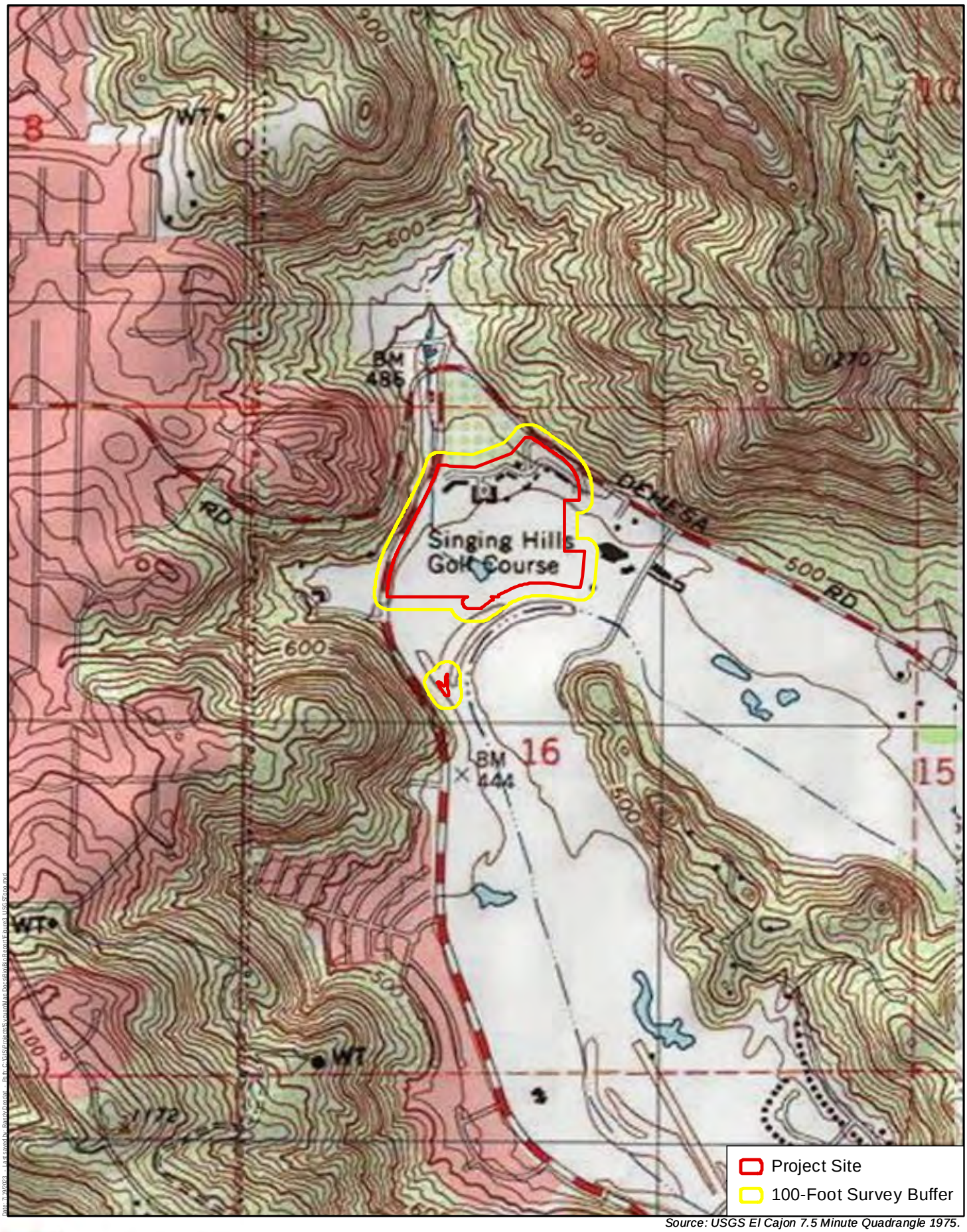
0 500 1,000

Feet

Figure 2

Project Site

Sycuan Project



Source: USGS El Cajon 7.5 Minute Quadrangle 1975.

Harris & Associates

N

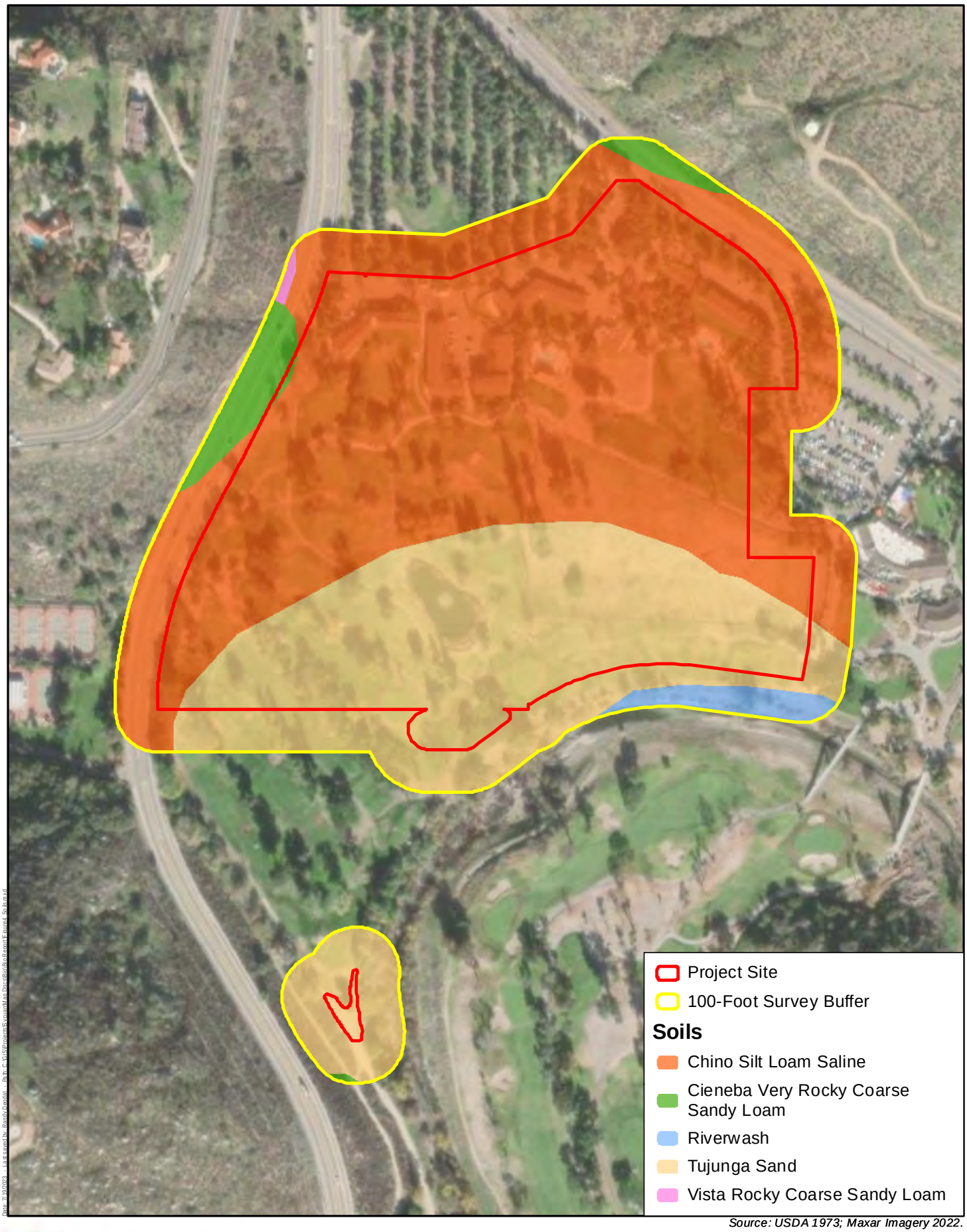
0 500 1,000

Feet

Figure 3

USGS Topographic Map

Sycuan Project



Source: USDA 1973; Maxar Imagery 2022.

Harris & Associates

N

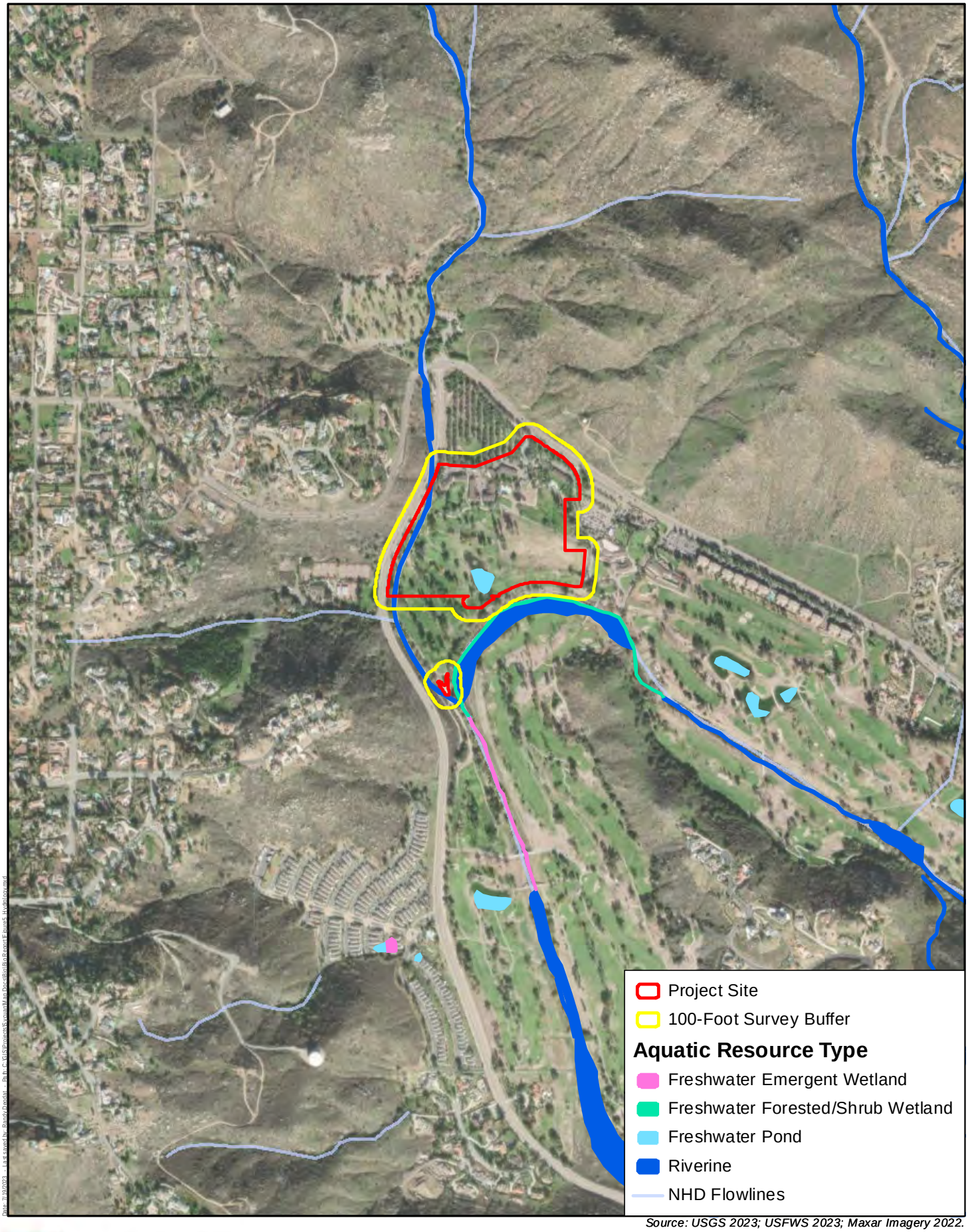
0 150 300

Feet

Figure 4

Soils

Sycuan Project



Source: USGS 2023; USFWS 2023; Maxar Imagery 2022.

Harris & Associates

N

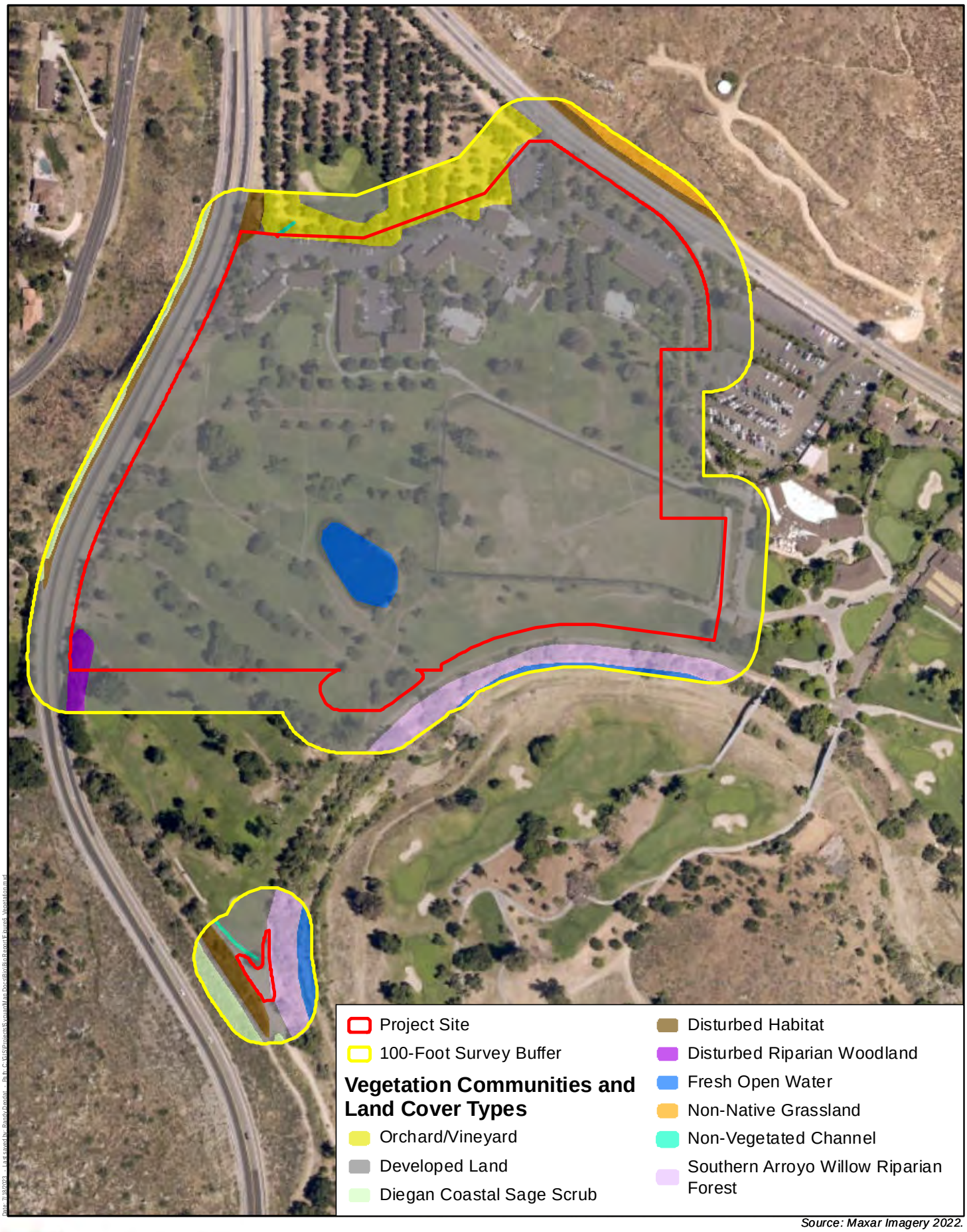
0 500 1,000

Feet

Figure 5

Hydrology

Sycuan Project



Source: Maxar Imagery 2022.

Harris & Associates

N

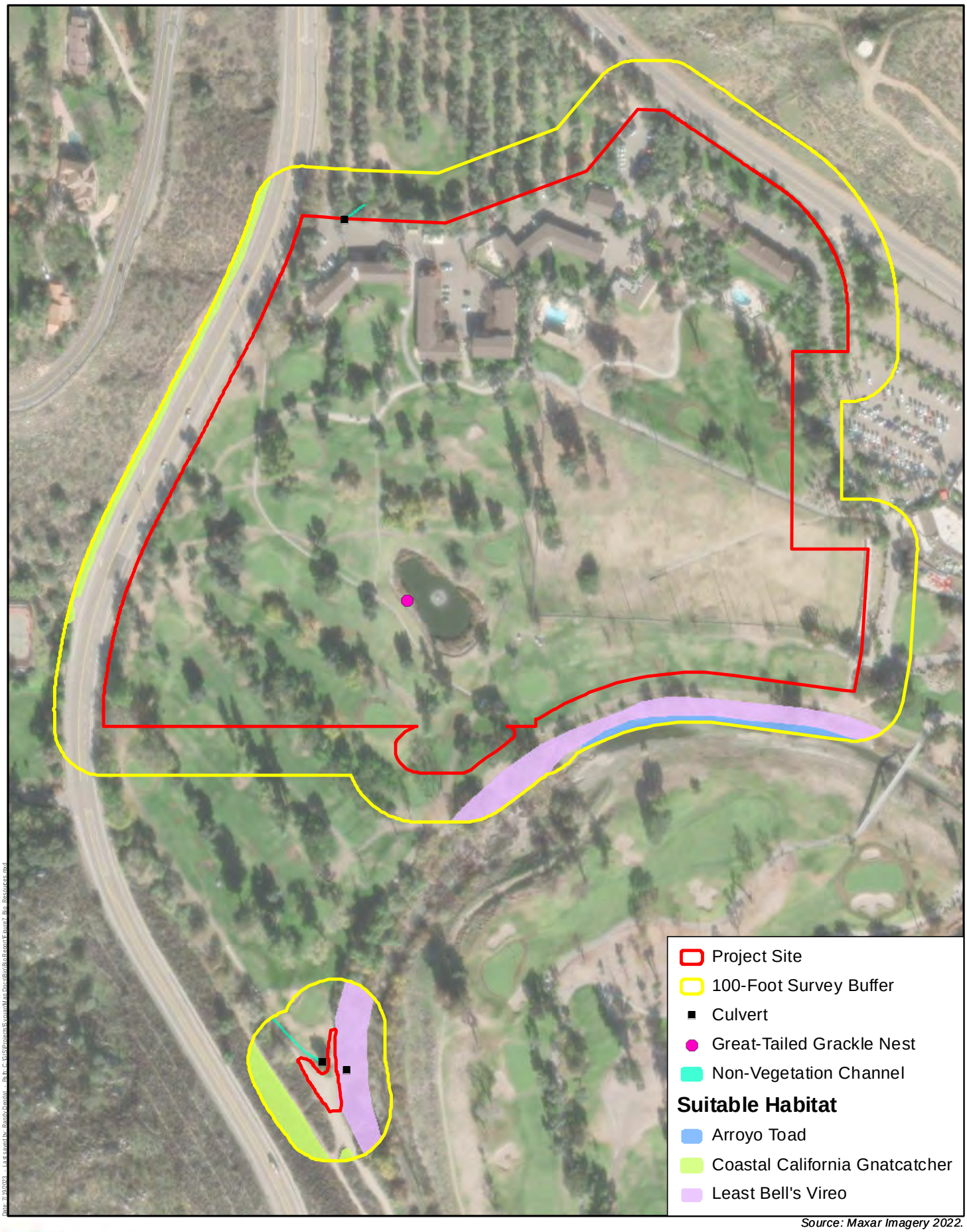
0 150 300

Feet

Figure 6

Vegetation Communities and Land Cover Types

Sycuan Project



Source: Maxar Imagery 2022.

Harris & Associates

N

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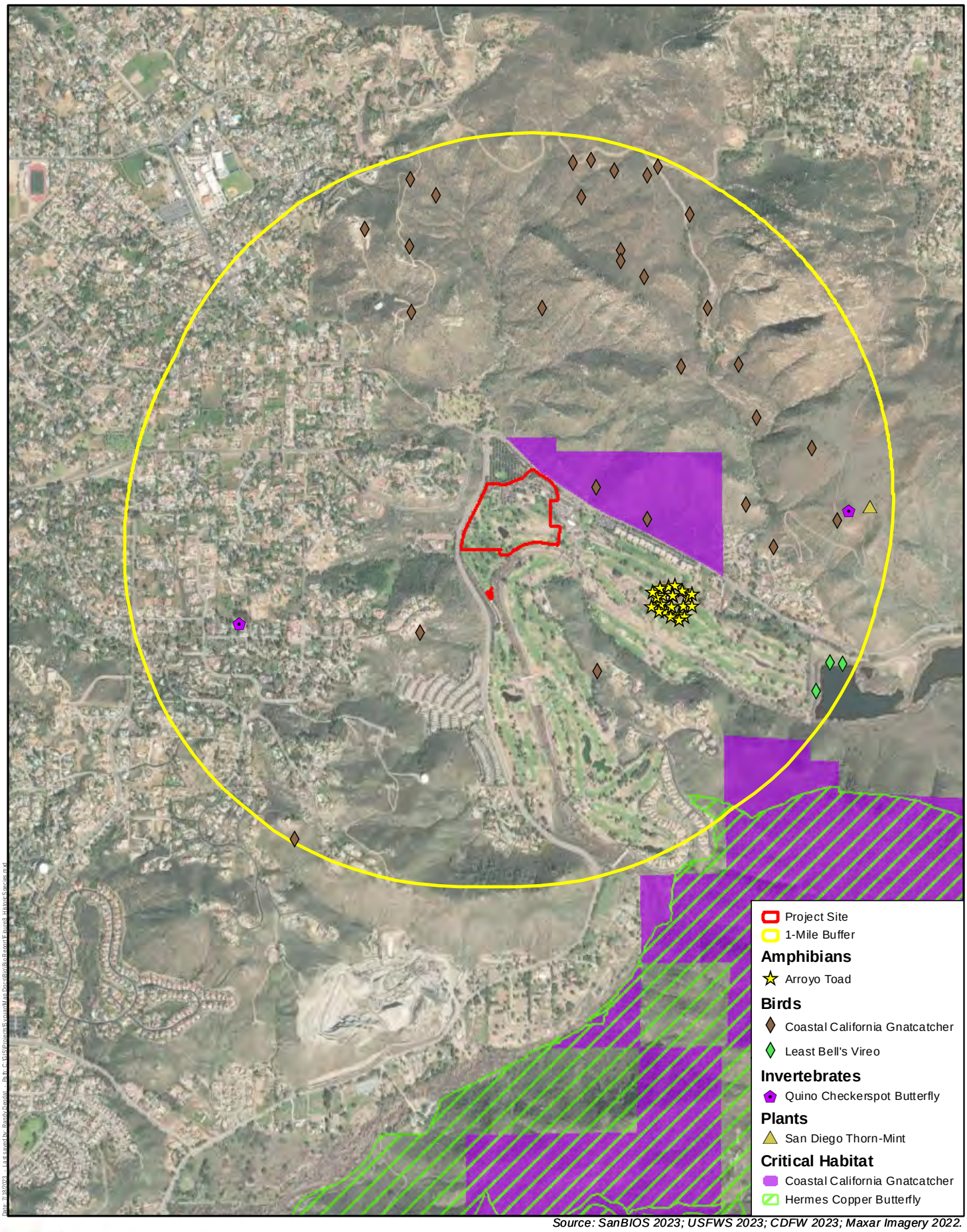
Feet

Figure 7

Biological Resources

Sycuan Project



Source: SanBIOS 2023; USFWS 2023; CDFW 2023; Maxar Imagery 2022.

