APPENDIX F-2.
DRAINAGE STUDY

Preliminary Drainage Study for

ARE Science Village

PTS#: 647676

XXXXX-D

Prepared For:

Alexandria Estate Equities, Inc.
San Diego, CA 92121
(858) 638-2800

Project Location:

9396 Towne Center Drive
San Diego, CA 92121
APN No. 343-200-04, 343-200-05
Parcel Map No. 11786, in the
City of San Diego, County of San Diego, CA

Prepared By:

Michael Baker
INTERNATIONAL
9755 Clairemont Mesa Blvd
San Diego, CA 92124
(858) 614-5000
Jay Sullivan, PE, CFM, QSD

Michael Baker JN:
181315

Prepared:
July 2022

Table of Contents

List of Tables

List of Appendices

Section 1 Project Information

1.1 Project Data

Project Owner:	ARE-SD Region No. 57, LLC
	10996 Torreyana Rd, Suite 250
Project Site Address:	9396 Towne Center Drive, San Diego, CA 92121
APN Number(s):	343-200-04, 343-200-05
Parcel Area:	3.89-acres
Project Disturbed Area:	3.89-acres

1.2 Scope of Report

This report includes analyses of 100-year project-site peak flow under existing and proposed conditions. This report documents the hydrologic impact of the proposed improvements, as compared to the existing condition; and includes preliminary sizing for attenuation measures required to mitigate peak flow.

This report does not address temporary Best Management Practices (BMPs) required during construction, refer to the project Storm Water Pollution Prevention Plan (SWPPP). Post Construction BMPs are addressed in the project Storm Water Quality Management Plan (SWQMP).

1.3 Project Description

Proposed improvements include demolition of an existing building and construction of a new parking structure and new office buildings. Total project-site impervious area will be slightly increased as a result of the proposed improvements; however, peak flow will not be diverted and will be mitigated to less than existing rates via a proposed detention vault.

Based on the Natural Resources Conservation Service's (NRCS) Websoil Survey, the project site is comprised of approximately 86-percent Chesterton fine sandy loam (CfB), with slopes ranging from 2 to 5 percent (hydrologic soil type D); and approximately 14-percent terrace encarpments (TeF) (hydrologic soil type D).

The Federal Emergency Management Agency (FEMA) has not mapped a Special Flood Hazard Area (SFHA) within the project site vicinity. The entire project site lies within un-shaded Zone X, which correlates with areas determined to be outside the 500-year floodplain. An exhibit is provided in Appendix A of this report.

1.4 Existing Conditions

The project site is entirely built out in the existing condition and has been hydrologically analyzed as a single drainage basin. The site drains southeasterly via a combination of surface flow and pipe flow via existing area drains. The project site does not receive run-on from the neighboring property; project site runoff is ultimately discharged from the site in the SE corner as pipe flow (18" RCP) to the public storm drain system within Executive Drive (24" RCP).

Impervious area is comprised of the concrete walkways, parking stalls, drive isles and roofing. Pervious area is comprised of landscape located within parking islands and adjacent to the existing building. Refer to Appendix B for an exhibit detailing the existing condition.

1.5 Proposed Conditions

The proposed structures will be located close to the property lines on all sides of the project site. Roof leaders, area drains, and new on-site private storm drain will direct project site runoff to a proposed storage vault, described in more detail below. The project site is entirely built out in the proposed condition and has been hydrologically analyzed as one drainage basin, similar to the existing condition analysis.

The storage vault has been designed as a "Conjunctive-Use" BMP, as defined by the City of San Diego. As such, the Design Capture Volume (with a 1.5 multiplier) has been made NOT available when analyzing 100-year peak flow mitigation (i.e. no overlap of WQ volume and 100-year Volume). Additionally, the Hydromodification volume has been ensured to draw-down within 96 hours, allowing overlap with 100-year volume when using Conjunctive-Use BMPs.

Project site runoff is collected via new on-site infrastructure and directed to a proposed subterranean vault located in the southwest corner of the site. The vault dimensions are 216'(L) x 16'(W) x 7'(H), with a weir 5.1" above the vault bottom and a 1.86" orifice.

A Modular Wetland System (MWS), or similar, is proposed downstream of the vault and provides water quality treatment. Refer to the project specific SWQMP, found under separate cover, for additional information.

Mitigated discharge from the project site will connect to the City's Municipal Separate Storm Sewer System (MS4) within Executive Drive (24" RCP), consistent with existing conditions.

Refer to Appendix C for an exhibit detailing the proposed condition.

Section 2 Study Objectives

The specific objectives of this study are as follows:

- Quantify 100-year peak flow rates under existing and proposed conditions;
- Develop measures to mitigate any increase in peak flow associated with proposed improvements;
- Demonstrate the proposed improvements will not increase the potential for erosion on the project site or downstream area.

Section 3 Methodology

3.1 Hydrology

The Rational Method has been utilized to perform the hydrologic analyses. The following formula conforms to the hydrologic methodologies outlined in the City of San Diego Drainage Design Manual (January 2017).

$$Q = C * I * A$$

Where, **Q** = Peak Discharge - *(cfs)*

C = Runoff Coefficient

I = Average Rainfall Intensity - *(in/hr)*

A = Drainage Area - *(acres)*

A runoff coefficient has been determined for the existing and proposed conditions per Section A.1.2 of the City of San Diego Drainage Design Manual. The tabulated impervious area chosen for the project site is 85% (commercial use) for the existing and proposed condition.

Intensity has been calculated per the IDF Curve in Figure A-1 of the City of San Diego Drainage Design Manual. A time of concentration of 5 minutes has been assumed for the project area under existing and proposed conditions.

3.2 Hydraulics

The Hydraflow Hydrographs Extension within AutoCAD has been used to model peak flows from the project as they are mitigated by the proposed detention vault. A hydrograph was generated using Rick Engineering Company's RatHydro software and has been routed through storage vault modeled in Hydraflow Hydrographs. The storage vault has been modeled to match the vault documented in the project specific SWQMP, designed as a conjunctive-used BMP. Refer to Appendix C for the modelling input and output.

Proposed storm drains have been preliminary sized to convey 100-year peak flow using Bentley's Flow Master. This software solves for normal depth under steady state flow conditions.

Section 4 Results

4.1 Hydrologic Results

The table below summarizes the hydrologic results under existing and proposed conditions. Calculations are included in Appendices B (existing) and C (proposed).

Table 4-1 - Hydrologic Summary

Discharge Location	C -	I* (in/hr)	A (ac)	Q_{100} (cfs)
Existing Condition				
Basin 1	0.76	4.5	3.89	13.3
Proposed Condition (Unmitigated)				
Basin 1	0.95	4.5	3.89	16.6
Proposed Condition (Mitigated)				
Basin 1	0.95	4.5	3.89	6.8

*A time in concentration of 5 minutes has been assumed for the vault. Per Figure A-1 of the Drainage Design Manual this will result in a similar intensity for all basins. Refer to Appendices B and C for hydrologic calculations.

4.2 Hydraulic Results

The table below summarizes the hydraulic performance of the proposed storage vault. Calculations are included in Appendix C.

Vault ID	Length	Wide	Height	Weir Height	Low Flow Orifice	Q100 (in)	Q100 (out)
	(ft)	(ft)	(ft)	(ft)	(in)	(cfs)	(cfs)
Vault -1	216	16	7	5.1	1.86	16.6	6.8

Section 5 Conclusions

Proposed improvements will not result in an increase to 100-year peak flow discharge from the site, as compared to the existing condition. Increases in peak flow associated with new impervious area have been mitigated below existing conditions through the use of a proposed storage vault. The vault has also been designed to provide hydromodification mitigation as a Conjunctive Use BMP, discussed in more detail within the SWQMP.

This project will not discharge, dredge, or fill material into any Water of The United States, thus the project is not required to obtain a Section 401 certification or Section 404 permit from the State or U.S. Army Corps of Engineers.

Section 6 Declaration of Responsible Charge

I, hereby declare that I am the Civil Engineer of work for this project, that I have exercised responsible charge over the design of the project as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with current design.

I understand that the check of project drawings and specifications by the City of San Diego is confined to a review only and does not relieve me, as Engineer of Work, of my responsibilities for the project design.

Jay Sullivan RCE 77445

7-7-2022

Date

Section 7 Bibliography

City of San Diego. (January 2017). *Drainage Design Manual.* San Diego.

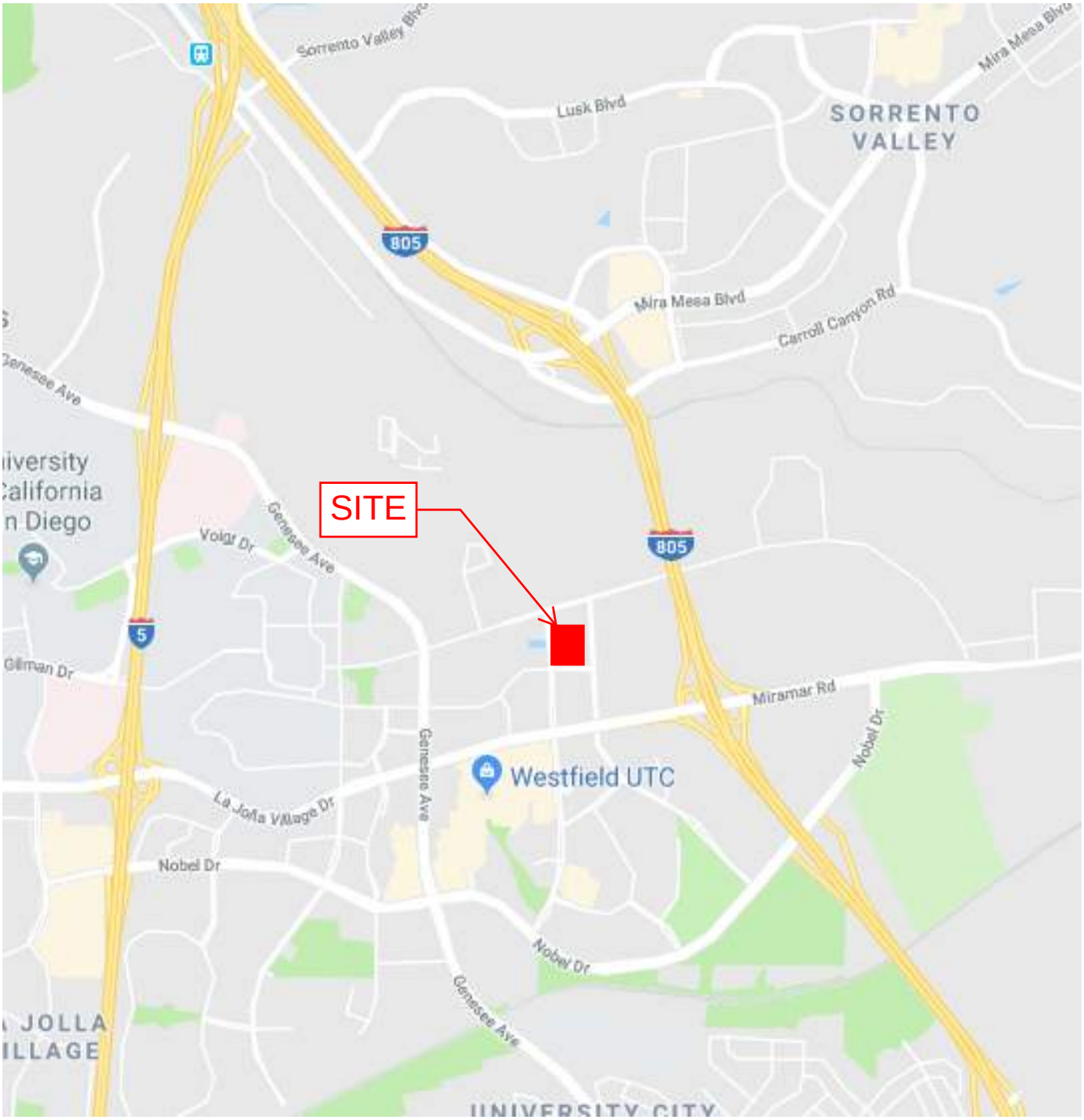
City of San Diego. (January 2018). *Storm Water Standards.* San Diego.

FEMA. (1997). *Flood Insurance Rate Map.* San Diego.

Soil Survey Staff, N. R. (2018, September 24). *Web Soil Survey.* Retrieved from Web Soil Survey: https://websoilsurvey.sc.egov.usda.gov/

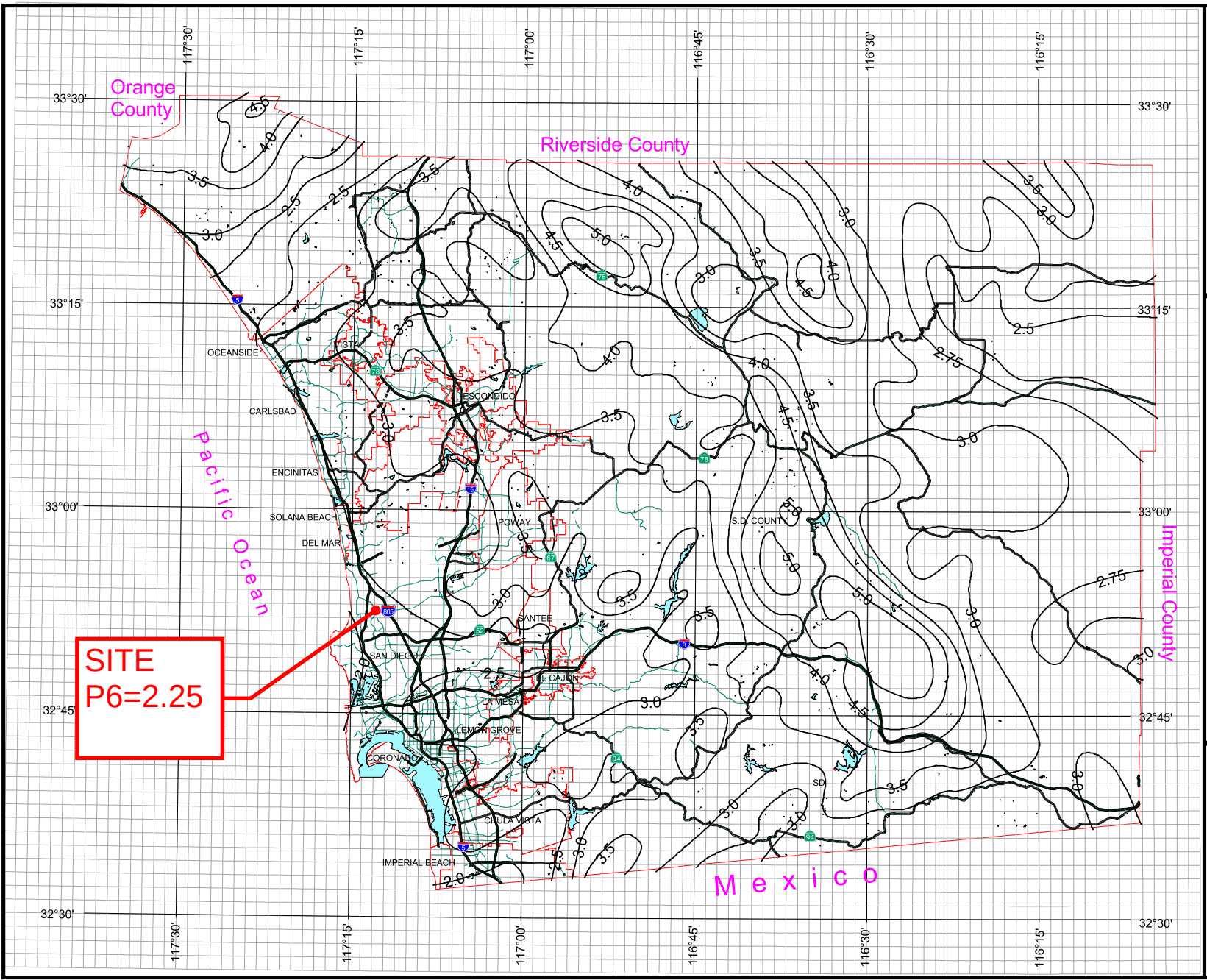
Appendix A – Site Information

Vicinity Map
Rainfall Isopluvials
FEMA FIRM
NRCS WebSoil Survey



VICINITY MAP

NO SCALE



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)

DPW GIS
Department of Public Works
Geographic Information Services

SanGIS
We Have San Diego Covered!

