Priority Development Project (PDP)
Storm Water Quality Management Plan (SWQMP)

Junipero Serra Museum ADA Improvements Project

[Insert Permit Application Number]

40809-D

☐ **Check if electing for offsite alternative compliance**

Engineer of Work:

James Jarrett Linn, PE 84231

Provide Wet Signature and Stamp Above Line

Prepared For:

City of San Diego - Parks and Recreation

525 B Street

San Diego, CA 92101

(619) 533-5414

Prepared By:

Nasland Engineering

4740 Ruffner Street

San Diego, CA 92111

(858) 292-7770

Date:

11/21/2025

Approved by: City of San Diego Date

The City of SAN DIEGO

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Acronyms

APN	Assessor's Parcel Number
ASBS	Area of Special Biological Significance
BMP	Best Management Practice
CEQA	California Environmental Quality Act
CGP	Construction General Permit
DCV	Design Capture Volume
DMA	Drainage Management Areas
ESA	Environmentally Sensitive Area
GLU	Geomorphic Landscape Unit
GW	Ground Water
HMP	Hydromodification Management Plan
HSG	Hydrologic Soil Group
HU	Harvest and Use
INF	Infiltration
LID	Low Impact Development
LUP	Linear Underground/Overhead Projects
MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
PDP	Priority Development Project
PE	Professional Engineer
POC	Pollutant of Concern
SC	Source Control
SD	Site Design
SDRWQCB	San Diego Regional Water Quality Control Board
SIC	Standard Industrial Classification
SWPPP	Stormwater Pollutant Protection Plan
SWQMP	Storm Water Quality Management Plan
TMDL	Total Maximum Daily Load
WMAA	Watershed Management Area Analysis
WPCP	Water Pollution Control Program
WQIP	Water Quality Improvement Plan

Certification Page

Project Name:
Permit Application

I hereby declare that I am the Engineer in Responsible Charge of design of storm water BMPs for this project, and 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 the requirements of the Storm Water Standards, which is based on the requirements of SDRWQCB Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100 (MS4 Permit).

I have read and understand that the City Engineer has adopted minimum requirements for managing urban runoff, including storm water, from land development activities, as described in the Storm Water Standards. I certify that this PDP SWQMP has been completed to the best of my ability and accurately reflects the project being proposed and the applicable source control and site design BMPs proposed to minimize the potentially negative impacts of this project's land development activities on water quality. I understand and acknowledge that the plan check review of this PDP SWQMP by the City Engineer is confined to a review and does not relieve me, as the Engineer in Responsible Charge of design of storm water BMPs for this project, of my responsibilities for project design.

Engineer of Work's Signature

84231 — PE#

09-30-2027 — Expiration Date

James Jarrett Linn

Print Name

Nasland Engineering

Company

11/21/2025

Date

Engineer's Stamp

Submittal Record

Use this Table to keep a record of submittals of this PDP SWQMP. Each time the PDP SWQMP is re-submitted, provide the date and status of the project. In last column indicate changes that have been made or indicate if response to plancheck comments is included. When applicable, insert response to plancheck comments.

Submittal Number	Date	Project Status	Changes
1	3/22/2019	☑ Preliminary Design/Planning/CEQA ☐ Final Design	Initial Submittal
2	07/01/2019	☑ Preliminary Design/Planning/CEQA ☐ Final Design	2nd Submittal
3	02/20/2020	☑ Preliminary Design/Planning/CEQA ☐ Final Design	3rd Submittal
4	11/21/2025	☐ Preliminary Design/Planning/CEQA ☑ Final Design	Final Submittal

Project Vicinity Map

Project Name: Junipero Serra Museum ADA Improvements Project
Permit Application

City of San Diego Form DS-560 Storm Water Requirements Applicability Checklist

Attach DS-560 form.

City of San Diego
Development Services
1222 First Ave., MS-302
San Diego, CA 92101
(619) 446-5000

Storm Water Requirements Applicability Checklist

FORM
DS-560
November 2018

Project Address: 2727 Presidio Drive, San Diego, 92103	Project Number:

SECTION 1. Construction Storm Water BMP Requirements:

All construction sites are required to implement construction BMPs in accordance with the performance standards in the Storm Water Standards Manual. Some sites are additionally required to obtain coverage under the State Construction General Permit (CGP)[1], which is administered by the State Regional Water Quality Control Board.

For all projects complete PART A: If project is required to submit a SWPPP or WPCP, continue to PART B.

PART A: Determine Construction Phase Storm Water Requirements.

1. Is the project subject to California's statewide General NPDES permit for Storm Water Discharges Associated with Construction Activities, also known as the State Construction General Permit (CGP)? (Typically projects with land disturbance greater than or equal to 1 acre.)

   ☒ Yes; SWPPP required, skip questions 2-4 ☐ No; next question

2. Does the project propose construction or demolition activity, including but not limited to, clearing, grading, grubbing, excavation, or any other activity resulting in ground disturbance and/or contact with storm water?

   ☐ Yes; WPCP required, skip questions 3-4 ☐ No; next question

3. Does the project propose routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility? (Projects such as pipeline/utility replacement)

   ☐ Yes; WPCP required, skip question 4 ☐ No; next question

4. Does the project only include the following Permit types listed below?

   - Electrical Permit, Fire Alarm Permit, Fire Sprinkler Permit, Plumbing Permit, Sign Permit, Mechanical Permit, Spa Permit.
   - Individual Right of Way Permits that exclusively include only ONE of the following activities: water service, sewer lateral, or utility service.
   - Right of Way Permits with a project footprint less than 150 linear feet that exclusively include only ONE of the following activities: curb ramp, sidewalk and driveway apron replacement, pot holing, curb and gutter replacement, and retaining wall encroachments.

   ☐ Yes; no document required

Check one of the boxes below, and continue to PART B:

☒ If you checked "Yes" for question 1, **a SWPPP is REQUIRED. Continue to PART B**

☐ If you checked "No" for question 1, and checked "Yes" for question 2 or 3, **a WPCP is REQUIRED.** If the project proposes less than 5,000 square feet of ground disturbance AND has less than a 5-foot elevation change over the entire project area, a Minor WPCP may be required instead. **Continue to PART B.**

☐ If you checked "No" for all questions 1-3, and checked "Yes" for question 4 PART B **does not apply and no document is required. Continue to Section 2.**

1. More information on the City's construction BMP requirements as well as CGP requirements can be found at: www.sandiego.gov/stormwater/regulations/index.shtml

PART B: Determine Construction Site Priority

This prioritization must be completed within this form, noted on the plans, and included in the SWPPP or WPCP. The city reserves the right to adjust the priority of projects both before and after construction. Construction projects are assigned an inspection frequency based on if the project has a "high threat to water quality." The City has aligned the local definition of "high threat to water quality" to the risk determination approach of the State Construction General Permit (CGP). The CGP determines risk level based on project specific sediment risk and receiving water risk. Additional inspection is required for projects within the Areas of Special Biological Significance (ASBS) watershed. **NOTE:** The construction priority does **NOT** change construction BMP requirements that apply to projects; rather, it determines the frequency of inspections that will be conducted by city staff.

Complete PART B and continued to Section 2

1. ☐ **ASBS**

a. Projects located in the ASBS watershed.

2. ☐ **High Priority**

a. Projects that qualify as Risk Level 2 or Risk Level 3 per the Construction General Permit (CGP) and not located in the ASBS watershed.

b. Projects that qualify as LUP Type 2 or LUP Type 3 per the CGP and not located in the ASBS watershed.

3. ☒ **Medium Priority**

a. Projects that are not located in an ASBS watershed or designated as a High priority site.

b. Projects that qualify as Risk Level 1 or LUP Type 1 per the CGP and not located in an ASBS watershed.

c. WPCP projects (>5,000sf of ground disturbance) located within the Los Penasquitos watershed management area.

4. ☐ **Low Priority**

a. Projects not subject to a Medium or High site priority designation and are not located in an ASBS watershed.

SECTION 2. Permanent Storm Water BMP Requirements.

Additional information for determining the requirements is found in the Storm Water Standards Manual.

PART C: Determine if Not Subject to Permanent Storm Water Requirements.

Projects that are considered maintenance, or otherwise not categorized as "new development projects" or "redevelopment projects" according to the Storm Water Standards Manual are not subject to Permanent Storm Water BMPs.

If "yes" is checked for any number in Part C, proceed to Part F and check "Not Subject to Permanent Storm Water BMP Requirements".

If "no" is checked for all of the numbers in Part C continue to Part D.

1.	Does the project only include interior remodels and/or is the project entirely within an existing enclosed structure and does not have the potential to contact storm water?	☐ Yes	☒ No
2.	Does the project only include the construction of overhead or underground utilities without creating new impervious surfaces?	☐ Yes	☒ No
3.	Does the project fall under routine maintenance? Examples include, but are not limited to: roof or exterior structure surface replacement, resurfacing or reconfiguring surface parking lots or existing roadways without expanding the impervious footprint, and routine replacement of damaged pavement (grinding, overlay, and pothole repair).	☐ Yes	☒ No

PART D: PDP Exempt Requirements.

PDP Exempt projects are required to implement site design and source control BMPs.

If "yes" was checked for any questions in Part D, continue to Part F and check the box labeled "PDP Exempt."

If "no" was checked for all questions in Part D, continue to Part E.

1. **Does the project ONLY include new or retrofit sidewalks, bicycle lanes, or trails that:**
   - **Are designed and constructed to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas? Or;**
   - **Are designed and constructed to be hydraulically disconnected from paved streets and roads? Or;**
   - **Are designed and constructed with permeable pavements or surfaces in accordance with the Green Streets guidance in the City's Storm Water Standards manual?**

   ☐ Yes; PDP exempt requirements apply ☒ No; next question

2. Does the project ONLY include retrofitting or redeveloping existing paved alleys, streets or roads designed and constructed in accordance with the Green Streets guidance in the City's Storm Water Standards Manual?

   ☐ Yes; PDP exempt requirements apply ☒ No; project not exempt.

PART E: Determine if Project is a Priority Development Project (PDP).

Projects that match one of the definitions below are subject to additional requirements including preparation of a Storm Water Quality Management Plan (SWQMP).

If "yes" is checked for any number in PART E, continue to PART F and check the box labeled "Priority Development Project".

If "no" is checked for every number in PART E, continue to PART F and check the box labeled "Standard Development Project".

1.	**New Development that creates 10,000 square feet or more of impervious surfaces collectively over the project site.** This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.	☐ Yes	☒ No
2.	**Redevelopment project that creates and/or replaces 5,000 square feet or more of impervious surfaces on an existing site of 10,000 square feet or more of impervious surfaces**. This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.	☒ Yes	☐ No
3.	**New development or redevelopment of a restaurant.** Facilities that sell prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (SIC 5812), and where the land development creates and/or replace 5,000 square feet or more of impervious surface.	☐ Yes	☒ No
4.	**New development or redevelopment on a hillside.** The project creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site) and where the development will grade on any natural slope that is twenty-five percent or greater.	☒ Yes	☐ No
5.	**New development or redevelopment of a parking lot that creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site).**	☒ Yes	☐ No
6.	**New development or redevelopment of streets, roads, highways, freeways, and driveways.** The project creates and/or replaces 5,000 square feet or more of impervious surface (collectively over the project site).	☒ Yes	☐ No

7.	**New development or redevelopment discharging directly to an Environmentally Sensitive Area.** The project creates and/or replaces 2,500 square feet of impervious surface (collectively over project site), and discharges directly to an Environmentally Sensitive Area (ESA). "Discharging directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the ESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands).	☒ Yes ☐ No
8.	**New development or redevelopment projects of a retail gasoline outlet (RGO) that create and/or replaces 5,000 square feet of impervious surface.** The development project meets the following criteria: (a) 5,000 square feet or more or (b) has a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.	☐ Yes ☒ No
9.	**New development or redevelopment projects of an automotive repair shops that creates and/or replaces 5,000 square feet or more of impervious surfaces.** Development projects categorized in any one of Standard Industrial Classification (SIC) codes 5013, 5014, 5541, 7532-7534, or 7536-7539.	☐ Yes ☒ No
10.	**Other Pollutant Generating Project.** The project is not covered in the categories above, results in the disturbance of one or more acres of land and is expected to generate pollutants post construction, such as fertilizers and pesticides. This does not include projects creating less than 5,000 sf of impervious surface and where added landscaping does not require regular use of pesticides and fertilizers, such as slope stabilization using native plants. Calculation of the square footage of impervious surface need not include linear pathways that are for infrequent vehicle use, such as emergency maintenance access or bicycle pedestrian use, if they are built with pervious surfaces of if they sheet flow to surrounding pervious surfaces.	☐ Yes ☒ No

PART F: Select the appropriate category based on the outcomes of PART C through PART E.

1.	The project is **NOT SUBJECT TO PERMANENT STORM WATER REQUIREMENTS**.	☐
2.	The project is a **STANDARD DEVELOPMENT PROJECT**. Site design and source control BMP requirements apply. See the Storm Water Standards Manual for guidance.	☐
3.	The project is **PDP EXEMPT**. Site design and source control BMP requirements apply. See the Storm Water Standards Manual for guidance.	☐
4.	The project is a **PRIORITY DEVELOPMENT PROJECT**. Site design, source control, and structural pollutant control BMP requirements apply. See the Storm Water Standards Manual for guidance on determining if project requires a hydromodification plan management	☒

Jarrett Linn	Project Manager
Name of Owner or Agent *(Please Print)*	Title
	11/21/2025
Signature	Date

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Applicability of Permanent, Post-Construction Storm Water BMP Requirements	Form I-1

Project Identification

Project Name: Junipero Serra Museum ADA Improvements Project

Permit Application Number: | Date: 10/30/2025

Determination of Requirements

The purpose of this form is to identify permanent, post-construction requirements that apply to the project. This form serves as a short summary of applicable requirements, in some cases referencing separate forms that will serve as the backup for the determination of requirements.

Answer each step below, starting with **Step 1** and progressing through each step until reaching "Stop". Refer to the manual sections and/or separate forms referenced in each step below.

Step	Answer	Progression
Step 1: Is the project a "development project"? See Section 1.3 of the manual (Part 1 of Storm Water Standards) for guidance.	☑ Yes	Go to **Step 2**.
	☐ No	**Stop**. Permanent BMP requirements do not apply. No SWQMP will be required. Provide discussion below.
Discussion / justification if the project is not a "development project" (e.g., the project includes *only* interior remodels within an existing building):		
Step 2: Is the project a Standard Project, PDP, or PDP Exempt? To answer this item, see Section 1.4 of the manual in its entirety for guidance AND complete Form DS-560, Storm Water Requirements Applicability Checklist.	☐ Standard Project	**Stop.** Standard Project requirements apply
	☑ PDP	PDP requirements apply, including PDP SWQMP. Go to **Step 3**.
	☐ PDP Exempt	**Stop.** Standard Project requirements apply. Provide discussion and list any additional requirements below.
Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable:		

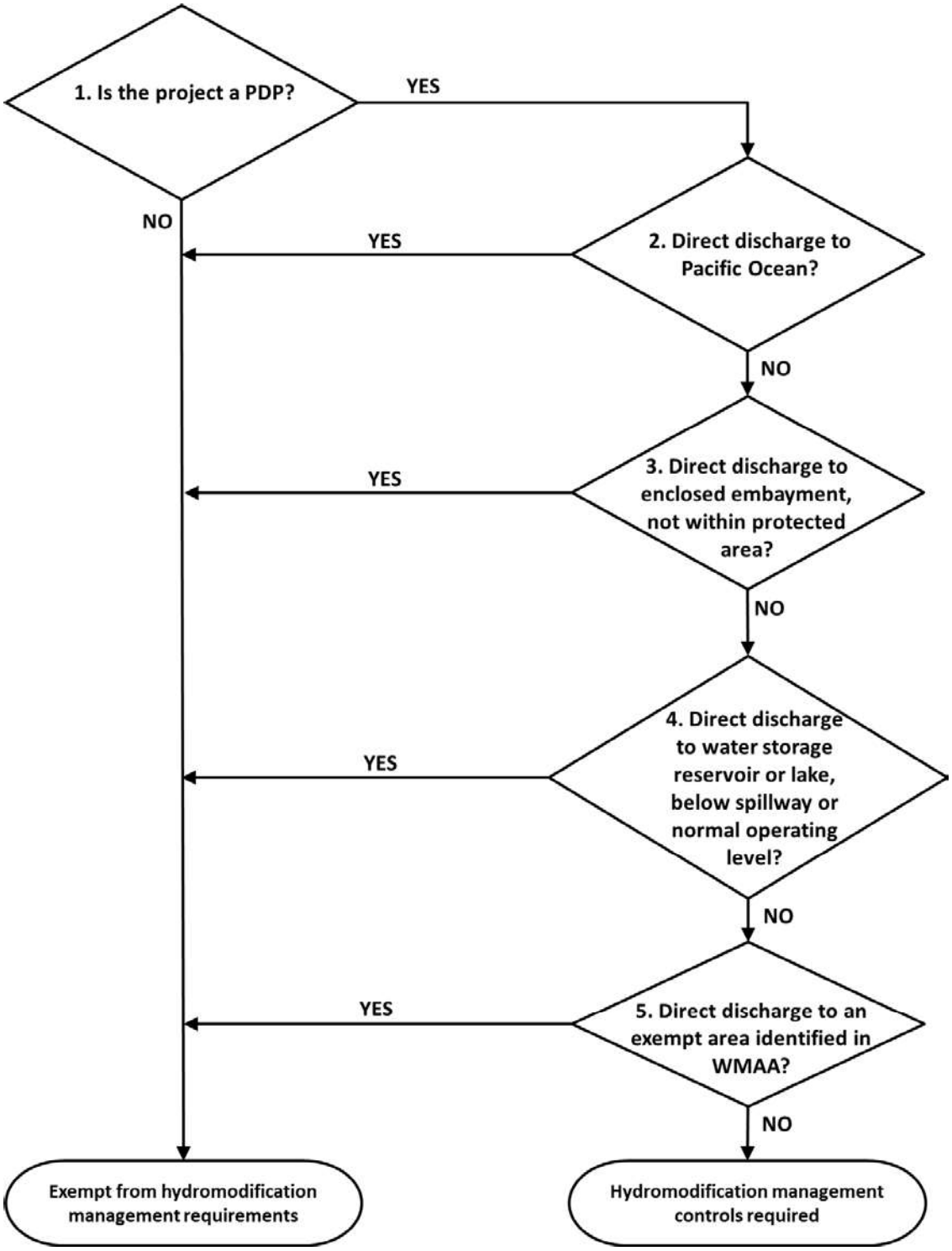
Form I-1 Page 2 of 2		
Step	**Answer**	**Progression**
Step 3. Is the project subject to earlier PDP requirements due to a prior lawful approval? See Section 1.10 of the manual (Part 1 of Storm Water Standards) for guidance.	☐ Yes	Consult the City Engineer to determine requirements. Provide discussion and identify requirements below. Go to **Step 4**.
	☑ No	BMP Design Manual PDP requirements apply. Go to **Step 4**.
Discussion / justification of prior lawful approval, and identify requirements (not required if prior lawful approval does not apply):		
Step 4. Do hydromodification control requirements apply? See Section 1.6 of the manual (Part 1 of Storm Water Standards) for guidance.	☐ Yes	PDP structural BMPs required for pollutant control (Chapter 5) and hydromodification control (Chapter 6). Go to **Step 5**.
	☑ No	**Stop**. PDP structural BMPs required for pollutant control (Chapter 5) only. Provide brief discussion of exemption to hydromodification control below.
Discussion / justification if hydromodification control requirements do not apply: Runoff from project site flows by existing gutter/swale into an exempt storm drain system that is directly routed to an exempt body (San Diego River). Inlet to exempt systems are located under Taylor Street and by Palm Canyon Presidio Park.		
Step 5. Does protection of critical coarse sediment yield areas apply? See Section 6.2 of the manual (Part 1 of Storm Water Standards) for guidance.	☐ Yes	Management measures required for protection of critical coarse sediment yield areas (Chapter 6.2). **Stop**.
	☑ No	Management measures not required for protection of critical coarse sediment yield areas. Provide brief discussion below. **Stop**.
Discussion / justification if protection of critical coarse sediment yield areas does not apply: There are no critical coarse sediment yield areas at or near the project site. Refer to exhibit provided in Attachment 2 of this document.		

HMP Exemption Exhibit

Attach a HMP Exemption Exhibit that shows direct storm water runoff discharge from the project site to HMP exempt area. Include project area, applicable underground storm drain line and/or concrete lined channels, outfall information and exempt waterbody.
Reference applicable drawing number(s).

Exhibit must be provided on 11"x17" or larger paper.

may require upgrading and may also disqualify the HMP exemption at the discretion of the City Engineer.



*Direct discharge refers to an uninterrupted hardened conveyance system; Note to be used in conjunction with Node Descriptions.

Figure 1-2. Applicability of Hydromodification Management BMP Requirements

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ECT BOUNDARY

OMODIFICATION EXEMPT STORM
N SYSTEM/WATERBODY

PATH OF RUNOFF

S TYPE D

PTH > 20 FEET

Nasland
Civil Engineering • Surveying • Land Planning

HYDR
EXE

JUNIPER

Site Information Checklist For PDPs	Form I-3B
Project Summary Information	
Project Name	Presidio Park Museum Parking Lot
Project Address	2727 Presidio Drive San Diego, CA 92103
Assessor's Parcel Number(s) (APN(s))	760-102-7500
Permit Application Number	
Project Watershed	Select One: ☐ San Dieguito River ☐ Penasquitos ☐ Mission Bay ☑ San Diego River ☐ San Diego Bay ☐ Tijuana River
Hydrologic subarea name with Numeric Identifier up to two decimal places (9XX.XX)	Mission San Diego (907.11)
Project Area (total area of Assessor's Parcel(s) associated with the project or total area of the right-of-way)	51.98 Acres (2,264,250 Square Feet)
Area to be disturbed by the project (Project Footprint)	1.42 Acres (62,104 Square Feet)
Project Proposed Impervious Area (subset of Project Footprint)	0.56 Acres (24,537 Square Feet)
Project Proposed Pervious Area (subset of Project Footprint)	0.86 Acres (37,567 Square Feet)
Note: Proposed Impervious Area + Proposed Pervious Area = Area to be Disturbed by the Project. This may be less than the Project Area.	
The proposed increase or decrease in impervious area in the proposed condition as compared to the pre-project condition	100 %

Form I-3B Page 2 of 11

Description of Existing Site Condition and Drainage Patterns

Current Status of the Site (select all that apply):

- ☐ Existing development
- ☐ Previously graded but not built out
- ☐ Agricultural or other non-impervious use
- ☑ Vacant, undeveloped/natural

Description / Additional Information:

Project site is an undeveloped hillside with native trees and no maintained landscaped coverage. Current area use is for museum maintenance activities and pedestrian trails.

Existing Land Cover Includes (select all that apply):

- ☑ Vegetative Cover
- ☑ Non-Vegetated Pervious Areas
- ☑ Impervious Areas

Description / Additional Information:

Majority of the project site covers natural dirt hillside with no impervious areas. Small portion of impervious area exist at proposed driveway that is to be removed. Significant coverage with eucalyptus and pines.

Underlying Soil belongs to Hydrologic Soil Group (select all that apply):

- ☐ NRCS Type A
- ☐ NRCS Type B
- ☐ NRCS Type C
- ☑ NRCS Type D

Approximate Depth to Groundwater:

- ☐ Groundwater Depth < 5 feet
- ☐ 5 feet < Groundwater Depth < 10 feet
- ☐ 10 feet < Groundwater Depth < 20 feet
- ☑ Groundwater Depth > 20 feet

Existing Natural Hydrologic Features (select all that apply):

- ☐ Watercourses
- ☐ Seeps
- ☐ Springs
- ☐ Wetlands
- ☑ None

Description / Additional Information:

Form I-3B Page 3 of 11

Description of Existing Site Topography and Drainage

How is storm water runoff conveyed from the site? At a minimum, this description should answer:

1. Whether existing drainage conveyance is natural or urban;
2. If runoff from offsite is conveyed through the site? If yes, quantification of all offsite drainage areas, design flows, and locations where offsite flows enter the project site and summarize how such flows are conveyed through the site;
3. Provide details regarding existing project site drainage conveyance network, including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, and natural and constructed channels;
4. Identify all discharge locations from the existing project along with a summary of the conveyance system size and capacity for each of the discharge locations. Provide summary of the pre-project drainage areas and design flows to each of the existing runoff discharge locations.

Descriptions/Additional Information

There are no existing drainage structures (ditches, inlets, pipes, or outlets) located within the proposed limits of work.

Existing runoff surface flows from the top of the hillside to Presidio Drive to the west, or to Palm Canyon Presidio Park to the east.

Surface runoff draining towards Presidio Drive is collected into a cobble gutter along the roadway that continues to flow with no collection point near the project vicinity. Flow continues down Presidio Drive to a curb inlets located near intersection of Presidio Drive and Taylor Street. The storm drain system it enters at this location is exempt from hydromodification requirements and discharges into the San Diego River. Approximately 1.93 acres drain this way which produces 4.51 cfs for the project site.

Surface runoff drainage towards Palm Canyon Park is collected into a large cobble drainage channel which ultimately is collected and conveyed underneath Taylor Street at Palm Canyon Presidio Park. Existing storm drain system is exempt from hydromodification requirements at continues underneath Interstate 8. which outlets to the San Diego River.
Approximately 5.49 acres drain this way which produces 11.54 cfs for the project site.

Form I-3B Page 4 of 11

Description of Proposed Site Development and Drainage Patterns

Project Description / Proposed Land Use and/or Activities:

The project proposes to construct a new parking lot with ADA and non-ADA stalls for the Junipero Serra Museum. Additional improvements include an access driveway and an accessible pedestrian ramp that connects to the pedestrian facilities at the Museum.

A "Green Waste" area is proposed near the parking lot for landscape maintenance purposes, which is an open flat space for work to be performed.

List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features):

Proposed asphaltic concrete surfaces include a driveway and parking lot.

Proposed concrete surface include pedestrian sidewalks and ADA path of travel.

List/describe proposed pervious features of the project (e.g., landscape areas):

For stormwater treatment purposes, a biofiltration facility is proposed near the beginning of the access roadway. A 2' strip of gravel is proposed directly adjacent to the ADA walkway for Green Street exemption purposes.

Does the project include grading and changes to site topography?

☑ Yes

☐ No

Description / Additional Information:

Grading is required for the construction of the parking lot and sidewalk. The goal is to design the improvements to follow existing grade as much as possible to minimize the impact of grading.

Form I-3B Page 5 of 11

Does the project include changes to site drainage (e.g., installation of new storm water conveyance systems)?

☑ Yes

☐ No

If yes, provide details regarding the proposed project site drainage conveyance network, including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural and constructed channels, and the method for conveying offsite flows through or around the proposed project site. Identify all discharge locations from the proposed project site along with a summary of the conveyance system size and capacity for each of the discharge locations. Provide a summary of pre and post-project drainage areas and design flows to each of the runoff discharge locations. Reference the drainage study for detailed calculations.

Description / Additional Information:

DMA-1 consists of 250 SF of driveway that drains to the existing cobble swale. The area is considered to be De Minimis and therefore needs no treatment.

DMA-2 consists of the parking lot and the roadway up to the proposed parking lot. Stormwater runoff surfaces sheet flows across the parking lot to a gutter that discharges into a biofiltration basin near Presidio Drive. After treatment/retention, basin overflow outlets via a 8" PVC pipe to the existing cobble gutter along Presidio Drive. Proposed area totals 0.70 acres and produces 2.1 cfs into the proposed basin and exits at a mitigated runoff of 1.49 cfs.

DMA-3 consists of 1.39 acres of undisturbed hillside and proposed ADA walkway which sheet flows to a 2'strip of crushed gravel directly adjacent. Under Section J.1.1 of the Storm Water Standards Manual, the DMA is exempt of Storm Water Treatment. Flow then travels to the existing cobble gutter along Presidio Drive. This area produces 3.03cfs.

Surface runoff drainage towards Palm Canyon Park is collected into a large cobble drainage channel which ultimately is collected and conveyed underneath Taylor Street at Palm Canyon Presidio Park. Existing storm drain system is exempt from hydromodification requirements at continues underneath Interstate 8. which outlets to the San Diego River.
Approximately 5.18 acres drain this way which produces 10.89 cfs for the project site.

Form I-3B Page 6 of 11

Identify whether any of the following features, activities, and/or pollutant source areas will be present (select all that apply):

- [x] Onsite storm drain inlets
- [ ] Interior floor drains and elevator shaft sump pumps
- [ ] Interior parking garages
- [ ] Need for future indoor & structural pest control
- [x] Landscape/outdoor pesticide use
- [ ] Pools, spas, ponds, decorative fountains, and other water features
- [ ] Food service
- [ ] Refuse areas
- [ ] Industrial processes
- [ ] Outdoor storage of equipment or materials
- [ ] Vehicle and equipment cleaning
- [ ] Vehicle/equipment repair and maintenance
- [ ] Fuel dispensing areas
- [ ] Loading docks
- [ ] Fire sprinkler test water
- [ ] Miscellaneous drain or wash water
- [x] Plazas, sidewalks, and parking lots

Description/Additional Information:

Proposed biofiltration facility will include landscaping and storm drain overflow inlet structure.

Proposed project includes parking lot and sidewalk.

Form I-3B Page 7 of 11
Identification and Narrative of Receiving Water
Narrative describing flow path from discharge location(s), through urban storm conveyance system, to receiving creeks, rivers, and lagoons and ultimate discharge location to Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable) Runoff is directed down Presidio Drive before collecting into Palm Canyon, after which is conveyed via a storm drain system which ultimately discharges into the San Diego River that flows into the Pacific Ocean. San Diego River (Lower) to Pacific Ocean Shoreline, San Diego HU, at Stub Jetty
Provide a summary of all beneficial uses of receiving waters downstream of the project discharge locations San Diego River: AGR, COLD, IND, MUN, RARE, REC1, REC2, WARM, WILD Pacific Ocea: AQUA, BIOL, COMM, IND, MAR, MIGR, NAV, RARE, REC1, REC2, SHELL, SPWN, WILD
Identify all ASBS (areas of special biological significance) receiving waters downstream of the project discharge locations N/A
Provide distance from project outfall location to impaired or sensitive receiving waters N/A
Summarize information regarding the proximity of the permanent, post-construction storm water BMPs to the City's Multi-Habitat Planning Area and environmentally sensitive lands N/A

Form I-3B Page 8 of 11

Identification of Receiving Water Pollutants of Concern

List any 303(d) impaired water bodies within the path of storm water from the project site to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable), identify the pollutant(s)/stressor(s) causing impairment, and identify any TMDLs and/or Highest Priority Pollutants from the WQIP for the impaired water bodies:

303(d) Impaired Water Body (Refer to Appendix K)	Pollutant(s)/Stressor(s) (Refer to Appendix K)	TMDLs/WQIP Highest Priority Pollutant (Refer to Table 1-4 in Chapter 1)
San Diego River (Lower)	Enterococcus, Fecal Coliform, Low Dissolved Oxygen	Indicator Bacteria
	Manganese, Nitrogen, Phosphorus	
	Total Dissolved Solids, Toxicity	

Identification of Project Site Pollutants*

*Identification of project site pollutants is only required if flow-thru treatment BMPs are implemented onsite in lieu of retention or biofiltration BMPs (note the project must also participate in an alternative compliance program unless prior lawful approval to meet earlier PDP requirements is demonstrated)

Identify pollutants anticipated from the project site based on all proposed use(s) of the site (see Appendix B.6):

Pollutant	Not Applicable to the Project Site	Anticipated from the Project Site	Also a Receiving Water Pollutant of Concern
Sediment	☐	☐	☐
Nutrients	☐	☐	☐
Heavy Metals	☐	☐	☐
Organic Compounds	☐	☐	☐
Trash & Debris	☐	☐	☐
Oxygen Demanding Substances	☐	☐	☐
Oil & Grease	☐	☐	☐
Bacteria & Viruses	☐	☐	☐
Pesticides	☐	☐	☐

Form I-3B Page 9 of 11

Hydromodification Management Requirements

Do hydromodification management requirements apply (see Section 1.6)?