Harris & Associates

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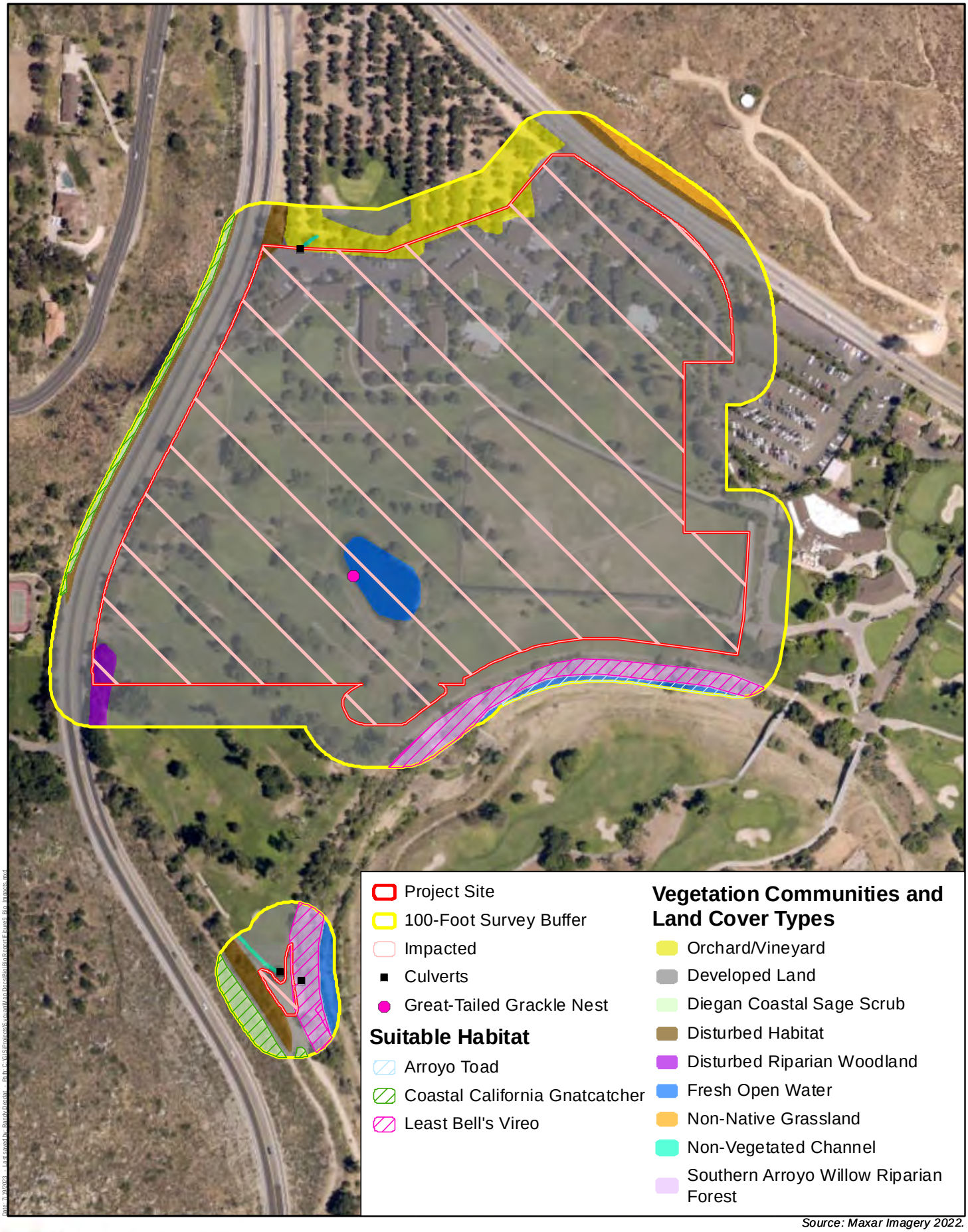
0 1,000 2,000

Feet

Figure 8

Historical Species and Critical Habitat

Sycuan Project



Source: Maxar Imagery 2022.

Harris & Associates

N

0 150 300

Feet

Figure 9

Biological Resource Impacts

Sycuan Project

Appendix F

Traffic Impact Analysis

TRAFFIC IMPACT ANALYSIS

TRAINING CAMPUS

San Diego County, California
August 16, 2023

LLG Ref. 3-23-3768

Prepared by:
Renald Espiritu
Transportation Engineer III

Under the Supervision of:
John Boarman, P.E.
Principal

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B. County of San Diego Roadway Classification Table

C. Existing Peak Hour Intersection Analysis Worksheets

D. Opening Year (Year 2025) Peak Hour Intersection Analysis Worksheets

E. Opening Year (Year 2025) + Project Peak Hour Intersection Analysis Worksheets

F. Bus Route Schedule and Map

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TRANSPORTATION IMPACT ANALYSIS

TRAINING CAMPUS

San Diego County, California
August 16, 2023

1.0 INTRODUCTION

Linscott, Law & Greenspan, Engineers (LLG) has prepared this Transportation Impact Analysis (TIA) to assess the potential impacts to the street system as a result of the proposed Training Campus project (hereby referred to as the "Project"). The Project proposes to develop a Professional Soccer Training Facility and Youth Academy Training campus within tribal trust land currently developed with the Singing Hills Golf Resort on the southeast corner of the Dehesa Road / Willow Glen Drive intersection in the Crest-Dehesa Community Plan.

The traffic analysis presented in this report includes the following:

- Project Description
- Existing Conditions Description
- Approach and Methodology
- Analysis of Existing Conditions
- Trip Generation / Distribution / Assignment
- Analysis of Opening Year (Year 2025) without and with Project Conditions
- Access Assessment
- Active Transportation Review
- Conclusions

2.0 PROJECT DESCRIPTION

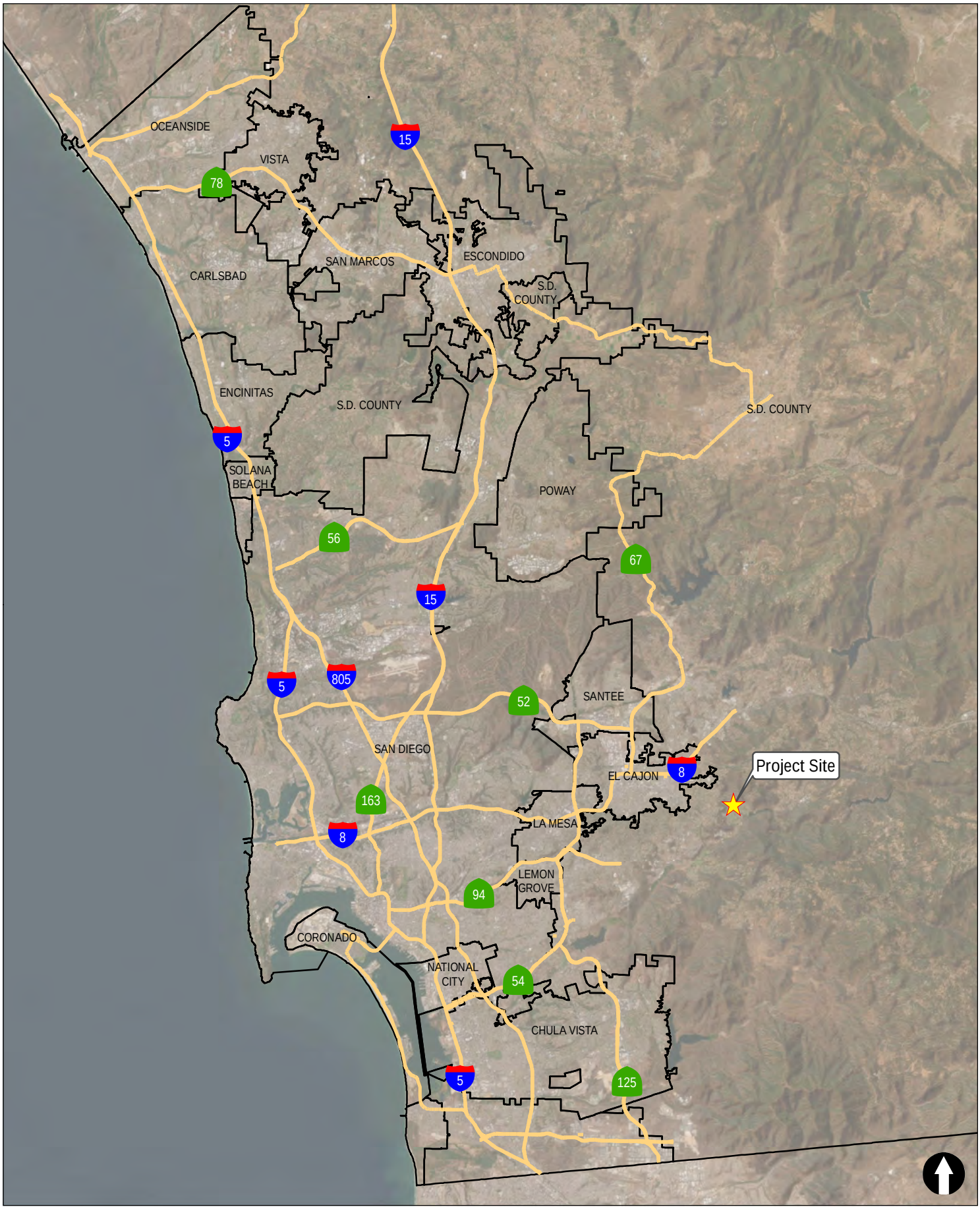
The Sycuan Band of the Kumeyaay Nation (Tribe) is considering entering into a land lease for the development of a Professional Soccer Training Facility and Youth Academy Training campus within tribal trust land currently developed with the Singing Hills Golf Course (Project). The Project would consist of retrofitting the existing Singing Hills Golf Course Hotel into classroom, dormitory facilities and offices, and construction of a new approximately 50,000-square foot training facility, five full-sized soccer fields (including 3 natural turf and 2 synthetic), one half-size goalie training field, open air training areas, and ancillary circulation and infrastructure improvements. Other facilities include 2,500-square foot maintenance building and 2,500-square foot maintenance carport.

There would be approximately 90 team players and staff accessing the site on a daily basis including 30 professional team players, 29 professional team coaching and other staff, and 30 youth academy staff. Players and coaching staff would not access the facility during the off-season and during travel.

The facility would host some special events such as scrimmages, visiting teams, parent's weekend but not on a regular, recurring basis.

The primary site access is proposed on existing full-access driveway on Dehesa Road which will serve the players, staff and visitors. It should be noted that this driveway is currently gated. A second access point would be available through the existing parking lot of the Singing Hills Golf Resort. A third access is proposed on Willow Glen Drive which will only be available to service trucks.

Figure 2–1 shows the Project vicinity. ***Figure 2–2*** shows a more detailed Project area map. ***Figure 2–3*** shows the Project Site Plan.



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Time: 10:08 AM

Figure 2-1

Vicinity Map

Training Campus

LINSCOTT LAW & GREENSPAN engineers

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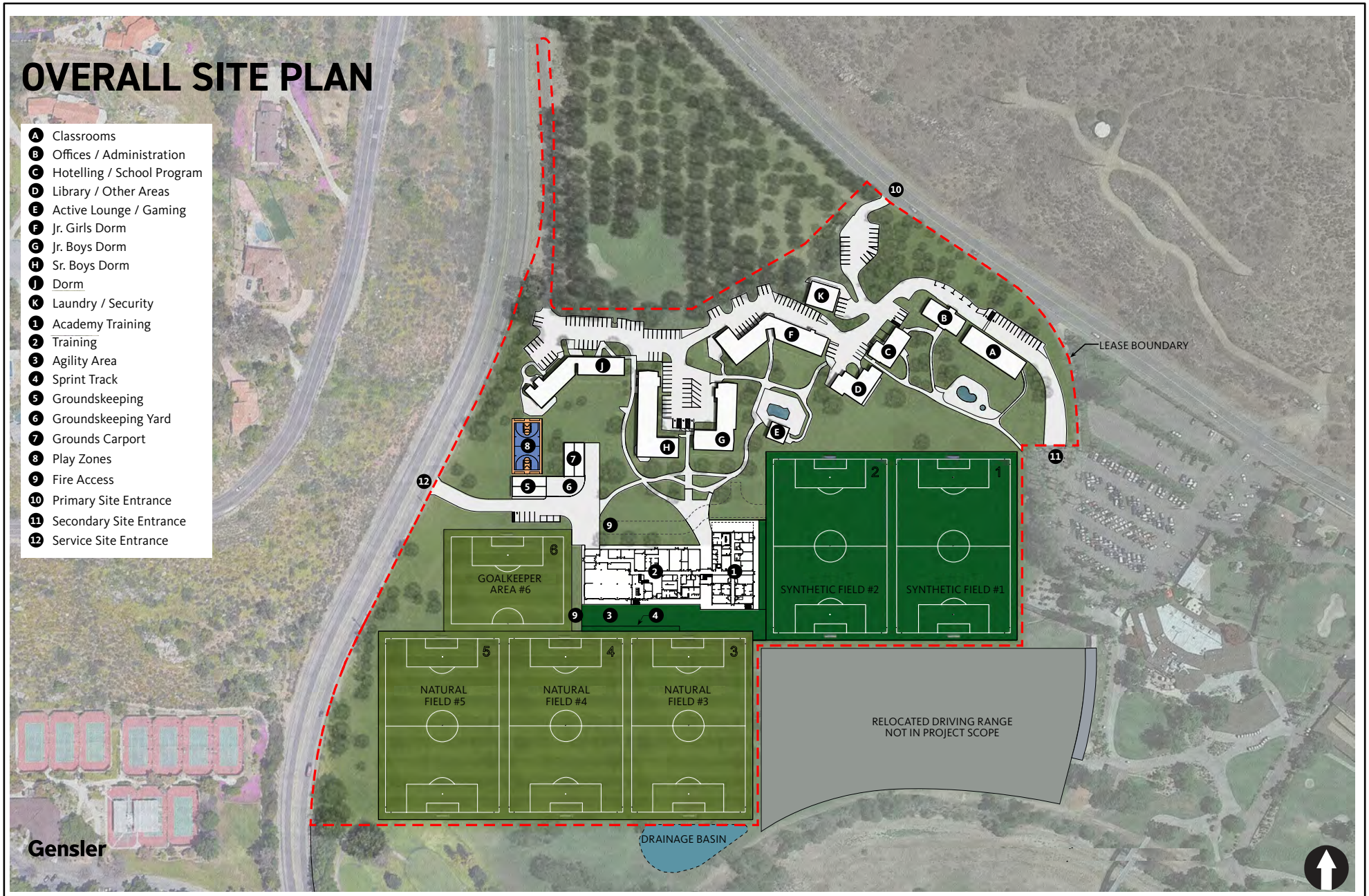
Date: 08/15/23

Figure 2-2

Project Area Map

TRAINING CAMPUS



LINSCOTT LAW & GREENSPAN engineers

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Figure 2-3

Site Plan

TRAINING CAMPUS

3.0 EXISTING CONDITIONS

Effective evaluation of the traffic impacts associated with the proposed Project requires an understanding of the existing transportation system within the project area. ***Figure 3–1*** shows an existing conditions diagram, including signalized intersections and lane configurations.

The study area includes the following intersections and street segments:

Intersections

1. Dehesa Road / Willow Glen Drive
2. Dehesa Road / Project Driveway #1
3. Dehesa Road / Singing Hills Driveway
4. Dehesa Road / Sloane Canyon Road
5. Willow Glen Drive / Project Driveway #2

Street Segments

1. Dehesa Road between Willow Glen Drive and Singing Hills Driveway
2. Dehesa Road between Singing Hills Driveway and Sloane Canyon Road
3. Willow Glen Drive south of Dehesa Road

3.1 Existing Transportation Conditions

The following is a description of the existing street network in the study area.

Dehesa Road is classified as a 4.1B Major Road in the *County of San Diego General Plan Mobility Element* and is currently constructed as a two-lane undivided roadway with intermittent turn lanes. Sidewalks are provided east of the Singing Hills Golf Resort on the south side only. Class II bike lanes are provided on both sides of the roadway. The posted speed limit is 50 mph.

Willow Glen Drive is classified as a 2.1C Community Collector in the *County of San Diego General Plan Mobility Element* and is currently constructed as a two-lane undivided roadway with intermittent turn lanes. No sidewalks are provided within the study area. Class II bike lanes are provided on both sides of the roadway. The posted speed limit is 45 mph.

3.2 Existing Traffic Volumes

Peak hour intersection turning movement and street segment average daily traffic (ADT) volume counts were conducted at the study area intersections and street segments on Wednesday, May 24, 2023, while schools were in session.

Table 3–1 is a summary of the average daily traffic volumes. ***Figure 3–2*** shows the Existing Traffic Volumes. ***Appendix A*** contains the manual count sheets.

TABLE 3–1
EXISTING TRAFFIC VOLUMES

Street Segment	ADT
Dehesa Road	
Willow Glen Drive to Singing Hill Driveway #3	16,500
Singing Hill Driveway #3 to Sloane Canyon Road	15,390
Willow Glen Drive	
South of Dehesa Road	8,760

LINSCOTT LAW & GREENSPAN engineers

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Time: 10:14 AM

Figure 3-1

Existing Conditions Diagram

TRAINING CAMPUS

LINSCOTT LAW & GREENSPAN engineers

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Date: 8/15/2023
Time: 10:15 AM

Figure 3-2

Existing Traffic Volumes

TRAINING CAMPUS

4.0 APPROACH AND METHODOLOGY

4.1 Analysis Approach

This traffic analysis assesses the study area intersections and street segments in the following scenarios to determine the potential impacts to the road network. The Project's expected Opening Year is 2025.

- Existing
- Opening Year (Year 2025) without Project
- Opening Year (Year 2025) with Project

4.2 Analysis Methodology

Level of service (LOS) is the term used to denote the different operating conditions which occur on a given roadway segment under various traffic volume loads. It is a qualitative measure used to describe a quantitative analysis taking into account factors such as roadway geometries, signal phasing, speed, travel delay, freedom to maneuver, and safety. Level of service provides an index to the operational qualities of a roadway segment or an intersection. Level of service designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. Level of service designation is reported differently for signalized and unsignalized intersections, as well as for roadway segments.

4.3 Intersections

Signalized intersections were analyzed under AM and PM peak hour conditions. Average vehicle delay was determined utilizing the methodology found in Chapter 19 of the *Highway Capacity Manual (HCM) 6th Edition*, with the assistance of the *Synchro* (version 11) computer software. The delay values (represented in seconds) were qualified with a corresponding intersection LOS.

Unsignalized intersections were analyzed under AM and PM peak hour conditions. Average vehicle delay and LOS was determined based upon the procedures found in Chapters 20 and 21 of the *HCM 6th Edition*, with the assistance of the *Synchro* (version 11) computer software.

4.4 Street Segments

Street segment analysis is based upon the comparison of daily traffic volumes (ADTs) to the *County of San Diego Roadway Classification, Level of Service, and ADT Table*. This table provides segment capacities for different street classifications, based on traffic volumes and roadway characteristics. The *County of San Diego Roadway Classification Table* is included in ***Appendix B***.

5.0 ANALYSIS OF EXISTING CONDITIONS

The analysis of existing conditions includes the assessment of the study area intersections and street segment using the methodologies described in *Section 4.0*.

5.1 Intersection Analysis

Intersection analyses were conducted for the study intersections under Existing conditions. ***Table 5–1*** summarizes the existing peak hour intersection operations. As shown in *Table 5–1*, all study area intersections are calculated to currently operate at LOS C or better with exception of the northbound left-turn movement at the Dehesa Road / Sloane Canyon Road intersection which is calculated to operate at LOS E during the PM peak hour.

Appendix C contains the Existing intersection analysis worksheets.

TABLE 5–1
EXISTING INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Existing	
			Delay[a]	LOS[b]
1. Dehesa Rd / Willow Glen Dr	Signal	AM	17.0	B
		PM	21.5	C
2. Dehesa Rd / Project Driveway #1	TWSC[c]	AM	0.0[e]	A
		PM	0.0[e]	A
3. Dehesa Rd / Singing Hills Driveway	Right-In Only[d]	AM	0.0	A
		PM	0.0	A
4. Dehesa Rd / Sloane Canyon Rd	TWSC	AM	15.7	C
		PM	44.0	E
5. Willow Glen Dr / Project Driveway #2	DNE	AM	–	–
		PM	–	–

Footnotes:
a. Average delay expressed in seconds per vehicle.
b. Level of Service.
c. TWSC – Two-Way Stop Controlled intersection. Minor street left-turn delay is reported.
d. This driveway operates as right-in only. Therefore, there are no conflict points that would cause a delay.
e. Operating as a gated driveway at the time of this analysis.

General Notes:
1. DNE – does not exist.

SIGNALIZED		UNSIGNALIZED	
DELAY/LOS THRESHOLDS		DELAY/LOS THRESHOLDS	
Delay	LOS	Delay	LOS
0.0 ≤ 10.0	A	0.0 ≤ 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
≥ 80.1	F	≥ 50.1	F

5.2 Street Segment Analysis

Street segment analyses were conducted for the study roadways under Existing conditions. ***Table 5–2*** summarizes the existing daily street segment operations. As shown in *Table 5–2*, Willow Glen Drive is calculated to currently operate at LOS C south of Dehesa Road. Dehesa Road is calculated to currently operate at LOS E between Willow Glen Drive and Sloane Canyon Road.