N
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3 0 3 Miles

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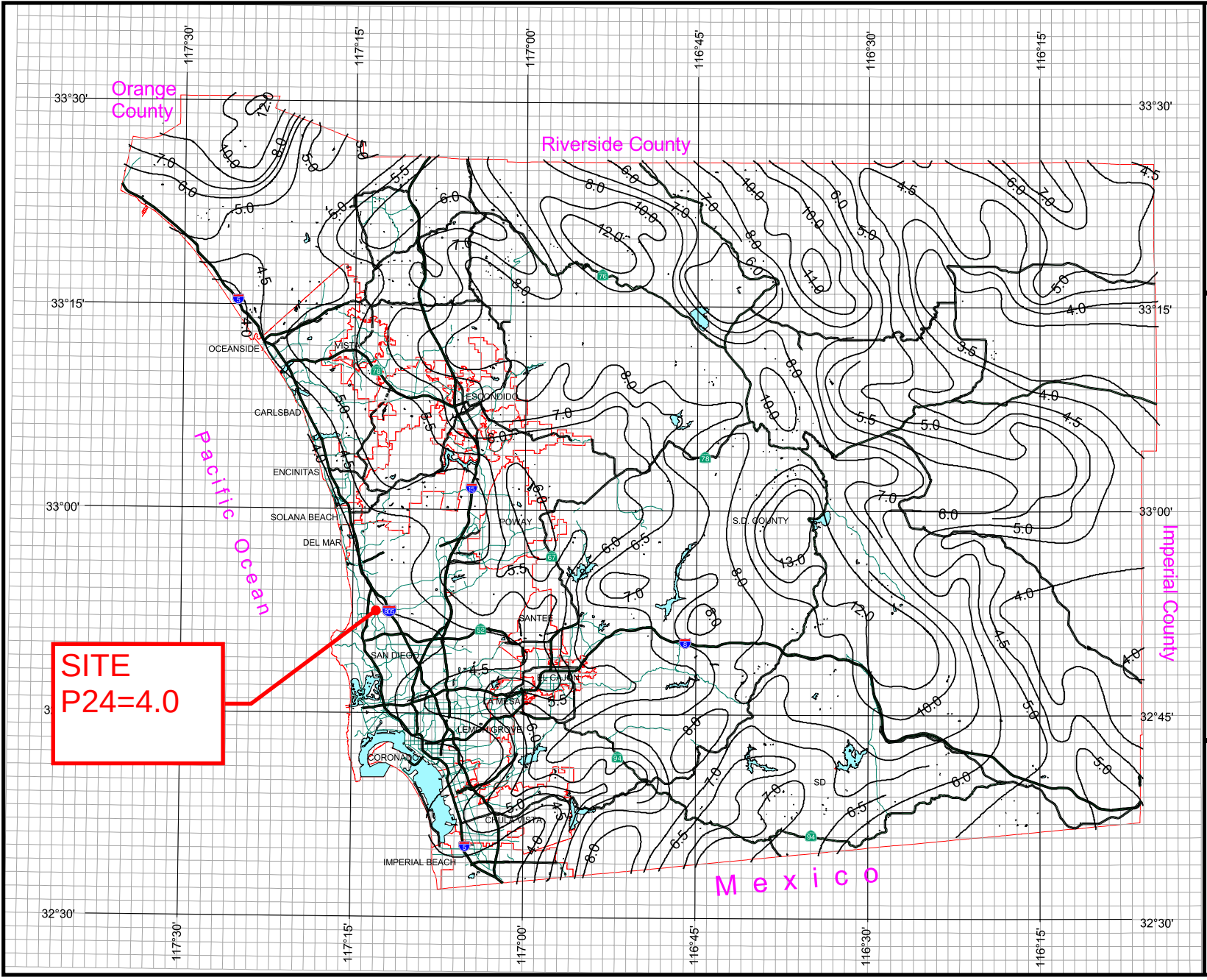

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

DPW GIS
Department of Public Works
Geographic Information Services

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N
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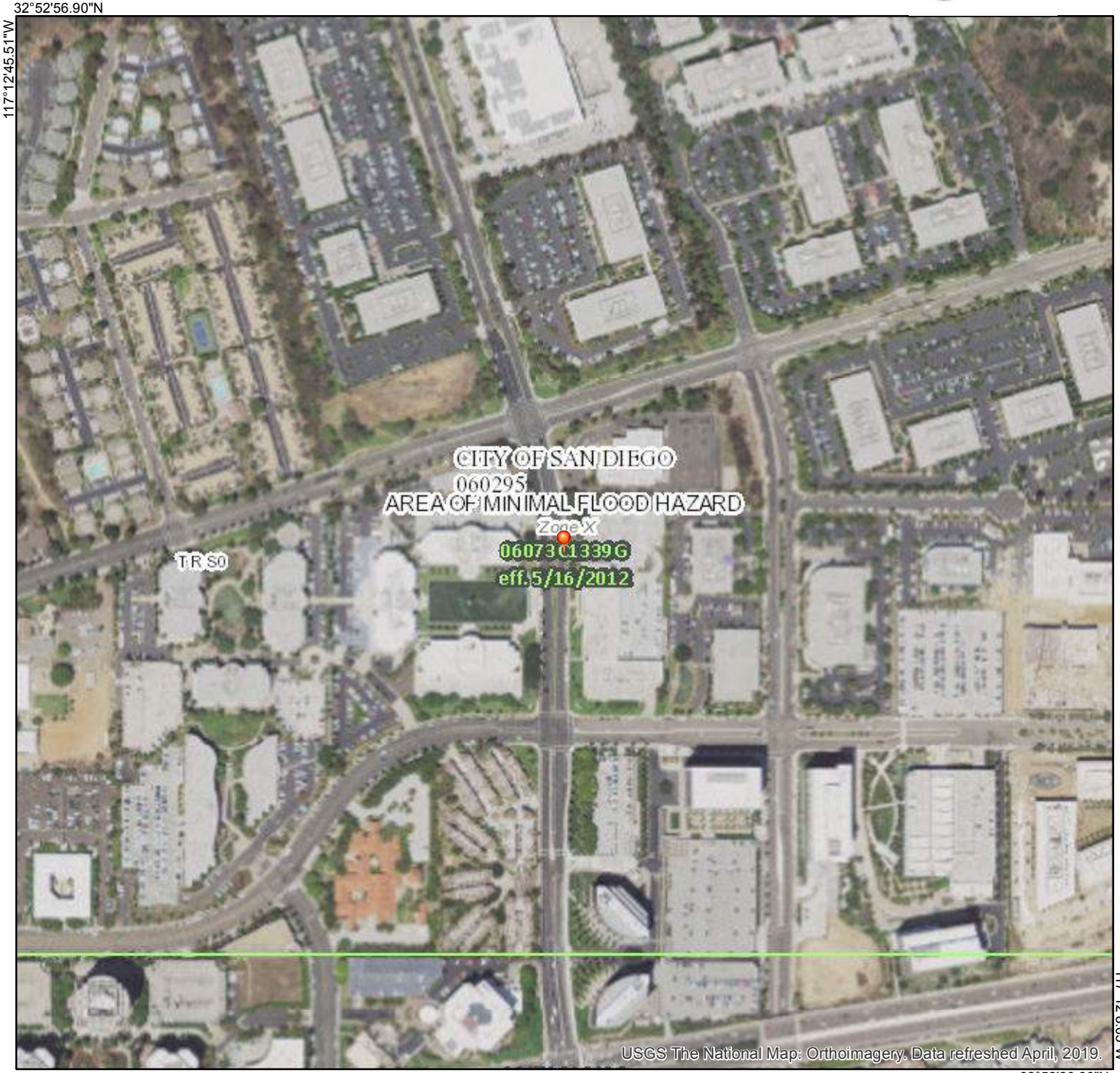
National Flood Hazard Layer FIRMette

FEMA

32°52'56.90"N

117°12'45.51"W



117°12'8.05"W

32°52'26.69"N

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

1:6,000

Legend

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

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

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

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

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

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

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

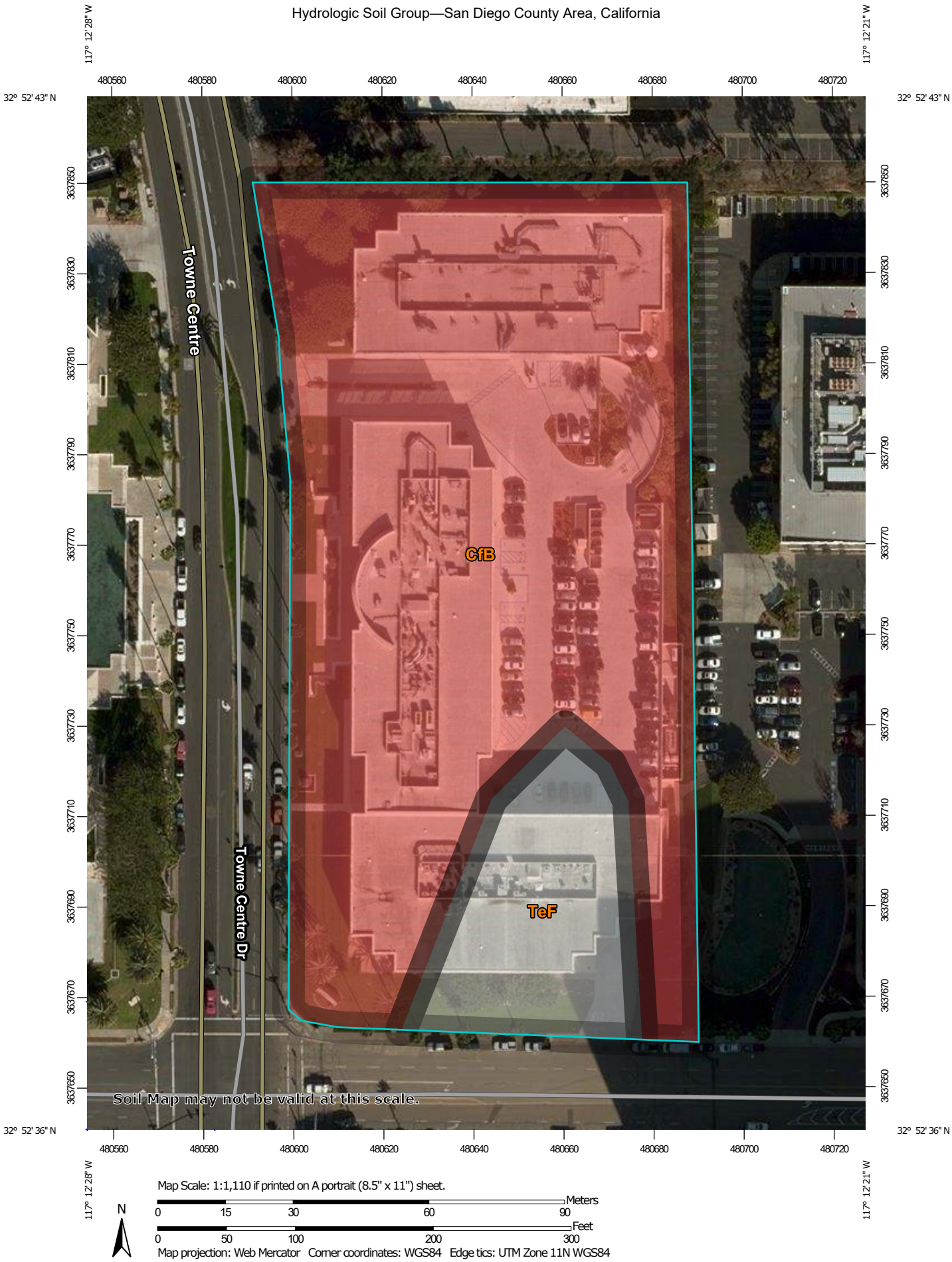
N

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/10/2019 at 11:04:31 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.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117° 12' 21" W
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32° 52' 43" N
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Towne Centre
Towne Centre Dr
CfB
TeF
Soil Map may not be valid at this scale.
Map Scale: 1:1,110 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0 15 30 60 90
Feet
0 50 100 200 300
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 13, Sep 12, 2018

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

Date(s) aerial images were photographed: Dec 7, 2014—Jan 4, 2015

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
CfB	Chesterton fine sandy loam, 2 to 5 percent slopes	D	3.6	85.6%
TeF	Terrace escarpments		0.6	14.4%
Totals for Area of Interest			**4.2**	**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

Appendix B –Existing Hydrology

Figure A-1 from the City DDM (Jan. 2017)
On-Site Hydrology Work Map
Hydrology Calculations

Table A-1. Runoff Coefficients for Rational Method

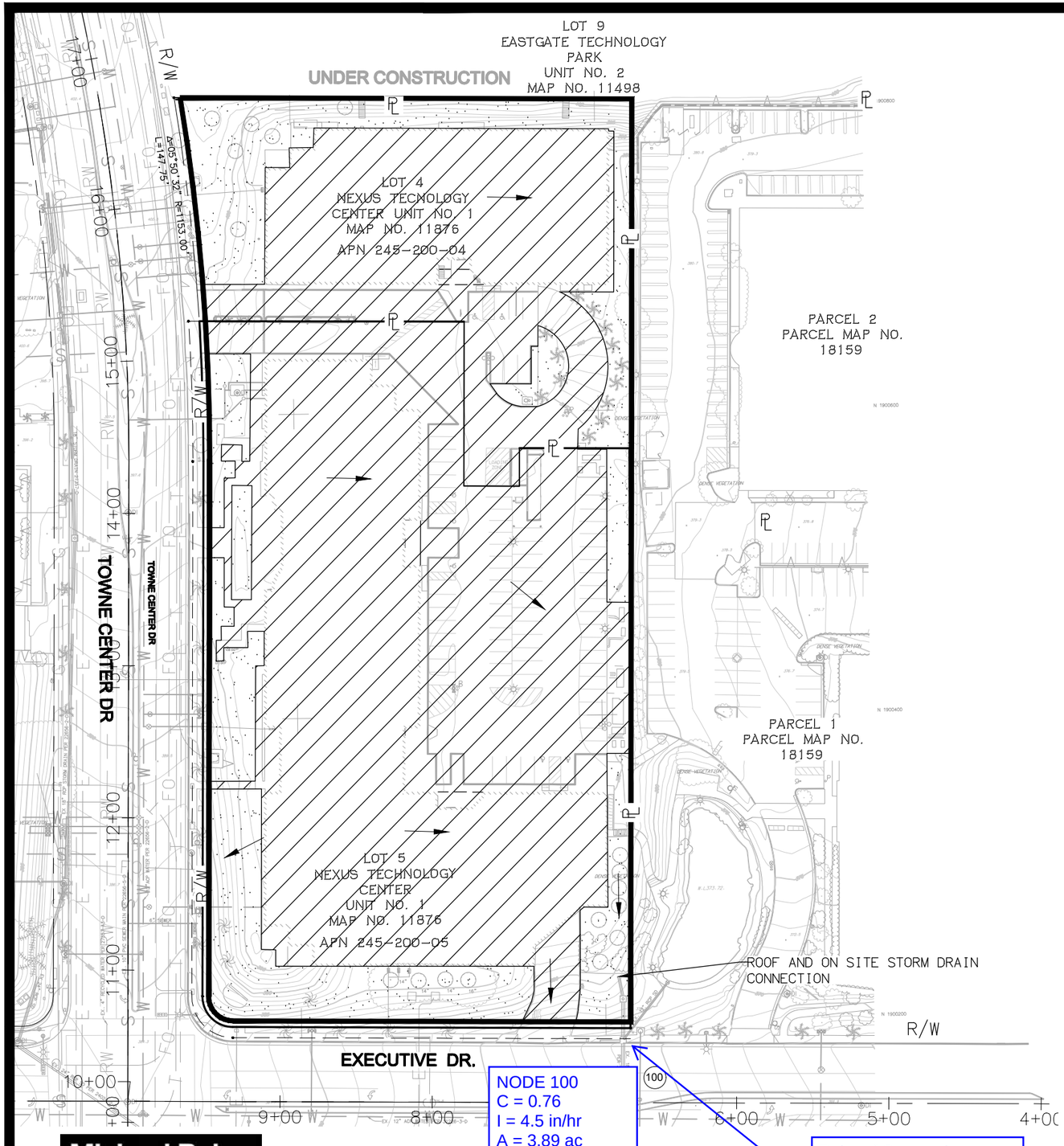
Land Use	Runoff Coefficient (C)
	Soil Type [1]
Residential:	
Single Family	0.55
Multi-Units	0.70
Mobile Homes	0.65
Rural (lots greater than ½ acre)	0.45
Commercial [2]	
80% Impervious	0.85
Industrial [2]	
90% Impervious	0.95

Note:
[1] Type D soil to be used for all areas.
[2] Where actual conditions deviate significantly from the tabulated imperviousness values of 80% or 90%, the values given for coefficient C, may be revised by multiplying 80% or 90% by the ratio of actual imperviousness to the tabulated imperviousness. However, in case shall the final coefficient be less than 0.50. For example: Consider commercial property on D soil.