☐ Yes, hydromodification management flow control structural BMPs required.

☐ No, the project will discharge runoff directly to existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.

☑ No, the project will discharge runoff directly to conveyance channels whose bed and bank are concrete-lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.

☐ No, the project will discharge runoff directly to an area identified as appropriate for an exemption by the WMAA for the watershed in which the project resides.

Description / Additional Information (to be provided if a 'No' answer has been selected above):

The entire project discharges to Presidio Drive with historic grouted cobble gutters until it reaches an exempt storm drain system that discharges directly to the San Diego River.

Note: If "No" answer has been selected the SWQMP must include an exhibit that shows the storm water conveyance system from the project site to an exempt water body. The exhibit should include details about the conveyance system and the outfall to the exempt water body.

Critical Coarse Sediment Yield Areas*
*This Section only required if hydromodification management requirements apply

Based on Section 6.2 and Appendix H does CCSYA exist on the project footprint or in the upstream area draining through the project footprint?

☐ Yes

☑ No

Discussion / Additional Information:

There are no critical coarse sediment yield areas at or near the project site.

Form I-3B Page 10 of 11
Flow Control for Post-Project Runoff*   ***This Section only required if hydromodification management requirements apply**
List and describe point(s) of compliance (POCs) for flow control for hydromodification management (see Section 6.3.1). For each POC, provide a POC identification name or number correlating to the project's HMP Exhibit and a receiving channel identification name or number correlating to the project's HMP Exhibit.   N/A
Has a geomorphic assessment been performed for the receiving channel(s)?   ☑ No, the low flow threshold is $0.1Q_2$ (default low flow threshold)   ☐ Yes, the result is the low flow threshold is $0.1Q_2$ ☐ Yes, the result is the low flow threshold is $0.3Q_2$ ☐ Yes, the result is the low flow threshold is $0.5Q_2$ If a geomorphic assessment has been performed, provide title, date, and preparer: N/A
Discussion / Additional Information: (optional)   N/A

Form I-3B Page 11 of 11

Other Site Requirements and Constraints

When applicable, list other site requirements or constraints that will influence storm water management design, such as zoning requirements including setbacks and open space, or local codes governing minimum street width, sidewalk construction, allowable pavement types, and drainage requirements.

Optional Additional Information or Continuation of Previous Sections As Needed

This space provided for additional information or continuation of information from previous sections as needed.

Source Control BMP Checklist for PDPs	Form I-4B

Source Control BMPs

All development projects must implement source control BMPs where applicable and feasible. See Chapter 4 and Appendix E of the BMP Design Manual (Part 1 of the Storm Water Standards) for information to implement source control BMPs shown in this checklist.

Answer each category below pursuant to the following.

- "Yes" means the project will implement the source control BMP as described in Chapter 4 and/or Appendix E of the BMP Design Manual. Discussion / justification is not required.
- "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided.
- "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project has no outdoor materials storage areas). Discussion / justification may be provided.

Source Control Requirement	Applied?		
4.2.1 Prevention of Illicit Discharges into the MS4	☑ Yes	☐ No	☐ N/A
Discussion / justification if 4.2.1 not implemented:			
4.2.2 Storm Drain Stenciling or Signage	☑ Yes	☐ No	☐ N/A
Discussion / justification if 4.2.2 not implemented:			
4.2.3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☑ N/A
Discussion / justification if 4.2.3 not implemented:			
4.2.4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☑ N/A
Discussion / justification if 4.2.4 not implemented:			
4.2.5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☑ N/A
Discussion / justification if 4.2.5 not implemented:			

Form I-4B Page 2 of 2			
Source Control Requirement	**Applied?**		
4.2.6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below)			
On-site storm drain inlets	☑ Yes	☐ No	☐ N/A
Interior floor drains and elevator shaft sump pumps	☐ Yes	☐ No	☑ N/A
Interior parking garages	☐ Yes	☐ No	☑ N/A
Need for future indoor & structural pest control	☐ Yes	☐ No	☑ N/A
Landscape/Outdoor Pesticide Use	☑ Yes	☐ No	☐ N/A
Pools, spas, ponds, decorative fountains, and other water features	☐ Yes	☐ No	☑ N/A
Food service	☐ Yes	☐ No	☑ N/A
Refuse areas	☐ Yes	☐ No	☑ N/A
Industrial processes	☐ Yes	☐ No	☑ N/A
Outdoor storage of equipment or materials	☐ Yes	☐ No	☑ N/A
Vehicle/Equipment Repair and Maintenance	☐ Yes	☐ No	☑ N/A
Fuel Dispensing Areas	☐ Yes	☐ No	☑ N/A
Loading Docks	☐ Yes	☐ No	☑ N/A
Fire Sprinkler Test Water	☐ Yes	☐ No	☑ N/A
Miscellaneous Drain or Wash Water	☐ Yes	☐ No	☑ N/A
Plazas, sidewalks, and parking lots	☑ Yes	☐ No	☐ N/A
SC-6A: Large Trash Generating Facilities	☐ Yes	☐ No	☑ N/A
SC-6B: Animal Facilities	☐ Yes	☐ No	☑ N/A
SC-6C: Plant Nurseries and Garden Centers	☐ Yes	☐ No	☑ N/A
SC-6D: Automotive Facilities	☐ Yes	☐ No	☑ N/A
Discussion / justification if 4.2.6 not implemented. Clearly identify which sources of runoff pollutants are discussed. Justification must be provided for all "No" answers shown above.			

Site Design BMP Checklist for PDPs	Form I-5B

Site Design BMPs

All development projects must implement site design BMPs where applicable and feasible. See Chapter 4 and Appendix E of the BMP Design Manual (Part 1 of Storm Water Standards) for information to implement site design BMPs shown in this checklist.
Answer each category below pursuant to the following.

- "Yes" means the project will implement the site design BMP as described in Chapter 4 and/or Appendix E of the BMP Design Manual. Discussion / justification is not required.
- "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided.
- "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project site has no existing natural areas to conserve). Discussion / justification may be provided.

A site map with implemented site design BMPs must be included at the end of this checklist.

Site Design Requirement	Applied?		
4.3.1 Maintain Natural Drainage Pathways and Hydrologic Features	☑ Yes	☐ No	☐ N/A
Discussion / justification if 4.3.1 not implemented:			
1-1 Are existing natural drainage pathways and hydrologic features mapped on the site map?	☑ Yes	☐ No	☐ N/A
1-2 Are trees implemented? If yes, are they shown on the site map?	☐ Yes	☐ No	☑ N/A
1-3 Implemented trees meet the design criteria in 4.3.1 Fact Sheet (e.g. soil volume, maximum credit, etc.)?	☐ Yes	☐ No	☑ N/A
1-4 Is tree credit volume calculated using Appendix B.2.2.1 and SD-1 Fact Sheet in Appendix E?	☐ Yes	☐ No	☑ N/A
4.3.2 Have natural areas, soils and vegetation been conserved?	☑ Yes	☐ No	☐ N/A
Discussion / justification if 4.3.2 not implemented:			

Form I-5B Page 2 of 4			
Site Design Requirement	**Applied?**		
4.3.3 Minimize Impervious Area	☑ Yes	☐ No	☐ N/A
Discussion / justification if 4.3.3 not implemented:			
4.3.4 Minimize Soil Compaction	☑ Yes	☐ No	☐ N/A
Discussion / justification if 4.3.4 not implemented:			
4.3.5 Impervious Area Dispersion	☐ Yes	☑ No	☐ N/A
Discussion / justification if 4.3.5 not implemented: Impervious area dispersion is not included for this project.			
5-1 Is the pervious area receiving runon from impervious area identified on the site map?	☐ Yes	☐ No	☑ N/A
5-2 Does the pervious area satisfy the design criteria in 4.3.5 Fact Sheet in Appendix E (e.g. maximum slope, minimum length, etc.)	☐ Yes	☐ No	☑ N/A
5-3 Is impervious area dispersion credit volume calculated using Appendix B.2.1.1 and 4.3.5 Fact Sheet in Appendix E?	☐ Yes	☐ No	☑ N/A

Form I-5B Page 3 of 4				
Site Design Requirement		**Applied?**		
4.3.6 Runoff Collection		☐ Yes	☑ No	☐ N/A
Discussion / justification if 4.3.6 not implemented: There is no toilet or urinal flushing demand for the project. Landscape irrigation demand is less than 0.25DCV per Worksheet B..3-1 and is not feasible.				
6a-1	Are green roofs implemented in accordance with design criteria in 4.3.6A Fact Sheet? If yes, are they shown on the site map?	☐ Yes	☐ No	☑ N/A
6a-2	Is the green roof credit volume calculated using Appendix B.2.1.2 and 4.3.6A Fact Sheet in Appendix E?	☐ Yes	☐ No	☑ N/A
6b-1	Are permeable pavements implemented in accordance with design criteria in 4.3.6B Fact Sheet? If yes, are they shown on the site map?	☐ Yes	☑ No	☐ N/A
6b-2	Is the permeable pavement credit volume calculated using Appendix B.2.1.3 and 4.3.6B Fact Sheet in Appendix E?	☐ Yes	☐ No	☑ N/A
4.3.7 Landscaping with Native or Drought Tolerant Species		☑ Yes	☐ No	☐ N/A
Discussion / justification if 4.3.7 not implemented:				
4.3.8 Harvest and Use Precipitation		☐ Yes	☑ No	☐ N/A
Discussion / justification if 4.3.8 not implemented: There is no toilet or urinal flushing demand for the project. Landscape irrigation demand is less than 0.25DCV per Worksheet B.3-1 and is not feasible.				
8-1	Are rain barrels implemented in accordance with design criteria in 4.3.8 Fact Sheet? If yes, are they shown on the site map?	☐ Yes	☐ No	☑ N/A
8-2	Is the rain barrel credit volume calculated using Appendix B.2.2.2 and 4.3.8 Fact Sheet in Appendix E?	☐ Yes	☐ No	☑ N/A

Form I-5B Page 4 of 4
Insert Site Map with all site design BMPs identified:

Summary of PDP Structural BMPs	Form I-6

PDP Structural BMPs

All PDPs must implement structural BMPs for storm water pollutant control (see Chapter 5 of the BMP Design Manual, Part 1 of Storm Water Standards). Selection of PDP structural BMPs for storm water pollutant control must be based on the selection process described in Chapter 5. PDPs subject to hydromodification management requirements must also implement structural BMPs for flow control for hydromodification management (see Chapter 6 of the BMP Design Manual). Both storm water pollutant control and flow control for hydromodification management can be achieved within the same structural BMP(s).

PDP structural BMPs must be verified by the City at the completion of construction. This includes requiring the project owner or project owner's representative to certify construction of the structural BMPs (complete Form DS-563). PDP structural BMPs must be maintained into perpetuity (see Chapter 7 of the BMP Design Manual).

Use this form to provide narrative description of the general strategy for structural BMP implementation at the project site in the box below. Then complete the PDP structural BMP summary information sheet (page 3 of this form) for each structural BMP within the project (copy the BMP summary information page as many times as needed to provide summary information for each individual structural BMP).

Describe the general strategy for structural BMP implementation at the site. This information must describe how the steps for selecting and designing storm water pollutant control BMPs presented in Section 5.1 of the BMP Design Manual were followed, and the results (type of BMPs selected). For projects requiring hydromodification flow control BMPs, indicate whether pollutant control and flow control BMPs are integrated or separate.

Infiltration is not feasible - Section 8.9 of attached "Geotechnical Investigation" states, "observed tested infiltration rates do not support stormwater infiltration in an appreciable quantity. Based on our test results, the feasibility screen category is No Infiltration."

Proposed BMP can be sized to account for the required DCV, therefore compliant with Pollutant Control BMP Sizing Requirements.

Runoff from proposed impervious surfaces is directed to biofiltration facilities. Biofiltration was selected because the proposed drainage patterns allow for depressed basin areas to be implemented easily and for outlet structures to match existing downstream drainage conditions. Pollutant treatment and drainage peak flow management are both satisfied by the integrated design of the basins.

(Continue on page 2 as necessary.)

Form I-6 Page of (Copy as many as needed)	
Structural BMP Summary Information	
Structural BMP ID No. BMP-1	
Construction Plan Sheet No. C-6	
Type of Structural BMP: ☐ Retention by harvest and use (e.g. HU-1, cistern) ☐ Retention by infiltration basin (INF-1) ☐ Retention by bioretention (INF-2) ☐ Retention by permeable pavement (INF-3) ☐ Partial retention by biofiltration with partial retention (PR-1) ☑ Biofiltration (BF-1) ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐ Detention pond or vault for hydromodification management ☐ Other (describe in discussion section below)	
Purpose: ☑ Pollutant control only ☐ Hydromodification control only ☐ Combined pollutant control and hydromodification control ☐ Pre-treatment/forebay for another structural BMP ☐ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification form DS-563	James Jarrett Linn Nasland Engineering 4740 Ruffner Street, San Diego, CA 92111
Who will be the final owner of this BMP?	City of San Diego Stormwater Department
Who will maintain this BMP into perpetuity?	City of San Diego Stormwater Department
What is the funding mechanism for maintenance?	City of San Diego Stormwater Department

Form I-6 Page of (Copy as many as needed)
Structural BMP ID No. BMP-1
Construction Plan Sheet No. C-6
Discussion (as needed; must include worksheets showing BMP sizing calculations in the SWQMPs): Refer to Worksheet B.5-1 for BMP-1. Biofiltration facility was selected due to Harvest and Use being considered not feasible and project is considered as a No Infiltration Condition. Design Capture Volume was able to be satisfied by Worksheet B.5-1.

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Attachment 1
Backup For PDP Pollutant Control BMPs

This is the cover sheet for Attachment 1.

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Project Name: Junipero Serra Museum ADA Improvements Project

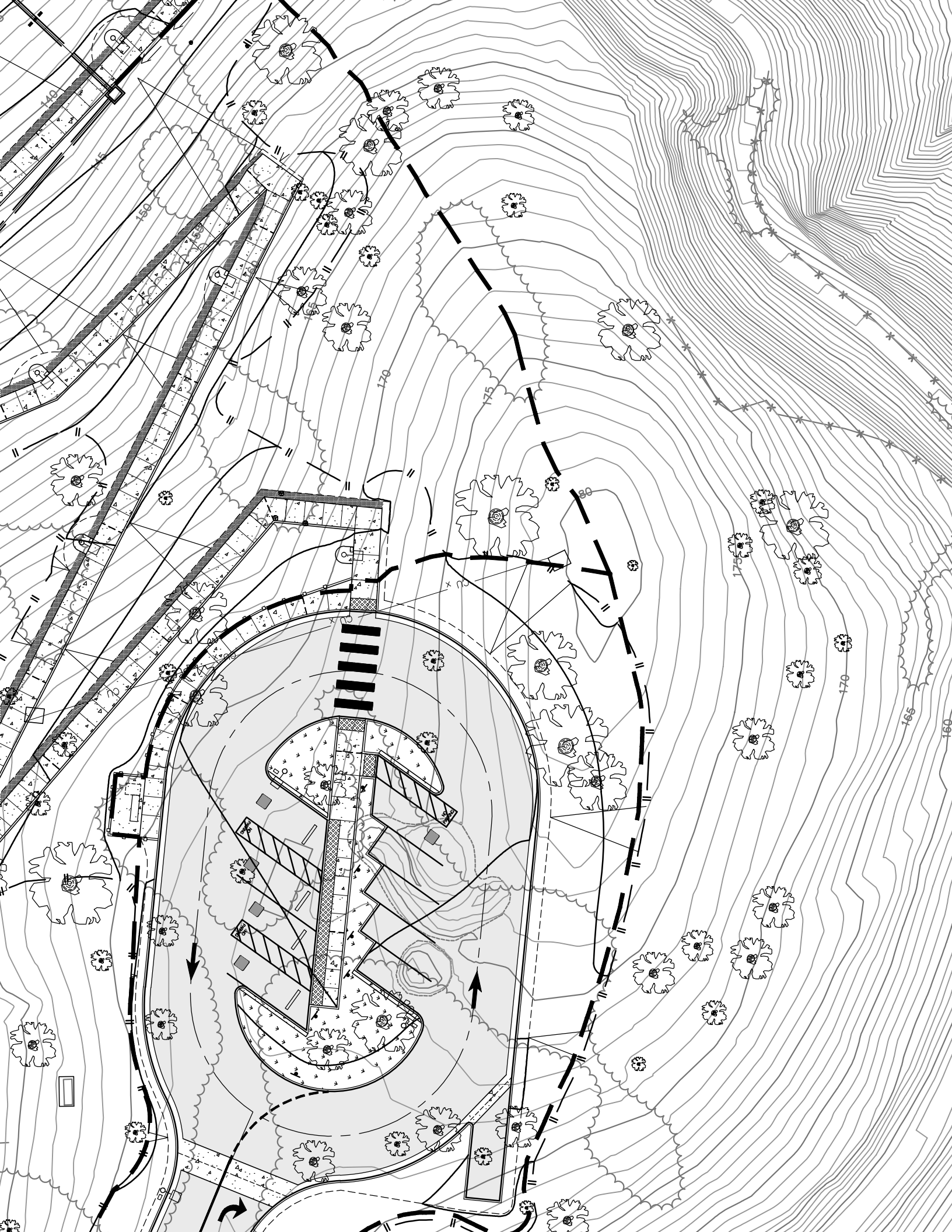
Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 1a	DMA Exhibit (Required) See DMA Exhibit Checklist.	☐ Included
Attachment 1b	Tabular Summary of DMAs Showing DMA ID matching DMA Exhibit, DMA Area, and DMA Type (Required)* *Provide table in this Attachment OR on DMA Exhibit in Attachment 1a	☐ Included on DMA Exhibit in Attachment 1a ☑ Included as Attachment 1b, separate from DMA Exhibit
Attachment 1c	Form I-7, Harvest and Use Feasibility Screening Checklist (Required unless the entire project will use infiltration BMPs) Refer to Appendix B.3-1 of the BMP Design Manual to complete Form I-7.	☑ Included ☐ Not included because the entire project will use infiltration BMPs
Attachment 1d	Infiltration Feasibility Information. Contents of Attachment 1d depend on the infiltration condition: • No Infiltration Condition: ○ Infiltration Feasibility Condition Letter (***Note: must be stamped and signed by licensed geotechnical engineer***) ○ Form I-8A (optional) ○ Form I-8B (optional) • Partial Infiltration Condition: ○ Infiltration Feasibility Condition Letter (***Note: must be stamped and signed by licensed geotechnical engineer***) ○ Form I-8A ○ Form I-8B • Full Infiltration Condition: ○ Form I-8A ○ Form I-8B ○ Worksheet C.4-3 ○ Form I-9 Refer to Appendices C and D of the BMP Design Manual for guidance.	☑ Included ☐ Not included because the entire project will use harvest and use BMPs
Attachment 1e	Pollutant Control BMP Design Worksheets / Calculations (Required) Refer to Appendices B and E of the BMP Design Manual for structural pollutant control BMP design guidelines and site design credit calculations	☑ Included

Use this checklist to ensure the required information has been included on the DMA Exhibit:

The DMA Exhibit must identify:

- ☑ Underlying hydrologic soil group
- ☑ Approximate depth to groundwater
- ☑ Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
- ☑ Critical coarse sediment yield areas to be protected
- ☑ Existing topography and impervious areas
- ☑ Existing and proposed site drainage network and connections to drainage offsite
- ☑ Proposed grading
- ☑ Proposed impervious features
- ☑ Proposed design features and surface treatments used to minimize imperviousness
- ☑ Drainage management area (DMA) boundaries, DMA ID numbers, and DMA areas (square footage or acreage), and DMA type (i.e., drains to BMP, self-retaining, or self-mitigating)
- ☑ Potential pollutant source areas and corresponding required source controls (see Chapter 4, Appendix E.1, and Form I-3B)
- ☑ Structural BMPs (identify location, type of BMP, size/detail, and include cross-section)


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Project Name: Junipero Serra Museum ADA Improvements Project

Tabular Summary of DMAs								Worksheet B-1	
DMA Unique Identifier	Area (acres)	Impervious Area (acres)	% Imp	HSG	Area Weighted Runoff Coefficient	DCV (cubic feet)	Treated By (BMP ID)	Pollutant Control Type	Drains to (POC ID)
DMA 1	250 SF	N/A	N/A	D	N/A	N/A	DE MINIMIS	N/A	A
DMA 2	0.70	0.42	60.0	D	0.68	1124	BMP-1	BF-1	A
DMA 3	1.39	0.13	9.3	D	0.40	N/A	PDP EXEMPTION	CATEGORY 1	A
Summary of DMA Information (Must match project description and SWQMP Narrative)									
No. of DMAs	Total DMA Area (acres)	Total Impervious Area (acres)	% Imp		Area Weighted Runoff Coefficient	Total DCV (cubic feet)	Total Area Treated (acres)		No. of POCs
3	2.10	0.56	26.7		0.50	1162	0.7		1

Where: DMA = Drainage Management Area; Imp = Imperviousness; HSG = Hydrologic Soil Group; DCV= Design Capture Volume; BMP = Best Management Practice; POC = Point of Compliance; ID = identifier; No. = Number

Design Capture Volume		Worksheet B.2-1		
1	85th percentile 24-hr storm depth from Figure B.1-1	d=	0.65	inches
2	Area tributary to BMP (s)	A=	0.70	acres
3	Area weighted runoff factor (estimate using Appendix B.1.1 and B.2.1)	C=	0.68	unitless
4	Trees Credit Volume Note: In the SWQMP list the number of trees, size of each tree, amount of soil volume installed for each tree, contributing area to each tree and the inlet opening dimension for each tree.	TCV=	N/A	cubic-feet
5	Rain barrels Credit Volume Note: In the SWQMP list the number of rain barrels, size of each rain barrel and the use of the captured storm water runoff.	RCV=	N/A	cubic-feet
6	Calculate DCV = (3630 x C x d x A) – TCV - RCV	DCV=	1124	cubic-feet

Harvest and Use Feasibility Checklist	Worksheet B.3-1 : Form I-7

1. Is there a demand for harvested water (check all that apply) at the project site that is reliably present during the wet season?

☐ Toilet and urinal flushing
☑ Landscape irrigation
☐ Other:_____

2. If there is a demand; estimate the anticipated average wet season demand over a period of 36 hours. Guidance for planning level demand calculations for toilet/urinal flushing and landscape irrigation is provided in Section B.3.2.
[Provide a summary of calculations here]
Modified ETWU = EToWet × [[Σ(PF x HA)/IE]] x 0.015
EToWet = 2.8 inches per month, using CIMS Zone 4 from Table G.1-1
PF = Plant Factor
HA = Hydrozone Area (sq-ft); Σ(PF x HA) = The sum of PF x HA for each individual Hydrozone
IE = Irrigation Efficiency (assume 90 percent for demand calculations)
Hydrozone - Moderate Plant Water Use - 1,470 gallons/irrigated acre, 0.35 irrigated acre = 514 gal

3. Calculate the DCV using worksheet B-2.1.
DCV = 1124 (cubic feet)
[Provide a summary of calculations here]
DCV = 3630 * (C) * (0.65) * (Area)

3a. Is the 36-hour demand greater than or equal to the DCV?	3b. Is the 36-hour demand greater than 0.25DCV but less than the full DCV?	3c. Is the 36-hour demand less than 0.25DCV?
☐ Yes / ☑ No ⇨	☐ Yes / ☑ No ⇨	☑ Yes ⇩
Harvest and use appears to be feasible. Conduct more detailed evaluation and sizing calculations to confirm that DCV can be used at an adequate rate to meet drawdown criteria.	Harvest and use may be feasible. Conduct more detailed evaluation and sizing calculations to determine feasibility. Harvest and use may only be able to be used for a portion of the site, or (optionally) the storage may need to be upsized to meet long term capture targets while draining in longer than 36 hours.	Harvest and use is considered to be infeasible.

Is harvest and use feasible based on further evaluation?
☐ Yes, refer to Appendix E to select and size harvest and use BMPs.
☑ No, select alternate BMPs.

APPENDIX IV
FORM I-8A

This appendix is the form from the City of San Diego's BMP Design Manual filled out for this project. It is used to help evaluate infiltration conditions.

Worksheet C.4-1: Categorization of Infiltration Feasibility Condition Based on Geotechnical Conditions[9]

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions	Worksheet C.4-1: Form I-8A[10]
Part 1 - Full Infiltration Feasibility Screening Criteria	
DMA(s) Being Analyzed:	Project Phase:
Junipero Serra Museum ADA Improvements	Planning
Criteria 1: Infiltration Rate Screening	
1A	Is the mapped hydrologic soil group according to the NRCS Web Soil Survey or UC Davis Soil Web Mapper Type A or B and corroborated by available site soil data[11]? ☐ Yes; the DMA may feasibly support full infiltration. Answer "Yes" to Criteria 1 Result or continue to Step 1B if the applicant elects to perform infiltration testing. ☐ No; the mapped soil types are A or B but is not corroborated by available site soil data (continue to Step 1B). ☒ No; the mapped soil types are C, D, or "urban/unclassified" and is corroborated by available site soil data. Answer "No" to Criteria 1 Result. ☐ No; the mapped soil types are C, D, or "urban/unclassified" but is not corroborated by available site soil data (continue to Step 1B).
1B	Is the reliable infiltration rate calculated using planning phase methods from Table D.3-1? ☐ Yes; Continue to Step 1C. ☐ No; Skip to Step 1D.
1C	Is the reliable infiltration rate calculated using planning phase methods from Table D.3-1 greater than 0.5 inches per hour? ☐ Yes; the DMA may feasibly support full infiltration. Answer "Yes" to Criteria 1 Result. ☐ No; full infiltration is not required. Answer "No" to Criteria 1 Result.
1D	**Infiltration Testing Method.** Is the selected infiltration testing method suitable during the design phase (see Appendix D.3)? Note: Alternative testing standards may be allowed with appropriate rationales and documentation. ☐ Yes; continue to Step 1E. ☐ No; select an appropriate infiltration testing method.

[9] Note that it is not required to investigate each and every criterion in the worksheet, a single "no" answer in Part 1, Part 2, Part 3, or Part 4 determines a full, partial, or no infiltration condition.

[10] This form must be completed each time there is a change to the site layout that would affect the infiltration feasibility condition. Previously completed forms shall be retained to document the evolution of the site storm water design.

[11] Available data includes site-specific sampling or observation of soil types or texture classes, such as obtained from borings or test pits necessary to support other design elements.

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions	Worksheet C.4-1: Form I-8A[10]
1E	**Number of Percolation/Infiltration Tests.** Does the infiltration testing method performed satisfy the minimum number of tests specified in Table D.3-2? ☐ Yes; continue to Step 1F. ☐ No; conduct appropriate number of tests.
IF	**Factor of Safety.** Is the suitable Factor of Safety selected for full infiltration design? See guidance in D.5; Tables D.5-1 and D.5-2; and Worksheet D.5-1 (Form I-9). ☐ Yes; continue to Step 1G. ☐ No; select appropriate factor of safety.
1G	**Full Infiltration Feasibility.** Is the average measured infiltration rate divided by the Factor of Safety greater than 0.5 inches per hour? ☐ Yes; answer "Yes" to Criteria 1 Result. ☐ No; answer "No" to Criteria 1 Result.
Criteria 1 Result	Is the estimated reliable infiltration rate greater than 0.5 inches per hour within the DMA where runoff can reasonably be routed to a BMP? ☐ Yes; the DMA may feasibly support full infiltration. Continue to Criteria 2. ☒ No; full infiltration is not required. Skip to Part 1 Result.

Summarize infiltration testing methods, testing locations, replicates, and results and summarize estimates of reliable infiltration rates according to procedures outlined in D.5. Documentation should be included in project geotechnical report.

Soils mapped as D and corroborated by our 3 borehole percolation tests performed on the west and southwest areas of project. See project geotechnical report.