TABLE 5–2
EXISTING STREET SEGMENT OPERATIONS

Street Segment	Functional Classification	Capacity (LOS E) [a]	ADT [b]	LOS [c]	V/C [d]
Dehesa Rd					
Willow Glen Dr to Singing Hills Drwy	2.1C Community Collector with Intermittent Turn Lanes	19,000	16,500	E	0.868
Singing Hills Drwy to Sloane Canyon Rd	2.1C Community Collector with Intermittent Turn Lanes	19,000	15,390	E	0.810
Willow Glen Dr					
South of Dehesa Rd	2.1C Community Collector with Intermittent Turn Lanes	19,000	8,760	C	0.461

Footnotes:

a. Capacities based on County of San Diego Roadway Classification & LOS table *(See Appendix B)*.
b. Average Daily Traffic Volumes.
c. Level of Service.
d. Volume to Capacity ratio.

6.0 TRIP GENERATION/DISTRIBUTION/ASSIGNMENT

The following is a discussion of the Project trip generation calculations and the Project traffic distribution and assignment through the local network.

6.1 Trip Generation

Based on coordination with the applicant, the Project is comprised of players and staff who are either living in the dorms or commuting from their home outside of the training facility. For the purposes of this report, only commuter trips were analyzed. The following are the expected daily number of trips from team members commuting to the site:

- 30 Professional team players
- 29 Professional team coaching and other staff
- 30 Youth academy staff
- 6 Visitors
- 3-4 Deliveries / Miscellaneous

Typical training hours are between 8:00 AM and 3:00 PM. Therefore, it is assumed that all players and staff traveling to/from the site would be captured in the AM peak hour. To be conservative, 25% of the afternoon trips are assumed to occur in the PM peak period of 4:00 to 6:00 PM. 10% of visitor trips were assumed to be captured in both the AM and PM peak hours. Based on coordination with the applicant, deliveries and miscellaneous vehicles are anticipated to generate 3-4 daily trips. Similar to the players and staff, 100% of these trips would be captured in the AM peak hour and 25% in the PM peak hour.

The analysis applies "credit" for the existing functioning hotel that will be retrofitted into classroom, dormitory facilities and offices, and will no longer contribute hotel trips as part of the Project. The hotel trip credit was applied to the study area intersections and street segments under "with Project" conditions with exception to the main Project driveway (intersection #2), which is currently gated and inaccessible to hotel trips, and the proposed Willow Glen Driveway (intersection #5) that currently does not exist. Trip credit from the hotel was applied to obtain the net Project trips. The hotel traffic generation calculations were conducted using the trip generation rates published in the *SANDAG's (Not So) Brief Guide of Vehicular Traffic Generation Rates for San Diego Region (April 2002)* and these rates are based on busy San Diego tourist hotels. Field observation shows that the hotel on the Project site generates less traffic. In order to take into account the observed traffic, half of the SANDAG motel trip rate was used (4.5 trips/occupied room).

Table 6–1 shows the forecast trip generation for the Project. As shown in *Table 6–1*, the Project is calculated to generate -253 net ADT, with 58 net trips during the AM peak hour (75 inbound and -17 outbound), and -16 net trips during the PM peak hour (-21 inbound and 5 outbound).

6.2 Trip Distribution/Assignment

The Project traffic was distributed and assigned to the street system based on the site location, access to I-8 and SR-54, existing traffic patterns in the area and anticipated traffic routes to and from the site. Based on the above, the Project traffic distribution assumes 45% of trips oriented to/from the west, 50% oriented to/from the south and 5% oriented to/from the east.

Figure 6–1 shows the Project traffic distribution. ***Figure 6–2*** shows the Project traffic volumes.

TABLE 6–1
TRIP GENERATION SUMMARY WITH HOTEL REMOVAL TRIP CREDIT

Use	Quantity[a]	Daily Trip Ends (ADTs)		AM Peak Hour			PM Peak Hour		
		Rate	Volume	Volume			Volume		
				In	Out	Total	In	Out	Total
Proposed									
Professional Team Players	30 players	x2	60	29	1	30	1	7	8
Professional Team Coaching and Other Staff	29 staff	x2	58	28	1	29	1	6	7
Youth Academy Staff	30 staff	x2	60	29	1	30	1	7	8
Visitors	6 visitors	x2	12	1	0	1	0	1	1
Deliveries / Miscellaneous[b]	3.5	x2	7	2	2	4	1	0	1
Subtotal			197	89	5	94	4	21	25
Existing									
Hotel[c]	100 rooms	4.5/room	450	14	22	36	25	16	41
Trip Generation Summary									
Net Project Total (Proposed – Existing)			***-253***	***75***	***-17***	***58***	***-21***	***5***	***-16***

Footnotes:

a. Information provided by applicant.
b. Deliveries and miscellaneous vehicles are anticipated to generate 3-4 daily trips. Trip generation calculation used an average of 3.5 trips.
c. Rate is based on half of SANDAG's motel trip rate of 9/room (4.5/room).

General Notes:

1. To be conservative, no carpooling was assumed.

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Date: 8/15/2023
Time: 10:15 AM

Figure 6-1

Project Traffic Distribution

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Date: 8/15/2023
Time: 10:19 AM

Figure 6-2

Project Traffic Volumes

TRAINING CAMPUS

7.0 ANALYSIS OF OPENING YEAR (YEAR 2025) CONDITIONS

The following section presents the analysis of study area locations under Opening Year (Year 2025) without and with Project conditions. The Opening Year (Year 2025) conditions include nearby cumulative development projects.

Cumulative projects are other projects in the study area that will add traffic to the local circulation system in the near future. LLG reviewed the City of El Cajon's Current Development website and the County of San Diego's Current Project website to identify relevant, pending cumulative projects in the study area that could be constructed and generating traffic in the study area vicinity by the expected opening year of the Project in Year 2025. Based on this research, no cumulative projects were identified within close proximity of the Project site.

In order to forecast future traffic volumes for Opening Year (Year 2025) conditions, the SANDAG ABM2+ model was first utilized to obtain the growth rate between Year 2016 and 2025 ADTs. Based on a volume comparison, a growth rate of 1% per year for 2 years was deemed appropriate to use as ambient growth and applied to the existing traffic volumes to develop the Opening Year (Year 2025) conditions. Project traffic was added to the Opening Year (Year 2025) traffic volumes to develop the Opening Year (Year 2025) With Project conditions.

Figure 7–1 shows the Opening Year (Year 2025) Project Traffic Volumes. ***Figure 7–2*** shows the Opening Year (Year 2025) + Project Traffic Volumes.

7.1 Opening Year (Year 2025) without Project Traffic

7.1.1 *Intersection Analysis*

Intersection analyses were conducted for the study intersections under Opening Year (Year 2025) conditions. ***Table7–1*** summarizes the peak hour intersection operations for the Opening Year (Year 2025) conditions. As shown in *Table 7–1*, all study area intersections are calculated to operate at LOS C or better with exception of the northbound left-turn movement at the Dehesa Road / Sloane Canyon Road intersection which is calculated to operate at LOS E during the PM peak hour.

Appendix D contains the Opening Year (Year 2025) intersection analysis worksheets.

7.1.2 *Segment Operations*

Street segment analyses were conducted for the study roadways under Opening Year (Year 2025) conditions. ***Table 7–2*** summarizes the daily street segment operations for the Opening Year (Year 2025) conditions. As seen in *Table 7–2*, Willow Glen Drive is calculated to operate at LOS C south of Dehesa Road. Dehesa Road is calculated to operate at LOS E between Willow Glen Drive and Sloane Canyon Road.

7.2 Opening Year (Year 2025) + Project Traffic

7.2.1 *Intersection Analysis*

Intersection analyses were conducted for the study intersections under Opening Year (Year 2025) + Project conditions. *Table 7–1* summarizes the peak hour intersection operations for the Opening Year (Year 2025) + Project conditions. As shown in *Table 7–1*, all study area intersections are calculated to continue to operate at LOS C or better with exception to the following intersections:

- Dehesa Road / Project Driveway #1 (LOS E on the northbound left-turn movement during the PM peak hour)
- Dehesa Road / Sloane Canyon Road (LOS E on the northbound left-turn movement during the PM peak hour)

Appendix E contains the Opening Year (Year 2025) + Project intersection analysis worksheets.

7.2.2 *Segment Operations*

Street segment analyses were conducted for the study roadways under Opening Year (Year 2025) + Project conditions. *Table 7–2* summarizes the daily street segment operations for the Opening Year (Year 2025) + Project conditions. As seen in *Table 7–2*, Willow Glen Drive is calculated to continue to operate at LOS C south of Dehesa Road. Dehesa Road is calculated to continue to operate at LOS E between Willow Glen Drive and Sloane Canyon Road. *Tables 7–2* also shows a flat or decrease in v/c ratio and improved operations with the hotel removal trip credit.

TABLE 7–1
OPENING YEAR (YEAR 2025) INTERSECTION OPERATIONS

Intersection	Control Type	Peak Hour	Existing		Opening Year (Year 2025)		Opening Year (Year 2025) + Project		Δ[c]
			Delay[a]	LOS[b]	Delay	LOS	Delay	LOS	
1. Dehesa Rd / Willow Glen Dr	Signal	AM	17.0	B	17.1	B	17.7	B	0.6
		PM	21.5	C	22.0	C	21.4	C	(0.6)
2. Dehesa Rd / Project Driveway #1	TWSC[d]	AM	0.0[f]	A	0.0[f]	A	19.2	C	19.2
		PM	0.0[f]	A	0.0[f]	A	35.9	E	35.9
3. Dehesa Rd / Singing Hills Driveway	Right-In Only[e]	AM	0.0	A	0.0	A	0.0	A	0.0
		PM	0.0	A	0.0	A	0.0	A	0.0
4. Dehesa Rd / Sloane Canyon Rd	TWSC	AM	15.7	C	16.0	C	16.0	C	0.0
		PM	44.0	E	46.2	E	46.2	E	0.0
5. Willow Glen Dr / Project Driveway #2	DNE/ TWSC	AM	–	–	–	–	9.3	A	9.3
		PM	–	–	–	–	8.2	A	8.2

Footnotes:

a. Average delay expressed in seconds per vehicle.
b. Level of Service.
c. Δ denotes an increase in delay due to project.
d. TWSC – Two-Way Stop Controlled intersection. Minor street left-turn delay is reported.
e. This driveway operates as right-in only. Therefore, there are no conflict points that would cause a delay.
f. Operating as a gated driveway at the time of this analysis.

General Notes:

1. DNE – does not exist.

SIGNALIZED		UNSIGNALIZED	
DELAY/LOS THRESHOLDS		DELAY/LOS THRESHOLDS	
Delay	LOS	Delay	LOS
0.0 ≤ 10.0	A	0.0 ≤ 10.0	A
10.1 to 20.0	B	10.1 to 15.0	B
20.1 to 35.0	C	15.1 to 25.0	C
35.1 to 55.0	D	25.1 to 35.0	D
55.1 to 80.0	E	35.1 to 50.0	E
≥ 80.1	F	≥ 50.1	F

TABLE 7–2
OPENING YEAR (YEAR 2025) STREET SEGMENT OPERATIONS

Street Segment	Existing Capacity (LOS E)[a]	Existing			Opening Year (Year 2025)			Opening Year (Year 2025) + Project			Δ[e]
		ADT[b]	LOS[c]	V/C[d]	ADT	V/C	LOS	ADT	V/C	LOS	
Dehesa Rd											
Willow Glen Dr to Singing Hills Driveway	19,000	16,500	E	0.868	16,830	E	0.886	16,590	E	0.873	(0.013)
Singing Hills Driveway to Sloane Canyon Rd	19,000	15,390	E	0.810	15,700	E	0.826	15,690	E	0.826	0.000
Willow Glen Dr											
South of Dehesa Rd	19,000	8,760	C	0.461	8,940	C	0.471	8,817	C	0.464	(0.007)

Footnotes:

a. Capacities based on County of San Diego Roadway Classification & LOS table *(See Appendix B)*.
b. Average Daily Traffic
c. Level of Service
d. Volume to Capacity ratio
e. Δ denotes a project-induced increase in the Volume to Capacity ratio

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Date: 8/15/2023
Time: 10:20 AM

Figure 7-1

Opening Year (2025) Traffic Volumes

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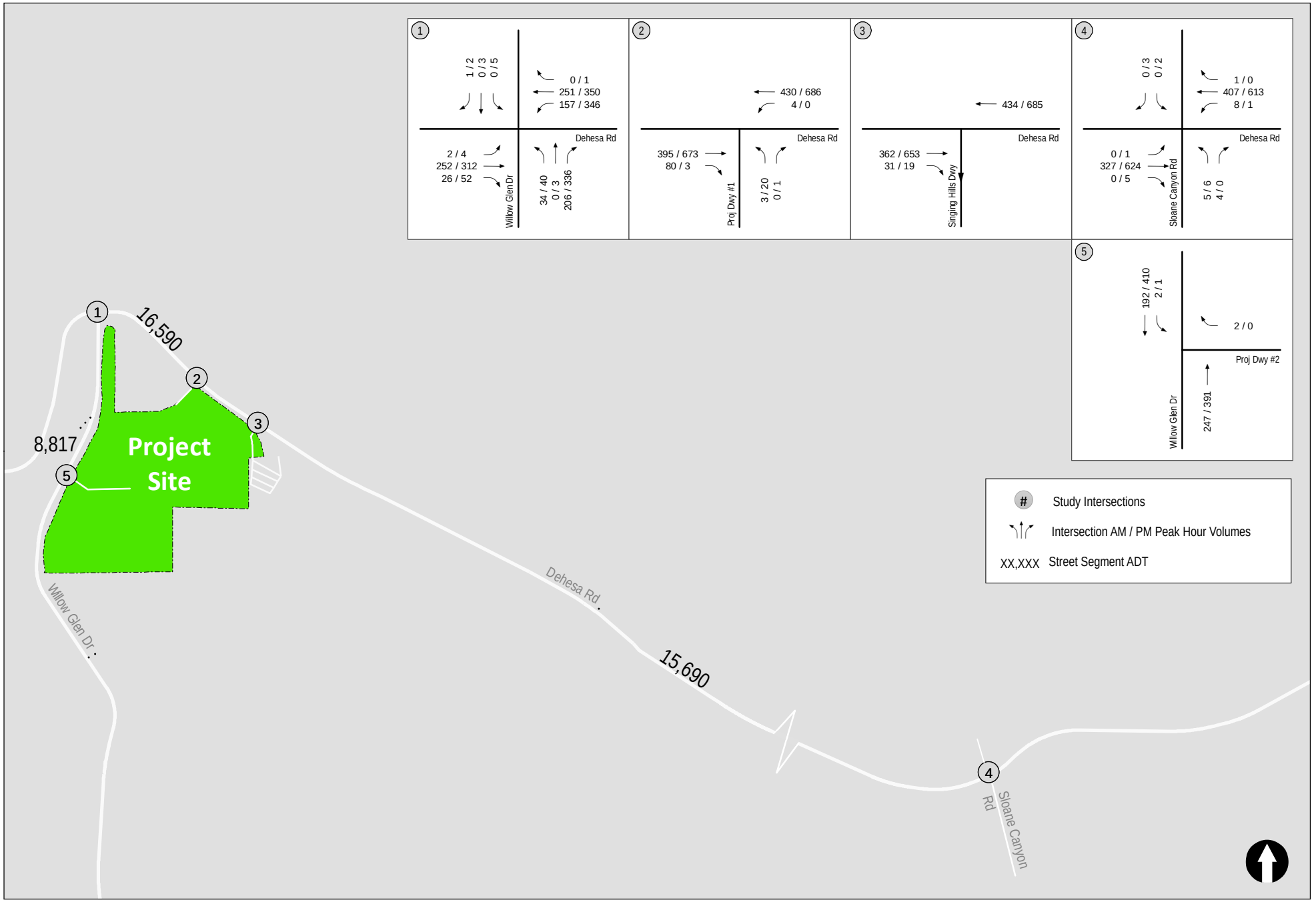

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Date: 8/15/2023
Time: 10:23 AM

Figure 7-2

Opening Year (2025) + Project Traffic Volumes

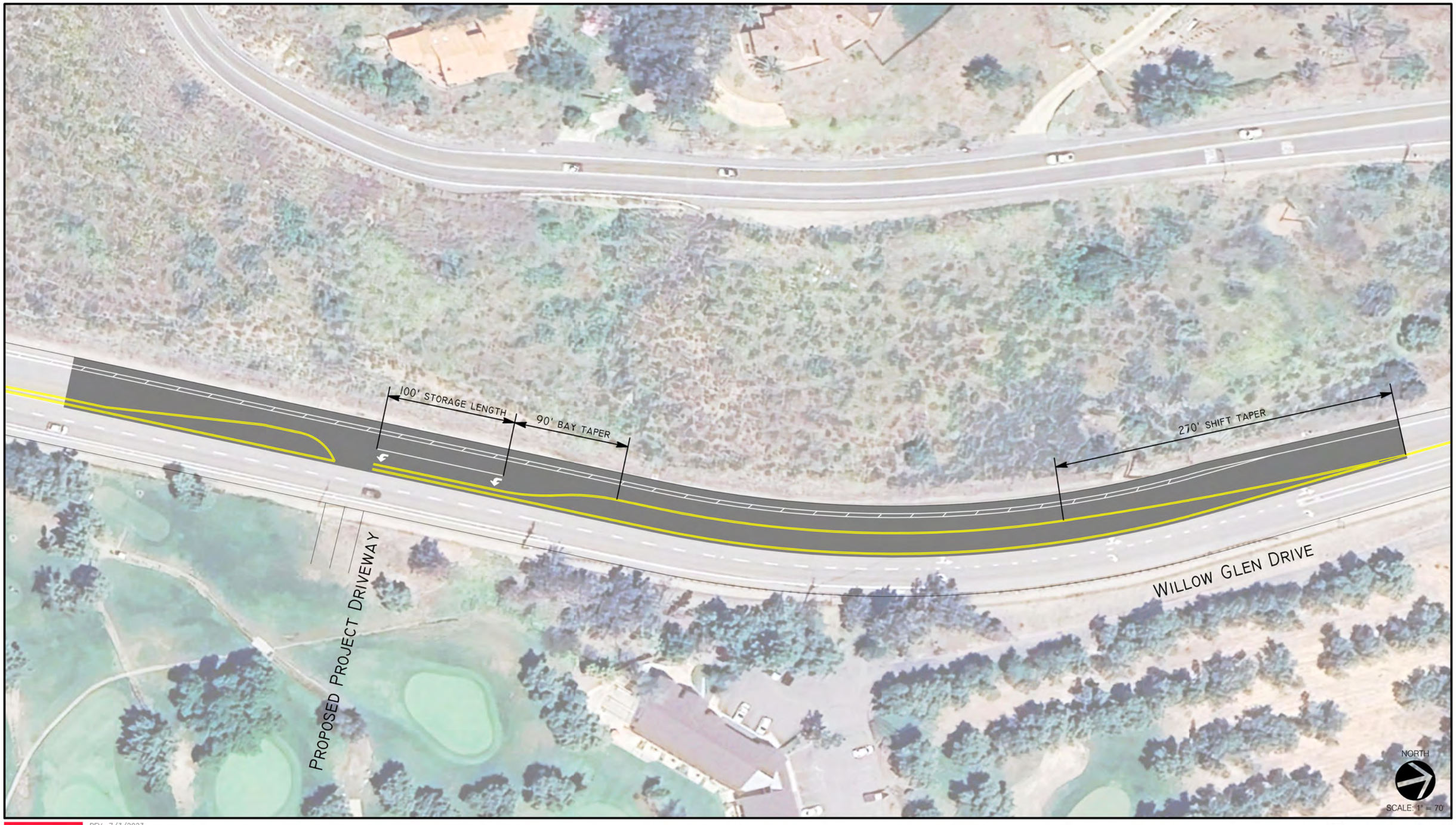
TRAINING CAMPUS

8.0 SITE ACCESS

There are currently several access points serving the existing site which will be maintained and one that will be improved. Currently, there are three main access points to the site. The first access point is through the existing parking lot for the golf resort and it enters the site from the southeast. This road is in good condition and no resurfacing or repaving is anticipated. The second access point is from the northeast and enters off of Dehesa Road (intersection #2). This is anticipated to be the main access point to the site for players, staff and visitors. This road appears to be in good condition and no resurfacing or repaving is anticipated. The third access point to the site is currently from the northwest and entering off of Willow Glen Drive. Direct access will be available to the groundskeeping building and the trash and loading dock.

The Willow Glen Drive access point is currently 140 feet south of the Dehesa Road / Willow Glen Drive intersection. The driveway's close proximity to the intersection can potentially have higher delays than if it was further south as there are more conflict points, such as vehicles departing the nearby intersection would have to wait behind a vehicle waiting for an adequate gap to make the southbound left-turn to enter the site. A queue of approximately six (6) vehicles would cause a spillback into the intersection. Therefore, the Project is proposing to relocate the driveway approximately 900 feet south (intersection #5) relative to the current location. Willow Glen Drive increases from one lane to two lanes in the southbound direction at this location. As mentioned in *Section 3.1,* Willow Glen Drive is classified as a 2.1C Community Collector in the County of San Diego General Plan Mobility Element. It is recommended to maintain Willow Glen Drive as a two-lane roadway and striped to include a dedicated southbound left-turn lane approaching the proposed driveway. This would allow vehicles to wait for an adequate gap to enter the site without blocking vehicles making a southbound through movement. The Project driveway should be designed to meet County of San Diego sight distance standards. This recommendation will help maintain an efficient flow in traffic as vehicles making a southbound through movement would not have to wait behind a vehicle waiting for an adequate gap to make the southbound left-turn to enter the Project site. ***Figure 8–1*** shows a conceptual plan of the striping on Willow Glen Drive.

It is recommended that a left-turn pocket be striped on Dehesa Road approaching intersection #2. This would offset the increase in delay and allow vehicles to wait for an adequate gap to enter the site without blocking vehicles making a westbound through movement. ***Figure 8–2*** shows a conceptual plan of the striping on Dehesa Road.