Actual imperviousness = 50%
Tabulated imperviousness = 80%
Revised C = (50/80) x 0.85 = 0.53

The values in Table A-1 are typical for urban areas. However, if the basin contains rural or agricultural land use, parks, golf courses, or other types of nonurban land use that are expected to be permanent, the appropriate value should be selected based upon the soil and cover and approved by the City.

A-1.2 Rainfall Intensity



LEGEND

PROJECT AREA

IMPERVIOUS AREA

PERVIOUS AREA

FLOW DIRECTION

EXISTING STORM DRAIN

NODE 100 (100)

EXISTING AREA		
Ex. Impervious Area	129,115 SF	2.96 ac
Ex. Pervious Area	40,384 SF	0.93 ac
Total	169,499 SF	3.89 ac
Actual Impervious 76%	0.76	
C Value Per City of San Diego DDM Section A.1.2		
Commercial Property		
Tabulated Impervious 80 %	0.85	
Weighted C Value = (Actual / Tabluated) x 0.85	0.76	
Peak Flow Calculation		
Q=CIA		
Intensity determined using Figure A.1 of the DDM		
Q = (0.76)*(4.5)*(3.89)		
Q100 = 13.3 CFS		

80 40 0 80

SCALE: 1"=80'

SCALE 1"=80'

Michael Baker
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ARE Science Village
On-Site Hydrologic Work Map Existing

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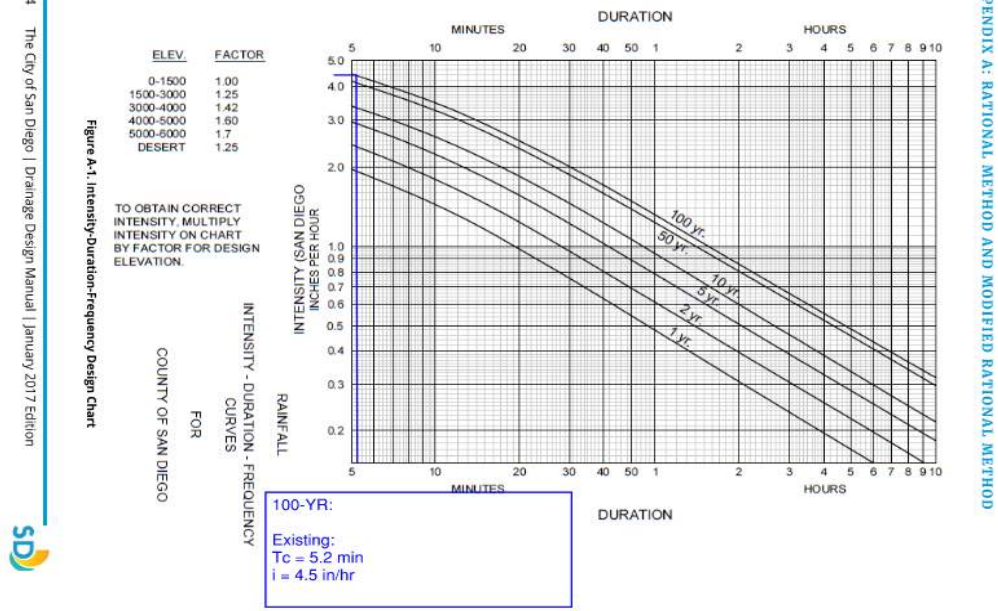

Figure A-1. Intensity-Duration-Frequency Design Chart

ARE Science Village

Existing Conditions

Time of Concentration Calculations

Natural Areas

Land Use = Commercial

C = 0.76

Dist. = 673.00 ft.

slope = 4.00 %

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

T_c = 10.02 min.

* Minimum T_c = 5 Minutes

Weighted C Value Calculation

Area (acres)	
Pervious	0.93
Impervious	2.96
Total	3.89

Actual Impervious	0.76
Tabulated Impervious	0.85
Coefecient	0.85
Revised 'C'	0.76
Use 'C'	0.76

***C value cannot exeed 1 or be less than 0.50**

Basin Intensity Calculations

Selected Frequency, **100** year

I = 4.50 in/hr

Basin Flow Calculations

Q = **13.3** **cfs**

$$Q = C * I * A$$

C = 0.76

I = 4.50 in/hr

A = 3.89 ac.

Job No. 181315

Appendix C – Proposed Hydrology

Figure A-1 from the City DDM (Jan. 2017)
On-Site Hydrology Work Map
Hydrology Calculations

Table A-1. Runoff Coefficients for Rational Method

Land Use	Runoff Coefficient (C)
	Soil Type [1]
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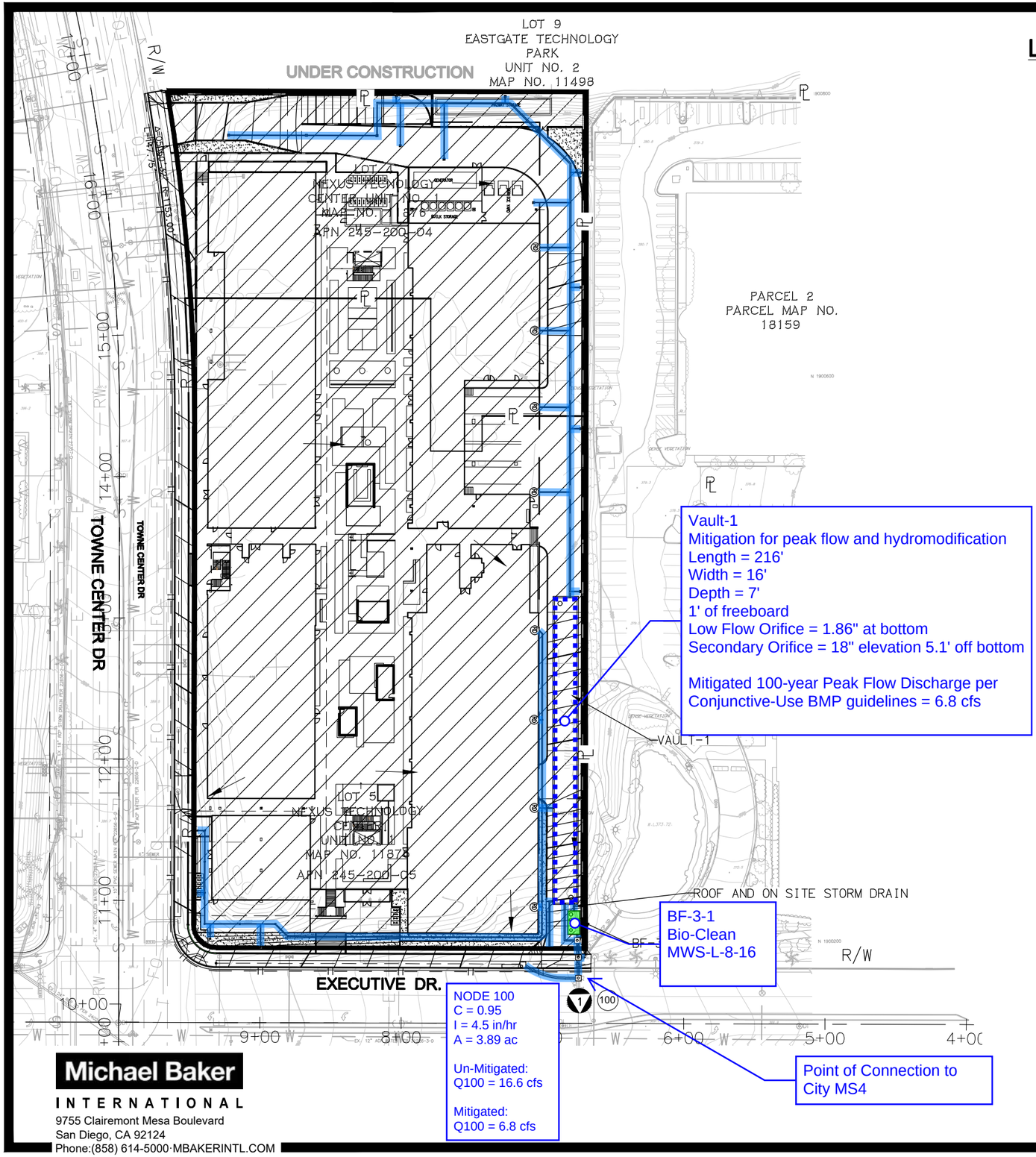
Single Family	0.55
Multi-Units	0.70
Mobile Homes	0.65
Rural (lots greater than ½ acre)	0.45
Commercial [2]	
80% Impervious	0.85
Industrial [2]	
90% Impervious	0.95

Note:
[1] Type D soil to be used for all areas.
[2] Where actual conditions deviate significantly from the tabulated imperviousness values of 80% or 90%, the values given for coefficient C, may be revised by multiplying 80% or 90% by the ratio of actual imperviousness to the tabulated imperviousness. However, in case shall the final coefficient be less than 0.50. For example: Consider commercial property on D soil.

Actual imperviousness = 50%
Tabulated imperviousness = 80%
Revised C = (50/80) x 0.85 = 0.53

The values in Table A-1 are typical for urban areas. However, if the basin contains rural or agricultural land use, parks, golf courses, or other types of nonurban land use that are expected to be permanent, the appropriate value should be selected based upon the soil and cover and approved by the City.

A-1.2 Rainfall Intensity



LEGEND

- PROJECT AREA
- IMPERVIOUS AREA
- PERVIOUS AREA
- FLOW DIRECTION
- EXISTING STORM DRAIN
- PROPOSED STORM DRAIN
- MODULAR WETLAND SYSTEM
- VAULT
- POINT OF CONNECTION (1)
- NODE 100 (100)

PROPOSED AREA		
Impervious Area	161,024 SF	3.70 ac
Pervious Area	8,475 SF	0.19 ac
Total	169,499 SF	3.89 ac
Actual Impervious 95%	0.95	
C Value Per City of San Diego DDM Section A.1.2		
Commercial Property		
Tabulated Impervious 80%	0.85	
Weighted C Value = (Actual / Tabluated) x 0.85	0.95	
Peak Flow Calculation		
Q=CIA		
Intensity determined using Figure A.1 of the DDM		
Q = (0.95)*(4.5)*(3.89)		
Q100 = 16.6 CFS		

80 40 0 80
SCALE: 1"=80'

SCALE 1"=80'

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San Diego, CA 92124
Phone:(858) 614-5000·MBAKERINTL.COM

ARE Science Village
On-Site Hydrologic Work Map Proposed

\\SANDCA1FS1.BKR.MBAKERCORP.COM\HROOT\PDATA\181315 - ARE SCIENCE VILLAGE\CADD\STORMWATER\181315 - PR_MAP_2022-07-05_RECOVER.DWG

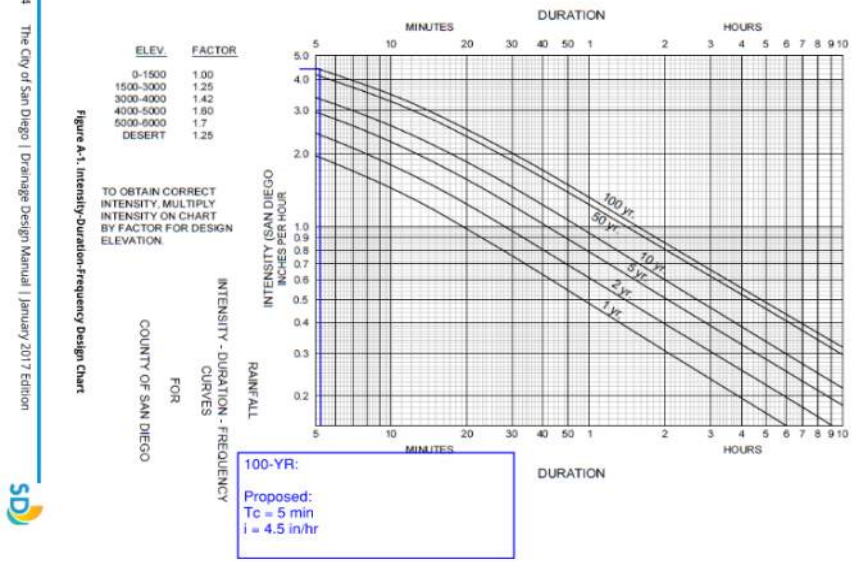


Figure A-1. Intensity-Duration-Frequency Design Chart

INTENSITY - DURATION - FREQUENCY CURVES FOR COUNTY OF SAN DIEGO RAINFALL

ARE Science Village

Proposed Conditions

Time of Concentration Calculations

Natural Areas

Land Use = Commercial

C = 0.95

Dist. = 673.00 ft.

slope = 4 %

$$T_C = \frac{1.8(1.1-C)\sqrt{D}}{\sqrt[3]{S}}$$

T_c = 4.43 min.

* Minimum T_c = 5 Minutes

Weighted C Value Calculation

	Area (acres)
Pervious	0.19
Impervious	3.70
Total	3.89

Actual Impervious	0.95
Tabulated Impervious	0.85
Coefecient	0.85
Revised 'C'	0.95
Use 'C'	0.95

***C value cannot exeed 1 or be less than 0.50**

Basin Intensity Calculations

Selected Frequency, **100** year

I = 4.50 in/hr

Basin Flow Calculations

Q = 16.63 cfs

$$Q = C * I * A$$

C = 0.95

I = 4.50 in/hr

A = 3.89 ac.