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
Criteria 2: Geologic/Geotechnical Screening			
2A	If all questions in Step 2A are answered "Yes," continue to Step 2B. For any "No" answer in Step 2A answer "No" to Criteria 2, and submit an "Infiltration Feasibility Condition Letter" that meets the requirements in Appendix C.1.1. The geologic/geotechnical analyses listed in Appendix C.2.1 do not apply to the DMA because one of the following setbacks cannot be avoided and therefore result in the DMA being in a no infiltration condition. The setbacks must be the closest horizontal radial distance from the surface edge (at the overflow elevation) of the BMP.		
2A-1	Can the proposed full infiltration BMP(s) avoid areas with existing fill materials greater than 5 feet thick below the infiltrating surface?	☐ Yes	☐ No
2A-2	Can the proposed full infiltration BMP(s) avoid placement within 10 feet of existing underground utilities, structures, or retaining walls?	☐ Yes	☐ No
2A-3	Can the proposed full infiltration BMP(s) avoid placement within 50 feet of a natural slope (>25%) or within a distance of 1.5H from fill slopes where H is the height of the fill slope?	☐ Yes	☐ No
2B	When full infiltration is determined to be feasible, a geotechnical investigation report must be prepared that considers the relevant factors identified in Appendix C.2.1. If all questions in Step 2B are answered "Yes," then answer "Yes" to Criteria 2 Result. If there are "No" answers continue to Step 2C.		
2B-1	**Hydroconsolidation.** Analyze hydroconsolidation potential per approved ASTM standard due to a proposed full infiltration BMP. Can full infiltration BMPs be proposed within the DMA without increasing hydroconsolidation risks?	☐ Yes	☐ No
2B-2	**Expansive Soils.** Identify expansive soils (soils with an expansion index greater than 20) and the extent of such soils due to proposed full infiltration BMPs. Can full infiltration BMPs be proposed within the DMA without increasing expansive soil risks?	☐ Yes	☐ No

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
2B-3	**Liquefaction**. If applicable, identify mapped liquefaction areas. Evaluate liquefaction hazards in accordance with Section 6.4.2 of the City of San Diego's Guidelines for Geotechnical Reports (2011 or most recent edition). Liquefaction hazard assessment shall take into account any increase in groundwater elevation or groundwater mounding that could occur as a result of proposed infiltration or percolation facilities. Can full infiltration BMPs be proposed within the DMA without increasing liquefaction risks?	☐ Yes	☐ No
2B-4	**Slope Stability**. If applicable, perform a slope stability analysis in accordance with the ASCE and Southern California Earthquake Center (2002) Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Landslide Hazards in California to determine minimum slope setbacks for full infiltration BMPs. See the City of San Diego's Guidelines for Geotechnical Reports (2011) to determine which type of slope stability analysis is required. Can full infiltration BMPs be proposed within the DMA without increasing slope stability risks?	☐ Yes	☐ No
2B-5	**Other Geotechnical Hazards.** Identify site-specific geotechnical hazards not already mentioned (refer to Appendix C.2.1). Can full infiltration BMPs be proposed within the DMA without increasing risk of geologic or geotechnical hazards not already mentioned?	☐ Yes	☐ No
2B-6	**Setbacks.** Establish setbacks from underground utilities, structures, and/or retaining walls. Reference applicable ASTM or other recognized standard in the geotechnical report. Can full infiltration BMPs be proposed within the DMA using established setbacks from underground utilities, structures, and/or retaining walls?	☐ Yes	☐ No

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
2C	**Mitigation Measures.** Propose mitigation measures for each geologic/geotechnical hazard identified in Step 2B. Provide a discussion of geologic/geotechnical hazards that would prevent full infiltration BMPs that cannot be reasonably mitigated in the geotechnical report. See Appendix C.2.1.8 for a list of typically reasonable and typically unreasonable mitigation measures. Can mitigation measures be proposed to allow for full infiltration BMPs? If the question in Step 2 is answered "Yes," then answer "Yes" to Criteria 2 Result. If the question in Step 2C is answered "No," then answer "No" to Criteria 2 Result.	☐ Yes	☐ No
Criteria 2 Result	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geologic or geotechnical hazards that cannot be reasonably mitigated to an acceptable level?	☐ Yes	☐ No
Summarize findings and basis; provide references to related reports or exhibits.			

Part 1 Result – Full Infiltration Geotechnical Screening [12]	Result
If answers to both Criteria 1 and Criteria 2 are "Yes", a full infiltration design is potentially feasible based on Geotechnical conditions only. If either answer to Criteria 1 or Criteria 2 is "No", a full infiltration design is not required.	☐ Full infiltration Condition ☒ Complete Part 2

[12] To be completed using gathered site information and best professional judgement considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings.

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions	Worksheet C.4-1: Form I-8A[10]
Part 2 – Partial vs. No Infiltration Feasibility Screening Criteria	
DMA(s) Being Analyzed:	Project Phase:
Junipero Serra Museum ADA Improvements	Planning
Criteria 3 : Infiltration Rate Screening	
3A	**NRCS Type C, D, or "urban/unclassified":** Is the mapped hydrologic soil group according to the NRCS Web Soil Survey or UC Davis Soil Web Mapper is Type C, D, or "urban/unclassified" and corroborated by available site soil data? ☐ Yes; the site is mapped as C soils and a reliable infiltration rate of 0.15 in/hr. is used to size partial infiltration BMPS. Answer "Yes" to Criteria 3 Result. ☐ Yes; the site is mapped as D soils or "urban/unclassified" and a reliable infiltration rate of 0.05 in/hr. is used to size partial infiltration BMPS. Answer "Yes" to Criteria 3 Result. ☒ No; infiltration testing is conducted (refer to Table D.3-1), continue to Step 3B.
3B	**Infiltration Testing Result:** Is the reliable infiltration rate (i.e. average measured infiltration rate/2) greater than 0.05 in/hr. and less than or equal to 0.5 in/hr? ☐ Yes; the site may support partial infiltration. Answer "Yes" to Criteria 3 Result. ☒ No; the reliable infiltration rate (i.e. average measured rate/2) is less than 0.05 in/hr., partial infiltration is not required. Answer "No" to Criteria 3 Result.
Criteria 3 Result	Is the estimated reliable infiltration rate (i.e., average measured infiltration rate/2) greater than or equal to 0.05 inches/hour and less than or equal to 0.5 inches/hour at any location within each DMA where runoff can reasonably be routed to a BMP? ☐ Yes; Continue to Criteria 4. ☒ No: Skip to Part 2 Result.
Summarize infiltration testing and/or mapping results (i.e. soil maps and series description used for infiltration rate).	

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
Criteria 4: Geologic/Geotechnical Screening			
4A	If all questions in Step 4A are answered "Yes," continue to Step 2B. For any "No" answer in Step 4A answer "No" to Criteria 4 Result, and submit an "Infiltration Feasibility Condition Letter" that meets the requirements in Appendix C.1.1. The geologic/geotechnical analyses listed in Appendix C.2.1 do not apply to the DMA because one of the following setbacks cannot be avoided and therefore result in the DMA being in a no infiltration condition. The setbacks must be the closest horizontal radial distance from the surface edge (at the overflow elevation) of the BMP.		
4A-1	Can the proposed partial infiltration BMP(s) avoid areas with existing fill materials greater than 5 feet thick?	☐ Yes	☐ No
4A-2	Can the proposed partial infiltration BMP(s) avoid placement within 10 feet of existing underground utilities, structures, or retaining walls?	☐ Yes	☐ No
4A-3	Can the proposed partial infiltration BMP(s) avoid placement within 50 feet of a natural slope (>25%) or within a distance of 1.5H from fill slopes where H is the height of the fill slope?	☐ Yes	☐ No
4B	When full infiltration is determined to be feasible, a geotechnical investigation report must be prepared that considers the relevant factors identified in Appendix C.2.1 If all questions in Step 4B are answered "Yes," then answer "Yes" to Criteria 4 Result. If there are any "No" answers continue to Step 4C.		
4B-1	**Hydroconsolidation.** Analyze hydroconsolidation potential per approved ASTM standard due to a proposed full infiltration BMP. Can partial infiltration BMPs be proposed within the DMA without increasing hydroconsolidation risks?	☐ Yes	☐ No
4B-2	**Expansive Soils.** Identify expansive soils (soils with an expansion index greater than 20) and the extent of such soils due to proposed full infiltration BMPs. Can partial infiltration BMPs be proposed within the DMA without increasing expansive soil risks?	☐ Yes	☐ No

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
4B-3	**Liquefaction**. If applicable, identify mapped liquefaction areas. Evaluate liquefaction hazards in accordance with Section 6.4.2 of the City of San Diego's Guidelines for Geotechnical Reports (2011). Liquefaction hazard assessment shall take into account any increase in groundwater elevation or groundwater mounding that could occur as a result of proposed infiltration or percolation facilities. Can partial infiltration BMPs be proposed within the DMA without increasing liquefaction risks?	☐ Yes	☐ No
4B-4	**Slope Stability**. If applicable, perform a slope stability analysis in accordance with the ASCE and Southern California Earthquake Center (2002) Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Landslide Hazards in California to determine minimum slope setbacks for full infiltration BMPs. See the City of San Diego's Guidelines for Geotechnical Reports (2011) to determine which type of slope stability analysis is required. Can partial infiltration BMPs be proposed within the DMA without increasing slope stability risks?	☐ Yes	☐ No
4B-5	**Other Geotechnical Hazards.** Identify site-specific geotechnical hazards not already mentioned (refer to Appendix C.2.1). Can partial infiltration BMPs be proposed within the DMA without increasing risk of geologic or geotechnical hazards not already mentioned?	☐ Yes	☐ No
4B-6	**Setbacks.** Establish setbacks from underground utilities, structures, and/or retaining walls. Reference applicable ASTM or other recognized standard in the geotechnical report. Can partial infiltration BMPs be proposed within the DMA using recommended setbacks from underground utilities, structures, and/or retaining walls?	☐ Yes	☐ No
4C	**Mitigation Measures.** Propose mitigation measures for each geologic/geotechnical hazard identified in Step 4B. Provide a discussion on geologic/geotechnical hazards that would prevent partial infiltration BMPs that cannot be reasonably mitigated in the geotechnical report. See Appendix C.2.1.8 for a list of typically reasonable and typically unreasonable mitigation measures. Can mitigation measures be proposed to allow for partial infiltration BMPs? If the question in Step 4C is answered "Yes," then answer "Yes" to Criteria 4 Result. If the question in Step 4C is answered "No," then answer "No" to Criteria 4 Result.	☐ Yes	☐ No

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
Criteria 4 Result	Can infiltration of greater than or equal to 0.05 inches/hour and less than or equal to 0.5 inches/hour be allowed without increasing the risk of geologic or geotechnical hazards that cannot be reasonably mitigated to an acceptable level?	☐ Yes	☐ No
Summarize findings and basis; provide references to related reports or exhibits.			

Part 2 – Partial Infiltration Geotechnical Screening Result[13]	Result
If answers to both Criteria 3 and Criteria 4 are "Yes", a partial infiltration design is potentially feasible based on geotechnical conditions only. If answers to either Criteria 3 or Criteria 4 is "No", then infiltration of any volume is considered to be infeasible within the site.	☐ Partial Infiltration Condition ☒ No Infiltration Condition

[13] To be completed using gathered site information and best professional judgement considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings.

The City of SAN DIEGO	Project Name	Junipero Serra Museum ADA Improvements	
	BMP ID	BMP-1	
Sizing Method for Pollutant Removal Criteria		**Worksheet B.5-1**	
1	Area draining to the BMP	30,516	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.68	
3	85th percentile 24-hour rainfall depth	0.65	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	1124	cu. ft.
BMP Parameters			
5	Surface ponding [6 inch minimum, 12 inch maximum]	6	inches
6	Media thickness [18 inches minimum], also add mulch layer and washed ASTM 33 fine aggregate sand thickness to this line for sizing calculations	24	inches
7	Aggregate storage (also add ASTM No 8 stone) above underdrain invert (12 inches typical) – use 0 inches if the aggregate is not over the entire bottom surface area	12	inches
8	Aggregate storage below underdrain invert (3 inches minimum) – use 0 inches if the aggregate is not over the entire bottom surface area	3	inches
9	Freely drained pore storage of the media	0.2	in/in
10	Porosity of aggregate storage	0.4	in/in
11	Media filtration rate to be used for sizing (maximum filtration rate of 5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate (includes infiltration into the soil and flow rate through the outlet structure) which will be less than 5 in/hr.)	5	in/hr.
Baseline Calculations			
12	Allowable routing time for sizing	6	hours
13	Depth filtered during storm [Line 11 x Line 12]	30	inches
14	Depth of Detention Storage [Line 5 + (Line 6 x Line 9) + (Line 7 x Line 10) + (Line 8 x Line 10)]	16.8	inches
15	Total Depth Treated [Line 13 + Line 14]	46.8	inches
Option 1 – Biofilter 1.5 times the DCV			
16	Required biofiltered volume [1.5 x Line 4]	1686	cu. ft.
17	Required Footprint [Line 16/ Line 15] x 12	432	sq. ft.
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
18	Required Storage (surface + pores) Volume [0.75 x Line 4]	843	cu. ft.
19	Required Footprint [Line 18/ Line 14] x 12	602	sq. ft.
Footprint of the BMP			
20	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Line 11 in Worksheet B.5-4)	0.03	
21	Minimum BMP Footprint [Line 1 x Line 2 x Line 20]	623	sq. ft.
22	Footprint of the BMP = Maximum(Minimum(Line 17, Line 19), Line 21)	623	sq. ft.
23	Provided BMP Footprint	962	sq. ft.
24	Is Line 23 ≥ Line 22?	**Yes, Performance Standard is Met**	

Attachment 2
Backup for PDP Hydromodification Control Measures

This is the cover sheet for Attachment 2.

☑ Mark this box if this attachment is empty because the project is exempt from PDP hydromodification management requirements.

Project Name: Junipero Serra Museum ADA Improvements Project

Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 2a	Hydromodification Management Exhibit (Required)	☑ Included See Hydromodification Management Exhibit Checklist.
Attachment 2b	Management of Critical Coarse Sediment Yield Areas (WMAA Exhibit is required, additional analyses are optional) See Section 6.2 of the BMP Design Manual.	☑ Exhibit showing project drainage boundaries marked on WMAA Critical Coarse Sediment Yield Area Map (Required) Optional analyses for Critical Coarse Sediment Yield Area Determination ☐ 6.2.1 Verification of Geomorphic Landscape Units Onsite ☐ 6.2.2 Downstream Systems Sensitivity to Coarse Sediment ☐ 6.2.3 Optional Additional Analysis of Potential Critical Coarse Sediment Yield Areas Onsite
Attachment 2c	Geomorphic Assessment of Receiving Channels (Optional) See Section 6.3.4 of the BMP Design Manual.	☑ Not Performed ☐ Included ☐ Submitted as separate stand-alone document
Attachment 2d	Flow Control Facility Design and Structural BMP Drawdown Calculations (Required) Overflow Design Summary for each structural BMP See Chapter 6 and Appendix G of the BMP Design Manual	☐ Included ☐ Submitted as separate stand-alone document

Project Name: Junipero Serra Museum ADA Improvements Project

Use this checklist to ensure the required information has been included on the Hydromodification Management Exhibit:

The Hydromodification Management Exhibit must identify:

- [x] Underlying hydrologic soil group
- [x] Approximate depth to groundwater
- [x] Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
- [x] Critical coarse sediment yield areas to be protected OR provide a separate map showing that the project site is outside of any critical coarse sediment yield areas
- [ ] Existing topography
- [ ] Existing and proposed site drainage network and connections to drainage offsite
- [ ] Proposed grading
- [ ] Proposed impervious features
- [ ] Proposed design features and surface treatments used to minimize imperviousness
- [ ] Point(s) of Compliance (POC) for Hydromodification Management
  Existing and proposed drainage boundary and drainage area to each POC (when necessary, create separate exhibits for pre-development and post-project conditions)
- [ ] Structural BMPs for hydromodification management (identify location, type of BMP, and size/detail).

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ECT BOUNDARY

OMODIFICATION EXEMPT STORM
N SYSTEM/WATERBODY

PATH OF RUNOFF

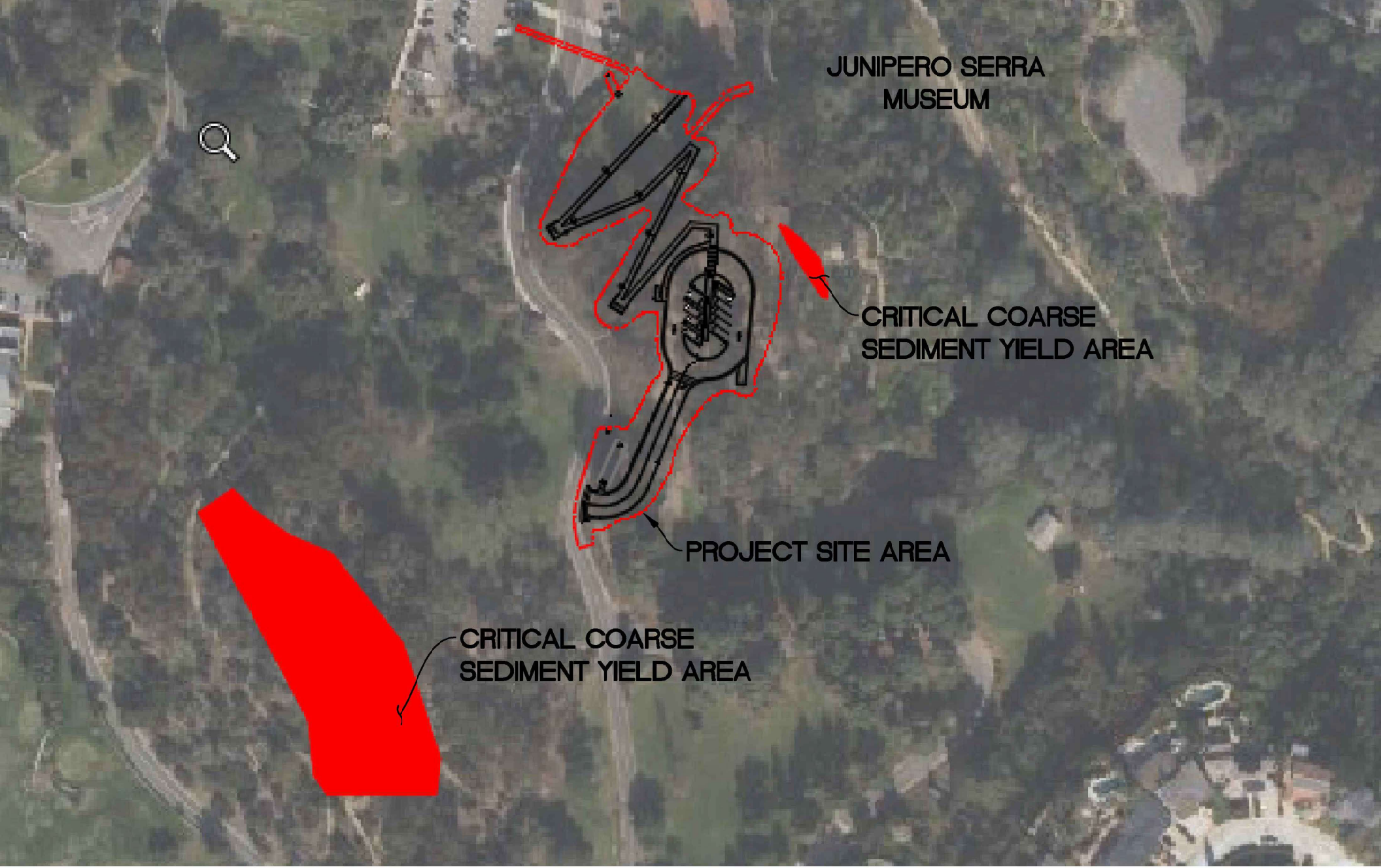
S TYPE D

PTH > 20 FEET

Nasland
Civil Engineering • Surveying • Land Planning

HYDR
EXE

JUNIPER



D:

– PROJECT BOUNDARY

– CRITICAL COARSE SEDIMENT YIELD AREA

Nasland

Civil Engineering • Surveying • Land Planning

CRITICAL
YIEL

JUNIPER

Attachment 3
Structural BMP Maintenance Information

This is the cover sheet for Attachment 3.

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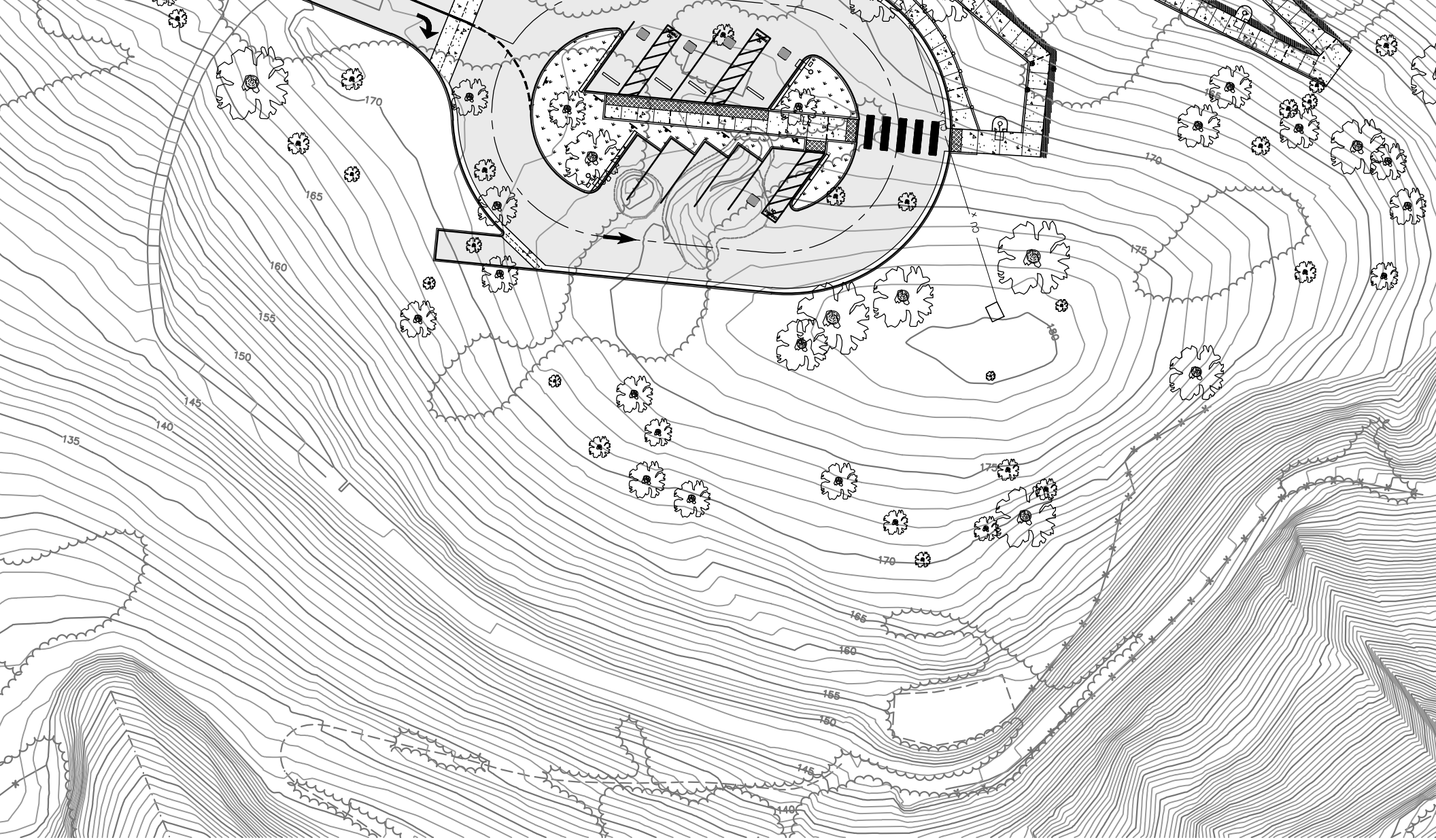
Indicate which Items are Included:

Attachment Sequence	Contents	Checklist
Attachment 3	Maintenance Agreement (Form DS-3247) (when applicable)	☐ Included ☑ Not applicable

Use this checklist to ensure the required information has been included in the Structural BMP Maintenance Information Attachment:

Attachment 3: For private entity operation and maintenance, Attachment 3 must include a Storm Water Management and Discharge Control Maintenance Agreement (Form DS-3247). The following information must be included in the exhibits attached to the maintenance agreement:

- ☑ Vicinity map
- ☑ Site design BMPs for which DCV reduction is claimed for meeting the pollutant control obligations.
- ☑ BMP and HMP location and dimensions
- ☑ BMP and HMP specifications/cross section/model
- ☑ Maintenance recommendations and frequency
- ☑ LID features such as (permeable paver and LS location, dim, SF).



SITE DESIGN, SOURCE CONTROL AND POLLUTANT CONTROL BMP OPERATION + MAINTENANCE PROCEDURE

LE PARTY DESIGNEE: CITY OF SAN DIEGO STORMWATER DEPARTMENT

	INSPECTION FREQUENCY	MAINTENANCE FREQUENCY	MAINTENANCE METHOD	QUANTITY	INCLUDED IN O&M MANUAL	SHEET NUMBER
N						

Attachment 4
Copy of Plan Sheets Showing Permanent Storm Water BMPs

This is the cover sheet for Attachment 4.

Project Name: Junipero Serra Museum ADA Improvements Project

Use this checklist to ensure the required information has been included on the plans:

The plans must identify:

- [x] Structural BMP(s) with ID numbers matching Form I-6 Summary of PDP Structural BMPs
- [x] The grading and drainage design shown on the plans must be consistent with the delineation of DMAs shown on the DMA exhibit
- [x] Details and specifications for construction of structural BMP(s)
- [x] Signage indicating the location and boundary of structural BMP(s) as required by the City Engineer
- [x] How to access the structural BMP(s) to inspect and perform maintenance
- [x] Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)
- [ ] Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
- [ ] Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)
- [x] Recommended equipment to perform maintenance
- [ ] When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management
- [x] Include landscaping plan sheets showing vegetation requirements for vegetated structural BMP(s)
- [x] All BMPs must be fully dimensioned on the plans
- [ ] When proprietary BMPs are used, site specific cross section with outflow, inflow and model number shall be provided. Broucher photocopies are not allowed.

BMP PLAN
BMP DETAILS
ADA ACCESSIBILITY PLAN
STRIPING AND SIGNAGE PLAN
LIGHTING PLAN
HORIZONTAL CONTROL DATA TABLES
HORIZONTAL CONTROL DATA TABLES
RRIGATION PLAN
RRIGATION PLAN
RRIGATION PLAN
RRIGATION LEGEND
PLANTING PLAN
PLANTING PLAN
PLANTING PLAN
PLANTING LEGEND

E

SPURLOCK LANDSCAPE ARCHITECTS
2122 HANCOCK ST
SAN DIEGO, CA 92110
P. (619) 681-0090 (X) 122
CONTACT: MARK STEMPNIAK
MSTEMPNIAK@SPURLOCK-LAND.COM

GEOTECHNICAL ENGINEER

ATLAS TECHNICAL CONSULTANTS
9085 AERO DR SUITE B
SAN DIEGO, CA 92123
P. (619) 280-4321
CONTACT:
CONTACT@ONEATLAS.COM

SITE ADDRESS

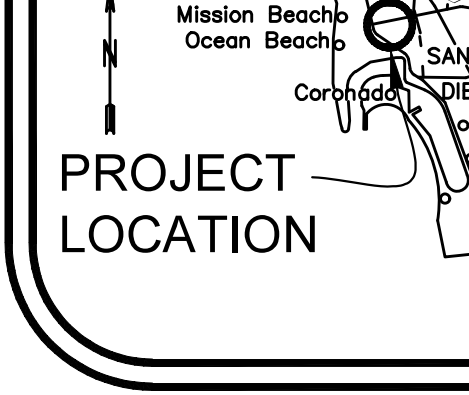
2727 PRESIDIO DRIVE
SAN DIEGO, CA 92103

ASSESSOR'S NUMBER

760-102-7500

PROJECT DATA

CONDITION OF SOIL - NATIVE NRCS TYPE D
LANDSCAPE AREA SQUARE FOOTAGE: 49,477 SF
TOTAL AREA OF DISTURBANCE: 1.35 ACRES



VICI

FIELD DATA

BENCHMARK: THE BENCHMARK FOR THIS SURVE
BRASS PLUG SET IN THE TOP OF NORTH CURB L
AND MORENA BOULEVARD, PER CITY OF SAN DI

ELEVATION: 13.512' NGVD 29

DATUM: NGVD 29

BASIS OF BEARING: THE BASIS OF BEARINGS FO
SYSTEM (CCS 83), ZONE 6, EPOCH 1991.35, GRID
CONTROL POINTS 1037 AND 1039, PER RECORD

IE. N5°19'44"E (3,478.61' GRID RECORD) 3,478.60'

TOPOGRAPHIC SOURCE: THE SOURCE OF TOPO
O'DAY CONSULTANTS ON MAY 18, 2017.

RESPONSIBLE CHARGE

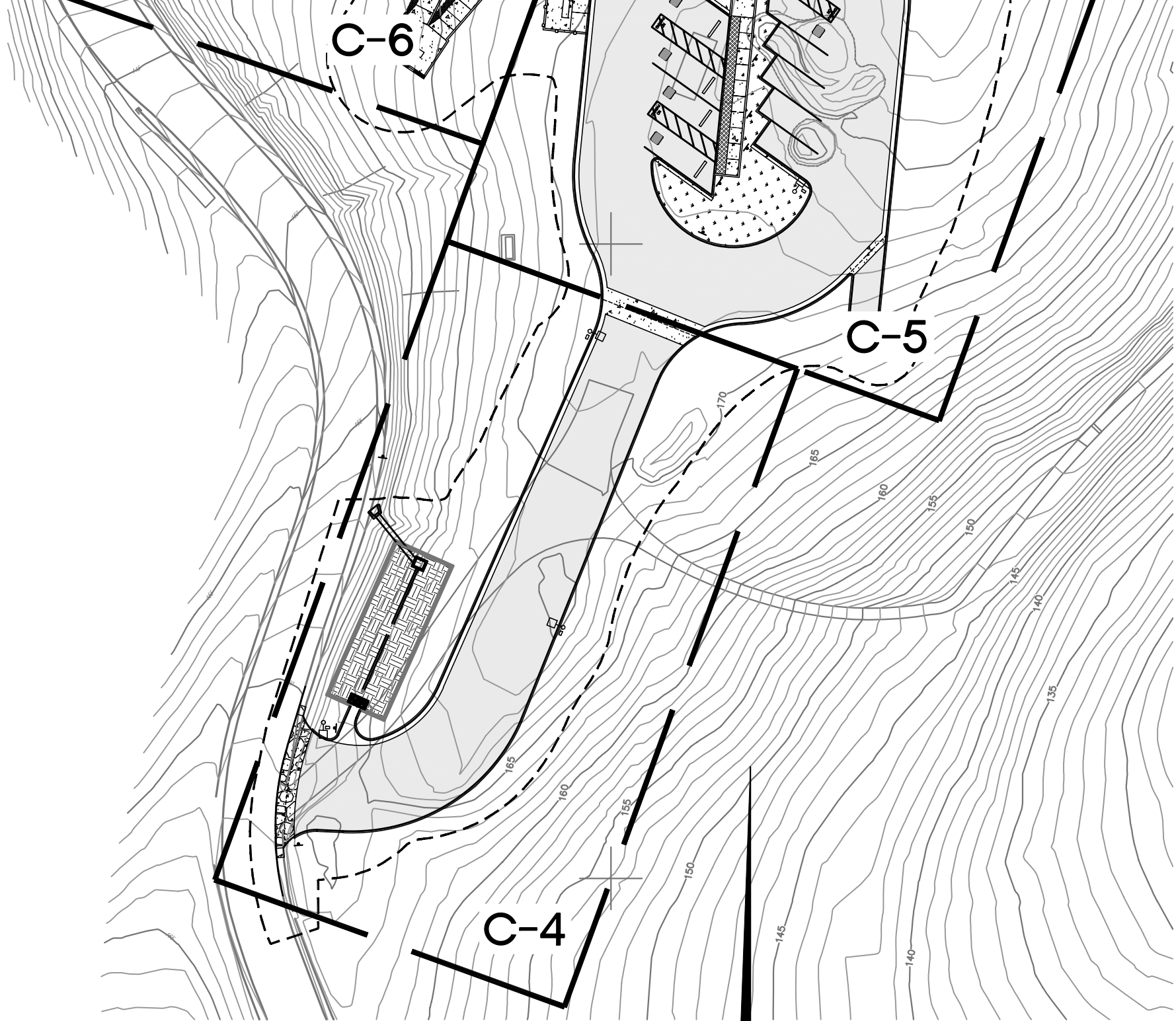
ENGINEER OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED
DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE
E, AND THAT THE DESIGN IS CONSISTENT WITH CURRENT

F PROJECT DRAWINGS AND SPECIFICATIONS BY THE CITY OF SAN
ONLY AND DOES NOT RELIEVE ME AS ENGINEER OF WORK, OR OF MY
ESIGN.