REV. 7/3/2023
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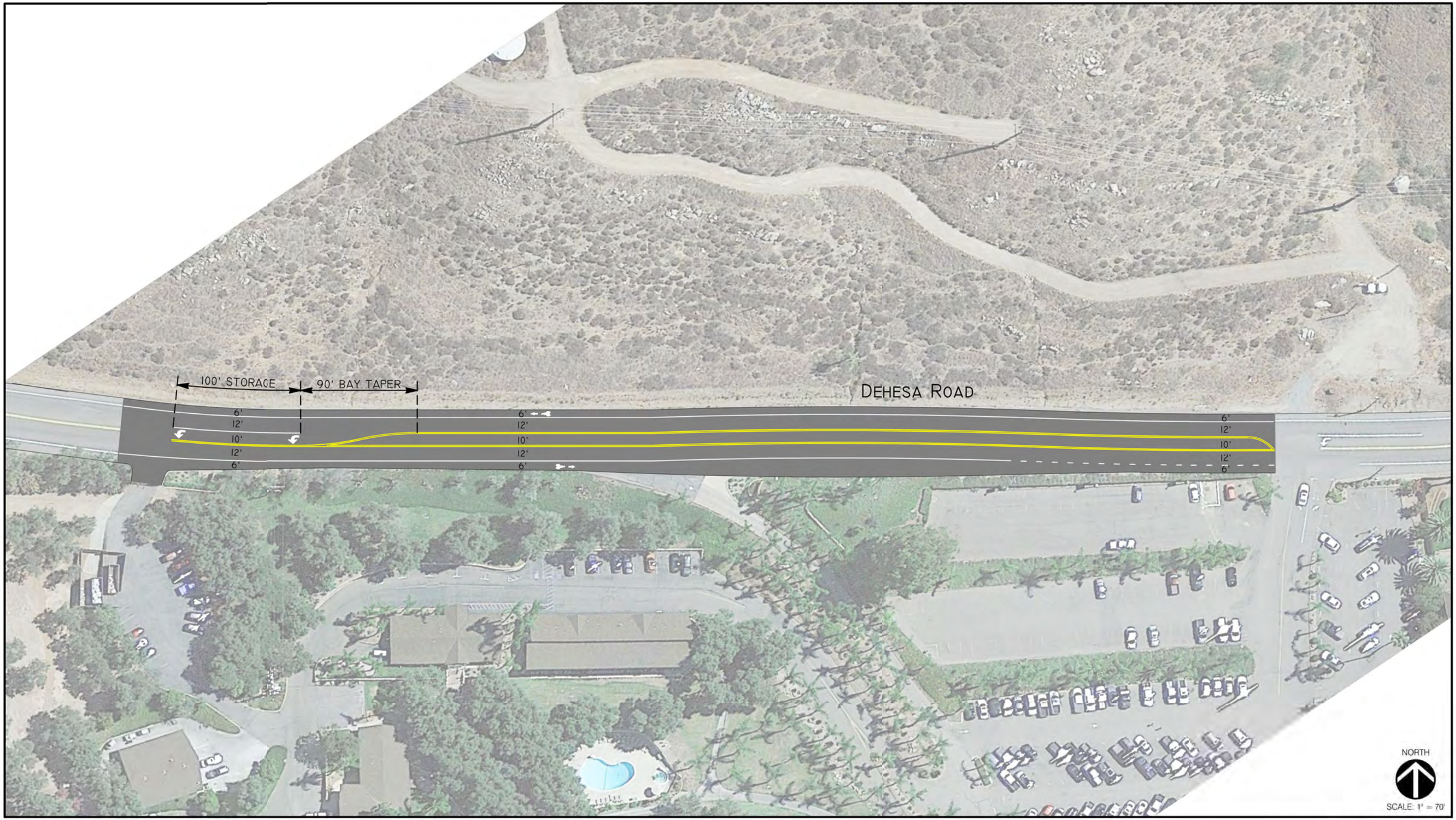
CONCEPTUAL ONLY
NOT FOR CONSTRUCTION

Figure 8–1

Willow Glen Drive Concept Plan

Training Campus



REV. 6/28/2023
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Figure 8–2

Dehesa Road Concept Plan

Training Campus

9.0 ACTIVE TRANSPORTATION

9.1 Pedestrian Mobility

Dehesa Road currently provides sidewalks only on the south side of the road and only east of the Singing Hills Golf Resort. The nearest signalized intersection is ½ mile west of the Project site, at the Dehesa Road / Willow Glen Drive intersection, and provides a controlled crossing location with pedestrian push buttons and crosswalks.

Willow Glen Drive currently does not provide sidewalks on either side of the roadway. A decomposed granite path is provided on the east side of the roadway. The nearest signalized intersection is the Dehesa Road / Willow Glen Drive intersection, and provides a controlled crossing location with pedestrian push buttons and crosswalks.

9.2 Bicycle Mobility

Currently, Dehesa Road provides Class II bike lanes between Granite Hills Drive and Harbison Canyon Road. Willow Glen Drive provides Class II bike lanes between Jamacha Road and Dehesa Road.

9.3 Transit Mobility

The nearest bus stops are approximately 3 miles away along Jamacha Road within the City of El Cajon. These bus stops are served by MTS bus route 875 which runs from the El Cajon Transit Center. MTS bus route 875 runs along Jamacha Road, Washington Avenue, Broadway and E Main Street, with 30-minute headways during the weekdays and 1-hour headways on Saturday and Sunday.

Appendix F contains the bus route schedule and map.

10.0 CONCLUSIONS

The Project proposes to develop a Professional Soccer Training Facility and Youth Academy Training campus within tribal trust land currently developed with the Singing Hills Golf Resort on the southeast corner of the Dehesa Road / Willow Glen Drive intersection in the Crest-Dehesa Community Plan.

Currently, there are three main access points to the site. The first access point is through the existing parking lot for the golf resort and it enters the site from the southeast. This road is in good condition and no resurfacing or repaving is anticipated. The second access point is from the northeast and enters off of Dehesa Road (intersection #2). This is anticipated to be the main access point to the site for players, staff and visitors. This road appears to be in good condition and no resurfacing or repaving is anticipated. The third access point to the site is currently from the northwest and entering off of Willow Glen Drive. Direct access will be available to the groundskeeping building and the trash and loading dock. The Project is proposing to relocate this driveway approximately 900 feet south (intersection #5) relative to the current location.

Based on a review of existing roadway conditions, existing traffic volumes, and the analysis results, the following is recommended:

- Stripe a 100-foot long left-turn lane with a 90-foot taper on Dehesa Road approaching intersection #2.
- Stripe a 100-foot long left-turn lane with a 90-foot taper approaching the new service driveway on Willow Glen Road (intersection #5).
- Ensure the new service driveway location meets County of San Diego sight distance standards.
- Schedule staffing shifts to end before 4 PM.

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TECHNICAL APPENDICES
TRAINING CAMPUS

San Diego County, California
August 16, 2023

LLG Ref. 3-23-3768

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APPENDICES

APPENDIX

A. Intersection and Street Segment Manual Count Sheets

B. County of San Diego Roadway Classification Table

C. Existing Peak Hour Intersection Analysis Worksheets

D. Opening Year (Year 2025) Peak Hour Intersection Analysis Worksheets

E. Opening Year (Year 2025) + Project Peak Hour Intersection Analysis Worksheets

F. Bus Route Schedule and Map

APPENDIX A

INTERSECTION AND SEGMENT MANUAL COUNT SHEETS

Counts Unlimited, Inc.
PO Box 1178
Corona, CA 92878
(951) 268-6268

County of San Diego
N/S: Willow Glen Dr / Memorial Estates
E/W: Dehesa Road
Weather: Clear

File Name : 01_CSD_WGDEAM
Site Code : 05723536
Start Date : 5/24/2023
Page No : 1

Groups Printed- Total Volume

	Memorial Estates Drive Southbound				Dehesa Road Westbound				Willow Glen Drive Northbound				Dehesa Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	0	0	35	48	0	83	9	1	31	41	0	36	3	39	163
07:15 AM	0	0	0	0	35	52	0	87	8	0	43	51	0	24	4	28	166
07:30 AM	0	0	0	0	38	59	0	97	11	0	44	55	0	42	6	48	200
07:45 AM	0	0	0	0	47	73	0	120	7	0	41	48	1	50	8	59	227
Total	0	0	0	0	155	232	0	387	35	1	159	195	1	152	21	174	756
08:00 AM	0	0	0	0	47	65	0	112	8	0	37	45	1	49	3	53	210
08:15 AM	0	0	1	1	38	65	0	103	9	0	42	51	0	57	3	60	215
08:30 AM	0	0	0	0	30	53	0	83	9	0	47	56	0	59	10	69	208
08:45 AM	0	0	0	0	37	51	0	88	11	1	40	52	0	58	11	69	209
Total	0	0	1	1	152	234	0	386	37	1	166	204	1	223	27	251	842
Grand Total	0	0	1	1	307	466	0	773	72	2	325	399	2	375	48	425	1598
Apprch %	0	0	100		39.7	60.3	0		18	0.5	81.5		0.5	88.2	11.3		
Total %	0	0	0.1	0.1	19.2	29.2	0	48.4	4.5	0.1	20.3	25	0.1	23.5	3	26.6	

	Memorial Estates Drive Southbound				Dehesa Road Westbound				Willow Glen Drive Northbound				Dehesa Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	0	0	0	**47**	**73**	0	**120**	7	0	41	48	**1**	50	8	59	**227**
08:00 AM	0	0	0	0	47	65	0	112	8	0	37	45	1	49	3	53	210
08:15 AM	0	0	**1**	**1**	38	65	0	103	**9**	0	42	51	0	57	3	60	215
08:30 AM	0	0	0	0	30	53	0	83	9	0	**47**	**56**	0	**59**	**10**	**69**	208
Total Volume	0	0	1	1	162	256	0	418	33	0	167	200	2	215	24	241	860
% App. Total	0	0	100		38.8	61.2	0		16.5	0	83.5		0.8	89.2	10		
PHF	.000	.000	.250	.250	.862	.877	.000	.871	.917	.000	.888	.893	.500	.911	.600	.873	.947

Counts Unlimited, Inc.
PO Box 1178
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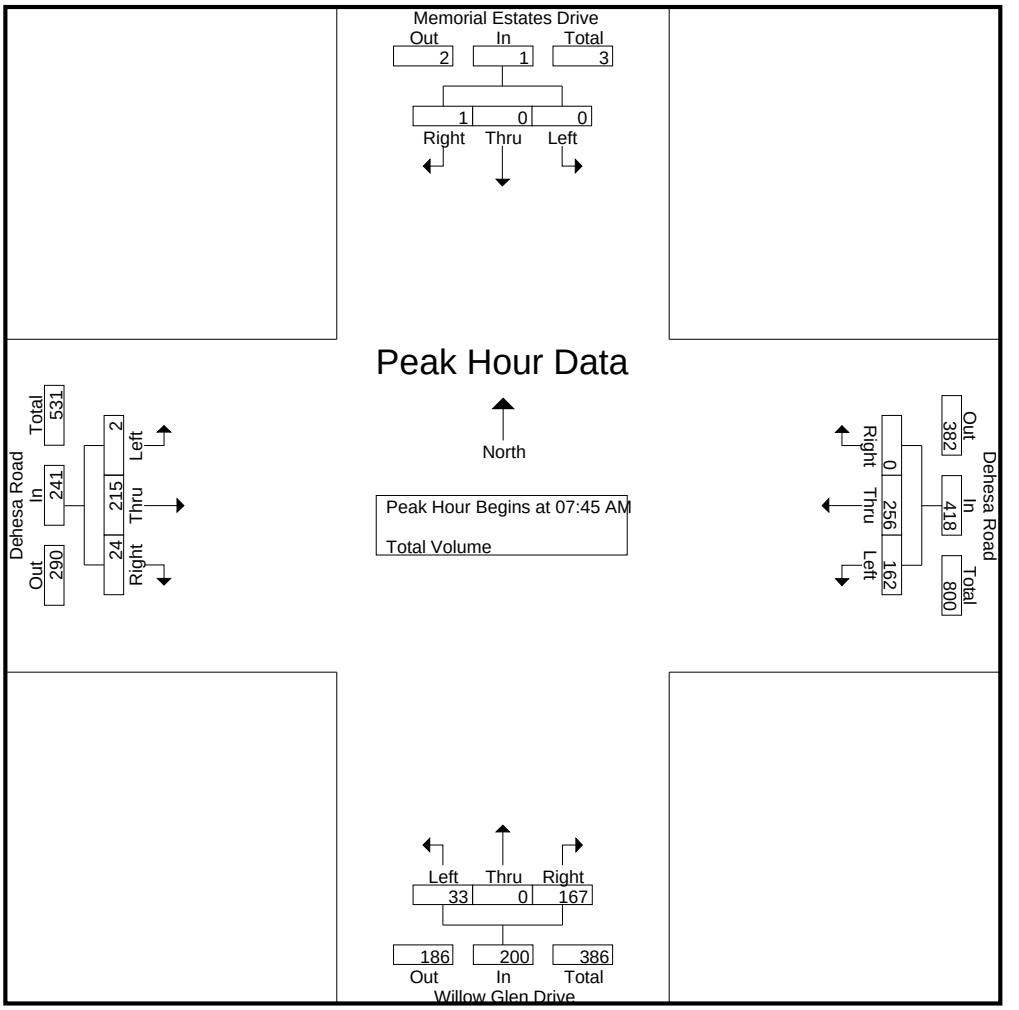
County of San Diego
N/S: Willow Glen Dr / Memorial Estates
E/W: Dehesa Road
Weather: Clear

File Name : 01_CSD_WGDEAM
Site Code : 05723536
Start Date : 5/24/2023
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM				07:30 AM				08:00 AM				08:00 AM			
+0 mins.	0	0	0	0	38	59	0	97	8	0	37	45	**1**	49	3	53
+15 mins.	0	0	0	0	**47**	**73**	0	**120**	9	0	42	51	0	57	3	60
+30 mins.	0	0	0	0	47	65	0	112	9	0	**47**	**56**	0	**59**	10	**69**
+45 mins.	0	0	**1**	**1**	38	65	0	103	**11**	**1**	40	52	0	58	**11**	69
Total Volume	0	0	1	1	170	262	0	432	37	1	166	204	1	223	27	251
% App. Total	0	0	100		39.4	60.6	0		18.1	0.5	81.4		0.4	88.8	10.8	
PHF	.000	.000	.250	.250	.904	.897	.000	.900	.841	.250	.883	.911	.250	.945	.614	.909

Counts Unlimited, Inc.
PO Box 1178
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County of San Diego
N/S: Willow Glen Dr / Memorial Estates
E/W: Dehesa Road
Weather: Clear

File Name : 01_CSD_WGDEPM
Site Code : 05723536
Start Date : 5/24/2023
Page No : 1

Groups Printed- Total Volume

	Memorial Estates Drive Southbound				Dehesa Road Westbound				Willow Glen Drive Northbound				Dehesa Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	1	1	1	3	93	94	0	187	8	0	92	100	1	69	11	81	371
04:15 PM	0	1	0	1	96	87	0	183	8	1	83	92	0	75	14	89	365
04:30 PM	2	0	0	2	72	84	1	157	13	1	87	101	0	82	15	97	357
04:45 PM	2	1	1	4	76	75	0	151	10	1	77	88	3	91	11	105	348
Total	5	3	2	10	337	340	1	678	39	3	339	381	4	317	51	372	1441
05:00 PM	0	1	1	2	67	72	1	140	9	0	88	97	0	80	11	91	330
05:15 PM	0	0	0	0	71	59	0	130	12	1	80	93	0	77	15	92	315
05:30 PM	0	2	0	2	39	62	0	101	8	0	92	100	0	83	6	89	292
05:45 PM	0	3	1	4	50	54	0	104	9	0	66	75	1	81	12	94	277
Total	0	6	2	8	227	247	1	475	38	1	326	365	1	321	44	366	1214
Grand Total	5	9	4	18	564	587	2	1153	77	4	665	746	5	638	95	738	2655
Apprch %	27.8	50	22.2		48.9	50.9	0.2		10.3	0.5	89.1		0.7	86.4	12.9		
Total %	0.2	0.3	0.2	0.7	21.2	22.1	0.1	43.4	2.9	0.2	25	28.1	0.2	24	3.6	27.8	

	Memorial Estates Drive Southbound				Dehesa Road Westbound				Willow Glen Drive Northbound				Dehesa Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	1	**1**	**1**	3	93	**94**	0	**187**	8	0	**92**	100	1	69	11	81	**371**
04:15 PM	0	1	0	1	**96**	87	0	183	8	**1**	83	92	0	75	14	89	365
04:30 PM	**2**	0	0	2	72	84	**1**	157	**13**	1	87	**101**	0	82	**15**	97	357
04:45 PM	2	1	1	**4**	76	75	0	151	10	1	77	88	**3**	**91**	11	**105**	348
Total Volume	5	3	2	10	337	340	1	678	39	3	339	381	4	317	51	372	1441
% App. Total	50	30	20		49.7	50.1	0.1		10.2	0.8	89		1.1	85.2	13.7		
PHF	.625	.750	.500	.625	.878	.904	.250	.906	.750	.750	.921	.943	.333	.871	.850	.886	.971

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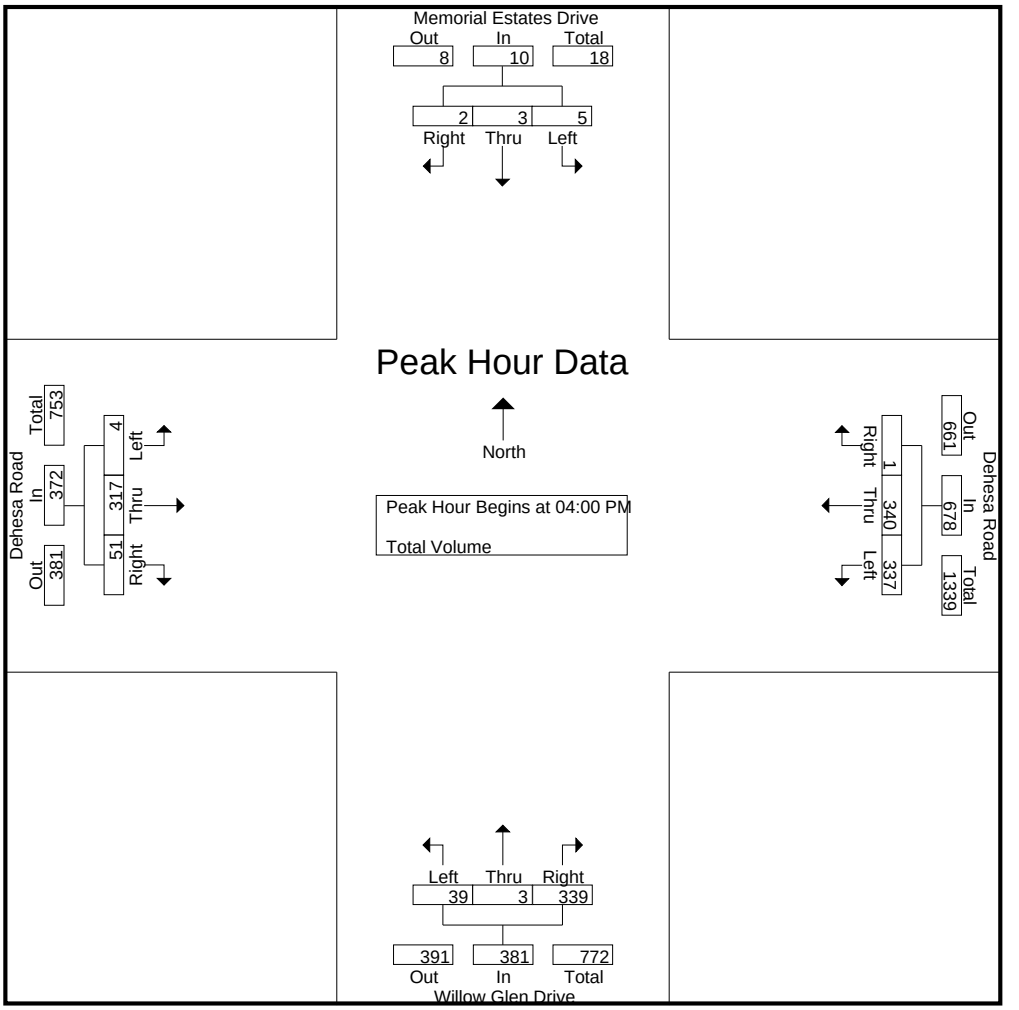
County of San Diego
N/S: Willow Glen Dr / Memorial Estates
E/W: Dehesa Road
Weather: Clear

File Name : 01_CSD_WGDEPM
Site Code : 05723536
Start Date : 5/24/2023
Page No : 2



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:00 PM				04:30 PM			
+0 mins.	1	**1**	**1**	3	93	**94**	0	**187**	8	0	**92**	100	0	82	**15**	97
+15 mins.	0	1	0	1	**96**	87	0	183	8	**1**	83	92	**3**	**91**	11	**105**
+30 mins.	**2**	0	0	2	72	84	**1**	157	**13**	1	87	**101**	0	80	11	91
+45 mins.	2	1	1	**4**	76	75	0	151	10	1	77	88	0	77	15	92
Total Volume	5	3	2	10	337	340	1	678	39	3	339	381	3	330	52	385
% App. Total	50	30	20		49.7	50.1	0.1		10.2	0.8	89		0.8	85.7	13.5	
PHF	.625	.750	.500	.625	.878	.904	.250	.906	.750	.750	.921	.943	.250	.907	.867	.917

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County of San Diego
N/S: Driveway 1
E/W: Dehesa Road
Weather: Clear

File Name : 02_CSD_DWY1DEAM
Site Code : 05723536
Start Date : 5/24/2023
Page No : 1

Groups Printed- Total Volume

	Dehesa Road Westbound			Driveway 1 Northbound			Dehesa Road Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
07:00 AM	0	81	81	0	0	0	58	8	66	147
07:15 AM	0	87	87	0	0	0	55	12	67	154
07:30 AM	0	96	96	0	0	0	78	9	87	183
07:45 AM	0	122	122	0	0	0	79	11	90	212
Total	0	386	386	0	0	0	270	40	310	696
08:00 AM	0	113	113	0	0	0	80	7	87	200
08:15 AM	0	102	102	0	0	0	95	5	100	202
08:30 AM	0	85	85	0	0	0	102	5	107	192
08:45 AM	0	87	87	0	0	0	89	8	97	184
Total	0	387	387	0	0	0	366	25	391	778
Grand Total	0	773	773	0	0	0	636	65	701	1474
Apprch %	0	100		0	0		90.7	9.3		
Total %	0	52.4	52.4	0	0	0	43.1	4.4	47.6	