Job No. 181315

Appendix D – Hydraulics

Proposed Q100 Hydrograph
Hydraflow Hydrographs Input & Output
Drawdown Calculations

RATIONAL METHOD HYDROGRAPH PROGRAM
COPYRIGHT 1992, 2001 RICK ENGINEERING COMPANY

RUN DATE 7/6/2022
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 2.25 INCHES
BASIN AREA 3.89 ACRES
RUNOFF COEFFICIENT 0.95
PEAK DISCHARGE 16.6 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 5	DISCHARGE (CFS) = 0.5
TIME (MIN) = 10	DISCHARGE (CFS) = 0.5
TIME (MIN) = 15	DISCHARGE (CFS) = 0.5
TIME (MIN) = 20	DISCHARGE (CFS) = 0.5
TIME (MIN) = 25	DISCHARGE (CFS) = 0.5
TIME (MIN) = 30	DISCHARGE (CFS) = 0.5
TIME (MIN) = 35	DISCHARGE (CFS) = 0.5
TIME (MIN) = 40	DISCHARGE (CFS) = 0.5
TIME (MIN) = 45	DISCHARGE (CFS) = 0.6
TIME (MIN) = 50	DISCHARGE (CFS) = 0.6
TIME (MIN) = 55	DISCHARGE (CFS) = 0.6
TIME (MIN) = 60	DISCHARGE (CFS) = 0.6
TIME (MIN) = 65	DISCHARGE (CFS) = 0.6
TIME (MIN) = 70	DISCHARGE (CFS) = 0.6
TIME (MIN) = 75	DISCHARGE (CFS) = 0.6
TIME (MIN) = 80	DISCHARGE (CFS) = 0.6
TIME (MIN) = 85	DISCHARGE (CFS) = 0.6
TIME (MIN) = 90	DISCHARGE (CFS) = 0.7
TIME (MIN) = 95	DISCHARGE (CFS) = 0.7
TIME (MIN) = 100	DISCHARGE (CFS) = 0.7
TIME (MIN) = 105	DISCHARGE (CFS) = 0.7
TIME (MIN) = 110	DISCHARGE (CFS) = 0.7
TIME (MIN) = 115	DISCHARGE (CFS) = 0.7
TIME (MIN) = 120	DISCHARGE (CFS) = 0.8
TIME (MIN) = 125	DISCHARGE (CFS) = 0.8
TIME (MIN) = 130	DISCHARGE (CFS) = 0.8
TIME (MIN) = 135	DISCHARGE (CFS) = 0.8
TIME (MIN) = 140	DISCHARGE (CFS) = 0.8
TIME (MIN) = 145	DISCHARGE (CFS) = 0.9
TIME (MIN) = 150	DISCHARGE (CFS) = 0.9
TIME (MIN) = 155	DISCHARGE (CFS) = 0.9
TIME (MIN) = 160	DISCHARGE (CFS) = 1
TIME (MIN) = 165	DISCHARGE (CFS) = 1
TIME (MIN) = 170	DISCHARGE (CFS) = 1
TIME (MIN) = 175	DISCHARGE (CFS) = 1.1
TIME (MIN) = 180	DISCHARGE (CFS) = 1.1
TIME (MIN) = 185	DISCHARGE (CFS) = 1.2
TIME (MIN) = 190	DISCHARGE (CFS) = 1.3
TIME (MIN) = 195	DISCHARGE (CFS) = 1.4
TIME (MIN) = 200	DISCHARGE (CFS) = 1.5
TIME (MIN) = 205	DISCHARGE (CFS) = 1.6
TIME (MIN) = 210	DISCHARGE (CFS) = 1.7
TIME (MIN) = 215	DISCHARGE (CFS) = 2
TIME (MIN) = 220	DISCHARGE (CFS) = 2.1
TIME (MIN) = 225	DISCHARGE (CFS) = 2.6
TIME (MIN) = 230	DISCHARGE (CFS) = 3
TIME (MIN) = 235	DISCHARGE (CFS) = 4.3
TIME (MIN) = 240	DISCHARGE (CFS) = 11.4
TIME (MIN) = 245	DISCHARGE (CFS) = 16.6
TIME (MIN) = 250	DISCHARGE (CFS) = 3.5
TIME (MIN) = 255	DISCHARGE (CFS) = 2.3
TIME (MIN) = 260	DISCHARGE (CFS) = 1.8
TIME (MIN) = 265	DISCHARGE (CFS) = 1.5
TIME (MIN) = 270	DISCHARGE (CFS) = 1.3
TIME (MIN) = 275	DISCHARGE (CFS) = 1.2
TIME (MIN) = 280	DISCHARGE (CFS) = 1.1
TIME (MIN) = 285	DISCHARGE (CFS) = 1
TIME (MIN) = 290	DISCHARGE (CFS) = 0.9
TIME (MIN) = 295	DISCHARGE (CFS) = 0.9
TIME (MIN) = 300	DISCHARGE (CFS) = 0.8
TIME (MIN) = 305	DISCHARGE (CFS) = 0.8
TIME (MIN) = 310	DISCHARGE (CFS) = 0.7
TIME (MIN) = 315	DISCHARGE (CFS) = 0.7
TIME (MIN) = 320	DISCHARGE (CFS) = 0.7
TIME (MIN) = 325	DISCHARGE (CFS) = 0.6
TIME (MIN) = 330	DISCHARGE (CFS) = 0.6
TIME (MIN) = 335	DISCHARGE (CFS) = 0.6
TIME (MIN) = 340	DISCHARGE (CFS) = 0.6
TIME (MIN) = 345	DISCHARGE (CFS) = 0.6
TIME (MIN) = 350	DISCHARGE (CFS) = 0.5
TIME (MIN) = 355	DISCHARGE (CFS) = 0.5
TIME (MIN) = 360	DISCHARGE (CFS) = 0.5
TIME (MIN) = 365	DISCHARGE (CFS) = 0

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Manual	16.60	5	245	29,970	------	------	------	Inflow
2	Reservoir	4.586	5	250	29,600	1	106.12	21,140	Actual Vault
3	Reservoir	6.838	5	250	22,016	1	104.42	15,260	Vault w/o WQ
4	Reservoir	1.226	5	275	5,089	1	107.35	25,404	Vault (Emer. Weir)

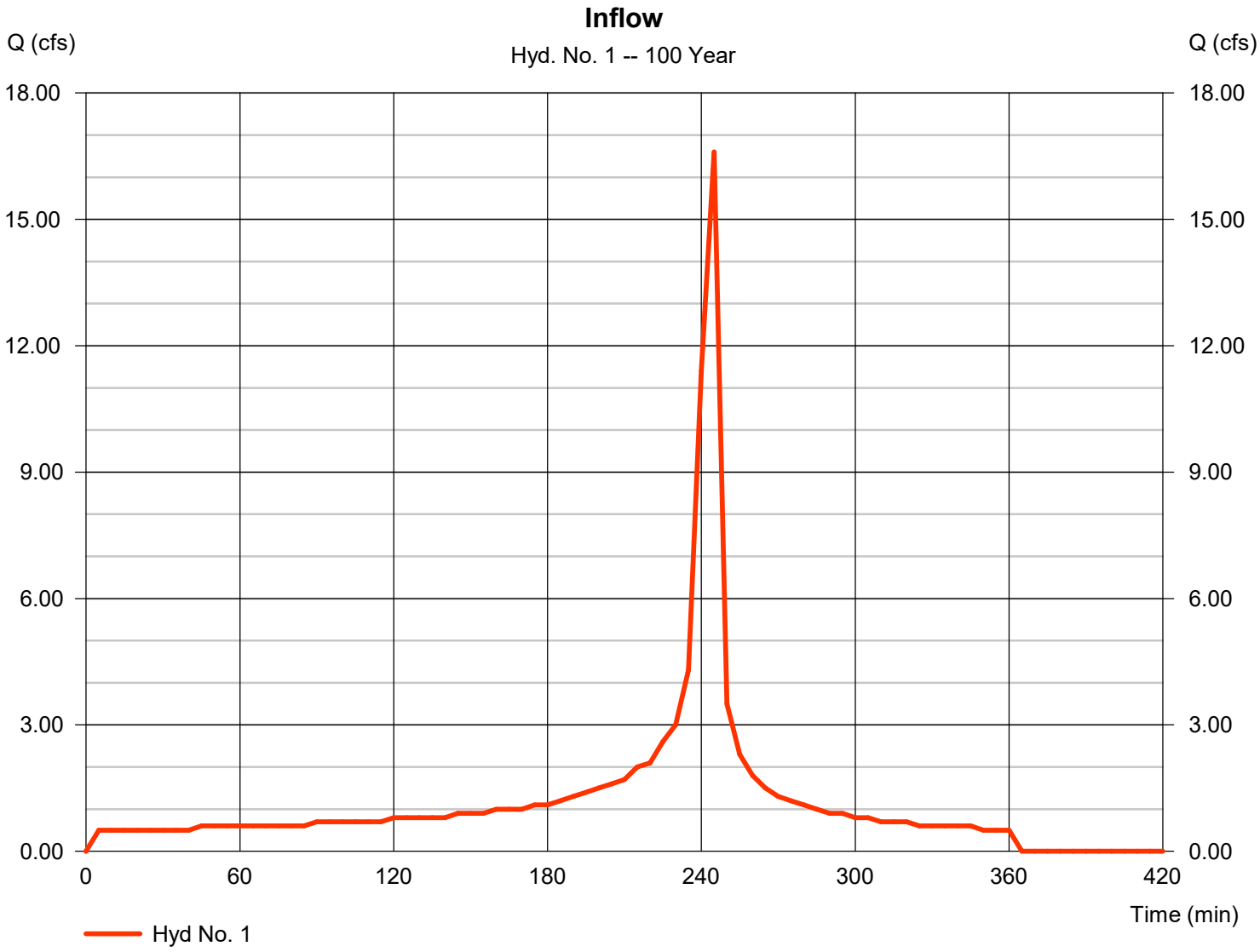
Mitigated 100-year Peak Flow Discharge per Conjunctive-Use BMP guidelines.

Hydrograph Report

Hyd. No. 1

Inflow

Hydrograph type	= Manual	Peak discharge	= 16.60 cfs
Storm frequency	= 100 yrs	Time to peak	= 245 min
Time interval	= 5 min	Hyd. volume	= 29,970 cuft



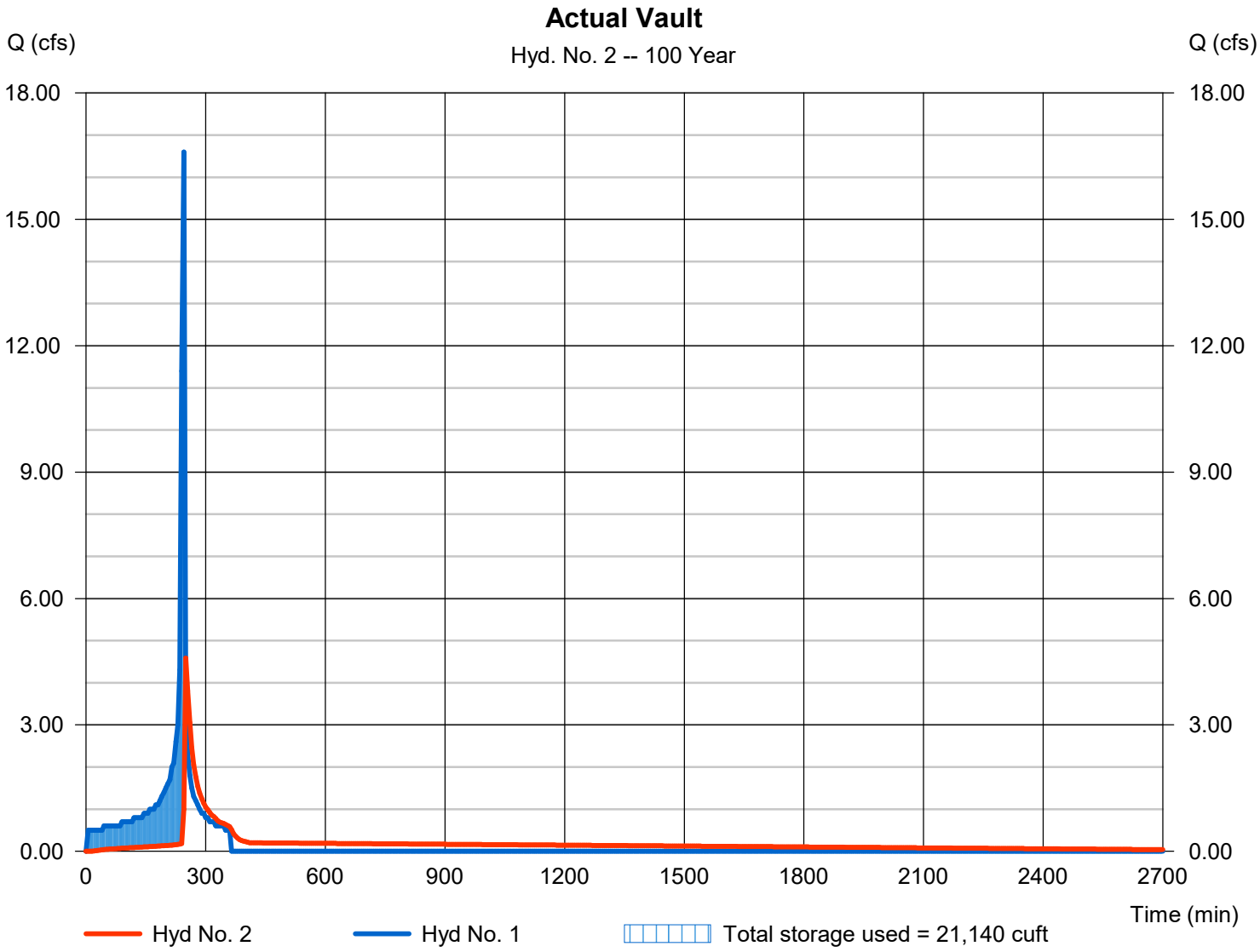
Hydrograph Report

Hyd. No. 2

Actual Vault

Hydrograph type	=	Reservoir	Peak discharge	=	4.586 cfs
Storm frequency	=	100 yrs	Time to peak	=	250 min
Time interval	=	5 min	Hyd. volume	=	29,600 cuft
Inflow hyd. No.	=	1 - Inflow	Max. Elevation	=	106.12 ft
Reservoir name	=	Actual Vault	Max. Storage	=	21,140 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - Actual Vault

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 100.00 ft

Matches HMP orifice found in SWQMP

Matches elevation of secondary release found in SWQMP

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	3,456	0	0
1.00	101.00	3,456	3,456	3,456
2.00	102.00	3,456	3,456	6,911
3.00	103.00	3,456	3,456	10,367
4.00	104.00	3,456	3,456	13,823
5.00	105.00	3,456	3,456	17,278
6.00	106.00	3,456	3,456	20,734
7.00	107.00	3,456	3,456	24,190

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	1.86	18.00	0.00
Span (in)	= 12.00	1.86	18.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 100.00	100.10	105.10	0.00
Length (ft)	= 10.00	1.00	10.00	0.00
Slope (%)	= 1.00	1.00	1.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	0.00	0.00	---	---	---	---	---	---	---	0.000
0.10	346	100.10	0.00	0.00	0.00	---	---	---	---	---	---	---	0.000
0.20	691	100.20	0.01 ic	0.01 ic	0.00	---	---	---	---	---	---	---	0.014
0.30	1,037	100.30	0.03 ic	0.03 ic	0.00	---	---	---	---	---	---	---	0.032
0.40	1,382	100.40	0.04 ic	0.04 ic	0.00	---	---	---	---	---	---	---	0.043
0.50	1,728	100.50	0.05 ic	0.05 ic	0.00	---	---	---	---	---	---	---	0.052
0.60	2,073	100.60	0.06 ic	0.06 ic	0.00	---	---	---	---	---	---	---	0.059
0.70	2,419	100.70	0.07 ic	0.07 ic	0.00	---	---	---	---	---	---	---	0.066
0.80	2,765	100.80	0.07 ic	0.07 ic	0.00	---	---	---	---	---	---	---	0.072
0.90	3,110	100.90	0.08 ic	0.08 ic	0.00	---	---	---	---	---	---	---	0.077
1.00	3,456	101.00	0.08 ic	0.08 ic	0.00	---	---	---	---	---	---	---	0.082
1.10	3,801	101.10	0.09 ic	0.09 ic	0.00	---	---	---	---	---	---	---	0.087
1.20	4,147	101.20	0.09 ic	0.09 ic	0.00	---	---	---	---	---	---	---	0.092
1.30	4,492	101.30	0.10 ic	0.10 ic	0.00	---	---	---	---	---	---	---	0.096
1.40	4,838	101.40	0.11 ic	0.10 ic	0.00	---	---	---	---	---	---	---	0.100
1.50	5,183	101.50	0.11 ic	0.10 ic	0.00	---	---	---	---	---	---	---	0.104
1.60	5,529	101.60	0.11 ic	0.11 ic	0.00	---	---	---	---	---	---	---	0.108
1.70	5,875	101.70	0.11 ic	0.11 ic	0.00	---	---	---	---	---	---	---	0.112
1.80	6,220	101.80	0.12 ic	0.12 ic	0.00	---	---	---	---	---	---	---	0.116
1.90	6,566	101.90	0.12 ic	0.12 ic	0.00	---	---	---	---	---	---	---	0.119
2.00	6,911	102.00	0.12 ic	0.12 ic	0.00	---	---	---	---	---	---	---	0.123
2.10	7,257	102.10	0.13 ic	0.13 ic	0.00	---	---	---	---	---	---	---	0.126
2.20	7,602	102.20	0.13 ic	0.13 ic	0.00	---	---	---	---	---	---	---	0.129
2.30	7,948	102.30	0.14 ic	0.13 ic	0.00								0.132
2.40	8,294	102.40	0.14 ic	0.14 ic	0.00								0.135
2.50	8,639	102.50	0.14 ic	0.14 ic	0.00								0.138
2.60	8,985	102.60	0.15 ic	0.14 ic	0.00								0.141
2.70	9,330	102.70	0.15 ic	0.14 ic	0.00								0.144
2.80	9,676	102.80	0.15 ic	0.15 ic	0.00								0.147
2.90	10,021	102.90	0.15 ic	0.15 ic	0.00								0.150
3.00	10,367	103.00	0.16 ic	0.15 ic	0.00								0.152
3.10	10,713	103.10	0.16 ic	0.16 ic	0.00								0.155
3.20	11,058	103.20	0.16 ic	0.16 ic	0.00								0.158
3.30	11,404	103.30	0.17 ic	0.16 ic	0.00	---	---	---	---	---	---	---	0.160
3.40	11,749	103.40	0.17 ic	0.16 ic	0.00	---	---	---	---	---	---	---	0.163

DCV = 6,317 CF
DCV X 1.5 = 9,475.5 CF

Stage that correlates to DCV is 2.8 ft.
Draw-down = 43.69 hours

Continues on next page...