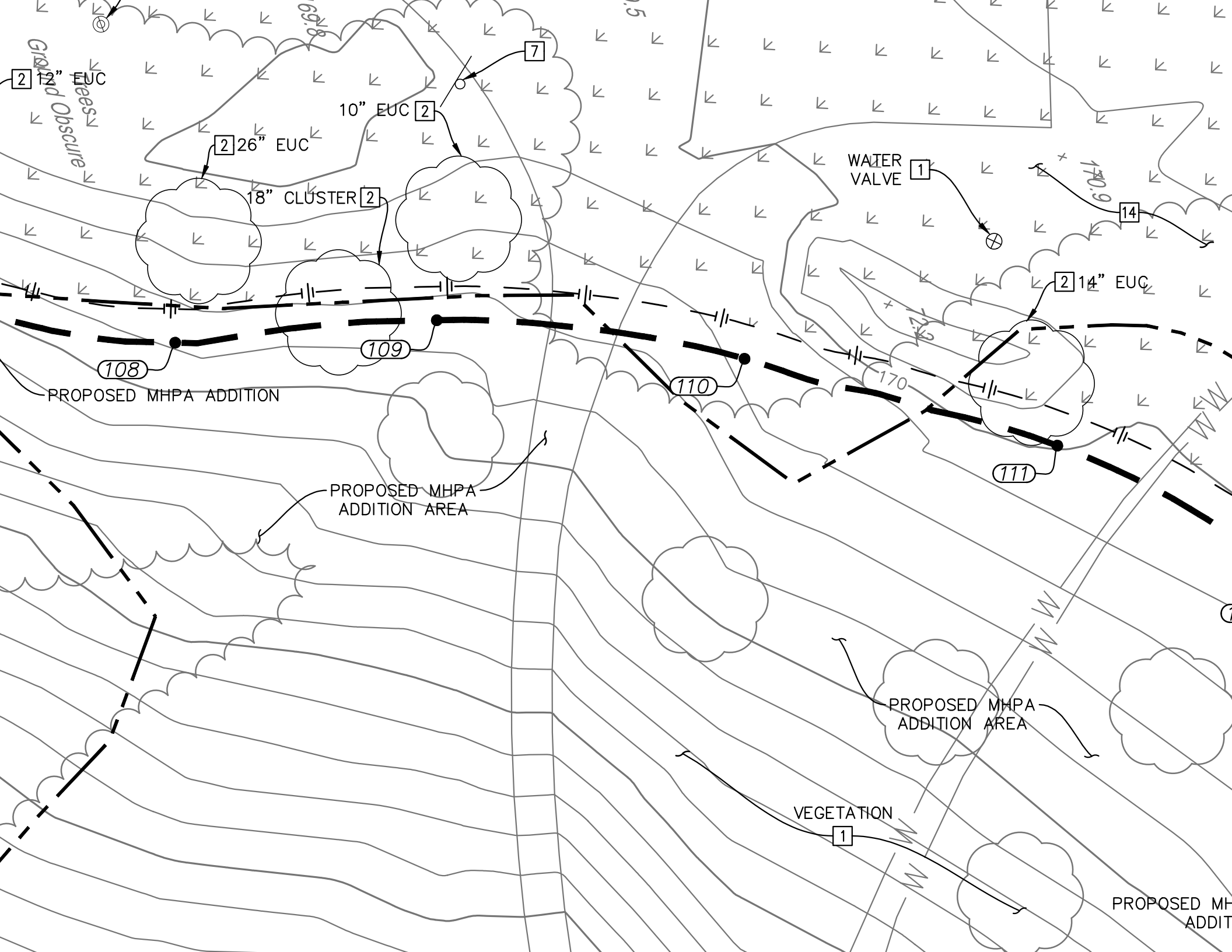
DATE

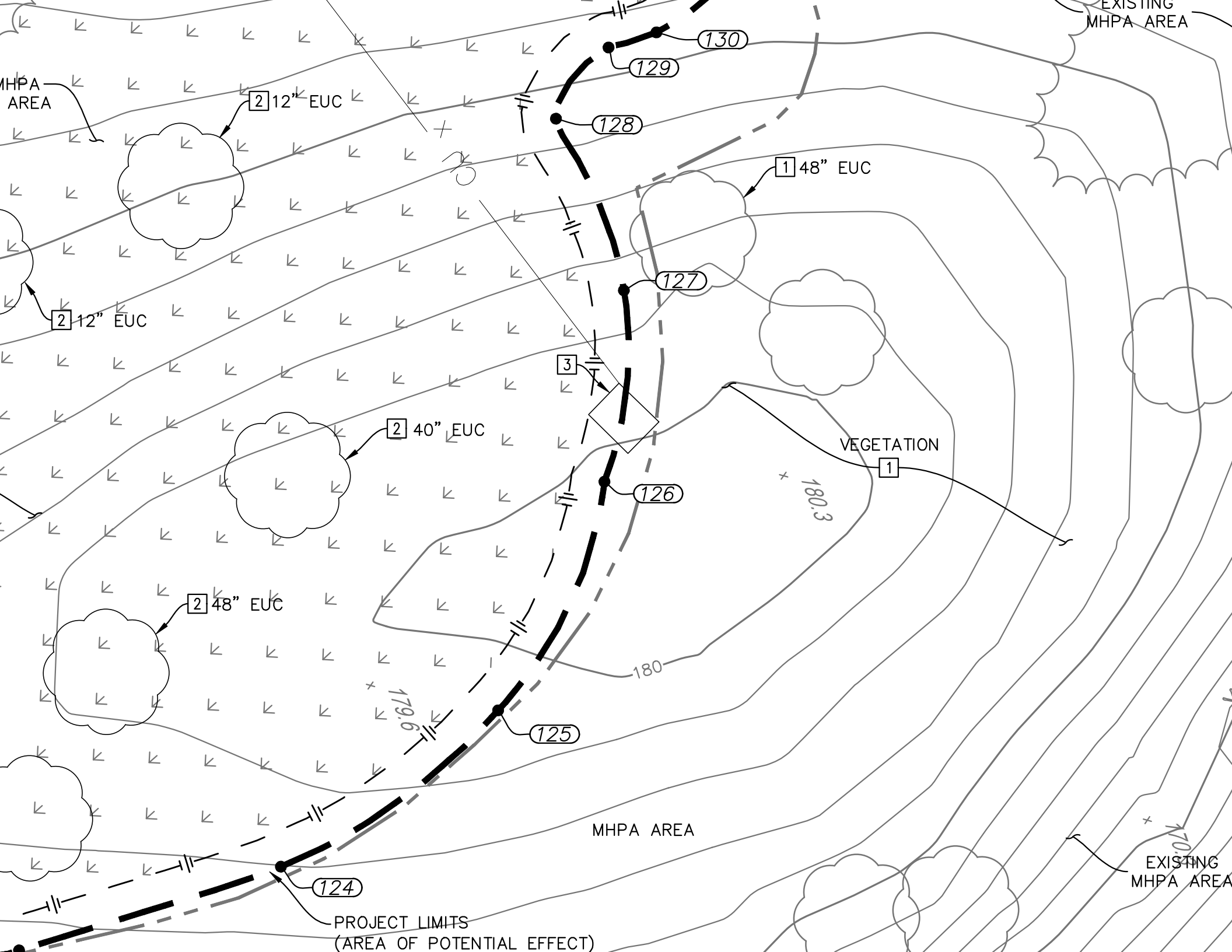
EXISTING STRUCTURES

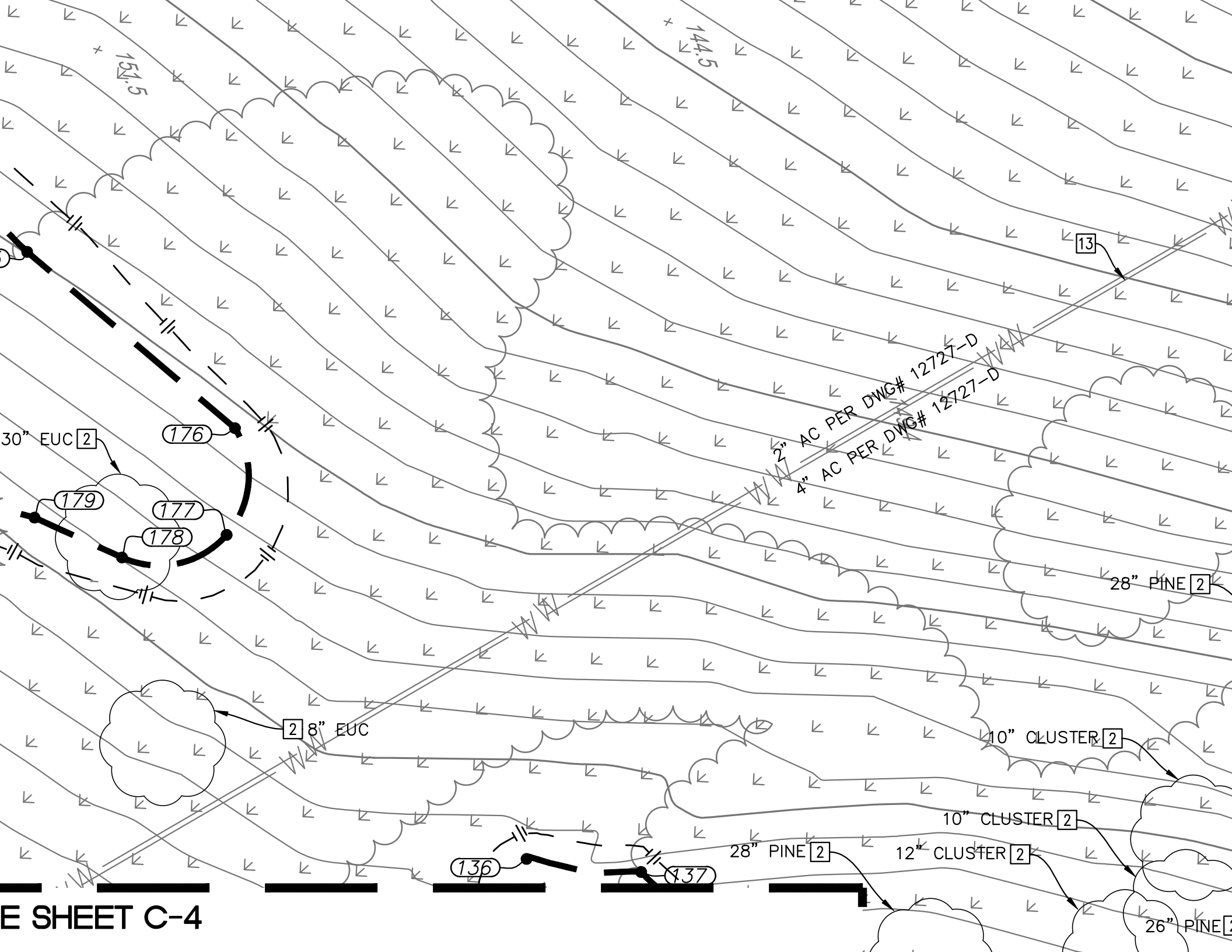
ITEM
EXISTING STORM DRAIN . . . . .
EXISTING SEWER MANHOLE . . . . .
EXISTING SEWER . . . . .
EXISTING WATER . . . . .
EXISTING WATER SERVICE . . . . .
EXISTING ELECTRICAL . . . . .
EXISTING TELEPHONE . . . . .
EXISTING OVERHEAD ELECTRIC . . . . .



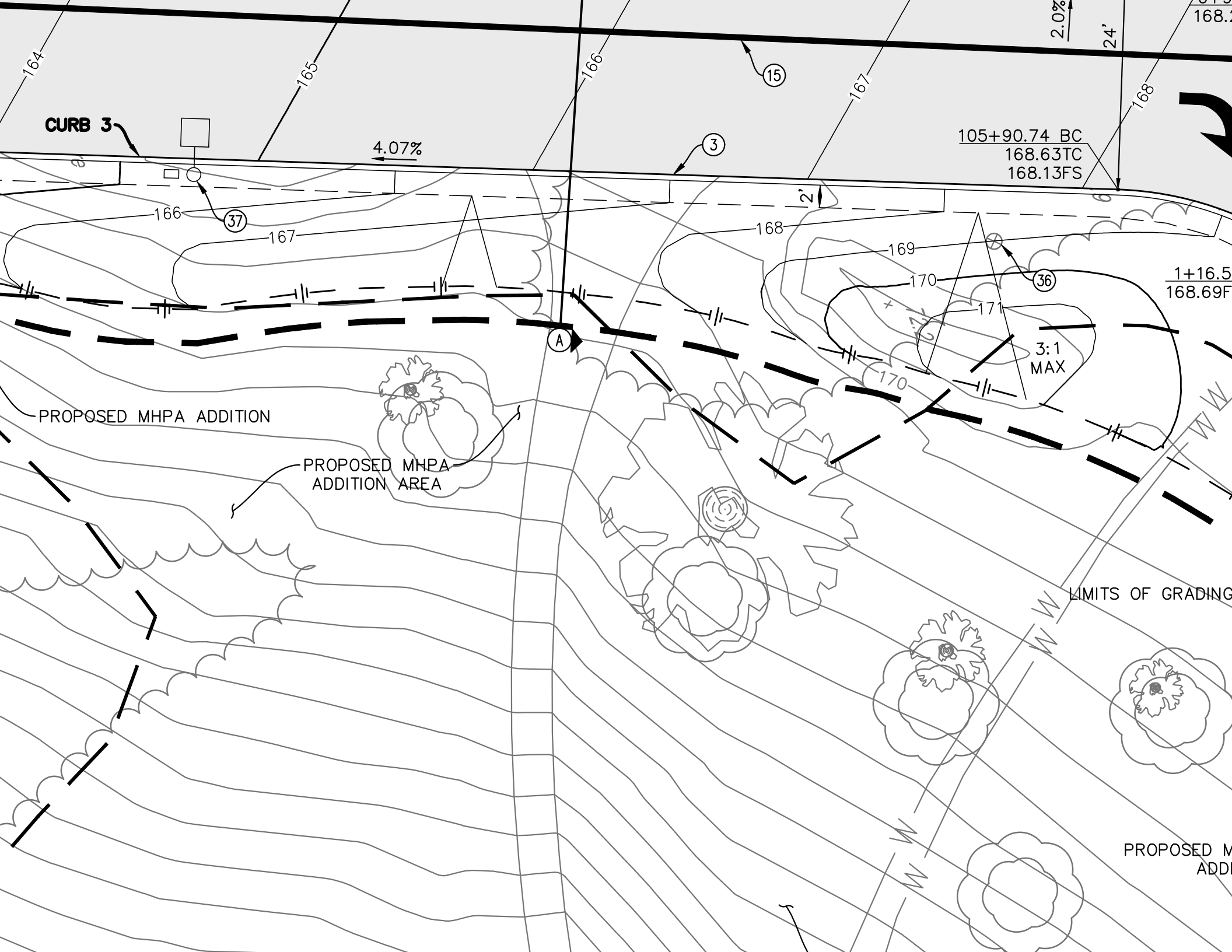
KEY MAP

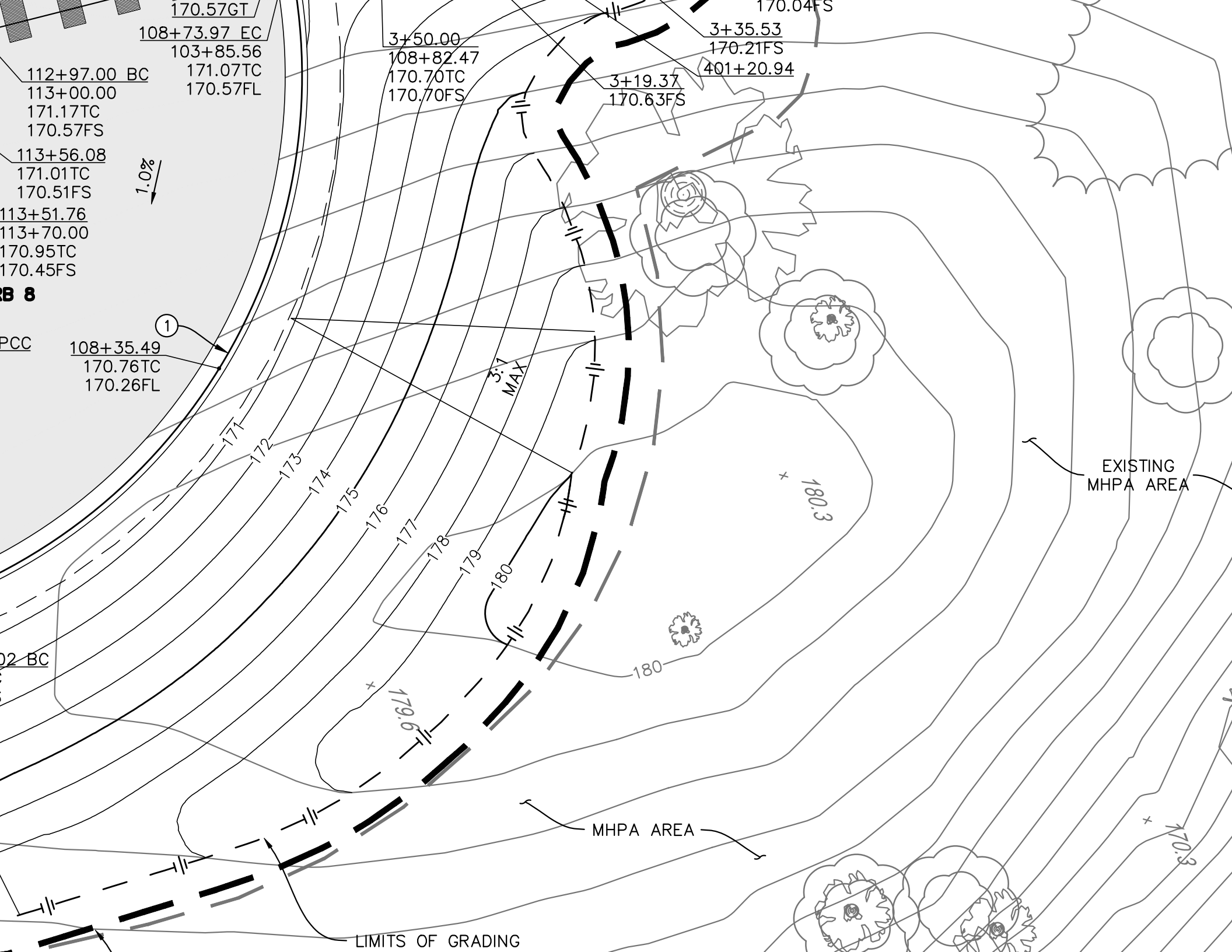

2 12" EUC
Ground Obscure Trees
7
10" EUC 2
2 26" EUC
18" CLUSTER 2
WATER VALVE 1
14
2 14" EUC
108
109
110
111
PROPOSED MHPA ADDITION
PROPOSED MHPA ADDITION AREA
PROPOSED MHPA ADDITION AREA
VEGETATION 1
PROPOSED MH ADDIT

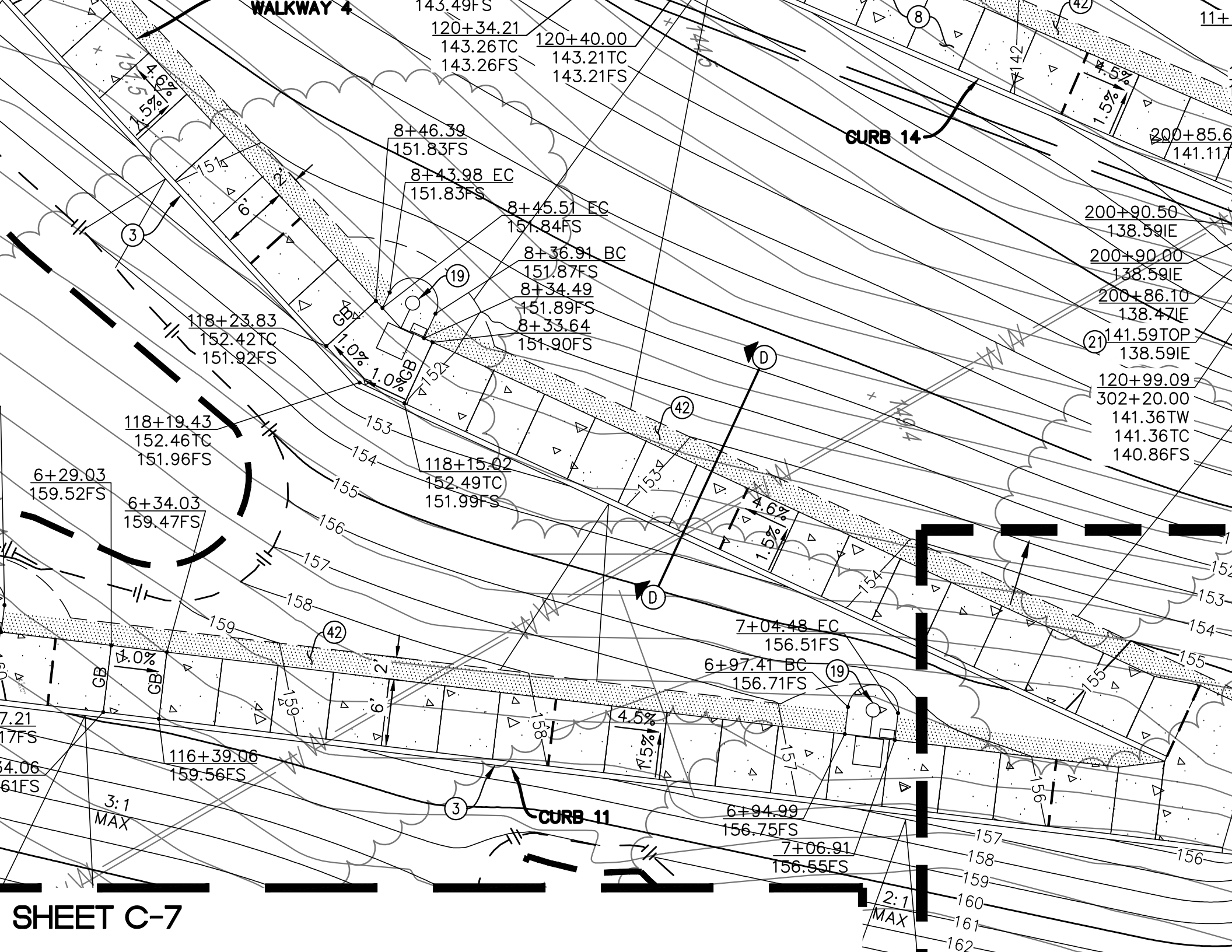

EXISTING MHPA AREA
MHPA AREA
2 12" EUC
130
129
128
1 48" EUC
127
2 12" EUC
3
2 40" EUC
VEGETATION 1
126
180.3
2 48" EUC
180
179.6
125
MHPA AREA
170
EXISTING MHPA AREA
124
PROJECT LIMITS
(AREA OF POTENTIAL EFFECT)


151.5
144.5
13
2" AC PER DWG# 12727-D
4" AC PER DWG# 12727-D
30" EUC 2
176
179
177
178
28" PINE 2
2 8" EUC
10" CLUSTER 2
10" CLUSTER 2
28" PINE 2
12" CLUSTER 2
136
137
26" PINE

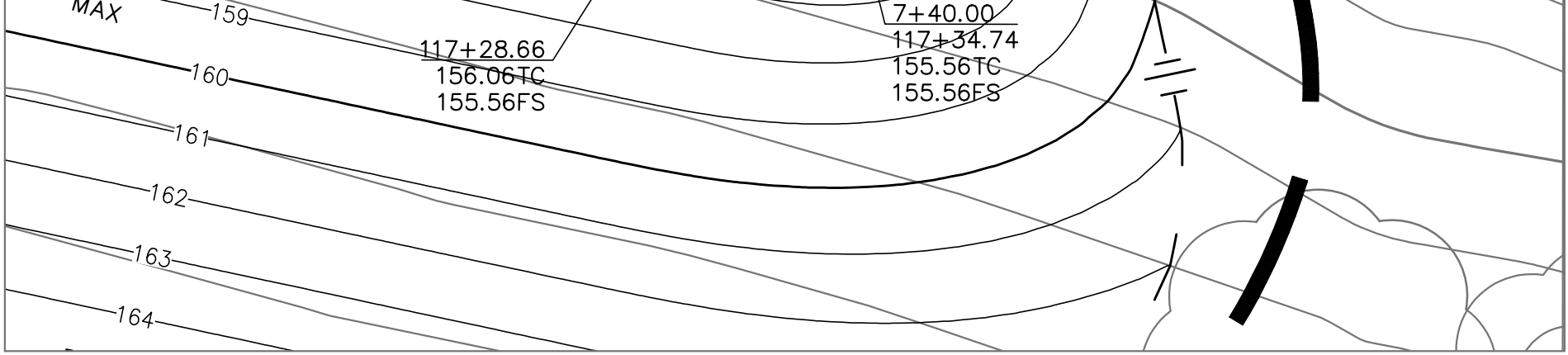
E SHEET C-4


CURB 3
4.07%
105+90.74 BC
168.63TC
168.13FS
1+16.5
168.69F
3:1
MAX
PROPOSED MHPA ADDITION
PROPOSED MHPA
ADDITION AREA
LIMITS OF GRADING
PROPOSED M
ADDI
164
165
166
167
168
169
170
171
2.0%
24'
2'


170.57GT
108+73.97 EC
103+85.56
171.07TC
170.57FL
112+97.00 BC
113+00.00
171.17TC
170.57FS
113+56.08
171.01TC
170.51FS
1.0%
113+51.76
113+70.00
170.95TC
170.45FS
PCC
108+35.49
170.76TC
170.26FL
3+50.00
108+82.47
170.70TC
170.70FS
3+19.37
170.63FS
3+35.53
170.21FS
401+20.94
170.04FS
3:1
MAX
171
172
173
174
175
176
177
178
179
180
180.3
180
179.6
EXISTING
MHPA AREA
MHPA AREA
LIMITS OF GRADING
170.3


WALKWAY 4
143.49FS
120+34.21
143.26TC
143.26FS
120+40.00
143.21TC
143.21FS
CURB 14
8+46.39
151.83FS
8+43.98 EC
151.83FS
8+45.51 EC
151.84FS
8+36.91 BC
151.87FS
8+34.49
151.89FS
8+33.64
151.90FS
118+23.83
152.42TC
151.92FS
118+19.43
152.46TC
151.96FS
118+15.02
152.49TC
151.99FS
6+29.03
159.52FS
6+34.03
159.47FS
116+39.06
159.56FS
CURB 11
7+04.48 EC
156.51FS
6+97.41 BC
156.71FS
6+94.99
156.75FS
7+06.91
156.55FS
200+85.6
141.11T
200+90.50
138.59IE
200+90.00
138.59IE
200+86.10
138.47IE
141.59TOP
138.59IE
120+99.09
302+20.00
141.36TW
141.36TC
140.86FS
4.6%
1.5%
4.5%
1.0%
GB
6'
2'
3:1 MAX
2:1 MAX

SHEET C-7



SIDEWALK DETAIL B

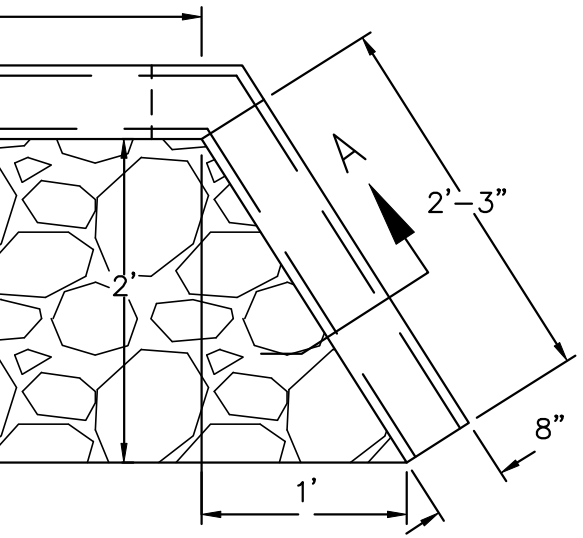
SCALE: 1" = 5'

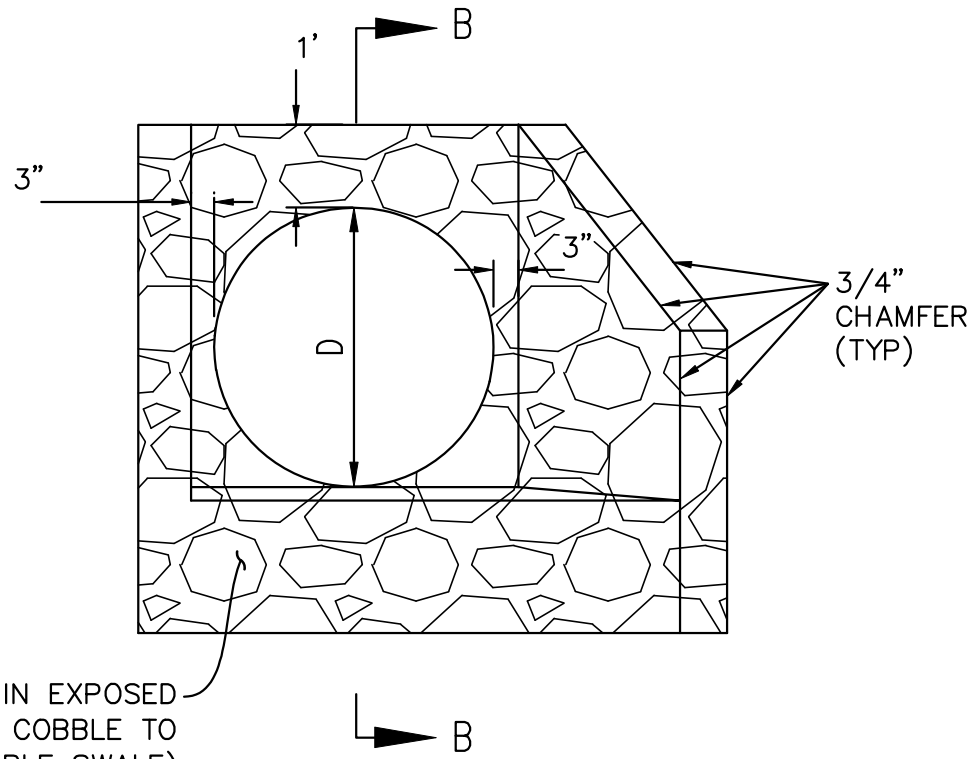
2. THE GRATE SHALL BE GALVANIZED STEEL WITH NATINA STAIN.

