R·E·C
Consultants, Inc.

PRELIMINARY DRAINAGE STUDY
FOR
Passerelle Tentative Map (Parcel 1)

TM _____

(Vacant) Horse Ranch Creek Road

Fallbrook, CA 92028

(APN 108-120-62)

Prepared for:

Passerelle, LLC

10531 4S Commons Dr # 700

San Diego, CA 92127

Prepared by:

REC Consultants, Inc.

2970 Fifth Avenue, Suite 340

San Diego, CA 92103

(619) 232-9200

Prepared March 1, 2021

Revised: August 22, 2023

Table of Contents

Declaration of Responsible Charge

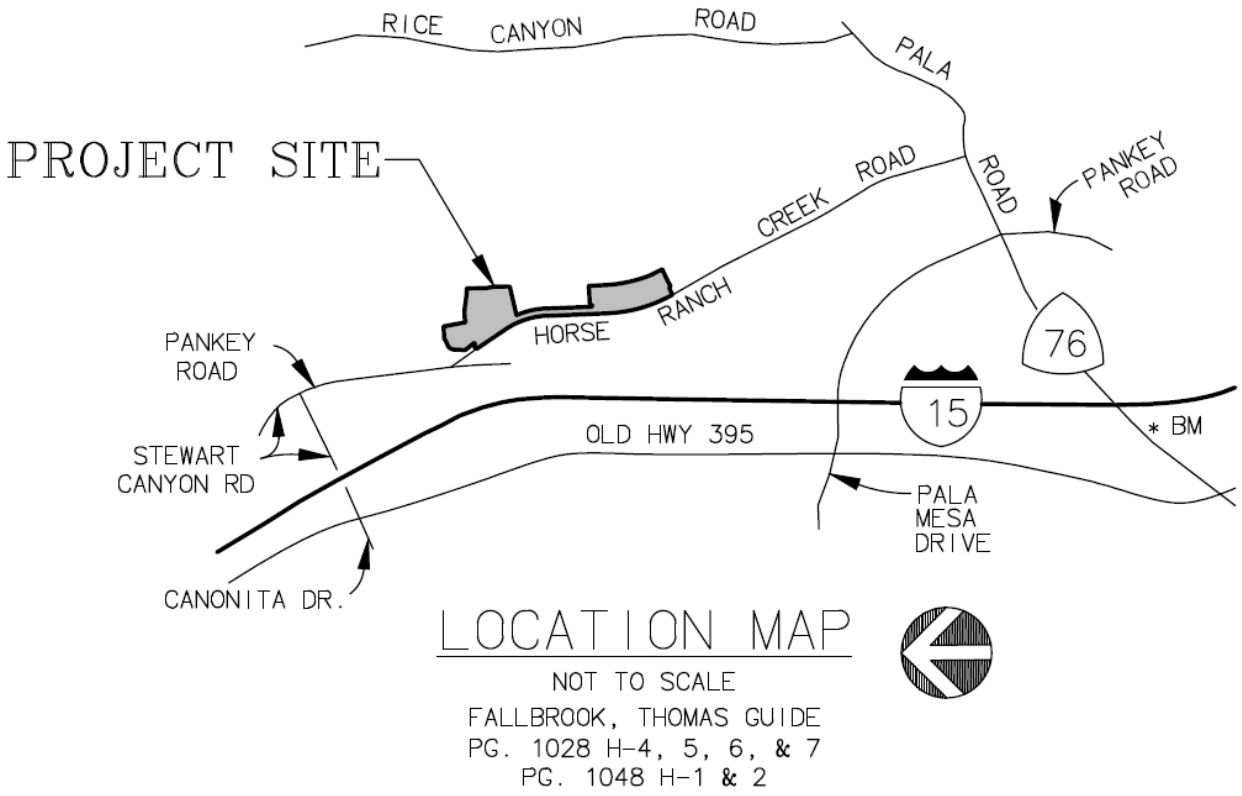
I, declare that I am the Civil Engineer of Work for this Drainage Study, that I have exercised responsible charge over the preparation of said study as defined in section 6703 of the Business and Professions Code, and that the recommendations are consistent with current standards.

I understand the check of this Drainage Study by the County of San Diego is confined to a review only and does not relieve me, as Engineer of Work, of my responsibilities.

William O'Gorman 8-22-23

William O'Gorman, RCE 88286, EXP. 3-31-24 Date

Vicinity Map



1.0 Introduction

The original approved Campus Park project (Vesting Tentative Map 5338 RPL-7) is a 416.1-acre planned community composed of multi-family and single family residential neighborhoods, a neighborhood commercial town center, professional office uses, parks and recreational facilities, and preservation of open space areas and trails. The Campus Park Multi-Family project will amend the Campus Park project to allow for the development of two multi-family condominium lots (Parcel 1 and Parcel 2). Parcel 1, located on Assessor's Parcel Number (APN) 108-120-62, is comprised of 3.02 acres and Parcel 2, located on APN 108-120-61, is comprised of 8.94 acres and were both originally designated for professional office (PO-1 and PO-2) uses in the Specific Plan. Only Parcel 1 will be analyzed herein while Parcel 2 will be analyzed in a separate Preliminary Drainage Study. Parcel 1 is bound to the west by Horse Ranch Creek Road, to the east by Jaeger Street and to the south by Friesian Way. Thirty five detached multi-family residences with a drive aisle is proposed. See the Tentative Map in **Appendix A.**

2.0 Hydrologic Description

2.1 Pre-Developed Condition

The pad has been previously graded and the improvements on Friesian Way and Jaeger Street built as part of the original Campus Park project. The site is mostly dirt with the entire pad gently sloping (approximately 1% slope) to the south west corner to a desilting basin. The entire site is type-C soil according the USGS Web Soil Survey. There will only drainage basin in the predeveloped condition. Basin 1 contains the entirety of the existing pad as well as the vegetated slope on the south and east side of the pad. Runoff from the desilting basin flows to an existing curb inlet located on Frisian way via a storm drain pipe. The Point of Comparison (POC) will be located at the curb inlet.

2.2 Post-Developed Condition

As mentioned above, the owner is proposing to build 35 single family residences and a drive aisle on a previously graded lot. The existing desilting basin will be removed and an underground storage tank will be constructed. This underground storage tank will be used for hydromodification flow control and peak 100-year flow attenuation. The site will be broken into two drainage basins in the post-developed condition. Basin 1 consists of all onsite areas flowing

to the underground storage tank. Runoff within basin 1 will flow southerly to a to a curb inlet located at a low point prior to discharging into the underground tank. Basin 2 consists of the existing vegetated slopes on the south, east, and west sides of the pad that will largely remain unchanged. Drainage patterns will remain relatively the same and the Point of Comparison for the site will continue to be at the outlet of this storm drain pipe as it discharges into the curb inlet. See the attached Hydrology Maps in **Appendix B**.

3.0 Hydrologic Methodology and Results

The hydrologic analysis is done to assess the impact of the proposed improvements on the existing drainage patterns and any increase to 100-year peak flowrates that will require mitigation. The projects major drainage basins are divided into minor sub basins based on changes in grade, conveyance geometry and run-off coefficients along the drainage paths. The project's 100-year peak flowrates for the existing and unmitigated post-developed conditions were analyzed using CIVILCADD/CIVILDESIGN Engineering Software Version 7.9 (CivilD) developed by CivilDesign Corporation. The software is a computer application of the modified rational method in accordance with the County of San Diego Flood Control District's Hydrology Manual (2003).

3. 1 100-Year Existing Condition

The below table summarizes the pre-developed runoff at key points. The full computer output file is titled "1581Parcel1Pre" and is found in **Appendix C.**

Table 1: 100-Year Existing Condition Summary Table

Node	Description	Effective C	Tc (min.)	I (in/hr)	Area (ac)	Q_{peak} (cfs)
1.031	Runoff at POC 1	-	14.342	4.673	2.94	**4.132**

3.2 100-Year Unmitigated Developed Condition

The below table summarizes the unmitigated post-developed runoff at key points. The full computer output file is titled "1581Parcel1Post" and is found in **Appendix D.**

Table 2: 100-Year Unmitigated Developed Condition Summary Table

Nodes	Description	Effective C	Tc (min.)	I (in/hr)	Area (ac)	Q_{peak} (cfs)
1.023	Runoff to underground storage (BMP-B)	0.83	7.15	7.33	2.750	15.71
1.025	Runoff at POC 1	-	7.314	7.215	2.95	**16.144**

4.0 Detention Routing & Mitigated Condition Analysis

4.1 Modified Puls Detention Routing

The Modified Puls Method (also called Storage Indication Method) has been used to determine the resulting hydrograph after routing takes place in the underground tank. The Modified Puls Method (including infiltration) can be written as:

$$\frac{(I_1+I_2)}{2}\Delta t - \frac{(O_1+O_2)}{2}\Delta t - \frac{(f_1+f_2)}{2}\Delta t = S_2 - S_1 \quad (4)$$

which is equivalent to:

$$2\frac{S_2}{\Delta t} + O_2 = 2\frac{S_1}{\Delta t} - O_1 + I_1 + I_2 - f_1 - f_2 \quad (5)$$

In equation (5) all the right hand side terms are known. I_1 , I_2 are the inflow are the start and end of the time interval (cfs), O_1, O_2 are the outflow at the start and end of the time interval (cfs), f1, f2 are the infiltration values at the start and end of the time interval (cfs), and S_1, S_2 are the stage values at the start and end of the time interval (cu-ft). The time interval is 2 min for the 6 hr storm.

The Modified Green-Ampt Equation to model infiltration has been used (including influence of ponding water to increase infiltration). To simplify the modeling effort, Green-Ampt has been limited to the bottom area only, and the suction front effect has been ignored. The resulting equation is:

$$f = \frac{K}{43200}\left[1 + (\phi - \theta_i)\left(\frac{h - S_f}{F}\right)A_i\right] \quad (6)$$

The suction front influence has been neglected (Sf = 0); the saturated hydraulic conductivity of the natural soil (K, in/hr) has been assumed equal to 0.1875 in/hr (0.075 in/hr for compacted type c soil divided by the void ratio of 0.4). The effect of the depth of the water over the infiltrating soil (h, ft) multiplied by the area of infiltration (Ai) which is equal to the bottom of the gravel

multiplied by the void ratio and divided by the total accumulated infiltration volume F, enhances the saturated hydraulic conductivity effect. Finally the difference between porosity φ and initial moisture content θi has been assumed as 0.2 for modeling purposes.

The Modified Puls routing also requires the stage vs. elevation table, and the discharge vs. elevation table. Volume vs elevation is calculated with the datum h = 0 corresponding to the bottom of the gravel layer. Note that the routing was started with an initial depth of 0.5' (elevation of the lowest outlet) to allow for ponding for water quality. Discharge vs elevation considers orifices & slots (using the weir or orifice equation depending if the outlet is working as a weir or as an orifice) and the riser (using the weir equation as the depth of the water at crest elevation does not floods the riser and it always works as a weir).

The runoff from the project site will be detained in an ADS MC-4500 placed under the proposed drive aisle. The full modified puls routing can be found in **Appendix E**. A summary of the BMP routing results is below:

Table 3: BMP Summary Table

BMP	BMP Area (ft^2)	Max. Depth (ft)	Peak Depth (ft)	Max. Storage (ac-ft)	Peak Storage (ac-ft)	Q_{in} (cfs)	Q_{out} (cfs)
BMP-B: Underground Tank (1.023)	4,180(1)	6.75	5.97	0.404	0.375	15.71	3.66

(1) The BMP area corresponds to the bottom area of the gravel.

Table 4: BMP Outlet Summary

BMP	Orifice		Slot 1		Overflow Weir	
	Diam. (in)	Elev. (ft)	Size (in)	Elev. (ft)	Width (ft)	Elev. (ft)
BMP-B	1.875	0	16.5 (W) x 3.5 (H)	2.25	3.5	5.5

4.2 100-Year Mitigated Post-Developed Condition

The 100-year mitigated post-developed condition analysis was created by copying the unmitigated post-developed condition CivilD file and replacing all nodes upstream from the proposed underground tank with a user-defined flow with a 100-year peak flow rate and time of concentration of the underground tank discharge. The full computer output file is titled "1581Parcel1Mit" and is found in **Appendix F.**

Table 5: 100-Year Mitigated Developed Condition Summary Table

Nodes	Description	Effective C	Tc (min.)	I (in/hr)	Area (ac)	Q_{peak} (cfs)
1.023	Outflow from underground storage (BMP-B)	0.83	14.29	4.68	2.750	3.66
1.025	Runoff at POC 1	-	14.33	4.676	2.95	**3.94**

4.3 Outlet Structure Emergency Overflow

An outlet structure is proposed downstream of the underground storage tanks. Inside the outlet structure, there is a 3.5 ft wide weir to control flows. In case of an emergency the weir is designed for the unmitigated developed flow rate of 15.71 cfs. The weir equation can be utilized to ensure there is sufficient head above the weir to convey the bypass flow:

$$Q = C\ x\ L\ x\ H^{1.5}$$

Where Q is flow rate (cfs), C is the weir coefficient of 3.1, L is the weir width (ft) and H is the head above the weir (ft). Since Q and L are known, solving for the height above the crest of the weir is:

$$H = \sqrt[1.5]{\frac{Q}{C\ x\ L}} = \sqrt[1.5]{\frac{15.71\ cfs}{3.1\ x3.5\ ft}} = 1.28\ ft\ above\ the\ crest\ of\ the\ weir$$

The proposed height above the crest of the weir is 1.67 ft which is greater than the required 1.28 ft calculated above. Therefore, in case of an emergency situation, the outlet structure has the necessary capacity. Downstream of the cleanout, the flow enters a storm drain pipe which will be adequately sized in final engineering for the calculated unmitigated Q100 using Civil-D.

5.0 Hydraulic Analysis

Nodes were placed at the upstream and downstream ends of any proposed storm drains, brow ditches and gutters in the unmitigated post-developed CivilD file in order for each facility to be sized within the program. As evident from the output file, all proposed drainage features are adequately sized to convey all flows from the project.

6.0 Conclusion

With the increase in impervious ground cover, the addition of road pavement, building roofs and hardscape, the unmitigated post-development peak 100-year flow rate has increased compared to the pre-development condition. However, this increased can be mitigated through the use of an underground storage tank. A summary of the pre-developed and post-developed condition at the POC is below:

Table 6: Hydrology Summary Table

POC	POC Location	Drainage Area (ac)			Peak 100-year flowrate (cfs)		
		Existing	Developed	Change	Existing	Developed	Change
1	Existing curb inlet on Frisian Way	2.94	2.95	0.01*	4.13	3.94	-0.19

* = Minor rounding error between sub-basin areas. Actual drainage areas are the same.

As can be seen in the table above, the project will reduce the peak 100-year flow rate from 4.13 cfs in the pre-developed condition to 3.94 cfs in the mitigated post-developed condition. This reduction sufficiently demonstrates there will be no impacts downstream as a result of this development. Questions for CEQA purposes are answered below. Would the project:

A. Substantially alter the existing drainage patterns of the site or area, including through the alteration if the course of a stream or river, in a manner which would result in substantial erosion or siltation on – or off-site?

The project does not substantially alter the existing drainage pattern of the area and does not alter the course of a stream or river. The storm drain system is designed to route all resulting runoff to existing points of discharge.

B. Substantially alter the existing drainage patterns of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

The project will not substantially alter the existing drainage pattern of the area as it will not alter the course of a stream or river, and also will not substantially increase the rate or amount of surface runoff in a manner which would result in on- or off-site flooding.

C. Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems?

The project will not create or contribute runoff water which would exceed the capacity of the existing storm water drainage system. All project discharge points release water at rates less than or equal to existing conditions.

D. Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood insurance Rate Map or other flood hazard delineation map, including County Floodplain Maps? For example; research the foregoing and provide same (to indicate applicability or not) in the study?

The project does not place any housing within a 100-year flood hazard area.

E. Place within a 100-year flood hazard area structures which would impede or redirect flood flows?

There are no structures proposed within a 100-year flood hazard area.

F. Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam on-sit or off-site?

N/A

Appendix A – Tentative Map

PRELIMINARY GRADING PLAN
"PASSERELLE"
COUNTY OF SAN DIEGO TRACT NO. ____
County of San Diego, California

GENERAL NOTES:

1. COUNTY ASSESSORS PARCEL No. 108-120-61, 108-120-62
2. TAX RATE AREA: 75169 (APN 108-120-61)
   75035 (APN 108-120-62)
3. GROSS AREA = 29.00 ACRES, NET AREA = 20.34 ± ACRES
4. NUMBER OF LOTS IS 5 LOTS
   (2) SINGLE-FAMILY CONDOMINIUM LOTS (TOTAL NUMBER OF UNITS 138)
   (1) REMAINDER LOT
   (2) PUBLIC STREET LOTS
5. COMMUNITY PLAN: FALLBROOK
6. NO SPECIAL ASSESSMENT ACT PROCEEDINGS ARE PROPOSED
7. PARK FEES IN LIEU OF PARK LAND DEDICATION IS PROPOSED
8. STREET LIGHTS TO BE INSTALLED IN ACCORDANCE WITH COUNTY STANDARDS.
9. TOPOGRAPHY: AERIAL SURVEY PROVIDED BY RANCHO COASTAL ENGINEERING & SURVEYING ON DECEMBER 18, 2019.
10. SEWER SERVICE: RAINBOW MUNICIPAL WATER DISTRICT - CHAD WILLIAMS 760-728-1178
11. WATER SERVICE: RAINBOW MUNICIPAL WATER DISTRICT - CHAD WILLIAMS 760-728-1178
12. FIRE PROTECTION SERVICE: NORTH COUNTY FIRE DISTRICT
    DOMINIC FIERA FIRE MARSHALL 760 723 2040
13. SCHOOLS: FALLBROOK UNIFIED SCHOOL DISTRICT - CYNTHIA MARTIN 760-731-5445 & FALLBROOK UNIFIED SCHOOL DISTRICT & UNION HIGH SCHOOL DISTRICT - BRENDA MEFFORD 760-723-6332 x6195
14. ALL ONSITE STREETS WILL BE PRIVATE.
15. ALL CUT AND FILL SLOPES ARE 2:1 UNLESS OTHERWISE NOTED.
16 STORM DRAIN DETENTION FACILITIES SHALL BE PROVIDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE COUNTY OF SAN DIEGO, DEPARTMENT OF PUBLIC WORKS.

LEGAL DESCRIPTION

PARCEL 2 OF PARCEL MAP NO. 21006, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY ON SEPTEMBER 25, 2012 AS FILE NO. 2012-0581442, OFFICIAL RECORDS

TOPO SOURCE

TOPOGRAPHY SURVEY PROVIDED BY RANCHO COASTAL ENGINEERING & SURVEYING.
DATE OF SURVEY DECEMBER 2019

EASEMENTS NOTES

SEE SHEET 2 FOR EASEMENTS PER PRELIMINARY TITLE REPORT PREPARED BY CHICAGO TITLE INSURANCE COMPANY ~ ORDER No. 00110425-996-SDI-CF2

NOISE RESTRICTION EASEMENT:

A NOISE RESTRICTION EASEMENT SHALL BE PLACED ON THE ENTIRE AREA OF THE PROJECT SITE AND WILL BE GRANTED TO THE COUNTY OF SAN DIEGO ON THE FINAL MAP.

SOLAR ACCESS STATEMENT:

ALL UNITS WITHIN THIS SUBDIVISION HAVE A MINIMUM OF 100 SQ. FT. OF SOLAR ACCESS FOR EACH FUTURE DWELLING UNIT ALLOWED BY THIS SUBDIVISION.

STREET LIGHT STATEMENT:

1. THE SUBDIVIDER INTENDS TO COMPLY WITH THE STREET LIGHT REQUIREMENTS AS SPECIFIED IN THE COUNTY STANDARDS. THIS SUBDIVISION IS PROPOSING ONLY PRIVATE STREETS.
2. ALL OUTDOOR LIGHTING SHALL CONFORM TO THE COUNTY OF SAN DIEGO LIGHTING CODE AND LIGHTING REQUIREMENTS WITHIN THE PERFORMANCE STANDARDS OF THE ZONING ORDINANCE

BASIS OF BEARINGS:

THE BASIS OF BEARINGS FOR THIS SURVEY IS CCS 83, ZONE 6, EPOCH 1991.35 GRID BEARING BETWEEN STATION "SDGPS 03" AND STATION "SDGPS 08" BOTH HAVING A CALIFORNIA COORDINATE VALUE OF FIRST ORDER ACCURACY, PER NATIONAL GEODETIC SURVEY DATA HTDP V2.4. SEE ROS 16810. I.E. NORTH 21°47'56" EAST. QUOTED BEARINGS FROM REFERENCE MAPS OR DEEDS MAY OR MAY NOT BE IN TERMS OF SAID SYSTEM. THE COMBINED GRID FACTOR AT STATION "SPGPS 03" IS 0.9999447. ELEVATION AT SAID STATION = 308.26 (NAVD 88) GRID DISTANCE = GROUND DISTANCE X COMBINED GRID FACTOR. ALL DISTANCES SHOWN ARE GROUND, UNLESS OTHERWISE NOTED.

CONDOMINIUM MAP STATEMENT:

THIS IS A MAP OF A CONDOMINIUM PROJECT AS DEFINED IN SECTION 1350 OF THE STATE OF CALIFORNIA CIVIL CODES

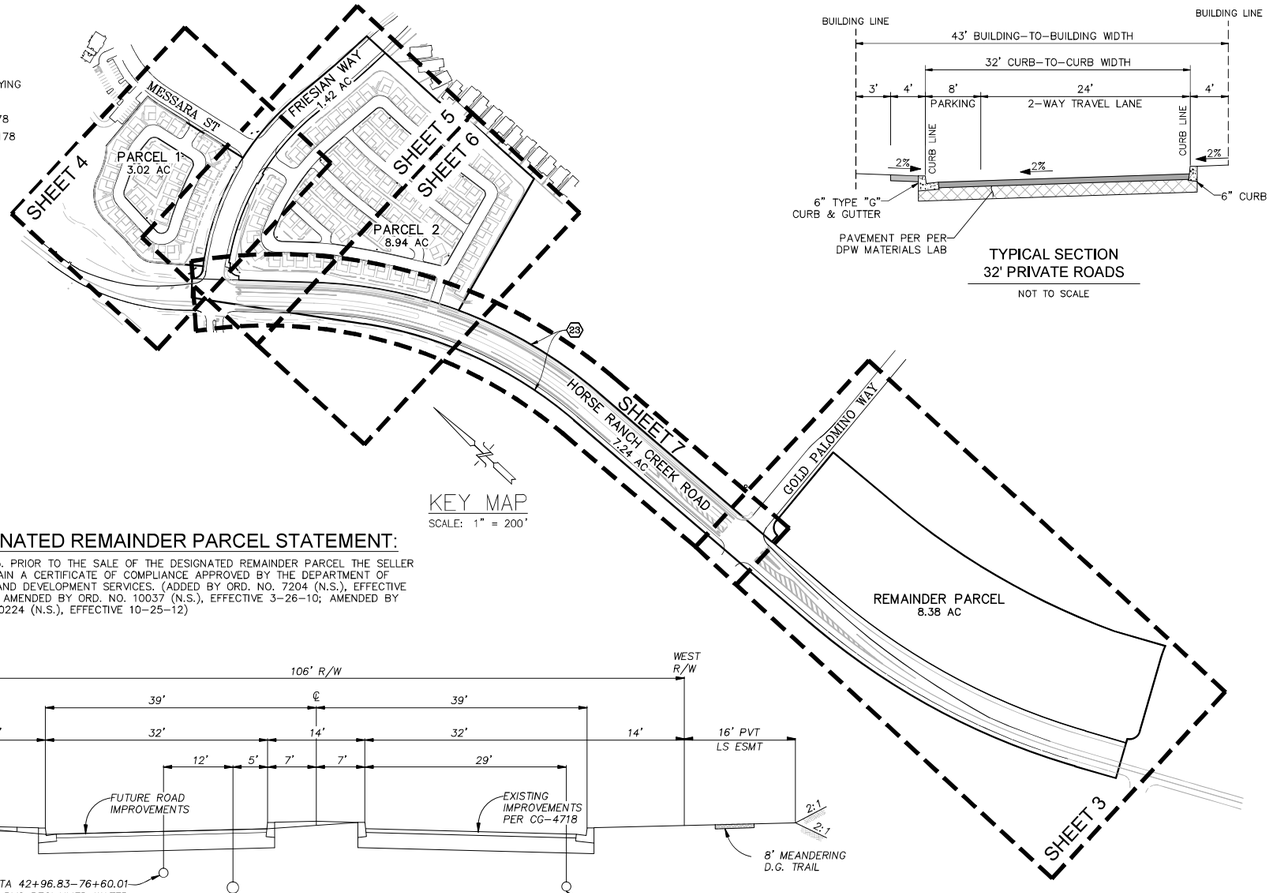
GRADING QUANTITIES

CUT	29,500
FILL	29,500
NET	BALANCE

MAX CUT = 18'
MAX FILL = 12'

PLAN NOTE:

THIS PLAN IS PROVIDED TO ALLOW FOR FULL AND ADEQUATE DISCRETIONARY REVIEW OF A PROPOSED DEVELOPMENT PROJECT. THE PROPERTY OWNER ACKNOWLEDGES THAT ACCEPTANCE OR APPROVAL OF THIS PLAN DOES NOT CONSTITUTE AN APPROVAL TO PERFORM ANY GRADING SHOWN HEREON, AND AGREES TO OBTAIN VALID GRADING PERMISSIONS BEFORE COMMENCING SUCH ACTIVITY

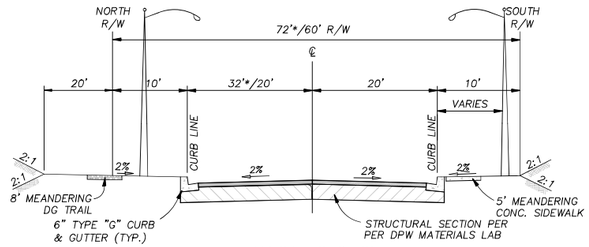


KEY MAP
SCALE: 1" = 200'

DESIGNATED REMAINDER PARCEL STATEMENT:

SEC. 81.515. PRIOR TO THE SALE OF THE DESIGNATED REMAINDER PARCEL THE SELLER SHALL OBTAIN A CERTIFICATE OF COMPLIANCE APPROVED BY THE DEPARTMENT OF PLANNING AND DEVELOPMENT SERVICES. (ADDED BY ORD. NO. 7204 (N.S.), EFFECTIVE 10-17-86; AMENDED BY ORD. NO. 10037 (N.S.), EFFECTIVE 3-26-10; AMENDED BY ORD. NO. 10224 (N.S.), EFFECTIVE 10-25-12)

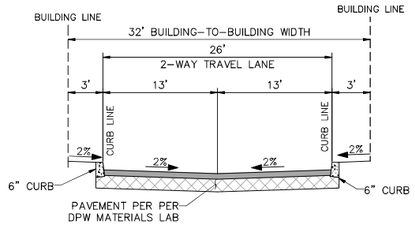
TYPICAL SECTION
HORSE RANCH CREEK ROAD
NO SCALE - LOOKING SOUTH



TYPICAL SECTION
FRIESIAN WAY (PUBLIC)
NO SCALE - LOOKING EAST

NOTE:
PRIVATE ROAD STRUCTURAL SECTION SHALL BE A MINIMUM OF TWO INCHES OF ASPHALT CONCRETE OVER FOUR INCHES OF APPROVED BASE. ADEQUACY OF THE STRUCTURAL SECTION AND SURFACE DRAINAGE SHALL BE INSPECTED AND CERTIFIED BY THE DIRECTOR OF PUBLIC WORKS.

TYPICAL SECTION
32' PRIVATE ROADS
NOT TO SCALE



TYPICAL SECTION
26' PRIVATE ROADS
NOT TO SCALE

LEGEND

PROPOSED:
- R/W — RIGHT-OF-WAY
- P/L — PROPERTY BOUNDARY
- CENTERLINE
- LOT LINE
- EASEMENTS
- BUILDING SETBACKS
- S — S — PROPOSED SEWER MAIN
- (S) — PROPOSED SEWER LATERAL
- PROPOSED SEWER MANHOLE

EXISTING:
- EX FH
- 420 — EX CONTOUR
- EX POWER POLE
- S — S — EX SEWER MAIN
- EX SEWER MANHOLE

APN'S:

108-120-61, 108-120-63

SITE ADDRESS

VACANT LAND HORSE RANCH CREEK ROAD
5378' NORTH OF SR 76

OWNER / DEVELOPER:

I CERTIFY UNDER PENALTY OF PERJURY THAT I MEET THE ELIGIBILITY REQUIREMENTS TO SUBDIVIDE THIS PARCEL BY THE MINOR SUBDIVISION PROCESS, IN ACCORDANCE WITH THE ELIGIBILITY REQUIREMENTS IN SECTION 81.602 OF THE COUNTY OF SAN DIEGO SUBDIVISION ORDINANCE.

NAME: MONTY MCCULLOUGH,
MCCULLOUGH DESIGN DEVELOPMENT
ADDRESS: 16773 CAMINITO DEL VIENTECITO,
SAN DIEGO, CA 92127
TELEPHONE: (858) 431-9622

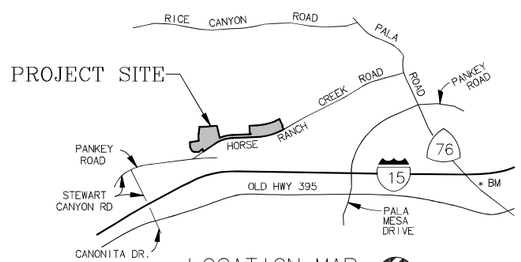
NAME DATE

ENGINEER OF WORK

REC CONSULTANTS, INC.
2442 SECOND AVENUE
SAN DIEGO, CA 92101
PH. (619) 232-9200

REGISTERED PROFESSIONAL ENGINEER
JONATHAN RAAB RYDEEN
RCE ~ 64811
EXP 6/30/21
CIVIL
STATE OF CALIFORNIA

JONATHAN RAAB RYDEEN R.C.E. 64811 DATE
EXPIRES ON 6/30/21



LOCATION MAP
NOT TO SCALE
FALLBROOK, THOMAS GUIDE
PG. 1028 H-4, 5, 6, & 7
PG. 1048 H-1 & 2

Civil Engineering • Environmental
2442 Second Avenue
San Diego, CA 92101
(619)232-9200 (619)232-9210 Fax
R·E·C Consultants, Inc.

REVISIONS

BY	DATE	DESCRIPTION

JOB NO. 1581

PRELIMINARY GRADING PLAN
PASSERELLE
COUNTY OF SAN DIEGO TRACT NO. ____
County of San Diego, California

SHEET NO.
1 OF 18

PRELIMINARY GRADING PLAN
"PASSERELLE"
COUNTY OF SAN DIEGO TRACT NO. ____
County of San Diego, California

EASEMENTS NOTES

EASEMENTS PER PRELIMINARY TITLE REPORT PREPARED BY:
CHICAGO TITLE INSURANCE COMPANY ~ ORDER No. 00110425-996-SDI-CF2

(1) AN EXISTING EASEMENT TO SAN DIEGO GAS AND ELECTRIC COMPANY
PURPOSE:. PUBLIC UTILITIES, INGRESS, EGRESS
RECORDED:. AUGUST 27, 1926 IN BOOK 1248, PAGE 267 OF DEEDS (TO BE QUITCLAIMED)

2 AN EXISTING EASEMENT TO SAN DIEGO GAS AND ELECTRIC COMPANY
PURPOSE:. PUBLIC UTILITIES, INGRESS, EGRESS
RECORDED:. OCTOBER 21, 1937 AS INSTRUMENT NO.64819 IN BOOK 694, PAGE 462, OF OFFICIAL RECORDS (EASEMENT NOT LOCATED ON SUBJECT PROPERTY)

3 AN EXISTING EASEMENT TO SAN DIEGO GAS AND ELECTRIC COMPANY
PURPOSE: PUBLIC UTILITIES, INGRESS, EGRESS
RECORDED: OCTOBER 22, 1937 IN BOOK 714, PAGE 60 OF OFFICIAL RECORDS
(EASEMENT NOT LOCATED ON SUBJECT PROPERTY)

(4) AN EXISTING EASEMENT TO HENRY R. DEAN, ET AL
PURPOSE:. ROAD PURPOSES
RECORDED:. FEBRUARY 13, 1948 AS INSTRUMENT NO. 14948 IN BOOK 2269, PAGE 339, OF OFFICIAL RECORDS (TO BE QUITCLAIMED)

(5) AN EXISTING EASEMENT TO THE COUNTY OF SAN DIEGO
PURPOSE:. PUBLIC ROAD PURPOSES
RECORDED:. AUGUST 10, 1948 AS INSTRUMENT NO. 78889 IN BOOK 2905, PAGE 434, OF OFFICIAL RECORDS (TO BE QUITCLAIMED)

(6) AN EXISTING EASEMENT TO THE COUNTY OF SAN DIEGO
PURPOSE:. PUBLIC ROAD PURPOSES
RECORDED:. AUGUST 10, 1948 IN BOOK 2905, PAGE 435, OF OFFICIAL RECORDS (TO BE QUITCLAIMED)

(7) AN EXISTING EASEMENT TO SAN DIEGO GAS AND ELECTRIC COMPANY
PURPOSE:. PUBLIC UTILITIES, INGRESS, EGRESS
RECORDED:. JUNE 20, 1951 IN BOOK 4151, PAGE 492, OF OFFICIAL RECORDS (TO BE QUITCLAIMED)

8 AN EXISTING EASEMENT TO SAN DIEGO GAS AND ELECTRIC COMPANY
PURPOSE:. PUBLIC UTILITIES, INGRESS, EGRESS
RECORDED:. DECEMBER 14, 1951 IN BOOK 4320, PAGE 280, OF OFFICIAL RECORDS (EASEMENT NOT LOCATED ON SUBJECT PROPERTY)

9 AN EXISTING EASEMENT TO THE SAN DIEGO GAS AND ELECTRIC COMPANY
PURPOSE:. PUBLIC UTILITIES, INGRESS, EGRESS
RECORDED:. JULY 2, 1974 AS INSTRUMENT NO. 74-177833, OF OFFICIAL RECORDS (EASEMENT NOT LOCATED ON SUBJECT PROPERTY)

10 AN EXISTING EASEMENT TO RAINBOW MUNICIPAL WATER DISTRICT, A MUNICIPAL CORPORATION
PURPOSE:. PIPELINE OR PIPELINES
RECORDED:. JUNE 13, 1978 AS INSTRUMENT NO. 78-244432, OF OFFICIAL RECORDS (EASEMENT NOT LOCATED ON SUBJECT PROPERTY)

11 AN EXISTING EASEMENT FOR TO RAINBOW MUNICIPAL WATER DISTRICT, A MUNICIPAL CORPORATION
PURPOSE:. A PIPELINE OR PIPELINES
RECORDED:. OCTOBER 6, 1978 AS INSTRUMENT NO. 78-0425959, OF OFFICIAL RECORDS (EASEMENT NOT LOCATED ON SUBJECT PROPERTY)

(12) AN EXISTING EASEMENT TO WILLIAM B. BUCK, ET AL
PURPOSE:. ROAD AND UTILITY PURPOSES
RECORDED:. OCTOBER 31, 1978 AS INSTRUMENT NO. 78-471499, OF OFFICIAL RECORDS
QUITCLAIM DEED RECORDED JANUARY 9, 1981 AS FILE NO. 81-006489, WILLIAM B. BUCK ET AL, QUITCLAIM OF INTEREST OF THE HEREIN ABOVE DESCRIBED EASEMENT.

(13) AN EXISTING EASEMENT TO PAKEY RANCH
PURPOSE:. ROAD AND PUBLIC UTILITY
RECORDED:. DECEMBER 4, 1979 AS INSTRUMENT NO. 79-508977, OF OFFICIAL RECORDS (TO BE QUITCLAIMED)

(14) AN EXISTING EASEMENT TO ROBERT H. PANKEY AND ROSEMARY R. PANKEY, HUSBAND AND WIFE AS COMMUNITY PROPERTY, ET AL
PURPOSE:. ROAD AND UTILITY PURPOSES
RECORDED:. JANUARY 8, 1981 AS INSTRUMENT NO. 81-006490, OF OFFICIAL RECORDS (TO BE QUITCLAIMED)
AND RE-RECORDED JUNE 10, 1981 AS INSTRUMENT NO. 81-181138, OF OFFICIAL RECORDS. (TO BE QUITCLAIMED)

(15) AN EXISTING EASEMENT FOR ROAD AND UTILITIES
RECORDED:. MARCH 27, 1981 AS INSTRUMENT NO. 81-092782 (TO BE QUITCLAIMED)

16 AN EXISTING EASEMENT TO THE SAN LUIS REY MUNICIPAL WATER DISTRICT
PURPOSE:. ACCESS AND DEVELOPMENT OF WATERS, WELLSITES, AND WATER WORKS
RECORDED:. JULY 26, 1984 AS INSTRUMENT NO. 84-284008, OF OFFICIAL RECORDS (EASEMENT NOT LOCATED ON SUBJECT PROPERTY)

19 EXISTING EASEMENTS FOR THE PURPOSE SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS SHOWN OR AS OFFERED FOR DEDICATION ON THE RECORDED PARCEL MAP 13703. (EASEMENT NOT LOCATED ON SUBJECT PROPERTY)

21 A DOCUMENT ENTITLED 'AGREEMENT FOR GRANT OF EASEMENTS', DATED, JUNE 15, 2007, EXECUTED BY PASSERELLE, LLC, A CALIFORNIA LIMITED LIABILITY COMPANY AND PALOMAR COMMUNITY COLLEGE DISTRICT, SUBJECT TO ALL THE TERMS, PROVISIONS AND CONDITIONS THEREIN CONTAINED, RECORDED JUNE 14, 2007 AS INSTRUMENT NO. 2007-0403365, OF OFFICIAL RECORDS. A DOCUMENT ENTITLED 'AGREEMENT FOR GRANT OF EASEMENTS', DATED, JUNE 15, 2007, EXECUTED BY PASSERELLE, LLC, A CALIFORNIA LIMITED LIABILITY COMPANY AND PALOMAR COMMUNITY COLLEGE DISTRICT, SUBJECT TO ALL THE TERMS, PROVISIONS AND CONDITIONS THEREIN CONTAINED, RECORDED JUNE 14, 2007 AS INSTRUMENT NO. 2007-0403364, OF OFFICIAL RECORDS. (EASEMENT IS NOT PLOTABLE)

22 AN EXISTING EASEMENT TO SAN DIEGO GAS & ELECTRIC COMPANY, A CORPORATION
PURPOSE:. UTILITIES, INGRESS & EGRESS
RECORDED:. JANUARY 7, 2011, AS INSTRUMENT NO. 2011-0013745 OF OFFICIAL RECORDS (EASEMENT NOT LOCATED ON SUBJECT PROPERTY)

(23) AN EXISTING EASEMENT TO THE COUNTY OF SAN DIEGO
PURPOSE:. PUBLIC HIGHWAY
RECORDED:. JANUARY 10, 2011, AS INSTRUMENT NO. 2011-0017036 OF OFFICIAL RECORDS

(30) AN EXISTING EASEMENT TO THE COUNTY OF SAN DIEGO, A POLITICAL SUBDIVISION OF THE STATE OF CALIFORNIA
PURPOSE: COUNTY HIGHWAY
RECORDING DATE: DECEMBER 05, 2013
RECORDING NO: 2013-0706899 OF OFFICIAL RECORDS

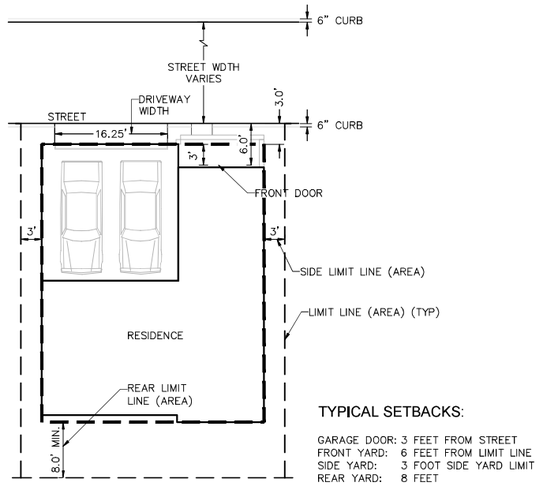
(33) AN EXISTING EASEMENT TO RAINBOW MUNICIPAL WATER DISTRICT, A MUNICIPAL WATER DISTRICT
PURPOSE: PUBLIC UTILITIES, INGRESS, EGRESS
RECORDING DATE: MARCH 26, 2014
RECORDING NO: 2014-0117990 OF OFFICIAL RECORDS

(34) EXISTING EASEMENTS CONTAINED IN THAT CERTAIN DOCUMENT
ENTITLED: EASEMENT AGREEMENT
RECORDING DATE: MAY 26, 2015
RECORDING NO: 2015-0265828 OF OFFICIAL RECORDS

35 AN EXISTING EASEMENT TO SAN DIEGO GAS AND ELECTRIC COMPANY, A CORPORATION
PURPOSE: PUBLIC UTILITIES, INGRESS, EGRESS
RECORDING DATE: MARCH 18, 2016
RECORDING NO: 2016-0120629 OF OFFICIAL RECORDS
(EASEMENT IS NOT PLOTABLE)

(36) EXISTING MATTERS CONTAINED IN THAT CERTAIN DOCUMENT
ENTITLED: TEMPORARY FUEL MANAGEMENT EASEMENT AGREEMENT
RECORDING DATE: MARCH 22, 2016
RECORDING NO: 2016-0126290 OF OFFICIAL RECORDS

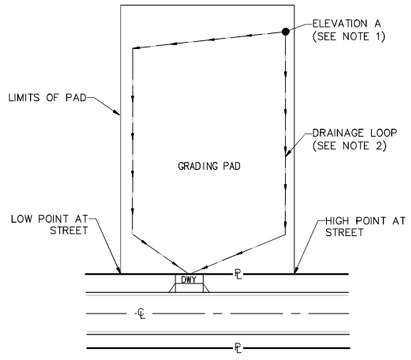
(37) EXISTING MATTERS CONTAINED IN THAT CERTAIN DOCUMENT
ENTITLED: WALLS AND FENCES EASEMENT AND COST-SHARING AGREEMENT
RECORDING DATE: DECEMBER 07, 2016
RECORDING NO: 2016-0671680 OF OFFICIAL RECORDS



TYPICAL SETBACKS:

GARAGE DOOR: 3 FEET FROM STREET
FRONT YARD: 6 FEET FROM LIMIT LINE
SIDE YARD: 3 FOOT SIDE YARD LIMIT
REAR YARD: 8 FEET

2 TYP. MIN. RESIDENTIAL LOT CONFIGURATION
NOT TO SCALE



NOTES:
1. ELEVATION "A" IS LOCATED AT THE MOST REMOTE CORNER OF THE PAD FROM THE DRIVEWAY.
2. MINIMUM 1% SWALE TO STREET OR OTHER DISCHARGE POINT.
3. ALL SLOPE SURFACES SHALL BE PROTECTED BY APPROVED EROSION CONTROL MATERIAL.
4. ALL PADS TO BE BERMED TO PREVENT RUN-OFF TO ADJACENT PADS.