Actual Vault

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
3.50	12,095	103.50	0.17 ic	0.17 ic	0.00	---	---	---	---	---	---	---	0.165
3.60	12,440	103.60	0.17 ic	0.17 ic	0.00	---	---	---	---	---	---	---	0.168
3.70	12,786	103.70	0.18 ic	0.17 ic	0.00	---	---	---	---	---	---	---	0.170
3.80	13,131	103.80	0.18 ic	0.17 ic	0.00	---	---	---	---	---	---	---	0.172
3.90	13,477	103.90	0.18 ic	0.17 ic	0.00	---	---	---	---	---	---	---	0.175
4.00	13,823	104.00	0.18 ic	0.18 ic	0.00	---	---	---	---	---	---	---	0.177
4.10	14,168	104.10	0.18 ic	0.18 ic	0.00	---	---	---	---	---	---	---	0.179
4.20	14,514	104.20	0.19 ic	0.18 ic	0.00	---	---	---	---	---	---	---	0.182
4.30	14,859	104.30	0.19 ic	0.18 ic	0.00	---	---	---	---	---	---	---	0.184
4.40	15,205	104.40	0.19 ic	0.19 ic	0.00	---	---	---	---	---	---	---	0.186
4.50	15,550	104.50	0.19 ic	0.19 ic	0.00	---	---	---	---	---	---	---	0.188
4.60	15,896	104.60	0.19 ic	0.19 ic	0.00	---	---	---	---	---	---	---	0.190
4.70	16,242	104.70	0.20 ic	0.19 ic	0.00	---	---	---	---	---	---	---	0.192
4.80	16,587	104.80	0.20 ic	0.19 ic	0.00	---	---	---	---	---	---	---	0.195
4.90	16,933	104.90	0.20 ic	0.20 ic	0.00	---	---	---	---	---	---	---	0.197
5.00	17,278	105.00	0.20 ic	0.20 ic	0.00								0.199
5.10	17,624	105.10	0.20 ic	0.20 ic	0.00								0.201
5.20	17,969	105.20	0.26 ic	0.20 ic	0.06 ic								0.260
5.30	18,315	105.30	0.42 oc	0.20 ic	0.22 ic								0.421
5.40	18,661	105.40	0.69 oc	0.20 ic	0.49 ic								0.692
5.50	19,006	105.50	1.04 oc	0.20 ic	0.84 ic								1.042
5.60	19,352	105.60	1.46 oc	0.20 ic	1.27 ic								1.462
5.70	19,697	105.70	1.97 oc	0.20 ic	1.78 ic								1.973
5.80	20,043	105.80	2.51 oc	0.20 ic	2.32 ic								2.511
5.90	20,388	105.90	3.15 oc	0.19 ic	2.96 ic	---	---	---	---	---	---	---	3.153
6.00	20,734	106.00	3.78 oc	0.19 ic	3.59 ic	---	---	---	---	---	---	---	3.777
6.10	21,079	106.10	4.47 ic	0.19 ic	4.28 ic	---	---	---	---	---	---	---	4.467
6.20	21,425	106.20	5.14 ic	0.18 ic	4.96 ic	---	---	---	---	---	---	---	5.142
6.30	21,771	106.30	5.82 ic	0.17 ic	5.65 ic	---	---	---	---	---	---	---	5.822
6.40	22,116	106.40	6.49 ic	0.16 ic	6.33 ic	---	---	---	---	---	---	---	6.491
6.50	22,462	106.50	7.06 ic	0.14 ic	6.92 ic	---	---	---	---	---	---	---	7.063
6.60	22,807	106.60	7.05 ic	0.15 ic	0.00	---	---	---	---	---	---	---	0.147
6.70	23,153	106.70	7.96 ic	0.12 ic	7.84 ic	---	---	---	---	---	---	---	7.964
6.80	23,498	106.80	8.40 ic	0.11 ic	8.29 ic	---	---	---	---	---	---	---	8.398
6.90	23,844	106.90	8.76 ic	0.09 ic	8.66 ic	---	---	---	---	---	---	---	8.756
7.00	24,190	107.00	8.82 ic	0.09 ic	8.73 ic	---	---	---	---	---	---	---	8.825

HMP Volume achieved after secondary outflow (located at 5.1') = 17, 625 cf

Draw-down = 56.1 hrs

...End

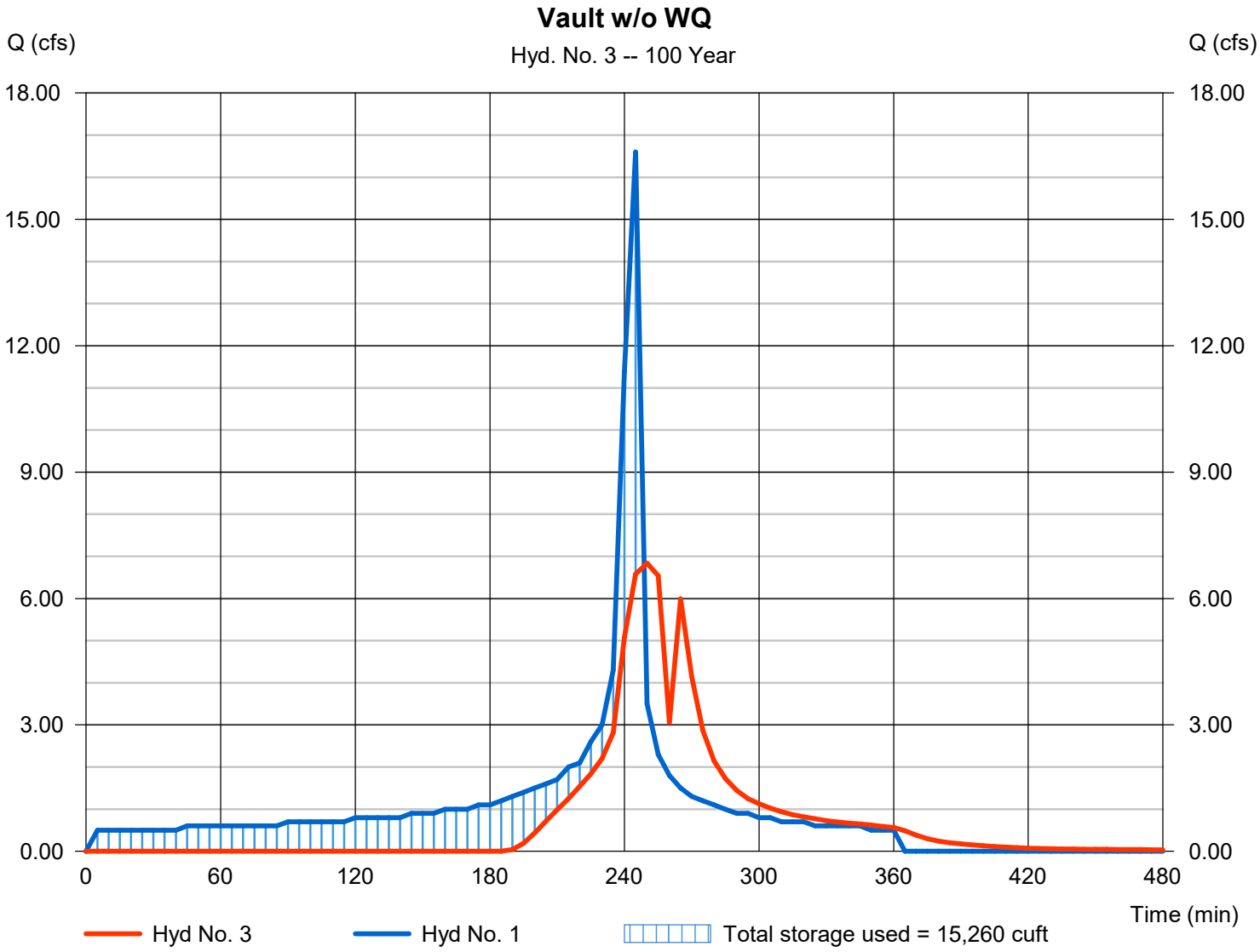
Hydrograph Report

Hyd. No. 3

Vault w/o WQ

Hydrograph type	=	Reservoir	Peak discharge	=	6.838 cfs
Storm frequency	=	100 yrs	Time to peak	=	250 min
Time interval	=	5 min	Hyd. volume	=	22,016 cuft
Inflow hyd. No.	=	1 - Inflow	Max. Elevation	=	104.42 ft
Reservoir name	=	Vault w/o WQ	Max. Storage	=	15,260 cuft

Storage Indication method used.



Pond Report

Pond No. 2 - Vault w/o WQ

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 100.00

WQ Volume (Stage 2.8') not accounted for in this model. Thus, secondary release is 5.1 - 2.8 = 2.3' from bottom of tank when WQ volume is ignored per Conjunctive-Use BMP guidelines.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (c
0.00	100.00	3,456	0	0
1.00	101.00	3,456	3,456	3,456
2.00	102.00	3,456	3,456	6,911
3.00	103.00	3,456	3,456	10,367
4.00	104.00	3,456	3,456	13,823
5.00	105.00	3,456	3,456	17,278
6.00	106.00	3,456	3,456	20,734
7.00	107.00	3,456	3,456	24,190

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	18.00	0.00	0.00
Span (in)	= 12.00	18.00	0.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 100.00	102.30	0.00	0.00
Length (ft)	= 10.00	10.00	0.00	0.00
Slope (%)	= 1.00	1.00	1.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	0.00	0.00	0.00
Crest El. (ft)	= 0.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= ---	---	---	---
Multi-Stage	= No	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.10	346	100.10	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.20	691	100.20	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.30	1,037	100.30	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.40	1,382	100.40	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.50	1,728	100.50	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.60	2,073	100.60	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.70	2,419	100.70	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.80	2,765	100.80	0.00	0.00	---	---	---	---	---	---	---	---	0.000
0.90	3,110	100.90	0.00	0.00	---	---	---	---	---	---	---	---	0.000
1.00	3,456	101.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
1.10	3,801	101.10	0.00	0.00	---	---	---	---	---	---	---	---	0.000
1.20	4,147	101.20	0.00	0.00	---	---	---	---	---	---	---	---	0.000
1.30	4,492	101.30	0.00	0.00	---	---	---	---	---	---	---	---	0.000
1.40	4,838	101.40	0.00	0.00	---	---	---	---	---	---	---	---	0.000
1.50	5,183	101.50	0.00	0.00	---	---	---	---	---	---	---	---	0.000
1.60	5,529	101.60	0.00	0.00	---	---	---	---	---	---	---	---	0.000
1.70	5,875	101.70	0.00	0.00	---	---	---	---	---	---	---	---	0.000
1.80	6,220	101.80	0.00	0.00	---	---	---	---	---	---	---	---	0.000
1.90	6,566	101.90	0.00	0.00	---	---	---	---	---	---	---	---	0.000
2.00	6,911	102.00	0.00	0.00	---	---	---	---	---	---	---	---	0.000
2.10	7,257	102.10	0.00	0.00	---	---	---	---	---	---	---	---	0.000
2.20	7,602	102.20	0.00	0.00	---	---	---	---	---	---	---	---	0.000
2.30	7,948	102.30	0.00	0.00	---	---	---	---	---	---	---	---	0.000
2.40	8,294	102.40	0.06 ic	0.06 ic	---	---	---	---	---	---	---	---	0.058
2.50	8,639	102.50	0.22 ic	0.22 ic	---	---	---	---	---	---	---	---	0.218
2.60	8,985	102.60	0.50 oc	0.49 ic	---	---	---	---	---	---	---	---	0.490
2.70	9,330	102.70	0.85 oc	0.84 ic	---	---	---	---	---	---	---	---	0.842
2.80	9,676	102.80	1.27 oc	1.27 ic	---	---	---	---	---	---	---	---	1.265
2.90	10,021	102.90	1.78 oc	1.78 ic	---	---	---	---	---	---	---	---	1.778
3.00	10,367	103.00	2.32 oc	2.32 ic	---	---	---	---	---	---	---	---	2.316
3.10	10,713	103.10	2.96 oc	2.96 ic	---	---	---	---	---	---	---	---	2.959
3.20	11,058	103.20	3.59 oc	3.59 ic	---	---	---	---	---	---	---	---	3.586
3.30	11,404	103.30	4.28 ic	4.28 ic	---	---	---	---	---	---	---	---	4.280
3.40	11,749	103.40	4.96 ic	4.96 ic	---	---	---	---	---	---	---	---	4.964

Continues on next page...