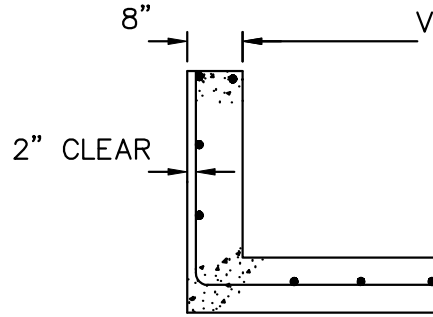
3. THE BOTTOM OF THE CATCH BASIN MAY BE CAST IN PLACE OR PRECAST WITH A BOTTOM SECTION. CAST IN P
BOTTOMS MUST BE A MINIMUM OF 6" THICK AND SLOPED TO DRAIN TO THE OUTLET. CAST WITH 560-C-3250
CURE FOR 3 DAYS PRIOR TO STAKING PRECAST CATCH BASIN.

(2) 24" PRECAST CATCH BASIN

NO SCALE



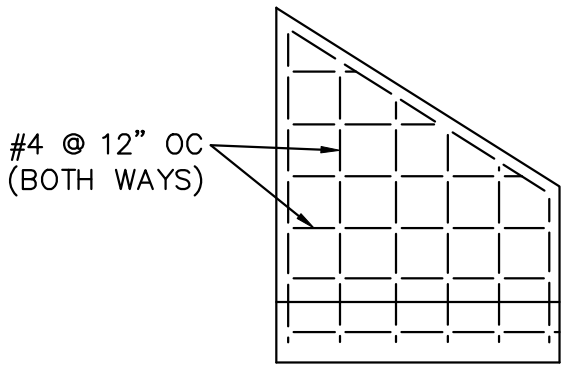


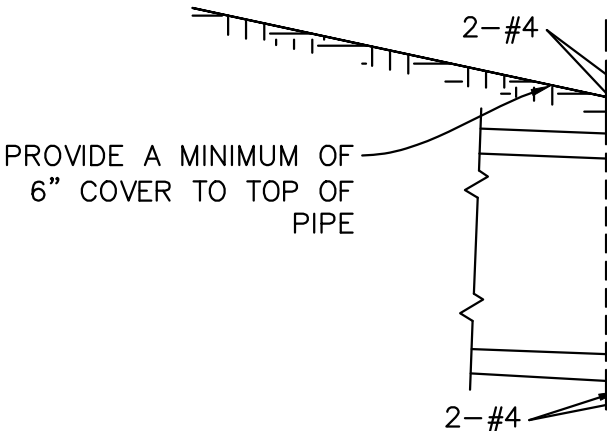


VIEW

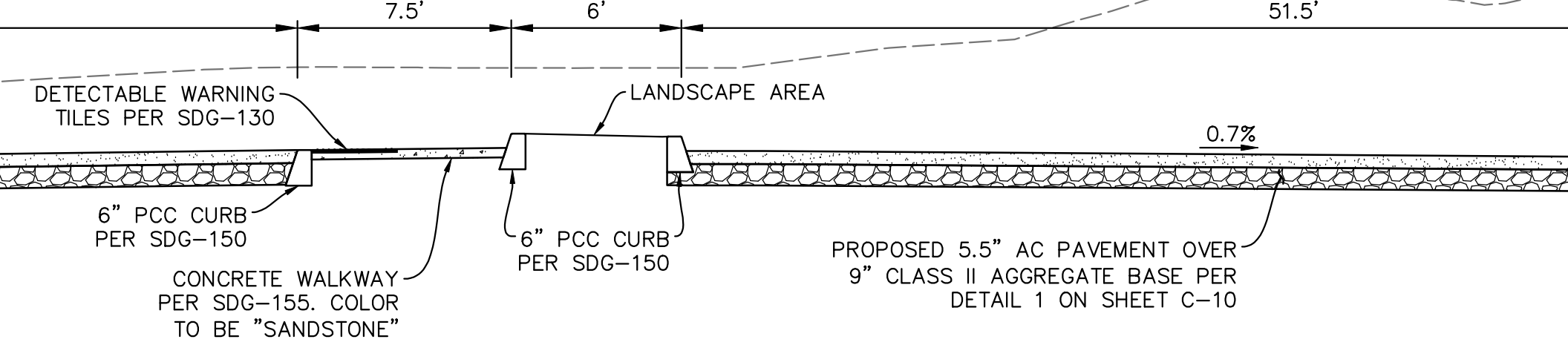
FRONT VIEW

SECTIO



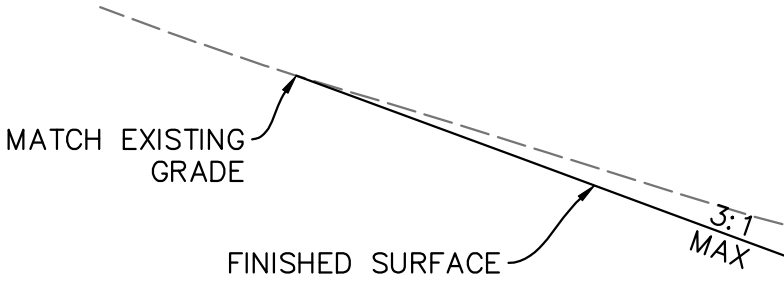


-C-3250.



SECTION C:C

NO SCALE



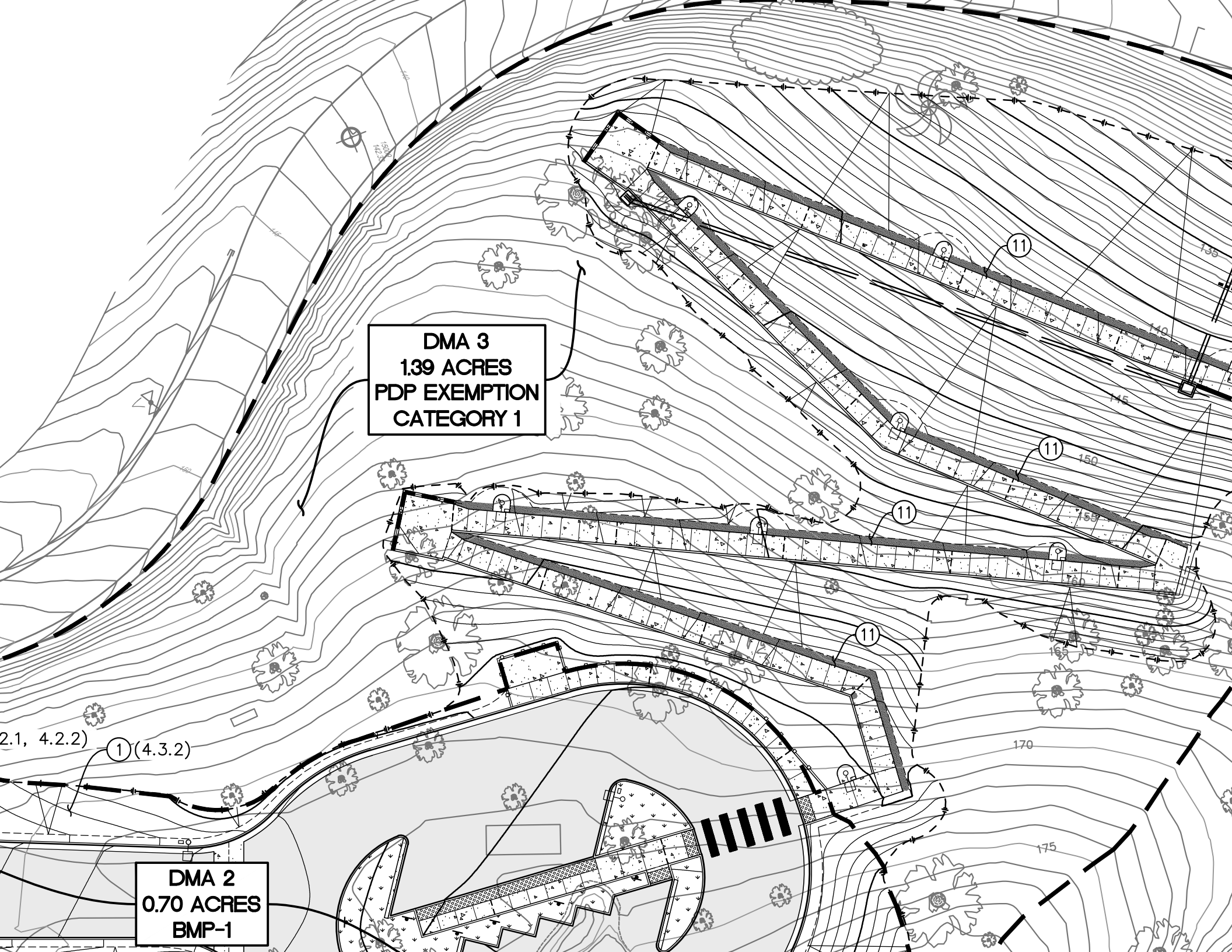
MODIFIED TYPE
DITCH PER S
WIDTH
DEPTH

GRAVITY
WALL TY
SDRSD C-
TO BE "S

S

PHONE NO.:_____

SITE DESIGN, SOURCE CONTROL AND POLLUTANT CONTROL BMP OPERATION + MAINTENANCE PROCEDURE					
O&M RESPONSIBLE PARTY DESIGNEE: CITY OF SAN DIEGO STORMWATER DEPARTMENT					
BMP DESCRIPTION	INSPECTION FREQUENCY	MAINTENANCE FREQUENCY	MAINTENANCE METHOD	QUANTITY	I
SOURCE CONTROL ELEMENTS	YEARLY	AS NEEDED	NEW STAMP	1	X
DESCRIPTION: SC-2, STORM DRAIN INLET MARKERS					
SOURCE CONTROL ELEMENTS	YEARLY	AS NEEDED	REMOVE BLOCKAGE	1	X
DESCRIPTION: SC-6, STORM DRAIN INLETS					
SITE DESIGN ELEMENTS	QUARTERLY	AS NEEDED	INSPECT FOR PAVERS THAT SETTLED OR RISEN, REMOVE ACCUMULATED DEBRIS, OR STANDING WATER, FLUSH UNDERDRAIN	3926 SF	X
DESCRIPTION: SD-7: LANDSCAPING WITH NATIVE OR DROUGHT TOLERANT SPECIES					
POLLUTANT CONTROL BMP(S)	YEARLY	AS NEEDED	REPAIR/RESEED/REPLANT ERODED AREAS	1	X
	YEARLY	AS NEEDED	UNCLOG INLETS	1	X
	YEARLY	MONTHLY	MOW/TRIM OVERGROWN VEGETATION	1	X
	YEARLY	AS NEEDED	REPAIR/REPLACE BASIN MEASURES TO REMOVE STANDING WATER	1	X
	YEARLY	AS NEEDED	REPAIR/REPLACE STRUCTURAL COMPONENTS	1	X
DESCRIPTION: BIOFILTRATION BASIN 1, TYP BF-1					

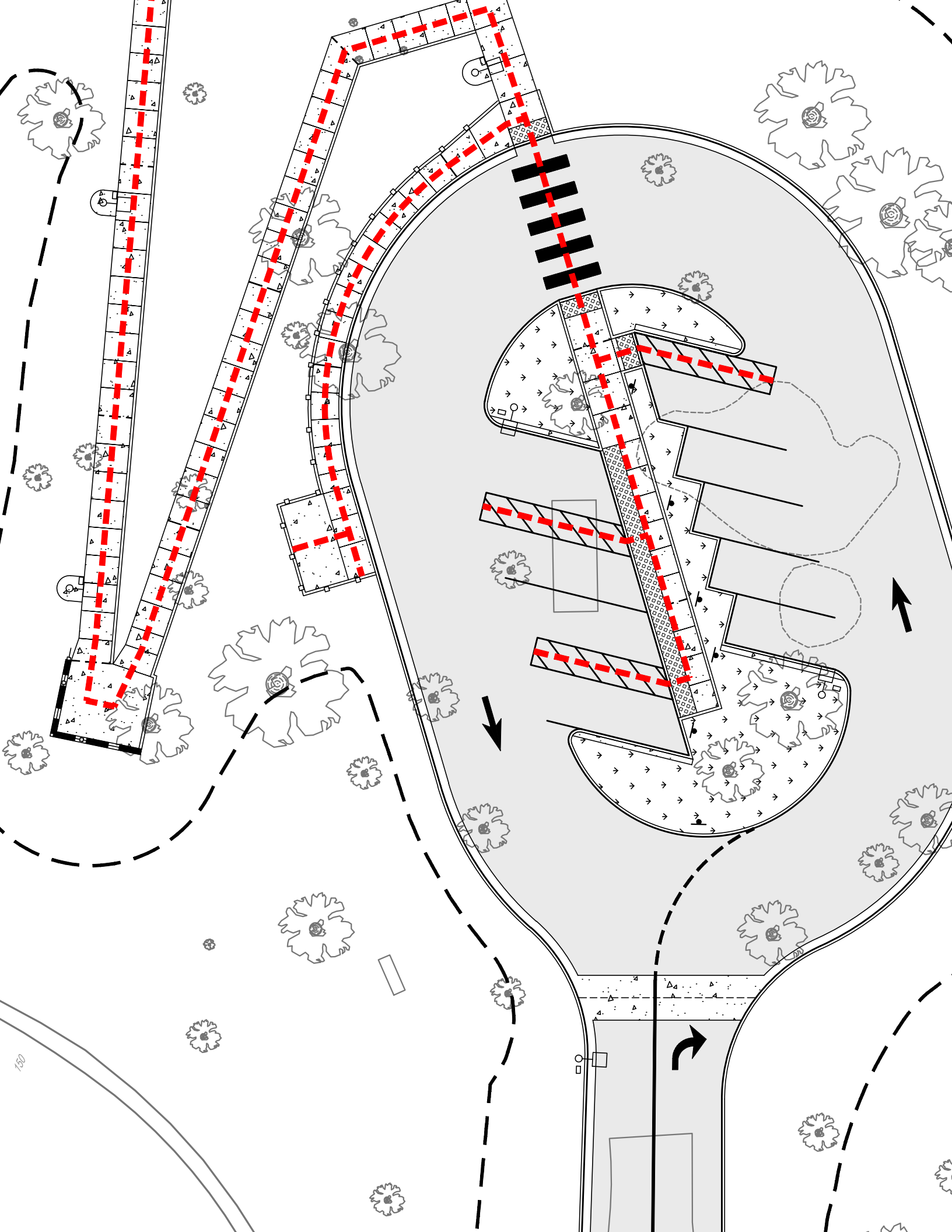

DMA 3
1.39 ACRES
PDP EXEMPTION
CATEGORY 1
DMA 2
0.70 ACRES
BMP-1
11
11
11
1 (4.3.2)
2.1, 4.2.2)
135
140
145
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160
165
170
175

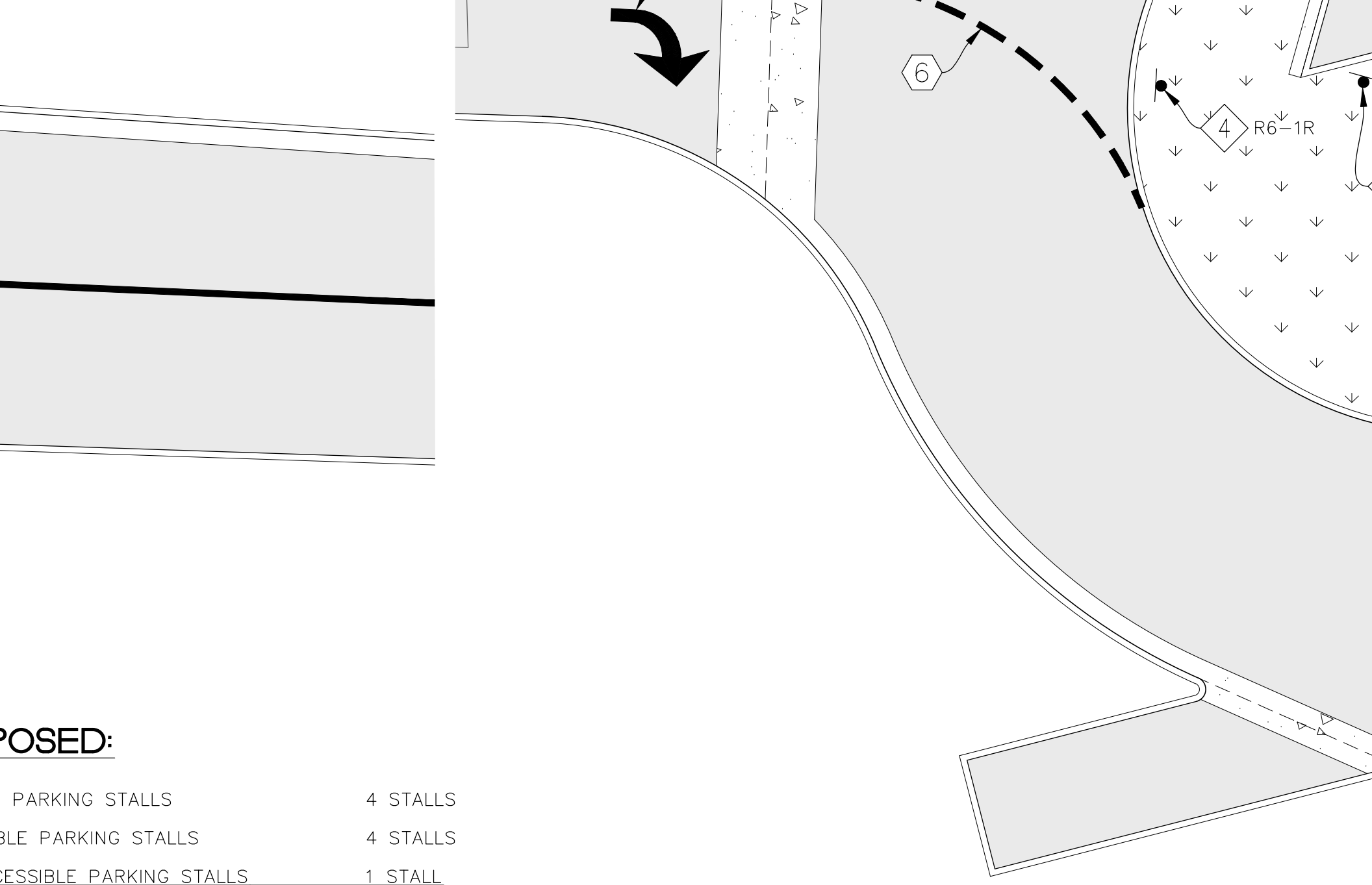
ONCRETE RETAINING WALLS FOR A MINIMUM OF 28 DAYS. COMPACTION
H WATER WILL NOT BE PERMITTED. EACH LAYER OF BACKFILL SHALL BE
ROUGHLY TAMPED, ROLLED OR OTHERWISE COMPACTED UNTIL THE

WITH THE STEEL TIED SECURELY IN ITS FINAL POSITION, AND IS READY

COMPLETED

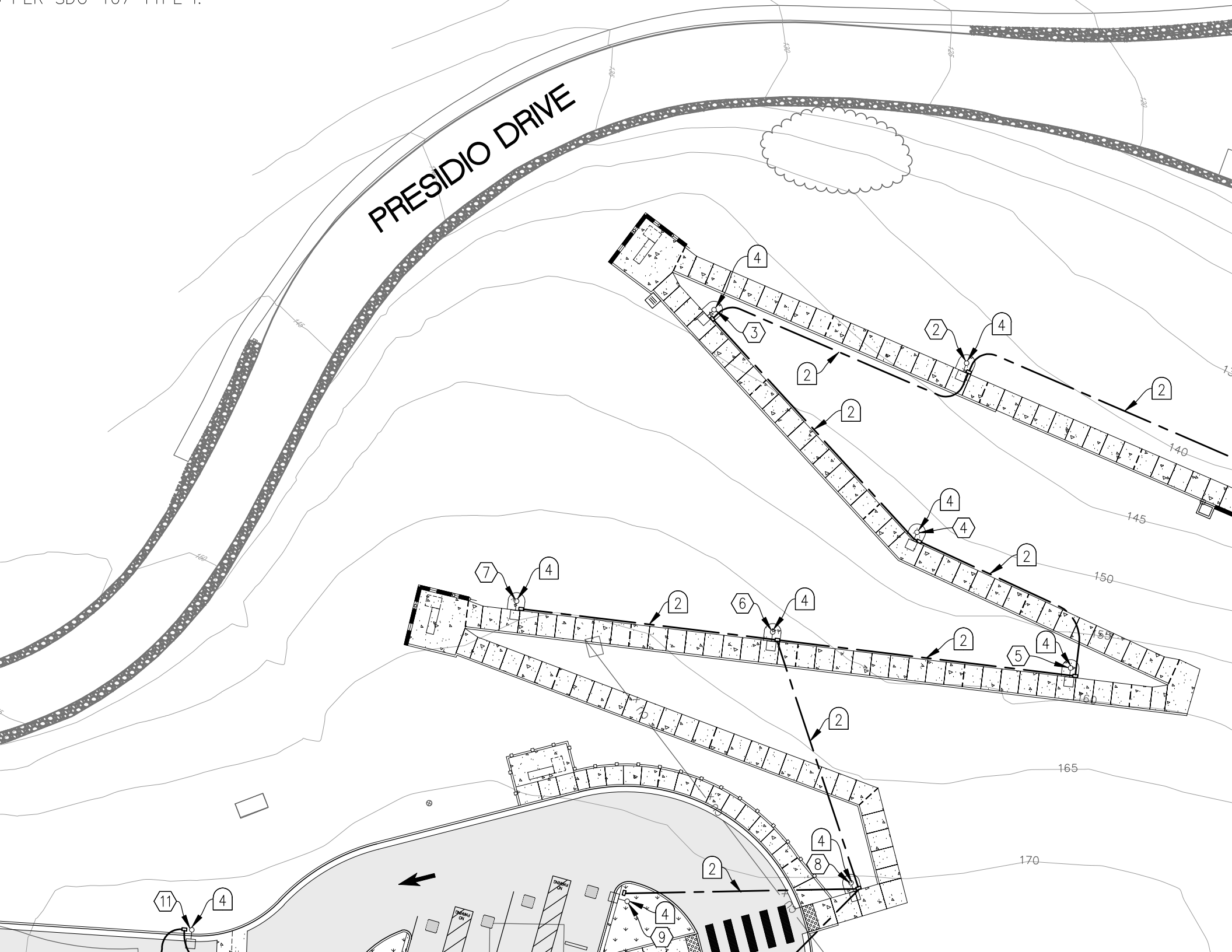
ISTURBED NATURAL SOIL OR APPROVED COMPACTED FILL. SOIL
E FOOTINGS.





POSED:

PARKING STALLS	4 STALLS
BLE PARKING STALLS	4 STALLS
CESSIBLE PARKING STALLS	1 STALL
ROPOSED PARKING STALLS	9 STALLS


PRESIDIO DRIVE
4
3
2
2
4
2
2
4
4
2
7
4
2
6
4
2
5
4
2
2
4
8
2
11
4
4
9

6' 28"E	E: 6271608.98	E: 6271611.15	7+04.48	7+06.91
4' 00"E	N: 1857218.55 E: 6271611.15	N: 1857236.51 E: 6271620.26	7+06.91	7+27.05
1' 21"E	N: 1857236.51 E: 6271620.26	N: 1857240.53 E: 6271621.18	7+27.05	7+31.17

EDGE OF WALKWAY - 4

/DELTA	BEGIN N/E	END N/E	BEGIN STATION	END STATION
9' 13"W	N: 1857242.79 E: 6271630.17	N: 1857250.13 E: 6271620.14	7+40.00	7+52.43
0' 36"W	N: 1857250.13 E: 6271620.14	N: 1857245.82 E: 6271615.86	7+52.43	7+58.50
8' 26"W	N: 1857245.82 E: 6271615.86	N: 1857242.28 E: 6271613.75	7+58.50	7+62.62
0' 44"W	N: 1857242.28 E: 6271613.75	N: 1857191.33 E: 6271563.07	7+62.62	8+34.49
9' 24"W	N: 1857191.33 E: 6271563.07	N: 1857193.04 E: 6271561.35	8+34.49	8+36.91
'00"	N: 1857193.04 E: 6271561.35	N: 1857189.85 E: 6271558.17	8+36.91	8+43.98
9' 24"E	N: 1857189.85 E: 6271558.17	N: 1857188.77 E: 6271559.26	8+43.98	8+45.51
4' 50"W	N: 1857154.34 E: 6271475.96	N: 1857153.74 E: 6271471.88	9+43.07	9+47.19

EDGE OF WALKWAY - 5

/DELTA	BEGIN N/E	END N/E	BEGIN STATION	END STATION
5' 42"E	N: 1857159.14 E: 6271466.69	N: 1857161.28 E: 6271470.07	9+50.00	9+54.00
3' 23"E	N: 1857161.28 E: 6271470.07	N: 1857216.12 E: 6271521.92	9+54.00	10+29.47
	N: 1857216.12	N: 1857217.79		

C17	73.12'	50.00	83°47'28"	N: 1857082.53 E: 6271594.16	N: 18571 E: 62716
L52	7.00'		S86° 33' 12"E	N: 1857127.62 E: 6271643.42	N: 18571 E: 62716

CURB - 3

#	LENGTH	RADIUS	BRG/DELTA	BEGIN N/E	END N
C18	7.78'	12.00	37°07'29"	N: 1856813.21 E: 6271500.18	N: 18568 E: 62715
L53	8.16'		S87° 21' 15"E	N: 1856815.30 E: 6271507.53	N: 18568 E: 62715
C19	69.69'	58.00	68°50'39"	N: 1856814.92 E: 6271515.68	N: 18568 E: 62715
L54	115.11'		N21° 54' 51"E	N: 1856849.45 E: 6271571.43	N: 18569 E: 62716
C20	34.34'	30.00	65°34'47"	N: 1856956.25 E: 6271614.39	N: 18569 E: 62716
C21	37.97'	50.00	43°30'44"	N: 1856975.03 E: 6271640.91	N: 18569 E: 62716
C22	2.47'	1.00	141°39'32"	N: 1856990.26 E: 6271674.70	N: 18569 E: 62716
L55	18.98'		S5° 38' 20"W	N: 1856989.47 E: 6271676.42	N: 18569 E: 62716
L56	9.00'		S84° 21' 40"E	N: 1856970.58 E: 6271674.55	N: 18569 E: 62716
L57	103.52'		N5° 38' 20"E	N: 1856969.69 E: 6271683.51	N: 18570 E: 62716
C23	76.95'	50.00	88°10'32"	N: 1857072.71 E: 6271693.68	N: 18571 E: 62716
L58	8.50'		N3° 26' 48"E	N: 1857127.20 E: 6271650.42	N: 18571 E: 62716

' 00"W	N: 1856898.03 E: 6271539.18	N: 1856858.98 E: 6271521.80	202+70.00	203+12.75

RETAINING WALL - 4

#	LENGTH	RADIUS	BRG/DELTA	BEGIN N/E	END N
L106	49.81'		N43° 23' 23"E	N: 1857269.13 E: 6271580.28	N: 18573 E: 627161

ATA TABLE	
	Easting
	6271507.75
	6271507.75
	6271518.45
	6271530.87
	6271537.20
	6271563.30
	6271578.82
	6271588.22
	6271598.45
	6271604.55
	6271617.19
	6271634.02
	6271654.13
	6271664.80
	6271673.12
	6271678.79

PROJECT LIMITS DATA TABLE		
POINT #	Northing	Easting
120	1857004.52	6271707.55
121	1857027.47	6271715.13
122	1857054.01	6271722.01
123	1857074.16	6271725.79
124	1857098.68	6271726.76
125	1857121.68	6271720.28
126	1857137.58	6271704.35
127	1857145.06	6271688.89
128	1857144.60	6271672.41
129	1857151.19	6271668.04
130	1857155.67	6271668.24
131	1857165.03	6271664.30
132	1857167.72	6271651.85
133	1857164.67	6271646.47
134	1857168.91	6271633.97
135	1857176.66	6271621.50

PROJECT LIMITS DATA TABLE		
POINT #	Northing	Easting
140	1857235.41	6271650.19
141	1857249.75	6271646.41
142	1857254.34	6271628.94
143	1857257.03	6271623.14
144	1857299.75	6271661.87
145	1857310.27	6271691.75
146	1857320.86	6271690.17
147	1857309.37	6271661.04
148	1857260.17	6271616.81
149	1857271.44	6271614.29
150	1857290.79	6271624.72
151	1857299.39	6271624.51
152	1857308.27	6271619.66
153	1857310.47	6271598.74
154	1857316.99	6271584.18
155	1857337.71	6271558.95

PROJEC	
POINT #	
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Attachment 5
Drainage Report

Attach project's drainage report. Refer to Drainage Design Manual to determine the reporting requirements.

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DRAINAGE STUDY

FOR

Junipero Serra Museum ADA Improvements

DWG: 40809-D

Developed for:

City of San Diego, Parks and Recreation Department
600 B Street
San Diego, CA 92111

Prepared by:

Nasland Engineering
4740 Ruffner Street
San Diego, CA 92111
(858) 292-7770
NE Job No. 117-229.1



November 21, 2025

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Purpose **2**

Description **2**

Vicinity Map **2**

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Proposed Conditions **3**

Assumptions and Methodology **4**

Detention Analysis **5**

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Conclusions **7**

Declaration of Responsible Charge **8**

Appendices

Appendix A – Pre-Developed Conditions
-Pre-Developed Conditions, Calculations, Intensity Duration Curves.

Appendix B – Post-Developed Conditions
-Post-Developed Conditions, Calculations, Intensity Duration Curves.