3 TYPICAL RESIDENTIAL PAD DRAINAGE
NOT TO SCALE

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JOB NO. 1581

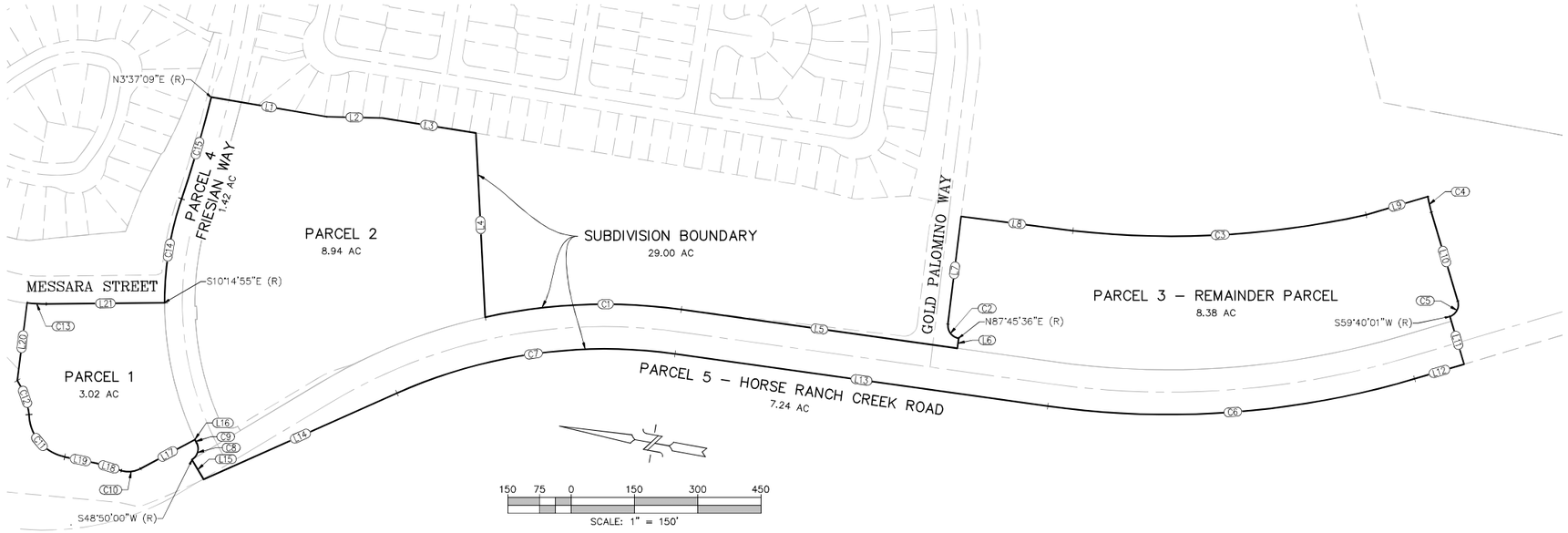
PRELIMINARY GRADING PLAN
PASSERELLE
COUNTY OF SAN DIEGO TRACT NO. ____
County of San Diego, California

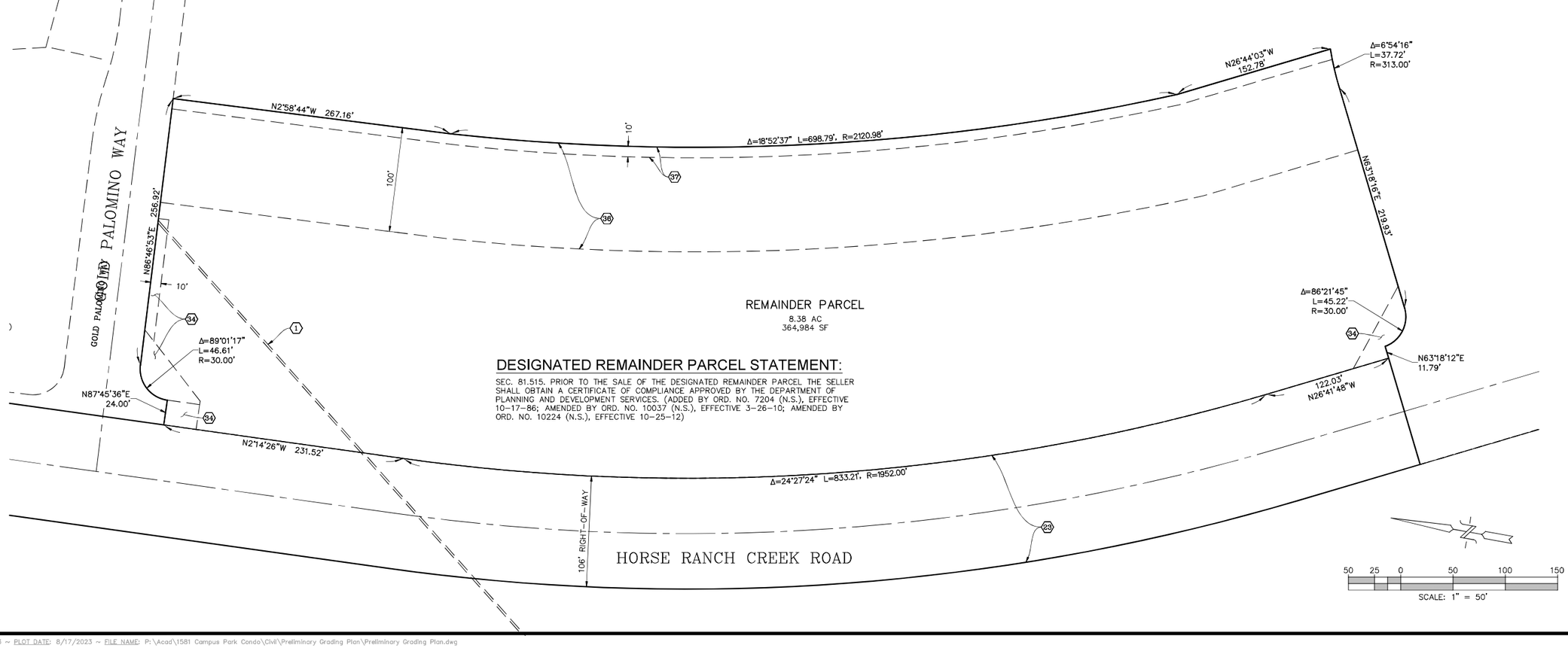
SHEET NO.
2 OF 18

SAVE DATE: 8/17/2023 ~ PLOT DATE: 8/17/2023 ~ FILE NAME: P:\Acad\1581 Campus Park Condo\Civil\Preliminary Grading Plan\Preliminary Grading Plan.dwg

DATA TABLE			
#	BEARING/DELTA	RADIUS	LENGTH
C1	Δ = 20°24'20"	1313.00'	467.62'
C2	Δ = 89°01'17"	30.00'	46.61'
C3	Δ = 18°52'37"	2120.98'	698.79'
C4	Δ = 6°54'16"	313.00'	37.72'
C5	Δ = 86°21'45"	30.00'	45.22'
C6	Δ = 24°27'24"	2058.00'	878.46'
C7	Δ = 32°00'00"	1207.00'	674.12'
C8	Δ = 84°50'41"	30.00'	44.42'
C9	Δ = 0°44'03"	767.00'	9.83'
C10	Δ = 44°39'42"	60.00'	46.77'
C11	Δ = 77°32'54"	104.66'	141.65'
C12	Δ = 24°47'25"	199.02'	86.11'
C13	Δ = 7°21'11"	355.00'	45.56'
C14	Δ = 18°44'01"	767.00'	250.78'
C15	Δ = 4°51'57"	2958.00'	251.21'
L1	N 00°33'32" W		277.64'
L2	N 08°59'44" W		131.04'
L3	N 01°05'43" W		225.35'
L4	N 76°53'58" E		437.11'
L5	N 02°14'26" W		660.87'

DATA TABLE			
#	BEARING/DELTA	RADIUS	LENGTH
L6	N 87°45'36" E		24.00'
L7	N 86°46'53" E		256.92'
L8	N 02°58'44" W		267.16'
L9	N 26°44'03" W		152.78'
L10	N 63°18'16" E		219.93'
L11	N 63°18'12" E		117.79'
L12	N 26°41'48" W		122.03'
L13	N 02°14'24" W		892.40'
L14	N 34°14'24" W		502.01'
L15	N 48°50'34" E		54.30'
L16	N 54°45'17" E		0.26'
L17	N 38°25'37" W		146.38'
L18	N 06°14'05" E		62.22'
L19	N 01°11'58" E		76.23'
L20	N 86°59'34" E		185.12'
L21	N 10°47'30" W		280.22'





DESIGNATED REMAINDER PARCEL STATEMENT:

SEC. 81.515. PRIOR TO THE SALE OF THE DESIGNATED REMAINDER PARCEL THE SELLER SHALL OBTAIN A CERTIFICATE OF COMPLIANCE APPROVED BY THE DEPARTMENT OF PLANNING AND DEVELOPMENT SERVICES. (ADDED BY ORD. NO. 7204 (N.S.), EFFECTIVE 10-17-86; AMENDED BY ORD. NO. 10037 (N.S.), EFFECTIVE 3-26-10; AMENDED BY ORD. NO. 10224 (N.S.), EFFECTIVE 10-25-12)

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JOB NO. 1581

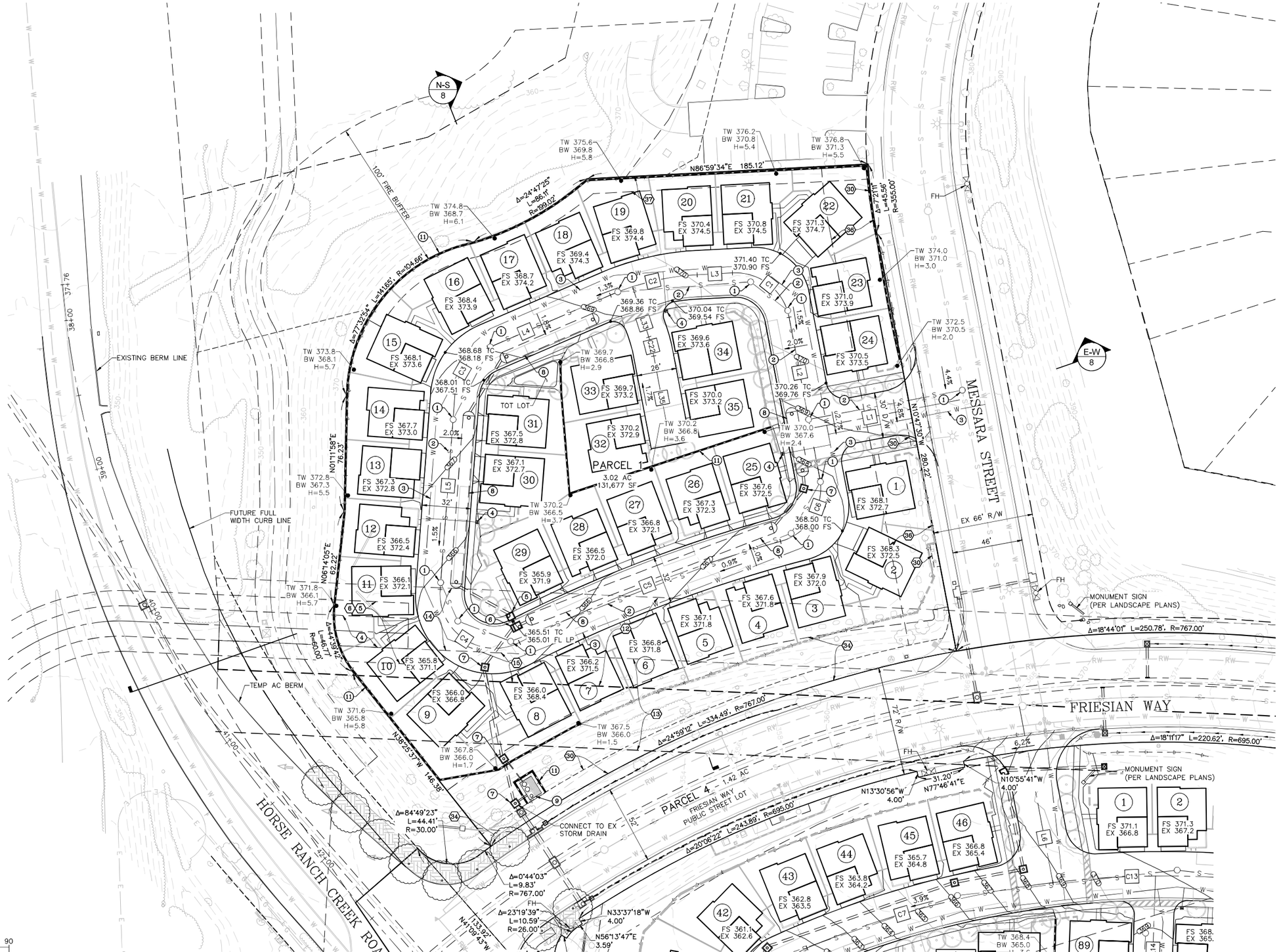
PRELIMINARY GRADING PLAN
PASSERELLE
COUNTY OF SAN DIEGO TRACT NO. ____
County of San Diego, California

SHEET NO.
3 OF 18

PRIVATE ROAD CENTERLINE			
#	BEARING/DELTA	RADIUS	LENGTH
C1	Δ = 82°12'56"	36.00'	51.66'
C2	Δ = 20°20'40"	166.00'	58.94'
C3	Δ = 62°17'18"	36.00'	39.14'
C4	Δ = 121°15'00"	36.00'	76.18'
C5	Δ = 11°29'20"	920.05'	184.49'
C6	Δ = 85°23'25"	36.00'	53.65'
C22	Δ = 7°11'32"	103.00'	12.93'
L1	S 79°12'30" W		100.03'
L2	N 10°47'30" W		107.85'
L3	S 86°59'34" W		23.25'
L4	S 66°38'54" W		87.77'
L5	S 04°21'35" W		128.88'
L33	S 17°59'03" E		34.76'
L35	S 10°47'30" E		56.16'

LEGEND

1. PROPOSED SEWER MAIN HOLE
2. PROPOSED SEWER MAIN
3. PROPOSED WATER MAIN
4. PROPOSED FIRE HYDRANT
5. PROPOSED CURB INLET
6. PROPOSED DIVERSION CHAMBER (SEE SHEET ___ FOR DETAILS)
7. PROPOSED STORM DRAIN CLEANOUT
8. PROPOSED UNDERGROUND STORAGE TANK (SEE SHEET ___ FOR DETAILS)
9. PROPOSED MODULAR WETLAND STRUCTURE (SEE SHEET ___ FOR DETAILS)
11. PROPOSED RETAINING WALL



SCALE: 1" = 30'

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PRELIMINARY GRADING PLAN
PASSERELLE
COUNTY OF SAN DIEGO TRACT NO. ____
County of San Diego, California

SHEET NO.
4 OF 18

SAVE DATE: 8/17/2023 ~ PLOT DATE: 8/17/2023 ~ FILE NAME: P:\Acad\1581 Campus Park Condo\Civil\Preliminary Grading Plan\Preliminary Grading Plan.dwg

PRIVATE ROAD CENTERLINE			
#	BEARING/DELTA	RADIUS	LENGTH
C7	Δ = 15°52'38"	606.00'	167.93'
C8	Δ = 108°21'01"	38.00'	71.86'
C9	Δ = 8°14'56"	616.00'	88.69'
C10	Δ = 2°55'06"	1216.00'	61.94'
C11	Δ = 7°31'15"	919.61'	120.71'
C12	Δ = 85°20'43"	31.00'	46.18'
C13	Δ = 13°32'33"	606.00'	143.24'
C14	Δ = 2°55'55"	1416.53'	72.48'
C15	Δ = 58°00'57"	28.00'	28.35'
C16	Δ = 7°31'15"	1184.00'	155.41'
L6	S 10°47'30" E		117.95'

PRIVATE ROAD CENTERLINE			
#	BEARING/DELTA	RADIUS	LENGTH
L7	N 41°09'35" W		87.32'
L8	N 32°54'39" W		91.04'
L9	S 05°33'55" E		228.71'
L10	S 01°57'20" W		17.87'
L11	S 83°23'23" E		160.92'
L12	N 00°08'23" E		42.57'
L13	N 55°29'31" E		23.50'
L14	N 01°57'20" E		63.25'
L15	N 05°33'55" W		175.76'
L16	S 01°57'20" W		57.50'

LEGEND

1. PROPOSED SEWER MAIN HOLE
2. PROPOSED SEWER MAIN
3. PROPOSED WATER MAIN
4. PROPOSED FIRE HYDRANT
5. PROPOSED CURB INLET
6. PROPOSED DIVERSION CHAMBER (SEE SHEET __ FOR DETAILS)
7. PROPOSED STORM DRAIN CLEANOUT
8. PROPOSED UNDERGROUND STORAGE TANK (SEE SHEET ____ FOR DETAILS)
9. PROPOSED MODULAR WETLAND STRUCTURE (SEE SHEET ____ FOR DETAILS)
10. PROPOSED STORM DRAIN INLET
11. PROPOSED RETAINING WALL

SCALE: 1" = 30'

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LEGEND

1. PROPOSED SEWER MAIN HOLE
2. PROPOSED SEWER MAIN
3. PROPOSED WATER MAIN
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9. PROPOSED MODULAR WETLAND STRUCTURE (SEE SHEET ____ FOR DETAILS)
10. PROPOSED STORM DRAIN INLET
11. PROPOSED RETAINING WALL

PRIVATE ROAD CENTERLINE			
#	BEARING/DELTA	RADIUS	LENGTH
C9	Δ = 8°14'56"	616.00'	88.69'
C10	Δ = 2°55'06"	1216.00'	61.94'
C11	Δ = 7°31'15"	919.61'	120.71'
C14	Δ = 2°55'55"	1416.53'	72.48'
C15	Δ = 58°00'57"	28.00'	28.35'
C16	Δ = 7°31'15"	1184.00'	155.41'
C17	Δ = 7°31'15"	1055.33'	138.52'
C18	Δ = 73°06'29"	36.00'	45.94'
C19	Δ = 82°27'53"	31.00'	44.62'
C20	Δ = 65°34'22"	23.00'	26.32'
C21	Δ = 12°41'00"	164.00'	36.30'
L7	N 41°09'35" W		87.32'

PRIVATE ROAD CENTERLINE			
#	BEARING/DELTA	RADIUS	LENGTH
L8	N 32°54'39" W		91.04'
L9	S 05°33'55" E		228.71'
L13	N 55°29'31" E		23.50'
L15	N 05°33'55" W		175.76'
L17	S 05°33'55" E		273.83'
L18	N 29°59'33" W		129.80'
L19	S 76°53'58" W		216.15'
L20	N 60°00'27" E		29.83'
L21	N 76°53'58" E		54.33'
L22	N 64°12'58" E		82.33'

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PRELIMINARY GRADING PLAN
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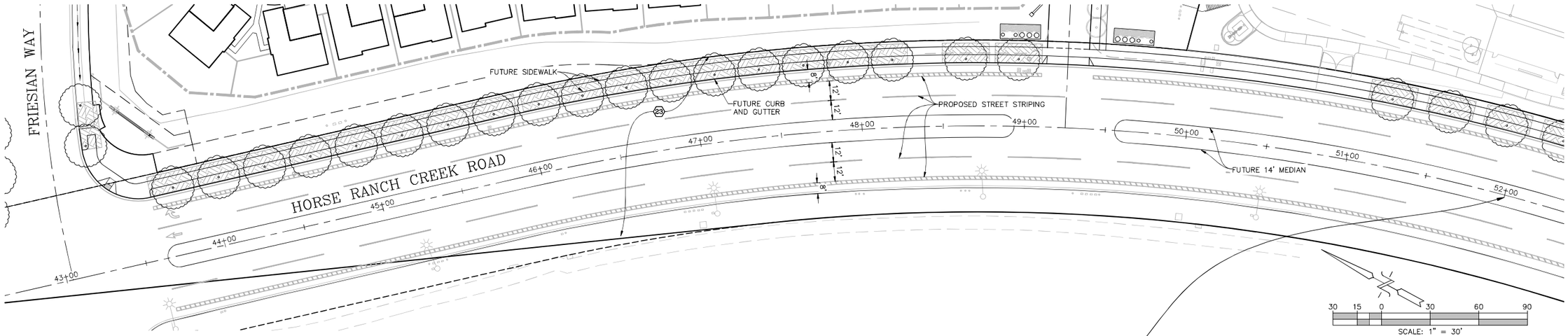


DRAFT CONDITION FOR PUBLIC IMPROVEMENTS BASED ON ORIGINAL TENTATIVE MAP DESIGN.

PRIOR TO THE APPROVAL OF THE FINAL MAP, IMPROVE OR AGREE TO IMPROVE AND PROVIDE SECURITY FOR ON- AND OFF-SITE HORSE RANCH CREEK ROAD FROM AN ACCEPTABLE INTERSECTION WITH GOLD PALOMINO WAY NORTHERLY TO FRIESIAN WAY AS FOLLOWS:

1) THE ROAD SHALL BE IMPROVED TO THE FOLLOWING STANDARD: PUBLIC BOULEVARD ROAD WITH RAISED MEDIAN STANDARDS TO A GRADED WIDTH OF ONE HUNDRED SIX FEET (106') WITH SEVENTY-EIGHT FEET (78') OF ASPHALT CONCRETE PAVEMENT OVER APPROVED BASE WITH PORTLAND CEMENT CONCRETE CURB, GUTTER AND SIDEWALK WITH FACE OF CURB AT THIRTY-NINE FEET (39') FROM CENTERLINE.

2) CONSTRUCT A FOURTEEN FOOT (14') WIDE RAISED MEDIAN WITH CONCRETE CURBS WITH FACE OF MEDIAN CURB AT SEVEN FEET (7') FROM CENTERLINE, INCLUDING TRANSITION NORTHERLY TO EXISTING PANKEY ROAD IMPROVEMENTS. 9HORSE CREEK RANCH RD. BECOMES PANKEY RD AFTER FRIESIAN WAY.

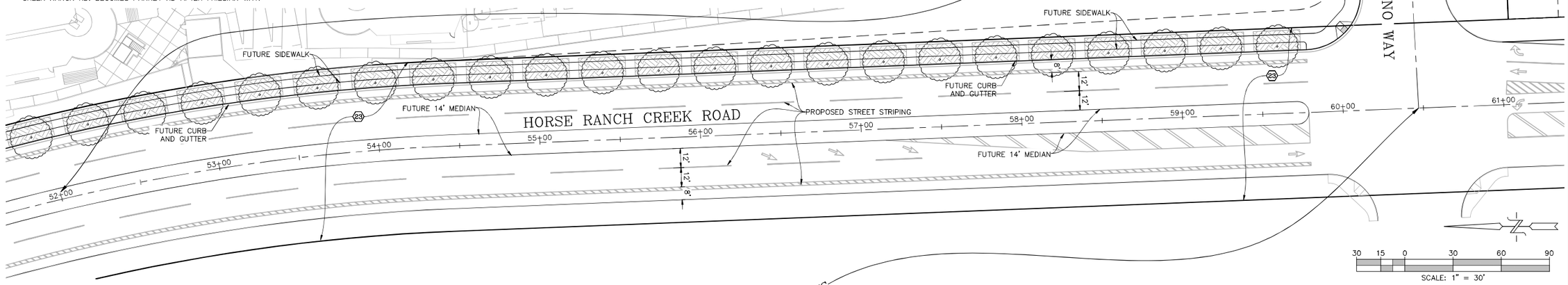
3) PROVIDE ADDITIONAL GRADING AND PAVING AS REQUIRED TO PROVIDE ADDITIONAL LEFT- AND RIGHT TURN LANES, AND PATHWAYS OR TRAILS ALONG THE IMPROVEMENTS AS NECESSARY.

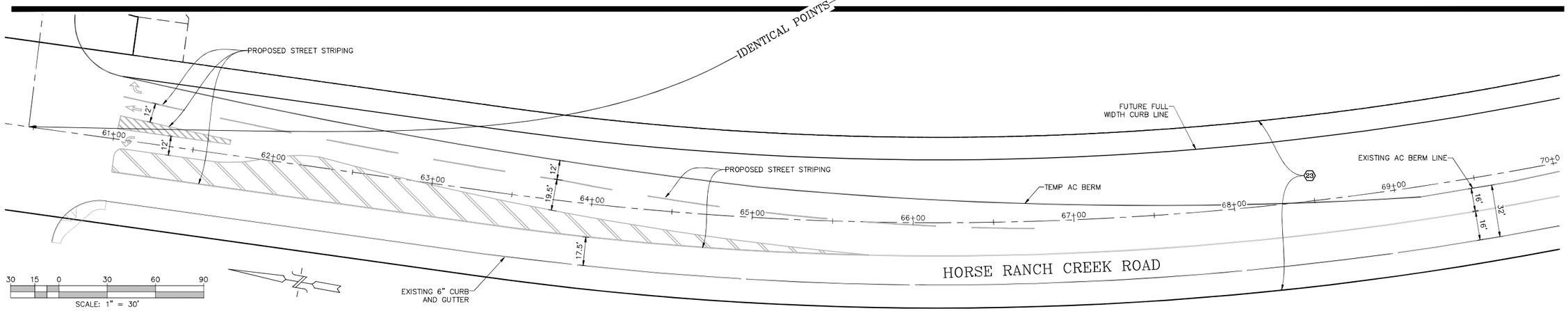
4) PROVIDE TRAFFIC SIGNALS WHEN TRAFFIC WARRANTS ARE MET AND PROVIDE TRANSITIONS ON- AND OFF-SITE.

5) SHOW THE PROPOSED ACCESS LOCATIONS FOR PALOMAR COLLEGE NORTH EDUCATION CENTER (WHICH HAS A CERTIFIED EIR) AND PROVIDE INTERSECTIONAL SEPARATIONS AND OPERATIONS WITH THE VTM 5338 RPL7 (AND VTM 5354RPL4) ACCESSES ACCORDING TO THE PUBLIC ROAD STANDARDS.

6) PROVIDE TRANSITIONS TO EXISTING PANKEY ROAD TO THE NORTH.

ALL OF THE ABOVE SHALL BE TO THE SATISFACTION OF CALTRANS AND THE DIRECTOR OF PUBLIC WORKS.





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COUNTY OF SAN DIEGO TRACT NO. ____
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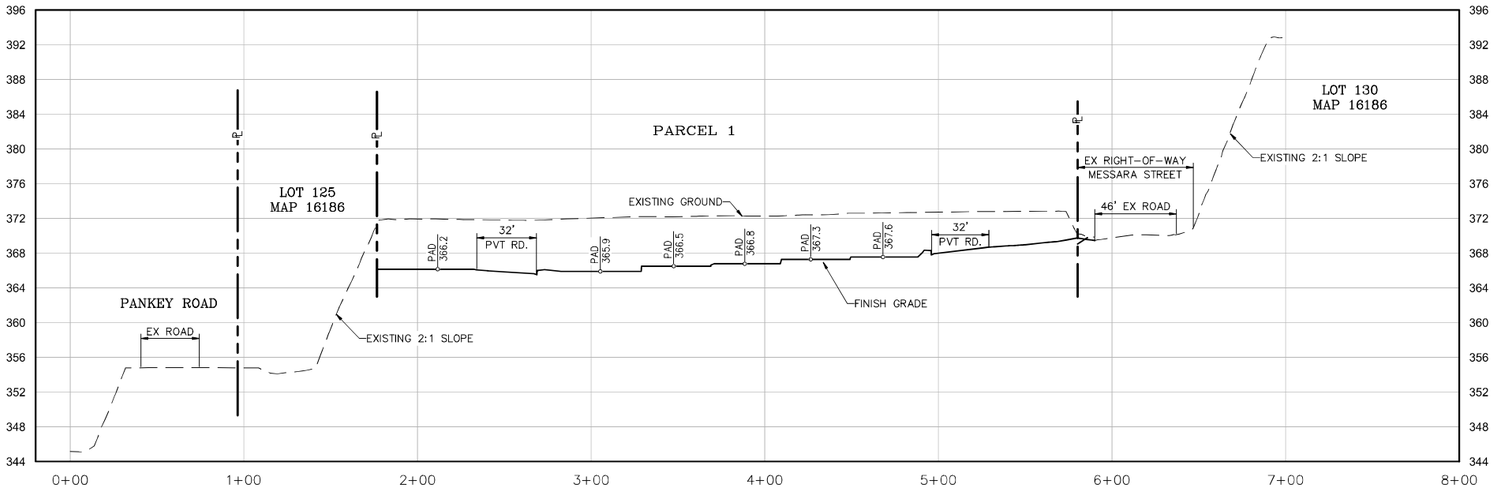
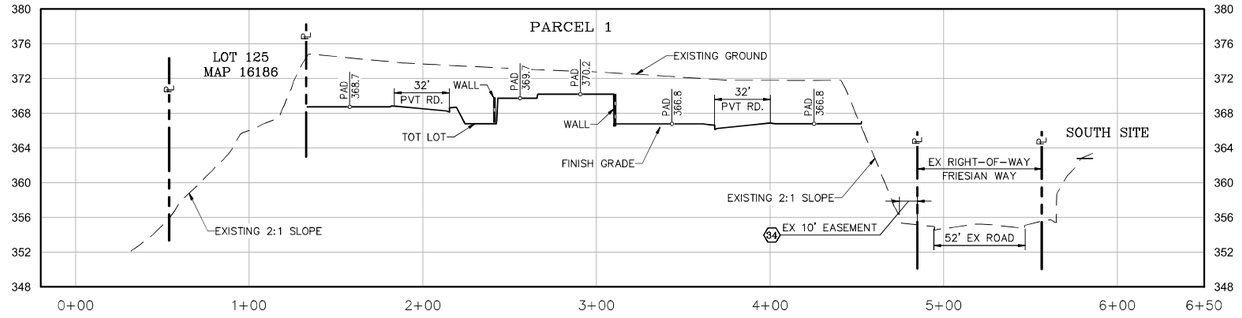


NORTH SITE - E-W SECTION

SCALE: HORZ: 1" = 40'
VERT: 1" = 8'



NORTH SITE - N-S SECTION

SCALE: HORZ: 1" = 40'
VERT: 1" = 8'

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COUNTY OF SAN DIEGO TRACT NO. _____
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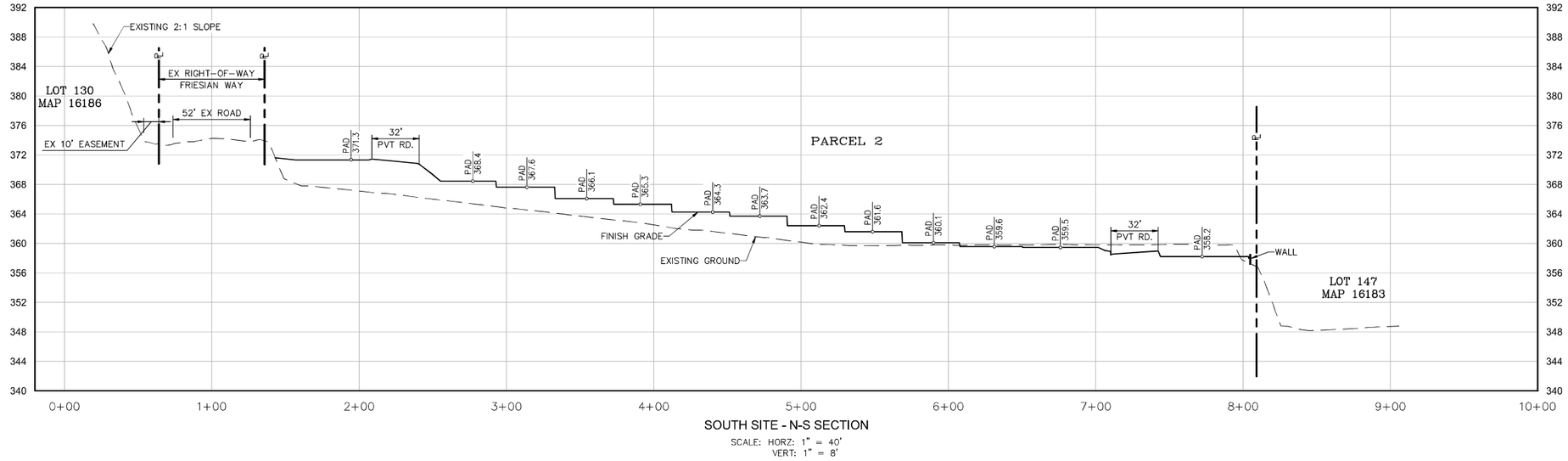
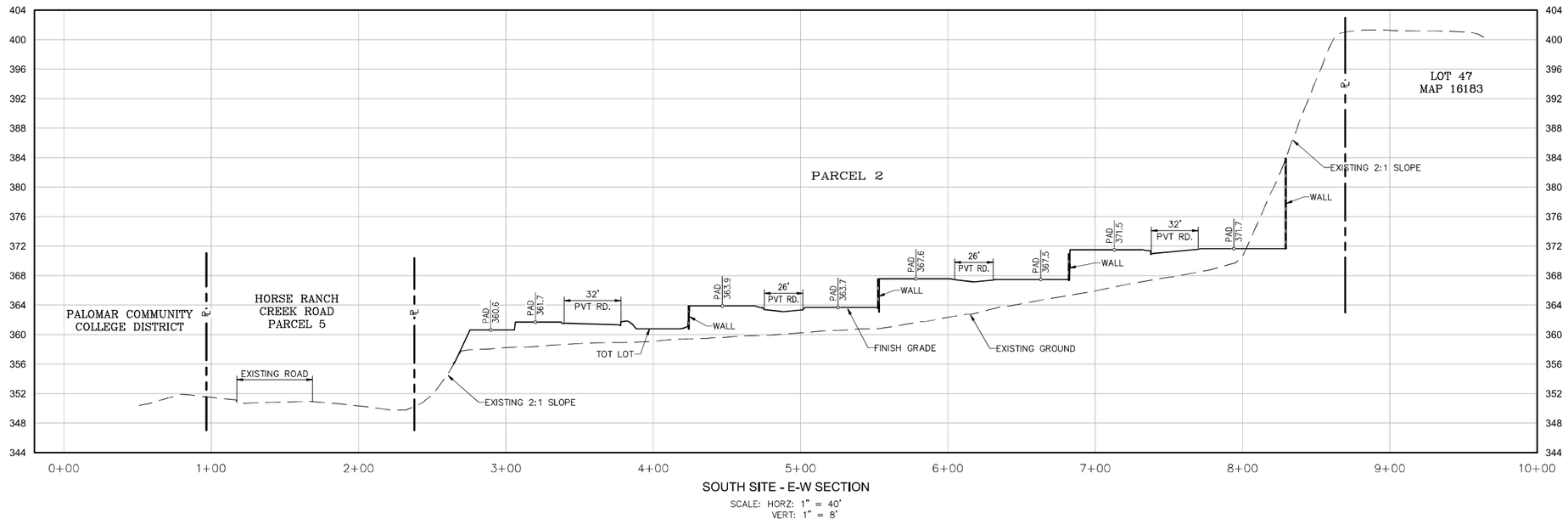


SOUTH SITE - N-S SECTION

SCALE: HORZ: 1" = 40'
VERT: 1" = 8'



SOUTH SITE - E-W SECTION

SCALE: HORZ: 1" = 40'
VERT: 1" = 8'

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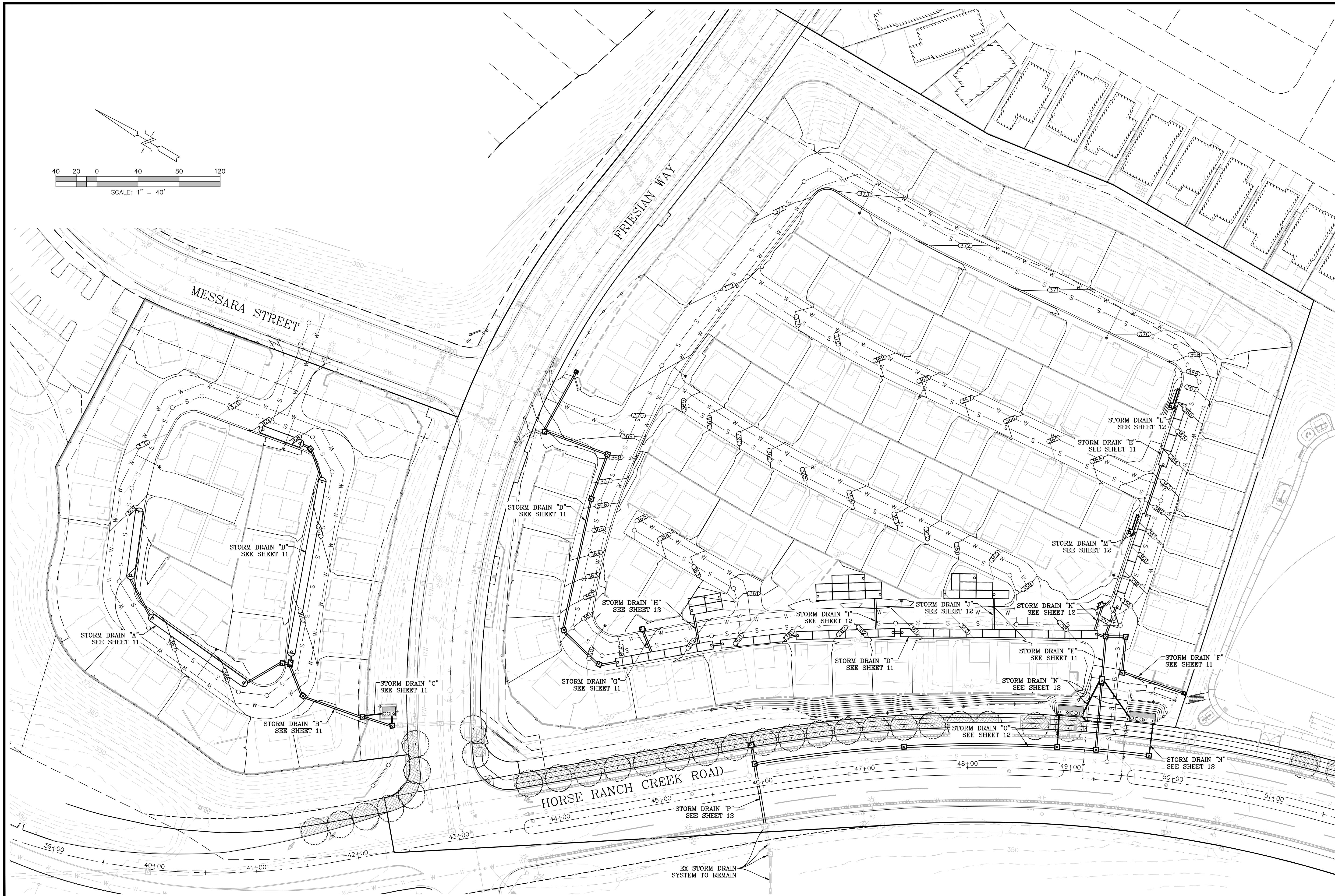

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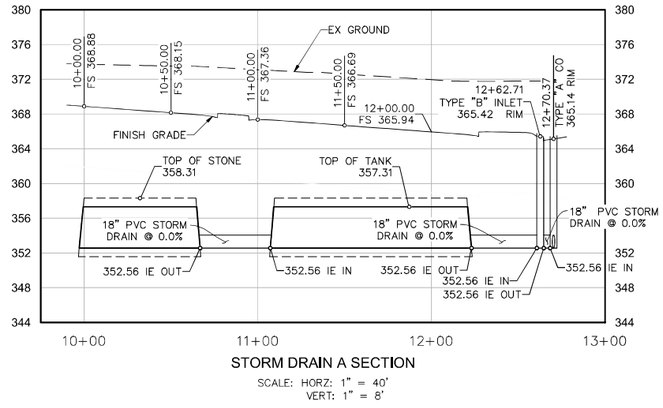
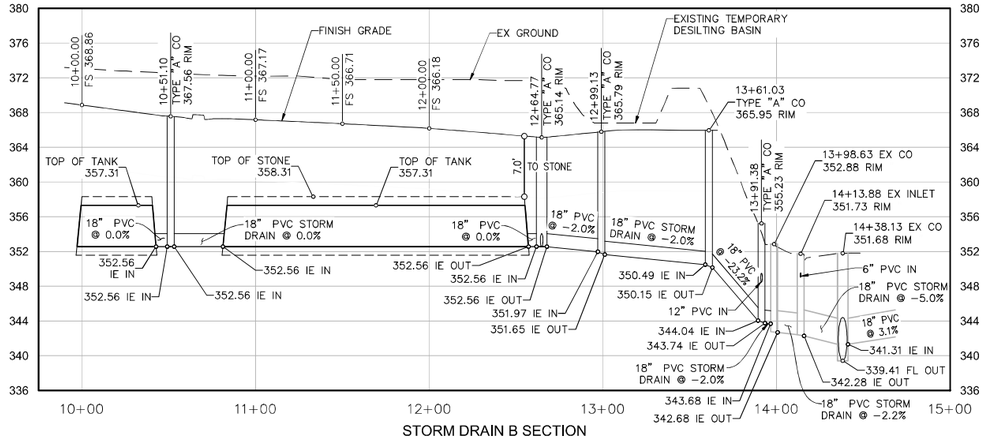
COUNTY OF SAN DIEGO TRACT NO. ____
County of San Diego, California