Vault w/o WQ

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
3.50	12,095	103.50	5.65 ic	5.65 ic	---	---	---	---	---	---	---	---	5.654
3.60	12,440	103.60	6.00 ic	6.00 ic	---	---	---	---	---	---	---	---	5.999
3.70	12,786	103.70	6.15 ic	6.15 ic	---	---	---	---	---	---	---	---	6.151
3.80	13,131	103.80	6.14 ic	0.00	---	---	---	---	---	---	---	---	0.000
3.90	13,477	103.90	6.37 ic	6.37 ic	---	---	---	---	---	---	---	---	6.371
4.00	13,823	104.00	6.46 ic	6.46 ic	---	---	---	---	---	---	---	---	6.464
4.10	14,168	104.10	6.56 ic	6.56 ic	---	---	---	---	---	---	---	---	6.556
4.20	14,514	104.20	6.65 ic	6.65 ic	---	---	---	---	---	---	---	---	6.646
4.30	14,859	104.30	6.74 ic	6.74 ic	---	---	---	---	---	---	---	---	6.736
4.40	15,205	104.40	6.82 ic	6.82 ic	---	---	---	---	---	---	---	---	6.824
4.50	15,550	104.50	6.91 ic	6.91 ic	---	---	---	---	---	---	---	---	6.910
4.60	15,896	104.60	7.00 ic	7.00 ic	---	---	---	---	---	---	---	---	6.996
4.70	16,242	104.70	7.08 ic	7.08 ic	---	---	---	---	---	---	---	---	7.081
4.80	16,587	104.80	7.17 ic	7.16 ic	---	---	---	---	---	---	---	---	7.165
4.90	16,933	104.90	7.25 ic	7.25 ic	---	---	---	---	---	---	---	---	7.247
5.00	17,278	105.00	7.33 ic	7.33 ic	---	---	---	---	---	---	---	---	7.329
5.10	17,624	105.10	7.41 ic	7.41 ic	---	---	---	---	---	---	---	---	7.411
5.20	17,969	105.20	7.49 ic	7.49 ic	---	---	---	---	---	---	---	---	7.491
5.30	18,315	105.30	7.57 ic	7.57 ic	---	---	---	---	---	---	---	---	7.570
5.40	18,661	105.40	7.65 ic	7.65 ic	---	---	---	---	---	---	---	---	7.648
5.50	19,006	105.50	7.73 ic	7.73 ic	---	---	---	---	---	---	---	---	7.726
5.60	19,352	105.60	7.80 ic	7.80 ic	---	---	---	---	---	---	---	---	7.803
5.70	19,697	105.70	7.88 ic	7.88 ic	---	---	---	---	---	---	---	---	7.879
5.80	20,043	105.80	7.95 ic	7.95 ic	---	---	---	---	---	---	---	---	7.955
5.90	20,388	105.90	8.03 ic	8.03 ic	---	---	---	---	---	---	---	---	8.029
6.00	20,734	106.00	8.10 ic	8.10 ic	---	---	---	---	---	---	---	---	8.103
6.10	21,079	106.10	8.18 ic	8.18 ic	---	---	---	---	---	---	---	---	8.177
6.20	21,425	106.20	8.25 ic	8.25 ic	---	---	---	---	---	---	---	---	8.249
6.30	21,771	106.30	8.32 ic	8.32 ic	---	---	---	---	---	---	---	---	8.321
6.40	22,116	106.40	8.39 ic	8.39 ic	---	---	---	---	---	---	---	---	8.392
6.50	22,462	106.50	8.46 ic	8.46 ic	---	---	---	---	---	---	---	---	8.463
6.60	22,807	106.60	8.53 ic	8.53 ic	---	---	---	---	---	---	---	---	8.534
6.70	23,153	106.70	8.60 ic	8.60 ic	---	---	---	---	---	---	---	---	8.603
6.80	23,498	106.80	8.67 ic	8.67 ic	---	---	---	---	---	---	---	---	8.672
6.90	23,844	106.90	8.74 ic	8.74 ic	---	---	---	---	---	---	---	---	8.741
7.00	24,190	107.00	8.81 ic	8.81 ic	---	---	---	---	---	---	---	---	8.809

...End

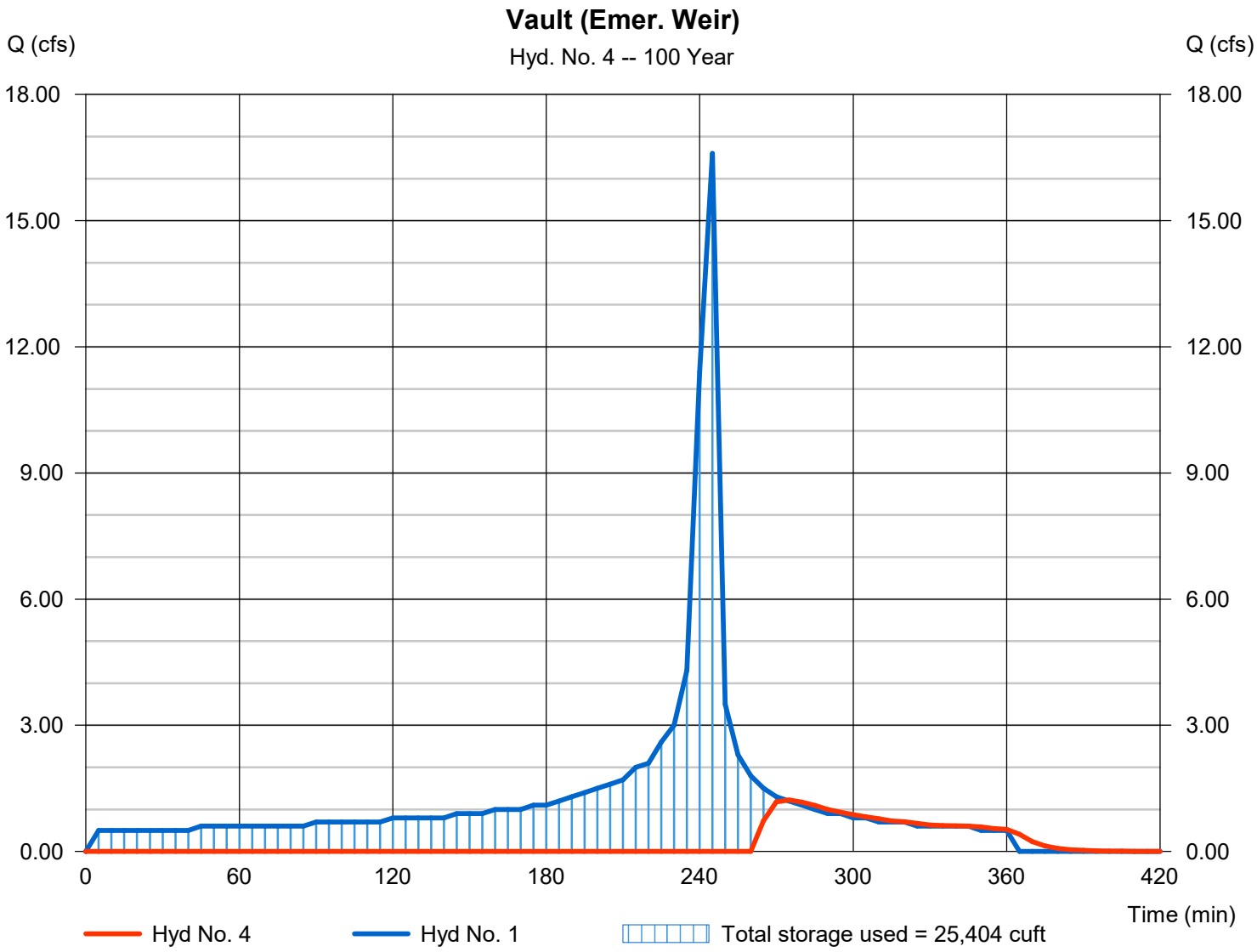
Hydrograph Report

Hyd. No. 4

Vault (Emer. Weir)

Hydrograph type	=	Reservoir	Peak discharge	=	1.226 cfs
Storm frequency	=	100 yrs	Time to peak	=	275 min
Time interval	=	5 min	Hyd. volume	=	5,089 cuft
Inflow hyd. No.	=	1 - Inflow	Max. Elevation	=	107.35 ft
Reservoir name	=	Vault (Emer. Weir)	Max. Storage	=	25,404 cuft

Storage Indication method used.



Pond No. 3 - Vault (Emer. Weir)

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 100.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	100.00	3,456	0	0
1.00	101.00	3,456	3,456	3,456
2.00	102.00	3,456	3,456	6,911
3.00	103.00	3,456	3,456	10,367
4.00	104.00	3,456	3,456	13,823
5.00	105.00	3,456	3,456	17,278
6.00	106.00	3,456	3,456	20,734
7.00	107.00	3,456	3,456	24,190
8.00	108.00	3,456	3,456	27,645

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	Inactive	Inactive	Inactive
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 100.00	0.00	0.00	0.00
Length (ft)	= 10.00	0.00	0.00	0.00
Slope (%)	= 1.00	1.00	1.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 6.00	0.00	0.00	0.00
Crest El. (ft)	= 107.20	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	100.00	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.10	346	100.10	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.20	691	100.20	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.30	1,037	100.30	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.40	1,382	100.40	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.50	1,728	100.50	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.60	2,073	100.60	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.70	2,419	100.70	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.80	2,765	100.80	0.00	---	---	---	0.00	---	---	---	---	---	0.000
0.90	3,110	100.90	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.00	3,456	101.00	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.10	3,801	101.10	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.20	4,147	101.20	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.30	4,492	101.30	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.40	4,838	101.40	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.50	5,183	101.50	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.60	5,529	101.60	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.70	5,875	101.70	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.80	6,220	101.80	0.00	---	---	---	0.00	---	---	---	---	---	0.000
1.90	6,566	101.90	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.00	6,911	102.00	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.10	7,257	102.10	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.20	7,602	102.20	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.30	7,948	102.30	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.40	8,294	102.40	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.50	8,639	102.50	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.60	8,985	102.60	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.70	9,330	102.70	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.80	9,676	102.80	0.00	---	---	---	0.00	---	---	---	---	---	0.000
2.90	10,021	102.90	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.00	10,367	103.00	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.10	10,713	103.10	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.20	11,058	103.20	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.30	11,404	103.30	0.00	---	---	---	0.00	---	---	---	---	---	0.000

Continues on next page...

Vault (Emer. Weir)

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
3.40	11,749	103.40	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.50	12,095	103.50	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.60	12,440	103.60	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.70	12,786	103.70	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.80	13,131	103.80	0.00	---	---	---	0.00	---	---	---	---	---	0.000
3.90	13,477	103.90	0.00	---	---	---	0.00	---	---	---	---	---	0.000
4.00	13,823	104.00	0.00	---	---	---	0.00	---	---	---	---	---	0.000
4.10	14,168	104.10	0.00	---	---	---	0.00	---	---	---	---	---	0.000
4.20	14,514	104.20	0.00	---	---	---	0.00	---	---	---	---	---	0.000
4.30	14,859	104.30	0.00	---	---	---	0.00	---	---	---	---	---	0.000
4.40	15,205	104.40	0.00	---	---	---	0.00	---	---	---	---	---	0.000
4.50	15,550	104.50	0.00	---	---	---	0.00	---	---	---	---	---	0.000
4.60	15,896	104.60	0.00	---	---	---	0.00	---	---	---	---	---	0.000
4.70	16,242	104.70	0.00	---	---	---	0.00	---	---	---	---	---	0.000
4.80	16,587	104.80	0.00	---	---	---	0.00	---	---	---	---	---	0.000
4.90	16,933	104.90	0.00	---	---	---	0.00	---	---	---	---	---	0.000
5.00	17,278	105.00	0.00	---	---	---	0.00	---	---	---	---	---	0.000
5.10	17,624	105.10	0.00	---	---	---	0.00	---	---	---	---	---	0.000
5.20	17,969	105.20	0.00	---	---	---	0.00	---	---	---	---	---	0.000
5.30	18,315	105.30	0.00	---	---	---	0.00	---	---	---	---	---	0.000
5.40	18,661	105.40	0.00	---	---	---	0.00	---	---	---	---	---	0.000
5.50	19,006	105.50	0.00	---	---	---	0.00	---	---	---	---	---	0.000
5.60	19,352	105.60	0.00	---	---	---	0.00	---	---	---	---	---	0.000
5.70	19,697	105.70	0.00	---	---	---	0.00	---	---	---	---	---	0.000
5.80	20,043	105.80	0.00	---	---	---	0.00	---	---	---	---	---	0.000
5.90	20,388	105.90	0.00	---	---	---	0.00	---	---	---	---	---	0.000
6.00	20,734	106.00	0.00	---	---	---	0.00	---	---	---	---	---	0.000
6.10	21,079	106.10	0.00	---	---	---	0.00	---	---	---	---	---	0.000
6.20	21,425	106.20	0.00	---	---	---	0.00	---	---	---	---	---	0.000
6.30	21,771	106.30	0.00	---	---	---	0.00	---	---	---	---	---	0.000
6.40	22,116	106.40	0.00	---	---	---	0.00	---	---	---	---	---	0.000
6.50	22,462	106.50	0.00	---	---	---	0.00	---	---	---	---	---	0.000
6.60	22,807	106.60	0.00	---	---	---	0.00	---	---	---	---	---	0.000
6.70	23,153	106.70	0.00	---	---	---	0.00	---	---	---	---	---	0.000
6.80	23,498	106.80	0.00	---	---	---	0.00	---	---	---	---	---	0.000
6.90	23,844	106.90	0.00	---	---	---	0.00	---	---	---	---	---	0.000
7.00	24,190	107.00	0.00	---	---	---	0.00	---	---	---	---	---	0.000
7.10	24,535	107.10	0.00	---	---	---	0.00	---	---	---	---	---	0.000
7.20	24,881	107.20	0.00	---	---	---	0.00	---	---	---	---	---	0.000
7.30	25,226	107.30	0.65 oc	---	---	---	0.63	---	---	---	---	---	0.632
7.40	25,572	107.40	1.79 oc	---	---	---	1.79	---	---	---	---	---	1.787
7.50	25,917	107.50	3.28 oc	---	---	---	3.28	---	---	---	---	---	3.283
7.60	26,263	107.60	5.05 ic	---	---	---	5.05	---	---	---	---	---	5.055
7.70	26,609	107.70	7.06 ic	---	---	---	7.06	---	---	---	---	---	7.064
7.80	26,954	107.80	9.29 ic	---	---	---	9.29	---	---	---	---	---	9.286
7.90	27,300	107.90	10.03 ic	---	---	---	10.03 s	---	---	---	---	---	10.03
8.00	27,645	108.00	10.19 ic	---	---	---	10.19 s	---	---	---	---	---	10.19

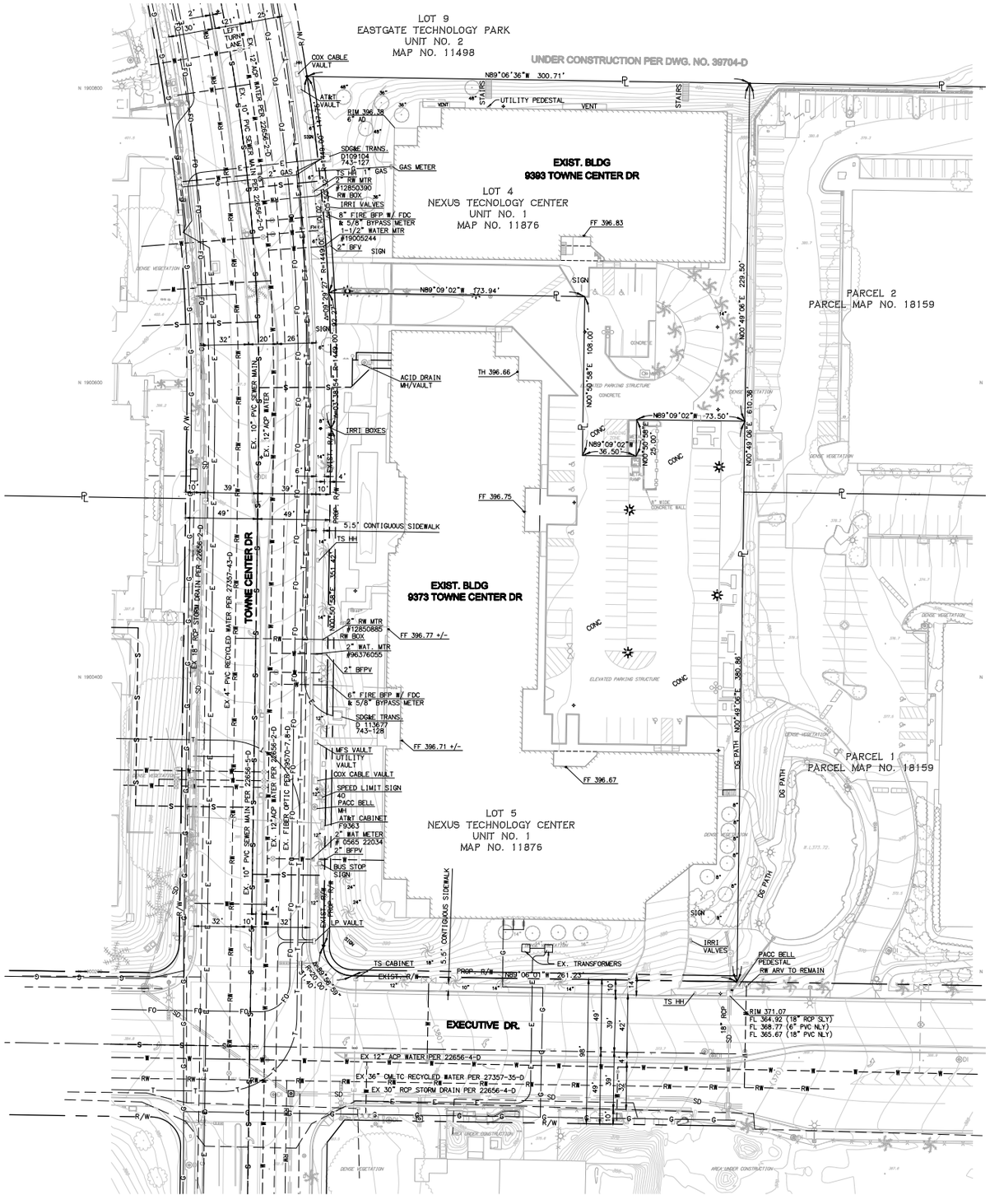
...End

ARE Science Village						
HMP Storage Drawdown						
Stage (ft)	**Storage (ft3)**	**Discharge (cfs)**	**Incremental Vol. (ft3)**	**Avg. Discharge (cfs)**	**Incremental Time (sec)**	**Incremental Time (hr)**
5.10	17,624	0.20	-	-		
4.60	15,896	0.19	1,728	0.195	8861.54	2.46
4.00	13,823	0.18	2,073	0.185	11205.41	3.11
3.00	10,021	0.16	3,802	0.17	22364.71	6.21
2.00	6,911	0.12	3,110	0.14	22214.29	6.17
1.60	5,529	0.11	1,382	0.115	12017.39	3.34
1.00	3,456	0.08	2,073	0.095	21821.05	6.06
0.80	2,765	0.07	691	0.075	9213.33	2.56
0.40	1,382	0.04	1,383	0.055	25145.45	6.98
0.00	0.00	0.00	1,382	0.02	69100.00	19.19
					Total Time =	**56.10**
State, Storage, and Discharge derived from Hydroflow Hydrographs routing analysis.						