Appendix C – Reference Documents
- Intensity Duration Frequency Design Chart, Time of Concentration, Runoff Coefficient

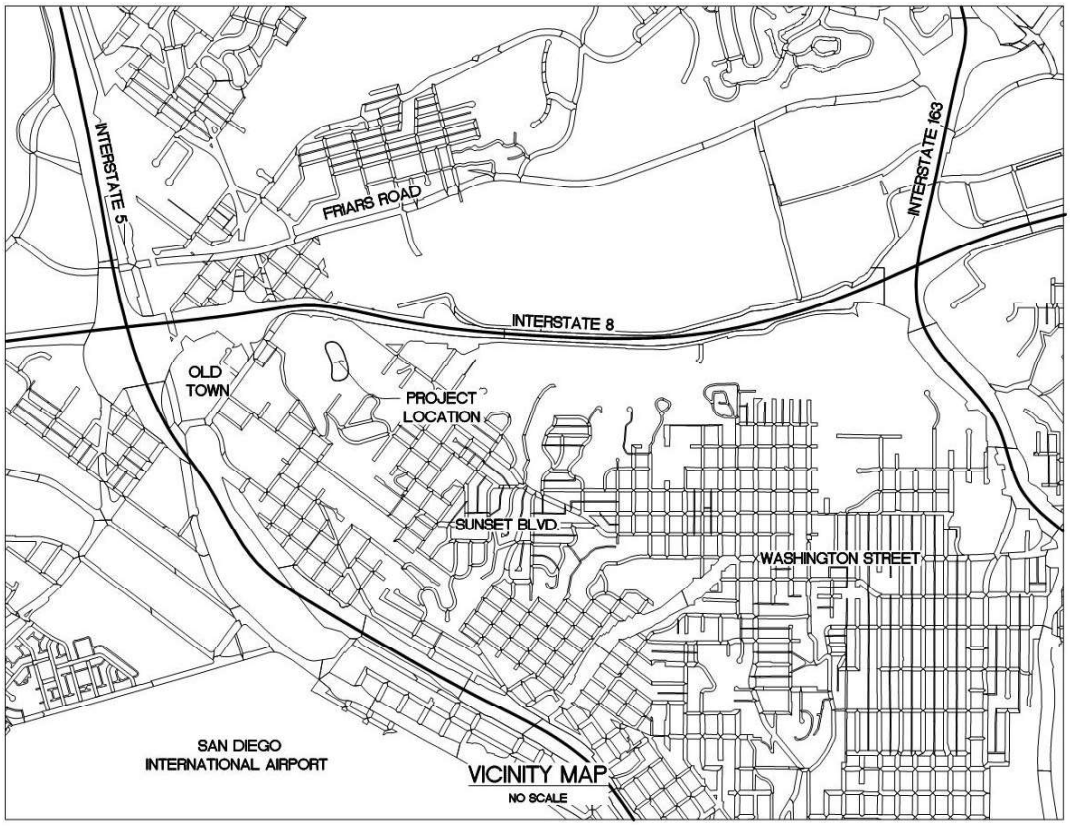
Purpose:

The purpose of this hydrology study is to examine the existing conditions and the effects of the proposed construction of a parking lot, driveway, and walkway for the Junipero Serra Museum.

Description:

The project is located on City of San Diego property at 2727 Presidio Drive. The project site is located east of Presidio Park and south of the Junipero Serra Museum and Taylor Street. This study assesses the hydrology associated with the onsite area.

Vicinity Map:



Existing Conditions:

The site is located within the Mission San Diego hydrologic sub area (907.11) of the Lower San Diego River Watershed. The existing site is close to the top of an undeveloped hillside with native dirt cover and trees. The total proposed project footprint covers approximately 1.42 acres. The underlying hydrologic soils type consists of type D soils and ground water is estimated to be greater than 20 feet deep.

The existing onsite drainage mostly sheet flows down the hillside in two separate directions. Surface flow down the western hillside is collected in an existing cobble gutter that runs down Presidio Drive. A portion of the Presidio Drive asphalt street also drains into the existing cobble gutter. Surface flow down the eastern hillside is collected in an existing cobble drainage channel that connects to an existing storm drain system underneath Taylor Street. There is no source of storm water run-on to the project.

Existing impervious area on the project site includes 110 square feet of an existing concrete driveway that will be removed. Other existing impervious area on the project site are a part of the museum's pedestrian facilities, which will not be disturbed but are included as part of the drainage areas.

Proposed Conditions:

The proposed project consists of an asphalt driveway with cobble cross gutter, asphalt parking lot with a total of 9 parking stalls, and an ADA accessible concrete walkway that connects to the pedestrian facilities at Junipero Serra Museum. Minimal demolition of existing surfaces is required.

The project proposes a total of 24,630 square feet of impervious surface. A biofiltration basin is proposed to collect runoff from the driveway and parking lot (PR-1A) and discharge to the existing cobble gutter along Presidio Drive. Runoff from PR-1B will flow across the existing hillside before discharging into the existing cobble swale. Drainage from PR-1C will sheet flow over the proposed ADA walkway before flowing into the proposed catch basin and then into proposed storm drain pipes before flowing out a proposed headwall and into the existing cobble swale. Drainage from PR-1D and PR-1F will sheet flow across the hillside and into the existing cobble swale. Drainage from PR-1E will flow across the ADA walkway and into the proposed Type F catch basin before flowing into storm drains that outlet through a headwall and into the existing cobble swale. A good portion of the Presidio Drive asphalt street will remain largely unchanged and continue to drain into the existing cobble gutter delineated as O-1. Drainage from EX-2A remains largely unchanged and will continue to drain to the existing cobble channel that connects to an existing storm drain system underneath Taylor Street.

Assumptions and Methodology:

This report was prepared in accordance with the City of San Diego Storm Water Standards Manual dated May 2021. Surface data and runoff equations were acquired from the City of San Diego Drainage Design Manual dated January 2017. All maps and tables utilized from these Manuals are located in the maps and tables attachment at the end of this report.

Runoff was calculated Following Appendix I: Rational Method which is given by the following equation:

Q = C x I x A

- Q = flow rate in cubic feet per second (cfs)
- C = Runoff Coefficient
- I = Rainfall intensity in inches per hour (in/hr)
- A = Drainage basin area in acres (acres)

Runoff Coefficient: The runoff coefficient C is determined using Table A-1: Runoff Coefficients (Rational Method) on page 191 of the City of San Diego Drainage Design Manual.

Rainfall Intensity: Intensity was calculated as a function of time of concentration, as defined by the Intensity Duration Design Chart on page 192 of the City of San Diego Drainage Design Manual.

Time of Concentration: Determined from using Figure 3-3 or Figure 3-4 of the SDC Drainage Design Manual:

For sheet flow: Urban Areas Overland Time of Flow Curves (Appendix I-E):

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

C = Runoff Coefficient

D = Watercourse Distance (ft)

s = Slope of basin

Grated Inlet Sizing: Inlet capacity sizing for grated inlets was determined by following the calculations provided by the County of San Diego Hydraulic Design Manual. Runoff will flow towards each grated inlet either by being a localized low point or a low point within a biofiltration basin, therefore the inlet capacity can be assumed to be modeled in a sag condition with the equation:

$$Q = C_W * P_e * d^{3/2}$$

Where:

Q = Inlet capacity

C_w = Weir coeifficent (3.0)

P_e = Effective grate permeter (ft)

d = Flow depth (ft)

Detention Analysis:

Storm water detention follows the design procedure described in the San Diego County Hydrology Manual. The project will utilize the proposed biofiltration basins as detention basins to mitigate the increase in storm water runoff rates. For a 6-hour storm event, a hydrograph was generated to determine the total volume of the design storm. Orifice structures are utilized to detain the flow within the basin and control the release of the runoff.

Detention analysis utilizes two programs to develop and model the hydrographs. RATHYDRO develops the rainfall distribution for a 6-hour design storm utilizing the 2/3, 1/3 method defined in the hydrology manual. The data produced by RATHYDRO can be manually entered into a hydrograph modeling program, Hydraflow Hydrographs extension. Hydraflow Hydrographs generates the hydrograph and models the outflow of the detention pond to determine the overall volume needed for the system. Detention volume calculations and hydrographs have been provided in **Appendix B.**

Results:

EXISTING BASIN SUMMARY

100 YEAR - 6 HOUR Storm

Basin	C Value	T_c (mins)	Intensity ($^{in}/_{hr}$)	Area (acres)	Runoff (Q, cfs)
O-1	0.90	5.00	4.40	0.14	0.57
EX-1A	0.50	5.00	4.40	1.79	3.94
EX-2A	0.50	6.00	4.20	5.49	11.54
				Q100 =	**16.05**

PROPOSED BASIN SUMMARY

100 YEAR - 6 HOUR Storm

Basin	C Value	T_c (mins)	Intensity ($^{in}/_{hr}$)	Area (acres)	Runoff (Q, cfs)	Mitigated Runoff (Q, cfs)
O-1	0.90	5.00	4.40	0.16	0.62	
PR-1A	0.68	5.00	4.40	0.70	2.10	1.49
PR-1B	0.50	5.00	4.40	0.39	0.86	
PR-1C	0.50	5.00	4.40	0.19	0.42	
PR-1D	0.50	5.00	4.40	0.35	0.76	
PR-1E	0.50	5.30	4.25	0.32	0.69	
PR-1F	0.50	5.00	4.40	0.14	0.30	
EX-2A	0.50	6.04	4.20	5.18	10.89	
					16.02	

Q100 POC COMPARISON

POC	PRE (Q, CFS)	POST (Q, CFS)	NET CHANGE (Q, CFS)	% CHANGE
A	4.51	5.14	0.63	13.9%
B	11.54	10.89	-0.65	-5.6%
TOTAL	**16.05**	**16.02**	**-0.02**	**-0.1%**

Grated Inlet Capacity

Structure Type: 24"x24" Catch Basin L = 2 ft

Grate Type: Metal Grate W = 2 ft

GRATE CHARACTERISTICS

Effective length	L_e =	1.5 ft	(50% clogging Factor), Length of grate - Width of bars
Effective Width	W_e =	0.8 ft	(50% clogging Factor), Width of grate - Width of bars
Effective perimeter	P_e =	4.6 ft	(4 sides = $2W_e + 2L_e$)
Effective Area	A_e =	2.35 ft^2	(50% clogging Factor)
Splash Over Velocity	V_o =	2 ft/s	

Weir

$$Q=C_W P_e d^{3/2}$$

Where:

C_W = 3

Pe = 4.6 ft

d = 0.25 ft

Q = 1.72 cfs

With a depth of flow of 0.25 inches, a 24"x24" Catch Basin with a grated inlet has a capacity of 1.72 cfs. Therefore, the proposed sized grated inlets should be able to handle the peak flow rate produced by drainage areas PR-1C.

Notes:

- A minimum time of concentration of 5 minutes was utilized.
- The project assumes Hydrologic Soil Type D.
- The Land Use for this site is a public park with a paved parking lot and boat ramp. This project does not fit into any of the pre-defined Land Use categories in Table A-1. A ratio of the actual pervious and impervious areas shall be used in order to calculate the C-Value for the basins for project. C-Values of 0.35 and 0.90 shall be used for pervious and impervious areas, respectively. **The final coefficient may not be less than 0.50 per City of San Diego Drainage Manual Section A.1.2.**

Applicability of Section 401 or 404:

According to the State Water Board Website, a 401-water quality permit is required if you have waters of the US on the subject property. A 404 permit is required if waters of the US are to be dredged or filled. The project site contains no natural drainage features. Therefore, no waters of the US are present onsite. A 401 or 404 permit is not applicable to this project.

Conclusions:

The Serra Museum ADA Improvements will increase the impervious area and subsequently increase the total runoff generated from the site at an unmitigated condition by 0.58CFS (3.6%). More specifically, the total runoffs to POC A will increase by 1.23 CFS (27.3%) and POC B will decrease by 0.65 CFS (5.6%) in the unmitigated condition. However, the runoff entering the biofiltration basins will be detained which will mitigate the projects overall runoff rate and specifically to POC A. The mitigated total runoff generated by the project will be 16.02 CFS, which is a net change in .02 CFS (1.2%) from the existing conditions. With the above improvements in place, we do not anticipate any adverse effects to the areas surrounding the Serra Museum ADA Improvements.

DECLARATION OF RESPONSIBLE CHARGE

I hereby declare that I am the 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 the current standards.

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



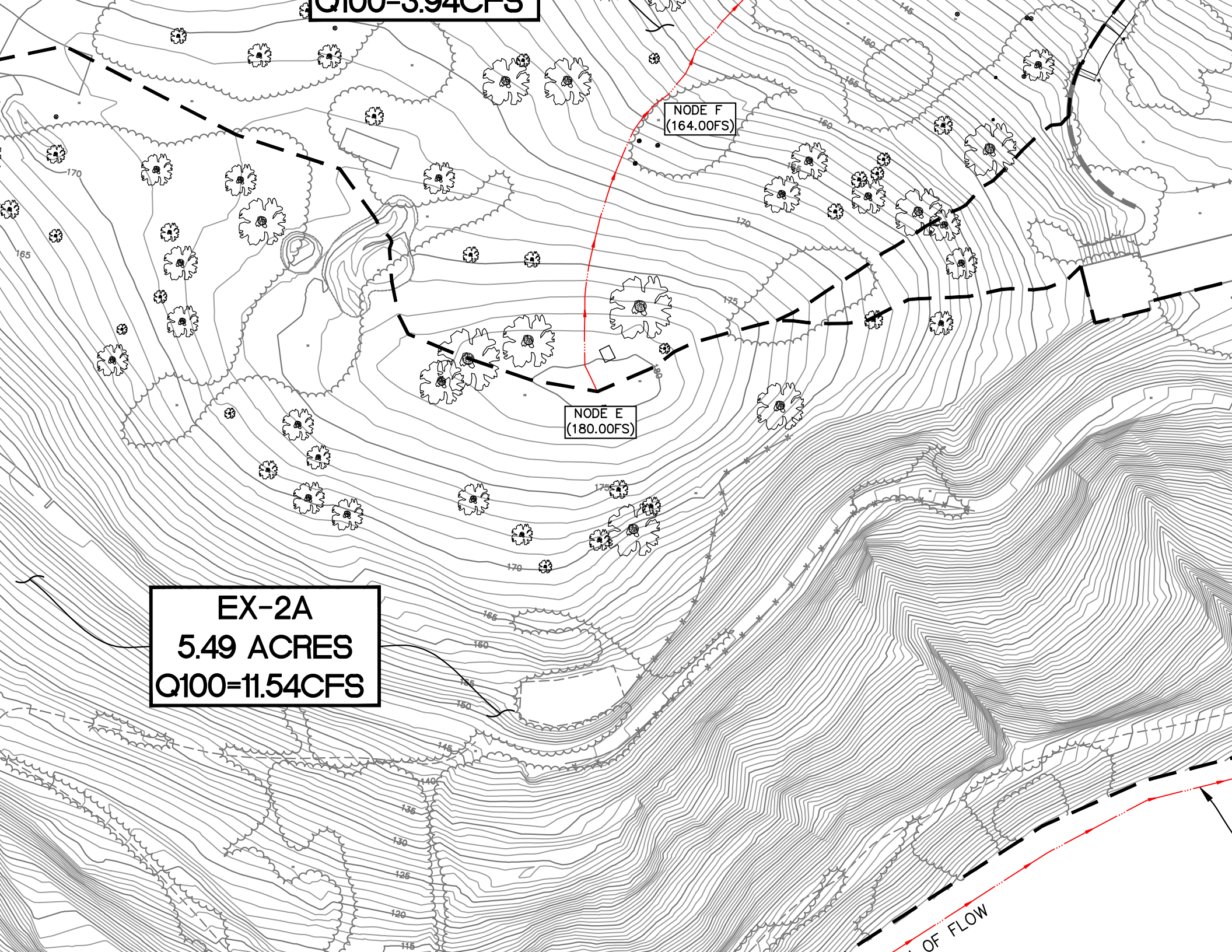
James J linn Date

R.C.E. 84231

Exp. 9-30-2027

Appendix A – Pre-Developed Conditions

Pre-Developed Conditions, Calculations, Intensity Duration Curves.


Q100=3.94CFS
NODE F
(164.00FS)
NODE E
(180.00FS)
EX-2A
5.49 ACRES
Q100=11.54CFS
OF FLOW

BASIN DATA: EXISTING CONDITIONS

Runoff Coefficient

Sub Area	Area (acres)	% Impervious	% Pervious	Description	C Value
Offsite					
O-1	0.14	100.0%	0.0%	Gutter	**0.90**
Basin 1					
EX-1A	1.79	0.0%	100.0%	Natural Sloped Terrain	**0.50**
Basin 2					
EX-2A	5.49	0.2%	99.8%	Natural Sloped Terrain	**0.50**
	7.43				

Hydrologic Soil Type D

Time of concentration

Sheet Flow $T_i = \frac{1.8(1.1 - C)\sqrt{L}}{\sqrt[3]{S}}$

Basin	Node	C Value	L (ft)	Δ Height (ft)	Slope (%)	T_i (min)
O-1	A-B	0.90	64.00	1.70	2.66	2.08
EX-1A	E-F	0.50	100.00	16.00	16.00	4.29
EX-2A	G-H	0.50	100.00	13.00	13.00	4.59

Channelized Flow $T_t = \frac{L}{60V}$

Basin	Channel Description	Node	Channel Length (ft)	Channel Slope (%)	Average Q (cfs)	Velocity (fps)	T_t (min)
O-1	Gutter	B-D	576.40	7.70	2.25	7.59	1.27
EX-1A	Concentrated Flow	F-C	184.00	24.50	1.97	4.93	0.62
EX-2A	Channel Flow	H-I	1084.00	12.00	5.77	12.85	1.41

Total Time of Concentration

Basin	T_i (min)	T_t (min)	Tc (min)
O-1	2.08	1.27	5.00
EX-1A	4.29	0.62	5.00
EX-2A	4.59	1.41	6.00

100 YEAR - 6 HOUR Storm

Use Figure A-1: Intensity Duration-Frequency Chart

Basin	C Value	T_c (mins)	Intensity ($^{in}/_{hr}$)	Area (acres)	Runoff (Q, cfs)
O-1	0.90	5.00	4.40	0.14	0.57
EX-1A	0.50	5.00	4.40	1.79	3.94
EX-2A	0.50	6.00	4.20	5.49	11.54

BASIN SUMMARY

Runoff to Presidio Drive (POC A) = 4.51 cfs
Runoff to Palm Canyon (POC B) = 11.54 cfs

Channel Report

EXISTING COBBLE SWALE (O-1)

Gutter

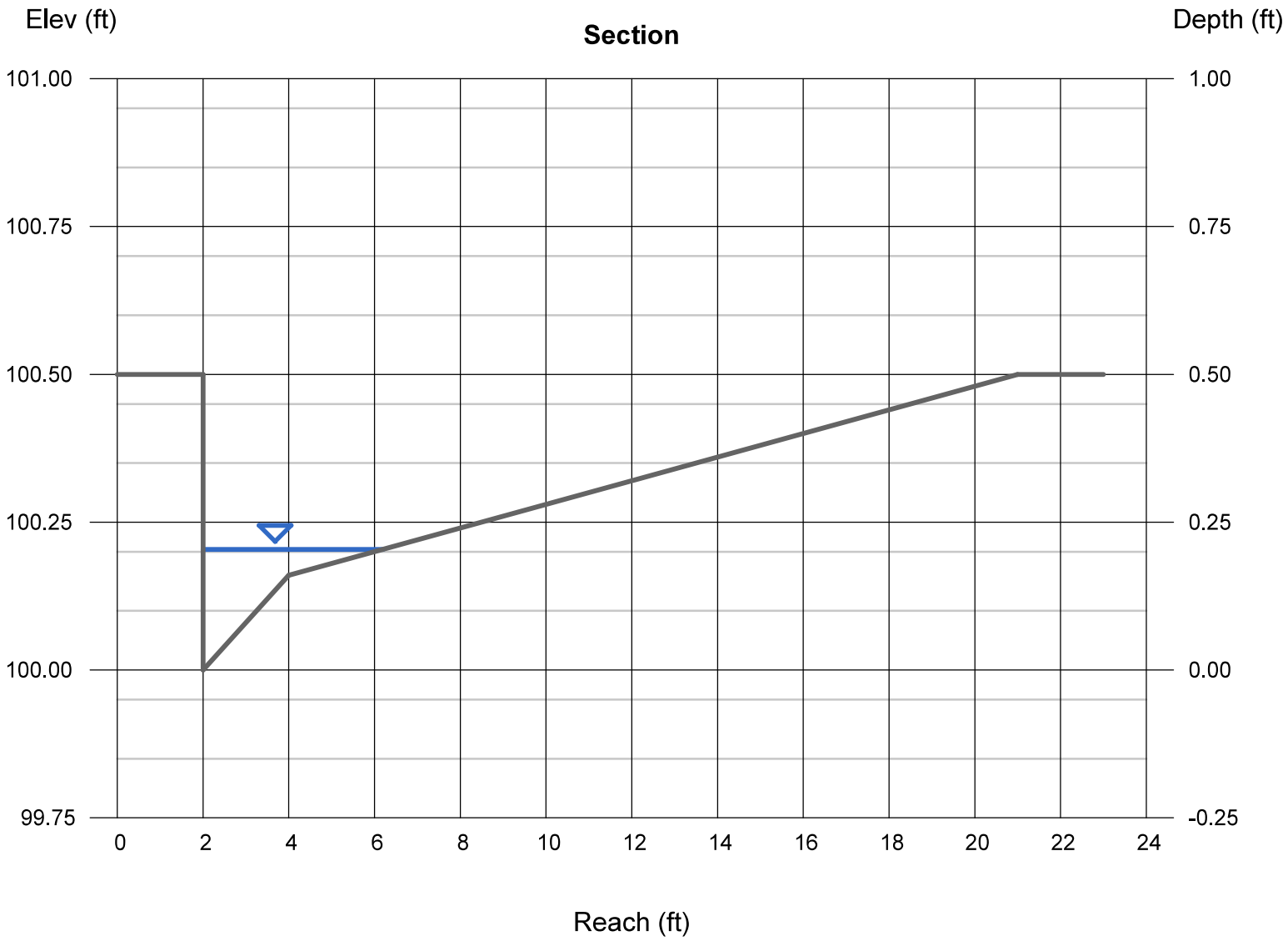
Cross Sl, Sx (ft/ft)	= 0.020
Cross Sl, Sw (ft/ft)	= 0.080
Gutter Width (ft)	= 2.00
Invert Elev (ft)	= 100.00
Slope (%)	= 7.70
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 2.25

Highlighted

Depth (ft)	= 0.20
Q (cfs)	= 2.250
Area (sqft)	= 0.30
Velocity (ft/s)	= 7.59
Wetted Perim (ft)	= 4.41
Crit Depth, Yc (ft)	= 0.33
Spread Width (ft)	= 4.20
EGL (ft)	= 1.10



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Nov 20 2025

EXISTING COBBLE CHANNEL(EX-2A)

Triangular

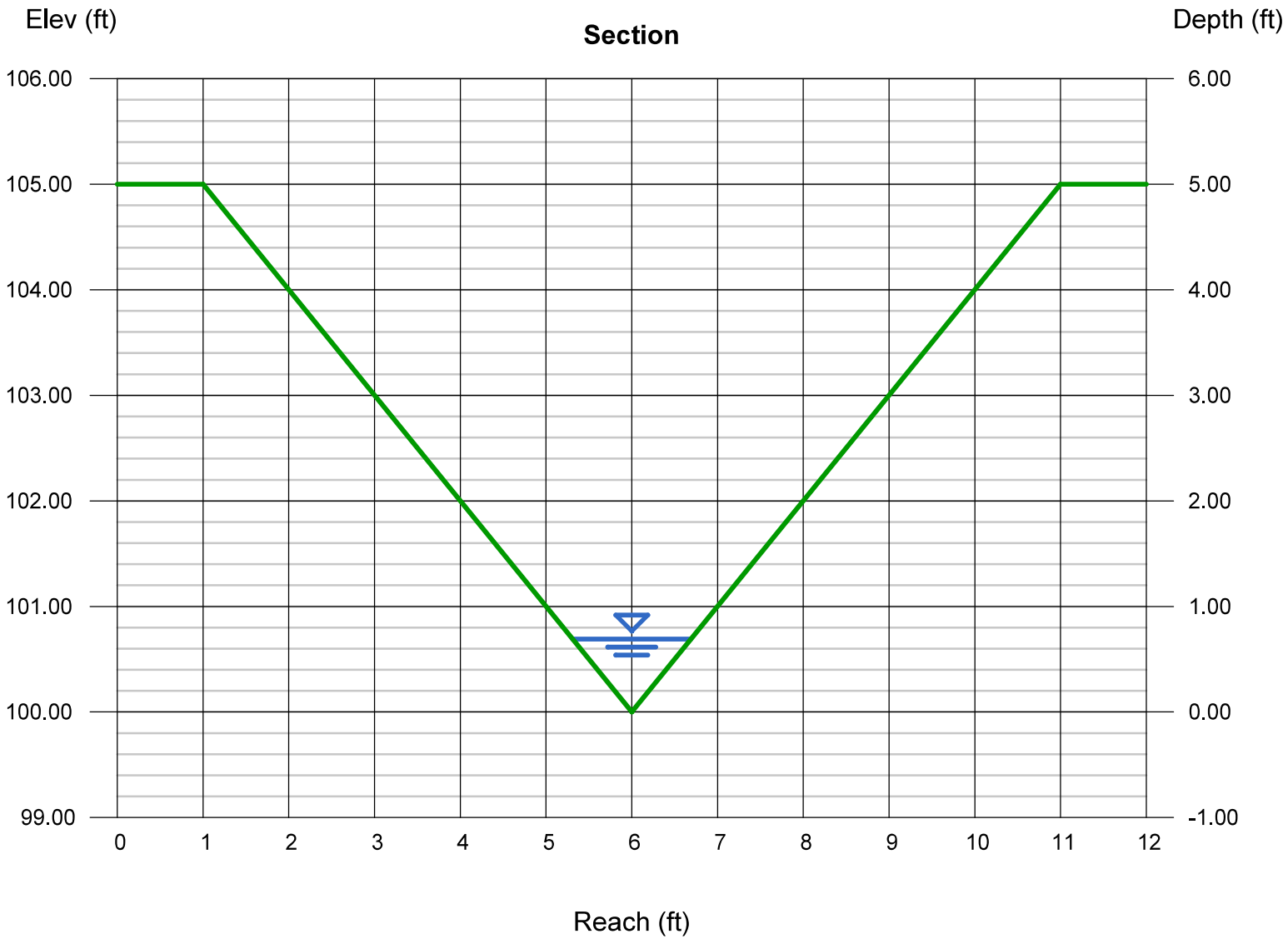
Side Slopes (z:1)	= 1.00, 1.00
Total Depth (ft)	= 5.00
Invert Elev (ft)	= 100.00
Slope (%)	= 10.00
N-Value	= 0.015

Calculations

Compute by:	Known Q
Known Q (cfs)	= 5.77

Highlighted

Depth (ft)	= 0.69
Q (cfs)	= 5.770
Area (sqft)	= 0.48
Velocity (ft/s)	= 12.12
Wetted Perim (ft)	= 1.95
Crit Depth, Yc (ft)	= 1.16
Top Width (ft)	= 1.38
EGL (ft)	= 2.97