SHEET NO. 10 OF 18



STORM DRAIN A SECTION

SCALE: HORZ: 1" = 40'
VERT: 1" = 8'



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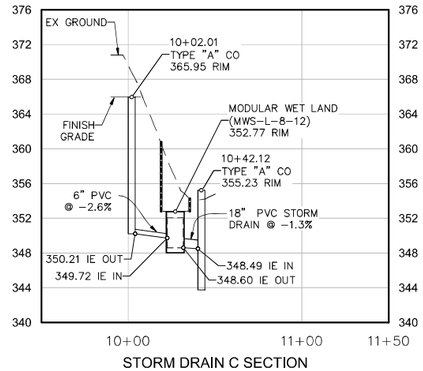
SCALE: HORZ: 1" = 40'
VERT: 1" = 8'



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SCALE: HORZ: 1" = 40'
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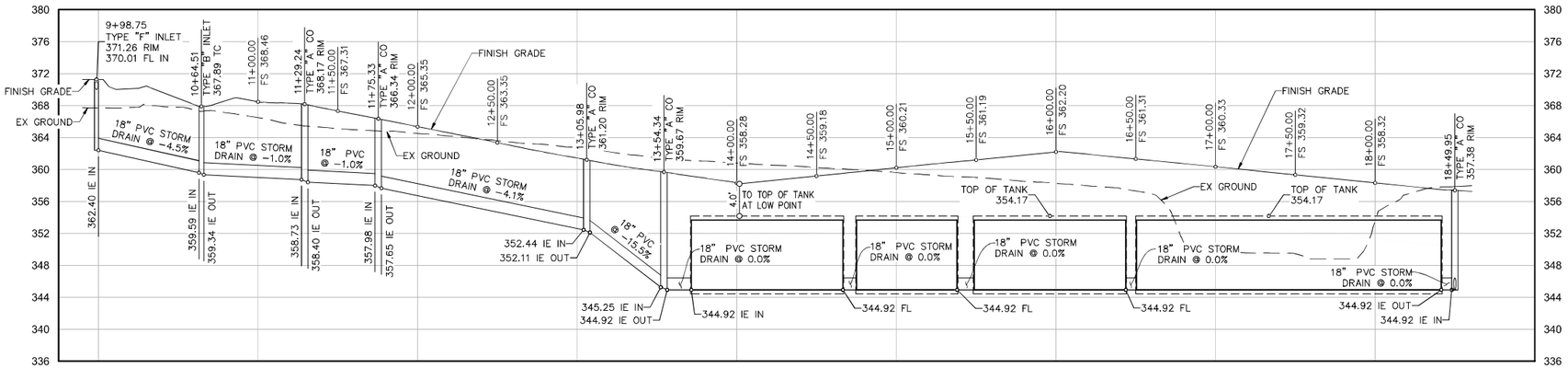

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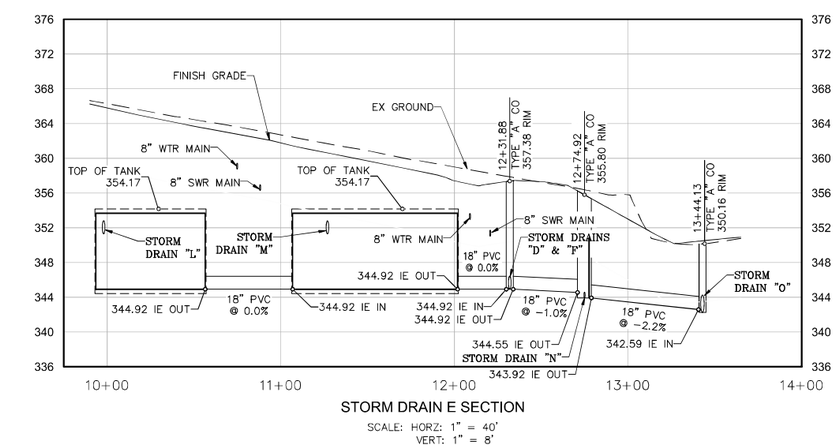
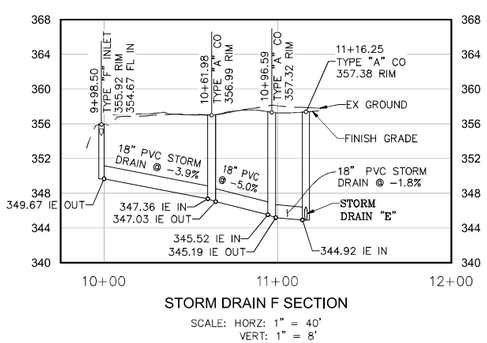
SCALE: HORZ: 1" = 40'
VERT: 1" = 8'



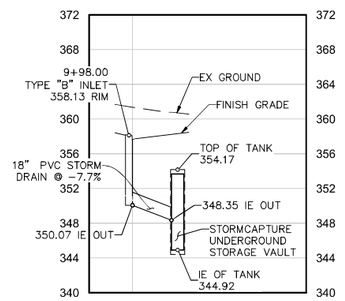
STORM DRAIN E SECTION

SCALE: HORZ: 1" = 40'
VERT: 1" = 8'



STORM DRAIN F SECTION

SCALE: HORZ: 1" = 40'
VERT: 1" = 8'



STORM DRAIN G SECTION

SCALE: HORZ: 1" = 40'
VERT: 1" = 8'

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JOB NO. 1581

PRELIMINARY GRADING PLAN
PASSERELLE
COUNTY OF SAN DIEGO TRACT NO. ____
County of San Diego, California

SHEET NO.
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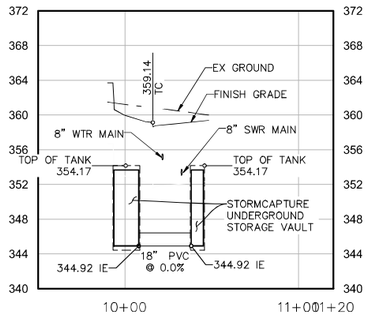
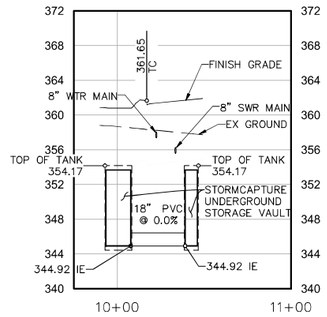
SAVE DATE: 8/17/2023 ~ PLOT DATE: 8/17/2023 ~ FILE NAME: P:\Acad\1581 Campus Park Condo\Civil\Preliminary Grading Plan\Preliminary Grading Plan.dwg



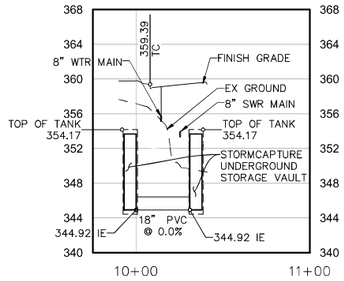
STORM DRAIN H SECTION

SCALE: HORZ: 1" = 40'
VERT: 1" = 8'



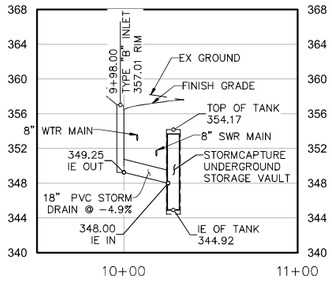
STORM DRAIN I SECTION

SCALE: HORZ: 1" = 40'
VERT: 1" = 8'



STORM DRAIN J SECTION

SCALE: HORZ: 1" = 40'
VERT: 1" = 8'



STORM DRAIN K SECTION

SCALE: HORZ: 1" = 40'
VERT: 1" = 8'

STORM DRAIN L SECTION

SCALE: HORZ: 1" = 40'
VERT: 1" = 8'

STORM DRAIN M SECTION

SCALE: HORZ: 1" = 40'
VERT: 1" = 8'

STORM DRAIN N SECTION

SCALE: HORZ: 1" = 40'
VERT: 1" = 8'

STORM DRAIN O SECTION

SCALE: HORZ: 1" = 40'
VERT: 1" = 8'

STORM DRAIN P SECTION

SCALE: HORZ: 1" = 40'
VERT: 1" = 8'

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BY	DATE	DESCRIPTION

JOB NO. 1581

PRELIMINARY GRADING PLAN
PASSERELLE
COUNTY OF SAN DIEGO TRACT NO. ____
County of San Diego, California

SHEET NO.
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SAVE DATE: 8/17/2023 ~ PLOT DATE: 8/17/2023 ~ FILE NAME: P:\Acad\1581 Campus Park Condo\Civil\Preliminary Grading Plan\Preliminary Grading Plan.dwg

LEGEND

ITEM	CALTRANS #	SYMBOL
RIPRAP ENERGY DISSIPATOR	SS-10	
SILT FENCE	SE-1	
STORM DRAIN INLET PROTECTION	SE-10	
GRAVEL BAGS	SE-6, SE-8	
DRAINAGE SWALE		
STABILIZED CONSTRUCTION ENTRANCE	TC-1	
FIBER ROLL:	SE-5	FR FR

ITEM	CALTRANS #	SYMBOL
MATERIAL DELIVERY & STORAGE:	WM-1	WM-1
STOCKPILE MANAGEMENT:	WM-3	WM-3
SPILL PREVENTION AND CONTROL:	WM-4	WM-4
SOLID WASTE MANAGEMENT:	WM-5	WM-5
HAZARDOUS WASTE MANAGEMENT:	WM-6	WM-6
CONCRETE WASTE MANAGEMENT:	WM-8	WM-8
SANITARY WASTE MANAGEMENT:	WM-9	WM-9
WATER CONSERVATION PRACTICES:	NS-1	NS-1
PAVING AND GRINDING OPERATIONS:	NS-3	NS-3
VEHICLE AND EQUIPMENT MAINT.	NS-10	NS-10
STREET SWEEPING AND VACUUMING:	SE-7	SE-7
HYDRAULIC MULCH:	SS-3	SS-3
HYDROSEEDING:	SS-4	SS-4
PAD STABILIZATION:	SS-5	SS-5

40 20 0 40 80 120

SCALE: 1" = 40'

MESSARA STREET

FRIESIAN WAY

HORSE RANCH CREEK ROAD

STABILIZED CONSTRUCTION ENTRANCE TC-1

STABILIZED CONSTRUCTION ENTRANCE TC-1

UNDERGROUND STORM WATER STORAGE TANK

UNDERGROUND STORM WATER STORAGE TANK

WATER QUALITY MODULAR WETLAND

WATER QUALITY MODULAR WETLAND

CONNECT TO EXISTING STORM DRAIN SYSTEM

CONNECT TO EXISTING STORM DRAIN SYSTEM

STABILIZED CONSTRUCTION ENTRANCE TC-1

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JOB NO. 1581

PRELIMINARY GRADING PLAN ~ BMP PLAN

PASSERELLE

COUNTY OF SAN DIEGO TRACT NO. _____
County of San Diego, California

SHEET NO.
13 OF 18

SAVE DATE: 8/17/2023 ~ PLOT DATE: 8/17/2023 ~ FILE NAME: P:\Acad\1581 Campus Park Condo\Civil\Preliminary Grading Plan\Preliminary Grading Plan.dwg

LEGEND

- EX. STORM DRAIN
- PROP. STORM DRAIN
- EX. INLET/CATCHBASIN/CLEANOUT
- DRAINAGE MANAGEMENT AREA BOUNDARY
- DRAINAGE DIRECTION
- PROP. INLET/CATCHBASIN/CLEANOUT

SITE DESIGN BMPS

- [SC-1] PREVENTION OF ILLICIT DISCHARGES INTO THE MS4
- [SC-5] PROTECT TRASH STORAGE AREAS FROM RAINFALL, RUN-ON, RUNOFF, AND WIND DISPERSAL
- [SC-6D1] NEED FOR FUTURE INDOOR & STRUCTURAL PEST CONTROL
- [SC-6D2] LANDSCAPE/OUTDOOR PESTICIDE USE
- [SC-6G] REFUSE AREAS
- [SC-6N] FIRE SPRINKLER TEST WATER
- [SC-6O] MISCELLANEOUS DRAIN OR WASH WATER
- [SC-6Q] PLAZAS, SIDEWALKS, AND PARKING LOTS

SOURCE CONTROL BMPS

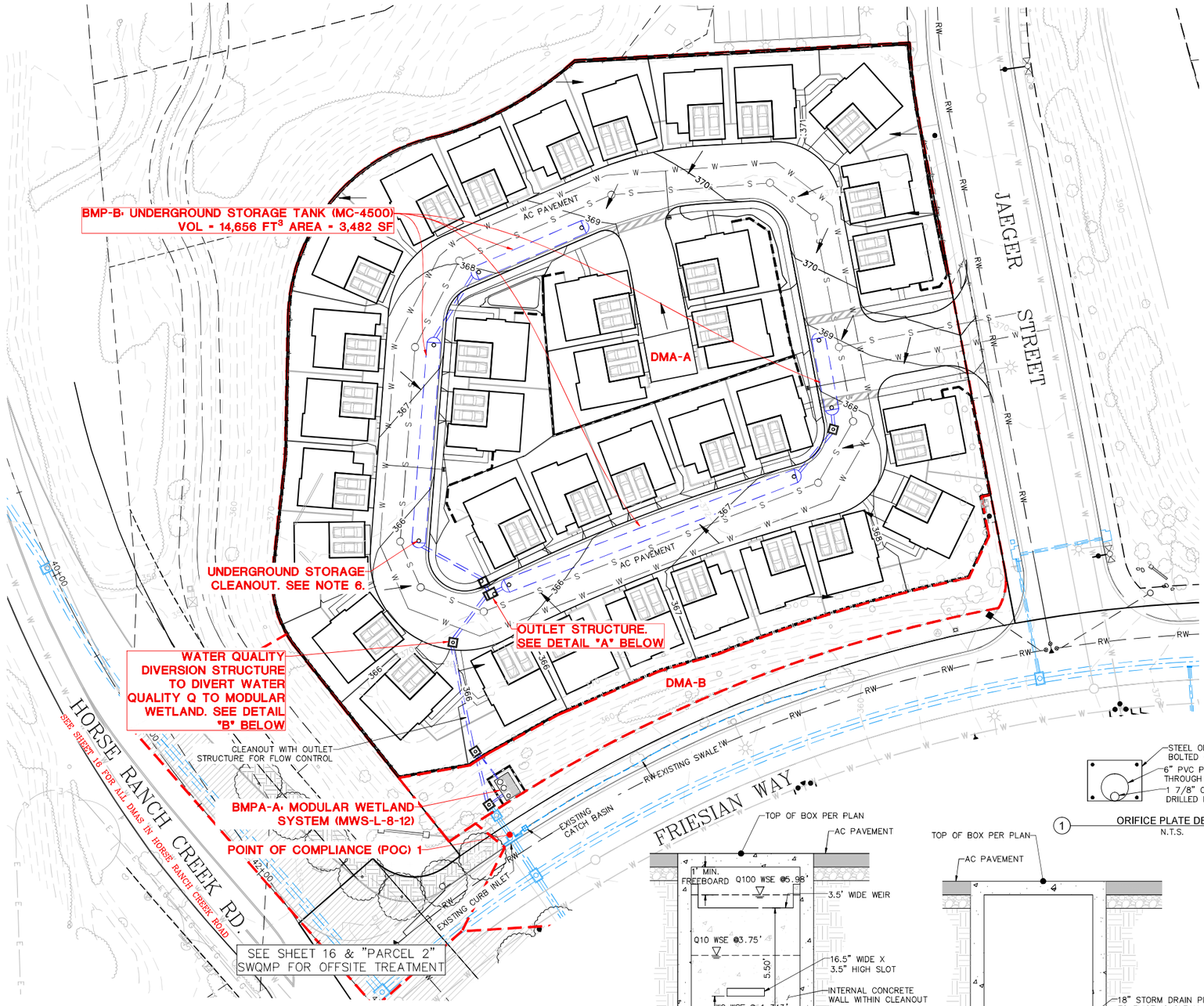
- [SD-3] MINIMIZE IMPERVIOUS AREA
- [SD-4] MINIMIZE SOIL COMPACTION
- [SD-5] IMPERVIOUS AREA DISPERSION
- [SD-6] RUNOFF COLLECTION
- [SD-7] LANDSCAPING WITH NATIVE OR DROUGHT TOLERANT SPECIES

POST-CONSTRUCTION BMPS

- MODULAR WETLAND SYSTEM (BF-3)
- UNDERGROUND STORAGE TANK

NOTES

1. CCSYA: NONE. SEE EXHIBIT IN ATTACHMENT 9
2. HYDROLOGIC SOIL GROUP: TYPE C PER COUNTY SOIL MAP
3. APPROXIMATE DEPTH TO GROUNDWATER: >10' (PREGRADED LOT)
4. EXISTING HYDRAULIC FEATURES: NONE
5. EACH UNIT ASSUMED TO HAVE A 32'X10' MINIMUM IMPERVIOUS PATIO (NOT SHOWN)
6. UNDERGROUND STORAGE MAINTENANCE ACCESS VIA CLEANOUT.



30 15 0 30 60 90

SCALE: 1" = 30'

DMA & BMP SUMMARY TABLE								
DMA	DMA TYPE	BMP	TOTAL AREA (SF)	TOTAL AREA (AC)	IMPERVIOUS AREA (SF)	IMPERVIOUS AREA (AC)	PERVIOUS AREA (SF)	PERVIOUS AREA (AC)
A	DRAINS TO BMP	BMP-A: MODULAR WETLAND SYSTEM (BF-2) & BMP-B: UNDERGROUND STORAGE TANK	119,764	2.749	91,623	2.103	28,141	0.646
B	SELF-MITIGATING	N/A	8,497	0.195	0	0.000	8,497	0.195
TOTAL			128,261	2.944	91,623	2.103	36,638	0.841

NOTE: THE BOTTOM OF THE GRAVEL STORAGE LAYER FOR BMP-A IS 6" BELOW THE INVERT OF THE ORIFICE

A OUTLET STRUCTURE

SCALE: 1"=2'

1 ORIFICE PLATE DETAIL

N.T.S.

B WQ DIVERSION STRUCTURE

SCALE: 1"=2'

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BY	DATE	DESCRIPTION

JOB NO. 1581

POST DEVELOPED DMA & HMP EXHIBIT
PASSERELLE (PARCEL 1)
COUNTY OF SAN DIEGO TRACT NO. ____
County of San Diego, California

SHEET NO.
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LEGEND

- EX. STORM DRAIN
- PROP. STORM DRAIN
- EX. INLET/CATCHBASIN/CLEANOUT
- DRAINAGE MANAGEMENT AREA BOUNDARY

SITE DESIGN BMPS

- SC-1 PREVENTION OF ILLICIT DISCHARGES INTO THE MS4
- SC-2 STORM DRAIN STENCILING OR SIGNAGE
- SC-5 PROTECT TRASH STORAGE AREAS FROM RAINFALL, RUN-ON, RUNOFF, AND WIND DISPERSAL
- SC-6A ON-SITE STORM DRAIN INLETS
- SC-6D NEED FOR FUTURE INDOOR & STRUCTURAL PEST CONTROL
- SC-6E LANDSCAPE/OUTDOOR PESTICIDE USE
- SC-6H REFUSE AREAS
- SC-6O FIRE SPRINKLER TEST WATER
- SC-6P MISCELLANEOUS DRAIN OR WASH WATER
- SC-6Q PLAZAS, SIDEWALKS, AND PARKING LOTS

SOURCE CONTROL BMPS

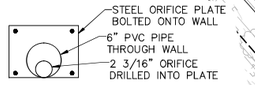
- SD-1 MAINTAIN NATURAL DRAINAGE PATHWAYS AND HYDROLOGIC FEATURES
- SD-3 MINIMIZE IMPERVIOUS AREA
- SD-4 MINIMIZE SOIL COMPACTION
- SD-5 IMPERVIOUS AREA DISPERSION
- SD-6 RUNOFF COLLECTION
- SD-7 LANDSCAPING WITH NATIVE OR DROUGHT TOLERANT SPECIES

POLLUTANT CONTROL BMPS

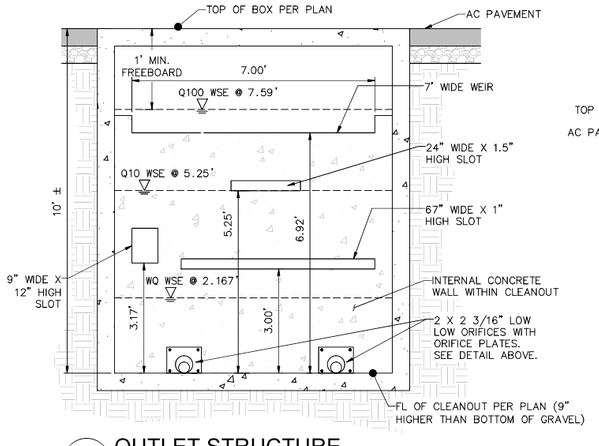
- MODULAR WETLAND SYSTEM (BF-3)
- STORMDRAIN PIPE
- UNDERGROUND DETENTION TANK

NOTES

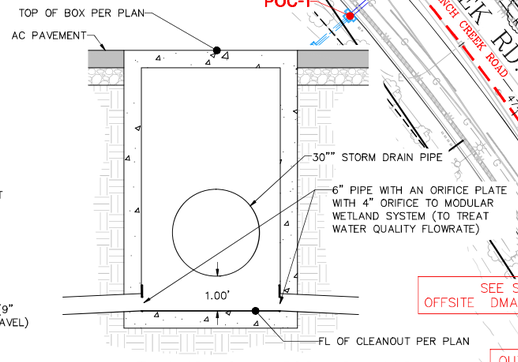
1. CCSYA: NONE. SEE EXHIBIT IN ATTACHMENT 9
2. HYDROLOGIC SOIL GROUP: TYPE C PER COUNTY SOIL MAP
3. THE UNDERGROUND DETENTION SYSTEM (BMP-A) IS COMPRISED OR A SERIES OF OLDCASTLE STORMCAPTURE TANKS (A = 3,072 SF, VOL = 52,704 CFT)
4. APPROXIMATE DEPTH TO GROUNDWATER: >10' (PREGRADED LOT)
5. EXISTING HYDRAULIC FEATURES: NONE
6. EACH UNIT ASSUMED TO HAVE A 32'X10' MINIMUM IMPERVIOUS PATIO (NOT SHOWN)
7. UNDERGROUND STORAGE MAINTENANCE ACCESS VIA CLEANOUT.



1 ORIFICE PLATE DETAIL
N.T.S.



A OUTLET STRUCTURE
SCALE: 1"=2'



B WQ DIVERSION STRUCTURE
SCALE: 1"=2'

DMA & BMP SUMMARY TABLE						
AREA	IMPERVIOUS (AC)	PERVIOUS (AC)	TOTAL AREA (AC)	DMA TYPE	BMP	POC
DM-A	5.947	1.758	7.705	DRAINS TO BMP	BMP-A: UNDERGROUND STORAGE TANK & BMP-B: MODULAR WETLAND SYSTEM (BF-2)	1
DM-B	0.061	0.030	0.091	DRAINS TO BMP	BMP-B: MODULAR WETLAND SYSTEM (BF-2)	1
DMA-C	0.003	0.615	0.618	DRAINS TO BMP	BMP-A: UNDERGROUND STORAGE TANK & BMP-B: MODULAR WETLAND SYSTEM (BF-2)	1
DMA-D	0.000	0.165	0.165	SELF-MITIGATING	N/A	2
DMA-E	0.000	0.050	0.050	SELF-MITIGATING	N/A	3
TOTAL	6.011	2.618	8.629	—	—	—

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JOB NO. 1581

POST DEVELOPED DMA & HMP EXHIBIT
PASSERELLE (PARCEL 2)
COUNTY OF SAN DIEGO TRACT NO. ____
County of San Diego, California

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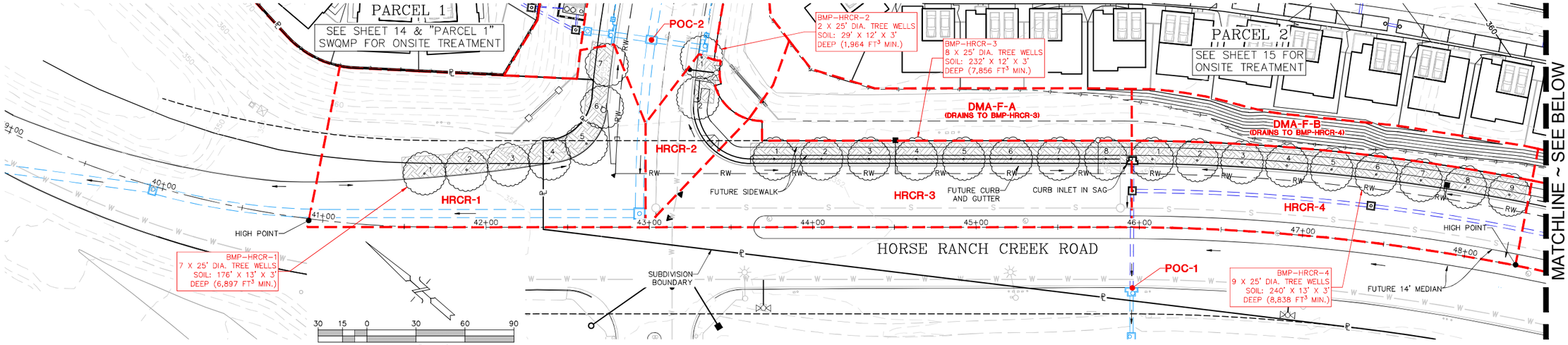

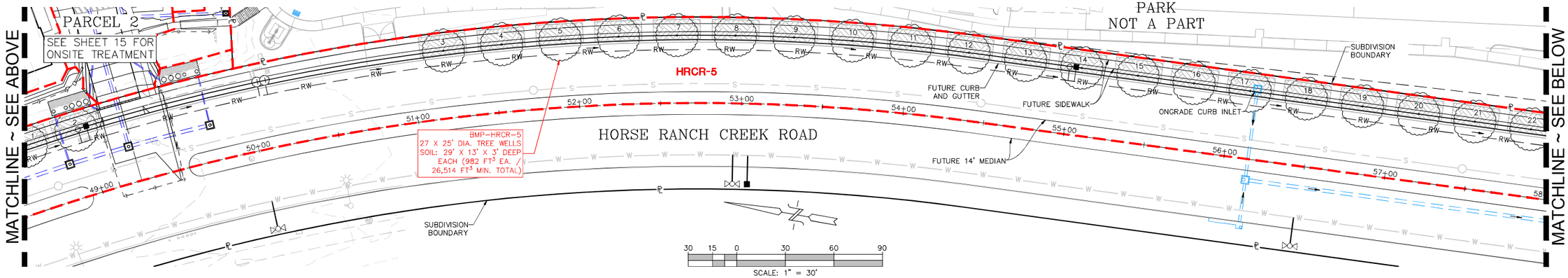

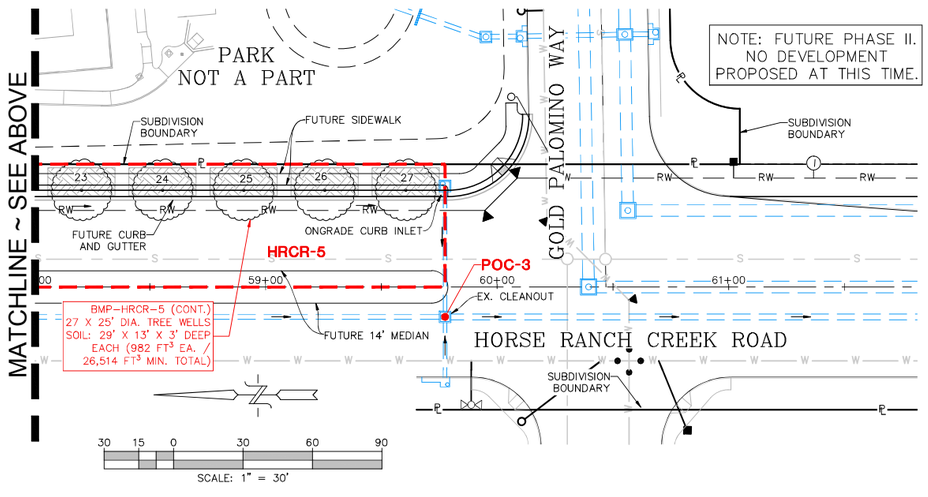

DMA & BMP SUMMARY TABLE

DMA	POC	DMA TYPE	BMP	TOTAL AREA (SF)	TOTAL AREA (AC)	IMPERVIOUS AREA (SF)	IMPERVIOUS AREA (AC)	PERVIOUS AREA (SF)	PERVIOUS AREA (AC)
HRCR-1	1	DRAINS TO BMP	BMP-HRCR-1: Tree Well (SD-A)	18,827	0.432	8,300	0.191	10,527	0.242
HRCR-2	1	DRAINS TO BMP	BMP-HRCR-2: Tree Well (SD-A)	3,254	0.075	2,577	0.059	677	0.016
HRCR-3	2	DRAINS TO BMP	BMP-HRCR-3: Tree Well (SD-A)	14,616	0.336	10,681	0.245	3,935	0.090
DMA-F-A	2	DRAINS TO BMP	BMP-HRCR-3: Tree Well (SD-A)	7,931	0.182	0	0.000	7,931	0.182
HRCR-4	2	DRAINS TO BMP	BMP-HRCR-4: Tree Well (SD-A)	12,802	0.294	8,935	0.205	3,867	0.089
DMA-F-B	2	DRAINS TO BMP	BMP-HRCR-4: Tree Well (SD-A)	5,565	0.128	0	0.000	5,565	0.128
HRCR-5	3	DRAINS TO BMP	BMP-HRCR-5: Tree Well (SD-A)	61,406	1.410	43,575	1.000	17,831	0.409
			TOTAL	124,401	2.856	74,068	1.700	50,333	1.155

LEGEND

- EX. STORM DRAIN
- PROP. STORM DRAIN
- EX. INLET/CATCHBASIN/CLEANOUT
- DRAINAGE MANAGEMENT AREA BOUNDARY
- DIRECTION OF FLOW
- TREE WELL (SD-A)

NOTES

1. ALL TREE WELLS ARE PER SAN DIEGO COUNTY DEPARTMENT OF PUBLIC WORKS GREEN STREET STANDARD DRAWING GS-1.02. SEE DETAIL ON SHEET 18
2. TREE WELLS TO HAVE STRUCTURAL SOIL.
3. THE REMAINDER PARCEL IS PHASE II OF THE PROJECT. NO DEVELOPMENT IS PROPOSED AT THIS TIME. THE BMPS FOR PHASE II ONSITE AND FRONTAGE IMPROVEMENTS WILL BE DESIGNED PER A SUBSEQUENT PERMIT APPLICATION.

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JOB NO. 1581

POST DEVELOPED DMA & HMP EXHIBIT
PASSERELLE
COUNTY OF SAN DIEGO TRACT NO. _____
County of San Diego, California

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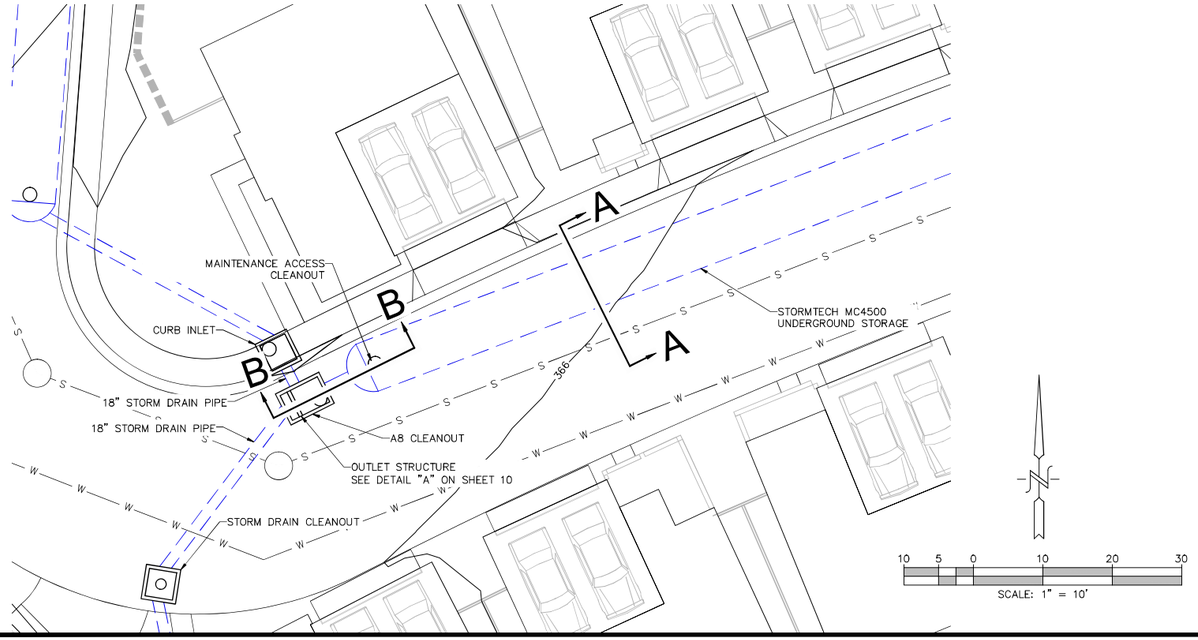
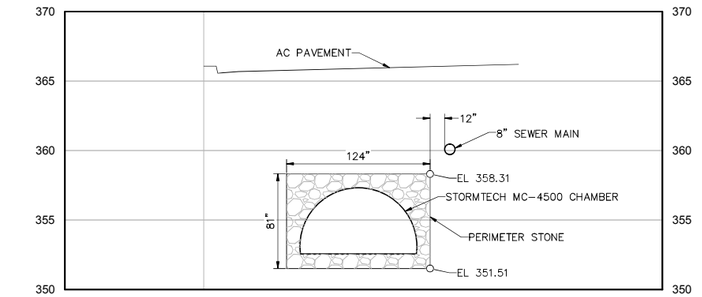
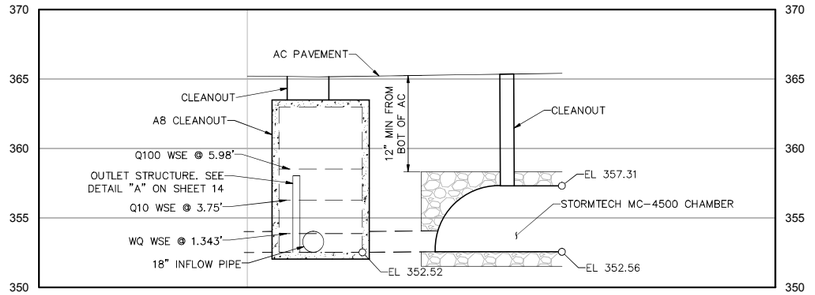
PARCEL 1 ~ BMP SECTIONS

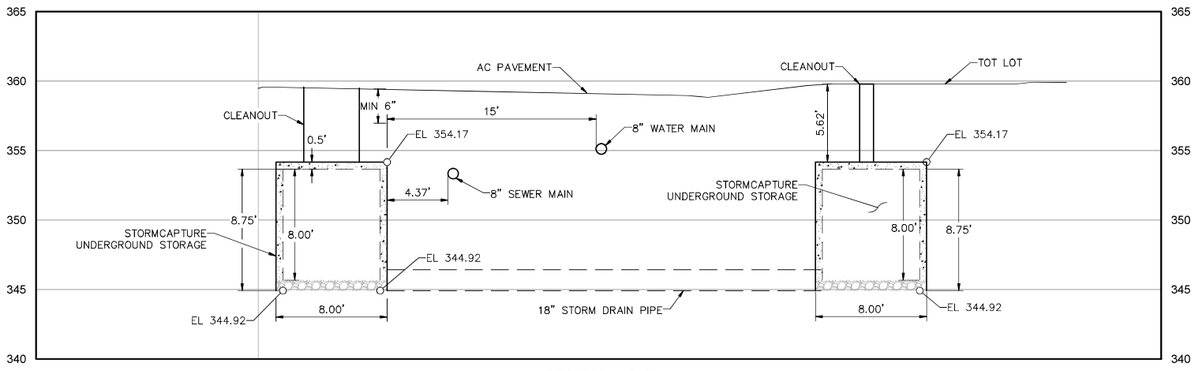




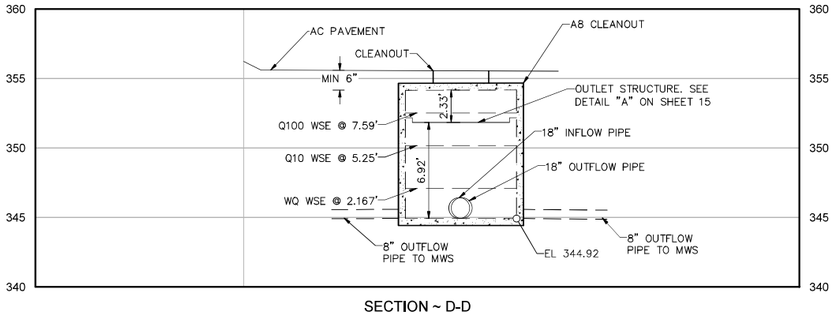
SECTION ~ A-A
SCALE: HORZ: 1" = 5'
VERT: 1" = 5'



SECTION ~ B-B
SCALE: HORZ: 1" = 5'
VERT: 1" = 5'



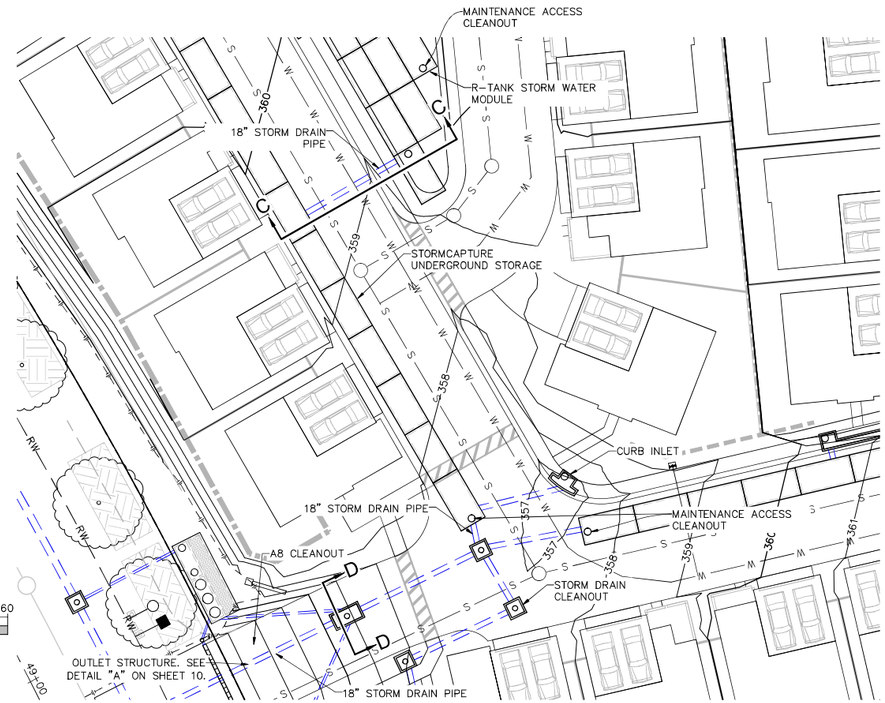
SECTION ~ C-C
SCALE: HORZ: 1" = 5'
VERT: 1" = 5'



SECTION ~ D-D
SCALE: HORZ: 1" = 5'
VERT: 1" = 5'

20 10 0 20 40 60
SCALE: 1" = 20'

PARCEL 2 ~ BMP SECTIONS



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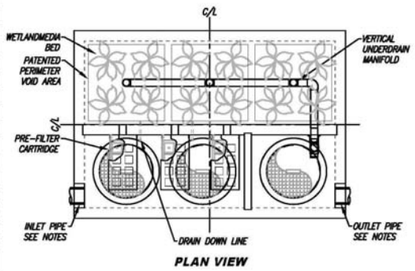
JOB NO. 1581

POST DEVELOPED CROSS SECTION DETAILS
PASSERELLE (PARCELS 1&2)
COUNTY OF SAN DIEGO TRACT NO. ____
County of San Diego, California

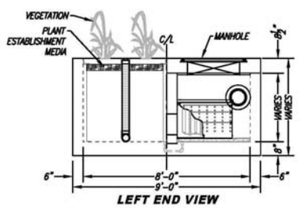
SHEET NO.
17 OF 18

SITE SPECIFIC DATA			
PROJECT NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
FLOW BASED (CFS)			
0.345			
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			OFFLINE
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2	N/A	N/A	N/A
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD	PEDESTRIAN		
NOTES:			

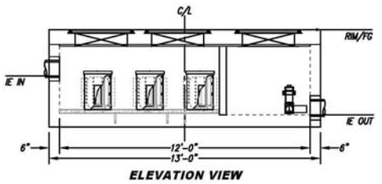
* PRELIMINARY NOT FOR CONSTRUCTION



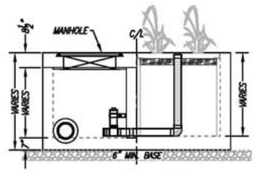
PLAN VIEW



LEFT END VIEW



ELEVATION VIEW



RIGHT END VIEW

INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURERS' SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE FOR VERIFYING PROJECT ENGINEER'S RECOMMENDED BASE SPECIFICATIONS.
4. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATERTIGHT PER MANUFACTURER'S STANDARD CONNECTION DETAIL.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL PIPES, RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO USE GROUT AND/OR BRICKS TO MATCH COVERS WITH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
6. VEGETATION SUPPLIED AND INSTALLED BY OTHERS. ALL UNITS WITH VEGETATION MUST HAVE DRIP OR SPRAY IRRIGATION SUPPLIED AND INSTALLED BY OTHERS.
7. CONTRACTOR RESPONSIBLE FOR CONTACTING CONTECH FOR ACTIVATION OF UNIT. MANUFACTURER'S WARRANTY IS VOID WITHOUT PROPER ACTIVATION BY A CONTECH REPRESENTATIVE.