ARE Science Village						
WQ Storage Drawdown						
Stage (ft)	**Storage (ft3)**	**Discharge (cfs)**	**Incremental Vol. (ft3)**	**Avg. Discharge (cfs)**	**Incremental Time (sec)**	**Incremental Time (hr)**
2.80	9,676	0.15	-	-		
2.00	6,911	0.12	2,765.00	0.135	20481.48	5.69
1.60	5,529	0.11	1,382.00	0.115	12017.39	3.34
1.40	4,838	0.11	691.00	0.11	6281.82	1.74
1.30	4,492	0.1	346.00	0.105	3295.24	0.92
1.20	4,147	0.09	345.00	0.095	3631.58	1.01
1.00	3,456	0.08	691.00	0.085	8129.41	2.26
0.80	2,765	0.07	691.00	0.075	9213.33	2.56
0.40	1,382	0.04	1,383.00	0.055	25145.45	6.98
0.00	0.00	0.00	1,382.00	0.02	69100.00	19.19
					Total Time =	**43.69**
State, Storage, and Discharge derived from Hydroflow Hydrographs routing analysis.						

Appendix E – Plan Sheets

Improvement Plans



ENGINEER OF WORK:
Brian Oliver 2/10/2022
BRIAN K. OLIVER, R.C.E. 45045 DATE
EXP. 3/31/24

BASIS OF COORDINATES

THE BASIS OF COORDINATES FOR THIS SURVEY IS THE CALIFORNIA COORDINATE SYSTEM NAD83, ZONE 6,(EPOCH 1991.35)

BENCHMARK

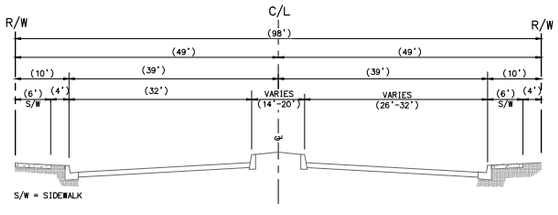
THE BASIS OF ELEVATIONS FOR THIS SURVEY IS THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 (NGVD29) PER THE CITY OF SAN DIEGO VERTICAL CONTROL NETWORK. SEBP LOCATED AT LA JOLLA VILLAGE DRIVE & TOWNE CENTER DRIVE. ELEVATION: 371.617 (ft.)

SOURCE OF TOPOGRAPHY

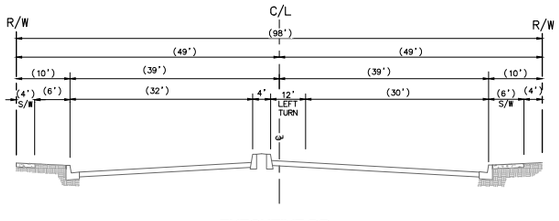
AERIAL PHOTOGRAMMETRY PROVIDED BY AEROTECH MAPPING, INC., FLOWN FEBRUARY 5, 2014 AND SUPPLEMENTED BY FIELD CREW SURVEY BY MICHAEL BAKER INTERNATIONAL ON JULY 22, 2019

LEGEND

- RIGHT OF WAY
- PROPERTY LINE
- EXIST. WATER LINE
- EXIST. RECYCLED WATER
- EXIST. SEWER LINE
- EXIST. STORM DRAIN
- EXIST. ELECTRIC LINE
- EXIST. TELECOMMUNICATION
- EXIST. GAS LINE
- EXIST. CONTOUR
- EXIST. FIRE HYDRANT
- EXIST. FIRE MANIFOLD
- EXIST. WATER VALVE
- EXIST. WATER METER
- EXIST. WATER MANHOLE
- EXIST. AIR RELEASE VALVE
- EXIST. CP TEST
- EXIST. IRRIGATION PEDESTAL
- EXIST. SEWER MANHOLE
- EXIST. SEWER CLEAN OUT
- EXIST. ELECTRIC PULL BOX
- EXIST. ELECTRIC METER
- EXIST. ELECTRIC JUNCTION BOX
- EXIST. STREET LIGHT
- EXIST. LIGHT STANDARD
- EXIST. POWER POLE
- EXIST. GUY WIRE
- EXIST. UTILITY PULL BOX
- EXIST. GAS VALVE
- EXIST. TRAFFIC PULL BOX
- EXIST. TRAFFIC SIGN
- EXIST. TRAFFIC SIGNAL
- EXIST. TELEPHONE MANHOLE
- EXIST. TELEPHONE PEDESTAL
- EXIST. TELEPHONE
- EXIST. STORM DRAIN MANHOLE
- EXIST. CURB DRAIN
- EXIST. ROOF DRAIN
- EXIST. POST
- EXIST. PALM TREE
- EXIST. TREE



TOWNE CENTER DR.
EXISTING STREET SECTION
N.T.S.



EXECUTIVE DR.
EXISTING STREET SECTION
N.T.S.

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Phone: 206.682.6837
Contact: Name

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04/18/2022

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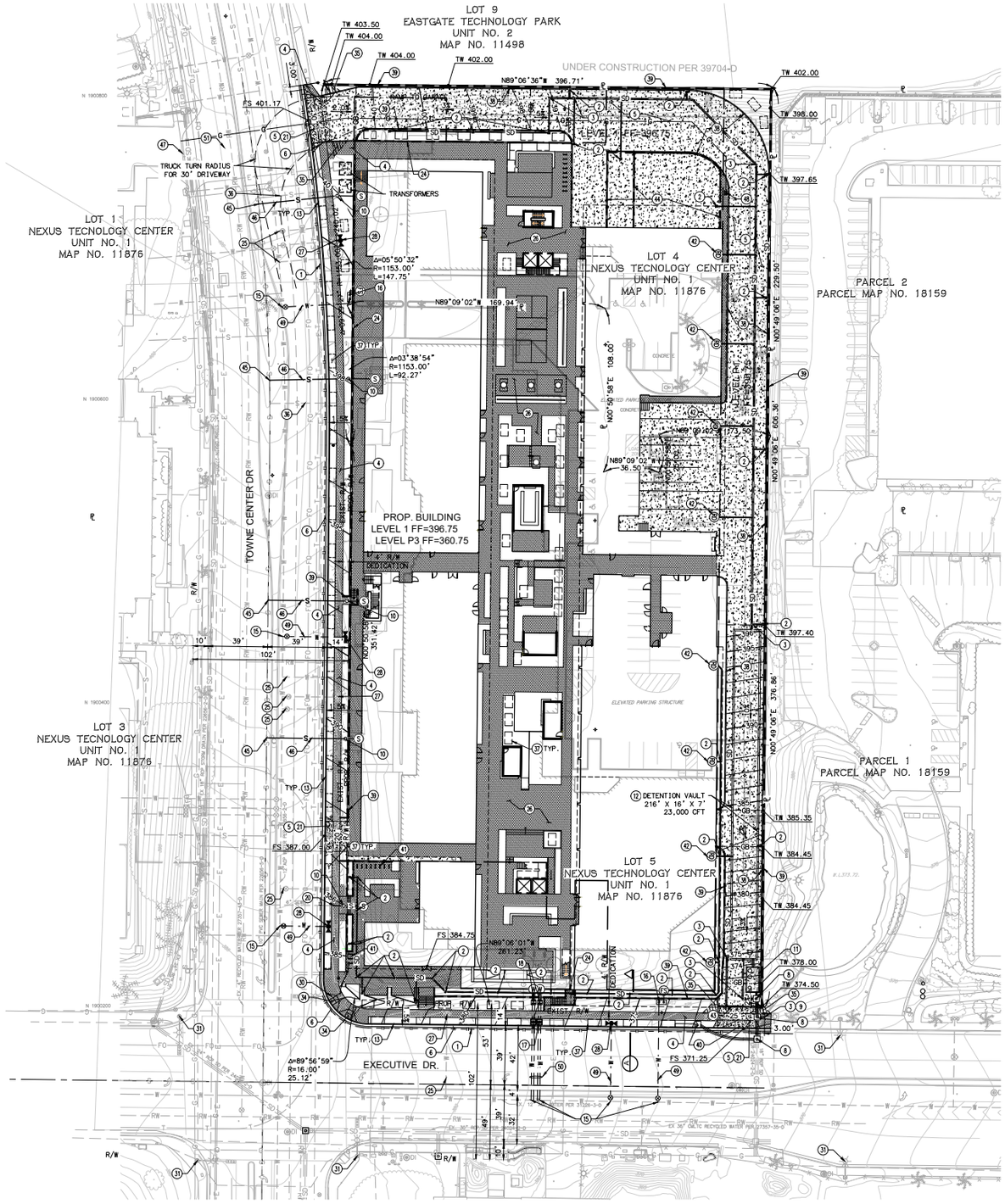
Issue Date: 04/18/2022

SHEET
TOPOGRAPHIC MAP

C101

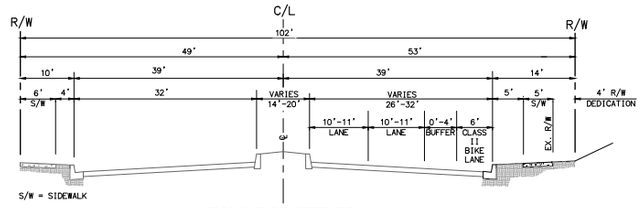


GRADING LEGEND

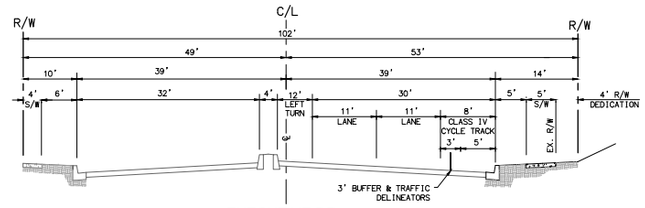
- RIGHT OF WAY LINE ····· R/W
- PROPERTY LINE ····· ℄
- GRADING LIMITS/SAWCUT ·····
- EXISTING CONTOUR ····· (372)
- PROPOSED CONTOUR ····· 380
- GRADE BREAK ····· GB
- PROPOSED ASPHALT ·····
- PROPOSED CONCRETE SIDEWALK ·····
- PROPOSED VEHICULAR CONC. ·····
- FIRE SERVICE ····· F
- SEWER SERVICE ····· S
- WATER SERVICE ····· W
- PROPOSED FIRE HYDRANT ·····
- MODULAR WETLAND ·····
- FLOW DIRECTION ·····
- STORM DRAIN LINE ····· SD
- CATCH BASIN ·····
- 'A-4' CLEANOUT ·····
- SEWER/STORM DRAIN TYPE CLEANOUT ·····
- PROPOSED STORM WATER DETENTION VAULT ·····
- TREE ROOT ZONE (40 SF) ·····

CONSTRUCTION NOTES

1. LIMIT OF GRADING/ LIMIT OF WORK/ SAWCUT LINE
2. CATCH BASIN
3. SEWER-TYPE STORM DRAIN CLEANOUT (SDCO)
4. CONCRETE SIDEWALK
5. VEHICULAR CONCRETE PAVEMENT
6. AC PAVEMENT
8. TYPE 'A-4' STORM DRAIN CLEANOUT
9. CONNECT TO EX. STORM DRAIN
10. SEWER-TYPE CLEANOUT
11. MODULAR WETLAND SYSTEM
12. STORM WATER DETENTION VAULT
13. REMOVE AND REPLACE CURB & GUTTER
15. CONNECT TO EX. WATER MAIN
16. FIRE SERVICE BACKFLOW PREVENTER
17. DUAL WATER METER
18. DUAL WATER BACKFLOW PREVENTER
20. CONNECT TO EX. 8" SEWER LATERAL
21. PROPOSED DRIVEWAY
24. LIMITS OF UNDERGROUND PARKING
25. EX. WATER SERVICE TO BE KILLED AT MAIN
26. HARDSCAPE PER LANDSCAPE PLANS
27. EX. FIRE HYDRANT TO BE RELOCATED
28. RELOCATED FIRE HYDRANT
30. RELOCATE EX. TRAFFIC SIGNAL & STREET LIGHT
31. EX. STREET LIGHT
34. CURB RAMP
35. VISIBILITY TRIANGLE, NO OBSTRUCTION INCLUDING LANDSCAPING OR SOLID WALLS IN THE VISIBILITY AREA SHALL EXCEED 24" IN HEIGHT
36. EX. SEWER LATERAL TO BE ABANDONED AT P/L
37. TREE ROOT ZONE (40 SF)
38. 6" PCC CURB
39. RETAINING WALL
40. RELOCATED CURB INLET
41. BIKE RACKS
42. ROOF DRAIN POC, SEE PLUMBING PLANS FOR CONTINUATION
43. 12" TRENCH DRAIN
44. ENCLOSURE WALL
45. CONNECT TO EXIST. SEWER
46. PROPOSED 6" SEWER LATERAL
47. CONNECT TO EXIST. GAS
48. GAS METER PER PLUMBING PLANS
49. PROPOSED FIRE SERVICE
50. PROPOSED WATER SERVICE
51. PROPOSED GAS SERVICE



TOWNE CENTER DR.
PROPOSED STREET SECTION
N.T.S.



EXECUTIVE DR.
PROPOSED STREET SECTION
N.T.S.

APPROVAL NUMERS

PDP APPROVAL NO. 2342720
LAND USE APPROVAL NO. 2342723
NDP APPROVAL NO. 2367484
SDP APPROVAL NO. 2367485
REZONE APPROVAL NO. 2367486

GENERAL NOTES

1. ALL EXISTING CURB, GUTTER, SIDEWALK, & DRIVEWAY IMPROVEMENTS ALONG TOWNE CENTER DRIVE & EXECUTIVE DRIVE FRONTAGE TO BE REMOVED & REPLACED.
2. ALL EXISTING UTILITY STRUCTURES IN RIGHT OF WAY FRONTAGE TO BE RELOCATED, REMOVED, OR ADJUSTED TO GRADE.
3. NO EXISTING OR PROPOSED EASEMENTS ONSITE

DEVIATIONS FROM STANDARDS:

1. MAXIMUM DRIVEWAY WIDTH:
   PROJECT PROPOSES ONE 30' WIDE DRIVEWAY IN LIEU OF THE CITY OF SAN DIEGO'S MAXIMUM 25' WIDE DRIVEWAY IN PARKING IMPACT ARE TO ALLOW FOR FULL SIZE DELIVERY TRUCKS TO ACCESS THE DELIVERY/SERVICE AREA. THE 30' DRIVEWAY WILL LESSEN THE REQUIRED TURNING RADIUS FOR DELIVERY TRUCKS ENTERING FROM TOWNE CENTER DR.