	Dehesa Road Westbound			Driveway 1 Northbound			Dehesa Road Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:45 AM										
07:45 AM	0	**122**	**122**	0	0	0	79	**11**	90	**212**
08:00 AM	0	113	113	0	0	0	80	7	87	200
08:15 AM	0	102	102	0	0	0	95	5	100	202
08:30 AM	0	85	85	0	0	0	**102**	5	**107**	192
Total Volume	0	422	422	0	0	0	356	28	384	806
% App. Total	0	100		0	0		92.7	7.3		
PHF	.000	.865	.865	.000	.000	.000	.873	.636	.897	.950

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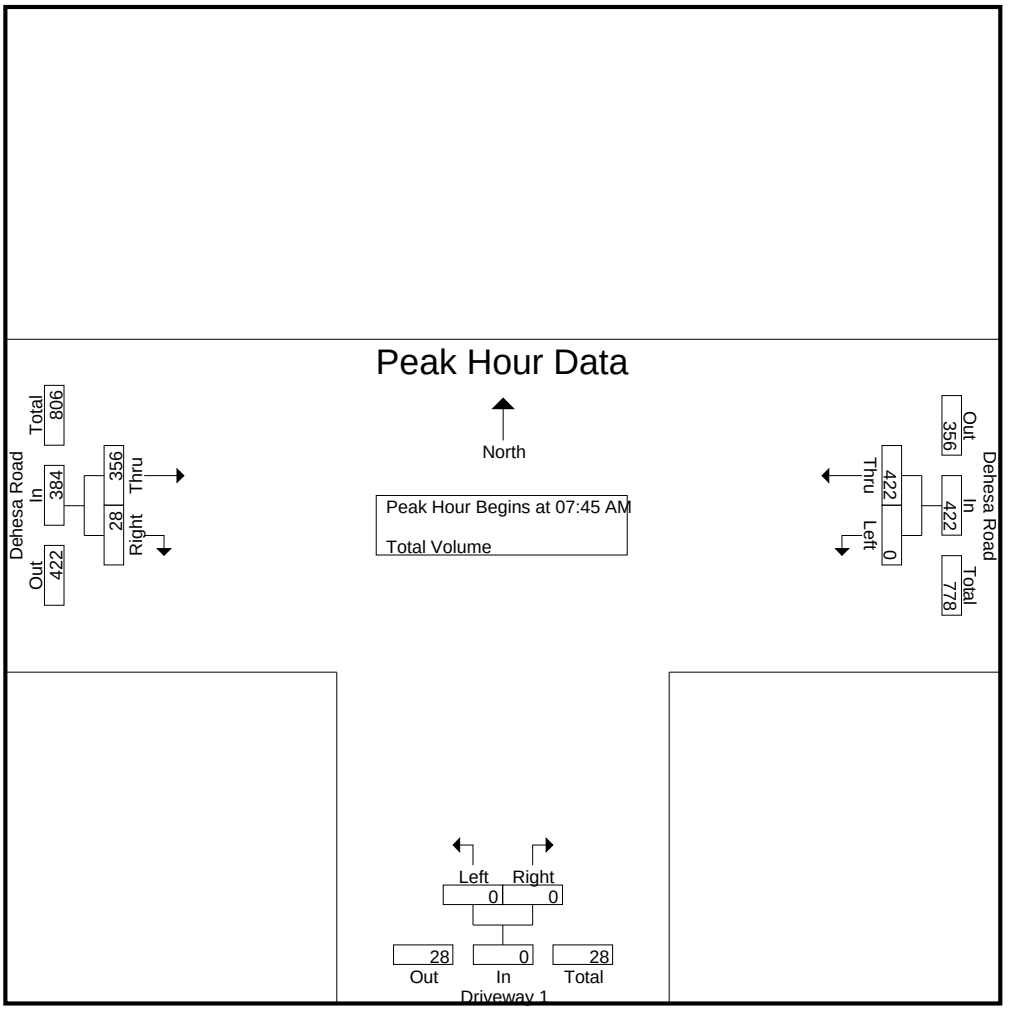
County of San Diego
N/S: Driveway 1
E/W: Dehesa Road
Weather: Clear

File Name : 02_CSD_DWY1DEAM
Site Code : 05723536
Start Date : 5/24/2023
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:30 AM			07:00 AM			08:00 AM		
+0 mins.	0	96	96	0	0	0	80	7	87
+15 mins.	0	**122**	**122**	0	0	0	95	5	100
+30 mins.	0	113	113	0	0	0	**102**	5	**107**
+45 mins.	0	102	102	0	0	0	89	**8**	97
Total Volume	0	433	433	0	0	0	366	25	391
% App. Total	0	100		0	0		93.6	6.4	
PHF	.000	.887	.887	.000	.000	.000	.897	.781	.914

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County of San Diego
N/S: Driveway 1
E/W: Dehesa Road
Weather: Clear

File Name : 02_CSD_DWY1DEPM
Site Code : 05723536
Start Date : 5/24/2023
Page No : 1

Groups Printed- Total Volume

	Dehesa Road Westbound			Driveway 1 Northbound			Dehesa Road Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
04:00 PM	0	181	181	0	0	0	159	5	164	345
04:15 PM	0	184	184	0	0	0	149	5	154	338
04:30 PM	0	156	156	0	0	0	167	4	171	327
04:45 PM	0	151	151	0	0	0	165	6	171	322
Total	0	672	672	0	0	0	640	20	660	1332
05:00 PM	0	140	140	0	0	0	154	12	166	306
05:15 PM	0	130	130	0	0	0	143	11	154	284
05:30 PM	0	100	100	0	0	0	179	5	184	284
05:45 PM	0	107	107	0	0	0	143	6	149	256
Total	0	477	477	0	0	0	619	34	653	1130
Grand Total	0	1149	1149	0	0	0	1259	54	1313	2462
Apprch %	0	100		0	0		95.9	4.1		
Total %	0	46.7	46.7	0	0	0	51.1	2.2	53.3	

	Dehesa Road Westbound			Driveway 1 Northbound			Dehesa Road Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 PM										
04:00 PM	0	181	181	0	0	0	159	5	164	**345**
04:15 PM	0	**184**	**184**	0	0	0	149	5	154	338
04:30 PM	0	156	156	0	0	0	**167**	4	**171**	327
04:45 PM	0	151	151	0	0	0	165	**6**	171	322
Total Volume	0	672	672	0	0	0	640	20	660	1332
% App. Total	0	100		0	0		97	3		
PHF	.000	.913	.913	.000	.000	.000	.958	.833	.965	.965

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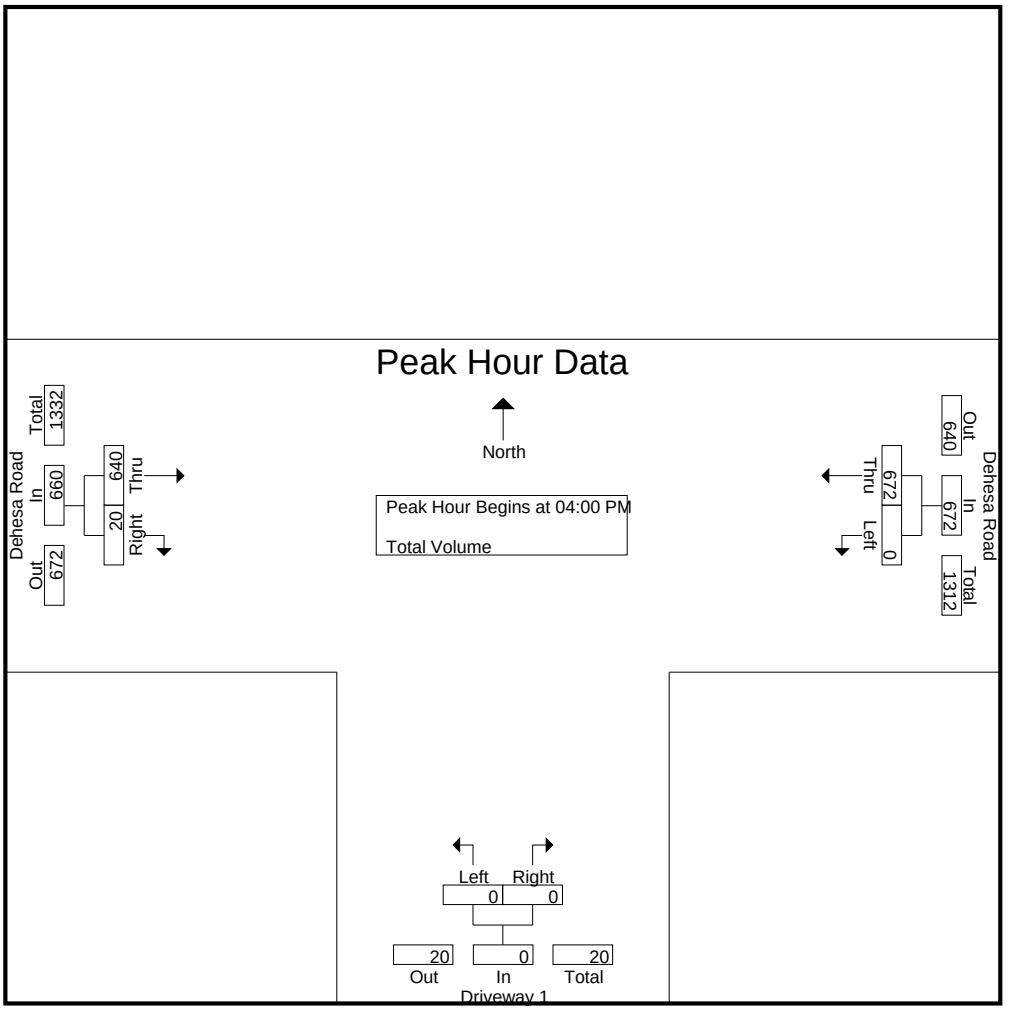
County of San Diego
N/S: Driveway 1
E/W: Dehesa Road
Weather: Clear

File Name : 02_CSD_DWY1DEPM
Site Code : 05723536
Start Date : 5/24/2023



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM			04:00 PM			04:45 PM		
+0 mins.	0	181	181	0	0	0	165	6	171
+15 mins.	0	**184**	**184**	0	0	0	154	**12**	166
+30 mins.	0	156	156	0	0	0	143	11	154
+45 mins.	0	151	151	0	0	0	**179**	5	**184**
Total Volume	0	672	672	0	0	0	641	34	675
% App. Total	0	100		0	0		95	5	
PHF	.000	.913	.913	.000	.000	.000	.895	.708	.917

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County of San Diego
N/S: Sloane Canyon Road
E/W: Dehesa Road
Weather: Clear

File Name : 05_CSD_SCDEAM
Site Code : 05723536
Start Date : 5/24/2023

Groups Printed- Total Volume

	Sloane Canyon Road Southbound				Dehesa Road Westbound				Sloane Canyon Road Northbound				Dehesa Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
07:00 AM	0	0	1	1	1	79	0	80	1	0	1	2	0	47	0	47	130
07:15 AM	0	0	0	0	1	82	0	83	2	0	0	2	0	56	1	57	142
07:30 AM	0	0	0	0	2	85	0	87	1	0	2	3	0	71	0	71	161
07:45 AM	0	0	0	0	1	121	0	122	0	0	1	1	0	70	0	70	193
Total	0	0	1	1	5	367	0	372	4	0	4	8	0	244	1	245	626
08:00 AM	0	0	0	0	0	111	1	112	1	0	1	2	0	77	0	77	191
08:15 AM	0	0	0	0	3	88	0	91	0	0	1	1	0	85	0	85	177
08:30 AM	0	0	0	0	4	75	0	79	4	0	1	5	0	90	0	90	174
08:45 AM	0	0	0	0	0	75	0	75	1	0	0	1	1	98	0	99	175
Total	0	0	0	0	7	349	1	357	6	0	3	9	1	350	0	351	717
Grand Total	0	0	1	1	12	716	1	729	10	0	7	17	1	594	1	596	1343
Apprch %	0	0	100		1.6	98.2	0.1		58.8	0	41.2		0.2	99.7	0.2		
Total %	0	0	0.1	0.1	0.9	53.3	0.1	54.3	0.7	0	0.5	1.3	0.1	44.2	0.1	44.4	

	Sloane Canyon Road Southbound				Dehesa Road Westbound				Sloane Canyon Road Northbound				Dehesa Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	0	0	0	1	**121**	0	**122**	0	0	**1**	1	0	70	0	70	**193**
08:00 AM	0	0	0	0	0	111	**1**	112	1	0	1	2	0	77	0	77	191
08:15 AM	0	0	0	0	3	88	0	91	0	0	1	1	0	85	0	85	177
08:30 AM	0	0	0	0	**4**	75	0	79	**4**	0	1	**5**	0	**90**	0	**90**	174
Total Volume	0	0	0	0	8	395	1	404	5	0	4	9	0	322	0	322	735
% App. Total	0	0	0		2	97.8	0.2		55.6	0	44.4		0	100	0		
PHF	.000	.000	.000	.000	.500	.816	.250	.828	.313	.000	1.00	.450	.000	.894	.000	.894	.952

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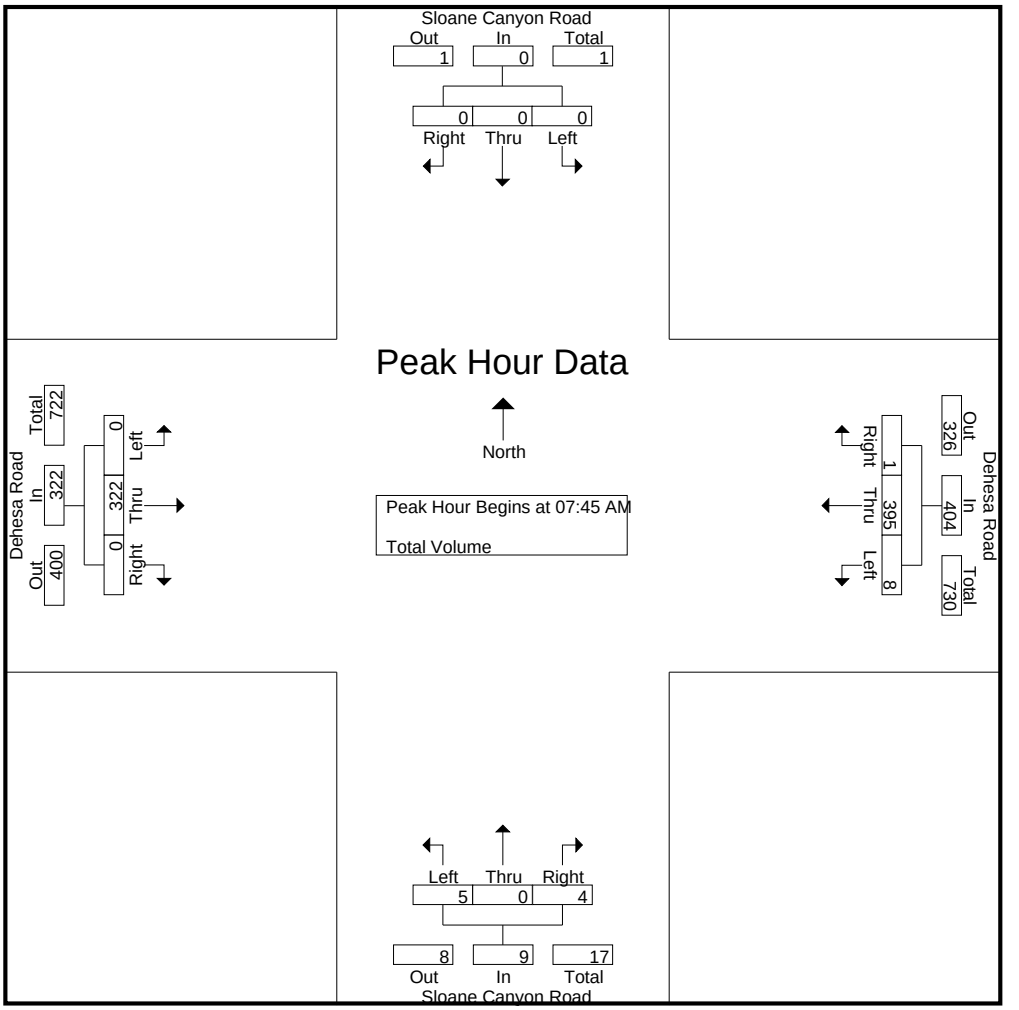
County of San Diego
N/S: Sloane Canyon Road
E/W: Dehesa Road
Weather: Clear

File Name : 05_CSD_SCDEAM
Site Code : 05723536
Start Date : 5/24/2023
Page No : 2



Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM				07:30 AM				07:45 AM				08:00 AM			
+0 mins.	0	0	**1**	**1**	2	85	0	87	0	0	**1**	1	0	77	0	77
+15 mins.	0	0	0	0	1	**121**	0	**122**	1	0	1	2	0	85	0	85
+30 mins.	0	0	0	0	0	111	**1**	112	0	0	1	1	0	90	0	90
+45 mins.	0	0	0	0	**3**	88	0	91	**4**	0	1	**5**	**1**	**98**	0	**99**
Total Volume	0	0	1	1	6	405	1	412	5	0	4	9	1	350	0	351
% App. Total	0	0	100		1.5	98.3	0.2		55.6	0	44.4		0.3	99.7	0	
PHF	.000	.000	.250	.250	.500	.837	.250	.844	.313	.000	1.000	.450	.250	.893	.000	.886

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County of San Diego
N/S: Sloane Canyon Road
E/W: Dehesa Road
Weather: Clear

File Name : 05_CSD_SCDEPM
Site Code : 05723536
Start Date : 5/24/2023
Page No : 1

Groups Printed- Total Volume

	Sloane Canyon Road Southbound				Dehesa Road Westbound				Sloane Canyon Road Northbound				Dehesa Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
04:00 PM	1	0	2	3	1	172	0	173	1	0	0	1	0	152	1	153	330
04:15 PM	0	0	1	1	0	152	0	152	0	0	0	0	0	143	2	145	298
04:30 PM	1	0	0	1	0	144	0	144	5	0	0	5	1	145	0	146	296
04:45 PM	0	0	0	0	0	134	0	134	0	0	0	0	0	172	2	174	308
Total	2	0	3	5	1	602	0	603	6	0	0	6	1	612	5	618	1232
05:00 PM	0	0	0	0	0	134	0	134	2	0	0	2	0	155	1	156	292
05:15 PM	0	0	0	0	0	113	0	113	0	0	2	2	0	154	1	155	270
05:30 PM	0	0	0	0	0	89	0	89	0	0	0	0	0	174	1	175	264
05:45 PM	0	0	0	0	2	89	0	91	0	0	1	1	0	133	0	133	225
Total	0	0	0	0	2	425	0	427	2	0	3	5	0	616	3	619	1051
Grand Total	2	0	3	5	3	1027	0	1030	8	0	3	11	1	1228	8	1237	2283
Apprch %	40	0	60		0.3	99.7	0		72.7	0	27.3		0.1	99.3	0.6		
Total %	0.1	0	0.1	0.2	0.1	45	0	45.1	0.4	0	0.1	0.5	0	53.8	0.4	54.2	

	Sloane Canyon Road Southbound				Dehesa Road Westbound				Sloane Canyon Road Northbound				Dehesa Road Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	**1**	0	**2**	**3**	**1**	**172**	0	**173**	1	0	0	1	0	152	1	153	**330**
04:15 PM	0	0	1	1	0	152	0	152	0	0	0	0	0	143	**2**	145	298
04:30 PM	1	0	0	1	0	144	0	144	**5**	0	0	**5**	**1**	145	0	146	296
04:45 PM	0	0	0	0	0	134	0	134	0	0	0	0	0	**172**	2	**174**	308
Total Volume	2	0	3	5	1	602	0	603	6	0	0	6	1	612	5	618	1232
% App. Total	40	0	60		0.2	99.8	0		100	0	0		0.2	99	0.8		
PHF	.500	.000	.375	.417	.250	.875	.000	.871	.300	.000	.000	.300	.250	.890	.625	.888	.933

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County of San Diego
N/S: Sloane Canyon Road
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File Name : 05_CSD_SCDEPM
Site Code : 05723536
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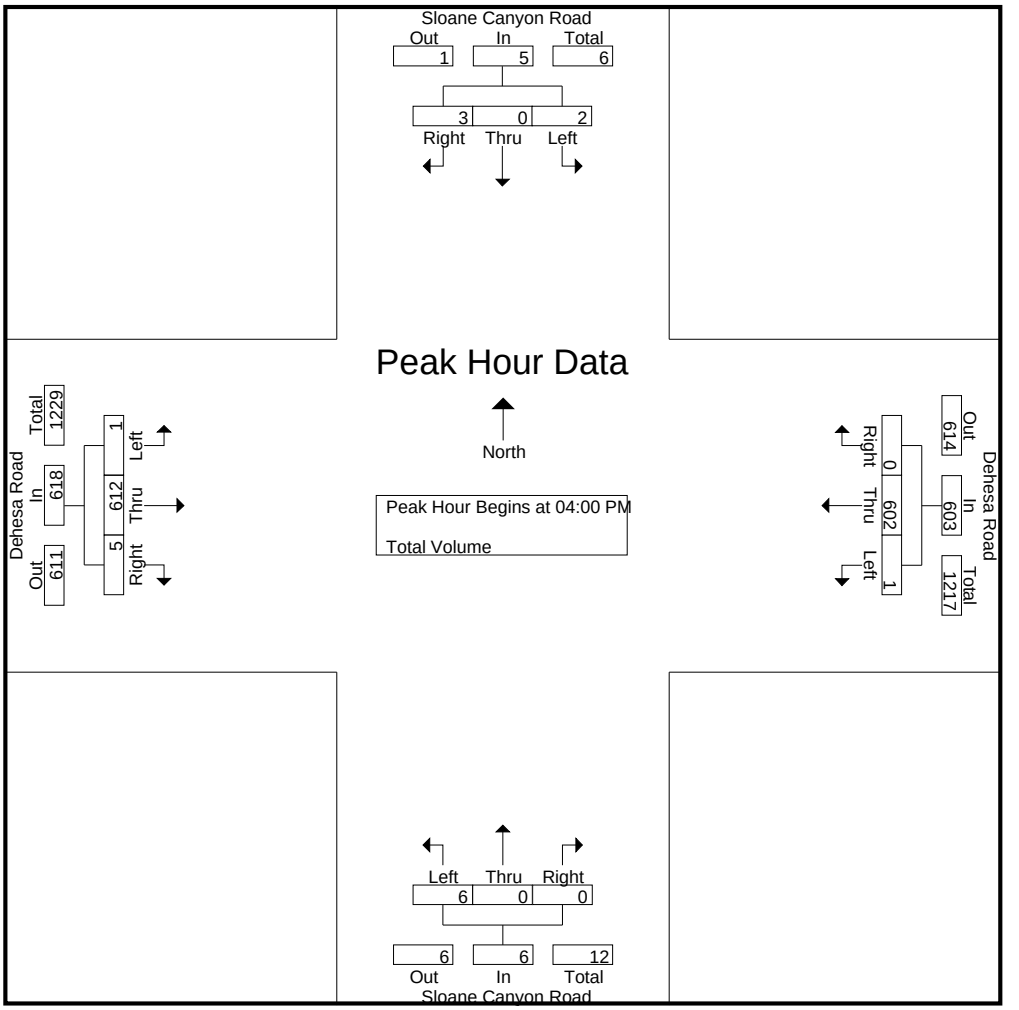