GENERAL NOTES

1. MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT CONTECH.

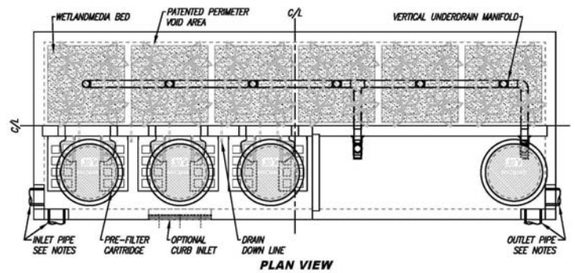
TREATMENT FLOW (CFS)	0.345
OPERATING HEAD (FT)	3.4
PRETREATMENT LOADING RATE (GPM/SF)	2.0
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

MODULAR WETLANDS — FOR PROJECT INFORMATION, GO TO www.ContechES.com/mws

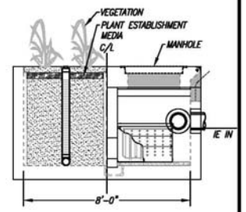
CONTECH ENGINEERED SOLUTIONS LLC www.ContechES.com

MWS-L-8-12-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL

SITE SPECIFIC DATA			
PROJECT NUMBER			
PROJECT NAME			
PROJECT LOCATION			
STRUCTURE ID			
TREATMENT REQUIRED			
TREATMENT FLOW (CFS)			
OPERATING HEAD (FT)			
PRETREATMENT LOADING RATE (GPM/SF)			
WETLAND MEDIA LOADING RATE (GPM/SF)			
PEAK BYPASS REQUIRED (CFS) – IF APPLICABLE			
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION			
SURFACE LOAD			
NOTES:			



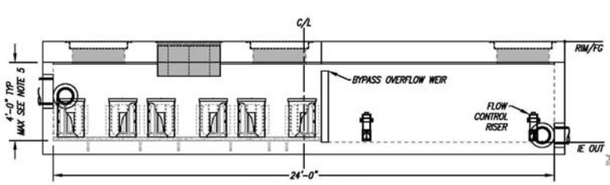
PLAN VIEW



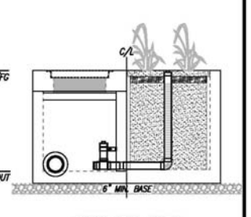
LEFT END VIEW

INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURER'S SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S CONTRACT.
2. UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE FOR VERIFYING PROJECT ENGINEER'S RECOMMENDED BASE SPECIFICATIONS.
3. CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATERTIGHT PER MANUFACTURER'S STANDARD CONNECTION DETAIL.
4. CONTRACTOR RESPONSIBLE FOR CONTACTING CONTECH FOR ACTIVATION OF UNIT. MANUFACTURER'S WARRANTY IS VOID WITHOUT PROPER ACTIVATION BY A CONTECH REPRESENTATIVE.
5. VERTICAL HEIGHT VARIES BASED ON SITE SPECIFIC REQUIREMENTS.



ELEVATION VIEW

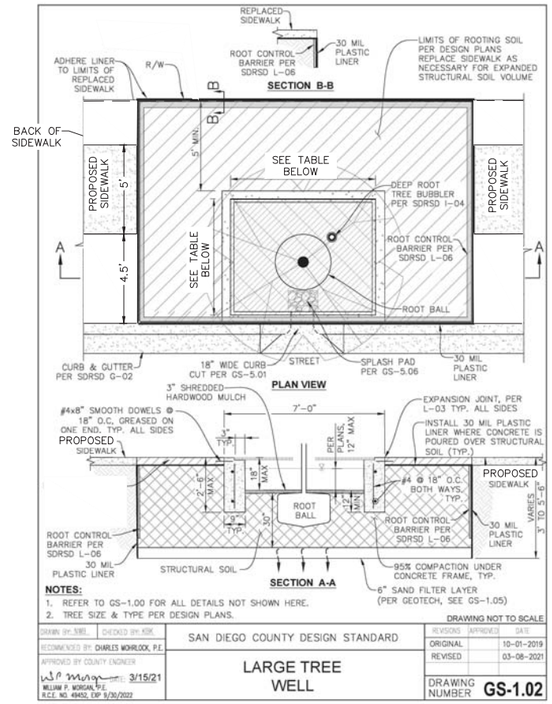


RIGHT END VIEW

MODULAR WETLANDS — FOR PROJECT INFORMATION, GO TO www.ContechES.com/mws

CONTECH ENGINEERED SOLUTIONS LLC www.ContechES.com

MWS-L-8-24-V
STORMWATER BIOFILTRATION SYSTEM
STANDARD DETAIL



TREE WELL DIMENSIONS					
DMA	HRCR-1	HRCR-2	HRCR-3	HRCR-4	HRCR-5
LENGTH (FT)	26.0	20.0	29.0	29.0	29.0
WIDTH (FT)	13.0	16.5	12.0	12.0	12.0
DEPTH (FT)	3.0	3.0	3.0	3.0	3.0

R·E·C Consultants, Inc.
Civil Engineering • Environmental
2970 FIFTHE AVENUE, SUITE 340
SAN DIEGO, CA 92103
(619)232-9200 (619)232-9210 Fax

REVISIONS | BY | DATE | DESCRIPTION

JOB NO. 1581

MODULAR WETLANDS STANDARD DETAILS
PASSERELLE (PARCELS 1&2)
COUNTY OF SAN DIEGO TRACT NO. ____
County of San Diego, California

SHEET NO.
18 OF 18

Appendix B – Drainage Map

LEGEND:
BASIN BOUNDARY
SUB-BASIN BOUNDARY
FLOW PATH (TC)

SUBBASIN DESIGNATOR
AREA (AC)
SUBAREA Q (CFS)

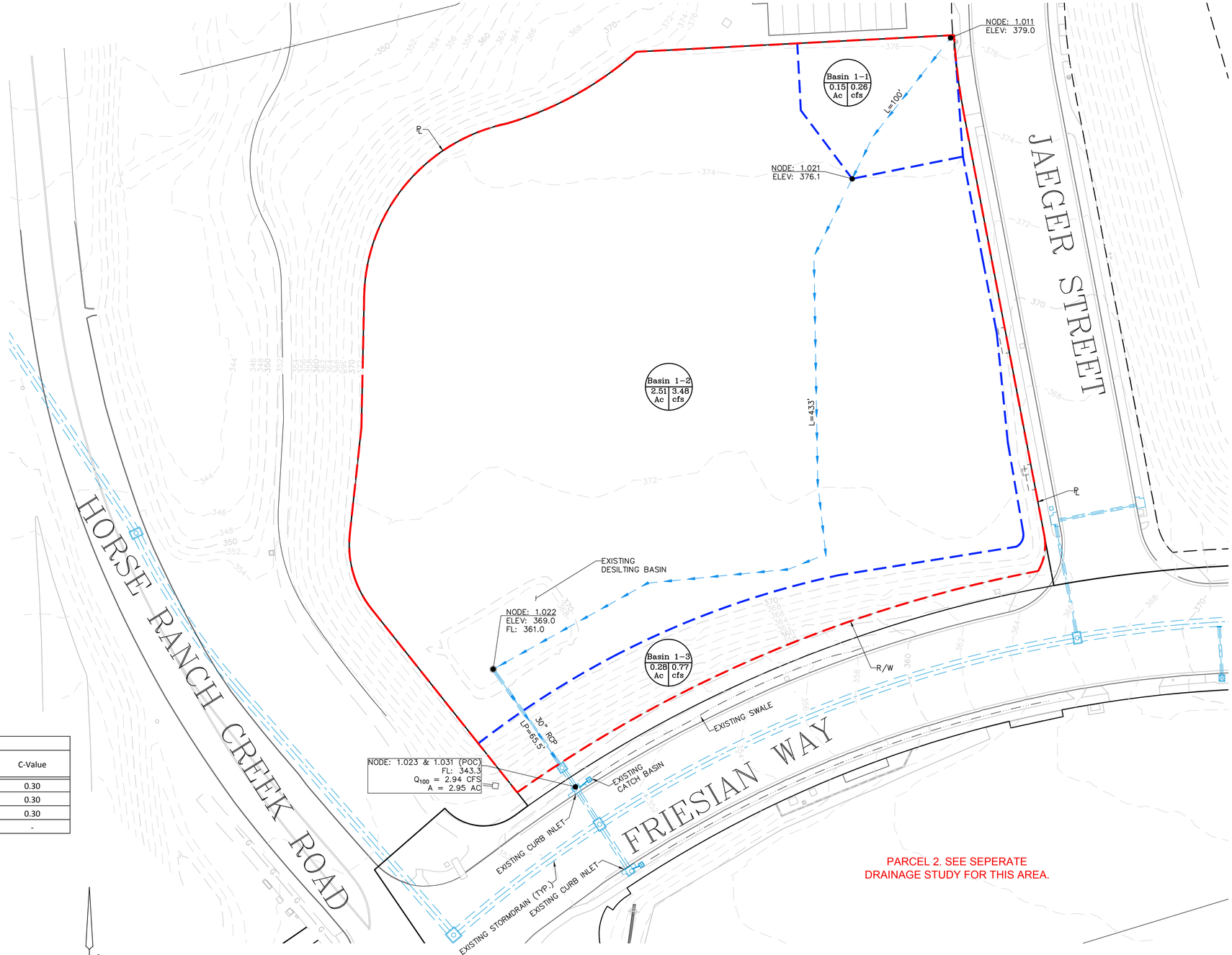
BASIN
SUB-BASIN
POINT WITHIN SUB-BASIN
NODE: 1.022
ELEV: 369.0 — ELEVATION
FL: 361.0 — FLOW LINE ELEVATION IN STORMDRAIN

NOTES:
1. SOIL: TYPE C PER COUNTY SOIL MAP
2. BASIN 1-3 WAS INPUTTED AS A USER-DEFINED FLOW WITH AN ASSUMED TC OF 5.0 MINUTES DUE TO THE SMALL BASIN AREA, STEEP SLOPE, AND GUTTER FLOW.

Pre-Developed				
Sub-Basin	Total Area (ac)	Impervious Area (ac)	Pervious Area (ac)	C-Value
1-1	0.15	0.00	0.15	0.30
1-2	2.51	0.00	2.51	0.30
1-3	0.28	0.00	0.28	0.30
Total	2.95	0.00	2.95	-

ABBREVIATIONS:
L = LENGTH
Lp = PIPE LENGTH
ELEV = ELEVATION
FL = FLOW LINE OF PIPE
POC = POINT OF COMPARISON
AC = ACRES
CFS = CUBIC FEET PER SECOND
Q, Q_{100} = 100-YEAR FLOW RATE IN CFS

30 15 0 30 60 90
SCALE: 1" = 30'



NO.	DESCRIPTION	DATE	APP'D

REVISIONS

Civil Engineering • Environmental
Land Surveying
2442 Second Avenue
San Diego, CA 92101
(619)232-9200 (619)232-9210 Fax
R·E·C
Consultants, Inc.

DATE: 1/18/2022
SCALE: 1" = 30'
DRAWN: WOG
CHECKED: WOG

SHEET TITLE: PRE-DEV. DRAINAGE MAP
PROJECT: CAMPUS PARK CONDOS (PARCEL 1)
Horse Ranch Creek Rd
Fallbrook, CA 92028

SHEET 1 OF 1 SHEETS

SAVE DATE: 2/25/2021 ~ PLOT DATE: 1/18/2022 ~ FILE NAME: P:\Acad\1581 Campus Park Condo\Reports\Drainage Study\Parcel 1\CAD\DRAINAGE-PRE.dwg

SUBBASIN DESIGNATOR
AREA (AC)
SUBAREA Q (CFS)

BASIN
SUB-BASIN
POINT WITHIN SUB-BASIN
NODE: 1.022
ELEV: 369.0 — ELEVATION
FL: 361.0 — FLOW LINE ELEVATION IN STORMDRAIN

LEGEND:

BASIN BOUNDARY
SUB-BASIN BOUNDARY
FLOW PATH (TC)

NOTES:

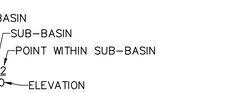
1. SOIL: TYPE C PER COUNTY SOIL MAP
2. BASIN 2-1 WAS INPUTTED AS A USER-DEFINED FLOW WITH AN ASSUMED TC OF 5.0 MINUTES DUE TO THE SMALL BASIN AREA, STEEP SLOPE, AND GUTTER FLOW.
3. THE UNDERGROUND DETENTION SYSTEM USES STORMTECH MC4500 UNDERGROUND STORAGE UNITS.
   TOTAL FOOTPRINT = 3,482 SF
   TOTAL AVAILABLE STORAGE = 14,656 CFT.

ABBREVIATIONS:

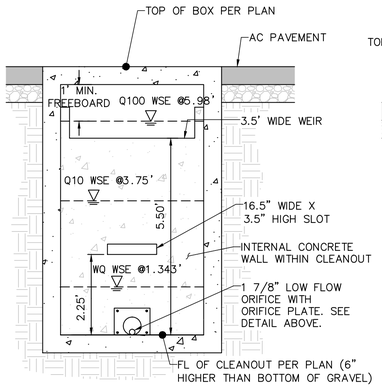
L = LENGTH
Lp = PIPE LENGTH
ELEV = ELEVATION
FL = FLOW LINE OF PIPE
POC = POINT OF COMPARISON
TC = TIME OF CONCENTRATION
AC = ACRES
CFS = CUBIC FEET PER SECOND
Q, Q_{100} = 100-YEAR FLOW RATE IN CFS
WSE = WATER SURFACE ELEVATION

Post-Developed				
Sub-Basin	Total Area (ac)	Impervious Area (ac)	Pervious Area (ac)	C-Value
1-1	0.07	0.05	0.01	0.78
1-2	2.68	2.15	0.54	0.78
2-1	0.20	0.16	0.04	0.30
Total	2.95	2.36	0.59	-

THE C-VALUE FOR HIGH DENSITY RESIDENTIAL 43 DU/AC TYPE C SOIL ACCORDING TO TABLE 3-1 OF THE HYDROLOGY MANUAL WAS USED FOR ALL ONSITE DEVELOPED AREAS.

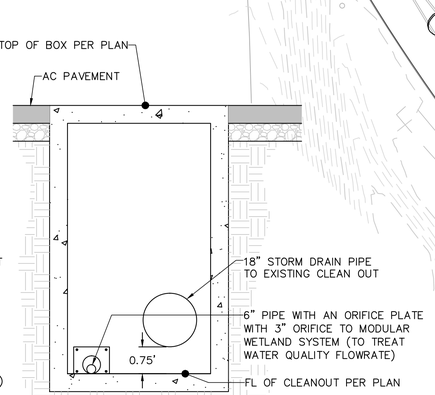


1 ORIFICE PLATE DETAIL
N.T.S.



NOTE: THE BOTTOM OF THE GRAVEL STORAGE LAYER FOR BMP-A IS 6" BELOW THE INVERT OF THE ORIFICE

A OUTLET STRUCTURE
SCALE: 1"=2'



B WQ DIVERSION STRUCTURE
SCALE: 1"=2'

30 15 0 30 60 90
SCALE: 1" = 30'

REVISIONS			
NO.	DESCRIPTION	DATE	APP'D

R·E·C Consultants, Inc.
Civil Engineering Environmental
Land Surveying
2442 Second Avenue
San Diego, CA 92101
(619)232-9200 (619)232-9210 Fax

DATE: 1/31/22
SCALE: 1" = 30'
DRAWN: WOG
CHECKED: WOG

SHEET TITLE: POST-DEV. DRAINAGE MAP
PROJECT: CAMPUS PARK CONDOS (PARCEL 1)
Horse Ranch Creek Rd
FallbrookK, CA 92028

SHEET 1 OF 1 SHEETS

SAVE DATE: 8/10/2023 ~ PLOT DATE: 8/22/2023 ~ FILE NAME: P:\Vicad\1581 Campus Park Condo\Reports\Drainage Study\Parcel 1\CAD\DRAINAGE-POST.dwg

108-12 Z
SHT 1 OF 4 1"=400'
01/25/19 ARS

1* NO ACCESS
2* FOR BRGS & DISTS REFER TO PM21006
3* FOR BRGS & DISTS REFER TO M16183

CHANGES				
BLK	OLD	NEW	YR	CUT
120	30 & 46-51	SAME		
121	11-14	AC. CHG.	83	6282
120	30,46,48	52-54	84	3885
121	11	15 & POR -122-13	05	1020
120	47 & 49 & 50 & 51	55-59	07	1188
121	12	16&17		
121	16&17	SAME & B/L CHG	08	5513
120	54 - 56 & 58	SAME & HWY OP		
121	15 - 17	SAME & HWY OP	12	463
120	56-59 -121-13 & POR -421-384	60-63	13	1016
120	61 & 62	SAME & ST OP	14	4709
120	60	SAME & OP SP	14	5578
121	17			
120	60	64 PG1253-55, PG42,50		RESERVED
120	52	SAME & OP SP	15	5571
120	52&54	SAME & ST OP	16	4654
	60	SAME & ST OP	16	4766
120	60 & 63	64, 69, PG50 ST&52, -421-23	18	14
121	17	18 & 19		
120	69	PG50 SHTS 4-6	18	25
120	65	SEE SHT 3	18	568
120	64	-124-01	18	10006
120	52&54	SAME & OP SP	19	5545
120	66	66 SIDS & 70	19	545

Parcel 1
Parcel 2
Caltrans ROW

DETAIL "A" 1"=200'
DETAIL "C" 1"=100'
DETAIL "D" NO SCALE
DETAIL "E" NO SCALE
DETAIL "F" NO SCALE
DETAIL "B" NO SCALE

THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSES ONLY. NO LIABILITY IS ASSUMED FOR THE ACCURACY OF THE DATA SHOWN. ASSESSOR'S PARCELS MAY NOT COMPLY WITH LOCAL SUBDIVISION OR BUILDING ORDINANCES.

SAN DIEGO COUNTY ASSESSOR'S MAP
BOOK 108 PAGE 12 SHT 1 OF 2

MAP 16183 – CO SD TCT NO 5338-2
PB 1 PG 108 & 115 – RHO MONSERATE – POR TCT A – MAP 827
ROS 9237, 20248, 21755

Appendix C – Pre-Developed Calculations

```
                San Diego County Rational Hydrology Program

      CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

      Rational method hydrology  program based on
      San Diego County Flood Control Division 2003 hydrology manual
            Rational Hydrology Study        Date: 10/31/22
      ------------------------------------------------------------------------
-
      1581 - CAMPUS PARK CONDOS PARCEL 1
      Q100, PRE-DEVELOPED


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

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


      Program License Serial Number 6292

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

      Map data precipitation entered:
      6 hour,  precipitation(inches) =  3.500
      24 hour precipitation(inches) =  6.000
      P6/P24 =    58.3%
      San Diego hydrology manual 'C' values used


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
      Process from Point/Station        1.011 to Point/Station        1.021
      **** 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 =  379.000(Ft.)
      Lowest elevation =  376.100(Ft.)
      Elevation difference =    2.900(Ft.) Slope =  2.900 %
      INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
      The maximum overland flow distance is 100.00 (Ft)
      for the top area slope value of   2.90 %, in a development type of
       Permanent Open Space
      In Accordance With Figure 3-3
```

```
Initial Area Time of Concentration =  10.10 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3000)*( 100.000^.5)/(   2.900^(1/3)]=  10.10
Rainfall intensity (I) =      5.860(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.300
Subarea runoff =      0.264(CFS)
Total initial stream area =        0.150(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.021 to Point/Station        1.022
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      2.036(CFS)
Depth of flow =   0.217(Ft.), Average velocity =   1.730(Ft/s)
      ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
      1              0.00              1.00
      2             25.00              0.00
      3             50.00              1.00
Manning's 'N' friction factor =   0.025
------------------------------------------------------------------
Sub-Channel flow  =      2.036(CFS)
  '     '    flow top width =     10.847(Ft.)
  '     '    velocity=    1.730(Ft/s)
  '     '    area =      1.177(Sq.Ft)
  '     '    Froude number =     0.926

Upstream point elevation =   376.100(Ft.)
Downstream point elevation =   369.000(Ft.)
Flow length =   433.000(Ft.)
Travel time  =    4.17 min.
Time of concentration =   14.27 min.
Depth of flow =   0.217(Ft.)
Average velocity =   1.730(Ft/s)
Total irregular channel flow =     2.036(CFS)
Irregular channel normal depth above invert elev. =   0.217(Ft.)
Average velocity of channel(s) =   1.730(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      4.689(In/Hr) for a   100.0 year storm
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
Rainfall intensity =      4.689(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.300  CA =      0.798
Subarea runoff =      3.478(CFS) for      2.510(Ac.)
Total runoff =      3.742(CFS)      Total area =       2.660(Ac.)
Depth of flow =   0.273(Ft.), Average velocity =   2.015(Ft/s)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.022 to Point/Station        1.023
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point/station elevation =   361.000(Ft.)
Downstream point/station elevation =   343.300(Ft.)
Pipe length  =    65.50(Ft.) Slope =   0.2702  Manning's N = 0.015
No. of pipes = 1  Required pipe flow  =     3.742(CFS)
Given pipe size =     30.00(In.)
Calculated individual pipe flow  =     3.742(CFS)
Normal flow depth in pipe =    2.96(In.)
Flow top width inside pipe =   17.89(In.)
Critical Depth =    7.62(In.)
Pipe flow velocity =     14.97(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    14.34 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.023 to Point/Station        1.031
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      2.660(Ac.)
Runoff from this stream =      3.742(CFS)
Time of concentration =   14.34 min.
Rainfall intensity =     4.673(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.031 to Point/Station        1.031
**** USER DEFINED FLOW INFORMATION AT A POINT ****
______________________________________________________________________
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
Rainfall intensity (I) =      9.222(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =   5.00 min.  Rain intensity =       9.22(In/Hr)
Total area =        0.280(Ac.)  Total runoff =     0.770(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.023 to Point/Station        1.031
**** CONFLUENCE OF MAIN STREAMS ****
______________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      0.280(Ac.)
```

```
Runoff from this stream =      0.770(CFS)
Time of concentration =    5.00 min.
Rainfall intensity =     9.222(In/Hr)
Summary of stream data:

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


1        3.742     14.34               4.673
2        0.770      5.00               9.222
Qmax(1) =
         1.000 *    1.000 *     3.742) +
         0.507 *    1.000 *     0.770) + =       4.132
Qmax(2) =
         1.000 *    0.349 *     3.742) +
         1.000 *    1.000 *     0.770) + =       2.074

Total of 2 main streams to confluence:
Flow rates before confluence point:
       3.742       0.770
Maximum flow rates at confluence using above data:
        4.132        2.074
Area of streams before confluence:
        2.660        0.280


Results of confluence:
Total flow rate =      4.132(CFS)
Time of concentration =    14.342 min.
Effective stream area after confluence  =      2.940(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.031 to Point/Station        1.031
**** 6 HOUR HYDROGRAPH ****
________________________________________________________________________
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Hydrograph Data - Section 6, San Diego County Hydrology manual, June
2003


Time of Concentration =  14.34
Basin Area =     2.94 Acres
6 Hour Rainfall =  3.500 Inches
Runoff Coefficient =  0.300
Peak Discharge =     4.13 CFS
     Time (Min)     Discharge (CFS)
       0               0.000
       14               0.184
       28               0.194
       42               0.200
       56               0.212
       70               0.219
       84               0.235
       98               0.244
       112               0.265
```

```
          126               0.277
          140               0.308
          154               0.326
          168               0.374
          182               0.406
          196               0.496
          210               0.565
          224               0.829
          238               1.168
          252               4.132
          266               0.665
          280               0.445
          294               0.348
          308               0.292
          322               0.254
          336               0.226
          350               0.205
          364               0.189
   ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                      6 - H O U R    S T O R M
                  R u n o f f      H y d r o g r a p h
   ----------------------------------------------------------------------
              Hydrograph in   1   Minute intervals ((CFS))

   ----------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        1.0       2.1       3.1       4.1
----------------------------------------------------------------------
  0+ 0       0.0000      0.00  Q         |         |         |         |
  0+ 1       0.0000      0.01  Q         |         |         |         |
  0+ 2       0.0001      0.03  Q         |         |         |         |
  0+ 3       0.0001      0.04  Q         |         |         |         |
  0+ 4       0.0002      0.05  Q         |         |         |         |
  0+ 5       0.0003      0.07  Q         |         |         |         |
  0+ 6       0.0004      0.08  Q         |         |         |         |
  0+ 7       0.0005      0.09  Q         |         |         |         |
  0+ 8       0.0007      0.11  VQ        |         |         |         |
  0+ 9       0.0008      0.12  VQ        |         |         |         |
  0+10       0.0010      0.13  VQ        |         |         |         |
  0+11       0.0012      0.14  VQ        |         |         |         |
  0+12       0.0014      0.16  VQ        |         |         |         |
  0+13       0.0016      0.17  VQ        |         |         |         |
  0+14       0.0019      0.18  VQ        |         |         |         |
  0+15       0.0022      0.18  VQ        |         |         |         |
  0+16       0.0024      0.19  VQ        |         |         |         |
  0+17       0.0027      0.19  VQ        |         |         |         |
  0+18       0.0029      0.19  VQ        |         |         |         |
  0+19       0.0032      0.19  VQ        |         |         |         |
  0+20       0.0034      0.19  VQ        |         |         |         |
  0+21       0.0037      0.19  VQ        |         |         |         |
  0+22       0.0040      0.19  VQ        |         |         |         |
  0+23       0.0042      0.19  VQ        |         |         |         |
  0+24       0.0045      0.19  VQ        |         |         |         |
  0+25       0.0048      0.19  VQ        |         |         |         |
  0+26       0.0050      0.19  VQ        |         |         |         |
  0+27       0.0053      0.19  VQ        |         |         |         |
  0+28       0.0056      0.19  VQ        |         |         |         |
  0+29       0.0058      0.19  VQ        |         |         |         |
```

```
0+30       0.0061      0.19  VQ        |           |           |           |
0+31       0.0064      0.20  |Q        |           |           |           |
0+32       0.0066      0.20  |Q        |           |           |           |
0+33       0.0069      0.20  |Q        |           |           |           |
0+34       0.0072      0.20  |Q        |           |           |           |
0+35       0.0074      0.20  |Q        |           |           |           |
0+36       0.0077      0.20  |Q        |           |           |           |
0+37       0.0080      0.20  |Q        |           |           |           |
0+38       0.0083      0.20  |Q        |           |           |           |
0+39       0.0085      0.20  |Q        |           |           |           |
0+40       0.0088      0.20  |Q        |           |           |           |
0+41       0.0091      0.20  |Q        |           |           |           |
0+42       0.0094      0.20  |Q        |           |           |           |
0+43       0.0096      0.20  |Q        |           |           |           |
0+44       0.0099      0.20  |Q        |           |           |           |
0+45       0.0102      0.20  |Q        |           |           |           |
0+46       0.0105      0.20  |Q        |           |           |           |
0+47       0.0107      0.20  |Q        |           |           |           |
0+48       0.0110      0.20  |Q        |           |           |           |
0+49       0.0113      0.21  |Q        |           |           |           |
0+50       0.0116      0.21  |Q        |           |           |           |
0+51       0.0119      0.21  |VQ       |           |           |           |
0+52       0.0122      0.21  |VQ       |           |           |           |
0+53       0.0125      0.21  |VQ       |           |           |           |
0+54       0.0127      0.21  | Q       |           |           |           |
0+55       0.0130      0.21  | Q       |           |           |           |
0+56       0.0133      0.21  | Q       |           |           |           |
0+57       0.0136      0.21  | Q       |           |           |           |
0+58       0.0139      0.21  | Q       |           |           |           |
0+59       0.0142      0.21  | Q       |           |           |           |
1+ 0       0.0145      0.21  | Q       |           |           |           |
1+ 1       0.0148      0.21  | Q       |           |           |           |
1+ 2       0.0151      0.21  | Q       |           |           |           |
1+ 3       0.0154      0.22  | Q       |           |           |           |
1+ 4       0.0157      0.22  | Q       |           |           |           |
1+ 5       0.0160      0.22  | Q       |           |           |           |
1+ 6       0.0163      0.22  | Q       |           |           |           |
1+ 7       0.0166      0.22  | Q       |           |           |           |
1+ 8       0.0169      0.22  | Q       |           |           |           |
1+ 9       0.0172      0.22  | Q       |           |           |           |
1+10       0.0175      0.22  | Q       |           |           |           |
1+11       0.0178      0.22  | Q       |           |           |           |
1+12       0.0181      0.22  | Q       |           |           |           |
1+13       0.0184      0.22  | Q       |           |           |           |
1+14       0.0187      0.22  | Q       |           |           |           |
1+15       0.0190      0.22  | Q       |           |           |           |
1+16       0.0193      0.23  | QV      |           |           |           |
1+17       0.0196      0.23  | QV      |           |           |           |
1+18       0.0200      0.23  | QV      |           |           |           |
1+19       0.0203      0.23  | QV      |           |           |           |
1+20       0.0206      0.23  | QV      |           |           |           |
1+21       0.0209      0.23  | QV      |           |           |           |
1+22       0.0212      0.23  | QV      |           |           |           |
1+23       0.0215      0.23  | QV      |           |           |           |
1+24       0.0219      0.23  | QV      |           |           |           |
1+25       0.0222      0.24  | QV      |           |           |           |
1+26       0.0225      0.24  | QV      |           |           |           |
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1+27	0.0228	0.24	QV			
1+28	0.0232	0.24	QV			
1+29	0.0235	0.24	QV			
1+30	0.0238	0.24	QV			
1+31	0.0242	0.24	QV			
1+32	0.0245	0.24	QV			
1+33	0.0248	0.24	QV			
1+34	0.0251	0.24	QV			
1+35	0.0255	0.24	Q V			
1+36	0.0258	0.24	Q V			
1+37	0.0261	0.24	Q V			
1+38	0.0265	0.24	Q V			
1+39	0.0268	0.25	Q V			
1+40	0.0272	0.25	Q V			
1+41	0.0275	0.25	Q V			
1+42	0.0278	0.25	Q V			
1+43	0.0282	0.25	Q V			
1+44	0.0285	0.25	Q V			
1+45	0.0289	0.25	Q V			
1+46	0.0292	0.26	Q V			
1+47	0.0296	0.26	Q V			
1+48	0.0300	0.26	Q V			
1+49	0.0303	0.26	Q V			
1+50	0.0307	0.26	Q V			
1+51	0.0310	0.26	Q V			
1+52	0.0314	0.26	Q V			
1+53	0.0318	0.27	Q V			
1+54	0.0321	0.27	Q V			
1+55	0.0325	0.27	Q V			
1+56	0.0329	0.27	Q V			
1+57	0.0332	0.27	Q V			
1+58	0.0336	0.27	Q V			
1+59	0.0340	0.27	Q V			
2+ 0	0.0344	0.27	Q V			
2+ 1	0.0347	0.27	Q V			
2+ 2	0.0351	0.27	Q V			
2+ 3	0.0355	0.27	Q V			
2+ 4	0.0359	0.28	Q V			
2+ 5	0.0363	0.28	Q V			
2+ 6	0.0366	0.28	Q V			
2+ 7	0.0370	0.28	Q V			
2+ 8	0.0374	0.28	Q V			
2+ 9	0.0378	0.28	Q V			
2+10	0.0382	0.29	Q V			
2+11	0.0386	0.29	Q V			
2+12	0.0390	0.29	Q V			
2+13	0.0394	0.29	Q V			
2+14	0.0398	0.29	Q V			
2+15	0.0402	0.30	Q V			
2+16	0.0406	0.30	Q V			
2+17	0.0410	0.30	Q V			
2+18	0.0415	0.30	Q V			
2+19	0.0419	0.31	Q V			
2+20	0.0423	0.31	Q V			
2+21	0.0427	0.31	Q V			
2+22	0.0432	0.31	Q V			
2+23	0.0436	0.31	Q V			

```
2+24       0.0440      0.31  |  Q  V   |          |          |          |
2+25       0.0444      0.31  |  Q   V  |          |          |          |
2+26       0.0449      0.32  |  Q   V  |          |          |          |
2+27       0.0453      0.32  |  Q   V  |          |          |          |
2+28       0.0458      0.32  |  Q   V  |          |          |          |
2+29       0.0462      0.32  |  Q   V  |          |          |          |
2+30       0.0466      0.32  |  Q   V  |          |          |          |
2+31       0.0471      0.32  |  Q   V  |          |          |          |
2+32       0.0475      0.32  |  Q   V  |          |          |          |
2+33       0.0480      0.32  |  Q   V  |          |          |          |
2+34       0.0484      0.33  |  Q   V  |          |          |          |
2+35       0.0489      0.33  |  Q   V  |          |          |          |
2+36       0.0493      0.33  |  Q   V  |          |          |          |
2+37       0.0498      0.34  |  Q   V  |          |          |          |
2+38       0.0503      0.34  |  Q   V  |          |          |          |
2+39       0.0507      0.34  |  Q   V  |          |          |          |
2+40       0.0512      0.35  |  Q    V |          |          |          |
2+41       0.0517      0.35  |  Q    V |          |          |          |
2+42       0.0522      0.35  |  Q    V |          |          |          |
2+43       0.0527      0.36  |  Q    V |          |          |          |
2+44       0.0532      0.36  |  Q    V |          |          |          |
2+45       0.0537      0.36  |  Q    V |          |          |          |
2+46       0.0542      0.37  |  Q    V |          |          |          |
2+47       0.0547      0.37  |  Q    V |          |          |          |
2+48       0.0552      0.37  |  Q    V |          |          |          |
2+49       0.0557      0.38  |  Q    V |          |          |          |
2+50       0.0563      0.38  |  Q    V |          |          |          |
2+51       0.0568      0.38  |  Q    V |          |          |          |
2+52       0.0573      0.38  |  Q     V|          |          |          |
2+53       0.0578      0.39  |  Q     V|          |          |          |
2+54       0.0584      0.39  |  Q     V|          |          |          |
2+55       0.0589      0.39  |  Q     V|          |          |          |
2+56       0.0594      0.39  |  Q     V|          |          |          |
2+57       0.0600      0.39  |  Q     V|          |          |          |
2+58       0.0605      0.40  |  Q     V|          |          |          |
2+59       0.0611      0.40  |  Q     V|          |          |          |
3+ 0       0.0616      0.40  |  Q     V|          |          |          |
3+ 1       0.0622      0.40  |  Q     V|          |          |          |
3+ 2       0.0628      0.41  |  Q     V|          |          |          |
3+ 3       0.0633      0.41  |  Q     V|          |          |          |
3+ 4       0.0639      0.42  |   Q     V          |          |          |
3+ 5       0.0645      0.42  |   Q     V          |          |          |
3+ 6       0.0651      0.43  |   Q     V          |          |          |
3+ 7       0.0657      0.44  |   Q     V          |          |          |
3+ 8       0.0663      0.44  |   Q     V          |          |          |
3+ 9       0.0669      0.45  |   Q     V          |          |          |
3+10       0.0675      0.46  |   Q     V          |          |          |
3+11       0.0682      0.46  |   Q     V          |          |          |
3+12       0.0688      0.47  |   Q     V          |          |          |
3+13       0.0695      0.48  |   Q     V          |          |          |
3+14       0.0701      0.48  |   Q     |V         |          |          |
3+15       0.0708      0.49  |   Q     |V         |          |          |
3+16       0.0715      0.50  |   Q     |V         |          |          |
3+17       0.0722      0.50  |   Q     |V         |          |          |
3+18       0.0729      0.51  |   Q     |V         |          |          |
3+19       0.0736      0.51  |   Q     |V         |          |          |
3+20       0.0743      0.52  |   Q     |V         |          |          |
```

```
3+21       0.0750      0.52  |    Q    |V        |         |         |
3+22       0.0757      0.53  |    Q    |V        |         |         |
3+23       0.0765      0.53  |    Q    | V       |         |         |
3+24       0.0772      0.54  |    Q    | V       |         |         |
3+25       0.0780      0.54  |    Q    | V       |         |         |
3+26       0.0787      0.54  |    Q    | V       |         |         |
3+27       0.0795      0.55  |    Q    | V       |         |         |
3+28       0.0802      0.55  |    Q    | V       |         |         |
3+29       0.0810      0.56  |    Q    | V       |         |         |
3+30       0.0818      0.56  |    Q    | V       |         |         |
3+31       0.0826      0.58  |    Q    |  V      |         |         |
3+32       0.0834      0.60  |    Q    |  V      |         |         |
3+33       0.0843      0.62  |     Q   |  V      |         |         |
3+34       0.0851      0.64  |     Q   |  V      |         |         |
3+35       0.0861      0.66  |     Q   |  V      |         |         |
3+36       0.0870      0.68  |     Q   |  V      |         |         |
3+37       0.0879      0.70  |     Q   |  V      |         |         |
3+38       0.0889      0.72  |     Q   |   V     |         |         |
3+39       0.0899      0.73  |      Q  |   V     |         |         |
3+40       0.0910      0.75  |      Q  |   V     |         |         |
3+41       0.0920      0.77  |      Q  |   V     |         |         |
3+42       0.0931      0.79  |      Q  |   V     |         |         |
3+43       0.0942      0.81  |      Q  |   V     |         |         |
3+44       0.0954      0.83  |       Q |    V    |         |         |
3+45       0.0966      0.85  |       Q |    V    |         |         |
3+46       0.0978      0.88  |       Q |    V    |         |         |
3+47       0.0990      0.90  |       Q |    V    |         |         |
3+48       0.1003      0.93  |       Q |    V    |         |         |
3+49       0.1016      0.95  |        Q|     V   |         |         |
3+50       0.1029      0.97  |        Q|     V   |         |         |
3+51       0.1043      1.00  |        Q|     V   |         |         |
3+52       0.1057      1.02  |        Q|     V   |         |         |
3+53       0.1072      1.05  |         Q     V   |         |         |
3+54       0.1086      1.07  |         Q      V  |         |         |
3+55       0.1102      1.10  |         Q      V  |         |         |
3+56       0.1117      1.12  |         Q      V  |         |         |
3+57       0.1133      1.14  |         |Q     V  |         |         |
3+58       0.1149      1.17  |         |Q      V |         |         |
3+59       0.1168      1.38  |         |  Q    V |         |         |
4+ 0       0.1190      1.59  |         |    Q  V |         |         |
4+ 1       0.1215      1.80  |         |      Q V|         |         |
4+ 2       0.1242      2.01  |         |        Q|         |         |
4+ 3       0.1273      2.23  |         |         VQ        |         |
4+ 4       0.1307      2.44  |         |         V  Q      |         |
4+ 5       0.1343      2.65  |         |         |V   Q    |         |
4+ 6       0.1382      2.86  |         |         |V     Q  |         |
4+ 7       0.1425      3.07  |         |         | V      Q|         |
4+ 8       0.1470      3.29  |         |         |  V      |Q        |
4+ 9       0.1518      3.50  |         |         |  V      |  Q      |
4+10       0.1569      3.71  |         |         |   V     |    Q    |
4+11       0.1623      3.92  |         |         |    V    |      Q  |
4+12       0.1680      4.13  |         |         |     V   |        Q|
4+13       0.1734      3.88  |         |         |      V  |      Q  |
4+14       0.1784      3.64  |         |         |       V |    Q    |
4+15       0.1830      3.39  |         |         |       V | Q       |
4+16       0.1874      3.14  |         |         |        VQ       |
4+17       0.1914      2.89  |         |         |       Q V       |
```