O-1

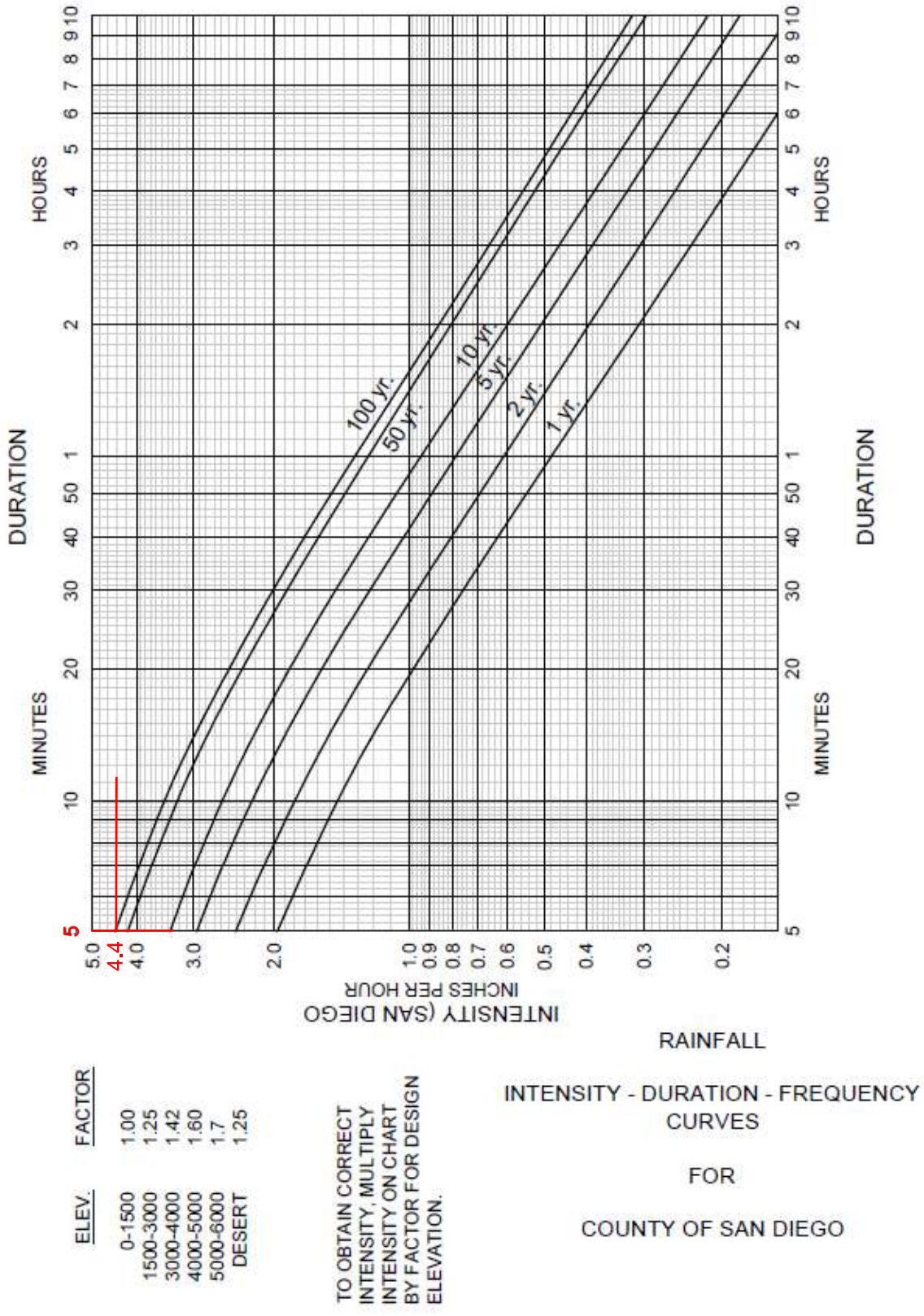


Figure A-1. Intensity-Duration-Frequency Design Chart

EX-1A

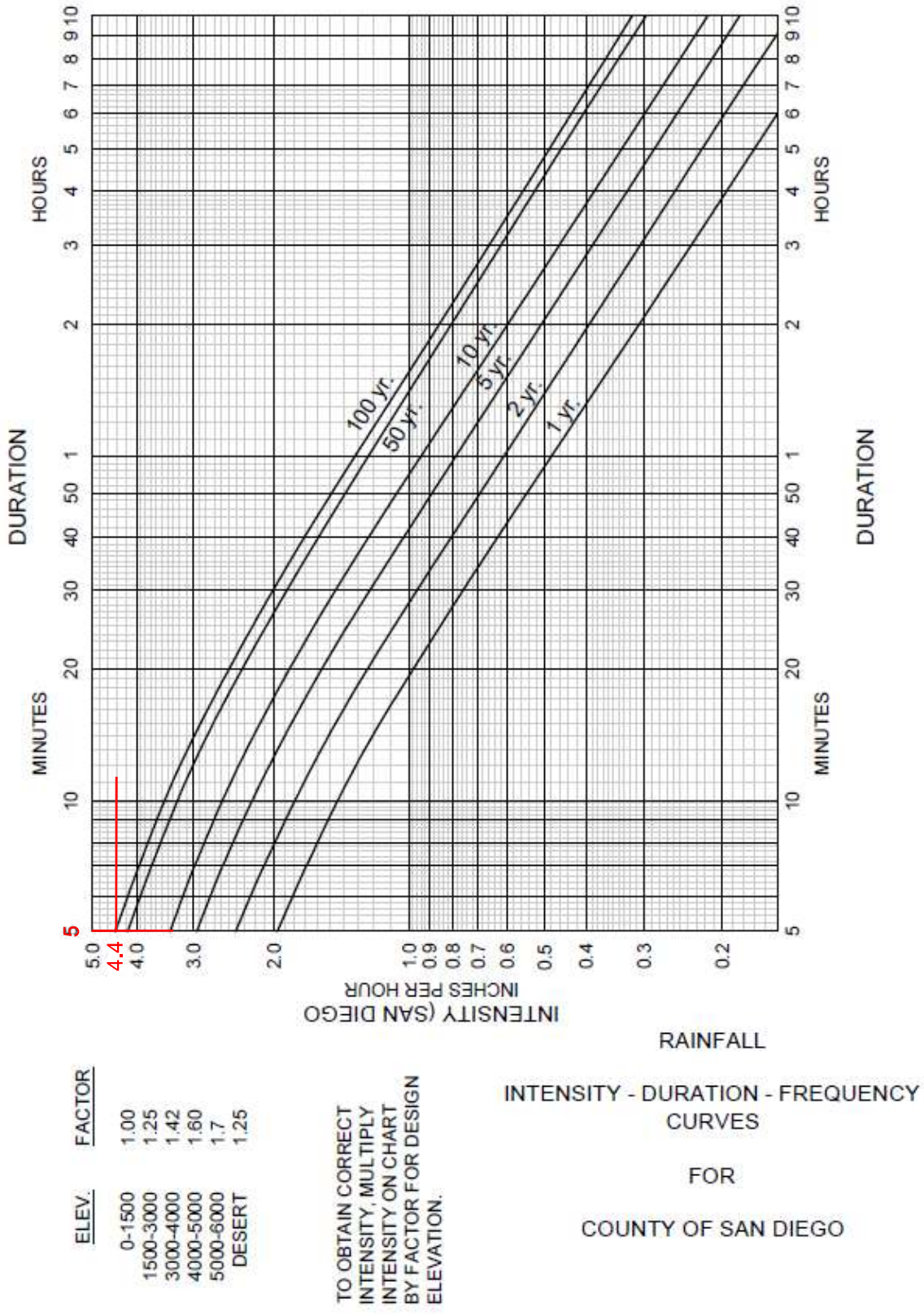


Figure A-1. Intensity-Duration-Frequency Design Chart

EX-2A

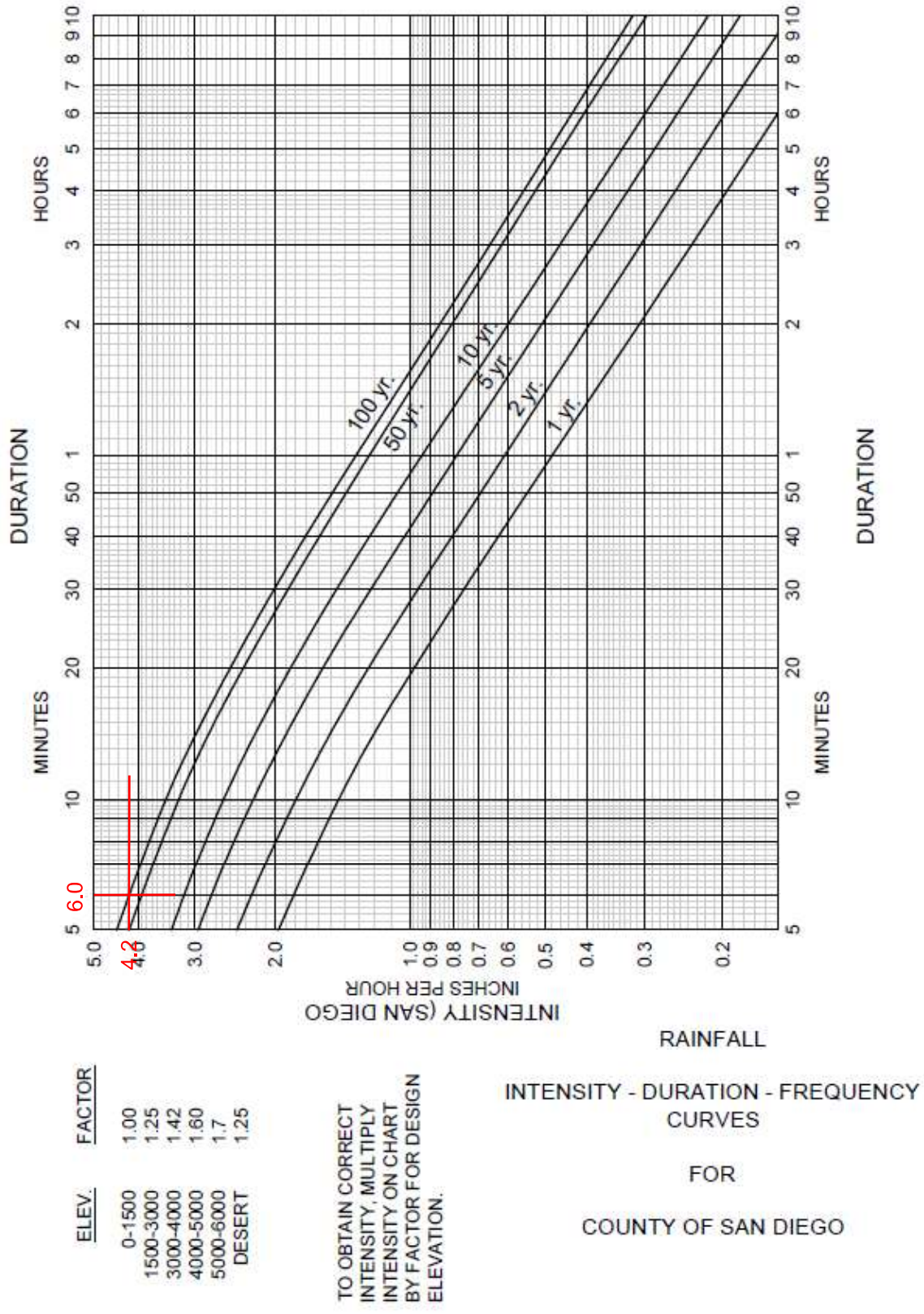
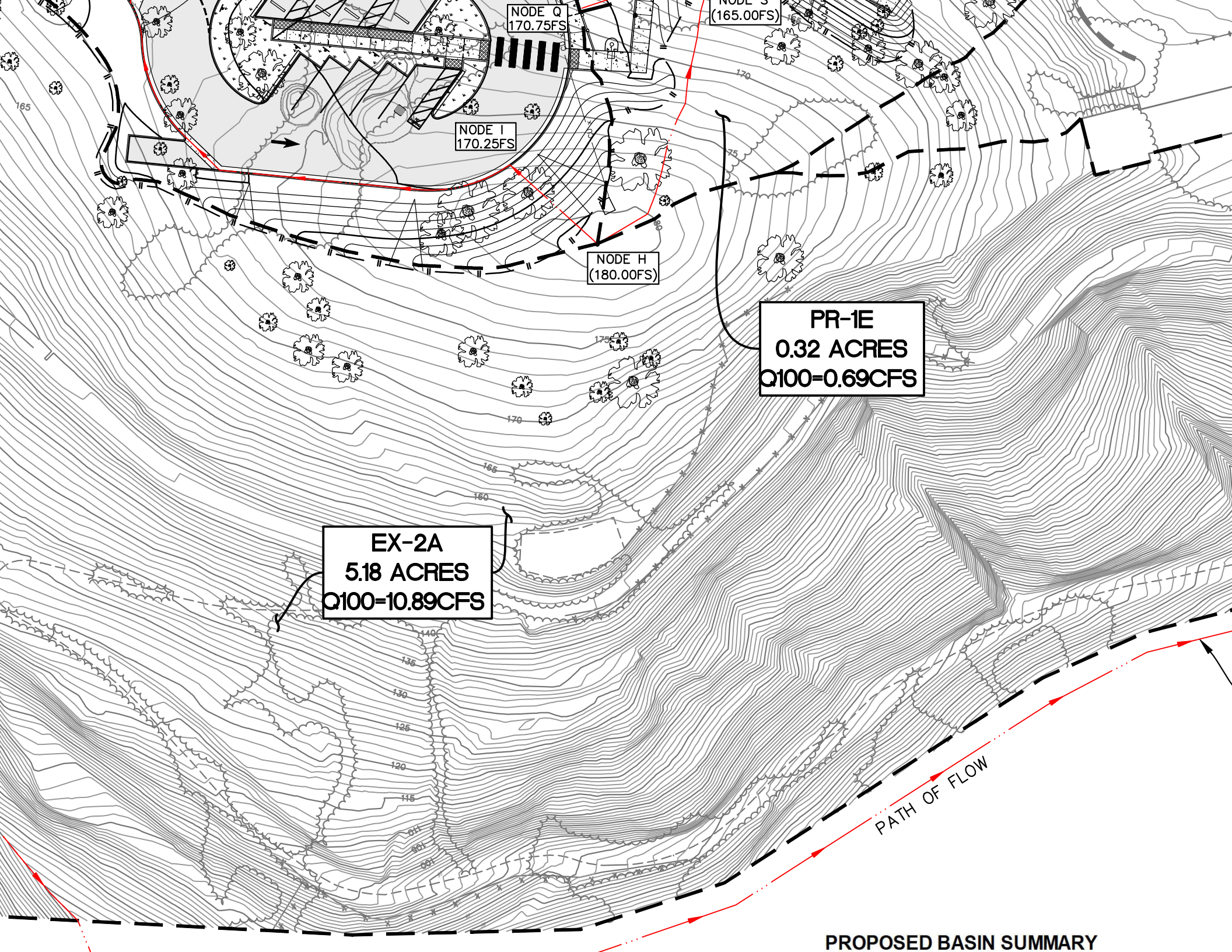


Figure A-1. Intensity-Duration-Frequency Design Chart

Appendix B – Post-Developed Conditions

Post-Developed Conditions, Calculations, Intensity Duration Curves.



PROPOSED BASIN SUMMARY

BASIN DATA: PROPOSED CONDITIONS

Runoff Coefficient

Sub Area	Area (acres)	% Impervious	% Pervious	Description	C Value
Offsite					
O-1	0.16	99.5%	0.5%	Asphalt road and gutter	0.90
Basin 1					
PR-1A	0.70	60.1%	39.9%	Access Driveway and Lot	0.68
PR-1B		2.4%	97.6%	Natural Sloped Terrain, ADA	
	0.39			Pathway	0.36
PR-1C		12.2%	87.8%	Natural Sloped Terrain, ADA	
	0.19			Pathway	0.42
		14.7%		Natural Sloped Terrain, ADA	
PR-1D	0.35			Pathway	0.43
		9.2%		Natural Sloped Terrain, ADA	
PR-1E	0.32			Pathway	0.40
		11.8%		Natural Sloped Terrain, ADA	
PR-1F	0.14			Pathway	0.41
Basin 2					
EX-2A	5.18	0.24%	99.8%	Natural Sloped Terrain	0.35
	7.43				

Assumes Hydrologic Soil Type D

Time of concentration

Sheet Flow $T_i = \frac{1.8(1.1 - C)\sqrt{L}}{\sqrt[3]{S}}$

Basin	Node	C Value	L (ft)	Delta (ft)	Slope (%)	T_i (min)
O-1	A-B	0.90	85.00	7.00	8.24	1.67
PR-1A	H-I	0.68	42.00	9.75	23.21	1.72
PR-1B	L-M	0.50	100.00	14.00	14.00	4.48
PR-1C	N-O	0.50	100.00	14.50	14.50	4.43
PR-1D	Q-R	0.50	100.00	17.75	17.75	4.14
PR-1E	H-S	0.50	100.00	15.00	15.00	4.38
PR-1F	U-F	0.50	100.00	21.00	21.00	3.91
EX-2A	A-V	0.50	100.00	13.00	13.00	4.59

On-Site Channelized Flow $T_t = \frac{L}{60V}$

Basin	Node	Channel Description	Channel Length (ft)	Channel Slope (%)	Average Q (cfs)	Velocity (fps)	T_t (min)
O-1	B-G	Gutter Flow	532.00	7.90%	2.57	7.75	1.14
PR-1A	I-J	Gutter Flow	383.00	2.68%	1.05	3.82	1.67
	K-C	Pipe Flow	19.44	1.30%	0.75	4.04	0.08
PR-1B	M-D	Concentrated Flow	77.00	27.30%	0.43	5.06	0.25
PR-1C	O-P	Concentrated Flow	98.00	8.30%	0.21	3.10	0.53
	P-U	Pipe Flow	156.00	6.80%	0.38	5.48	0.47
PR-1D	R-E	Concentrated Flow	162.00	21.60%	0.34	4.53	0.60
PR-1E	S-T	Concentrated Flow	163.00	14.70%	0.15	3.28	0.83
	T-X	Pipe Flow	82.40	41.80%	1.11	14.79	0.09
EX-2A	V-W	Channel Flow	1084.00	11.99%	5.44	12.49	1.45

Total Time of Concentration

Basin	T_i (min)	T_t (min)	Tc (min)
O-1	1.67	1.14	5.00
PR-1A	1.72	1.75	5.00
PR-1B	4.48	0.25	5.00
PR-1C	4.43	0.53	5.00
PR-1D	4.14	0.60	5.00
PR-1E	4.38	0.92	5.30
PR-1F	3.91	0.00	5.00
EX-2A	4.59	1.45	6.04

100 YEAR - 6 HOUR Storm

Use Figure A-1: Intensity Duration-Frequency Chart

Basin	C Value	T_c (mins)	Intensity ($^{in}/_{hr}$)	Area (acres)	Runoff (Q, cfs)	Mitigated Runoff (Q, cfs)	
O-1	0.90	5.00	4.40	0.16	0.62		
PR-1A	0.68	5.00	4.40	0.70	2.10	1.49	Flow to be captured and treated
PR-1B	0.50	5.00	4.40	0.39	0.86		Runoff to existing gutter
PR-1C	0.50	5.00	4.40	0.19	0.42		Runoff to existing gutter
PR-1D	0.50	5.00	4.40	0.35	0.76		
PR-1E	0.50	5.30	4.25	0.32	0.69		
PR-1F	0.50	5.00	4.40	0.14	0.30		
EX-2A	0.50	6.04	4.20	5.18	10.89		Runoff to existing channel

BASIN SUMMARY

Runoff to Presidio Drive (POC A) = 5.14 cfs
Runoff to Palm Canyon (POC B) = 10.89 cfs

Pond Report

Pond No. 1 - Biofiltration Basin

First pond report produced to find at what stage (elevation) the Water Quality Control DCV requirement has been achieved

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	156.75	n/a	0	0
1.25	158.00	n/a	481	481
3.25	160.00	n/a	385	866
4.75	162.00	n/a	1,443	2,309

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	8.00	0.00	0.00
Span (in)	= 18.00	8.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 156.75	157.00	0.00	0.00
Length (ft)	= 100.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 1.00	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	0.00	0.00	0.00
Crest El. (ft)	= 161.15	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 Wet area)

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	156.75	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.13	48	156.88	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.25	96	157.00	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.38	144	157.13	0.06 ic	0.06 ic	---	---	0.00	---	---	---	---	---	0.057
0.50	192	157.25	0.22 ic	0.20 ic	---	---	0.00	---	---	---	---	---	0.204
0.63	241	157.38	0.42 ic	0.42 ic	---	---	0.00	---	---	---	---	---	0.422
0.75	289	157.50	0.68 ic	0.68 ic	---	---	0.00	---	---	---	---	---	0.680
0.88	337	157.63	0.92 ic	0.92 ic	---	---	0.00	---	---	---	---	---	0.915
1.00	385	157.75	1.08 ic					---	---	---	---	---	1.085
1.13	433	157.88	1.27 ic					---	---	---	---	---	1.237
1.25	481	158.00	1.40 ic					---	---	---	---	---	1.372
1.45	520	158.20	1.62 ic					---	---	---	---	---	1.564
1.65	558	158.40	1.77 ic	1.74 ic	---	---	0.00	---	---	---	---	---	1.736
1.85	597	158.60	1.93 ic	1.89 ic	---	---	0.00	---	---	---	---	---	1.891
2.05	635	158.80	2.04 ic	2.04 ic	---	---	0.00	---	---	---	---	---	2.035
2.25	674	159.00	2.19 ic	2.17 ic	---	---	0.00	---	---	---	---	---	2.170
2.45	712	159.20	2.30 ic	2.30 ic	---	---	0.00	---	---	---	---	---	2.296
2.65	751	159.40	2.46 ic	2.42 ic	---	---	0.00	---	---	---	---	---	2.416
2.85	789	159.60	2.56 ic	2.53 ic	---	---	0.00	---	---	---	---	---	2.530
3.05	828	159.80	2.66 ic	2.64 ic	---	---	0.00	---	---	---	---	---	2.639
3.25	866	160.00	2.75 ic	2.74 ic	---	---	0.00	---	---	---	---	---	2.744
3.40	1,010	160.15	2.86 ic	2.82 ic	---	---	0.00	---	---	---	---	---	2.819
3.55	1,155	160.30	2.96 ic	2.89 ic	---	---	0.00	---	---	---	---	---	2.887
3.70	1,299	160.45	2.96 ic	2.96 ic	---	---	0.00	---	---	---	---	---	2.959
3.85	1,443	160.60	3.63 ic	2.99 ic	---	---	0.63	---	---	---	---	---	3.626
4.00	1,588	160.75	5.56 ic	2.98 ic	---	---	2.50	---	---	---	---	---	5.477
4.15	1,732	160.90	8.00 ic	2.95 ic	---	---	5.05	---	---	---	---	---	8.002
4.30	1,876	161.05	11.04 ic	2.89 ic	---	---	8.15	---	---	---	---	---	11.04
4.45	2,020	161.20	12.19 oc	1.19 ic	---	---	11.00 s	---	---	---	---	---	12.19
4.60	2,165	161.35	13.00 oc	0.95 ic	---	---	12.05 s	---	---	---	---	---	13.00
4.75	2,309	162.00	14.92 oc	0.50 ic	---	---	14.41 s	---	---	---	---	---	14.91

Water Quality Control DCV: 1124 CF
Achieved at stage 3.52
Water Quality Control Elevation: 160.27

Note that the Water Quality Control DCV has been obtained from Worksheet B5.1 of the SWQMP report

1 # Watershed Model Schematic

Legend

Hyd.	Origin	Description
1	Manual	PR-1A
2	Reservoir	PR-1A Mitigated

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	Manual	------	-------	0.000	-------	-------	0.000	-------	-------	2.100	PR-1A
2	Reservoir	1	-------	0.000	-------	-------	0.000	-------	-------	1.492	PR-1A Mitigated

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

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	2.100	5	240	4,500	------	------	------	PR-1A
2	Reservoir	1.492	5	245	4,498	1	161.16	857	PR-1A Mitigated

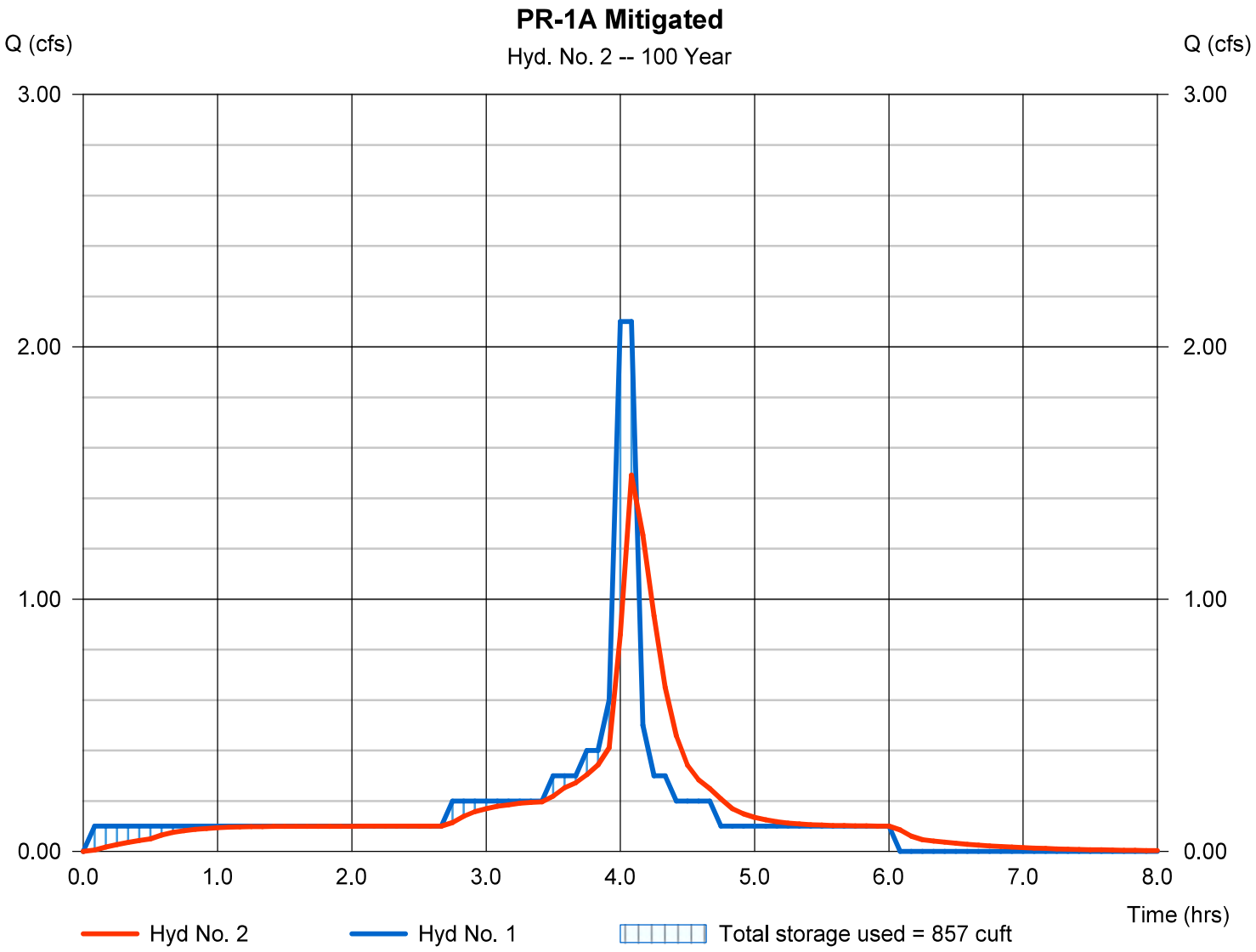
Hydrograph Report

Hyd. No. 2

PR-1A Mitigated

Hydrograph type	=	Reservoir	Peak discharge	=	1.492 cfs
Storm frequency	=	100 yrs	Time to peak	=	4.08 hrs
Time interval	=	5 min	Hyd. volume	=	4,498 cuft
Inflow hyd. No.	=	1 - PR-1A	Max. Elevation	=	161.16 ft
Reservoir name	=	Biofiltration Basin	Max. Storage	=	857 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - Biofiltration Basin

To model only flood control, the stage where water quality control is achieved (stage 3.52), will be set to stage 0

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	160.27	n/a	0	0
1.23	161.50	n/a	1,183	1,183

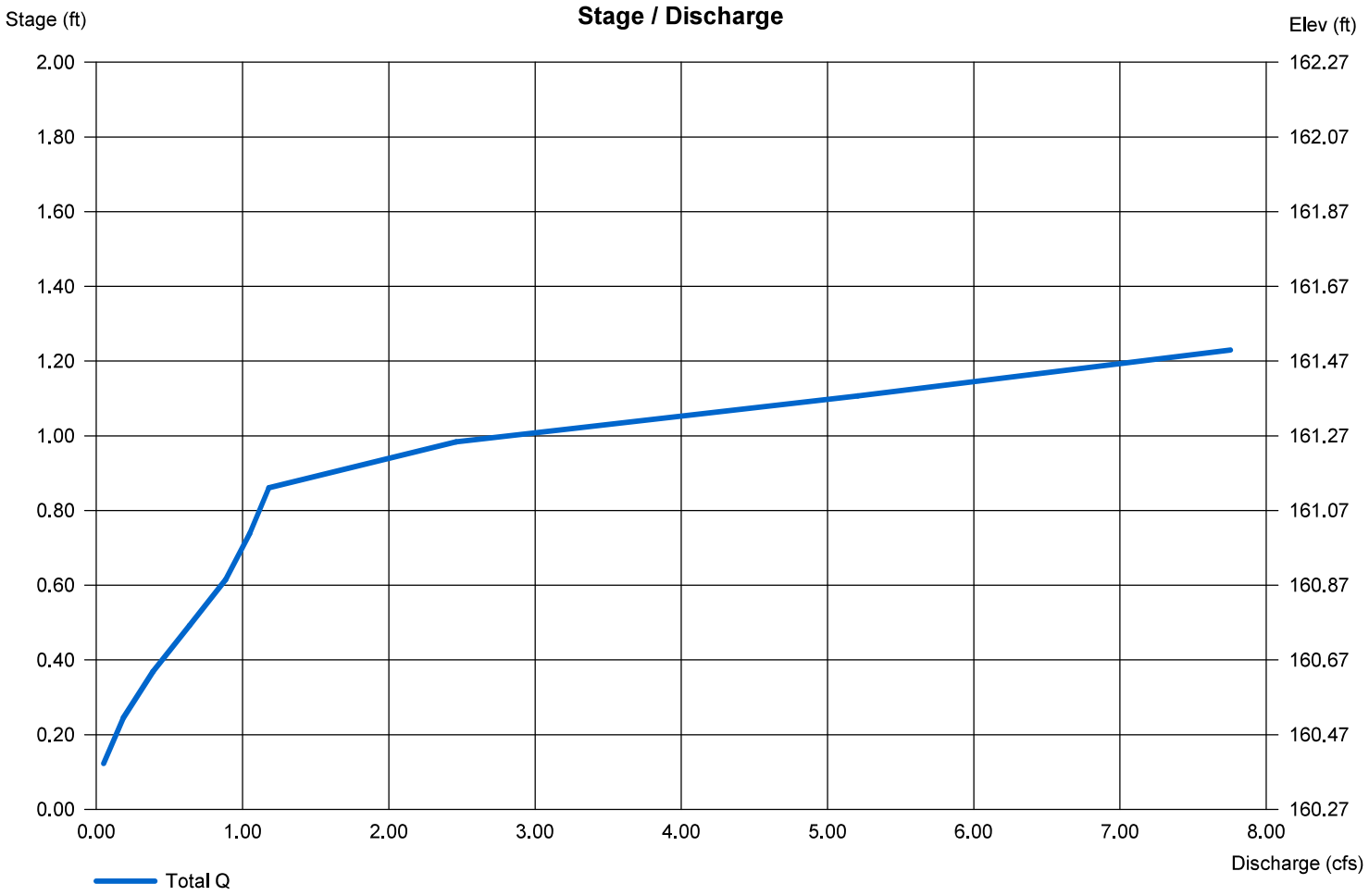
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	8.00	0.00	0.00
Span (in)	= 18.00	8.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 160.27	160.27	0.00	0.00
Length (ft)	= 100.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 1.00	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	0.00	0.00	0.00
Crest El. (ft)	= 161.15	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 Wet area)			
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).