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:30 PM				04:45 PM			
+0 mins.	**1**	0	**2**	**3**	**1**	**172**	0	**173**	**5**	0	0	**5**	0	172	**2**	174
+15 mins.	0	0	1	1	0	152	0	152	0	0	0	0	0	155	1	156
+30 mins.	1	0	0	1	0	144	0	144	2	0	0	2	0	154	1	155
+45 mins.	0	0	0	0	0	134	0	134	0	0	**2**	2	0	**174**	1	**175**
Total Volume	2	0	3	5	1	602	0	603	7	0	2	9	0	655	5	660
% App. Total	40	0	60		0.2	99.8	0		77.8	0	22.2		0	99.2	0.8	
PHF	.500	.000	.375	.417	.250	.875	.000	.871	.350	.000	.250	.450	.000	.941	.625	.943

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County of San Diego
Dehesa Road
E/ Willow Glen Drive
24 Hour Directional Volume Count

CSD002
Site Code: 057-23536

Start Time	5/24/23 Wed	Eastbound Morning	Eastbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Westbound Morning	Westbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		29	100			76	106				
12:15		35	129			71	96				
12:30		24	138			57	106				
12:45		22	137	110	504	46	93	250	401	360	905
01:00		22	123			55	111				
01:15		20	134			43	102				
01:30		17	139			44	115				
01:45		7	126	66	522	42	131	184	459	250	981
02:00		13	123			23	120				
02:15		14	143			39	109				
02:30		23	142			41	128				
02:45		9	163	59	571	50	131	153	488	212	1059
03:00		8	141			25	143				
03:15		11	141			30	150				
03:30		15	163			37	**157**				
03:45		11	163	45	608	30	**163**	122	613	167	1221
04:00		18	162			22	**187**				
04:15		14	158			35	**183**				
04:30		20	171			35	157				
04:45		18	**170**	70	661	31	151	123	678	193	1339
05:00		28	**168**			33	140				
05:15		25	**157**			59	130				
05:30		46	**175**			53	101				
05:45		51	147	150	647	52	104	197	475	347	1122
06:00		54	143			62	113				
06:15		63	129			60	118				
06:30		91	134			55	91				
06:45		76	112	284	518	81	103	258	425	542	943
07:00		67	127			83	104				
07:15		67	128			87	86				
07:30		86	114			**97**	80				
07:45		91	101	311	470	**120**	68	387	338	698	808
08:00		86	88			**112**	62				
08:15		99	71			**103**	60				
08:30		106	93			83	62				
08:45		98	77	389	329	88	58	386	242	775	571
09:00		100	79			83	56				
09:15		108	77			101	64				
09:30		93	85			83	62				
09:45		93	66	394	307	77	66	344	248	738	555
10:00		93	70			73	74				
10:15		106	66			69	110				
10:30		113	70			90	129				
10:45		92	43	404	249	76	106	308	419	712	668
11:00		**114**	40			70	88				
11:15		**106**	47			88	89				
11:30		**103**	58			77	80				
11:45		**155**	40	478	185	109	65	344	322	822	507
Total		2760	5571	2760	5571	3056	5108	3056	5108	5816	10679
Combined Total		8331		8331		8164		8164		16495	
AM Peak	-	11:00	-	-	-	07:30	-	-	-	-	-
Vol.	-	478	-	-	-	432	-	-	-	-	-
P.H.F.		0.771				0.900					
PM Peak	-	-	04:45	-	-	-	03:30	-	-	-	-
Vol.	-	-	670	-	-	-	690	-	-	-	-
P.H.F.			0.957				0.922				
Percentage		33.1%	66.9%			37.4%	62.6%				
ADT/AADT		ADT 16,495		AADT 16,495							

Counts Unlimited, Inc.

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email: counts@countsunlimited.com

County of San Diego
Dehesa Road
W/ Sloane Canyon Road
24 Hour Directional Volume Count

CSD003
Site Code: 057-23536

Start Time	5/24/23 Wed	Eastbound Morning	Eastbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Westbound Morning	Westbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		24	113			81	90				
12:15		32	113			60	87				
12:30		25	131			55	99				
12:45		20	129	101	486	42	76	238	352	339	838
01:00		20	105			63	107				
01:15		24	139			40	90				
01:30		14	131			41	95				
01:45		6	124	64	499	34	115	178	407	242	906
02:00		10	105			26	105				
02:15		11	126			41	89				
02:30		24	156			40	126				
02:45		12	144	57	531	46	112	153	432	210	963
03:00		6	136			22	146				
03:15		15	138			32	127				
03:30		11	146			35	146				
03:45		19	132	51	552	29	**157**	118	576	169	1128
04:00		10	153			20	**175**				
04:15		15	145			35	**153**				
04:30		12	146			33	**149**				
04:45		11	**174**	48	618	25	134	113	611	161	1229
05:00		14	**156**			37	136				
05:15		20	**155**			56	113				
05:30		40	**175**			46	89				
05:45		43	133	117	619	57	89	196	427	313	1046
06:00		40	111			49	108				
06:15		54	138			60	98				
06:30		65	125			59	89				
06:45		85	115	244	489	65	99	233	394	477	883
07:00		47	109			81	89				
07:15		57	126			84	85				
07:30		71	123			**86**	81				
07:45		70	110	245	468	**121**	80	372	335	617	803
08:00		77	102			**112**	78				
08:15		85	98			**88**	75				
08:30		90	94			79	73				
08:45		99	84	351	378	76	70	355	296	706	674
09:00		87	77			90	67				
09:15		93	70			96	66				
09:30		90	63			74	63				
09:45		83	65	353	275	68	60	328	256	681	531
10:00		89	70			65	70				
10:15		104	62			59	139				
10:30		104	62			81	112				
10:45		91	45	388	239	59	95	264	416	652	655
11:00		**101**	40			75	10				
11:15		**115**	42			64	79				
11:30		**106**	57			76	80				
11:45		**116**	42	438	181	98	68	313	237	751	418
Total		2457	5335	2457	5335	2861	4739	2861	4739	5318	10074
Combined Total		7792		7792		7600		7600		15392	
AM Peak	-	11:00	-	-	-	07:30	-	-	-	-	-
Vol.	-	438	-	-	-	407	-	-	-	-	-
P.H.F.		0.944				0.841					
PM Peak	-	-	04:45	-	-	-	03:45	-	-	-	-
Vol.	-	-	660	-	-	-	634	-	-	-	-
P.H.F.			0.943				0.906				
Percentage		31.5%	68.5%			37.6%	62.4%				
ADT/AADT		ADT 15,392		AADT 15,392							

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County of San Diego
Willow Glen Drive
S/ Dehesa Road
24 Hour Directional Volume Count

CSD001
Site Code: 057-23536

Start Time	5/24/23 Wed	Northbound Morning	Northbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Southbound Morning	Southbound Afternoon	Hour Totals Morning	Hour Totals Afternoon	Combined Totals Morning	Combined Totals Afternoon
12:00		11	49			30	60				
12:15		12	59			38	45				
12:30		9	77			29	52				
12:45		6	74	38	259	25	50	122	207	160	466
01:00		5	75			25	59				
01:15		8	57			23	48				
01:30		6	81			21	67				
01:45		3	75	22	288	22	74	91	248	113	536
02:00		3	73			14	55				
02:15		7	74			19	75				
02:30		6	75			18	80				
02:45		9	73	25	295	22	93	73	303	98	598
03:00		7	79			3	85				
03:15		6	66			18	84				
03:30		8	88			14	86				
03:45		7	**96**	28	329	9	**93**	44	348	72	677
04:00		6	**100**			12	**105**				
04:15		9	**92**			13	**111**				
04:30		7	**101**			11	**87**				
04:45		12	88	34	381	15	88	51	391	85	772
05:00		18	97			12	79				
05:15		11	93			28	86				
05:30		26	100			20	47				
05:45		27	75	82	365	27	65	87	277	169	642
06:00		30	78			33	49				
06:15		33	66			32	73				
06:30		44	65			23	53				
06:45		40	54	147	263	46	53	134	228	281	491
07:00		41	73			38	54				
07:15		51	64			39	57				
07:30		55	55			44	52				
07:45		48	52	195	244	55	41	176	204	371	448
08:00		45	42			50	38				
08:15		51	36			41	39				
08:30		56	41			40	19				
08:45		52	47	204	166	**48**	28	179	124	383	290
09:00		59	36			**42**	32				
09:15		63	40			**58**	37				
09:30		52	33			**55**	29				
09:45		57	31	231	140	46	39	201	137	432	277
10:00		50	32			37	35				
10:15		64	29			29	62				
10:30		61	29			51	58				
10:45		48	20	223	110	41	57	158	212	381	322
11:00		**60**	13			54	38				
11:15		**54**	17			50	43				
11:30		**55**	34			50	40				
11:45		**91**	18	260	82	46	37	200	158	460	240
Total		1489	2922	1489	2922	1516	2837	1516	2837	3005	5759
Combined Total		4411		4411		4353		4353		8764	
AM Peak	-	11:00	-	-	-	08:45	-	-	-	-	-
Vol.	-	260	-	-	-	203	-	-	-	-	-
P.H.F.		0.714				0.875					
PM Peak	-	-	03:45	-	-	-	03:45	-	-	-	-
Vol.	-	-	389	-	-	-	396	-	-	-	-
P.H.F.			0.963				0.892				
Percentage		33.8%	66.2%			34.8%	65.2%				
ADT/AADT		ADT 8,764		AADT 8,764							

APPENDIX B

COUNTY OF SAN DIEGO ROADWAY CLASSIFICATION TABLE

TABLE 1
AVERAGE DAILY VEHICLE TRIPS*

MOBILITY ELEMENT ROADS			LEVELS OF SERVICE				
Road Classification		# of Travel Lanes	A	B	C	D	E
Expressway (6.1)		6	<36,000	<54,000	<70,000	<86,000	<108,000
Prime Arterial (6.2)		6	<22,200	<37,000	<44,600	<50,000	<57,000
Major Road	w/ Raised Median (4.1A)	4	<14,800	<24,700	<29,600	<33,400	<37,000
	w/ Intermittent Turn Lanes (4.1B)	4	<13,700	<22,800	<27,400	<30,800	<34,200
Boulevard	w/ Raised Median (4.2A)	4	<18,000	<21,000	<24,000	<27,000	<30,000
	w/ Intermittent Turn Lanes (4.2B)	4	<16,800	<19,600	<22,500	<25,000	<28,000
Community Collector	w/ Raised Median (2.1A)	2	<10,000	<11,700	<13,400	<15,000	<19,000
	w/ Continuous Left Turn Lane (2.1B)	2	<3,000	<6,000	<9,500	<13,500	<19,000
	w/ Intermittent Turn Lane (2.1C)	2	<3,000	<6,000	<9,500	<13,500	<19,000
	w/ Passing Lane (2.1D)	2	<3,000	<6,000	<9,500	<13,500	<19,000
	No Median (2.1E)	2	<1,900	<4,100	<7,100	<10,900	<16,200
Light Collector	w/ Raised Median (2.2A)	2	<3,000	<6,000	<9,500	<13,500	<19,000
	w/ Continuous Left Turn Lane (2.2B)	2	<3,000	<6,000	<9,500	<13,500	<19,000
	w/ Intermittent Turn Lane (2.2C)	2	<3,000	<6,000	<9,500	<13,500	<19,000
	w/ Passing Lane (2.2D)	2	<3,000	<6,000	<9,500	<13,500	<19,000
	No Median (2.2E)	2	<1,900	<4,100	<7,100	<10,900	<16,200
	w/ Reduced Shoulder (2.2F)	2	<5,800	<6,800	<7,800	<8,700	<9,700
Minor Collector	w/ Raised Median (2.3A)	2	<3,000	<6,000	<7,000	<8,000	<9,000
	w/ Intermittent Turn Lane (2.3B)	2	<3,000	<6,000	<7,000	<8,000	<9,000
	No Median (2.3C)	2	<1,900	<4,100	<6,000	<7,000	<8,000
NON-MOBILITY ELEMENT ROADS**			LEVELS OF SERVICE				
Residential Collector		2	-	-	<4,500	-	-
Rural Residential Collector***		2	-	-	<4,500	-	-
Residential Road		2	-	-	<1,500	-	-
Rural Residential Road***		2	-	-	<1,500	-	-
Residential Cul-de-Sac or Loop Road		2	-	-	<200	-	-

* The values shown are subject to adjustment based on the geometry of the roadway, side frictions, and other relevant factors as determined by the Director, Department of Public Works.

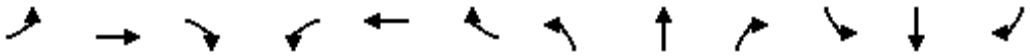
** Levels of service are not applied to residential streets since their primary purpose is to serve abutting lots, not carry through traffic. Levels of service normally apply to roads carrying through traffic between major trip generators and attractors.

*** Rural Residential Collectors and Rural Residential Roads are intended to serve areas with lot sizes of 2 acres or more which do not have a demand for on-street parking. On-street parking is not assured for these cross sections. Additional right-of-way is needed if on-street parking is in paved area.

**** See Tables 2A and 2B for roadway surfacing and right-of-way widths.

APPENDIX C

EXISTING PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	215	24	162	256	0	33	0	167	0	0	1
Future Volume (veh/h)	2	215	24	162	256	0	33	0	167	0	0	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		1.00	1.00		0.92	1.00		0.88
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	2	247	28	186	294	0	37	0	188	0	0	4
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.89	0.89	0.89	0.25	0.25	0.25
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	4	391	44	246	712	603	250	0	424	0	0	45
Arrive On Green	0.00	0.24	0.24	0.14	0.38	0.00	0.14	0.00	0.14	0.00	0.00	0.03
Sat Flow, veh/h	1767	1625	184	1767	1856	1572	1767	0	1447	0	0	1382
Grp Volume(v), veh/h	2	0	275	186	294	0	37	0	188	0	0	4
Grp Sat Flow(s),veh/h/ln	1767	0	1810	1767	1856	1572	1767	0	1447	0	0	1382
Q Serve(g_s), s	0.1	0.0	6.6	4.9	5.6	0.0	0.9	0.0	5.2	0.0	0.0	0.1
Cycle Q Clear(g_c), s	0.1	0.0	6.6	4.9	5.6	0.0	0.9	0.0	5.2	0.0	0.0	0.1
Prop In Lane	1.00		0.10	1.00		1.00	1.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	4	0	435	246	712	603	250	0	424	0	0	45
V/C Ratio(X)	0.52	0.00	0.63	0.76	0.41	0.00	0.15	0.00	0.44	0.00	0.00	0.09
Avail Cap(c_a), veh/h	161	0	1111	773	1778	1507	264	0	435	0	0	602
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	24.0	0.0	16.4	20.0	10.9	0.0	18.1	0.0	14.3	0.0	0.0	22.6
Incr Delay (d2), s/veh	72.7	0.0	1.5	5.1	0.4	0.0	0.3	0.0	0.8	0.0	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	2.3	2.0	1.6	0.0	0.3	0.0	1.4	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	96.8	0.0	17.9	25.1	11.3	0.0	18.4	0.0	15.1	0.0	0.0	23.4
LnGrp LOS	F	A	B	C	B	A	B	A	B	A	A	C
Approach Vol, veh/h		277			480			225			4	
Approach Delay, s/veh		18.5			16.6			15.7			23.4	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.6	17.8		6.2	4.7	24.7		12.6				
Change Period (Y+Rc), s	4.9	* 6.2		4.6	4.6	6.2		5.8				
Max Green Setting (Gmax), s	21.1	* 30		21.0	4.4	46.2		7.2				
Max Q Clear Time (g_c+I1), s	6.9	8.6		2.1	2.1	7.6		7.2				
Green Ext Time (p_c), s	0.4	1.4		0.0	0.0	1.6		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		17.0	
HCM 6th LOS		B	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	384	0	0	422	0	0
Future Vol, veh/h	384	0	0	422	0	0
Conflicting Peds, #/hr	0	10	10	0	10	10
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	86	86	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	427	0	0	491	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	437	0	938	447
Stage 1	-	-	-	-	437	-
Stage 2	-	-	-	-	501	-
Critical Hdwy	-	-	4.13	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.227	-	3.527	3.327
Pot Cap-1 Maneuver	-	-	1117	-	292	609
Stage 1	-	-	-	-	649	-
Stage 2	-	-	-	-	607	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1106	-	286	597
Mov Cap-2 Maneuver	-	-	-	-	286	-
Stage 1	-	-	-	-	643	-
Stage 2	-	-	-	-	601	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1106	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

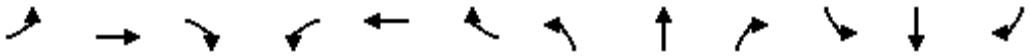
Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	322	0	8	395	1	5	0	4	0	0	0
Future Vol, veh/h	0	322	0	8	395	1	5	0	4	0	0	0
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	60	-	60	60	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	83	83	83	45	45	45	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	362	0	10	476	1	11	0	9	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	487	0	0	372	0	0	879	879	382	884	879	497
Stage 1	-	-	-	-	-	-	372	372	-	507	507	-
Stage 2	-	-	-	-	-	-	507	507	-	377	372	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1071	-	-	1181	-	-	267	285	663	265	285	571
Stage 1	-	-	-	-	-	-	646	617	-	546	538	-
Stage 2	-	-	-	-	-	-	546	538	-	642	617	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1061	-	-	1170	-	-	260	277	650	255	277	560
Mov Cap-2 Maneuver	-	-	-	-	-	-	260	277	-	255	277	-
Stage 1	-	-	-	-	-	-	640	611	-	541	528	-
Stage 2	-	-	-	-	-	-	536	528	-	627	611	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	15.7	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	355	1061	-	-	1170	-	-	-
HCM Lane V/C Ratio	0.056	-	-	-	0.008	-	-	-
HCM Control Delay (s)	15.7	0	-	-	8.1	-	-	0
HCM Lane LOS	C	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	317	51	337	340	1	39	3	339	5	3	2
Future Volume (veh/h)	4	317	51	337	340	1	39	3	339	5	3	2
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.96	1.00		0.86	1.00		0.85
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	4	356	57	370	374	1	41	3	361	8	5	3
Peak Hour Factor	0.89	0.89	0.89	0.91	0.91	0.91	0.94	0.94	0.94	0.62	0.62	0.62
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	8	451	72	436	1000	817	113	8	480	36	23	14
Arrive On Green	0.00	0.29	0.29	0.25	0.54	0.54	0.07	0.07	0.07	0.04	0.04	0.04
Sat Flow, veh/h	1767	1548	248	1767	1856	1516	1652	121	1350	846	529	317
Grp Volume(v), veh/h	4	0	413	370	374	1	44	0	361	16	0	0
Grp Sat Flow(s),veh/h/ln	1767	0	1796	1767	1856	1516	1773	0	1350	1691	0	0
Q Serve(g_s), s	0.1	0.0	13.0	12.2	7.1	0.0	1.5	0.0	4.2	0.6	0.0	0.0
Cycle Q Clear(g_c), s	0.1	0.0	13.0	12.2	7.1	0.0	1.5	0.0	4.2	0.6	0.0	0.0
Prop In Lane	1.00		0.14	1.00		1.00	0.93		1.00	0.50		0.19
Lane Grp Cap(c), veh/h	8	0	523	436	1000	817	121	0	480	72	0	0
V/C Ratio(X)	0.53	0.00	0.79	0.85	0.37	0.00	0.36	0.00	0.75	0.22	0.00	0.00
Avail Cap(c_a), veh/h	115	0	838	723	1501	1226	121	0	480	579	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	30.5	0.0	20.0	22.0	8.2	6.5	27.3	0.0	19.1	28.4	0.0	0.0
Incr Delay (d2), s/veh	43.0	0.0	2.7	5.4	0.2	0.0	2.0	0.0	6.6	1.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	4.9	4.9	2.0	0.0	0.6	0.0	4.8	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	73.5	0.0	22.7	27.4	8.4	6.5	29.2	0.0	25.8	29.7	0.0	0.0
LnGrp LOS	E	A	C	C	A	A	C	A	C	C	A	A
Approach Vol, veh/h		417			745			405			16	
Approach Delay, s/veh		23.2			17.8			26.1			29.7	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	20.0	24.1		7.2	4.9	39.2		10.0				
Change Period (Y+Rc), s	4.9	* 6.2		4.6	4.6	6.2		5.8				
Max Green Setting (Gmax), s	25.1	* 29		21.0	4.0	49.6		4.2				
Max Q Clear Time (g_c+I1), s	14.2	15.0		2.6	2.1	9.1		6.2				
Green Ext Time (p_c), s	0.9	1.9		0.0	0.0	2.1		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		21.5
HCM 6th LOS		C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	660	0	0	672	0	0
Future Vol, veh/h	660	0	0	672	0	0
Conflicting Peds, #/hr	0	10	10	0	10	10
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	91	91	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	688	0	0	738	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	698	0	1446	708
Stage 1	-	-	-	-	698	-
Stage 2	-	-	-	-	748	-
Critical Hdwy	-	-	4.13	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.227	-	3.527	3.327
Pot Cap-1 Maneuver	-	-	894	-	144	433
Stage 1	-	-	-	-	492	-
Stage 2	-	-	-	-	466	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	885	-	141	425
Mov Cap-2 Maneuver	-	-	-	-	141	-
Stage 1	-	-	-	-	487	-
Stage 2	-	-	-	-	461	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	885	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	612	5	1	602	0	6	0	0	2	0	3
Future Vol, veh/h	1	612	5	1	602	0	6	0	0	2	0	3
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	60	-	60	60	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	87	87	87	30	30	30	42	42	42
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	1	688	6	1	692	0	20	0	0	5	0	7