```
4+18       0.1950      2.65  |          |          |    Q    V          |
4+19       0.1983      2.40  |          |          |  Q      |V         |
4+20       0.2013      2.15  |          |          Q         |V         |
4+21       0.2039      1.90  |          |       Q  |         | V        |
4+22       0.2062      1.66  |          |     Q    |         | V        |
4+23       0.2081      1.41  |          |  Q       |         | V        |
4+24       0.2097      1.16  |          |Q         |         |  V       |
4+25       0.2110      0.91  |        Q |          |         |  V       |
4+26       0.2119      0.66  |      Q   |          |         |  V       |
4+27       0.2128      0.65  |      Q   |          |         |  V       |
4+28       0.2136      0.63  |      Q   |          |         |  V       |
4+29       0.2145      0.62  |     Q    |          |         |  V       |
4+30       0.2153      0.60  |     Q    |          |         |  V       |
4+31       0.2161      0.59  |     Q    |          |         |   V      |
4+32       0.2169      0.57  |     Q    |          |         |   V      |
4+33       0.2177      0.55  |     Q    |          |         |   V      |
4+34       0.2184      0.54  |     Q    |          |         |   V      |
4+35       0.2191      0.52  |     Q    |          |         |   V      |
4+36       0.2198      0.51  |    Q     |          |         |   V      |
4+37       0.2205      0.49  |    Q     |          |         |   V      |
4+38       0.2212      0.48  |    Q     |          |         |   V      |
4+39       0.2218      0.46  |    Q     |          |         |   V      |
4+40       0.2224      0.44  |    Q     |          |         |    V     |
4+41       0.2230      0.44  |    Q     |          |         |    V     |
4+42       0.2236      0.43  |    Q     |          |         |    V     |
4+43       0.2242      0.42  |    Q     |          |         |    V     |
4+44       0.2248      0.42  |    Q     |          |         |    V     |
4+45       0.2254      0.41  |  Q       |          |         |    V     |
4+46       0.2259      0.40  |  Q       |          |         |    V     |
4+47       0.2265      0.40  |  Q       |          |         |    V     |
4+48       0.2270      0.39  |  Q       |          |         |    V     |
4+49       0.2275      0.38  |  Q       |          |         |    V     |
4+50       0.2280      0.38  |  Q       |          |         |    V     |
4+51       0.2285      0.37  |  Q       |          |         |     V    |
4+52       0.2290      0.36  |  Q       |          |         |     V    |
4+53       0.2295      0.35  |  Q       |          |         |     V    |
4+54       0.2300      0.35  |  Q       |          |         |     V    |
4+55       0.2305      0.34  |  Q       |          |         |     V    |
4+56       0.2310      0.34  |  Q       |          |         |     V    |
4+57       0.2314      0.34  |  Q       |          |         |     V    |
4+58       0.2319      0.33  |  Q       |          |         |     V    |
4+59       0.2323      0.33  |  Q       |          |         |     V    |
5+ 0       0.2328      0.32  |  Q       |          |         |     V    |
5+ 1       0.2332      0.32  |  Q       |          |         |     V    |
5+ 2       0.2336      0.32  |  Q       |          |         |     V    |
5+ 3       0.2341      0.31  |  Q       |          |         |     V    |
5+ 4       0.2345      0.31  | Q        |          |         |     V    |
5+ 5       0.2349      0.30  | Q        |          |         |      V   |
5+ 6       0.2353      0.30  | Q        |          |         |      V   |
5+ 7       0.2357      0.30  | Q        |          |         |      V   |
5+ 8       0.2361      0.29  | Q        |          |         |      V   |
5+ 9       0.2365      0.29  | Q        |          |         |      V   |
5+10       0.2369      0.29  | Q        |          |         |      V   |
5+11       0.2373      0.28  | Q        |          |         |      V   |
5+12       0.2377      0.28  | Q        |          |         |      V   |
5+13       0.2381      0.28  | Q        |          |         |      V   |
5+14       0.2385      0.28  | Q        |          |         |      V   |
```

```
    5+15       0.2388      0.27  | Q       |         |         |      V  |
    5+16       0.2392      0.27  | Q       |         |         |      V  |
    5+17       0.2396      0.27  | Q       |         |         |      V  |
    5+18       0.2399      0.26  | Q       |         |         |      V  |
    5+19       0.2403      0.26  | Q       |         |         |      V  |
    5+20       0.2407      0.26  | Q       |         |         |      V  |
    5+21       0.2410      0.26  | Q       |         |         |      V  |
    5+22       0.2414      0.25  | Q       |         |         |       V |
    5+23       0.2417      0.25  | Q       |         |         |       V |
    5+24       0.2421      0.25  | Q       |         |         |       V |
    5+25       0.2424      0.25  | Q       |         |         |       V |
    5+26       0.2427      0.25  | Q       |         |         |       V |
    5+27       0.2431      0.24  | Q       |         |         |       V |
    5+28       0.2434      0.24  | Q       |         |         |       V |
    5+29       0.2437      0.24  | Q       |         |         |       V |
    5+30       0.2441      0.24  | Q       |         |         |       V |
    5+31       0.2444      0.24  | Q       |         |         |       V |
    5+32       0.2447      0.23  | Q       |         |         |       V |
    5+33       0.2450      0.23  | Q       |         |         |       V |
    5+34       0.2454      0.23  | Q       |         |         |       V |
    5+35       0.2457      0.23  | Q       |         |         |       V |
    5+36       0.2460      0.23  | Q       |         |         |       V |
    5+37       0.2463      0.22  | Q       |         |         |       V |
    5+38       0.2466      0.22  | Q       |         |         |       V |
    5+39       0.2469      0.22  | Q       |         |         |       V |
    5+40       0.2472      0.22  | Q       |         |         |       V |
    5+41       0.2475      0.22  | Q       |         |         |       V |
    5+42       0.2478      0.22  | Q       |         |         |        V|
    5+43       0.2481      0.22  | Q       |         |         |        V|
    5+44       0.2484      0.21  | Q       |         |         |        V|
    5+45       0.2487      0.21  | Q       |         |         |        V|
    5+46       0.2490      0.21  | Q       |         |         |        V|
    5+47       0.2493      0.21  | Q       |         |         |        V|
    5+48       0.2496      0.21  | Q       |         |         |        V|
    5+49       0.2498      0.21  | Q       |         |         |        V|
    5+50       0.2501      0.21  |Q        |         |         |        V|
    5+51       0.2504      0.20  |Q        |         |         |        V|
    5+52       0.2507      0.20  |Q        |         |         |        V|
    5+53       0.2510      0.20  |Q        |         |         |        V|
    5+54       0.2512      0.20  |Q        |         |         |        V|
    5+55       0.2515      0.20  |Q        |         |         |        V|
    5+56       0.2518      0.20  |Q        |         |         |        V|
    5+57       0.2521      0.20  |Q        |         |         |        V|
    5+58       0.2523      0.20  |Q        |         |         |        V|
    5+59       0.2526      0.19  |Q        |         |         |        V|
    6+ 0       0.2529      0.19  |Q        |         |         |        V|
    6+ 1       0.2531      0.19  |Q        |         |         |        V|
    6+ 2       0.2534      0.19  |Q        |         |         |        V|
    6+ 3       0.2537      0.19  |Q        |         |         |        V|
    6+ 4       0.2539      0.19  |Q        |         |         |         V
--------------------------------------------------------------------------

      End of computations, total study area =          2.940 (Ac.)
```

Appendix D – Unmitigated Post-Developed Calculations

```
                San Diego County Rational Hydrology Program

      CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

      Rational method hydrology  program based on
      San Diego County Flood Control Division 2003 hydrology manual
            Rational Hydrology Study        Date: 10/31/22
      ------------------------------------------------------------------------
-
      1581 - CAMPUS PARK CONDOS PARCEL 1
      Q100, UNMITIGATED POST-DEVELOPED


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

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


      Program License Serial Number 6292

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

      Map data precipitation entered:
      6 hour,  precipitation(inches) =  3.500
      24 hour precipitation(inches) =  6.000
      P6/P24 =    58.3%
      San Diego hydrology manual 'C' values used


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
      Process from Point/Station        1.011 to Point/Station        1.021
      **** 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
      [HIGH DENSITY RESIDENTIAL                    ]
      (43.0 DU/A or Less      )
      Impervious value, Ai = 0.800
      Sub-Area C Value = 0.780
      Initial subarea total flow distance  =  100.000(Ft.)
      Highest elevation =  371.900(Ft.)
      Lowest elevation =  370.700(Ft.)
      Elevation difference =    1.200(Ft.) Slope =  1.200 %
      INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
      The maximum overland flow distance is 65.00 (Ft)
      for the top area slope value of   1.20 %, in a development type of
       43.0 DU/A or Less
      In Accordance With Table 3-2
```

```
Initial Area Time of Concentration =   4.70 minutes
 (for slope value of   1.00 %)
Calculated TC of    4.700 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      9.222(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.780
Subarea runoff =      0.503(CFS)
Total initial stream area =        0.070(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.021 to Point/Station        1.022
**** STREET INLET + AREA  + PIPE  TRAVEL TIME ****
________________________________________________________________________
Top of street segment elevation =   370.700(Ft.)
End of street segment elevation =   365.400(Ft.)
Length of street segment  =   389.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  32.000(Ft.)
Distance from crown to crossfall grade break  =  16.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  1.500(In.)
 Manning's N in gutter =  0.0150
 Manning's N from gutter to grade break =  0.0180
 Manning's N from grade break to crown =  0.0180
No street inlet installed at this point
Estimated mean flow rate at midpoint of street =      7.907(CFS)
Depth of flow =   0.342(Ft.), Average velocity =   2.474(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  12.355(Ft.)
Flow velocity =   2.47(Ft/s)
Travel time =    2.62 min.     TC =    7.32  min.
 Adding area flow to street
Rainfall intensity (I) =      7.211(In/Hr) for a   100.0 year storm
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
[HIGH DENSITY RESIDENTIAL                    ]
(43.0 DU/A or Less      )
Impervious value, Ai = 0.800
Sub-Area C Value = 0.780
Rainfall intensity =      7.211(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.780  CA =      2.145
Subarea runoff =     14.965(CFS) for      2.680(Ac.)
Total runoff =     15.469(CFS)      Total area =       2.750(Ac.)
Street flow at end of street =     15.469(CFS)
Half street flow at end of street =      7.734(CFS)
Depth of flow =   0.417(Ft.), Average velocity =   2.905(Ft/s)
Flow width (from curb towards crown)=  16.096(Ft.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.022 to Point/Station        1.023
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   361.400(Ft.)
Downstream point/station elevation =   361.300(Ft.)
Pipe length  =     3.80(Ft.) Slope =   0.0263  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    15.469(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =    15.469(CFS)
Normal flow depth in pipe =   13.45(In.)
Flow top width inside pipe =   15.64(In.)
Critical Depth =   16.97(In.)
Pipe flow velocity =     10.92(Ft/s)
Travel time through pipe =    0.01 min.
Time of concentration (TC) =     7.33 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.023 to Point/Station        1.024
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   361.300(Ft.)
Downstream point/station elevation =   360.600(Ft.)
Pipe length  =    73.40(Ft.) Slope =   0.0095  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    15.469(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
     2.676(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.591(Ft.)
 Minor friction loss =      1.785(Ft.)    K-factor =   1.50
Pipe flow velocity =      8.75(Ft/s)
Travel time through pipe =    0.14 min.
Time of concentration (TC) =     7.47 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.024 to Point/Station        1.025
**** PIPEFLOW TRAVEL TIME (User specified size) ****
------------------------------------------------------------------------
Upstream point/station elevation =   360.600(Ft.)
Downstream point/station elevation =   343.300(Ft.)
Pipe length  =    48.00(Ft.) Slope =   0.3604  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    15.469(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =    15.469(CFS)
Normal flow depth in pipe =    6.07(In.)
Flow top width inside pipe =   17.02(In.)
Critical Depth =   16.97(In.)
Pipe flow velocity =     29.50(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =     7.49 min.


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

```
Process from Point/Station        1.025 to Point/Station        1.025
**** CONFLUENCE OF MAIN STREAMS ****
____________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      2.750(Ac.)
Runoff from this stream =     15.469(CFS)
Time of concentration =    7.49 min.
Rainfall intensity =     7.104(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.011 to Point/Station        2.011
**** USER DEFINED FLOW INFORMATION AT A POINT ****
____________________________________________________________________
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
Rainfall intensity (I) =      9.222(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =   5.00 min.  Rain intensity =       9.22(In/Hr)
Total area =        0.200(Ac.)  Total runoff =     0.550(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.025 to Point/Station        1.025
**** CONFLUENCE OF MAIN STREAMS ****
____________________________________________________________________
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      0.200(Ac.)
Runoff from this stream =      0.550(CFS)
Time of concentration =    5.00 min.
Rainfall intensity =     9.222(In/Hr)
Summary of stream data:

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


1       15.469      7.49              7.104
2        0.550      5.00              9.222
Qmax(1) =
         1.000 *    1.000 *    15.469) +
         0.770 *    1.000 *     0.550) + =      15.892
Qmax(2) =
         1.000 *    0.667 *    15.469) +
         1.000 *    1.000 *     0.550) + =      10.872

Total of 2 main streams to confluence:
Flow rates before confluence point:
```

```
      15.469       0.550
Maximum flow rates at confluence using above data:
       15.892       10.872
Area of streams before confluence:
        2.750        0.200


Results of confluence:
Total flow rate =     15.892(CFS)
Time of concentration =     7.493 min.
Effective stream area after confluence  =      2.950(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.026 to Point/Station        1.026
**** 6 HOUR HYDROGRAPH ****
______________________________________________________________________
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Hydrograph Data - Section 6, San Diego County Hydrology manual, June
2003


Time of Concentration =   7.49
Basin Area =     2.95 Acres
6 Hour Rainfall =  3.500 Inches
Runoff Coefficient =  0.747
Peak Discharge =    15.89 CFS
     Time (Min)     Discharge (CFS)
       0               0.000
       7               0.463
       14               0.469
       21               0.482
       28               0.488
       35               0.502
       42               0.510
       49               0.525
       56               0.534
       63               0.552
       70               0.561
       77               0.581
       84               0.592
       91               0.615
       98               0.628
       105               0.655
       112               0.670
       119               0.702
       126               0.719
       133               0.758
       140               0.780
       147               0.828
       154               0.855
       161               0.917
       168               0.953
       175               1.036
       182               1.085
       189               1.203
       196               1.276
```

```
           203              1.462
           210              1.585
           217              1.938
           224              2.207
           231              3.241
           238              4.566
           245             15.892
           252              2.599
           259              1.739
           266              1.361
           273              1.140
           280              0.992
           287              0.885
           294              0.803
           301              0.738
           308              0.685
           315              0.641
           322              0.603
           329              0.571
           336              0.542
           343              0.517
           350              0.495
           357              0.475
           364              0.457
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                      6 - H O U R    S T O R M
                  R u n o f f      H y d r o g r a p h
    ----------------------------------------------------------------------
              Hydrograph in   1   Minute intervals ((CFS))

    ----------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        4.0       7.9      11.9      15.9
----------------------------------------------------------------------------
  0+ 0       0.0000      0.00  Q         |         |         |         |
  0+ 1       0.0001      0.07  Q         |         |         |         |
  0+ 2       0.0003      0.13  Q         |         |         |         |
  0+ 3       0.0005      0.20  Q         |         |         |         |
  0+ 4       0.0009      0.26  Q         |         |         |         |
  0+ 5       0.0014      0.33  Q         |         |         |         |
  0+ 6       0.0019      0.40  Q         |         |         |         |
  0+ 7       0.0026      0.46  VQ        |         |         |         |
  0+ 8       0.0032      0.46  VQ        |         |         |         |
  0+ 9       0.0038      0.46  VQ        |         |         |         |
  0+10       0.0045      0.47  VQ        |         |         |         |
  0+11       0.0051      0.47  VQ        |         |         |         |
  0+12       0.0058      0.47  VQ        |         |         |         |
  0+13       0.0064      0.47  VQ        |         |         |         |
  0+14       0.0070      0.47  VQ        |         |         |         |
  0+15       0.0077      0.47  VQ        |         |         |         |
  0+16       0.0083      0.47  VQ        |         |         |         |
  0+17       0.0090      0.47  VQ        |         |         |         |
  0+18       0.0097      0.48  VQ        |         |         |         |
  0+19       0.0103      0.48  VQ        |         |         |         |
  0+20       0.0110      0.48  VQ        |         |         |         |
  0+21       0.0116      0.48  VQ        |         |         |         |
  0+22       0.0123      0.48  VQ        |         |         |         |
  0+23       0.0130      0.48  VQ        |         |         |         |
```

0+24	0.0136	0.48	VQ	|	|	|	|
0+25	0.0143	0.49	VQ	|	|	|	|
0+26	0.0150	0.49	VQ	|	|	|	|
0+27	0.0156	0.49	VQ	|	|	|	|
0+28	0.0163	0.49	|Q	|	|	|	|
0+29	0.0170	0.49	|Q	|	|	|	|
0+30	0.0177	0.49	|Q	|	|	|	|
0+31	0.0184	0.49	|Q	|	|	|	|
0+32	0.0190	0.50	|Q	|	|	|	|
0+33	0.0197	0.50	|Q	|	|	|	|
0+34	0.0204	0.50	|Q	|	|	|	|
0+35	0.0211	0.50	|Q	|	|	|	|
0+36	0.0218	0.50	|Q	|	|	|	|
0+37	0.0225	0.50	|Q	|	|	|	|
0+38	0.0232	0.51	|Q	|	|	|	|
0+39	0.0239	0.51	|Q	|	|	|	|
0+40	0.0246	0.51	|Q	|	|	|	|
0+41	0.0253	0.51	|Q	|	|	|	|
0+42	0.0260	0.51	|Q	|	|	|	|
0+43	0.0267	0.51	|Q	|	|	|	|
0+44	0.0274	0.51	|Q	|	|	|	|
0+45	0.0281	0.52	|Q	|	|	|	|
0+46	0.0288	0.52	|Q	|	|	|	|
0+47	0.0295	0.52	|Q	|	|	|	|
0+48	0.0303	0.52	|Q	|	|	|	|
0+49	0.0310	0.53	|Q	|	|	|	|
0+50	0.0317	0.53	|Q	|	|	|	|
0+51	0.0324	0.53	|QV	|	|	|	|
0+52	0.0332	0.53	|QV	|	|	|	|
0+53	0.0339	0.53	|QV	|	|	|	|
0+54	0.0346	0.53	|QV	|	|	|	|
0+55	0.0354	0.53	|QV	|	|	|	|
0+56	0.0361	0.53	|QV	|	|	|	|
0+57	0.0368	0.54	|QV	|	|	|	|
0+58	0.0376	0.54	|QV	|	|	|	|
0+59	0.0383	0.54	|QV	|	|	|	|
1+ 0	0.0391	0.54	|QV	|	|	|	|
1+ 1	0.0398	0.55	|QV	|	|	|	|
1+ 2	0.0406	0.55	|QV	|	|	|	|
1+ 3	0.0413	0.55	|QV	|	|	|	|
1+ 4	0.0421	0.55	|QV	|	|	|	|
1+ 5	0.0429	0.55	|QV	|	|	|	|
1+ 6	0.0436	0.56	|QV	|	|	|	|
1+ 7	0.0444	0.56	|QV	|	|	|	|
1+ 8	0.0452	0.56	|QV	|	|	|	|
1+ 9	0.0459	0.56	|QV	|	|	|	|
1+10	0.0467	0.56	|QV	|	|	|	|
1+11	0.0475	0.56	|QV	|	|	|	|
1+12	0.0483	0.57	|Q V	|	|	|	|
1+13	0.0491	0.57	|Q V	|	|	|	|
1+14	0.0499	0.57	|Q V	|	|	|	|
1+15	0.0506	0.58	|Q V	|	|	|	|
1+16	0.0514	0.58	|Q V	|	|	|	|
1+17	0.0522	0.58	|Q V	|	|	|	|
1+18	0.0530	0.58	|Q V	|	|	|	|
1+19	0.0538	0.58	|Q V	|	|	|	|
1+20	0.0547	0.59	|Q V	|	|	|	|

```
1+21       0.0555      0.59  |Q V      |          |          |          |
1+22       0.0563      0.59  |Q V      |          |          |          |
1+23       0.0571      0.59  |Q V      |          |          |          |
1+24       0.0579      0.59  |Q V      |          |          |          |
1+25       0.0587      0.60  |Q V      |          |          |          |
1+26       0.0595      0.60  |Q V      |          |          |          |
1+27       0.0604      0.60  |Q V      |          |          |          |
1+28       0.0612      0.61  |Q V      |          |          |          |
1+29       0.0620      0.61  |Q V      |          |          |          |
1+30       0.0629      0.61  |Q V      |          |          |          |
1+31       0.0637      0.62  |Q  V     |          |          |          |
1+32       0.0646      0.62  |Q  V     |          |          |          |
1+33       0.0654      0.62  |Q  V     |          |          |          |
1+34       0.0663      0.62  |Q  V     |          |          |          |
1+35       0.0672      0.62  |Q  V     |          |          |          |
1+36       0.0680      0.62  |Q  V     |          |          |          |
1+37       0.0689      0.63  |Q  V     |          |          |          |
1+38       0.0697      0.63  |Q  V     |          |          |          |
1+39       0.0706      0.63  |Q  V     |          |          |          |
1+40       0.0715      0.64  |Q  V     |          |          |          |
1+41       0.0724      0.64  |Q  V     |          |          |          |
1+42       0.0733      0.64  |Q  V     |          |          |          |
1+43       0.0741      0.65  |Q  V     |          |          |          |
1+44       0.0750      0.65  |Q  V     |          |          |          |
1+45       0.0759      0.65  |Q  V     |          |          |          |
1+46       0.0768      0.66  |Q  V     |          |          |          |
1+47       0.0778      0.66  |Q  V     |          |          |          |
1+48       0.0787      0.66  |Q  V     |          |          |          |
1+49       0.0796      0.66  |Q   V    |          |          |          |
1+50       0.0805      0.67  |Q   V    |          |          |          |
1+51       0.0814      0.67  |Q   V    |          |          |          |
1+52       0.0823      0.67  |Q   V    |          |          |          |
1+53       0.0833      0.67  |Q   V    |          |          |          |
1+54       0.0842      0.68  |Q   V    |          |          |          |
1+55       0.0851      0.68  |Q   V    |          |          |          |
1+56       0.0861      0.69  |Q   V    |          |          |          |
1+57       0.0870      0.69  |Q   V    |          |          |          |
1+58       0.0880      0.70  |Q   V    |          |          |          |
1+59       0.0890      0.70  |Q   V    |          |          |          |
2+ 0       0.0899      0.70  |Q   V    |          |          |          |
2+ 1       0.0909      0.71  |Q   V    |          |          |          |
2+ 2       0.0919      0.71  |Q   V    |          |          |          |
2+ 3       0.0929      0.71  |Q   V    |          |          |          |
2+ 4       0.0939      0.71  |Q   V    |          |          |          |
2+ 5       0.0948      0.72  |Q   V    |          |          |          |
2+ 6       0.0958      0.72  |Q    V   |          |          |          |
2+ 7       0.0968      0.73  |Q    V   |          |          |          |
2+ 8       0.0978      0.73  |Q    V   |          |          |          |
2+ 9       0.0989      0.74  |Q    V   |          |          |          |
2+10       0.0999      0.74  |Q    V   |          |          |          |
2+11       0.1009      0.75  |Q    V   |          |          |          |
2+12       0.1019      0.75  |Q    V   |          |          |          |
2+13       0.1030      0.76  |Q    V   |          |          |          |
2+14       0.1040      0.76  |Q    V   |          |          |          |
2+15       0.1051      0.76  |Q    V   |          |          |          |
2+16       0.1061      0.77  |Q    V   |          |          |          |
2+17       0.1072      0.77  |Q    V   |          |          |          |
```

```
2+18       0.1083      0.77  |Q    V   |          |          |          |
2+19       0.1093      0.78  |Q    V   |          |          |          |
2+20       0.1104      0.78  |Q    V   |          |          |          |
2+21       0.1115      0.79  |Q     V  |          |          |          |
2+22       0.1126      0.79  |Q     V  |          |          |          |
2+23       0.1137      0.80  | Q    V  |          |          |          |
2+24       0.1148      0.81  | Q    V  |          |          |          |
2+25       0.1159      0.81  | Q    V  |          |          |          |
2+26       0.1171      0.82  | Q    V  |          |          |          |
2+27       0.1182      0.83  | Q    V  |          |          |          |
2+28       0.1194      0.83  | Q    V  |          |          |          |
2+29       0.1205      0.84  | Q    V  |          |          |          |
2+30       0.1217      0.84  | Q    V  |          |          |          |
2+31       0.1228      0.84  | Q    V  |          |          |          |
2+32       0.1240      0.85  | Q    V  |          |          |          |
2+33       0.1252      0.85  | Q    V  |          |          |          |
2+34       0.1263      0.86  | Q    V  |          |          |          |
2+35       0.1275      0.86  | Q     V |          |          |          |
2+36       0.1287      0.87  | Q     V |          |          |          |
2+37       0.1299      0.88  | Q     V |          |          |          |
2+38       0.1312      0.89  | Q     V |          |          |          |
2+39       0.1324      0.90  | Q     V |          |          |          |
2+40       0.1337      0.91  | Q     V |          |          |          |
2+41       0.1349      0.92  | Q     V |          |          |          |
2+42       0.1362      0.92  | Q     V |          |          |          |
2+43       0.1375      0.93  | Q     V |          |          |          |
2+44       0.1388      0.93  | Q     V |          |          |          |
2+45       0.1401      0.94  | Q     V |          |          |          |
2+46       0.1414      0.94  | Q     V |          |          |          |
2+47       0.1427      0.95  | Q     V |          |          |          |
2+48       0.1440      0.95  | Q      V|          |          |          |
2+49       0.1453      0.96  | Q      V|          |          |          |
2+50       0.1466      0.98  | Q      V|          |          |          |
2+51       0.1480      0.99  | Q      V|          |          |          |
2+52       0.1494      1.00  | Q      V|          |          |          |
2+53       0.1508      1.01  | Q      V|          |          |          |
2+54       0.1522      1.02  | Q      V|          |          |          |
2+55       0.1536      1.04  | Q      V|          |          |          |
2+56       0.1550      1.04  | Q      V|          |          |          |
2+57       0.1565      1.05  | Q      V|          |          |          |
2+58       0.1579      1.06  | Q      V|          |          |          |
2+59       0.1594      1.06  | Q       V          |          |          |
3+ 0       0.1609      1.07  | Q       V          |          |          |
3+ 1       0.1624      1.08  | Q       V          |          |          |
3+ 2       0.1639      1.08  | Q       V          |          |          |
3+ 3       0.1654      1.10  | Q       V          |          |          |
3+ 4       0.1669      1.12  | Q       V          |          |          |
3+ 5       0.1685      1.14  | Q       V          |          |          |
3+ 6       0.1701      1.15  | Q       V          |          |          |
3+ 7       0.1717      1.17  | Q       V          |          |          |
3+ 8       0.1733      1.19  | Q       V          |          |          |
3+ 9       0.1750      1.20  |  Q      |V         |          |          |
3+10       0.1766      1.21  |  Q      |V         |          |          |
3+11       0.1783      1.22  |  Q      |V         |          |          |
3+12       0.1800      1.23  |  Q      |V         |          |          |
3+13       0.1817      1.24  |  Q      |V         |          |          |
3+14       0.1835      1.25  |  Q      |V         |          |          |
```

```
3+15       0.1852      1.27  |  Q      |V        |         |         |
3+16       0.1870      1.28  |  Q      |V        |         |         |
3+17       0.1888      1.30  |  Q      |V        |         |         |
3+18       0.1906      1.33  |  Q      | V       |         |         |
3+19       0.1925      1.36  |  Q      | V       |         |         |
3+20       0.1944      1.38  |  Q      | V       |         |         |
3+21       0.1963      1.41  |  Q      | V       |         |         |
3+22       0.1983      1.44  |  Q      | V       |         |         |
3+23       0.2003      1.46  |  Q      | V       |         |         |
3+24       0.2023      1.48  |  Q      | V       |         |         |
3+25       0.2044      1.50  |  Q      | V       |         |         |
3+26       0.2065      1.51  |  Q      |  V      |         |         |
3+27       0.2086      1.53  |  Q      |  V      |         |         |
3+28       0.2107      1.55  |  Q      |  V      |         |         |
3+29       0.2129      1.57  |  Q      |  V      |         |         |
3+30       0.2151      1.59  |  Q      |  V      |         |         |
3+31       0.2173      1.64  |   Q     |  V      |         |         |
3+32       0.2196      1.69  |   Q     |  V      |         |         |
3+33       0.2220      1.74  |   Q     |  V      |         |         |
3+34       0.2245      1.79  |   Q     |   V     |         |         |
3+35       0.2270      1.84  |   Q     |   V     |         |         |
3+36       0.2296      1.89  |   Q     |   V     |         |         |
3+37       0.2323      1.94  |   Q     |   V     |         |         |
3+38       0.2350      1.98  |   Q     |   V     |         |         |
3+39       0.2378      2.01  |    Q    |   V     |         |         |
3+40       0.2406      2.05  |    Q    |    V    |         |         |
3+41       0.2435      2.09  |    Q    |    V    |         |         |
3+42       0.2464      2.13  |    Q    |    V    |         |         |
3+43       0.2494      2.17  |    Q    |    V    |         |         |
3+44       0.2525      2.21  |    Q    |    V    |         |         |
3+45       0.2557      2.35  |    Q    |     V   |         |         |
3+46       0.2592      2.50  |     Q   |     V   |         |         |
3+47       0.2628      2.65  |     Q   |     V   |         |         |
3+48       0.2667      2.80  |      Q  |     V   |         |         |
3+49       0.2707      2.95  |      Q  |      V  |         |         |
3+50       0.2750      3.09  |      Q  |      V  |         |         |
3+51       0.2794      3.24  |       Q |      V  |         |         |
3+52       0.2842      3.43  |       Q |      V  |         |         |
3+53       0.2892      3.62  |        Q|       V |         |         |
3+54       0.2944      3.81  |        Q|       V |         |         |
3+55       0.2999      4.00  |         Q       V |         |         |
3+56       0.3057      4.19  |         Q        V|         |         |
3+57       0.3117      4.38  |         |Q       V|         |         |
3+58       0.3180      4.57  |         |Q        V         |         |
3+59       0.3265      6.18  |         |    Q    V         |         |
4+ 0       0.3373      7.80  |         |         Q|V        |         |
4+ 1       0.3502      9.42  |         |          | VQ     |         |
4+ 2       0.3654     11.04  |         |          |  V   Q |         |
4+ 3       0.3829     12.66  |         |          |   V    |Q        |
4+ 4       0.4025     14.27  |         |          |    V   |    Q    |
4+ 5       0.4244     15.89  |         |          |     V  |         Q
4+ 6       0.4437     13.99  |         |          |      V |    Q    |
4+ 7       0.4604     12.09  |         |          |       V Q       |
4+ 8       0.4744     10.20  |         |          |    Q   V|       |
4+ 9       0.4858      8.30  |         |          Q         V       |
4+10       0.4946      6.40  |         |     Q    |         |V      |
4+11       0.5008      4.50  |         |Q         |         |V      |
```

```
4+12      0.5044     2.60  |     Q    |          |          |V         |
4+13      0.5078     2.48  |     Q    |          |          |V         |
4+14      0.5111     2.35  |    Q     |          |          | V        |
4+15      0.5141     2.23  |    Q     |          |          | V        |
4+16      0.5170     2.11  |    Q     |          |          | V        |
4+17      0.5198     1.98  |   Q      |          |          | V        |
4+18      0.5223     1.86  |   Q      |          |          | V        |
4+19      0.5247     1.74  |   Q      |          |          |  V       |
4+20      0.5271     1.69  |   Q      |          |          |  V       |
4+21      0.5293     1.63  |   Q      |          |          |  V       |
4+22      0.5315     1.58  |  Q       |          |          |  V       |
4+23      0.5336     1.52  |  Q       |          |          |  V       |
4+24      0.5356     1.47  |  Q       |          |          |  V       |
4+25      0.5375     1.41  |  Q       |          |          |  V       |
4+26      0.5394     1.36  |  Q       |          |          |  V       |
4+27      0.5413     1.33  |  Q       |          |          |   V      |
4+28      0.5430     1.30  |  Q       |          |          |   V      |
4+29      0.5448     1.27  |  Q       |          |          |   V      |
4+30      0.5465     1.23  |  Q       |          |          |   V      |
4+31      0.5481     1.20  |  Q       |          |          |   V      |
4+32      0.5498     1.17  | Q        |          |          |   V      |
4+33      0.5513     1.14  | Q        |          |          |   V      |
4+34      0.5529     1.12  | Q        |          |          |   V      |
4+35      0.5544     1.10  | Q        |          |          |   V      |
4+36      0.5559     1.08  | Q        |          |          |    V     |
4+37      0.5573     1.06  | Q        |          |          |    V     |
4+38      0.5587     1.03  | Q        |          |          |    V     |
4+39      0.5601     1.01  | Q        |          |          |    V     |
4+40      0.5615     0.99  | Q        |          |          |    V     |
4+41      0.5628     0.98  | Q        |          |          |    V     |
4+42      0.5642     0.96  | Q        |          |          |    V     |
4+43      0.5655     0.95  | Q        |          |          |    V     |
4+44      0.5668     0.93  | Q        |          |          |    V     |
4+45      0.5680     0.92  | Q        |          |          |    V     |
4+46      0.5693     0.90  | Q        |          |          |    V     |
4+47      0.5705     0.88  | Q        |          |          |    V     |
4+48      0.5717     0.87  | Q        |          |          |    V     |
4+49      0.5729     0.86  | Q        |          |          |     V    |
4+50      0.5740     0.85  | Q        |          |          |     V    |
4+51      0.5752     0.84  | Q        |          |          |     V    |
4+52      0.5763     0.83  | Q        |          |          |     V    |
4+53      0.5774     0.81  | Q        |          |          |     V    |
4+54      0.5786     0.80  | Q        |          |          |     V    |
4+55      0.5796     0.79  |Q         |          |          |     V    |
4+56      0.5807     0.78  |Q         |          |          |     V    |
4+57      0.5818     0.78  |Q         |          |          |     V    |
4+58      0.5829     0.77  |Q         |          |          |     V    |
4+59      0.5839     0.76  |Q         |          |          |     V    |
5+ 0      0.5849     0.75  |Q         |          |          |     V    |
5+ 1      0.5859     0.74  |Q         |          |          |     V    |
5+ 2      0.5869     0.73  |Q         |          |          |     V    |
5+ 3      0.5879     0.72  |Q         |          |          |      V   |
5+ 4      0.5889     0.72  |Q         |          |          |      V   |
5+ 5      0.5899     0.71  |Q         |          |          |      V   |
5+ 6      0.5909     0.70  |Q         |          |          |      V   |
5+ 7      0.5918     0.69  |Q         |          |          |      V   |
5+ 8      0.5928     0.69  |Q         |          |          |      V   |
```

```
    5+ 9       0.5937      0.68  |Q        |         |         |      V  |
    5+10       0.5946      0.67  |Q        |         |         |      V  |
    5+11       0.5955      0.67  |Q        |         |         |      V  |
    5+12       0.5965      0.66  |Q        |         |         |      V  |
    5+13       0.5974      0.65  |Q        |         |         |      V  |
    5+14       0.5982      0.65  |Q        |         |         |      V  |
    5+15       0.5991      0.64  |Q        |         |         |      V  |
    5+16       0.6000      0.64  |Q        |         |         |      V  |
    5+17       0.6009      0.63  |Q        |         |         |      V  |
    5+18       0.6017      0.62  |Q        |         |         |      V  |
    5+19       0.6026      0.62  |Q        |         |         |      V  |
    5+20       0.6034      0.61  |Q        |         |         |      V  |
    5+21       0.6043      0.61  |Q        |         |         |       V |
    5+22       0.6051      0.60  |Q        |         |         |       V |
    5+23       0.6059      0.60  |Q        |         |         |       V |
    5+24       0.6067      0.59  |Q        |         |         |       V |
    5+25       0.6076      0.59  |Q        |         |         |       V |
    5+26       0.6084      0.58  |Q        |         |         |       V |
    5+27       0.6092      0.58  |Q        |         |         |       V |
    5+28       0.6100      0.58  |Q        |         |         |       V |
    5+29       0.6107      0.57  |Q        |         |         |       V |
    5+30       0.6115      0.57  |Q        |         |         |       V |
    5+31       0.6123      0.56  |Q        |         |         |       V |
    5+32       0.6131      0.56  |Q        |         |         |       V |
    5+33       0.6138      0.55  |Q        |         |         |       V |
    5+34       0.6146      0.55  |Q        |         |         |       V |
    5+35       0.6153      0.55  |Q        |         |         |       V |
    5+36       0.6161      0.54  |Q        |         |         |       V |
    5+37       0.6168      0.54  |Q        |         |         |       V |
    5+38       0.6176      0.54  |Q        |         |         |       V |
    5+39       0.6183      0.53  |Q        |         |         |       V |
    5+40       0.6190      0.53  |Q        |         |         |       V |
    5+41       0.6198      0.52  |Q        |         |         |        V|
    5+42       0.6205      0.52  |Q        |         |         |        V|
    5+43       0.6212      0.52  |Q        |         |         |        V|
    5+44       0.6219      0.51  |Q        |         |         |        V|
    5+45       0.6226      0.51  |Q        |         |         |        V|
    5+46       0.6233      0.51  |Q        |         |         |        V|
    5+47       0.6240      0.50  |Q        |         |         |        V|
    5+48       0.6247      0.50  |Q        |         |         |        V|
    5+49       0.6254      0.50  |Q        |         |         |        V|
    5+50       0.6260      0.50  |Q        |         |         |        V|
    5+51       0.6267      0.49  |Q        |         |         |        V|
    5+52       0.6274      0.49  |Q        |         |         |        V|
    5+53       0.6281      0.49  |Q        |         |         |        V|
    5+54       0.6287      0.48  |Q        |         |         |        V|
    5+55       0.6294      0.48  |Q        |         |         |        V|
    5+56       0.6301      0.48  |Q        |         |         |        V|
    5+57       0.6307      0.48  |Q        |         |         |        V|
    5+58       0.6314      0.47  |Q        |         |         |        V|
    5+59       0.6320      0.47  |Q        |         |         |        V|
    6+ 0       0.6327      0.47  |Q        |         |         |        V|
    6+ 1       0.6333      0.46  |Q        |         |         |        V|
    6+ 2       0.6339      0.46  |Q        |         |         |        V|
    6+ 3       0.6346      0.46  |Q        |         |         |        V|
    6+ 4       0.6352      0.46  |Q        |         |         |         V
---------------------------------------------------------------------------
```

```
End of computations, total study area =          2.950 (Ac.)
```

Appendix E – Modified-Puls Detention Routing & Basin Design

Modified Puls / Storage Indication Method Legend

Time (hr): Time Elapsed in hours

Inflow, In (cfs): Inflow rate at a time step n

In+In+1 (cfs): Inflow rate at a time step n plus inflow rate at a time step n+1, (ft3/s)

Fn (cfs): Infiltration flow rate at a time step n

Inf. Vol, F (ft3): Inflow volume in cubic feet

2S1/At-O1 (cfs):

S = storage within a detention facility at a time step n

At = Time interval (sec)

O = Outflow rate at a time step n

2S2/At+O2 (cfs): Storage indication number, see variables above.

Outflow, On (cfs): Outflow rate at a time step n

Volume, S (ft3): Storage with a detention facility at a time step n

Elevation, h (ft-Osl): Water Surface Elevation in feet

may be used to estimate the stage-storage curve may be determined by either an average-end area calculation (Equation 6-1) or as the volume of a conic frustum (Equation 6-2):

$$V_{1,2} = \frac{(A_1 + A_2)}{2}(h_2 - h_1) \qquad (6\text{-}1)$$

$$V_{1,2} = \frac{1}{3}\left(A_1 + A_2 + \sqrt{A_1 A_2}\right)(h_2 - h_1) \qquad (6\text{-}2)$$

where …

$V_{1,2}$ = storage volume between elevations $h_1$and h_2 (ft^3);
A_1, A_2 = surface area at elevation elevations $h_1$and h_2, respectively (ft^2); and
h_1, h_2 = lower and upper bounding elevations, respectively (ft).

The stage-storage curve begins at the bottom of the storage basin or the maximum elevation of sediment or debris allowed in the operation and maintenance plan, whichever is greater. Volume reduction factors may be applied to account for vegetation and/or additional sediment and debris deposition within the detention facility when necessary.

6.3.1.3 Stage-Discharge Curve

Stage-discharge curves define a relationship between the depth of water in the detention facility and the outflow or release from its outlet structures. Section 6.4 describes the basic procedures for calculating discharges from outlet control structures. Figure 6-3 illustrates a typical stage-discharge curve.

6.3.2 Storage Routing Calculations

Routing is the process of analyzing flows entering and leaving a detention facility in order to determine the change of the water surface elevation within the facility over time. Storage routing calculations are typically performed using computer programs. The routing of flows through a detention facility is fundamentally based on conservation of mass (Inflow-Outflow=ΔStorage), approximated as a finite-difference as:

$$\frac{S_{n+1} - S_n}{\Delta t} = \frac{I_n + I_{n+1}}{2} - \frac{O_n + O_{n+1}}{2} \qquad (6\text{-}3)$$

where …

S_n, S_{n+1} = storage within a detention facility at a time step n and $n+1$, respectively (ft^3);
Δt = time interval (sec);
I_n, I_{n+1} = inflow rate at a time step n and $n+1$, respectively (ft^3/s); and
O_n, O_{n+1} = outflow rate at a time step n and $n+1$, respectively (ft^3/s).