ENGINEER OF WORK:
Brian K. Oliver, R.C.E. 45045 DATE
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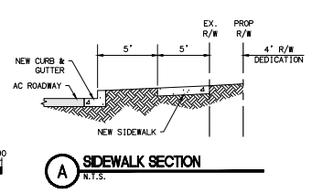
2/10/2022

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



A SIDEWALK SECTION
N.T.S.

GRADING QUANTITIES

TOTAL AMOUNT OF SITE TO BE GRADED: 3.97 ACRES
PERCENT OF TOTAL SITE GRADED: 100%
AMOUNT OF SITE WITH 25 PERCENT SLOPES OR GREATER: 0.08 ACRES
PERCENT OF TOTAL SITE WITH 25 PERCENT SLOPES OR GREATER: 2%
AMOUNT OF SITE WITHIN HILLSIDE REVIEW: 0%
PERCENT OF TOTAL SITE WITHIN HILLSIDE REVIEW: 0%
AMOUNT OF CUT: 315,000 CY
AMOUNT OF FILL: 100 CY
MAXIMUM HEIGHT OF FILL SLOPE 3 FEET 2: 1 SLOPE RATIO
MAXIMUM HEIGHT OF CUT SLOPE 4 FEET 2: 1 SLOPE RATIO
AMOUNT OF EXPORT SOIL: 314,900 CY
RETAINING WALLS: HOW MANY: 18
MAXIMUM LENGTH: 900'
MAXIMUM HEIGHT: 14.5'
MAXIMUM DEPTH OF CUT: 71 FT

ALL EXCAVATED MATERIALS TO BE EXPORTED SHALL BE EXPORTED TO A LEGAL DISPOSAL SITE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION "GREEN BOOK", 2018 EDITION AND REGIONAL SUPPLEMENT AMENDMENTS ADOPTED BY REGIONAL STANDARDS COMMITTEE

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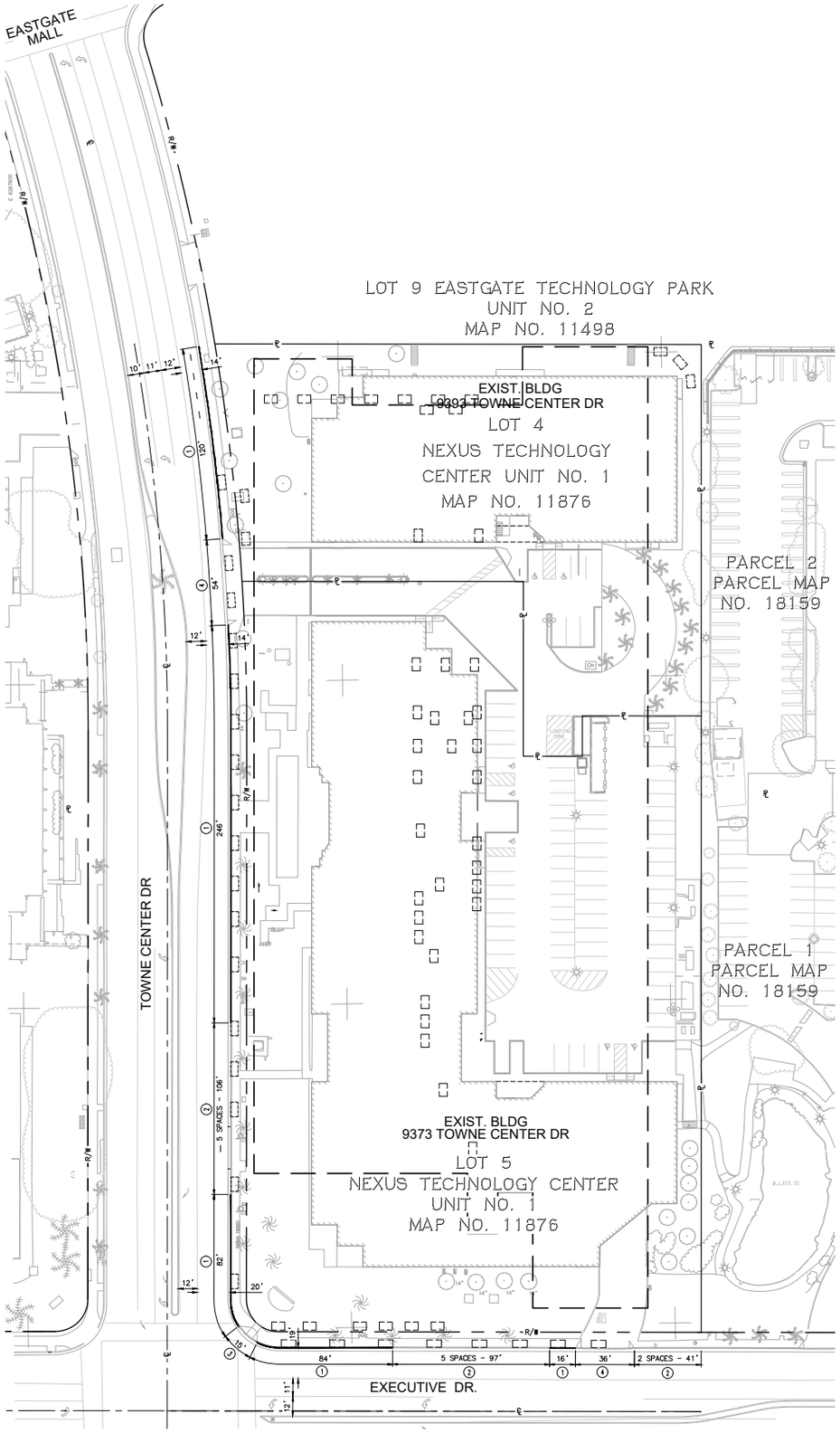
SHEET
PRELIMINARY GRADING AND UTILITY PLAN

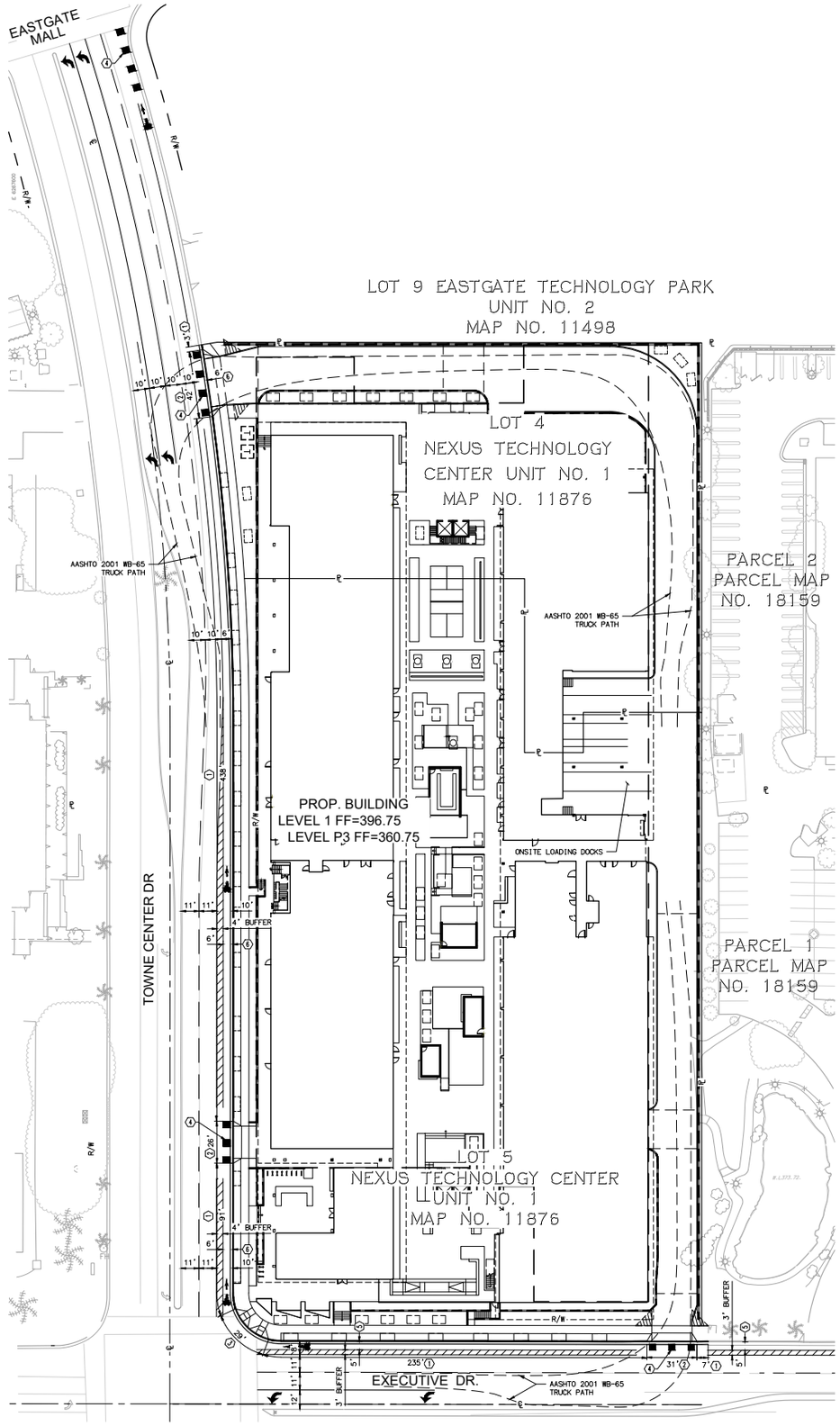
C201



EXISTING
CURB UTILIZATION

STRIPING NOTES (EXISTING)

1. EXISTING RED CURB MARKING
2. EXISTING PARKING TO BE REMOVED
3. EXISTING CURB RAMP
4. EXISTING DRIVEWAY CURB CUT



PROPOSED
CURB UTILIZATION

STRIPING NOTES (PROPOSED)

1. NEW RED CURB MARKING
2. NEW DRIVEWAY CURB CUT
3. NEW CURB RAMP CUT
4. NEW CONFLICT STRIPING - WHITE DASHED LINE WITH GREEN INFILL ACROSS ENTIRE LENGTH OF BIKE LANE/CYCLE TRACK
5. CLASS IV CYCLE TRACK
6. CLASS II BIKE LANE

PARKING SUMMARY

EXISTING SPACES	12 SPACES
PROPOSED SPACES	0 SPACES
NET LOSS	12 SPACES

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

ENGINEER OF WORK:
Brian Oliver 2/10/2022
BRIAN K. OLIVER, R.C.E. 45045 DATE
EXP. 3/31/24

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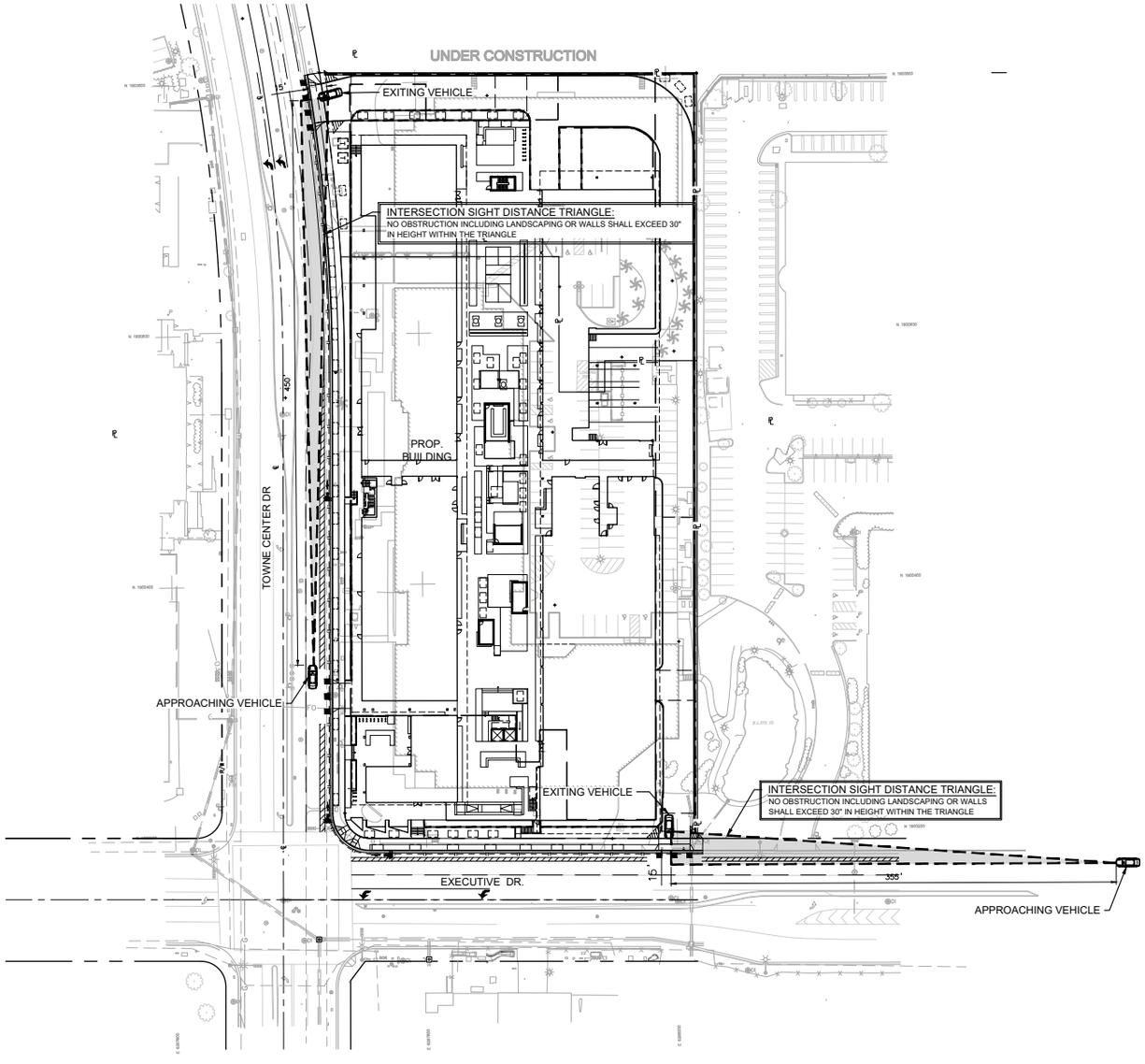
SHEET
CURB UTILIZATION PLAN

C301



SIGHT DISTANCE TABLE		
DESIGN SPEED (MPH)	STOPPING SIGHT DISTANCE (FT)	INTERSECTION SIGHT DISTANCE (FT) (RIGHT TURNS)
30	200	290
35	250	335
37	272**	355***
40	305	385
45	360	430
47	386**	450***
50	425	480

SIGHT DISTANCE

EXECUTIVE DRIVE
- POSTED SPEED LIMIT ..... 30 MPH
- 85TH PERCENTILE SPEED ..... 37 MPH*
- STOPPING SIGHT DISTANCE ..... 272'
- INTERSECTION SIGHT DISTANCE ..... 355'

TOWNE CENTER DRIVE
- POSTED SPEED LIMIT ..... 40 MPH
- 85TH PERCENTILE SPEED ..... 47 MPH*
- STOPPING SIGHT DISTANCE ..... 386'
- INTERSECTION SIGHT DISTANCE ..... 450'

* ASSUMED 85TH PERCENTILE SPEED IS 7 MPH GREATER THAN POSTED SPEED

** INTERPOLATED FROM AASHTO STOPPING SIGHT DISTANCE TABLE EXHIBIT 3-1

*** INTERPOLATED FROM AASHTO INTERSECTION SIGHT DISTANCE TABLE EXHIBIT 9-57

ENGINEER OF WORK:
BRIAN K. OLIVER, R.C.E. 45045 DATE
EXP. 3/31/22
2/10/2022

40 20 0 40 80 120
SCALE: 1"=40'

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SHEET
SIGHT DISTANCE PLAN

C311