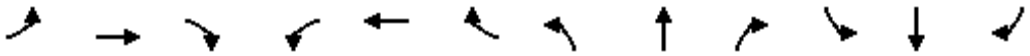
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	702	0	0	704	0	0	1408	1404	708	1407	1410	712
Stage 1	-	-	-	-	-	-	700	700	-	704	704	-
Stage 2	-	-	-	-	-	-	708	704	-	703	706	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	891	-	-	889	-	-	116	139	433	116	138	431
Stage 1	-	-	-	-	-	-	428	440	-	426	438	-
Stage 2	-	-	-	-	-	-	424	438	-	427	437	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	883	-	-	881	-	-	112	136	425	114	135	423
Mov Cap-2 Maneuver	-	-	-	-	-	-	112	136	-	114	135	-
Stage 1	-	-	-	-	-	-	423	435	-	421	433	-
Stage 2	-	-	-	-	-	-	412	433	-	422	432	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	44	23.8
HCM LOS			E	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	112	883	-	-	881	-	-	203
HCM Lane V/C Ratio	0.179	0.001	-	-	0.001	-	-	0.059
HCM Control Delay (s)	44	9.1	-	-	9.1	-	-	23.8
HCM Lane LOS	E	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.6	0	-	-	0	-	-	0.2

APPENDIX D

OPENING YEAR (YEAR 2025) PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	219	24	165	261	0	34	0	170	0	0	1
Future Volume (veh/h)	2	219	24	165	261	0	34	0	170	0	0	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.94	1.00		1.00	1.00		0.92	1.00		0.88
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	2	252	28	190	300	0	38	0	191	0	0	4
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.89	0.89	0.89	0.25	0.25	0.25
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	4	395	44	250	720	610	253	0	430	0	0	45
Arrive On Green	0.00	0.24	0.24	0.14	0.39	0.00	0.14	0.00	0.14	0.00	0.00	0.03
Sat Flow, veh/h	1767	1629	181	1767	1856	1572	1767	0	1448	0	0	1380
Grp Volume(v), veh/h	2	0	280	190	300	0	38	0	191	0	0	4
Grp Sat Flow(s),veh/h/ln	1767	0	1810	1767	1856	1572	1767	0	1448	0	0	1380
Q Serve(g_s), s	0.1	0.0	6.8	5.0	5.8	0.0	0.9	0.0	5.3	0.0	0.0	0.1
Cycle Q Clear(g_c), s	0.1	0.0	6.8	5.0	5.8	0.0	0.9	0.0	5.3	0.0	0.0	0.1
Prop In Lane	1.00		0.10	1.00		1.00	1.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	4	0	438	250	720	610	253	0	430	0	0	45
V/C Ratio(X)	0.52	0.00	0.64	0.76	0.42	0.00	0.15	0.00	0.44	0.00	0.00	0.09
Avail Cap(c_a), veh/h	159	0	1098	764	1756	1488	261	0	436	0	0	594
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	24.3	0.0	16.6	20.1	10.9	0.0	18.3	0.0	14.4	0.0	0.0	22.9
Incr Delay (d2), s/veh	72.8	0.0	1.6	5.1	0.4	0.0	0.3	0.0	0.8	0.0	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	2.4	2.0	1.7	0.0	0.3	0.0	1.4	0.0	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	97.1	0.0	18.1	25.2	11.3	0.0	18.6	0.0	15.2	0.0	0.0	23.7
LnGrp LOS	F	A	B	C	B	A	B	A	B	A	A	C
Approach Vol, veh/h		282			490			229			4	
Approach Delay, s/veh		18.7			16.7			15.7			23.7	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.8	18.0		6.2	4.7	25.1		12.8				
Change Period (Y+Rc), s	4.9	* 6.2		4.6	4.6	6.2		5.8				
Max Green Setting (Gmax), s	21.1	* 30		21.0	4.4	46.2		7.2				
Max Q Clear Time (g_c+I1), s	7.0	8.8		2.1	2.1	7.8		7.3				
Green Ext Time (p_c), s	0.4	1.4		0.0	0.0	1.6		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		17.1
HCM 6th LOS		B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	392	0	0	430	0	0
Future Vol, veh/h	392	0	0	430	0	0
Conflicting Peds, #/hr	0	10	10	0	10	10
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	86	86	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	436	0	0	500	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	446	0	956	456
Stage 1	-	-	-	-	446	-
Stage 2	-	-	-	-	510	-
Critical Hdwy	-	-	4.13	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.227	-	3.527	3.327
Pot Cap-1 Maneuver	-	-	1109	-	285	602
Stage 1	-	-	-	-	643	-
Stage 2	-	-	-	-	601	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1098	-	279	591
Mov Cap-2 Maneuver	-	-	-	-	279	-
Stage 1	-	-	-	-	637	-
Stage 2	-	-	-	-	595	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	1098	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

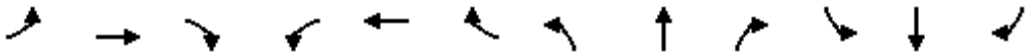
Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	328	0	8	403	1	5	0	4	0	0	0
Future Vol, veh/h	0	328	0	8	403	1	5	0	4	0	0	0
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	60	-	60	60	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	83	83	83	45	45	45	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	369	0	10	486	1	11	0	9	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	497	0	0	379	0	0	896	896	389	901	896	507
Stage 1	-	-	-	-	-	-	379	379	-	517	517	-
Stage 2	-	-	-	-	-	-	517	517	-	384	379	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1062	-	-	1174	-	-	260	279	657	258	279	564
Stage 1	-	-	-	-	-	-	641	613	-	539	532	-
Stage 2	-	-	-	-	-	-	539	532	-	637	613	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1052	-	-	1163	-	-	254	271	645	248	271	553
Mov Cap-2 Maneuver	-	-	-	-	-	-	254	271	-	248	271	-
Stage 1	-	-	-	-	-	-	635	607	-	534	522	-
Stage 2	-	-	-	-	-	-	529	522	-	622	607	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	16	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	348	1052	-	-	1163	-	-	-
HCM Lane V/C Ratio	0.057	-	-	-	0.008	-	-	-
HCM Control Delay (s)	16	0	-	-	8.1	-	-	0
HCM Lane LOS	C	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	323	52	344	347	1	40	3	346	5	3	2
Future Volume (veh/h)	4	323	52	344	347	1	40	3	346	5	3	2
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.96	1.00		0.86	1.00		0.85
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	4	363	58	378	381	1	43	3	368	8	5	3
Peak Hour Factor	0.89	0.89	0.89	0.91	0.91	0.91	0.94	0.94	0.94	0.62	0.62	0.62
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	8	455	73	443	1011	826	112	8	485	36	23	14
Arrive On Green	0.00	0.29	0.29	0.25	0.55	0.55	0.07	0.07	0.07	0.04	0.04	0.04
Sat Flow, veh/h	1767	1549	247	1767	1856	1516	1657	116	1347	845	528	317
Grp Volume(v), veh/h	4	0	421	378	381	1	46	0	368	16	0	0
Grp Sat Flow(s),veh/h/ln	1767	0	1796	1767	1856	1516	1773	0	1347	1691	0	0
Q Serve(g_s), s	0.1	0.0	13.5	12.7	7.3	0.0	1.5	0.0	4.2	0.6	0.0	0.0
Cycle Q Clear(g_c), s	0.1	0.0	13.5	12.7	7.3	0.0	1.5	0.0	4.2	0.6	0.0	0.0
Prop In Lane	1.00		0.14	1.00		1.00	0.93		1.00	0.50		0.19
Lane Grp Cap(c), veh/h	8	0	528	443	1011	826	120	0	485	72	0	0
V/C Ratio(X)	0.53	0.00	0.80	0.85	0.38	0.00	0.38	0.00	0.76	0.22	0.00	0.00
Avail Cap(c_a), veh/h	114	0	825	712	1478	1208	120	0	485	570	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	30.9	0.0	20.3	22.2	8.1	6.4	27.8	0.0	19.4	28.8	0.0	0.0
Incr Delay (d2), s/veh	43.1	0.0	3.0	6.1	0.2	0.0	2.2	0.0	6.9	1.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	5.2	5.2	2.0	0.0	0.7	0.0	5.0	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.0	0.0	23.3	28.3	8.3	6.4	30.0	0.0	26.3	30.2	0.0	0.0
LnGrp LOS	E	A	C	C	A	A	C	A	C	C	A	A
Approach Vol, veh/h		425			760			414			16	
Approach Delay, s/veh		23.8			18.3			26.7			30.2	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	20.5	24.5		7.3	4.9	40.1		10.0				
Change Period (Y+Rc), s	4.9	* 6.2		4.6	4.6	6.2		5.8				
Max Green Setting (Gmax), s	25.1	* 29		21.0	4.0	49.6		4.2				
Max Q Clear Time (g_c+I1), s	14.7	15.5		2.6	2.1	9.3		6.2				
Green Ext Time (p_c), s	0.9	1.9		0.0	0.0	2.1		0.0				

Intersection Summary			
HCM 6th Ctrl Delay		22.0	
HCM 6th LOS		C	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	673	0	0	686	0	0
Future Vol, veh/h	673	0	0	686	0	0
Conflicting Peds, #/hr	0	10	10	0	10	10
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	91	91	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	701	0	0	754	0	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	711	0	1475	721
Stage 1	-	-	-	-	711	-
Stage 2	-	-	-	-	764	-
Critical Hdwy	-	-	4.13	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.227	-	3.527	3.327
Pot Cap-1 Maneuver	-	-	884	-	138	426
Stage 1	-	-	-	-	485	-
Stage 2	-	-	-	-	458	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	876	-	135	418
Mov Cap-2 Maneuver	-	-	-	-	135	-
Stage 1	-	-	-	-	480	-
Stage 2	-	-	-	-	453	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	-	-	-	876	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	624	5	1	614	0	6	0	0	2	0	3
Future Vol, veh/h	1	624	5	1	614	0	6	0	0	2	0	3
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	60	-	60	60	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	87	87	87	30	30	30	42	42	42
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	1	701	6	1	706	0	20	0	0	5	0	7

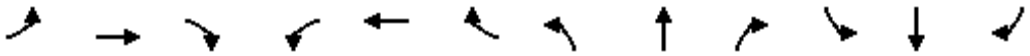
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	716	0	0	717	0	0	1435	1431	721	1434	1437	726
Stage 1	-	-	-	-	-	-	713	713	-	718	718	-
Stage 2	-	-	-	-	-	-	722	718	-	716	719	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	880	-	-	879	-	-	111	134	426	111	133	423
Stage 1	-	-	-	-	-	-	421	434	-	419	432	-
Stage 2	-	-	-	-	-	-	416	432	-	420	431	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	872	-	-	871	-	-	107	131	418	109	130	415
Mov Cap-2 Maneuver	-	-	-	-	-	-	107	131	-	109	130	-
Stage 1	-	-	-	-	-	-	416	429	-	414	427	-
Stage 2	-	-	-	-	-	-	404	427	-	416	426	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	46.2	24.7
HCM LOS			E	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	107	872	-	-	871	-	-	195
HCM Lane V/C Ratio	0.187	0.001	-	-	0.001	-	-	0.061
HCM Control Delay (s)	46.2	9.1	-	-	9.1	-	-	24.7
HCM Lane LOS	E	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.7	0	-	-	0	-	-	0.2

APPENDIX E

OPENING YEAR (YEAR 2025) + PROJECT PEAK HOUR INTERSECTION ANALYSIS WORKSHEETS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	252	26	157	251	0	34	0	206	0	0	1
Future Volume (veh/h)	2	252	26	157	251	0	34	0	206	0	0	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		1.00	1.00		0.92	1.00		0.88
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	2	290	30	180	289	0	38	0	231	0	0	4
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.89	0.89	0.89	0.25	0.25	0.25
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	4	428	44	237	740	627	254	0	419	0	0	45
Arrive On Green	0.00	0.26	0.26	0.13	0.40	0.00	0.14	0.00	0.14	0.00	0.00	0.03
Sat Flow, veh/h	1767	1644	170	1767	1856	1572	1767	0	1448	0	0	1376
Grp Volume(v), veh/h	2	0	320	180	289	0	38	0	231	0	0	4
Grp Sat Flow(s),veh/h/ln	1767	0	1814	1767	1856	1572	1767	0	1448	0	0	1376
Q Serve(g_s), s	0.1	0.0	7.9	4.9	5.6	0.0	0.9	0.0	6.9	0.0	0.0	0.1
Cycle Q Clear(g_c), s	0.1	0.0	7.9	4.9	5.6	0.0	0.9	0.0	6.9	0.0	0.0	0.1
Prop In Lane	1.00		0.09	1.00		1.00	1.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h	4	0	473	237	740	627	254	0	419	0	0	45
V/C Ratio(X)	0.52	0.00	0.68	0.76	0.39	0.00	0.15	0.00	0.55	0.00	0.00	0.09
Avail Cap(c_a), veh/h	155	0	1071	744	1709	1449	254	0	419	0	0	576
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	25.0	0.0	16.6	20.9	10.7	0.0	18.8	0.0	15.6	0.0	0.0	23.5
Incr Delay (d2), s/veh	72.8	0.0	1.7	5.3	0.3	0.0	0.3	0.0	1.6	0.0	0.0	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	2.8	2.0	1.6	0.0	0.3	0.0	2.0	0.0	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	97.8	0.0	18.4	26.2	11.1	0.0	19.1	0.0	17.2	0.0	0.0	24.3
LnGrp LOS	F	A	B	C	B	A	B	A	B	A	A	C
Approach Vol, veh/h		322			469			269			4	
Approach Delay, s/veh		18.8			16.9			17.5			24.3	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.6	19.3		6.2	4.7	26.2		13.0				
Change Period (Y+Rc), s	4.9	* 6.2		4.6	4.6	6.2		5.8				
Max Green Setting (Gmax), s	21.1	* 30		21.0	4.4	46.2		7.2				
Max Q Clear Time (g_c+I1), s	6.9	9.9		2.1	2.1	7.6		8.9				
Green Ext Time (p_c), s	0.4	1.6		0.0	0.0	1.5		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		17.7
HCM 6th LOS		B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	395	80	4	430	3	0
Future Vol, veh/h	395	80	4	430	3	0
Conflicting Peds, #/hr	0	10	10	0	10	10
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	86	86	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	439	89	5	500	3	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	538	0	1014	504
Stage 1	-	-	-	-	494	-
Stage 2	-	-	-	-	520	-
Critical Hdwy	-	-	4.13	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.227	-	3.527	3.327
Pot Cap-1 Maneuver	-	-	1025	-	263	566
Stage 1	-	-	-	-	611	-
Stage 2	-	-	-	-	595	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1015	-	256	555
Mov Cap-2 Maneuver	-	-	-	-	256	-
Stage 1	-	-	-	-	605	-
Stage 2	-	-	-	-	587	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	19.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	256	-	-	1015	-
HCM Lane V/C Ratio	0.013	-	-	0.005	-
HCM Control Delay (s)	19.2	-	-	8.6	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	327	0	8	407	1	5	0	4	0	0	0
Future Vol, veh/h	0	327	0	8	407	1	5	0	4	0	0	0
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	60	-	60	60	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	83	83	83	45	45	45	92	92	92
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	0	367	0	10	490	1	11	0	9	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	501	0	0	377	0	0	898	898	387	903	898	511
Stage 1	-	-	-	-	-	-	377	377	-	521	521	-
Stage 2	-	-	-	-	-	-	521	521	-	382	377	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	1058	-	-	1176	-	-	259	278	659	257	278	561
Stage 1	-	-	-	-	-	-	642	614	-	537	530	-
Stage 2	-	-	-	-	-	-	537	530	-	638	614	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1048	-	-	1165	-	-	253	270	647	247	270	550
Mov Cap-2 Maneuver	-	-	-	-	-	-	253	270	-	247	270	-
Stage 1	-	-	-	-	-	-	636	608	-	532	520	-
Stage 2	-	-	-	-	-	-	527	520	-	623	608	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	16	0
HCM LOS			C	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	347	1048	-	-	1165	-	-	-
HCM Lane V/C Ratio	0.058	-	-	-	0.008	-	-	-
HCM Control Delay (s)	16	0	-	-	8.1	-	-	0
HCM Lane LOS	C	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	-

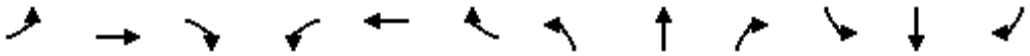
Intersection	
Int Delay, s/veh	0.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	2	247	0	2	192
Future Vol, veh/h	0	2	247	0	2	192
Conflicting Peds, #/hr	10	10	0	10	10	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	89	89	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	2	278	0	2	209

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	511	159	0	0	288	0
Stage 1	288	-	-	-	-	-
Stage 2	223	-	-	-	-	-
Critical Hdwy	6.645	6.945	-	-	4.145	-
Critical Hdwy Stg 1	5.845	-	-	-	-	-
Critical Hdwy Stg 2	5.445	-	-	-	-	-
Follow-up Hdwy	3.5285	3.3285	-	-	2.2285	-
Pot Cap-1 Maneuver	505	856	-	-	1266	-
Stage 1	734	-	-	-	-	-
Stage 2	811	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	494	840	-	-	1254	-
Mov Cap-2 Maneuver	494	-	-	-	-	-
Stage 1	727	-	-	-	-	-
Stage 2	801	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.3	0	0.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	840	1254	-
HCM Lane V/C Ratio	-	-	0.003	0.002	-
HCM Control Delay (s)	-	-	9.3	7.9	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	312	52	346	350	1	40	3	336	5	3	2
Future Volume (veh/h)	4	312	52	346	350	1	40	3	336	5	3	2
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.95	1.00		0.96	1.00		0.86	1.00		0.85
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856	1856
Adj Flow Rate, veh/h	4	351	58	380	385	1	43	3	357	8	5	3
Peak Hour Factor	0.89	0.89	0.89	0.91	0.91	0.91	0.94	0.94	0.94	0.62	0.62	0.62
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	3	3	3
Cap, veh/h	8	445	74	445	1005	821	113	8	488	36	23	14
Arrive On Green	0.00	0.29	0.29	0.25	0.54	0.54	0.07	0.07	0.07	0.04	0.04	0.04
Sat Flow, veh/h	1767	1540	254	1767	1856	1516	1657	116	1348	845	528	317
Grp Volume(v), veh/h	4	0	409	380	385	1	46	0	357	16	0	0
Grp Sat Flow(s),veh/h/ln	1767	0	1794	1767	1856	1516	1773	0	1348	1691	0	0
Q Serve(g_s), s	0.1	0.0	13.0	12.7	7.4	0.0	1.5	0.0	4.2	0.6	0.0	0.0
Cycle Q Clear(g_c), s	0.1	0.0	13.0	12.7	7.4	0.0	1.5	0.0	4.2	0.6	0.0	0.0
Prop In Lane	1.00		0.14	1.00		1.00	0.93		1.00	0.50		0.19
Lane Grp Cap(c), veh/h	8	0	519	445	1005	821	121	0	488	72	0	0
V/C Ratio(X)	0.53	0.00	0.79	0.85	0.38	0.00	0.38	0.00	0.73	0.22	0.00	0.00
Avail Cap(c_a), veh/h	114	0	831	718	1490	1218	121	0	488	575	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	30.7	0.0	20.2	22.0	8.2	6.5	27.5	0.0	18.9	28.6	0.0	0.0
Incr Delay (d2), s/veh	43.0	0.0	2.7	6.0	0.2	0.0	2.1	0.0	5.7	1.4	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	5.0	5.1	2.0	0.0	0.7	0.0	4.6	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	73.7	0.0	22.9	28.0	8.4	6.5	29.7	0.0	24.6	29.9	0.0	0.0
LnGrp LOS	E	A	C	C	A	A	C	A	C	C	A	A
Approach Vol, veh/h		413			766			403			16	
Approach Delay, s/veh		23.4			18.1			25.2			29.9	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	20.5	24.0		7.2	4.9	39.6		10.0				
Change Period (Y+Rc), s	4.9	* 6.2		4.6	4.6	6.2		5.8				
Max Green Setting (Gmax), s	25.1	* 29		21.0	4.0	49.6		4.2				
Max Q Clear Time (g_c+I1), s	14.7	15.0		2.6	2.1	9.4		6.2				
Green Ext Time (p_c), s	0.9	1.9		0.0	0.0	2.2		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		21.4
HCM 6th LOS		C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	673	3	0	686	20	1
Future Vol, veh/h	673	3	0	686	20	1
Conflicting Peds, #/hr	0	10	10	0	10	10
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	91	91	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	701	3	0	754	22	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	714	0	1477	723
Stage 1	-	-	-	-	713	-
Stage 2	-	-	-	-	764	-
Critical Hdwy	-	-	4.13	-	6.43	6.23
Critical Hdwy Stg 1	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.227	-	3.527	3.327
Pot Cap-1 Maneuver	-	-	882	-	138	425
Stage 1	-	-	-	-	484	-
Stage 2	-	-	-	-	458	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	874	-	135	417
Mov Cap-2 Maneuver	-	-	-	-	135	-
Stage 1	-	-	-	-	479	-
Stage 2	-	-	-	-	453	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	35.9
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	139	-	-	874	-
HCM Lane V/C Ratio	0.164	-	-	-	-
HCM Control Delay (s)	35.9	-	-	0	-
HCM Lane LOS	E	-	-	A	-
HCM 95th %tile Q(veh)	0.6	-	-	0	-