The most common method for performing routing analysis for a detention facility is the storage indication or modified Puls method. The storage indication method re-arranges the expression for mass conservation as:

$$\left(\frac{2S_{n+1}}{\Delta t} + O_{n+1}\right) = \left(\frac{2S_n}{\Delta t} - O_n\right) + \left(I_n + I_{n+1}\right) \qquad (6\text{-}4)$$

The left-hand side of Equation 6-4 is usually called the storage indication number. The storage indication method facilitates the routing analysis of detention facilities, which can be accomplished by spreadsheet calculations or using computer programs such as the Corps of

Outlet Rating Curve (continued)

1.75	41.67
2.00	50.91
2.25	60.75
2.50	71.15
2.75	82.09
3.00	93.53

Stage- Storage Relationship

The stage-storage relationship can be determined using Equation 6-1:

$$V_{1,2} = \frac{(A_1 + A_2)}{2}(h_2 - h_1)$$

This equation yields the following relationship:

Stage-Storage Relationship

Stage (feet)	Storage (ft^3)
0.00	0
0.25	14,805
0.50	29,926
0.75	45,576
1.00	61,966
1.25	79,312
1.50	97,830
1.75	117,735
2.00	139,246
2.25	162,582
2.50	187,963
2.75	215,610
3.00	245,746

Storage Indication Method

Now that an inflow hydrograph and outlet-rating curve have been established, the Storage Indication Method can be used to determine the routing characteristics of the detention basin. Equation 6-4 summarizes this method:

$$\left(\frac{2S_{n+1}}{\Delta t} + O_{n+1}\right) = \left(\frac{2S_n}{\Delta t} - O_n\right) + (I_n + I_{n+1})$$

Typically, computer programs are used to perform the required calculations. However, hand calculations are possible. The following table shows a portion of the Storage Indication Method results:

Storage Indication Method

Time	Inflow I_n	I_n+I_{n+1}	Q_n	S_n	$2S_n/dt-O_n$	$2S_{n+1}/dt+O_{n+1}$	WSEL
0	0.00	4.70	0.00	0.00	0.00	4.70	0.23
15	4.70	9.50	2.09	1,172	0.51	10.01	0.35
30	4.80	9.90	3.88	2,758	2.25	12.15	0.39
45	5.10	10.40	4.58	3,403	2.98	13.38	0.42
60	5.30	11.00	4.99	3,775	3.40	14.40	0.44
75	5.70	11.60	5.33	4,083	3.75	15.35	0.46
90	5.90	12.30	5.64	4,370	4.07	16.37	0.48
105	6.40	13.10	5.97	4,679	4.43	17.53	0.50
120	6.70	14.10	6.35	5,027	4.82	18.92	0.52
135	7.40	15.30	6.74	5,480	5.44	20.74	0.54
150	7.90	16.90	7.24	6,074	6.26	23.16	0.57
165	9.00	18.80	7.91	6,862	7.34	26.14	0.61
180	9.80	21.80	8.73	7,835	8.68	30.48	0.67
195	12.00	25.60	9.93	9,249	10.63	36.23	0.74
210	13.60	33.60	11.51	11,121	13.20	46.80	0.85
225	20.00	49.40	14.11	14,712	18.59	67.99	1.04
240	29.40	129.40	19.25	21,929	29.48	158.88	1.78
255	**100.00**	116.10	42.61	52,321	73.66	189.76	**2.01**
270	16.10	26.90	**51.24**	**62,334**	87.28	114.18	1.42
285	10.80	19.20	30.69	37,570	52.80	72.00	1.08
300	8.40	15.40	20.22	23,300	31.56	46.96	0.85
315	7.00	13.10	14.15	14,766	18.67	31.77	0.68

This analysis indicates that the peak 100-year flow is attenuated from 100 cfs to 51.2 cfs. The maximum storage volume used is 62,334 ft^3, with a maximum water surface elevation of 2.01 feet. Continuing the computations would demonstrate that the basin will empty within 72 hours.

Emergency Spillway

The emergency spillway must be able to convey the unattenuated peak flow of 100 cfs, ignoring the storage inside of the basin. The invert of the emergency spillway is placed just above the maximum water surface elevation. The maximum spillway depth is found by taking the difference between the top of embankment (5.0 feet) and the maximum water surface elevation (2.0 ft). Allowing for 1.0 foot of required freeboard, the spillway flow cannot be more than 2 ft deep. Therefore, the minimum length of the emergency spillway can be found using the broad-crested weir equation:

$$L = \frac{Q}{C_{BCW} H^{3/2}} = \frac{100}{3.0 * 2^{3/2}} = 11.76 ft$$

RATIONAL METHOD HYDROGRAPH PROGRAM

BMP-A INFLOW HYDROGRAPH

RUN DATE 2/2/2022
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 7 MIN.
6 HOUR RAINFALL 3.5 INCHES
BASIN AREA 2.75 ACRES
RUNOFF COEFFICIENT 0.78
PEAK DISCHARGE 15.714 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 7	DISCHARGE (CFS) = 0.5
TIME (MIN) = 14	DISCHARGE (CFS) = 0.5
TIME (MIN) = 21	DISCHARGE (CFS) = 0.5
TIME (MIN) = 28	DISCHARGE (CFS) = 0.5
TIME (MIN) = 35	DISCHARGE (CFS) = 0.5
TIME (MIN) = 42	DISCHARGE (CFS) = 0.5
TIME (MIN) = 49	DISCHARGE (CFS) = 0.5
TIME (MIN) = 56	DISCHARGE (CFS) = 0.5
TIME (MIN) = 63	DISCHARGE (CFS) = 0.5
TIME (MIN) = 70	DISCHARGE (CFS) = 0.5
TIME (MIN) = 77	DISCHARGE (CFS) = 0.6
TIME (MIN) = 84	DISCHARGE (CFS) = 0.6
TIME (MIN) = 91	DISCHARGE (CFS) = 0.6
TIME (MIN) = 98	DISCHARGE (CFS) = 0.6
TIME (MIN) = 105	DISCHARGE (CFS) = 0.6
TIME (MIN) = 112	DISCHARGE (CFS) = 0.7
TIME (MIN) = 119	DISCHARGE (CFS) = 0.7
TIME (MIN) = 126	DISCHARGE (CFS) = 0.7
TIME (MIN) = 133	DISCHARGE (CFS) = 0.7
TIME (MIN) = 140	DISCHARGE (CFS) = 0.8
TIME (MIN) = 147	DISCHARGE (CFS) = 0.8
TIME (MIN) = 154	DISCHARGE (CFS) = 0.8
TIME (MIN) = 161	DISCHARGE (CFS) = 0.9
TIME (MIN) = 168	DISCHARGE (CFS) = 0.9
TIME (MIN) = 175	DISCHARGE (CFS) = 1
TIME (MIN) = 182	DISCHARGE (CFS) = 1.1
TIME (MIN) = 189	DISCHARGE (CFS) = 1.2
TIME (MIN) = 196	DISCHARGE (CFS) = 1.2
TIME (MIN) = 203	DISCHARGE (CFS) = 1.4
TIME (MIN) = 210	DISCHARGE (CFS) = 1.5
TIME (MIN) = 217	DISCHARGE (CFS) = 1.9
TIME (MIN) = 224	DISCHARGE (CFS) = 2.1
TIME (MIN) = 231	DISCHARGE (CFS) = 3.2
TIME (MIN) = 238	DISCHARGE (CFS) = 4.6
TIME (MIN) = 245	DISCHARGE (CFS) = 15.714
TIME (MIN) = 252	DISCHARGE (CFS) = 2.5
TIME (MIN) = 259	DISCHARGE (CFS) = 1.7
TIME (MIN) = 266	DISCHARGE (CFS) = 1.3
TIME (MIN) = 273	DISCHARGE (CFS) = 1.1
TIME (MIN) = 280	DISCHARGE (CFS) = 1
TIME (MIN) = 287	DISCHARGE (CFS) = 0.9
TIME (MIN) = 294	DISCHARGE (CFS) = 0.8
TIME (MIN) = 301	DISCHARGE (CFS) = 0.7
TIME (MIN) = 308	DISCHARGE (CFS) = 0.7
TIME (MIN) = 315	DISCHARGE (CFS) = 0.6
TIME (MIN) = 322	DISCHARGE (CFS) = 0.6
TIME (MIN) = 329	DISCHARGE (CFS) = 0.6
TIME (MIN) = 336	DISCHARGE (CFS) = 0.5
TIME (MIN) = 343	DISCHARGE (CFS) = 0.5
TIME (MIN) = 350	DISCHARGE (CFS) = 0.5
TIME (MIN) = 357	DISCHARGE (CFS) = 0.5
TIME (MIN) = 364	DISCHARGE (CFS) = 0

Project: **CAMPUS PARK, PARCEL 1**

Chamber Model -	MC-4500	
Units -	**Imperial**	Click Here for Metric
Number of Chambers -	96	
Number of End Caps -	8	
Voids in the stone (porosity) -	40	%
Base of Stone Elevation -	0.00	ft
Amount of Stone Above Chambers -	12	in
Amount of Stone Below Chambers -	9	in
Area of system -	4180	sf Min. Area - 3781 sf min. area

☑ Include Perimeter Stone in Calculations

StormTech MC-4500 Cumulative Storage Volumes

Height of System *(inches)*	Incremental Single Chamber *(cubic feet)*	Incremental Single End Cap *(cubic feet)*	Incremental Chambers *(cubic feet)*	Incremental End Cap *(cubic feet)*	Incremental Stone *(cubic feet)*	Incremental Ch, EC and Stone *(cubic feet)*	Cumulative System (cubic feet)	Elevation (feet)
81	0.00	0.00	0.00	0.00	139.33	139.33	17610.59	6.75
80	0.00	0.00	0.00	0.00	139.33	139.33	17471.26	6.67
79	0.00	0.00	0.00	0.00	139.33	139.33	17331.93	6.58
78	0.00	0.00	0.00	0.00	139.33	139.33	17192.59	6.50
77	0.00	0.00	0.00	0.00	139.33	139.33	17053.26	6.42
76	0.00	0.00	0.00	0.00	139.33	139.33	16913.93	6.33
75	0.00	0.00	0.00	0.00	139.33	139.33	16774.59	6.25
74	0.00	0.00	0.00	0.00	139.33	139.33	16635.26	6.17
73	0.00	0.00	0.00	0.00	139.33	139.33	16495.93	6.08
72	0.00	0.00	0.00	0.00	139.33	139.33	16356.59	6.00
71	0.00	0.00	0.00	0.00	139.33	139.33	16217.26	5.92
70	0.00	0.00	0.00	0.00	139.33	139.33	16077.93	5.83
69	0.04	0.01	3.93	0.10	137.72	141.76	15938.59	5.75
68	0.12	0.03	11.15	0.27	134.77	146.18	15796.84	5.67
67	0.16	0.05	15.81	0.41	132.84	149.07	15650.65	5.58
66	0.21	0.07	20.04	0.53	131.11	151.67	15501.58	5.50
65	0.27	0.08	25.76	0.66	128.76	155.19	15349.91	5.42
64	0.45	0.11	43.47	0.84	121.61	165.92	15194.72	5.33
63	0.67	0.13	63.87	1.06	113.36	178.29	15028.80	5.25
62	0.80	0.16	76.71	1.29	108.14	186.13	14850.51	5.17
61	0.91	0.19	87.18	1.51	103.86	192.55	14664.39	5.08
60	1.00	0.22	96.28	1.75	100.12	198.15	14471.84	5.00
59	1.09	0.25	104.38	1.98	96.79	203.15	14273.69	4.92
58	1.16	0.28	111.69	2.20	93.77	207.67	14070.54	4.83
57	1.23	0.30	118.46	2.41	90.98	211.86	13862.87	4.75
56	1.30	0.33	124.77	2.62	88.38	215.77	13651.01	4.67
55	1.36	0.35	130.66	2.84	85.94	219.43	13435.24	4.58
54	1.42	0.38	136.20	3.07	83.63	222.89	13215.81	4.50
53	1.47	0.41	141.44	3.27	81.45	226.16	12992.92	4.42
52	1.53	0.44	146.41	3.53	79.36	229.30	12766.76	4.33
51	1.57	0.47	151.15	3.75	77.37	232.27	12537.46	4.25
50	1.62	0.50	155.65	3.96	75.49	235.10	12305.18	4.17
49	1.67	0.52	159.96	4.17	73.68	237.81	12070.08	4.08
48	1.71	0.54	164.07	4.36	71.96	240.39	11832.27	4.00
47	1.75	0.57	168.01	4.53	70.32	242.86	11591.88	3.92
46	1.79	0.59	171.77	4.71	68.74	245.22	11349.02	3.83
45	1.83	0.61	175.41	4.88	67.22	247.51	11103.80	3.75
44	1.86	0.63	178.89	5.06	65.75	249.70	10856.29	3.67
43	1.90	0.64	182.24	5.14	64.38	251.76	10606.59	3.58
42	1.93	0.68	185.46	5.42	62.98	253.86	10354.83	3.50
41	1.96	0.70	188.55	5.60	61.67	255.82	10100.97	3.42
40	2.00	0.72	191.53	5.78	60.41	257.72	9845.15	3.33
39	2.03	0.74	194.40	5.95	59.19	259.54	9587.43	3.25
38	2.05	0.76	197.16	6.12	58.02	261.30	9327.88	3.17
37	2.08	0.79	199.82	6.28	56.89	263.00	9066.58	3.08
36	2.11	0.80	202.38	6.42	55.81	264.61	8803.58	3.00
35	2.13	0.82	204.85	6.56	54.77	266.18	8538.97	2.92
34	2.16	0.84	207.23	6.71	53.76	267.70	8272.79	2.83
33	2.18	0.85	209.52	6.81	52.80	269.13	8005.10	2.75
32	2.21	0.86	211.73	6.88	51.89	270.50	7735.96	2.67
31	2.23	0.89	213.85	7.12	50.95	271.92	7465.47	2.58
30	2.25	0.90	215.89	7.23	50.08	273.21	7193.55	2.50
29	2.27	0.92	217.86	7.34	49.26	274.45	6920.34	2.42
28	2.29	0.92	219.74	7.36	48.49	275.59	6645.89	2.33
27	2.31	0.94	221.55	7.55	47.69	276.79	6370.30	2.25
26	2.33	0.96	223.29	7.65	46.96	277.90	6093.50	2.17
25	2.34	0.97	224.96	7.75	46.25	278.96	5815.60	2.08
24	2.36	0.98	226.55	7.85	45.57	279.97	5536.65	2.00
23	2.38	0.97	228.08	7.77	45.00	280.84	5256.67	1.92
22	2.39	1.00	229.53	8.03	44.31	281.87	4975.83	1.83
21	2.41	1.01	230.92	8.09	43.73	282.74	4693.96	1.75
20	2.42	1.02	232.25	8.16	43.17	283.58	4411.22	1.67
19	2.43	1.03	233.51	8.24	42.63	284.38	4127.64	1.58
18	2.44	1.04	234.70	8.31	42.13	285.14	3843.26	1.50
17	2.46	1.05	235.84	8.37	41.65	285.86	3558.12	1.42
16	2.47	1.05	236.91	8.43	41.20	286.54	3272.26	1.33
15	2.48	1.05	237.92	8.40	40.81	287.12	2985.72	1.25
14	2.49	1.06	238.87	8.45	40.40	287.73	2698.60	1.17
13	2.50	1.08	239.78	8.60	39.98	288.36	2410.87	1.08
12	2.51	1.08	240.62	8.66	39.62	288.91	2122.50	1.00
11	2.51	1.09	241.41	8.70	39.29	289.40	1833.60	0.92
10	2.53	1.11	242.59	8.85	38.76	290.20	1544.20	0.83
9	0.00	0.00	0.00	0.00	139.33	139.33	1254.00	0.75
8	0.00	0.00	0.00	0.00	139.33	139.33	1114.67	0.67
7	0.00	0.00	0.00	0.00	139.33	139.33	975.33	0.58
6	0.00	0.00	0.00	0.00	139.33	139.33	836.00	0.50
5	0.00	0.00	0.00	0.00	139.33	139.33	696.67	0.42
4	0.00	0.00	0.00	0.00	139.33	139.33	557.33	0.33
3	0.00	0.00	0.00	0.00	139.33	139.33	418.00	0.25
2	0.00	0.00	0.00	0.00	139.33	139.33	278.67	0.17
1	0.00	0.00	0.00	0.00	139.33	139.33	139.33	0.08

Outlet structure for Discharge of Underground System

Discharge vs Elevation Table

Low orifice	1.8750 "	Lower slot		Lower Weir	
Number of orif:	1	# of slots:	1	Number of weirs:	0
Cg-low:	0.61	Invert:	2.25 ft	Invert:	0.00
		B	1.375 ft	B:	0.000
Middle orifice	1.125 "	h_{slot}	0.292 ft		
Number of orif:	0				
Cg-middle:	0.61	Upper slot		Emergency weir	
invert elev:	0.000 ft	# of slots:	0	Invert:	5.500
		Invert:	0.000 ft	W:	3.500 ft
		B:	0.000 ft		
*Note: h = head above the invert of the lowest surface discharge opening.		h_{slot}	0.000 ft		

h* (ft)	H/D-low -	H/D-mid -	Qlow-orif (cfs)	Qlow-weir (cfs)	Qtot-low (cfs)	Qmid-orif (cfs)	Qmid-weir (cfs)	Qtot-med (cfs)	Qslot-low (cfs)	Qslot-upp (cfs)	Qweir (cfs)	Qemerg (cfs)	Qtot (cfs)
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.083	0.533	0.889	0.007	0.008	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008
0.167	1.067	1.778	0.028	0.028	0.028	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.028
0.250	1.600	2.667	0.039	0.049	0.039	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.039
0.333	2.133	3.556	0.047	0.063	0.047	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.047
0.417	2.667	4.444	0.055	0.068	0.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.055
0.500	3.200	5.333	0.061	0.069	0.061	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.061
0.583	3.733	6.222	0.067	0.088	0.067	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.067
0.667	4.267	7.111	0.072	0.160	0.072	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.072
0.750	4.800	8.000	0.077	0.345	0.077	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.077
0.833	5.333	8.889	0.082	0.726	0.082	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.082
0.917	5.867	9.778	0.086	0.860	0.086	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.086
1.000	6.400	10.667	0.090	0.901	0.090	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.090
1.083	6.933	11.556	0.094	0.941	0.094	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.094
1.167	7.467	12.444	0.098	0.979	0.098	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.098
1.250	8.000	13.333	0.102	1.016	0.102	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.102
1.333	8.533	14.222	0.105	1.052	0.105	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.105
1.417	9.067	15.111	0.109	1.086	0.109	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.109
1.500	9.600	16.000	0.112	1.119	0.112	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.112
1.583	10.133	16.889	0.115	1.152	0.115	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.115
1.667	10.667	17.778	0.118	1.183	0.118	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.118
1.750	11.200	18.667	0.121	1.214	0.121	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.121
1.833	11.733	19.556	0.124	1.244	0.124	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.124
1.917	12.267	20.444	0.127	1.273	0.127	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.127
2.000	12.800	21.333	0.130	1.301	0.130	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.130
2.083	13.333	22.222	0.133	1.329	0.133	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.133
2.167	13.867	23.111	0.136	1.357	0.136	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.136
2.250	14.400	24.000	0.138	1.383	0.138	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.138
2.333	14.933	24.889	0.141	1.410	0.141	0.000	0.000	0.000	0.103	0.000	0.000	0.000	0.243
2.417	15.467	25.778	0.144	1.435	0.144	0.000	0.000	0.000	0.290	0.000	0.000	0.000	0.434
2.500	16.000	26.667	0.146	1.461	0.146	0.000	0.000	0.000	0.533	0.000	0.000	0.000	0.679
2.583	16.533	27.556	0.149	1.486	0.149	0.000	0.000	0.000	0.820	0.000	0.000	0.000	0.969
2.667	17.067	28.444	0.151	1.510	0.151	0.000	0.000	0.000	1.022	0.000	0.000	0.000	1.173
2.750	17.600	29.333	0.153	1.534	0.153	0.000	0.000	0.000	1.168	0.000	0.000	0.000	1.322
2.833	18.133	30.222	0.156	1.558	0.156	0.000	0.000	0.000	1.299	0.000	0.000	0.000	1.454
2.917	18.667	31.111	0.158	1.581	0.158	0.000	0.000	0.000	1.417	0.000	0.000	0.000	1.575
3.000	19.200	32.000	0.160	1.604	0.160	0.000	0.000	0.000	1.526	0.000	0.000	0.000	1.686
3.083	19.733	32.889	0.163	1.627	0.163	0.000	0.000	0.000	1.628	0.000	0.000	0.000	1.790
3.167	20.267	33.778	0.165	1.650	0.165	0.000	0.000	0.000	1.724	0.000	0.000	0.000	1.889
3.250	20.800	34.667	0.167	1.672	0.167	0.000	0.000	0.000	1.814	0.000	0.000	0.000	1.982
3.333	21.333	35.556	0.169	1.694	0.169	0.000	0.000	0.000	1.901	0.000	0.000	0.000	2.070
3.417	21.867	36.444	0.172	1.715	0.172	0.000	0.000	0.000	1.984	0.000	0.000	0.000	2.155
3.500	22.400	37.333	0.174	1.736	0.174	0.000	0.000	0.000	2.063	0.000	0.000	0.000	2.237
3.583	22.933	38.222	0.176	1.757	0.176	0.000	0.000	0.000	2.139	0.000	0.000	0.000	2.315
3.667	23.467	39.111	0.178	1.778	0.178	0.000	0.000	0.000	2.213	0.000	0.000	0.000	2.391
3.750	24.000	40.000	0.180	1.799	0.180	0.000	0.000	0.000	2.285	0.000	0.000	0.000	2.464
3.833	24.533	40.889	0.182	1.819	0.182	0.000	0.000	0.000	2.354	0.000	0.000	0.000	2.536
3.917	25.067	41.778	0.184	1.839	0.184	0.000	0.000	0.000	2.421	0.000	0.000	0.000	2.605
4.000	25.600	42.667	0.186	1.859	0.186	0.000	0.000	0.000	2.486	0.000	0.000	0.000	2.672
4.083	26.133	43.556	0.188	1.879	0.188	0.000	0.000	0.000	2.550	0.000	0.000	0.000	2.738
4.167	26.667	44.444	0.190	1.898	0.190	0.000	0.000	0.000	2.612	0.000	0.000	0.000	2.802
4.250	27.200	45.333	0.192	1.917	0.192	0.000	0.000	0.000	2.673	0.000	0.000	0.000	2.865
4.333	27.733	46.222	0.194	1.936	0.194	0.000	0.000	0.000	2.733	0.000	0.000	0.000	2.926
4.417	28.267	47.111	0.196	1.955	0.196	0.000	0.000	0.000	2.791	0.000	0.000	0.000	2.986
4.500	28.800	48.000	0.197	1.974	0.197	0.000	0.000	0.000	2.848	0.000	0.000	0.000	3.045

4.583	29.333	48.889	0.199	1.992	0.199	0.000	0.000	0.000	2.904	0.000	0.000	0.000	3.103
4.667	29.867	49.778	0.201	2.011	0.201	0.000	0.000	0.000	2.958	0.000	0.000	0.000	3.159
4.750	30.400	50.667	0.203	2.029	0.203	0.000	0.000	0.000	3.012	0.000	0.000	0.000	3.215
4.833	30.933	51.556	0.205	2.047	0.205	0.000	0.000	0.000	3.065	0.000	0.000	0.000	3.270
4.917	31.467	52.444	0.206	2.065	0.206	0.000	0.000	0.000	3.117	0.000	0.000	0.000	3.323
5.000	32.000	53.333	0.208	2.082	0.208	0.000	0.000	0.000	3.168	0.000	0.000	0.000	3.376
5.083	32.533	54.222	0.210	2.100	0.210	0.000	0.000	0.000	3.218	0.000	0.000	0.000	3.428
5.167	33.067	55.111	0.212	2.117	0.212	0.000	0.000	0.000	3.268	0.000	0.000	0.000	3.480
5.250	33.600	56.000	0.213	2.135	0.213	0.000	0.000	0.000	3.317	0.000	0.000	0.000	3.530
5.333	34.133	56.889	0.215	2.152	0.215	0.000	0.000	0.000	3.365	0.000	0.000	0.000	3.580
5.417	34.667	57.778	0.217	2.169	0.217	0.000	0.000	0.000	3.412	0.000	0.000	0.000	3.629
5.500	35.200	58.667	0.219	2.186	0.219	0.000	0.000	0.000	3.459	0.000	0.000	0.000	3.677
5.583	35.733	59.556	0.220	2.202	0.220	0.000	0.000	0.000	3.505	0.000	0.000	0.261	3.986
5.667	36.267	60.444	0.222	2.219	0.222	0.000	0.000	0.000	3.551	0.000	0.000	0.738	4.511
5.750	36.800	61.333	0.224	2.235	0.224	0.000	0.000	0.000	3.595	0.000	0.000	1.356	5.175
5.833	37.333	62.222	0.225	2.252	0.225	0.000	0.000	0.000	3.640	0.000	0.000	2.088	5.953
5.917	37.867	63.111	0.227	2.268	0.227	0.000	0.000	0.000	3.684	0.000	0.000	2.918	6.829
6.000	38.400	64.000	0.228	2.284	0.228	0.000	0.000	0.000	3.727	0.000	0.000	3.836	7.792
6.083	38.933	64.889	0.230	2.300	0.230	0.000	0.000	0.000	3.770	0.000	0.000	4.834	8.834
6.167	39.467	65.778	0.232	2.316	0.232	0.000	0.000	0.000	3.812	0.000	0.000	5.906	9.950
6.250	40.000	66.667	0.233	2.332	0.233	0.000	0.000	0.000	3.854	0.000	0.000	7.047	11.135
6.333	40.533	67.556	0.235	2.348	0.235	0.000	0.000	0.000	3.896	0.000	0.000	8.254	12.384
6.417	41.067	68.444	0.236	2.363	0.236	0.000	0.000	0.000	3.937	0.000	0.000	9.522	13.695
6.500	41.600	69.333	0.238	2.379	0.238	0.000	0.000	0.000	3.977	0.000	0.000	10.850	15.065
6.583	42.133	70.222	0.239	2.394	0.239	0.000	0.000	0.000	4.017	0.000	0.000	12.234	16.491
6.667	42.667	71.111	0.241	2.409	0.241	0.000	0.000	0.000	4.057	0.000	0.000	13.673	17.971
6.750	43.200	72.000	0.242	2.425	0.242	0.000	0.000	0.000	4.097	0.000	0.000	15.163	19.502

MODIFIED PULS

RESULTS: Routing of 6 hr - 100 yr hydrograph in Underground Pond. Campus Park - 1.

Max outflow: 3.664 cfs initial elev: 0.50 ft

Max elevation in pond: 5.977 ft (from bottom of gravel)

Vol-out: 20359 cu-ft 1672

Pond Storm: 6 hr - 100 yr

time (hr)	Inflow, In (cfs)	In+In+1 (cfs)	fn (cfs)	Inf. Vol, F (ft3)	2S1/At-O1 (cfs)	2S2/At+O2 (cfs)	Outflow, On (cfs)	Volume, S (ft3)	Elevation, h (ft-osl)
0.00	0.000	0.25	0.00	1672.0	7.96		0.000	836	0.50
0.06	0.250	0.75	0.008	1672.8	8.20	8.20	0.002	861	0.52
0.12	0.500	1.00	0.008	1674.5	8.92	8.93	0.006	938	0.56
0.18	0.500	1.00	0.008	1676.2	9.87	9.91	0.017	1038	0.62
0.23	0.500	1.00	0.008	1677.9	10.80	10.86	0.030	1137	0.68
0.29	0.500	1.00	0.008	1679.6	11.71	11.78	0.037	1233	0.74
0.35	0.500	1.00	0.008	1681.4	12.61	12.69	0.041	1328	0.77
0.41	0.500	1.00	0.008	1683.1	13.50	13.59	0.044	1422	0.80
0.47	0.500	1.00	0.008	1684.9	14.39	14.49	0.047	1516	0.83
0.53	0.500	1.00	0.008	1686.7	15.28	15.38	0.049	1609	0.85
0.58	0.500	1.00	0.008	1688.4	16.16	16.26	0.051	1702	0.88
0.64	0.500	1.00	0.009	1690.2	17.03	17.14	0.054	1794	0.91
0.70	0.500	1.00	0.009	1692.0	17.91	18.02	0.056	1886	0.93
0.76	0.500	1.00	0.009	1693.8	18.77	18.89	0.058	1977	0.96
0.82	0.500	1.00	0.009	1695.6	19.64	19.76	0.060	2068	0.98
0.88	0.500	1.00	0.009	1697.4	20.50	20.62	0.062	2159	1.01
0.93	0.500	1.00	0.009	1699.3	21.35	21.48	0.063	2249	1.04
0.99	0.500	1.00	0.009	1701.1	22.20	22.33	0.065	2338	1.06
1.05	0.500	1.00	0.009	1702.9	23.05	23.19	0.067	2427	1.09
1.11	0.500	1.00	0.009	1704.8	23.90	24.03	0.069	2516	1.11
1.17	0.500	1.05	0.009	1706.6	24.74	24.88	0.070	2605	1.14
1.23	0.550	1.15	0.009	1708.5	25.63	25.77	0.072	2698	1.17
1.28	0.600	1.20	0.009	1710.4	26.61	26.76	0.074	2802	1.20
1.34	0.600	1.20	0.009	1712.2	27.64	27.79	0.076	2910	1.23
1.40	0.600	1.20	0.009	1714.1	28.67	28.82	0.077	3018	1.26
1.46	0.600	1.20	0.009	1716.0	29.69	29.85	0.079	3126	1.29
1.52	0.600	1.20	0.009	1717.9	30.71	30.87	0.081	3233	1.32
1.58	0.600	1.20	0.009	1719.8	31.73	31.89	0.083	3340	1.35
1.63	0.600	1.20	0.009	1721.7	32.74	32.91	0.084	3447	1.38
1.69	0.600	1.20	0.009	1723.7	33.75	33.92	0.086	3553	1.42
1.75	0.600	1.25	0.009	1725.6	34.76	34.93	0.087	3659	1.45
1.81	0.650	1.35	0.009	1727.6	35.81	35.99	0.089	3770	1.48
1.87	0.700	1.40	0.009	1729.5	36.96	37.14	0.091	3891	1.51
1.93	0.700	1.40	0.009	1731.5	38.16	38.34	0.093	4016	1.55
1.98	0.700	1.40	0.009	1733.5	39.35	39.54	0.094	4142	1.59
2.04	0.700	1.40	0.009	1735.4	40.54	40.73	0.096	4267	1.62
2.10	0.700	1.40	0.010	1737.4	41.73	41.92	0.098	4391	1.66
2.16	0.700	1.40	0.010	1739.4	42.91	43.11	0.099	4516	1.70
2.22	0.700	1.45	0.010	1741.5	44.09	44.29	0.101	4640	1.73
2.28	0.750	1.55	0.010	1743.5	45.31	45.52	0.103	4769	1.77
2.33	0.800	1.60	0.010	1745.5	46.63	46.84	0.104	4908	1.81
2.39	0.800	1.60	0.010	1747.6	48.00	48.22	0.106	5051	1.86
2.45	0.800	1.60	0.010	1749.6	49.37	49.58	0.108	5195	1.90
2.51	0.800	1.60	0.010	1751.7	50.73	50.95	0.110	5338	1.94
2.57	0.800	1.65	0.010	1753.8	52.09	52.31	0.111	5481	1.98
2.63	0.850	1.75	0.010	1755.9	53.49	53.72	0.113	5628	2.03

time (hr)	Inflow, In (cfs)	In+In+1 (cfs)	fn (cfs)	Inf. Vol, F (ft3)	2S1/At-O1 (cfs)	2S2/At+O2 (cfs)	Outflow, On (cfs)	Volume, S (ft3)	Elevation, h (ft-osl)
2.68	0.900	1.80	0.010	1758.0	54.99	55.22	0.115	5786	2.07
2.74	0.900	1.80	0.010	1760.1	56.54	56.77	0.117	5949	2.12
2.80	0.900	1.85	0.010	1762.2	58.08	58.32	0.118	6111	2.17
2.86	0.950	1.95	0.010	1764.4	59.67	59.91	0.120	6278	2.22
2.92	1.000	2.05	0.010	1766.5	61.35	61.60	0.122	6455	2.28
2.98	1.050	2.15	0.010	1768.7	63.13	63.38	0.124	6642	2.33
3.03	1.100	2.25	0.010	1770.9	65.01	65.26	0.126	6839	2.39
3.09	1.150	2.35	0.011	1773.1	66.98	67.24	0.129	7047	2.46
3.15	1.200	2.40	0.011	1775.3	69.05	69.31	0.131	7264	2.52
3.21	1.200	2.40	0.011	1777.6	71.16	71.43	0.133	7486	2.59
3.27	1.200	2.50	0.011	1779.8	73.27	73.54	0.135	7708	2.66
3.33	1.300	2.70	0.011	1782.1	75.47	75.75	0.138	7939	2.73
3.38	1.400	2.85	0.011	1784.4	77.73	78.15	0.209	8184	2.81
3.44	1.450	2.95	0.011	1786.7	79.86	80.56	0.350	8422	2.88
3.50	1.500	3.20	0.011	1789.0	81.74	82.79	0.525	8638	2.95
3.56	1.700	3.60	0.011	1791.4	83.48	84.92	0.720	8841	3.01
3.62	1.900	3.90	0.011	1793.8	85.17	87.05	0.942	9042	3.08
3.67	2.000	4.10	0.011	1796.2	86.85	89.05	1.100	9235	3.14
3.73	2.100	4.75	0.011	1798.6	88.48	90.93	1.225	9419	3.20
3.79	2.650	5.85	0.012	1801.0	90.50	93.20	1.351	9644	3.27
3.85	3.200	7.10	0.012	1803.4	93.31	96.33	1.507	9956	3.37
3.91	3.900	8.50	0.012	1805.9	97.01	100.39	1.690	10364	3.50
3.97	4.600	14.49	0.012	1808.4	101.69	105.49	1.896	10877	3.67
4.02	9.887	25.06	0.012	1810.9	111.60	116.16	2.278	11957	4.04
4.08	15.174	24.01	0.013	1813.5	130.80	136.64	2.917	14041	4.82
4.14	8.837	11.34	0.014	1816.3	147.77	154.79	3.511	15884	5.72
4.20	2.500	4.60	0.015	1819.3	151.75	159.07	3.664	16318	5.98
4.26	2.100	3.80	0.015	1822.5	149.18	156.32	3.566	16039	5.81
4.32	1.700	3.20	0.015	1825.6	146.06	152.95	3.445	15698	5.61
4.37	1.500	2.80	0.015	1828.8	142.61	149.23	3.314	15322	5.40
4.43	1.300	2.50	0.014	1831.8	139.01	145.38	3.184	14930	5.20
4.49	1.200	2.30	0.014	1834.8	135.35	141.48	3.064	14534	5.03
4.55	1.100	2.15	0.014	1837.8	131.73	137.63	2.947	14141	4.86
4.61	1.050	2.05	0.014	1840.7	128.19	133.85	2.834	13757	4.71
4.67	1.000	1.95	0.013	1843.5	124.76	130.21	2.723	13386	4.56
4.73	0.950	1.85	0.013	1846.3	121.45	126.69	2.615	13027	4.43
4.78	0.900	1.75	0.013	1849.1	118.26	123.28	2.509	12681	4.30
4.84	0.850	1.65	0.013	1851.8	115.18	119.98	2.404	12346	4.18
4.90	0.800	1.55	0.013	1854.5	112.20	116.80	2.299	12023	4.07
4.96	0.750	1.45	0.013	1857.2	109.34	113.73	2.195	11711	3.96
5.02	0.700	1.40	0.012	1859.8	106.58	110.76	2.092	11410	3.85
5.08	0.700	1.40	0.012	1862.4	103.97	107.95	1.990	11126	3.76
5.13	0.700	1.35	0.012	1864.9	101.57	105.35	1.891	10863	3.67
5.19	0.650	1.25	0.012	1867.5	99.31	102.89	1.794	10615	3.59
5.25	0.600	1.20	0.012	1870.0	97.14	100.53	1.696	10378	3.51
5.31	0.600	1.20	0.012	1872.5	95.12	98.32	1.599	10155	3.43
5.37	0.600	1.20	0.012	1875.0	93.28	96.29	1.505	9953	3.37
5.43	0.600	1.20	0.012	1877.4	91.63	94.46	1.416	9770	3.31
5.48	0.600	1.15	0.012	1879.8	90.15	92.81	1.331	9605	3.26
5.54	0.550	1.05	0.011	1882.3	88.78	91.27	1.244	9453	3.21
5.60	0.500	1.00	0.011	1884.7	87.50	89.81	1.158	9309	3.16
5.66	0.500	1.00	0.011	1887.0	86.36	88.47	1.056	9179	3.12

time (hr)	Inflow, In (cfs)	In+In+1 (cfs)	fn (cfs)	Inf. Vol, F (ft3)	2S1/At-O1 (cfs)	2S2/At+O2 (cfs)	Outflow, On (cfs)	Volume, S (ft3)	Elevation, h (ft-osl)
5.72	0.500	1.00	0.011	1889.4	85.40	87.34	0.970	9069	3.08
5.78	0.500	1.00	0.011	1891.8	84.63	86.37	0.871	8978	3.06
5.83	0.500	1.00	0.011	1894.1	84.03	85.61	0.792	8906	3.03
5.89	0.500	1.00	0.011	1896.5	83.55	85.00	0.729	8849	3.01
5.95	0.500	0.75	0.011	1898.8	83.17	84.52	0.679	8804	3.00
6.01	0.250	0.25	0.011	1901.1	82.65	83.89	0.623	8743	2.98
6.07	0.000	0.00	0.011	1903.5	81.81	82.88	0.533	8646	2.95
6.13	0.000	0.00	0.011	1905.8	80.92	81.79	0.436	8542	2.92
6.18	0.000	0.00	0.011	1908.1	80.15	80.89	0.373	8455	2.89
6.24	0.000	0.00	0.011	1910.4	79.49	80.12	0.320	8380	2.87
6.30	0.000	0.00	0.011	1912.7	78.92	79.46	0.274	8315	2.85
6.36	0.000	0.00	0.011	1915.0	78.42	78.89	0.238	8259	2.83
6.42	0.000	0.00	0.011	1917.2	77.96	78.40	0.218	8209	2.81
6.48	0.000	0.00	0.011	1919.5	77.54	77.94	0.200	8163	2.80
6.53	0.000	0.00	0.011	1921.8	77.15	77.52	0.183	8120	2.79
6.59	0.000	0.00	0.011	1924.1	76.79	77.13	0.168	8081	2.77
6.65	0.000	0.00	0.011	1926.3	76.46	76.77	0.154	8045	2.76
6.71	0.000	0.00	0.011	1928.6	76.16	76.44	0.141	8012	2.75
6.77	0.000	0.00	0.011	1930.8	75.86	76.14	0.138	7980	2.74
6.83	0.000	0.00	0.011	1933.1	75.56	75.84	0.138	7949	2.73
6.88	0.000	0.00	0.011	1935.3	75.27	75.54	0.137	7918	2.72
6.94	0.000	0.00	0.011	1937.6	74.97	75.25	0.137	7887	2.71
7.00	0.000	0.00	0.011	1939.8	74.68	74.95	0.137	7856	2.70
7.06	0.000	0.00	0.011	1942.0	74.38	74.66	0.137	7825	2.69
7.12	0.000	0.00	0.011	1944.3	74.09	74.36	0.136	7794	2.68
7.18	0.000	0.00	0.011	1946.5	73.80	74.07	0.136	7763	2.68
7.23	0.000	0.00	0.011	1948.7	73.50	73.78	0.136	7732	2.67
7.29	0.000	0.00	0.011	1951.0	73.21	73.48	0.135	7702	2.66
7.35	0.000	0.00	0.011	1953.2	72.92	73.19	0.135	7671	2.65
7.41	0.000	0.00	0.011	1955.4	72.63	72.90	0.135	7640	2.64
7.47	0.000	0.00	0.011	1957.6	72.34	72.61	0.134	7610	2.63
7.53	0.000	0.00	0.011	1959.8	72.05	72.32	0.134	7580	2.62
7.58	0.000	0.00	0.010	1962.0	71.76	72.03	0.134	7549	2.61
7.64	0.000	0.00	0.010	1964.2	71.48	71.74	0.133	7519	2.60
7.70	0.000	0.00	0.010	1966.4	71.19	71.45	0.133	7489	2.59
7.76	0.000	0.00	0.010	1968.6	70.90	71.17	0.133	7459	2.58
7.82	0.000	0.00	0.010	1970.8	70.62	70.88	0.133	7429	2.57
7.88	0.000	0.00	0.010	1973.0	70.33	70.59	0.132	7399	2.56
7.93	0.000	0.00	0.010	1975.2	70.05	70.31	0.132	7369	2.55
7.99	0.000	0.00	0.010	1977.4	69.76	70.02	0.132	7339	2.54
8.05	0.000	0.00	0.010	1979.6	69.48	69.74	0.131	7309	2.54
8.11	0.000	0.00	0.010	1981.7	69.20	69.46	0.131	7279	2.53
8.17	0.000	0.00	0.010	1983.9	68.91	69.17	0.131	7250	2.52
8.23	0.000	0.00	0.010	1986.1	68.63	68.89	0.130	7220	2.51
8.28	0.000	0.00	0.010	1988.2	68.35	68.61	0.130	7191	2.50
8.34	0.000	0.00	0.010	1990.4	68.07	68.33	0.130	7161	2.49
8.40	0.000	0.00	0.010	1992.6	67.79	68.05	0.129	7132	2.48
8.46	0.000	0.00	0.010	1994.7	67.51	67.77	0.129	7102	2.47
8.52	0.000	0.00	0.010	1996.9	67.23	67.49	0.129	7073	2.46
8.58	0.000	0.00	0.010	1999.0	66.96	67.21	0.129	7044	2.45
8.63	0.000	0.00	0.010	2001.2	66.68	66.94	0.128	7015	2.45
8.69	0.000	0.00	0.010	2003.3	66.40	66.66	0.128	6986	2.44