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	624	5	1	613	0	6	0	0	2	0	3
Future Vol, veh/h	1	624	5	1	613	0	6	0	0	2	0	3
Conflicting Peds, #/hr	10	0	10	10	0	10	10	0	10	10	0	10
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	60	-	60	60	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	89	87	87	87	30	30	30	42	42	42
Heavy Vehicles, %	3	3	3	3	3	3	3	3	3	3	3	3
Mvmt Flow	1	701	6	1	705	0	20	0	0	5	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	715	0	0	717	0	0	1434	1430	721	1433	1436	725
Stage 1	-	-	-	-	-	-	713	713	-	717	717	-
Stage 2	-	-	-	-	-	-	721	717	-	716	719	-
Critical Hdwy	4.13	-	-	4.13	-	-	7.13	6.53	6.23	7.13	6.53	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.13	5.53	-	6.13	5.53	-
Follow-up Hdwy	2.227	-	-	2.227	-	-	3.527	4.027	3.327	3.527	4.027	3.327
Pot Cap-1 Maneuver	881	-	-	879	-	-	111	134	426	111	133	423
Stage 1	-	-	-	-	-	-	421	434	-	419	432	-
Stage 2	-	-	-	-	-	-	417	432	-	420	431	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	873	-	-	871	-	-	107	131	418	109	130	415
Mov Cap-2 Maneuver	-	-	-	-	-	-	107	131	-	109	130	-
Stage 1	-	-	-	-	-	-	416	429	-	414	427	-
Stage 2	-	-	-	-	-	-	405	427	-	416	426	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	46.2	24.7
HCM LOS			E	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	107	873	-	-	871	-	-	195
HCM Lane V/C Ratio	0.187	0.001	-	-	0.001	-	-	0.061
HCM Control Delay (s)	46.2	9.1	-	-	9.1	-	-	24.7
HCM Lane LOS	E	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.7	0	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	391	0	1	410
Future Vol, veh/h	0	0	391	0	1	410
Conflicting Peds, #/hr	10	10	0	10	10	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	0	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	94	94	92	92
Heavy Vehicles, %	3	3	3	3	3	3
Mvmt Flow	0	0	416	0	1	446

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	884	228	0	0	426	0
Stage 1	426	-	-	-	-	-
Stage 2	458	-	-	-	-	-
Critical Hdwy	6.645	6.945	-	-	4.145	-
Critical Hdwy Stg 1	5.845	-	-	-	-	-
Critical Hdwy Stg 2	5.445	-	-	-	-	-
Follow-up Hdwy	3.5285	3.3285	-	-	2.2285	-
Pot Cap-1 Maneuver	298	773	-	-	1125	-
Stage 1	625	-	-	-	-	-
Stage 2	633	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	292	758	-	-	1114	-
Mov Cap-2 Maneuver	292	-	-	-	-	-
Stage 1	619	-	-	-	-	-
Stage 2	626	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	1114	-
HCM Lane V/C Ratio	-	-	-	0.001	-
HCM Control Delay (s)	-	-	0	8.2	-
HCM Lane LOS	-	-	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0	-

APPENDIX F

BUS ROUTE SCHEDULE AND MAP

Exact fare, please *Favor de pagar la cantidad exacta*

Fares *Tarifas*	**Adult** *Adulto*	**Senior/Disabled/ Medicare/Youth*** *Personas Mayores/con Discapacidades/Medicare/Jóvenes**
ONE-WAY FARES *Tarifas Sencillas*	**$2.50**	**$1.25**
EARNED DAY PASS *Pase del Día Ganado*	**$6.00**	**$3.00**
MONTH PASS *Pase mensual*	**$72.00**	**$23.00**

Load money into your PRONTO account to earn Day Passes and Month Passes. Tap your PRONTO card ($2) or scan your PRONTO mobile app (free) to ride. *Carga dinero a tu cuenta de PRONTO para ganar Pases del Día y Pases Mensuales. Toca tu tarjeta PRONTO ($2) o escanea tu aplicación móvil PRONTO (gratis) para viajar.*

- **One-ways with PRONTO receive free transfers for two hours. No free transfers for cash.** *Los viajes de ida con PRONTO reciben transbordes gratuitos por dos horas. No se permiten transbordes gratuitos con pagos en efectivo.*
- **Day Passes not sold in advance. Earned with PRONTO.** *Los pases diarios no se venden por adelantado. Se obtienen con PRONTO.*
- **A month pass can be purchased in advanced or earned with PRONTO. Good from first day to last day of the month.** *El Pase Mensual se puede comprar por adelantado o se obtiene mientras viaja con PRONTO. Válido desde el primer día hasta el último día del mes.*

*Proof of eligibility required. Senior Eligibility: Age 65+ or born on or before September 1, 1959. Youth Eligibility: Ages 6-18
Se requiere verificación de elegibilidad. Elegibilidad para Personas Mayores: Edad 65+ o nacido en o antes del 1 de septiembre, 1959. Elegibilidad para Jóvenes: edades 6-18

For more information, visit: / *Para más información, visite:* **sdmts.com/fares**

DIRECTORY / *Directorio*

MTS Information & Trip Planning *MTS Información y planeo de viaje*	**(619) 233-3004**
TTY/TDD (teletype for hearing impaired) *Teletipo para sordos*	**(619) 234-5005 or/ó (888) 722-4889**
InfoExpress (24-hour info via Touch-Tone phone) *Información las 24 horas (via teléfono de teclas)*	**(619) 685-4900**
Customer Service / Suggestions *Servicio al cliente / Sugerencias*	**(619) 557-4555**
MTS Security *MTS Seguridad*	**(619) 595-4960**
Lost & Found *Objetos extraviados*	**(619) 233-3004**
Transit Store	**(619) 234-1060** 12th & Imperial Transit Center M–F 8am–5pm
For MTS online trip planning *Planificación de viajes por Internet*	**sdmts.com**

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Thank you for riding MTS! ***¡Gracias por viajar con MTS!***

Effective JUNE 12, 2022

874 875

El Cajon Transit Center – East El Cajon

via Washington Avenue / Parkway Plaza / Broadway

DESTINATIONS
- Broadway
- Kaiser Permanente Bostonia
- Parkway Plaza
- Washington Avenue

TROLLEY CONNECTIONS
- El Cajon

06/22

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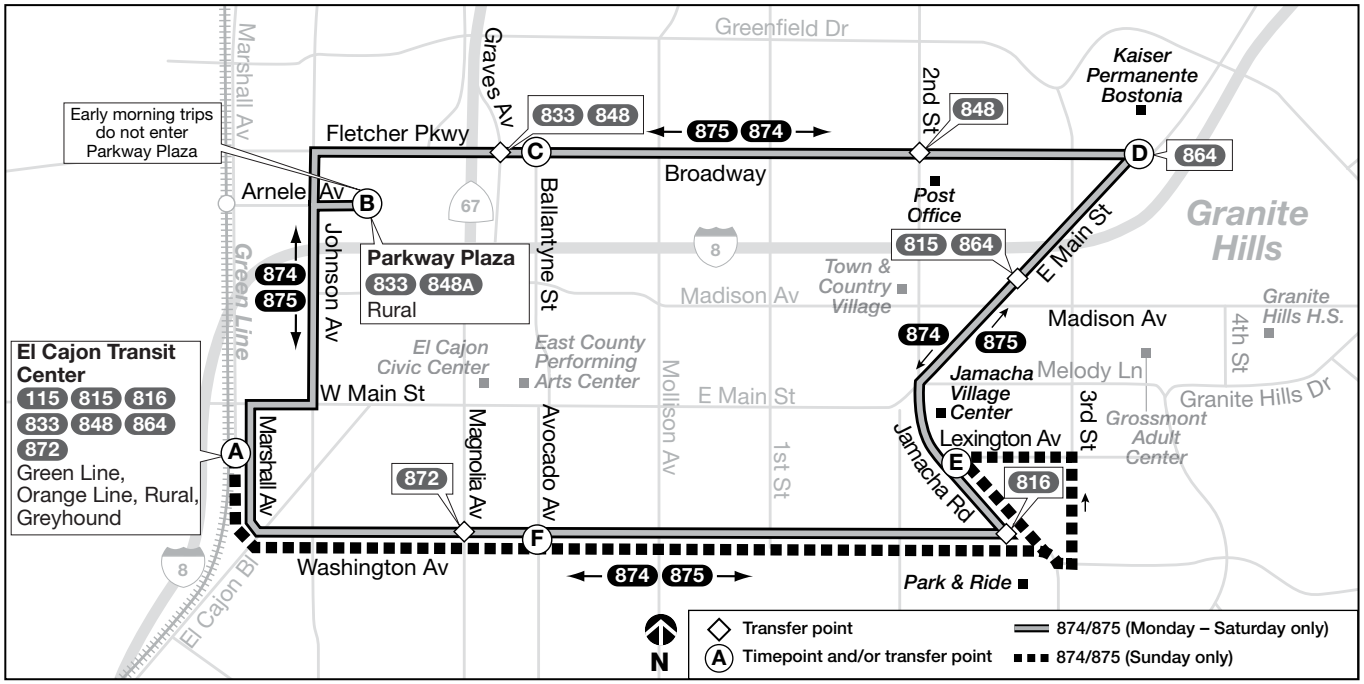
Alternative formats available upon request. Please call: (619) 557-4555 / ***Formato alternativo disponible al preguntar. Favor de llamar: (619) 557-4555***



The schedules and other information shown in this timetable are subject to change. MTS does not assume responsibility for errors in timetables nor for any inconvenience caused by delayed buses.

Los horarios e información que se indican en este itinerario están sujetos a cambios. MTS no asume responsabilidad por errores en los itinerarios, ni por ningún perjuicio que se origine por los autobuses demorados.

Route 874 – Monday through Friday / *lunes a viernes*

El Cajon T.C. ➡ Broadway ➡ Washington ➡ El Cajon T.C.

Ⓐ El Cajon Transit Ctr. **DEPART**	Ⓑ Parkway Plaza	Ⓒ Broadway & Ballantyne St.	Ⓓ East Main St. & Broadway	Ⓔ Jamacha Rd. & Lexington Av.	Ⓕ Washington Av. & Avocado Av.	Ⓐ El Cajon Transit Ctr. **ARRIVE**
—	—	—	—	5:10a	5:17a	5:23a
—	—	—	—	5:40	5:47	5:53
—	—	—	—	6:10	6:17	6:23
—	—	6:25a	6:33a	6:40	6:47	6:53
—	—	6:52	7:01	7:08	7:16	7:23
—	—	7:21	7:31	7:38	7:46	7:53
7:35a	7:43a	7:51	8:01	8:08	8:16	8:23
8:05	8:13	8:21	8:31	8:38	8:46	8:53
8:35	8:43	8:51	9:01	9:08	9:16	9:23
9:05	9:13	9:21	9:31	9:38	9:46	9:53
9:35	9:43	9:51	10:01	10:08	10:16	10:23
10:05	10:14	10:23	10:33	10:40	10:48	10:55
10:35	10:44	10:53	11:03	11:10	11:18	11:25
11:05	11:14	11:23	11:33	11:40	11:48	11:55
11:39	11:48	11:57	**12:08p**	**12:16p**	**12:24p**	**12:31p**
12:13p	**12:22p**	**12:31p**	**12:42**	**12:50**	**12:58**	**1:05**
12:43	**12:52**	**1:01**	**1:12**	**1:20**	**1:28**	**1:35**
1:13	**1:22**	**1:31**	**1:42**	**1:50**	**1:58**	**2:05**
1:43	**1:52**	**2:01**	**2:12**	**2:20**	**2:28**	**2:35**
2:13	**2:22**	**2:31**	**2:42**	**2:50**	**2:58**	**3:05**
2:43	**2:52**	**3:01**	**3:12**	**3:20**	**3:28**	**3:35**
3:13	**3:22**	**3:31**	**3:42**	**3:50**	**3:58**	**4:05**
3:43	**3:52**	**4:01**	**4:12**	**4:20**	**4:28**	**4:35**
4:13	**4:22**	**4:31**	**4:42**	**4:50**	**4:58**	**5:05**
4:43	**4:52**	**5:01**	**5:12**	**5:20**	**5:28**	**5:35**
5:13	**5:22**	**5:31**	**5:41**	**5:48**	**5:56**	**6:03**
5:43	**5:51**	**5:59**	**6:09**	**6:16**	**6:24**	**6:31**
6:11	**6:19**	**6:27**	**6:36**	**6:43**	**6:50**	**6:56**
6:41	**6:49**	**6:57**	**7:06**	**7:13**	**7:20**	**7:26**
7:41	**7:49**	**7:57**	**8:06**	**8:13**	**8:20**	**8:26**
8:41	**8:48**	**8:55**	**9:03**	**9:10**	**9:17**	**9:23**
9:41	**9:48**	**9:55**	**10:03**	—	—	—

Route 874 – Saturday / *sábado*

El Cajon T.C. ➡ Broadway ➡ Washington ➡ El Cajon T.C.

Ⓐ El Cajon Transit Ctr. **DEPART**	Ⓑ Parkway Plaza	Ⓒ Broadway & Ballantyne St.	Ⓓ East Main St. & Broadway	Ⓔ Jamacha Rd. & Lexington Av.	Ⓕ Washington Av. & Avocado Av.	Ⓐ El Cajon Transit Ctr. **ARRIVE**
—	—	—	6:33a	6:39a	6:47a	6:54a
7:10a	7:18a	7:25a	7:33	7:39	7:47	7:54
8:10	8:18	8:25	8:33	8:39	8:47	8:54
9:10	9:18	9:25	9:34	9:41	9:49	9:56
10:08	10:17	10:25	10:34	10:41	10:49	10:56
11:08	11:17	11:25	11:34	11:41	11:49	11:56
12:11p	**12:20p**	**12:29p**	**12:39p**	**12:46p**	**12:54p**	**1:01p**
1:11	**1:20**	**1:29**	**1:39**	**1:46**	**1:54**	**2:01**
2:11	**2:20**	**2:29**	**2:39**	**2:46**	**2:54**	**3:01**
3:11	**3:20**	**3:29**	**3:39**	**3:46**	**3:54**	**4:01**
4:11	**4:20**	**4:29**	**4:39**	**4:46**	**4:54**	**5:01**
5:11	**5:20**	**5:29**	**5:38**	**5:44**	**5:52**	**5:59**
6:11	**6:19**	**6:27**	**6:36**	**6:42**	**6:50**	**6:56**
7:11	**7:19**	**7:27**	**7:36**	**7:42**	**7:50**	**7:56**
8:11	**8:19**	**8:26**	**8:34**	**8:40**	**8:47**	**8:53**
9:11	**9:18**	**9:24**	**9:32**	—	—	—

Route 874 – Sunday / *domingo*

Washington ➡ El Cajon T.C.

Ⓐ El Cajon Transit Ctr. **DEPART**	Ⓑ Parkway Plaza	Ⓒ Broadway & Ballantyne St.	Ⓓ East Main St. & Broadway	Ⓔ Jamacha Rd. & Lexington Av.	Ⓕ Washington Av. & Avocado Av.	Ⓐ El Cajon Transit Ctr. **ARRIVE**
Alternative Sunday service available on Route 815, 848, or 864 *Servicio de domingo alterno por la Ruta 815, 848, o 864*			—	6:39a	6:47a	6:54a
			—	7:39	7:47	7:54
			—	8:39	8:47	8:54
			—	9:39	9:47	9:54
			—	10:39	10:47	10:54
			—	11:39	11:47	11:54
			—	**12:39p**	**12:47p**	**12:54p**
			—	**1:39**	**1:47**	**1:54**
			—	**2:39**	**2:47**	**2:54**
			—	**3:39**	**3:47**	**3:54**
			—	**4:39**	**4:47**	**4:54**
			—	**5:39**	**5:47**	**5:54**
			—	**6:40**	**6:48**	**6:54**
			—	**7:41**	**7:48**	**7:54**

Route 875 – Monday through Friday / *lunes a viernes*

El Cajon T.C. ➡ Washington ➡ Broadway ➡ El Cajon T.C.

Ⓐ El Cajon Transit Ctr. **DEPART**	Ⓕ Washington Av. & Avocado Av.	Ⓔ Jamacha Rd. & Lexington Av.	Ⓓ East Main St. & Broadway	Ⓒ Broadway & Ballantyne St.	Ⓑ Parkway Plaza		Ⓐ El Cajon Transit Ctr. **ARRIVE**
—	—	—	5:49a	5:58a	6:03a	**J**	6:09a
—	—	—	6:19	6:28	6:33	**J**	6:39
6:27a	6:32a	6:40a	6:46	6:55	7:00	**J**	7:06
6:55	7:01	7:09	7:16	7:25	7:30	**J**	7:36
7:19	7:25	7:34	7:42	7:52	8:02		8:09
7:49	7:55	8:04	8:12	8:22	8:32		8:39
8:19	8:25	8:34	8:42	8:52	9:02		9:09
8:49	8:55	9:04	9:12	9:22	9:32		9:39
9:19	9:25	9:34	9:42	9:52	10:02		10:09
9:49	9:55	10:04	10:12	10:22	10:32		10:39
10:19	10:25	10:34	10:42	10:52	11:02		11:09
10:49	10:55	11:04	11:12	11:22	11:32		11:39
11:19	11:25	11:34	11:42	11:52	**12:02p**		**12:10p**
11:49	11:55	**12:04p**	**12:12p**	**12:22p**	**12:32**		**12:40**
12:19p	**12:25p**	**12:34**	**12:42**	**12:52**	**1:02**		**1:10**
12:49	**12:55**	**1:04**	**1:12**	**1:22**	**1:32**		**1:40**
1:19	**1:25**	**1:34**	**1:42**	**1:52**	**2:02**		**2:10**
1:49	**1:56**	**2:05**	**2:13**	**2:23**	**2:33**		**2:41**
2:19	**2:26**	**2:35**	**2:43**	**2:53**	**3:03**		**3:11**
2:49	**2:56**	**3:05**	**3:13**	**3:23**	**3:33**		**3:41**
3:19	**3:26**	**3:35**	**3:43**	**3:53**	**4:03**		**4:11**
3:49	**3:56**	**4:05**	**4:13**	**4:23**	**4:33**		**4:41**
4:19	**4:26**	**4:35**	**4:43**	**4:53**	**5:03**		**5:11**
4:49	**4:56**	**5:05**	**5:13**	**5:22**	**5:32**		**5:39**
5:19	**5:26**	**5:35**	**5:43**	**5:52**	**6:02**		**6:09**
5:49	**5:56**	**6:05**	**6:13**	**6:22**	**6:32**		**6:39**
6:19	**6:26**	**6:35**	**6:43**	**6:52**	**7:02**		**7:09**
6:49	**6:55**	**7:03**	**7:10**	**7:19**	**7:29**		**7:36**
7:34	**7:40**	**7:48**	**7:55**	**8:04**	**8:14**		**8:21**
8:41	**8:46**	**8:54**	**9:00**	**9:09**	**9:18**		**9:24**
9:41	**9:46**	**9:54**	**10:00**	—	—		—

J = Trip does not enter Parkway Plaza. Use bus stop on Johnson Av. & Arnele Av. for access to/from Parkway Plaza. */ Este viaje no entra a Parkway Plaza. Para servicio hacia/desde Parkway Plaza, utilice la parada en Johnson Av. y Arnele Av.*

Route 875 – Saturday / *sábado*

El Cajon T.C. ➡ Washington ➡ Broadway ➡ El Cajon T.C.

Ⓐ El Cajon Transit Ctr. **DEPART**	Ⓕ Washington Av. & Avocado Av.	Ⓔ Jamacha Rd. & Lexington Av.	Ⓓ East Main St. & Broadway	Ⓒ Broadway & Ballantyne St.	Ⓑ Parkway Plaza		Ⓐ El Cajon Transit Ctr. **ARRIVE**
6:16a	6:21a	6:29a	6:35a	6:44a	6:49a	**J**	6:54a
7:11	7:16	7:24	7:30	7:39	7:48		7:54
8:08	8:13	8:22	8:29	8:38	8:47		8:54
9:08	9:14	9:23	9:30	9:39	9:49		9:56
10:08	10:14	10:23	10:30	10:39	10:49		10:56
11:10	11:16	11:25	11:33	11:43	11:53		**12:01p**
12:10p	**12:16p**	**12:25p**	**12:33p**	**12:43p**	**12:53p**		**1:01**
1:10	**1:16**	**1:25**	**1:33**	**1:43**	**1:53**		**2:01**
2:10	**2:16**	**2:25**	**2:33**	**2:43**	**2:53**		**3:01**
3:10	**3:16**	**3:25**	**3:33**	**3:43**	**3:53**		**4:01**
4:10	**4:16**	**4:25**	**4:33**	**4:43**	**4:53**		**5:01**
5:12	**5:18**	**5:27**	**5:35**	**5:44**	**5:54**		**6:01**
6:12	**6:18**	**6:27**	**6:35**	**6:44**	**6:54**		**7:01**
7:10	**7:16**	**7:24**	**7:31**	**7:39**	**7:49**		**7:56**
8:10	**8:15**	**8:23**	**8:29**	**8:37**	**8:46**		**8:52**
9:10	**9:15**	**9:23**	**9:29**	—	—		—

J = Trip does not enter Parkway Plaza. Use bus stop on Johnson Av. & Arnele Av. for access to/from Parkway Plaza. */ Este viaje no entra a Parkway Plaza. Para servicio hacia/desde Parkway Plaza, utilice la parada en Johnson Av. y Arnele Av.*

Route 875 – Sunday / *domingo*

El Cajon T.C. ➡ Washington

Ⓐ El Cajon Transit Ctr. **DEPART**	Ⓕ Washington Av. & Avocado Av.	Ⓔ Jamacha Rd. & Lexington Av.	Ⓓ East Main St. & Broadway	Ⓒ Broadway & Ballantyne St.	Ⓑ Parkway Plaza	Ⓐ El Cajon Transit Ctr. **ARRIVE**
7:11a	7:16a	7:24a	—	Alternative Sunday service available on Route 815, 848, or 864 *Servicio de domingo alterno por la Ruta 815, 848, o 864*		
8:11	8:16	8:24	—			
9:11	9:17	9:25	—			
10:11	10:17	10:25	—			
11:11	11:17	11:26	—			
12:11p	**12:17p**	**12:26p**	—			
1:11	**1:17**	**1:26**	—			
2:11	**2:17**	**2:26**	—			
3:11	**3:17**	**3:26**	—			
4:11	**4:17**	**4:26**	—			
5:11	**5:17**	**5:26**	—			
6:11	**6:17**	**6:26**	—			
7:11	**7:17**	**7:26**	—			
8:11	**8:16**	**8:24**	—			

A Saturday or Sunday schedule will be operated on the following holidays and observed holidays
Se operará con horario de sábado o domingo durante los siguientes días festivos y feriados observados

>>> New Year's Day, Presidents' Day, Memorial Day, Independence Day, Labor Day, Thanksgiving, Christmas