time (hr)	Inflow, In (cfs)	In+In+1 (cfs)	fn (cfs)	Inf. Vol, F (ft3)	2S1/At-O1 (cfs)	2S2/At+O2 (cfs)	Outflow, On (cfs)	Volume, S (ft3)	Elevation, h (ft-osl)
8.75	0.000	0.00	0.010	2005.5	66.13	66.38	0.128	6957	2.43
8.81	0.000	0.00	0.010	2007.6	65.85	66.11	0.127	6928	2.42
8.87	0.000	0.00	0.010	2009.8	65.58	65.83	0.127	6899	2.41
8.93	0.000	0.00	0.010	2011.9	65.30	65.56	0.127	6870	2.40
8.98	0.000	0.00	0.010	2014.0	65.03	65.28	0.126	6841	2.39
9.04	0.000	0.00	0.010	2016.2	64.76	65.01	0.126	6813	2.38
9.10	0.000	0.00	0.010	2018.3	64.49	64.74	0.126	6784	2.38
9.16	0.000	0.00	0.010	2020.4	64.21	64.47	0.126	6756	2.37
9.22	0.000	0.00	0.010	2022.5	63.94	64.19	0.125	6727	2.36
9.28	0.000	0.00	0.010	2024.7	63.67	63.92	0.125	6699	2.35
9.33	0.000	0.00	0.010	2026.8	63.40	63.65	0.125	6671	2.34
9.39	0.000	0.00	0.010	2028.9	63.14	63.38	0.124	6642	2.33
9.45	0.000	0.00	0.010	2031.0	62.87	63.12	0.124	6614	2.32
9.51	0.000	0.00	0.010	2033.1	62.60	62.85	0.124	6586	2.32
9.57	0.000	0.00	0.010	2035.2	62.33	62.58	0.123	6558	2.31
9.63	0.000	0.00	0.010	2037.3	62.07	62.31	0.123	6530	2.30
9.68	0.000	0.00	0.010	2039.4	61.80	62.05	0.123	6502	2.29
9.74	0.000	0.00	0.010	2041.5	61.54	61.78	0.122	6474	2.28
9.80	0.000	0.00	0.010	2043.6	61.27	61.52	0.122	6446	2.27
9.86	0.000	0.00	0.010	2045.7	61.01	61.25	0.122	6419	2.26
9.92	0.000	0.00	0.010	2047.8	60.75	60.99	0.122	6391	2.26
9.98	0.000	0.00	0.010	2049.9	60.48	60.73	0.121	6363	2.25
10.03	0.000	0.00	0.010	2052.0	60.22	60.46	0.121	6336	2.24
10.09	0.000	0.00	0.010	2054.1	59.96	60.20	0.121	6308	2.23
10.15	0.000	0.00	0.010	2056.1	59.70	59.94	0.120	6281	2.22
10.21	0.000	0.00	0.010	2058.2	59.44	59.68	0.120	6254	2.21
10.27	0.000	0.00	0.010	2060.3	59.18	59.42	0.120	6227	2.21
10.33	0.000	0.00	0.010	2062.4	58.92	59.16	0.119	6199	2.20
10.38	0.000	0.00	0.010	2064.4	58.66	58.90	0.119	6172	2.19
10.44	0.000	0.00	0.010	2066.5	58.41	58.64	0.119	6145	2.18
10.50	0.000	0.00	0.010	2068.6	58.15	58.39	0.119	6118	2.17
10.56	0.000	0.00	0.010	2070.6	57.89	58.13	0.118	6091	2.17
10.62	0.000	0.00	0.010	2072.7	57.64	57.87	0.118	6064	2.16
10.68	0.000	0.00	0.010	2074.7	57.38	57.62	0.118	6038	2.15
10.73	0.000	0.00	0.010	2076.8	57.13	57.36	0.117	6011	2.14
10.79	0.000	0.00	0.010	2078.8	56.87	57.11	0.117	5984	2.13
10.85	0.000	0.00	0.010	2080.9	56.62	56.86	0.117	5958	2.13
10.91	0.000	0.00	0.010	2082.9	56.37	56.60	0.116	5931	2.12
10.97	0.000	0.00	0.010	2085.0	56.12	56.35	0.116	5905	2.11
11.03	0.000	0.00	0.010	2087.0	55.87	56.10	0.116	5878	2.10
11.08	0.000	0.00	0.010	2089.0	55.62	55.85	0.116	5852	2.09
11.14	0.000	0.00	0.010	2091.1	55.37	55.60	0.115	5826	2.09
11.20	0.000	0.00	0.010	2093.1	55.12	55.35	0.115	5799	2.08
11.26	0.000	0.00	0.010	2095.1	54.87	55.10	0.115	5773	2.07
11.32	0.000	0.00	0.010	2097.2	54.62	54.85	0.114	5747	2.06
11.38	0.000	0.00	0.010	2099.2	54.37	54.60	0.114	5721	2.06
11.43	0.000	0.00	0.010	2101.2	54.13	54.35	0.114	5695	2.05
11.49	0.000	0.00	0.010	2103.3	53.88	54.11	0.113	5669	2.04
11.55	0.000	0.00	0.010	2105.3	53.63	53.86	0.113	5643	2.03
11.61	0.000	0.00	0.010	2107.3	53.39	53.61	0.113	5618	2.02
11.67	0.000	0.00	0.010	2109.3	53.14	53.37	0.113	5592	2.02
11.73	0.000	0.00	0.010	2111.3	52.90	53.13	0.112	5566	2.01

time (hr)	Inflow, In (cfs)	In+In+1 (cfs)	fn (cfs)	Inf. Vol, F (ft3)	2S1/At-O1 (cfs)	2S2/At+O2 (cfs)	Outflow, On (cfs)	Volume, S (ft3)	Elevation, h (ft-osl)
11.78	0.000	0.00	0.010	2113.3	52.66	52.88	0.112	5541	2.00
11.84	0.000	0.00	0.010	2115.3	52.42	52.64	0.112	5515	1.99
11.90	0.000	0.00	0.010	2117.3	52.17	52.40	0.111	5490	1.99
11.96	0.000	0.00	0.010	2119.3	51.93	52.15	0.111	5465	1.98
12.02	0.000	0.00	0.010	2121.3	51.69	51.91	0.111	5439	1.97
12.08	0.000	0.00	0.010	2123.3	51.45	51.67	0.110	5414	1.96
12.13	0.000	0.00	0.010	2125.3	51.21	51.43	0.110	5389	1.96
12.19	0.000	0.00	0.009	2127.3	50.97	51.19	0.110	5364	1.95
12.25	0.000	0.00	0.009	2129.3	50.74	50.95	0.110	5339	1.94
12.31	0.000	0.00	0.009	2131.3	50.50	50.72	0.109	5314	1.93
12.37	0.000	0.00	0.009	2133.3	50.26	50.48	0.109	5289	1.93
12.43	0.000	0.00	0.009	2135.3	50.02	50.24	0.109	5264	1.92
12.48	0.000	0.00	0.009	2137.3	49.79	50.01	0.108	5239	1.91
12.54	0.000	0.00	0.009	2139.2	49.55	49.77	0.108	5215	1.90
12.60	0.000	0.00	0.009	2141.2	49.32	49.54	0.108	5190	1.90
12.66	0.000	0.00	0.009	2143.2	49.09	49.30	0.107	5165	1.89
12.72	0.000	0.00	0.009	2145.2	48.85	49.07	0.107	5141	1.88
12.78	0.000	0.00	0.009	2147.1	48.62	48.83	0.107	5116	1.88
12.83	0.000	0.00	0.009	2149.1	48.39	48.60	0.107	5092	1.87
12.89	0.000	0.00	0.009	2151.1	48.16	48.37	0.106	5068	1.86
12.95	0.000	0.00	0.009	2153.1	47.93	48.14	0.106	5043	1.85
13.01	0.000	0.00	0.009	2155.0	47.70	47.91	0.106	5019	1.85
13.07	0.000	0.00	0.009	2157.0	47.47	47.68	0.105	4995	1.84
13.13	0.000	0.00	0.009	2158.9	47.24	47.45	0.105	4971	1.83
13.18	0.000	0.00	0.009	2160.9	47.01	47.22	0.105	4947	1.82
13.24	0.000	0.00	0.009	2162.9	46.78	46.99	0.104	4923	1.82
13.30	0.000	0.00	0.009	2164.8	46.56	46.76	0.104	4899	1.81
13.36	0.000	0.00	0.009	2166.8	46.33	46.54	0.104	4875	1.80
13.42	0.000	0.00	0.009	2168.7	46.10	46.31	0.104	4852	1.80
13.48	0.000	0.00	0.009	2170.7	45.88	46.08	0.103	4828	1.79
13.53	0.000	0.00	0.009	2172.6	45.65	45.86	0.103	4804	1.78
13.59	0.000	0.00	0.009	2174.5	45.43	45.63	0.103	4781	1.78
13.65	0.000	0.00	0.009	2176.5	45.21	45.41	0.102	4757	1.77
13.71	0.000	0.00	0.009	2178.4	44.98	45.19	0.102	4734	1.76
13.77	0.000	0.00	0.009	2180.4	44.76	44.96	0.102	4711	1.75
13.83	0.000	0.00	0.009	2182.3	44.54	44.74	0.102	4687	1.75
13.88	0.000	0.00	0.009	2184.2	44.32	44.52	0.101	4664	1.74
13.94	0.000	0.00	0.009	2186.2	44.10	44.30	0.101	4641	1.73
14.00	0.000	0.00	0.009	2188.1	43.88	44.08	0.101	4618	1.73
14.06	0.000	0.00	0.009	2190.0	43.66	43.86	0.100	4595	1.72
14.12	0.000	0.00	0.009	2191.9	43.44	43.64	0.100	4572	1.71
14.18	0.000	0.00	0.009	2193.9	43.22	43.42	0.100	4549	1.71
14.23	0.000	0.00	0.009	2195.8	43.01	43.21	0.099	4526	1.70
14.29	0.000	0.00	0.009	2197.7	42.79	42.99	0.099	4503	1.69
14.35	0.000	0.00	0.009	2199.6	42.57	42.77	0.099	4481	1.69
14.41	0.000	0.00	0.009	2201.5	42.36	42.56	0.099	4458	1.68
14.47	0.000	0.00	0.009	2203.4	42.14	42.34	0.098	4435	1.67
14.53	0.000	0.00	0.009	2205.4	41.93	42.13	0.098	4413	1.67
14.58	0.000	0.00	0.009	2207.3	41.72	41.91	0.098	4390	1.66
14.64	0.000	0.00	0.009	2209.2	41.50	41.70	0.097	4368	1.65
14.70	0.000	0.00	0.009	2211.1	41.29	41.49	0.097	4346	1.65
14.76	0.000	0.00	0.009	2213.0	41.08	41.27	0.097	4324	1.64

time (hr)	Inflow, In (cfs)	In+In+1 (cfs)	fn (cfs)	Inf. Vol, F (ft3)	2S1/At-O1 (cfs)	2S2/At+O2 (cfs)	Outflow, On (cfs)	Volume, S (ft3)	Elevation, h (ft-osl)
14.82	0.000	0.00	0.009	2214.9	40.87	41.06	0.096	4301	1.63
14.88	0.000	0.00	0.009	2216.8	40.66	40.85	0.096	4279	1.63
14.93	0.000	0.00	0.009	2218.7	40.45	40.64	0.096	4257	1.62
14.99	0.000	0.00	0.009	2220.6	40.24	40.43	0.096	4235	1.61
15.05	0.000	0.00	0.009	2222.5	40.03	40.22	0.095	4213	1.61
15.11	0.000	0.00	0.009	2224.4	39.82	40.01	0.095	4191	1.60
15.17	0.000	0.00	0.009	2226.3	39.62	39.80	0.095	4170	1.60
15.23	0.000	0.00	0.009	2228.2	39.41	39.60	0.094	4148	1.59
15.28	0.000	0.00	0.009	2230.1	39.20	39.39	0.094	4126	1.58
15.34	0.000	0.00	0.009	2231.9	39.00	39.18	0.094	4105	1.58
15.40	0.000	0.00	0.009	2233.8	38.79	38.98	0.093	4083	1.57
15.46	0.000	0.00	0.009	2235.7	38.59	38.77	0.093	4062	1.56
15.52	0.000	0.00	0.009	2237.6	38.38	38.57	0.093	4040	1.56
15.58	0.000	0.00	0.009	2239.5	38.18	38.37	0.093	4019	1.55
15.63	0.000	0.00	0.009	2241.3	37.98	38.16	0.092	3997	1.55
15.69	0.000	0.00	0.009	2243.2	37.78	37.96	0.092	3976	1.54
15.75	0.000	0.00	0.009	2245.1	37.58	37.76	0.092	3955	1.53
15.81	0.000	0.00	0.009	2247.0	37.37	37.56	0.091	3934	1.53
15.87	0.000	0.00	0.009	2248.8	37.17	37.36	0.091	3913	1.52
15.93	0.000	0.00	0.009	2250.7	36.98	37.16	0.091	3892	1.51
15.98	0.000	0.00	0.009	2252.6	36.78	36.96	0.091	3871	1.51
16.04	0.000	0.00	0.009	2254.4	36.58	36.76	0.090	3850	1.50
16.10	0.000	0.00	0.009	2256.3	36.38	36.56	0.090	3829	1.50
16.16	0.000	0.00	0.009	2258.2	36.18	36.36	0.090	3809	1.49
16.22	0.000	0.00	0.009	2260.0	35.99	36.17	0.089	3788	1.48
16.28	0.000	0.00	0.009	2261.9	35.79	35.97	0.089	3767	1.48
16.33	0.000	0.00	0.009	2263.7	35.60	35.77	0.089	3747	1.47
16.39	0.000	0.00	0.009	2265.6	35.40	35.58	0.088	3727	1.47
16.45	0.000	0.00	0.009	2267.5	35.21	35.38	0.088	3706	1.46
16.51	0.000	0.00	0.009	2269.3	35.01	35.19	0.088	3686	1.45
16.57	0.000	0.00	0.009	2271.2	34.82	35.00	0.088	3666	1.45
16.63	0.000	0.00	0.009	2273.0	34.63	34.80	0.087	3645	1.44
16.68	0.000	0.00	0.009	2274.9	34.44	34.61	0.087	3625	1.44
16.74	0.000	0.00	0.009	2276.7	34.25	34.42	0.087	3605	1.43
16.80	0.000	0.00	0.009	2278.6	34.06	34.23	0.086	3585	1.42
16.86	0.000	0.00	0.009	2280.4	33.87	34.04	0.086	3565	1.42
16.92	0.000	0.00	0.009	2282.2	33.68	33.85	0.086	3545	1.41
16.98	0.000	0.00	0.009	2284.1	33.49	33.66	0.085	3525	1.41
17.03	0.000	0.00	0.009	2285.9	33.30	33.47	0.085	3506	1.40
17.09	0.000	0.00	0.009	2287.8	33.12	33.29	0.085	3486	1.40
17.15	0.000	0.00	0.009	2289.6	32.93	33.10	0.085	3466	1.39
17.21	0.000	0.00	0.009	2291.4	32.74	32.91	0.084	3447	1.38
17.27	0.000	0.00	0.009	2293.3	32.56	32.73	0.084	3427	1.38
17.33	0.000	0.00	0.009	2295.1	32.37	32.54	0.084	3408	1.37
17.38	0.000	0.00	0.009	2296.9	32.19	32.36	0.083	3389	1.37
17.44	0.000	0.00	0.009	2298.7	32.01	32.17	0.083	3369	1.36
17.50	0.000	0.00	0.009	2300.6	31.82	31.99	0.083	3350	1.36
17.56	0.000	0.00	0.009	2302.4	31.64	31.80	0.082	3331	1.35
17.62	0.000	0.00	0.009	2304.2	31.46	31.62	0.082	3312	1.34
17.68	0.000	0.00	0.009	2306.0	31.28	31.44	0.082	3293	1.34
17.73	0.000	0.00	0.009	2307.9	31.10	31.26	0.082	3274	1.33
17.79	0.000	0.00	0.009	2309.7	30.92	31.08	0.081	3255	1.33

time (hr)	Inflow, In (cfs)	In+In+1 (cfs)	fn (cfs)	Inf. Vol, F (ft3)	2S1/At-O1 (cfs)	2S2/At+O2 (cfs)	Outflow, On (cfs)	Volume, S (ft3)	Elevation, h (ft-osl)
17.85	0.000	0.00	0.009	2311.5	30.74	30.90	0.081	3236	1.32
17.91	0.000	0.00	0.009	2313.3	30.56	30.72	0.081	3217	1.32
17.97	0.000	0.00	0.009	2315.1	30.38	30.54	0.080	3198	1.31
18.03	0.000	0.00	0.009	2316.9	30.20	30.36	0.080	3180	1.31
18.08	0.000	0.00	0.009	2318.8	30.03	30.19	0.080	3161	1.30
18.14	0.000	0.00	0.009	2320.6	29.85	30.01	0.079	3143	1.30
18.20	0.000	0.00	0.009	2322.4	29.67	29.83	0.079	3124	1.29
18.26	0.000	0.00	0.009	2324.2	29.50	29.66	0.079	3106	1.28
18.32	0.000	0.00	0.009	2326.0	29.33	29.48	0.079	3087	1.28
18.38	0.000	0.00	0.009	2327.8	29.15	29.31	0.078	3069	1.27
18.43	0.000	0.00	0.009	2329.6	28.98	29.13	0.078	3051	1.27
18.49	0.000	0.00	0.009	2331.4	28.81	28.96	0.078	3033	1.26
18.55	0.000	0.00	0.009	2333.2	28.63	28.79	0.077	3015	1.26
18.61	0.000	0.00	0.009	2335.0	28.46	28.62	0.077	2997	1.25
18.67	0.000	0.00	0.009	2336.8	28.29	28.45	0.077	2979	1.25
18.73	0.000	0.00	0.009	2338.6	28.12	28.27	0.077	2961	1.24
18.78	0.000	0.00	0.009	2340.4	27.95	28.10	0.076	2943	1.24
18.84	0.000	0.00	0.009	2342.2	27.78	27.93	0.076	2925	1.23
18.90	0.000	0.00	0.009	2344.0	27.61	27.77	0.076	2908	1.23
18.96	0.000	0.00	0.009	2345.8	27.45	27.60	0.075	2890	1.22
19.02	0.000	0.00	0.009	2347.6	27.28	27.43	0.075	2872	1.22
19.08	0.000	0.00	0.009	2349.3	27.11	27.26	0.075	2855	1.21
19.13	0.000	0.00	0.009	2351.1	26.95	27.10	0.074	2837	1.21
19.19	0.000	0.00	0.009	2352.9	26.78	26.93	0.074	2820	1.20
19.25	0.000	0.00	0.008	2354.7	26.62	26.77	0.074	2803	1.20
19.31	0.000	0.00	0.008	2356.5	26.45	26.60	0.074	2785	1.19
19.37	0.000	0.00	0.008	2358.3	26.29	26.44	0.073	2768	1.19
19.43	0.000	0.00	0.008	2360.1	26.13	26.27	0.073	2751	1.18
19.48	0.000	0.00	0.008	2361.8	25.97	26.11	0.073	2734	1.18
19.54	0.000	0.00	0.008	2363.6	25.80	25.95	0.072	2717	1.17
19.60	0.000	0.00	0.008	2365.4	25.64	25.79	0.072	2700	1.17
19.66	0.000	0.00	0.008	2367.2	25.48	25.63	0.072	2683	1.16
19.72	0.000	0.00	0.008	2368.9	25.32	25.47	0.071	2666	1.16
19.78	0.000	0.00	0.008	2370.7	25.16	25.31	0.071	2650	1.15
19.83	0.000	0.00	0.008	2372.5	25.01	25.15	0.071	2633	1.15
19.89	0.000	0.00	0.008	2374.3	24.85	24.99	0.070	2616	1.14
19.95	0.000	0.00	0.008	2376.0	24.69	24.83	0.070	2600	1.14
20.01	0.000	0.00	0.008	2377.8	24.53	24.67	0.070	2583	1.13
20.07	0.000	0.00	0.008	2379.6	24.38	24.52	0.070	2567	1.13
20.13	0.000	0.00	0.008	2381.3	24.22	24.36	0.069	2551	1.12
20.18	0.000	0.00	0.008	2383.1	24.07	24.21	0.069	2534	1.12
20.24	0.000	0.00	0.008	2384.9	23.91	24.05	0.069	2518	1.11
20.30	0.000	0.00	0.008	2386.6	23.76	23.90	0.068	2502	1.11
20.36	0.000	0.00	0.008	2388.4	23.61	23.74	0.068	2486	1.11
20.42	0.000	0.00	0.008	2390.1	23.45	23.59	0.068	2470	1.10
20.48	0.000	0.00	0.008	2391.9	23.30	23.44	0.068	2454	1.10
20.53	0.000	0.00	0.008	2393.7	23.15	23.29	0.067	2438	1.09
20.59	0.000	0.00	0.008	2395.4	23.00	23.13	0.067	2422	1.09
20.65	0.000	0.00	0.008	2397.2	22.85	22.98	0.067	2406	1.08
20.71	0.000	0.00	0.008	2398.9	22.70	22.83	0.066	2391	1.08
20.77	0.000	0.00	0.008	2400.7	22.55	22.69	0.066	2375	1.07
20.83	0.000	0.00	0.008	2402.4	22.40	22.54	0.066	2359	1.07

time (hr)	Inflow, In (cfs)	In+In+1 (cfs)	fn (cfs)	Inf. Vol, F (ft3)	2S1/At-O1 (cfs)	2S2/At+O2 (cfs)	Outflow, On (cfs)	Volume, S (ft3)	Elevation, h (ft-osl)
20.88	0.000	0.00	0.008	2404.2	22.26	22.39	0.065	2344	1.06
20.94	0.000	0.00	0.008	2405.9	22.11	22.24	0.065	2328	1.06
21.00	0.000	0.00	0.008	2407.7	21.96	22.09	0.065	2313	1.06
21.06	0.000	0.00	0.008	2409.4	21.82	21.95	0.064	2298	1.05
21.12	0.000	0.00	0.008	2411.2	21.67	21.80	0.064	2283	1.05
21.18	0.000	0.00	0.008	2412.9	21.53	21.66	0.064	2267	1.04
21.23	0.000	0.00	0.008	2414.7	21.39	21.51	0.064	2252	1.04
21.29	0.000	0.00	0.008	2416.4	21.24	21.37	0.063	2237	1.03
21.35	0.000	0.00	0.008	2418.2	21.10	21.23	0.063	2222	1.03
21.41	0.000	0.00	0.008	2419.9	20.96	21.08	0.063	2207	1.02
21.47	0.000	0.00	0.008	2421.6	20.82	20.94	0.062	2192	1.02
21.53	0.000	0.00	0.008	2423.4	20.68	20.80	0.062	2178	1.02
21.58	0.000	0.00	0.008	2425.1	20.54	20.66	0.062	2163	1.01
21.64	0.000	0.00	0.008	2426.8	20.40	20.52	0.061	2148	1.01
21.70	0.000	0.00	0.008	2428.6	20.26	20.38	0.061	2134	1.00
21.76	0.000	0.00	0.008	2430.3	20.12	20.24	0.061	2119	1.00
21.82	0.000	0.00	0.008	2432.1	19.98	20.10	0.061	2104	0.99
21.88	0.000	0.00	0.008	2433.8	19.84	19.97	0.060	2090	0.99
21.93	0.000	0.00	0.008	2435.5	19.71	19.83	0.060	2076	0.99
21.99	0.000	0.00	0.008	2437.2	19.57	19.69	0.060	2061	0.98
22.05	0.000	0.00	0.008	2439.0	19.44	19.56	0.059	2047	0.98
22.11	0.000	0.00	0.008	2440.7	19.30	19.42	0.059	2033	0.97
22.17	0.000	0.00	0.008	2442.4	19.17	19.29	0.059	2019	0.97
22.23	0.000	0.00	0.008	2444.2	19.04	19.15	0.058	2005	0.97
22.28	0.000	0.00	0.008	2445.9	18.90	19.02	0.058	1991	0.96
22.34	0.000	0.00	0.008	2447.6	18.77	18.89	0.058	1977	0.96
22.40	0.000	0.00	0.008	2449.3	18.64	18.76	0.057	1963	0.95
22.46	0.000	0.00	0.008	2451.1	18.51	18.62	0.057	1950	0.95
22.52	0.000	0.00	0.008	2452.8	18.38	18.49	0.057	1936	0.95
22.58	0.000	0.00	0.008	2454.5	18.25	18.36	0.057	1922	0.94
22.63	0.000	0.00	0.008	2456.2	18.12	18.23	0.056	1909	0.94
22.69	0.000	0.00	0.008	2457.9	17.99	18.10	0.056	1895	0.93
22.75	0.000	0.00	0.008	2459.7	17.87	17.98	0.056	1882	0.93
22.81	0.000	0.00	0.008	2461.4	17.74	17.85	0.055	1868	0.93
22.87	0.000	0.00	0.008	2463.1	17.61	17.72	0.055	1855	0.92
22.93	0.000	0.00	0.008	2464.8	17.49	17.60	0.055	1842	0.92
22.98	0.000	0.00	0.008	2466.5	17.36	17.47	0.054	1829	0.92
23.04	0.000	0.00	0.008	2468.2	17.24	17.34	0.054	1815	0.91
23.10	0.000	0.00	0.008	2469.9	17.11	17.22	0.054	1802	0.91
23.16	0.000	0.00	0.008	2471.7	16.99	17.10	0.054	1789	0.90
23.22	0.000	0.00	0.008	2473.4	16.87	16.97	0.053	1776	0.90
23.28	0.000	0.00	0.008	2475.1	16.74	16.85	0.053	1764	0.90
23.33	0.000	0.00	0.008	2476.8	16.62	16.73	0.053	1751	0.89
23.39	0.000	0.00	0.008	2478.5	16.50	16.61	0.052	1738	0.89
23.45	0.000	0.00	0.008	2480.2	16.38	16.49	0.052	1725	0.89
23.51	0.000	0.00	0.008	2481.9	16.26	16.37	0.052	1713	0.88
23.57	0.000	0.00	0.008	2483.6	16.14	16.25	0.051	1700	0.88
23.63	0.000	0.00	0.008	2485.3	16.02	16.13	0.051	1688	0.87
23.68	0.000	0.00	0.008	2487.0	15.91	16.01	0.051	1676	0.87
23.74	0.000	0.00	0.008	2488.7	15.79	15.89	0.050	1663	0.87
23.80	0.000	0.00	0.008	2490.4	15.67	15.77	0.050	1651	0.86
23.86	0.000	0.00	0.008	2492.1	15.56	15.66	0.050	1639	0.86

time (hr)	Inflow, In (cfs)	In+In+1 (cfs)	fn (cfs)	Inf. Vol, F (ft3)	2S1/At-O1 (cfs)	2S2/At+O2 (cfs)	Outflow, On (cfs)	Volume, S (ft3)	Elevation, h (ft-osl)
23.92	0.000	0.00	0.008	2493.8	15.44	15.54	0.049	1627	0.86
23.98	0.000	0.00	0.008	2495.5	15.33	15.43	0.049	1615	0.85
24.03	0.000	0.00	0.008	2497.2	15.21	15.31	0.049	1603	0.85
24.09	0.000	0.00	0.008	2498.9	15.10	15.20	0.049	1591	0.85
24.15	0.000	0.00	0.008	2500.6	14.99	15.08	0.048	1579	0.84
24.21	0.000	0.00	0.008	2502.3	14.88	14.97	0.048	1567	0.84
24.27	0.000	0.00	0.008	2504.0	14.76	14.86	0.048	1555	0.84
24.33	0.000	0.00	0.008	2505.7	14.65	14.75	0.047	1544	0.83
24.38	0.000	0.00	0.008	2507.4	14.54	14.64	0.047	1532	0.83
24.44	0.000	0.00	0.008	2509.1	14.43	14.53	0.047	1520	0.83
24.50	0.000	0.00	0.008	2510.8	14.33	14.42	0.046	1509	0.82
24.56	0.000	0.00	0.008	2512.5	14.22	14.31	0.046	1498	0.82
24.62	0.000	0.00	0.008	2514.2	14.11	14.20	0.046	1486	0.82
24.68	0.000	0.00	0.008	2515.9	14.00	14.09	0.045	1475	0.81
24.73	0.000	0.00	0.008	2517.6	13.90	13.99	0.045	1464	0.81
24.79	0.000	0.00	0.008	2519.2	13.79	13.88	0.045	1453	0.81
24.85	0.000	0.00	0.008	2520.9	13.69	13.77	0.044	1442	0.80
24.91	0.000	0.00	0.008	2522.6	13.58	13.67	0.044	1431	0.80
24.97	0.000	0.00	0.008	2524.3	13.48	13.57	0.044	1420	0.80
25.03	0.000	0.00	0.008	2526.0	13.37	13.46	0.043	1409	0.79
25.08	0.000	0.00	0.008	2527.7	13.27	13.36	0.043	1398	0.79
25.14	0.000	0.00	0.008	2529.4	13.17	13.26	0.043	1387	0.79
25.20	0.000	0.00	0.008	2531.0	13.07	13.15	0.043	1377	0.79
25.26	0.000	0.00	0.008	2532.7	12.97	13.05	0.042	1366	0.78
25.32	0.000	0.00	0.008	2534.4	12.87	12.95	0.042	1356	0.78
25.38	0.000	0.00	0.008	2536.1	12.77	12.85	0.042	1345	0.78
25.43	0.000	0.00	0.008	2537.8	12.67	12.75	0.041	1335	0.77
25.49	0.000	0.00	0.008	2539.4	12.57	12.66	0.041	1325	0.77
25.55	0.000	0.00	0.008	2541.1	12.48	12.56	0.041	1314	0.77
25.61	0.000	0.00	0.008	2542.8	12.38	12.46	0.040	1304	0.76
25.67	0.000	0.00	0.008	2544.5	12.28	12.36	0.040	1294	0.76
25.73	0.000	0.00	0.008	2546.2	12.19	12.27	0.040	1284	0.76
25.78	0.000	0.00	0.008	2547.8	12.09	12.17	0.039	1274	0.76
25.84	0.000	0.00	0.008	2549.5	12.00	12.08	0.039	1264	0.75
25.90	0.000	0.00	0.008	2551.2	11.91	11.98	0.039	1254	0.75
25.96	0.000	0.00	0.008	2552.9	11.81	11.89	0.038	1244	0.74
26.02	0.000	0.00	0.008	2554.5	11.72	11.80	0.037	1235	0.74
26.08	0.000	0.00	0.008	2556.2	11.63	11.71	0.037	1225	0.73
26.13	0.000	0.00	0.008	2557.9	11.55	11.62	0.036	1216	0.73
26.19	0.000	0.00	0.008	2559.5	11.46	11.53	0.035	1207	0.72
26.25	0.000	0.00	0.008	2561.2	11.37	11.44	0.034	1198	0.72
26.31	0.000	0.00	0.008	2562.9	11.29	11.36	0.034	1189	0.71
26.37	0.000	0.00	0.008	2564.5	11.21	11.28	0.033	1180	0.71
26.43	0.000	0.00	0.008	2566.2	11.13	11.19	0.032	1172	0.70
26.48	0.000	0.00	0.008	2567.9	11.05	11.11	0.032	1164	0.70
26.54	0.000	0.00	0.008	2569.5	10.97	11.03	0.031	1155	0.69
26.60	0.000	0.00	0.008	2571.2	10.89	10.96	0.030	1147	0.69
26.66	0.000	0.00	0.008	2572.9	10.82	10.88	0.030	1139	0.68
26.72	0.000	0.00	0.008	2574.5	10.75	10.80	0.029	1131	0.68
26.78	0.000	0.00	0.008	2576.2	10.67	10.73	0.028	1124	0.67
26.83	0.000	0.00	0.008	2577.8	10.60	10.66	0.028	1116	0.67
26.89	0.000	0.00	0.008	2579.5	10.53	10.59	0.027	1109	0.66

time (hr)	Inflow, In (cfs)	In+In+1 (cfs)	fn (cfs)	Inf. Vol, F (ft3)	2S1/At-O1 (cfs)	2S2/At+O2 (cfs)	Outflow, On (cfs)	Volume, S (ft3)	Elevation, h (ft-osl)
26.95	0.000	0.00	0.008	2581.1	10.46	10.52	0.026	1101	0.66
27.01	0.000	0.00	0.008	2582.8	10.40	10.45	0.025	1094	0.65
27.07	0.000	0.00	0.008	2584.5	10.33	10.38	0.024	1088	0.65
27.13	0.000	0.00	0.008	2586.1	10.27	10.32	0.023	1081	0.65
27.18	0.000	0.00	0.008	2587.8	10.21	10.26	0.022	1075	0.64
27.24	0.000	0.00	0.008	2589.4	10.15	10.20	0.021	1068	0.64
27.30	0.000	0.00	0.008	2591.1	10.10	10.14	0.020	1062	0.64
27.36	0.000	0.00	0.008	2592.7	10.04	10.08	0.020	1057	0.63
27.42	0.000	0.00	0.008	2594.4	9.99	10.03	0.019	1051	0.63
27.48	0.000	0.00	0.008	2596.0	9.94	9.97	0.018	1045	0.63
27.53	0.000	0.00	0.008	2597.6	9.89	9.92	0.017	1040	0.62
27.59	0.000	0.00	0.008	2599.3	9.84	9.87	0.017	1035	0.62
27.65	0.000	0.00	0.008	2600.9	9.79	9.82	0.016	1030	0.62
27.71	0.000	0.00	0.008	2602.6	9.74	9.77	0.015	1025	0.61
27.77	0.000	0.00	0.008	2604.2	9.70	9.73	0.015	1020	0.61
27.83	0.000	0.00	0.008	2605.9	9.66	9.68	0.014	1015	0.61
27.88	0.000	0.00	0.008	2607.5	9.61	9.64	0.013	1011	0.60
27.94	0.000	0.00	0.008	2609.2	9.57	9.60	0.013	1006	0.60
28.00	0.000	0.00	0.008	2610.8	9.53	9.56	0.012	1002	0.60
28.06	0.000	0.00	0.008	2612.4	9.49	9.52	0.012	998	0.60
28.12	0.000	0.00	0.008	2614.1	9.46	9.48	0.011	994	0.59
28.18	0.000	0.00	0.008	2615.7	9.42	9.44	0.010	990	0.59
28.23	0.000	0.00	0.008	2617.4	9.38	9.40	0.010	986	0.59
28.29	0.000	0.00	0.008	2619.0	9.35	9.37	0.009	983	0.59
28.35	0.000	0.00	0.008	2620.6	9.32	9.33	0.009	979	0.59
28.41	0.000	0.00	0.008	2622.3	9.28	9.30	0.008	976	0.58
28.47	0.000	0.00	0.008	2623.9	9.25	9.27	0.008	972	0.58
28.53	0.000	0.00	0.008	2625.6	9.22	9.24	0.008	969	0.58
28.58	0.000	0.00	0.008	2627.2	9.19	9.21	0.008	966	0.58
28.64	0.000	0.00	0.008	2628.8	9.16	9.17	0.008	963	0.58
28.70	0.000	0.00	0.008	2630.5	9.13	9.14	0.007	959	0.57
28.76	0.000	0.00	0.008	2632.1	9.10	9.11	0.007	956	0.57
28.82	0.000	0.00	0.008	2633.7	9.07	9.08	0.007	953	0.57
28.88	0.000	0.00	0.008	2635.4	9.04	9.05	0.007	950	0.57
28.93	0.000	0.00	0.008	2637.0	9.01	9.02	0.007	947	0.57
28.99	0.000	0.00	0.008	2638.6	8.98	9.00	0.006	944	0.56
29.05	0.000	0.00	0.008	2640.3	8.95	8.97	0.006	941	0.56
29.11	0.000	0.00	0.008	2641.9	8.93	8.94	0.006	938	0.56
29.17	0.000	0.00	0.008	2643.5	8.90	8.91	0.006	935	0.56
29.23	0.000	0.00	0.008	2645.2	8.87	8.88	0.006	932	0.56
29.28	0.000	0.00	0.008	2646.8	8.85	8.86	0.006	929	0.56
29.34	0.000	0.00	0.008	2648.4	8.82	8.83	0.005	927	0.55
29.40	0.000	0.00	0.008	2650.1	8.79	8.80	0.005	924	0.55
29.46	0.000	0.00	0.008	2651.7	8.77	8.78	0.005	921	0.55
29.52	0.000	0.00	0.008	2653.3	8.74	8.75	0.005	918	0.55
29.58	0.000	0.00	0.008	2654.9	8.72	8.73	0.005	916	0.55
29.63	0.000	0.00	0.008	2656.6	8.69	8.70	0.005	913	0.55
29.69	0.000	0.00	0.008	2658.2	8.67	8.68	0.004	911	0.54
29.75	0.000	0.00	0.008	2659.8	8.64	8.65	0.004	908	0.54
29.81	0.000	0.00	0.008	2661.5	8.62	8.63	0.004	906	0.54
29.87	0.000	0.00	0.008	2663.1	8.60	8.60	0.004	903	0.54
29.93	0.000	0.00	0.008	2664.7	8.57	8.58	0.004		

MODIFIED PULS

At	0.058	hr	Storage coefficients for Bio-Retention 5		
min	0	ft	$S= ah^3+bh^2+ch$; (h: elevation over datum)		
datum:	0	ft	a	NOT USED	
initial elev.	0.5	ft	b	NOT USED	ft
Outlet structure:			c	NOT USED	ft^2
Complex Hydromodification Structure			A	1672	sq-ft
Safety Factor (infiltr):	1		f	0.1875	in/hr

Volume-elevation-Outflow curve
24 hr Storm Events (Δt = 6.00 min).

S	h	Slope h/S	2S/At+O	O	Slope
0	0.00	0.0006	0.00	0.000	0.0000
836	0.50	0.0006	7.96	0.000	0.0062
975	0.58	0.0006	9.30	0.008	0.0144
1115	0.67	0.0006	10.64	0.028	0.0083
1254	0.75	0.0003	11.98	0.039	0.0031
1544	0.83	0.0003	14.75	0.047	0.0026
1834	0.92	0.0003	17.52	0.055	0.0023
2123	1.00	0.0003	20.28	0.061	0.0021
2411	1.08	0.0003	23.03	0.067	0.0019
2699	1.17	0.0003	25.77	0.072	0.0018
2986	1.25	0.0003	28.51	0.077	0.0017
3272	1.33	0.0003	31.25	0.082	0.0016
3558	1.42	0.0003	33.97	0.086	0.0015
3843	1.50	0.0003	36.69	0.090	0.0015
4128	1.58	0.0003	39.40	0.094	0.0014
4411	1.67	0.0003	42.11	0.098	0.0014
4694	1.75	0.0003	44.81	0.102	0.0013
4976	1.83	0.0003	47.49	0.105	0.0013
5257	1.92	0.0003	50.17	0.109	0.0012
5537	2.00	0.0003	52.84	0.112	0.0012
5816	2.08	0.0003	55.50	0.115	0.0012
6094	2.17	0.0003	58.15	0.118	0.0012
6370	2.25	0.0003	60.79	0.121	0.0011
6646	2.33	0.0003	63.42	0.124	0.0011
6920	2.42	0.0003	66.04	0.127	0.0011
7194	2.50	0.0003	68.64	0.130	0.0011
7465	2.58	0.0003	71.23	0.133	0.0011
7736	2.67	0.0003	73.81	0.136	0.0010
8005	2.75	0.0003	76.38	0.138	0.0396
8273	2.83	0.0003	79.03	0.243	0.0697
8539	2.92	0.0003	81.76	0.434	0.0887
8804	3.00	0.0003	84.52	0.679	0.1038
9067	3.08	0.0003	87.32	0.969	0.0757
9328	3.17	0.0003	90.01	1.173	0.0569
9587	3.25	0.0003	92.63	1.322	0.0512
9845	3.33	0.0003	95.22	1.454	0.0472
10101	3.42	0.0003	97.77	1.575	0.0441
10355	3.50	0.0003	100.30	1.686	0.0416
10607	3.58	0.0003	102.81	1.790	0.0396
10856	3.67	0.0003	105.28	1.889	0.0380
11104	3.75	0.0003	107.73	1.982	0.0366
11349	3.83	0.0003	110.16	2.070	0.0354

11592	3.92	0.0003	112.55	2.155	0.0344
11832	4.00	0.0004	114.92	2.237	0.0335
12070	4.08	0.0004	117.27	2.315	0.0328
12305	4.17	0.0004	119.58	2.391	0.0321
12537	4.25	0.0004	121.87	2.464	0.0316
12767	4.33	0.0004	124.12	2.536	0.0312
12993	4.42	0.0004	126.35	2.605	0.0308
13216	4.50	0.0004	128.54	2.672	0.0305
13435	4.58	0.0004	130.69	2.738	0.0303
13651	4.67	0.0004	132.81	2.802	0.0301
13863	4.75	0.0004	134.89	2.865	0.0301
14071	4.83	0.0004	136.93	2.926	0.0301
14274	4.92	0.0004	138.93	2.986	0.0302
14472	5.00	0.0004	140.87	3.045	0.0305
14664	5.08	0.0004	142.76	3.103	0.0310
14851	5.17	0.0005	144.59	3.159	0.0317
15029	5.25	0.0005	146.35	3.215	0.0334
15195	5.33	0.0005	147.98	3.270	0.0351
15350	5.42	0.0005	149.51	3.323	0.0353
15502	5.50	0.0006	151.01	3.376	0.0354
15651	5.58	0.0006	152.48	3.428	0.0355
15797	5.67	0.0006	153.93	3.480	0.0361
15939	5.75	0.0006	155.33	3.530	0.0362
16078	5.83	0.0006	156.70	3.580	0.0357
16217	5.92	0.0006	158.08	3.629	0.0352
16357	6.00	0.0006	159.45	3.677	0.1888
16496	6.08	0.0006	161.09	3.986	0.2833
16635	6.17	0.0006	162.94	4.511	0.3337
16775	6.25	0.0006	164.93	5.175	0.3696
16914	6.33	0.0006	167.04	5.953	0.3975
17053	6.42	0.0006	169.24	6.829	0.4205
17193	6.50	0.0006	171.53	7.792	0.4399
17332	6.58	0.0006	173.90	8.834	0.4568
17471	6.67	0.0006	176.34	9.950	0.4717
17611	6.75		178.85	11.135	

MC-4500 CHAMBER

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.

STORMTECH MC-4500 CHAMBER
(not to scale)

Nominal Chamber Specifications

Size (L x W x H)
52” x 100” x 60”
1321 mm x 2540 mm x 1524 mm

Chamber Storage
106.5 ft³ (3.01 m³)

Min. Installed Storage*
162.6 ft³ (4.60 m³)

Weight
Nominal 125 lbs (56.7 kg)

Shipping
7 chambers/pallet
5 end caps/pallet
11 pallets/truck

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below chambers, 9” (230 mm) of stone between chambers/end caps and 40% stone porosity.

STORMTECH MC-4500 END CAP
(not to scale)

Nominal End Cap Specifications

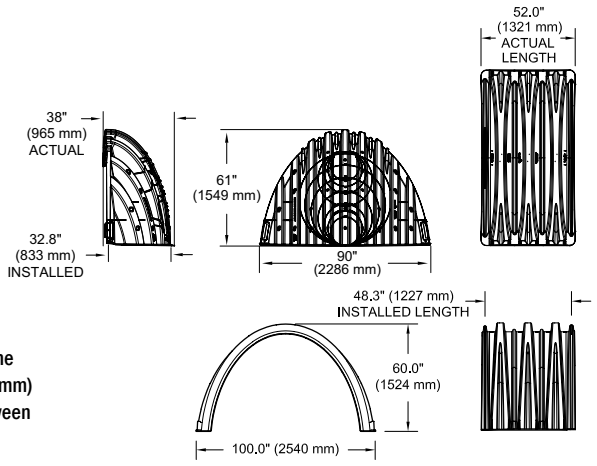
Size (L x W x H)
38” x 90” x 61”
965 mm x 2286 mm x 1549 mm

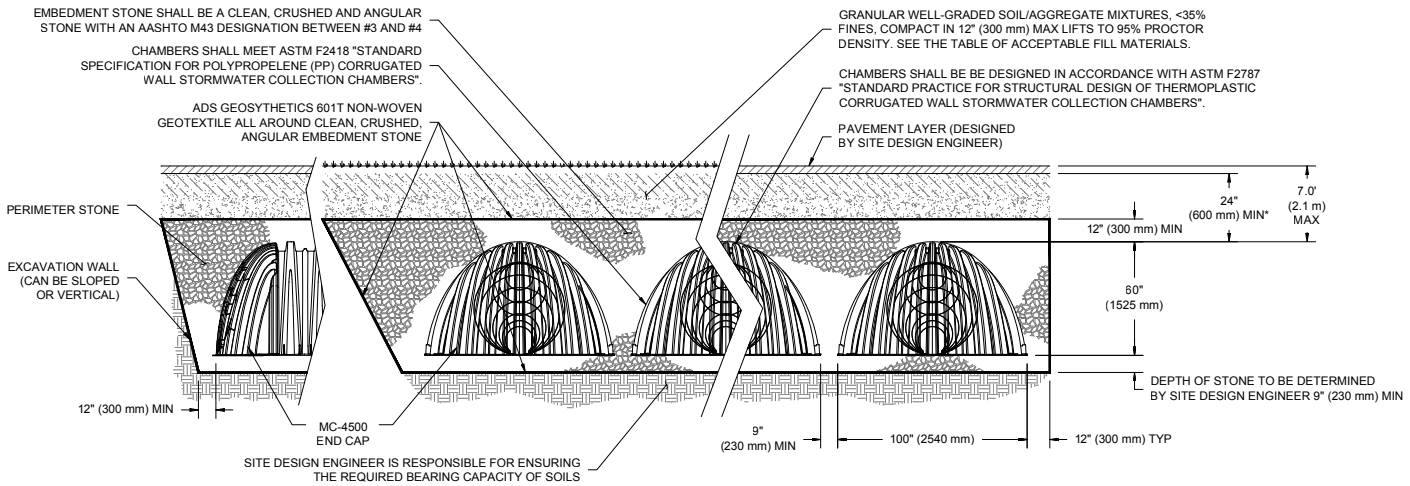
End Cap Storage
39.5 ft³ (1.12 m³)

Min. Installed Storage*
115.3 ft³ (3.26 m³)

Weight
Nominal 90.0 lbs (40.8 kg)

*Assumes a minimum of 12” (300 mm) of stone above, 9” (230 mm) of stone below, 12” (300 mm) of stone perimeter, 9” (230 mm) of stone between chambers/end caps and 40% stone porosity.





*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 30" (750 mm).

MC-4500 CHAMBER SPECIFICATIONS

STORAGE VOLUME PER CHAMBER FT³ (M³)

	Bare Chamber Storage ft³ (m³)	Chamber and Stone Foundation Depth in. (mm)			
		9" (230 mm)	12" (300 mm)	15" (375 mm)	18" (450 mm)
MC-4500 Chamber	106.5 (3.01)	162.6 (4.60)	166.3 (4.71)	169.9 (4.81)	173.6 (4.91)
MC-4500 End Cap	39.5 (1.12)	115.3 (3.26)	118.6 (3.36)	121.9 (3.45)	125.2 (3.54)

Note: Assumes 9" (230 mm) row spacing, 40% stone porosity, 12" (300 mm) stone above and includes the bare chamber/end cap volume. End cap volume assumes 12" (300 mm) stone perimeter in front of end cap.

AMOUNT OF STONE PER CHAMBER

ENGLISH TONS (yds³)	Stone Foundation Depth			
	9"	12"	15"	18"
MC-4500 Chamber	7.4 (5.2)	7.8 (5.5)	8.3 (5.9)	8.8 (6.2)
MC-4500 End Cap	9.8 (7.0)	10.2 (7.3)	10.6 (7.6)	11.1 (7.9)
METRIC KILOGRAMS (m³)	230 mm	300 mm	375 mm	450 mm
MC-4500 Chamber	6713 (4.0)	7076 (4.2)	7529 (4.5)	7983 (4.7)
MC-4500 End Cap	8890 (5.3)	9253 (5.5)	9616 (5.8)	10069 (6.0)

Note: Assumes 12" (300 mm) of stone above and 9" (230 mm) row spacing and 12" (300 mm) of perimeter stone in front of end caps.

VOLUME EXCAVATION PER CHAMBER YD³ (M³)

	Stone Foundation Depth			
	9" (230 mm)	12" (300 mm)	15" (375mm)	18" (450 mm)
MC-4500 Chamber	10.5 (8.0)	10.8 (8.3)	11.2 (8.5)	11.5 (8.8)
MC-4500 End Cap	9.7 (7.4)	10.0 (7.6)	10.3 (7.9)	10.6 (8.1)

Note: Assumes 9" (230 mm) of separation between chamber rows, 12" (300 mm) of perimeter in front of the end caps, and 24" (600 mm) of cover. The volume of excavation will vary as depth of cover increases.

Working on a project?
Visit us at www.stormtech.com
and utilize the StormTech Design Tool

For more information on the StormTech MC-4500 Chamber and other ADS products, please contact our Customer Service Representatives at 1-800-821-6710

Advanced Drainage Systems, Inc.
4640 Trueman Blvd., Hilliard, OH 43026
1-800-821-6710 www.ads-pipe.com

Appendix F – Mitigated Post-Developed Calculations

```
                San Diego County Rational Hydrology Program

      CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

      Rational method hydrology  program based on
      San Diego County Flood Control Division 2003 hydrology manual
            Rational Hydrology Study        Date: 10/31/22
      ------------------------------------------------------------------------
-
      1581 - CAMPUS PARK CONDOS PARCEL 1
      Q100, MITIGATED


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

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


      Program License Serial Number 6292

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

      Map data precipitation entered:
      6 hour,  precipitation(inches) =  3.500
      24 hour precipitation(inches) =  6.000
      P6/P24 =    58.3%
      San Diego hydrology manual 'C' values used


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
      Process from Point/Station        1.011 to Point/Station        1.024
      **** USER DEFINED FLOW INFORMATION AT A POINT ****
      ________________________________________________________________________
      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
      [HIGH DENSITY RESIDENTIAL                    ]
      (43.0 DU/A or Less      )
      Impervious value, Ai = 0.800
      Sub-Area C Value = 0.780
      Rainfall intensity (I) =      4.684(In/Hr) for a   100.0 year storm
      User specified values are as follows:
      TC =  14.29 min.  Rain intensity =       4.68(In/Hr)
      Total area =        2.750(Ac.)  Total runoff =     3.660(CFS)


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
      Process from Point/Station        1.024 to Point/Station        1.025
      **** PIPEFLOW TRAVEL TIME (User specified size) ****
```

```
Upstream point/station elevation =   360.600(Ft.)
Downstream point/station elevation =   343.300(Ft.)
Pipe length  =    48.00(Ft.) Slope =   0.3604  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.660(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =     3.660(CFS)
Normal flow depth in pipe =    2.94(In.)
Flow top width inside pipe =   13.31(In.)
Critical Depth =    8.76(In.)
Pipe flow velocity =     19.44(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =    14.33 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.025 to Point/Station        1.025
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area =      2.750(Ac.)
Runoff from this stream =      3.660(CFS)
Time of concentration =   14.33 min.
Rainfall intensity =     4.676(In/Hr)
Program is now starting with Main Stream No. 2


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        2.011 to Point/Station        2.011
**** USER DEFINED FLOW INFORMATION AT A POINT ****
------------------------------------------------------------------------------
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
Rainfall intensity (I) =      9.222(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =   5.00 min.  Rain intensity =       9.22(In/Hr)
Total area =        0.200(Ac.)  Total runoff =     0.550(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.025 to Point/Station        1.025
**** CONFLUENCE OF MAIN STREAMS ****
------------------------------------------------------------------------------
The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area =      0.200(Ac.)
Runoff from this stream =      0.550(CFS)
Time of concentration =    5.00 min.
Rainfall intensity =     9.222(In/Hr)
Summary of stream data:
```

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


1        3.660     14.33               4.676
2        0.550      5.00               9.222
Qmax(1) =
         1.000 *    1.000 *     3.660) +
         0.507 *    1.000 *     0.550) + =       3.939
Qmax(2) =
         1.000 *    0.349 *     3.660) +
         1.000 *    1.000 *     0.550) + =       1.827

Total of 2 main streams to confluence:
Flow rates before confluence point:
       3.660       0.550
Maximum flow rates at confluence using above data:
        3.939        1.827
Area of streams before confluence:
        2.750        0.200


Results of confluence:
Total flow rate =      3.939(CFS)
Time of concentration =    14.331 min.
Effective stream area after confluence  =      2.950(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        1.026 to Point/Station        1.026
**** 6 HOUR HYDROGRAPH ****
________________________________________________________________________
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Hydrograph Data - Section 6, San Diego County Hydrology manual, June
2003


Time of Concentration =  14.33
Basin Area =     2.95 Acres
6 Hour Rainfall =  3.500 Inches
Runoff Coefficient =  0.747
Peak Discharge =     3.94 CFS
     Time (Min)     Discharge (CFS)
       0               0.000
       14               0.460
       28               0.485
       42               0.499
       56               0.530
       70               0.547
       84               0.587
       98               0.609
       112               0.662
       126               0.694
       140               0.769
       154               0.816
       168               0.935
```

```
          182              1.014
          196              1.239
          210              1.411
          224              2.072
          238              2.920
          252              3.939
          266              1.662
          280              1.112
          294              0.870
          308              0.729
          322              0.634
          336              0.566
          350              0.514
          364              0.472
    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                      6 - H O U R   S T O R M
                  R u n o f f     H y d r o g r a p h
    ----------------------------------------------------------------------
              Hydrograph in   1   Minute intervals ((CFS))

    ----------------------------------------------------------------------
Time(h+m) Volume Ac.Ft   Q(CFS)  0        1.0       2.0       3.0       3.9
----------------------------------------------------------------------------
  0+ 0       0.0000      0.00  Q          |         |         |         |
  0+ 1       0.0000      0.03  Q          |         |         |         |
  0+ 2       0.0001      0.07  Q          |         |         |         |
  0+ 3       0.0003      0.10  VQ         |         |         |         |
  0+ 4       0.0005      0.13  VQ         |         |         |         |
  0+ 5       0.0007      0.16  VQ         |         |         |         |
  0+ 6       0.0010      0.20  V Q        |         |         |         |
  0+ 7       0.0013      0.23  V Q        |         |         |         |
  0+ 8       0.0016      0.26  V Q        |         |         |         |
  0+ 9       0.0020      0.30  V  Q       |         |         |         |
  0+10       0.0025      0.33  V  Q       |         |         |         |
  0+11       0.0030      0.36  V  Q       |         |         |         |
  0+12       0.0035      0.39  V   Q      |         |         |         |
  0+13       0.0041      0.43  V   Q      |         |         |         |
  0+14       0.0048      0.46  V   Q      |         |         |         |
  0+15       0.0054      0.46  V   Q      |         |         |         |
  0+16       0.0060      0.46  V   Q      |         |         |         |
  0+17       0.0067      0.47  V   Q      |         |         |         |
  0+18       0.0073      0.47  V   Q      |         |         |         |
  0+19       0.0080      0.47  V   Q      |         |         |         |
  0+20       0.0086      0.47  V   Q      |         |         |         |
  0+21       0.0093      0.47  V   Q      |         |         |         |
  0+22       0.0099      0.47  V   Q      |         |         |         |
  0+23       0.0106      0.48  V   Q      |         |         |         |
  0+24       0.0112      0.48  V   Q      |         |         |         |
  0+25       0.0119      0.48  V   Q      |         |         |         |
  0+26       0.0125      0.48  V   Q      |         |         |         |
  0+27       0.0132      0.48  |V  Q      |         |         |         |
  0+28       0.0139      0.48  |V  Q      |         |         |         |
  0+29       0.0146      0.49  |V  Q      |         |         |         |
  0+30       0.0152      0.49  |V  Q      |         |         |         |
  0+31       0.0159      0.49  |V  Q      |         |         |         |
  0+32       0.0166      0.49  |V  Q      |         |         |         |
  0+33       0.0172      0.49  |V  Q      |         |         |         |
```

```
0+34      0.0179     0.49  |V  Q     |          |          |          |
0+35      0.0186     0.49  |V  Q     |          |          |          |
0+36      0.0193     0.49  |V   Q    |          |          |          |
0+37      0.0200     0.49  |V   Q    |          |          |          |
0+38      0.0206     0.49  |V   Q    |          |          |          |
0+39      0.0213     0.50  |V   Q    |          |          |          |
0+40      0.0220     0.50  |V   Q    |          |          |          |
0+41      0.0227     0.50  |V   Q    |          |          |          |
0+42      0.0234     0.50  |V   Q    |          |          |          |
0+43      0.0241     0.50  |V   Q    |          |          |          |
0+44      0.0248     0.50  |V   Q    |          |          |          |
0+45      0.0255     0.51  |V   Q    |          |          |          |
0+46      0.0262     0.51  | V  Q    |          |          |          |
0+47      0.0269     0.51  | V  Q    |          |          |          |
0+48      0.0276     0.51  | V  Q    |          |          |          |
0+49      0.0283     0.51  | V  Q    |          |          |          |
0+50      0.0290     0.52  | V  Q    |          |          |          |
0+51      0.0297     0.52  | V  Q    |          |          |          |
0+52      0.0304     0.52  | V  Q    |          |          |          |
0+53      0.0311     0.52  | V  Q    |          |          |          |
0+54      0.0319     0.53  | V  Q    |          |          |          |
0+55      0.0326     0.53  | V  Q    |          |          |          |
0+56      0.0333     0.53  | V  Q    |          |          |          |
0+57      0.0340     0.53  | V  Q    |          |          |          |
0+58      0.0348     0.53  | V  Q    |          |          |          |
0+59      0.0355     0.53  | V  Q    |          |          |          |
1+ 0      0.0362     0.53  | V  Q    |          |          |          |
1+ 1      0.0370     0.54  | V  Q    |          |          |          |
1+ 2      0.0377     0.54  | V  Q    |          |          |          |
1+ 3      0.0385     0.54  |  V Q    |          |          |          |
1+ 4      0.0392     0.54  |  V Q    |          |          |          |
1+ 5      0.0400     0.54  |  V Q    |          |          |          |
1+ 6      0.0407     0.54  |  V Q    |          |          |          |
1+ 7      0.0415     0.54  |  V Q    |          |          |          |
1+ 8      0.0422     0.54  |  V Q    |          |          |          |
1+ 9      0.0430     0.55  |  V Q    |          |          |          |
1+10      0.0437     0.55  |  V Q    |          |          |          |
1+11      0.0445     0.55  |  V Q    |          |          |          |
1+12      0.0452     0.55  |  V Q    |          |          |          |
1+13      0.0460     0.56  |  V Q    |          |          |          |
1+14      0.0468     0.56  |  V Q    |          |          |          |
1+15      0.0475     0.56  |  V Q    |          |          |          |
1+16      0.0483     0.56  |  V Q    |          |          |          |
1+17      0.0491     0.57  |  V Q    |          |          |          |
1+18      0.0499     0.57  |  V Q    |          |          |          |
1+19      0.0507     0.57  |  V Q    |          |          |          |
1+20      0.0515     0.58  |   VQ    |          |          |          |
1+21      0.0523     0.58  |   VQ    |          |          |          |
1+22      0.0531     0.58  |   VQ    |          |          |          |
1+23      0.0539     0.58  |   VQ    |          |          |          |
1+24      0.0547     0.59  |   VQ    |          |          |          |
1+25      0.0555     0.59  |   VQ    |          |          |          |
1+26      0.0563     0.59  |   VQ    |          |          |          |
1+27      0.0571     0.59  |   V Q   |          |          |          |
1+28      0.0579     0.59  |   V Q   |          |          |          |
1+29      0.0587     0.59  |   V Q   |          |          |          |
1+30      0.0596     0.60  |   V Q   |          |          |          |
```

1+31	0.0604	0.60	V Q			
1+32	0.0612	0.60	V Q			
1+33	0.0620	0.60	V Q			
1+34	0.0629	0.60	V Q			
1+35	0.0637	0.60	V Q			
1+36	0.0645	0.61	VQ			
1+37	0.0654	0.61	VQ			
1+38	0.0662	0.61	VQ			
1+39	0.0671	0.61	VQ			
1+40	0.0679	0.62	VQ			
1+41	0.0688	0.62	VQ			
1+42	0.0696	0.62	VQ			
1+43	0.0705	0.63	VQ			
1+44	0.0714	0.63	VQ			
1+45	0.0722	0.64	VQ			
1+46	0.0731	0.64	VQ			
1+47	0.0740	0.64	VQ			
1+48	0.0749	0.65	VQ			
1+49	0.0758	0.65	VQ			
1+50	0.0767	0.65	VQ			
1+51	0.0776	0.66	Q			
1+52	0.0785	0.66	Q			
1+53	0.0794	0.66	Q			
1+54	0.0803	0.67	Q			
1+55	0.0813	0.67	Q			
1+56	0.0822	0.67	Q			
1+57	0.0831	0.67	Q			
1+58	0.0840	0.68	Q			
1+59	0.0850	0.68	Q			
2+ 0	0.0859	0.68	Q			
2+ 1	0.0869	0.68	Q			
2+ 2	0.0878	0.68	Q			
2+ 3	0.0887	0.69	Q			
2+ 4	0.0897	0.69	QV			
2+ 5	0.0906	0.69	Q			
2+ 6	0.0916	0.69	Q			
2+ 7	0.0926	0.70	Q			
2+ 8	0.0935	0.70	Q			
2+ 9	0.0945	0.71	Q			
2+10	0.0955	0.72	Q			
2+11	0.0965	0.72	Q			
2+12	0.0975	0.73	Q			
2+13	0.0985	0.73	Q			
2+14	0.0995	0.74	Q			
2+15	0.1005	0.74	Q			
2+16	0.1016	0.75	Q			
2+17	0.1026	0.75	QV			
2+18	0.1036	0.76	QV			
2+19	0.1047	0.76	QV			
2+20	0.1058	0.77	QV			
2+21	0.1068	0.77	QV			
2+22	0.1079	0.78	QV			
2+23	0.1090	0.78	QV			
2+24	0.1100	0.78	QV			
2+25	0.1111	0.79	QV			
2+26	0.1122	0.79	Q			
2+27	0.1133	0.79	Q			

2+28	0.1144	0.80	Q |				
2+29	0.1155	0.80	QV|				
2+30	0.1166	0.80	QV|				
2+31	0.1177	0.81	QV|				
2+32	0.1188	0.81	QV|				
2+33	0.1199	0.81	QV|				
2+34	0.1211	0.82	QV|				
2+35	0.1222	0.82	QV|				
2+36	0.1234	0.83	QV|				
2+37	0.1245	0.84	QV|				
2+38	0.1257	0.85	QV|				
2+39	0.1269	0.86	QV|				
2+40	0.1281	0.87	Q V				
2+41	0.1293	0.88	Q V				
2+42	0.1305	0.88	Q V				
2+43	0.1317	0.89	QV				
2+44	0.1330	0.90	QV				
2+45	0.1342	0.91	QV				
2+46	0.1355	0.92	QV				
2+47	0.1367	0.93	QV				
2+48	0.1380	0.94	QV				
2+49	0.1393	0.94	QV				
2+50	0.1406	0.95	QV				
2+51	0.1419	0.95	Q|V				
2+52	0.1433	0.96	Q|V				
2+53	0.1446	0.96	Q|V				
2+54	0.1459	0.97	Q|V				
2+55	0.1473	0.97	Q|V				
2+56	0.1486	0.98	Q|V				
2+57	0.1500	0.99	QV				
2+58	0.1513	0.99	QV				
2+59	0.1527	1.00	QV				
3+ 0	0.1541	1.00	Q V				
3+ 1	0.1555	1.01	Q V				
3+ 2	0.1569	1.01	Q V				
3+ 3	0.1583	1.03	Q V				
3+ 4	0.1597	1.05	Q V				
3+ 5	0.1612	1.06	Q V				
3+ 6	0.1627	1.08	Q V				
3+ 7	0.1642	1.09	|QV				
3+ 8	0.1657	1.11	|QV				
3+ 9	0.1673	1.13	|Q V				
3+10	0.1688	1.14	|Q V				
3+11	0.1704	1.16	|Q V				
3+12	0.1721	1.17	|Q V				
3+13	0.1737	1.19	| QV				
3+14	0.1754	1.21	| QV				
3+15	0.1770	1.22	| QV				
3+16	0.1788	1.24	| QV				
3+17	0.1805	1.25	| Q V				
3+18	0.1822	1.26	| Q V				
3+19	0.1840	1.28	| Q V				
3+20	0.1858	1.29	| QV				
3+21	0.1875	1.30	| QV				
3+22	0.1894	1.31	| QV				
3+23	0.1912	1.33	| QV				
3+24	0.1930	1.34	| Q V				

```
3+25       0.1949      1.35  |          |  Q V    |          |          |
3+26       0.1968      1.36  |          |  Q V    |          |          |
3+27       0.1986      1.37  |          |  Q V    |          |          |
3+28       0.2006      1.39  |          |   QV    |          |          |
3+29       0.2025      1.40  |          |   QV    |          |          |
3+30       0.2044      1.41  |          |   QV    |          |          |
3+31       0.2064      1.46  |          |   Q V   |          |          |
3+32       0.2085      1.51  |          |    QV   |          |          |
3+33       0.2107      1.55  |          |    QV   |          |          |
3+34       0.2129      1.60  |          |     Q   |          |          |
3+35       0.2151      1.65  |          |     Q   |          |          |
3+36       0.2175      1.69  |          |      Q  |          |          |
3+37       0.2199      1.74  |          |      Q  |          |          |
3+38       0.2223      1.79  |          |      VQ |          |          |
3+39       0.2249      1.84  |          |      VQ |          |          |
3+40       0.2274      1.88  |          |      V Q|          |          |
3+41       0.2301      1.93  |          |      V Q|          |          |
3+42       0.2328      1.98  |          |       V Q          |          |
3+43       0.2356      2.03  |          |       V Q          |          |
3+44       0.2385      2.07  |          |       V |Q         |          |
3+45       0.2414      2.13  |          |       V |Q         |          |
3+46       0.2444      2.19  |          |        V| Q        |          |
3+47       0.2475      2.25  |          |        V| Q        |          |
3+48       0.2507      2.31  |          |        V|  Q       |          |
3+49       0.2540      2.38  |          |        V|   Q      |          |
3+50       0.2574      2.44  |          |         V   Q      |          |
3+51       0.2608      2.50  |          |         V    Q     |          |
3+52       0.2643      2.56  |          |         V    Q     |          |
3+53       0.2679      2.62  |          |         V     Q    |          |
3+54       0.2716      2.68  |          |         |V     Q   |          |
3+55       0.2754      2.74  |          |         |V     Q   |          |
3+56       0.2792      2.80  |          |         |V      Q  |          |
3+57       0.2832      2.86  |          |         | V      Q|          |
3+58       0.2872      2.92  |          |         | V      Q|          |
3+59       0.2913      2.99  |          |         | V       Q          |
4+ 0       0.2955      3.07  |          |         |  V      |Q         |
4+ 1       0.2999      3.14  |          |         |  V      |Q         |
4+ 2       0.3043      3.21  |          |         |  V      | Q        |
4+ 3       0.3088      3.28  |          |         |   V     |  Q       |
4+ 4       0.3134      3.36  |          |         |   V     |   Q      |
4+ 5       0.3182      3.43  |          |         |   V     |   Q      |
4+ 6       0.3230      3.50  |          |         |    V    |    Q     |
4+ 7       0.3279      3.57  |          |         |    V    |     Q    |
4+ 8       0.3329      3.65  |          |         |     V   |      Q   |
4+ 9       0.3381      3.72  |          |         |     V   |      Q   |
4+10       0.3433      3.79  |          |         |     V   |       Q  |
4+11       0.3486      3.87  |          |         |      V  |       Q  |
4+12       0.3540      3.94  |          |         |      V  |        Q |
4+13       0.3592      3.78  |          |         |       V |       Q  |
4+14       0.3642      3.61  |          |         |       V |     Q    |
4+15       0.3690      3.45  |          |         |       V |    Q     |
4+16       0.3735      3.29  |          |         |        V|  Q       |
4+17       0.3778      3.13  |          |         |        V|Q         |
4+18       0.3819      2.96  |          |         |         VQ         |
4+19       0.3857      2.80  |          |         |        Q V         |
4+20       0.3894      2.64  |          |         |      Q   V         |
4+21       0.3928      2.48  |          |         |     Q    V         |
```

```
4+22    0.3960    2.31  |          |          |  Q      V          |
4+23    0.3989    2.15  |          |          |Q        |V         |
4+24    0.4017    1.99  |          |          Q         |V         |
4+25    0.4042    1.82  |          |        Q |         |V         |
4+26    0.4065    1.66  |          |     Q    |         |V         |
4+27    0.4087    1.62  |          |     Q    |         |V         |
4+28    0.4109    1.58  |          |     Q    |         | V        |
4+29    0.4130    1.54  |          |    Q     |         | V        |
4+30    0.4151    1.51  |          |    Q     |         | V        |
4+31    0.4171    1.47  |          |   Q      |         | V        |
4+32    0.4191    1.43  |          |   Q      |         | V        |
4+33    0.4210    1.39  |          |   Q      |         | V        |
4+34    0.4228    1.35  |          |  Q       |         |  V       |
4+35    0.4246    1.31  |          |  Q       |         |  V       |
4+36    0.4264    1.27  |          | Q        |         |  V       |
4+37    0.4281    1.23  |          | Q        |         |  V       |
4+38    0.4297    1.19  |          | Q        |         |  V       |
4+39    0.4313    1.15  |          |Q         |         |  V       |
4+40    0.4328    1.11  |          |Q         |         |  V       |
4+41    0.4343    1.09  |          |Q         |         |  V       |
4+42    0.4358    1.08  |         Q          |         |   V      |
4+43    0.4373    1.06  |         Q          |         |   V      |
4+44    0.4387    1.04  |         Q          |         |   V      |
4+45    0.4401    1.03  |         Q          |         |   V      |
4+46    0.4415    1.01  |         Q          |         |   V      |
4+47    0.4429    0.99  |         Q          |         |   V      |
4+48    0.4442    0.97  |        Q|          |         |   V      |
4+49    0.4456    0.96  |        Q|          |         |   V      |
4+50    0.4468    0.94  |        Q|          |         |   V      |
4+51    0.4481    0.92  |        Q|          |         |    V     |
4+52    0.4494    0.90  |        Q|          |         |    V     |
4+53    0.4506    0.89  |        Q|          |         |    V     |
4+54    0.4518    0.87  |       Q |          |         |    V     |
4+55    0.4530    0.86  |       Q |          |         |    V     |
4+56    0.4541    0.85  |       Q |          |         |    V     |
4+57    0.4553    0.84  |       Q |          |         |    V     |
4+58    0.4564    0.83  |       Q |          |         |    V     |
4+59    0.4576    0.82  |       Q |          |         |    V     |
5+ 0    0.4587    0.81  |       Q |          |         |    V     |
5+ 1    0.4598    0.80  |       Q |          |         |    V     |
5+ 2    0.4609    0.79  |       Q |          |         |     V    |
5+ 3    0.4619    0.78  |      Q  |          |         |     V    |
5+ 4    0.4630    0.77  |      Q  |          |         |     V    |
5+ 5    0.4640    0.76  |      Q  |          |         |     V    |
5+ 6    0.4651    0.75  |      Q  |          |         |     V    |
5+ 7    0.4661    0.74  |      Q  |          |         |     V    |
5+ 8    0.4671    0.73  |      Q  |          |         |     V    |
5+ 9    0.4681    0.72  |      Q  |          |         |     V    |
5+10    0.4691    0.72  |      Q  |          |         |     V    |
5+11    0.4701    0.71  |      Q  |          |         |     V    |
5+12    0.4710    0.70  |      Q  |          |         |     V    |
5+13    0.4720    0.70  |      Q  |          |         |     V    |
5+14    0.4729    0.69  |     Q   |          |         |     V    |
5+15    0.4739    0.68  |     Q   |          |         |      V   |
5+16    0.4748    0.67  |     Q   |          |         |      V   |
5+17    0.4757    0.67  |     Q   |          |         |      V   |
5+18    0.4766    0.66  |     Q   |          |         |      V   |
```

```
    5+19       0.4775      0.65  |      Q    |           |           |       V   |
    5+20       0.4784      0.65  |      Q    |           |           |       V   |
    5+21       0.4793      0.64  |      Q    |           |           |       V   |
    5+22       0.4802      0.63  |      Q    |           |           |       V   |
    5+23       0.4810      0.63  |      Q    |           |           |       V   |
    5+24       0.4819      0.62  |      Q    |           |           |       V   |
    5+25       0.4828      0.62  |      Q    |           |           |       V   |
    5+26       0.4836      0.61  |      Q    |           |           |       V   |
    5+27       0.4844      0.61  |      Q    |           |           |       V   |
    5+28       0.4853      0.61  |      Q    |           |           |       V   |
    5+29       0.4861      0.60  |      Q    |           |           |        V  |
    5+30       0.4869      0.60  |      Q    |           |           |        V  |
    5+31       0.4877      0.59  |     Q     |           |           |        V  |
    5+32       0.4885      0.59  |     Q     |           |           |        V  |
    5+33       0.4893      0.58  |     Q     |           |           |        V  |
    5+34       0.4901      0.58  |     Q     |           |           |        V  |
    5+35       0.4909      0.57  |     Q     |           |           |        V  |
    5+36       0.4917      0.57  |     Q     |           |           |        V  |
    5+37       0.4925      0.56  |     Q     |           |           |        V  |
    5+38       0.4933      0.56  |     Q     |           |           |        V  |
    5+39       0.4940      0.55  |     Q     |           |           |        V  |
    5+40       0.4948      0.55  |     Q     |           |           |        V  |
    5+41       0.4955      0.55  |     Q     |           |           |        V  |
    5+42       0.4963      0.54  |     Q     |           |           |        V  |
    5+43       0.4970      0.54  |     Q     |           |           |        V  |
    5+44       0.4978      0.54  |     Q     |           |           |        V  |
    5+45       0.4985      0.53  |     Q     |           |           |        V  |
    5+46       0.4992      0.53  |     Q     |           |           |         V |
    5+47       0.4999      0.52  |     Q     |           |           |         V |
    5+48       0.5007      0.52  |     Q     |           |           |         V |
    5+49       0.5014      0.52  |     Q     |           |           |         V |
    5+50       0.5021      0.51  |     Q     |           |           |         V |
    5+51       0.5028      0.51  |     Q     |           |           |         V |
    5+52       0.5035      0.51  |     Q     |           |           |         V |
    5+53       0.5042      0.50  |     Q     |           |           |         V |
    5+54       0.5049      0.50  |     Q     |           |           |         V |
    5+55       0.5056      0.50  |     Q     |           |           |         V |
    5+56       0.5062      0.50  |     Q     |           |           |         V |
    5+57       0.5069      0.49  |     Q     |           |           |         V |
    5+58       0.5076      0.49  |    Q      |           |           |         V |
    5+59       0.5083      0.49  |    Q      |           |           |         V |
    6+ 0       0.5089      0.48  |    Q      |           |           |         V |
    6+ 1       0.5096      0.48  |    Q      |           |           |         V |
    6+ 2       0.5103      0.48  |    Q      |           |           |         V |
    6+ 3       0.5109      0.48  |    Q      |           |           |         V |
    6+ 4       0.5116      0.47  |    Q      |           |           |          V
--------------------------------------------------------------------------------


      End of computations, total study area =          2.950 (Ac.)
```

Appendix G – Referenced Tables & Figures

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)

P6= 3.5 in

Orange County

Riverside County

Project Site

Imperial County

Mexico

Pacific Ocean

OCEANSIDE
VISTA
CARLSBAD
ESCONDIDO
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
S.D. COUNTY
SANTEE
SAN DIEGO
EL CAJON
LA MESA
LEMON GROVE
CORONADO
CHULA VISTA
IMPERIAL BEACH
SD

33°30'
33°15'
33°00'
32°45'
32°30'
117°30'
117°15'
117°00'
116°45'
116°30'
116°15'

DPW GIS
Department of Public Works
Geographic Information Services

SanGIS
We Have San Diego Covered!

N
W
E
S

3 0 3 Miles

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

P24= 6 in

Orange County

Riverside County

Project Site

Pacific Ocean

Imperial County

Mexico

OCEANSIDE
VISTA
CARLSBAD
ESCONDIDO
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
S.D. COUNTY
SANTEE
SAN DIEGO
EL CAJON
LA MESA
LEMON GROVE
CORONADO
CHULA VISTA
IMPERIAL BEACH
SD

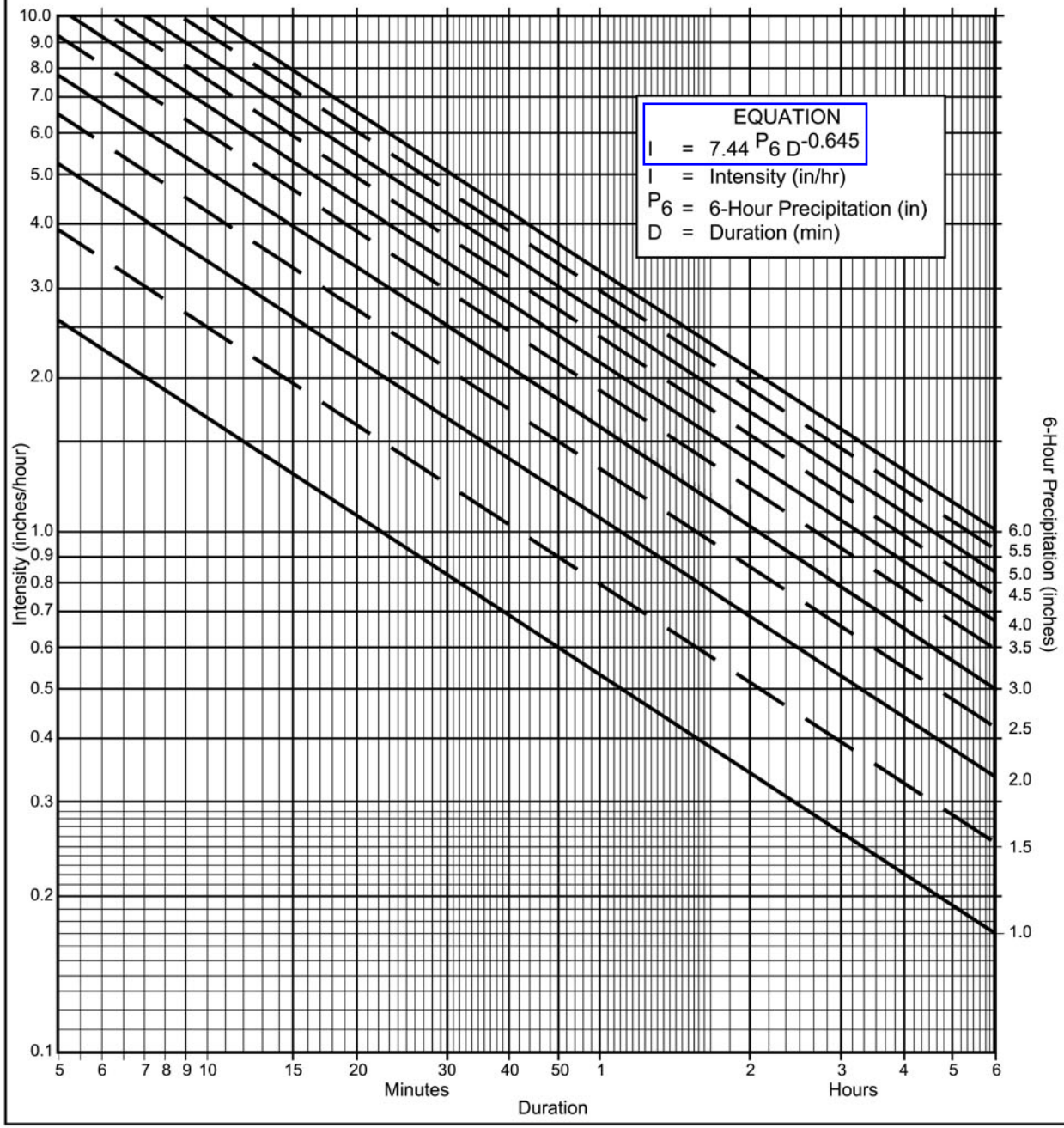
117°30' 117°15' 117°00' 116°45' 116°30' 116°15'
33°30' 33°15' 33°00' 32°45' 32°30'

DPW GIS
Department of Public Works
Geographic Information Services

SanGIS
We Have San Diego Covered!

N W E S

3 0 3 Miles



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 = 3.5 in., P_{24} = 6, $\frac{P_6}{P_{24}}$ = 58 %(2)

(c) Adjusted P_6(2) = 3.5 in.

(d) t_x = ** min.

(e) I = ** in./hr.

** = See calculations

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

Map Scale: 1:2,190 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 30 60 120 180

Feet: 0 100 200 400 600

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.

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

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

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

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

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

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

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 14, Sep 16, 2019

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

Date(s) aerial images were photographed: Dec 31, 2009—Dec 9, 2018

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
WmB	Wyman loam, 2 to 5 percent slopes	C	2.1	14.8%
WmC	Wyman loam, 5 to 9 percent slopes	C	11.9	85.2%
Totals for Area of Interest			**14.0**	**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.

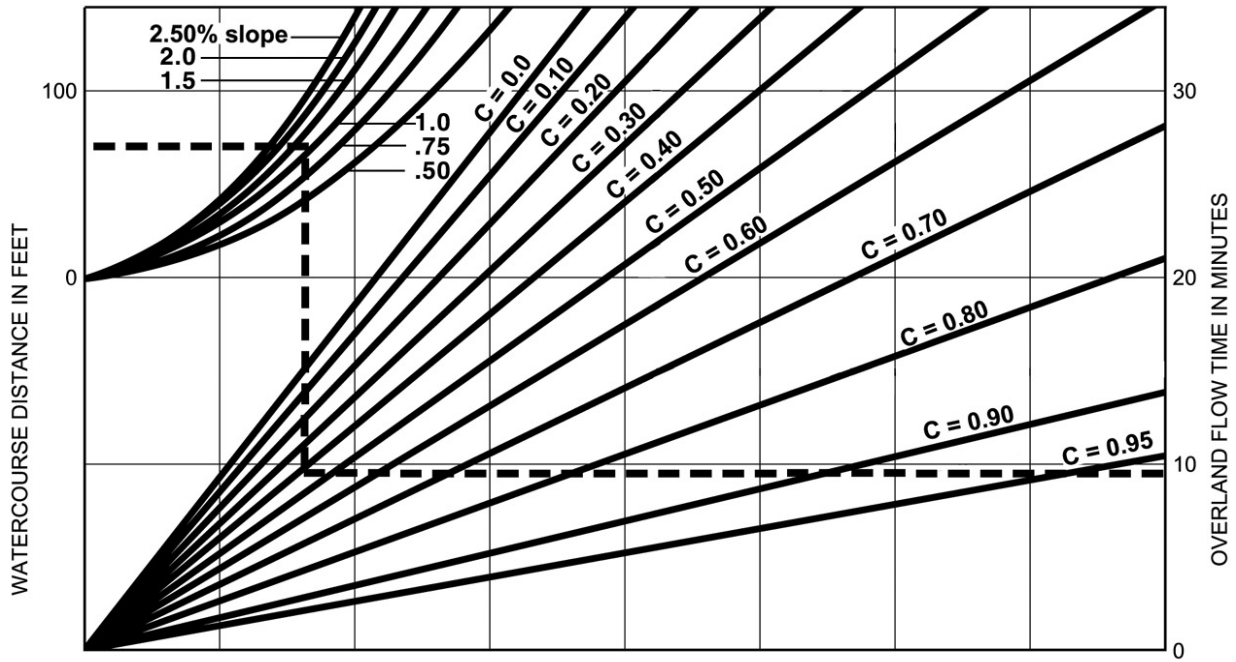
Rating Options

Aggregation Method: Dominant Condition

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



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 3-3

Rational Formula - Overland Time of Flow Nomograph

National Flood Hazard Layer FIRMette

FEMA

117°9'43"W 33°21'42"N

117°9'5"W 33°21'12"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
- 513 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 3/3/2021 at 11:42 AM 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.