Channel Report

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PROPOSED GUTTER(PR-1A)

Gutter

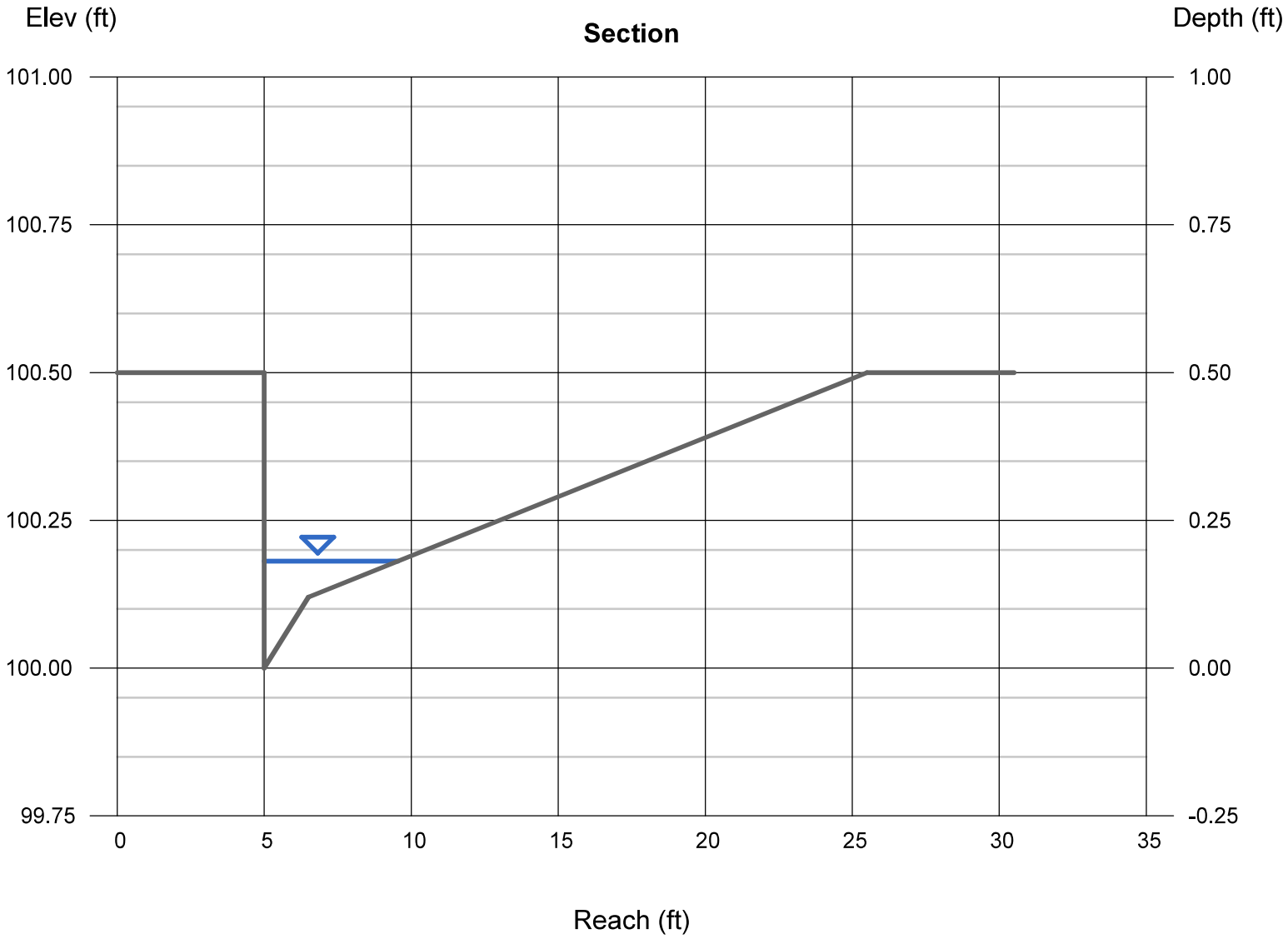
Cross Sl, Sx (ft/ft)	= 0.020
Cross Sl, Sw (ft/ft)	= 0.080
Gutter Width (ft)	= 1.50
Invert Elev (ft)	= 100.00
Slope (%)	= 2.68
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.05

Highlighted

Depth (ft)	= 0.18
Q (cfs)	= 1.050
Area (sqft)	= 0.27
Velocity (ft/s)	= 3.82
Wetted Perim (ft)	= 4.74
Crit Depth, Yc (ft)	= 0.25
Spread Width (ft)	= 4.55
EGL (ft)	= 0.41



Channel Report

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EXISTING COBBLE CHANNEL(EX-2A)

Triangular

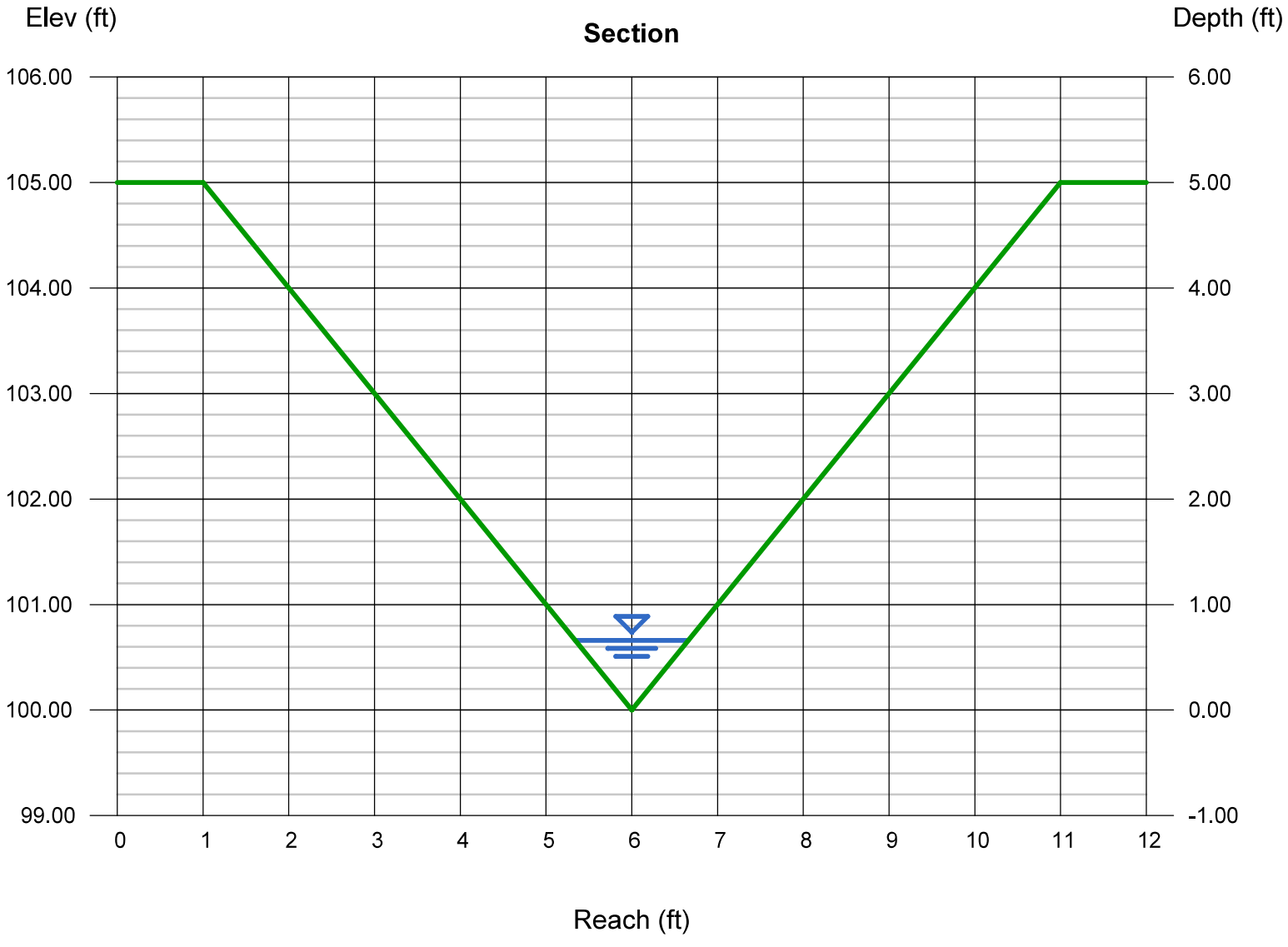
Side Slopes (z:1)	= 1.00, 1.00
Total Depth (ft)	= 5.00
Invert Elev (ft)	= 100.00
Slope (%)	= 11.99
N-Value	= 0.015

Calculations

Compute by:	Known Q
Known Q (cfs)	= 5.44

Highlighted

Depth (ft)	= 0.66
Q (cfs)	= 5.440
Area (sqft)	= 0.44
Velocity (ft/s)	= 12.49
Wetted Perim (ft)	= 1.87
Crit Depth, Yc (ft)	= 1.13
Top Width (ft)	= 1.32
EGL (ft)	= 3.08



Channel Report

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EXISTING COBBLE SWALE(O-1)

Gutter

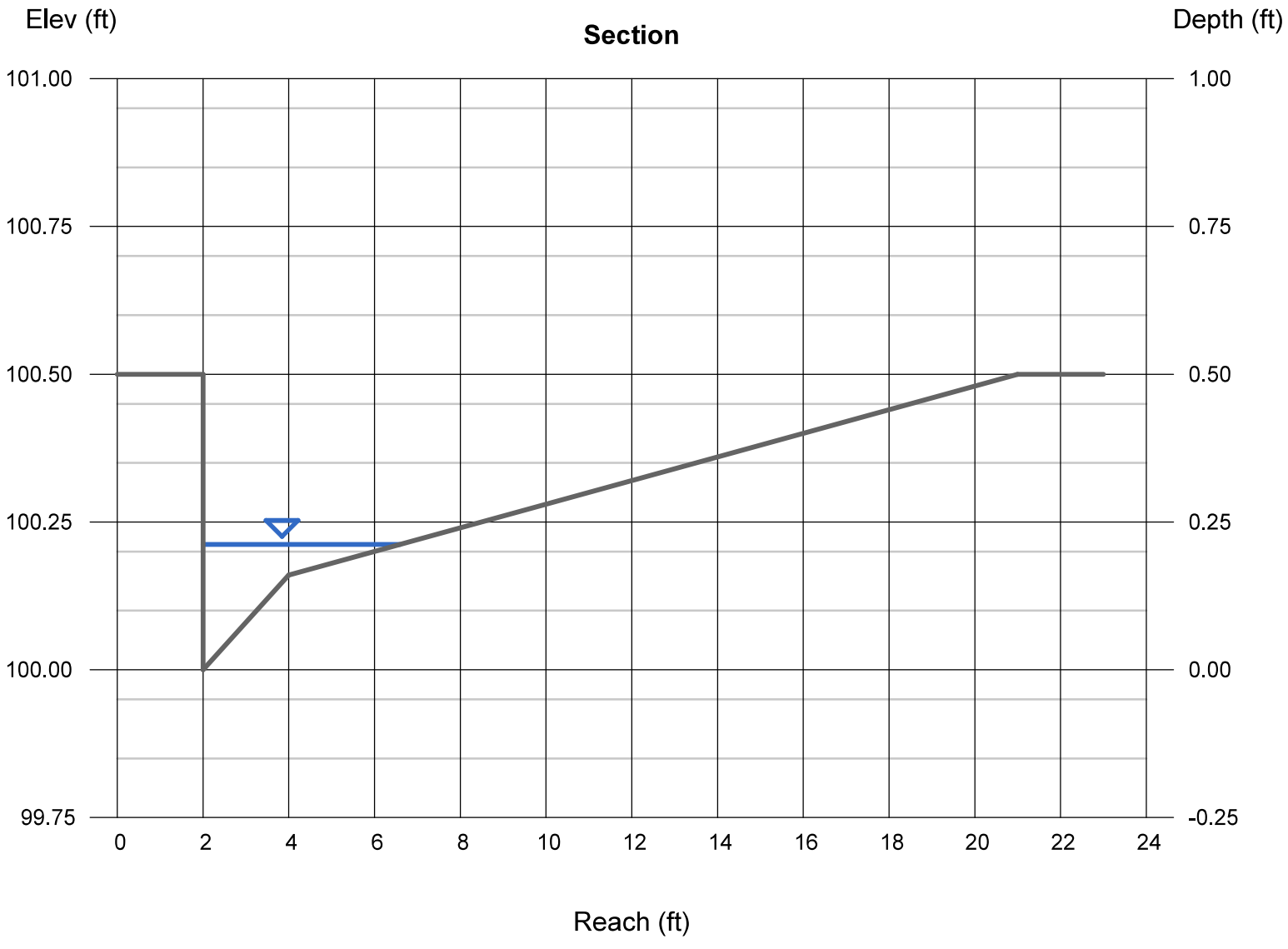
Cross Sl, Sx (ft/ft)	= 0.020
Cross Sl, Sw (ft/ft)	= 0.080
Gutter Width (ft)	= 2.00
Invert Elev (ft)	= 100.00
Slope (%)	= 7.90
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 2.57

Highlighted

Depth (ft)	= 0.21
Q (cfs)	= 2.570
Area (sqft)	= 0.33
Velocity (ft/s)	= 7.75
Wetted Perim (ft)	= 4.82
Crit Depth, Yc (ft)	= 0.34
Spread Width (ft)	= 4.60
EGL (ft)	= 1.15



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Nov 20 2025

PROPOSED 12 INCH STORM DRAIN (PR-1E)

Circular

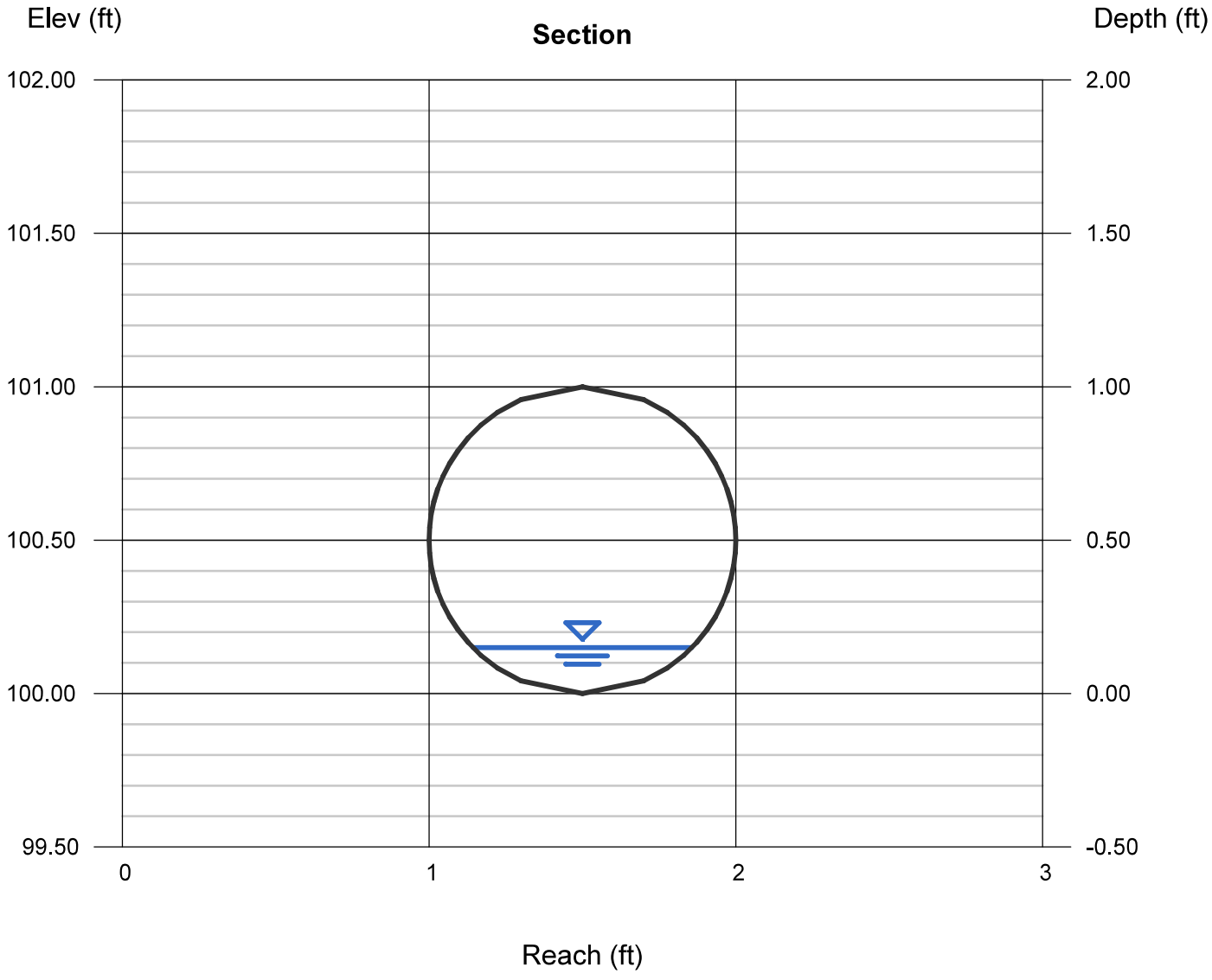
Diameter (ft)	= 1.00
Invert Elev (ft)	= 100.00
Slope (%)	= 41.80
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.11

Highlighted

Depth (ft)	= 0.15
Q (cfs)	= 1.110
Area (sqft)	= 0.08
Velocity (ft/s)	= 14.79
Wetted Perim (ft)	= 0.80
Crit Depth, Yc (ft)	= 0.45
Top Width (ft)	= 0.72
EGL (ft)	= 3.55



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Friday, Nov 21 2025

18 INCH STORM DRAIN(PR-1A)

Circular

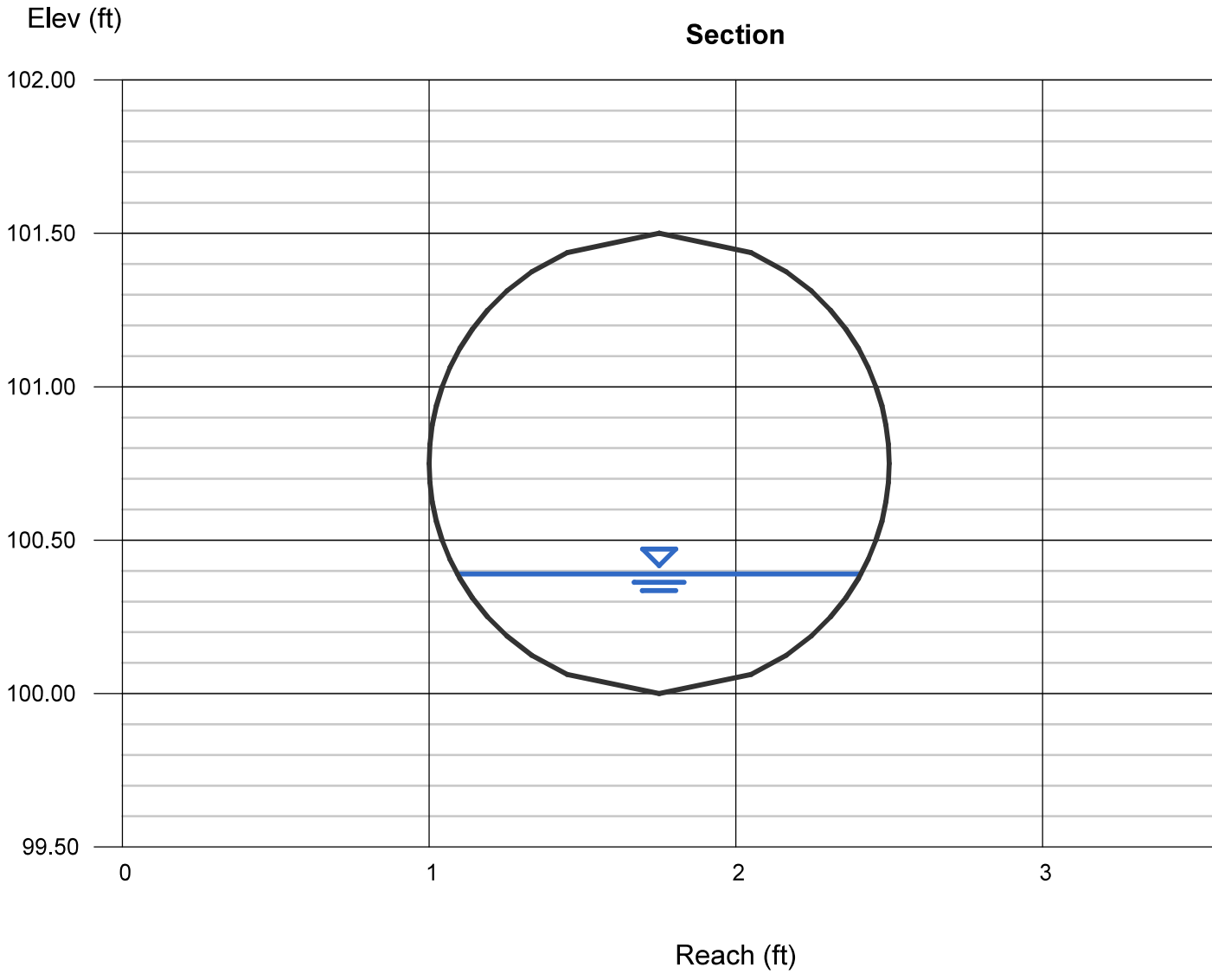
Diameter (ft)	= 1.50
Invert Elev (ft)	= 100.00
Slope (%)	= 1.00
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.49

Highlighted

Depth (ft)	= 0.39
Q (cfs)	= 1.490
Area (sqft)	= 0.37
Velocity (ft/s)	= 4.03
Wetted Perim (ft)	= 1.61
Crit Depth, Yc (ft)	= 0.46
Top Width (ft)	= 1.32
EGL (ft)	= 0.64



O-1

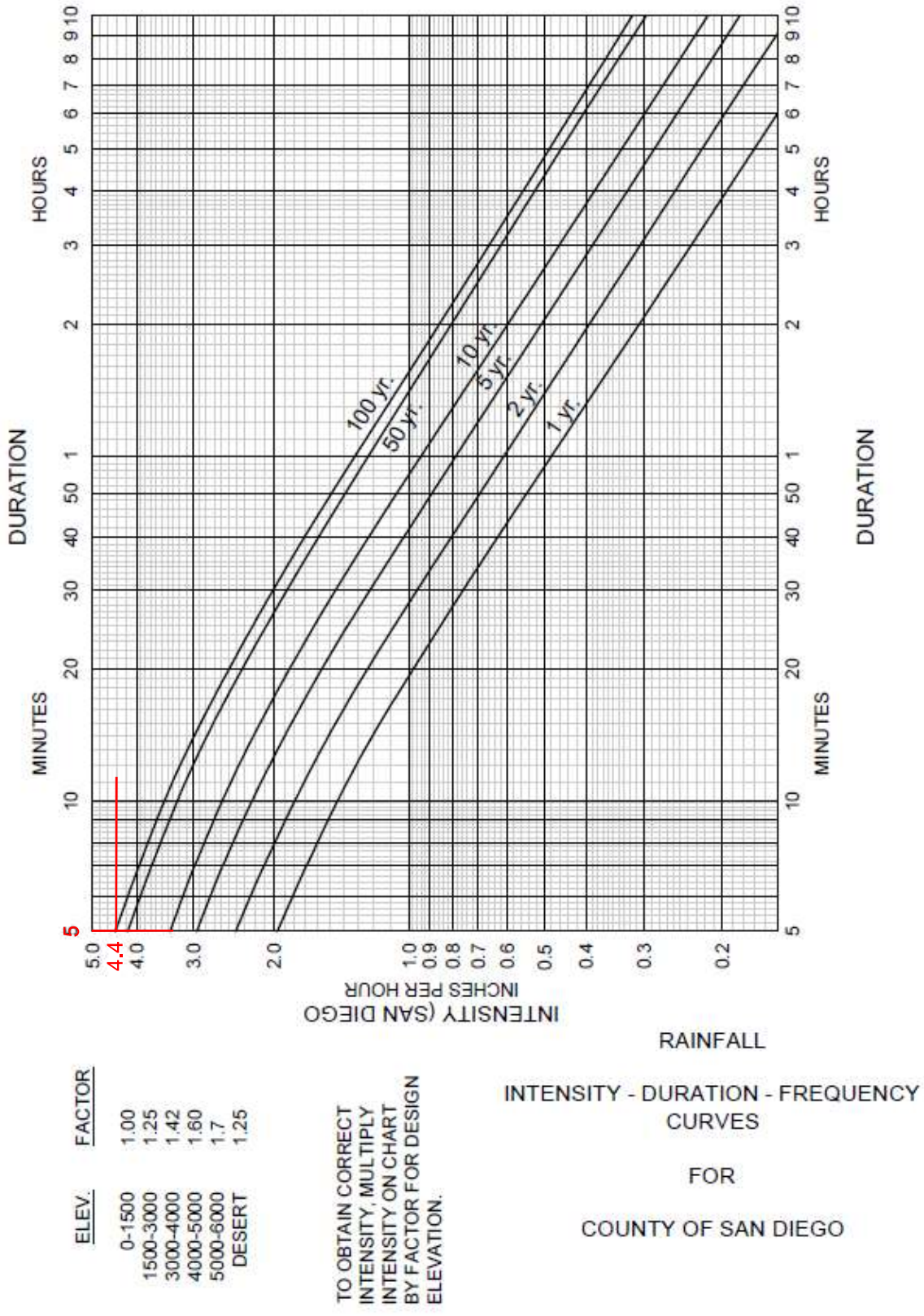


Figure A-1. Intensity-Duration-Frequency Design Chart

PR-1A

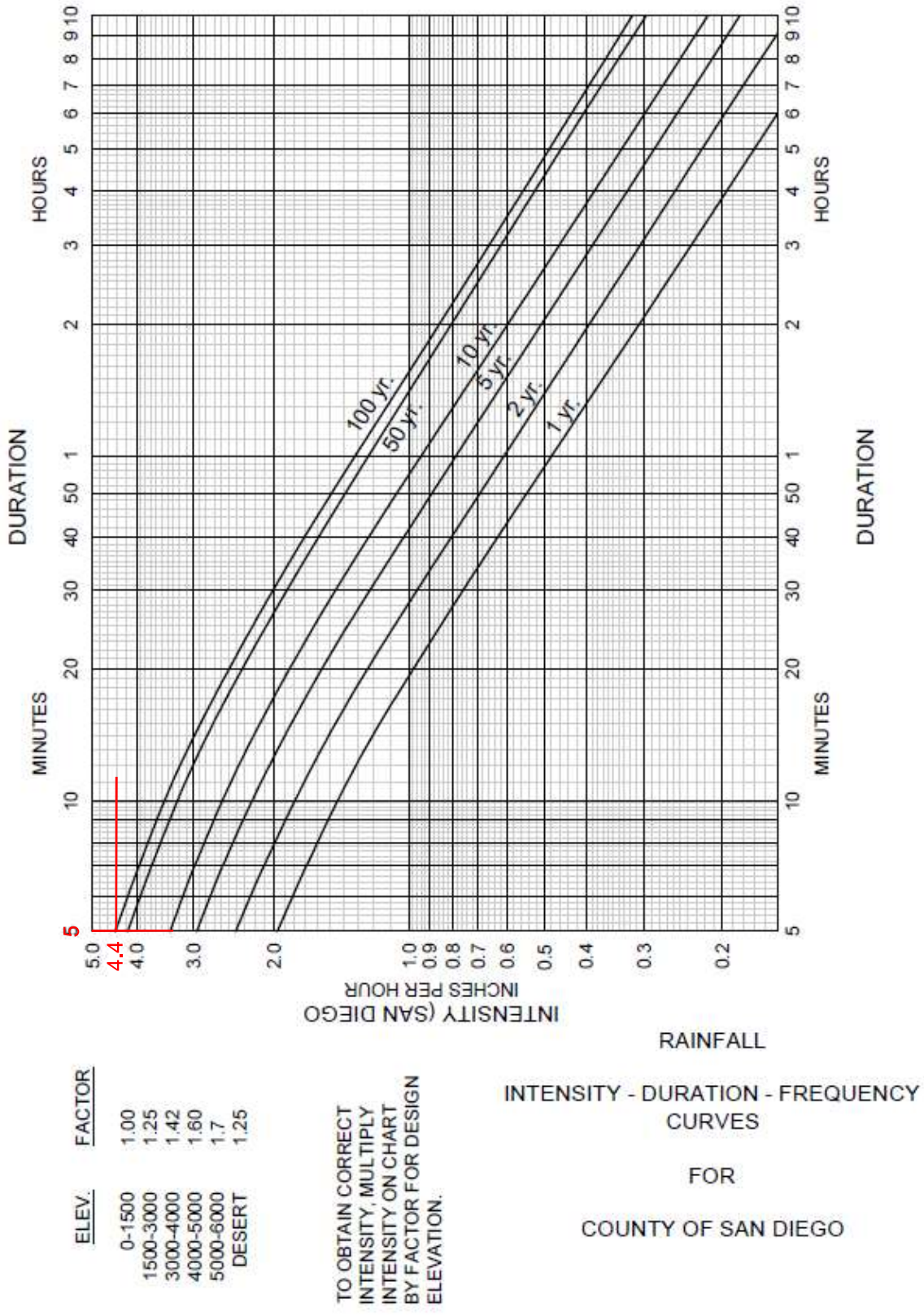


Figure A-1. Intensity-Duration-Frequency Design Chart

PR-1B

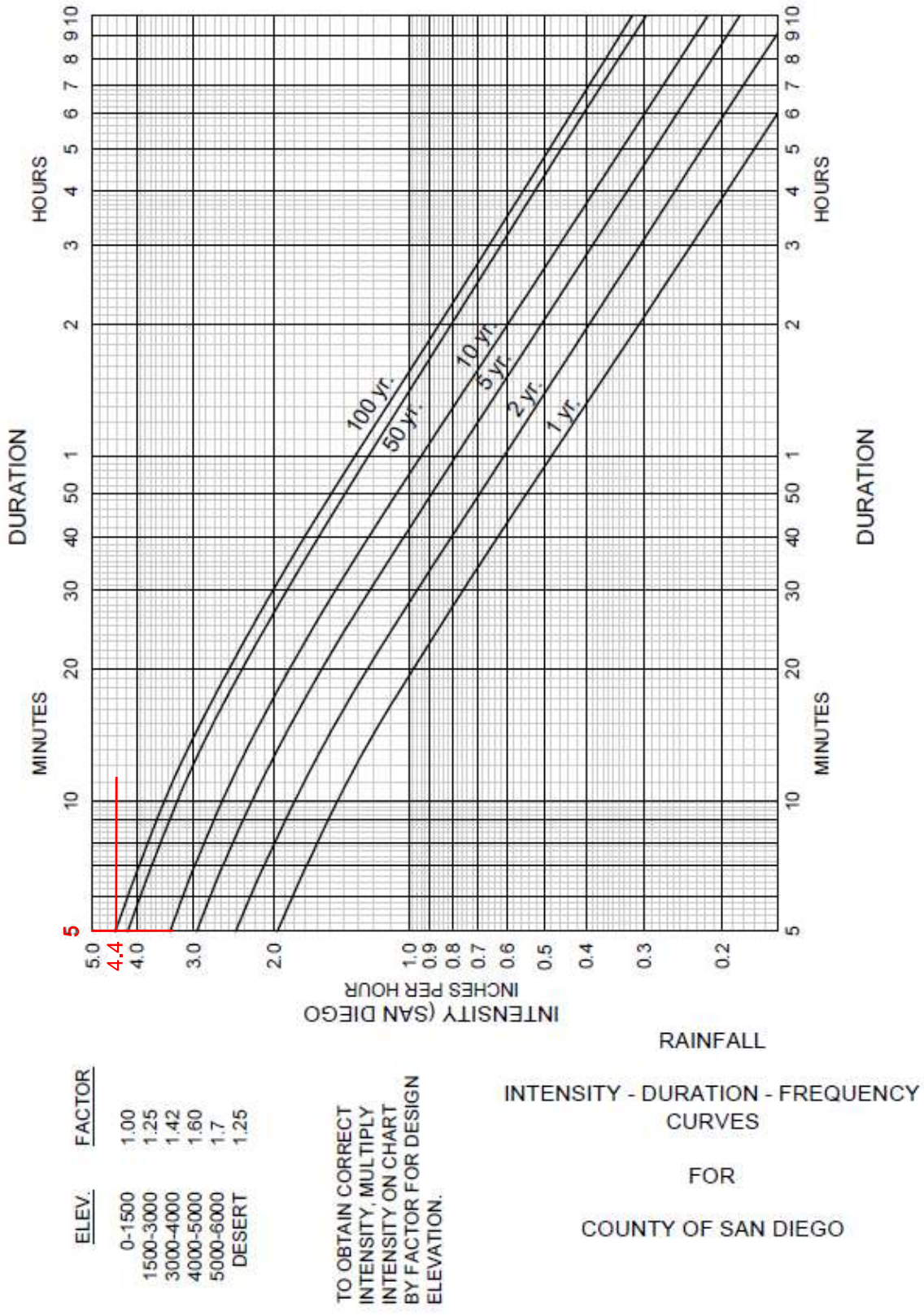


Figure A-1. Intensity-Duration-Frequency Design Chart

PR-1C

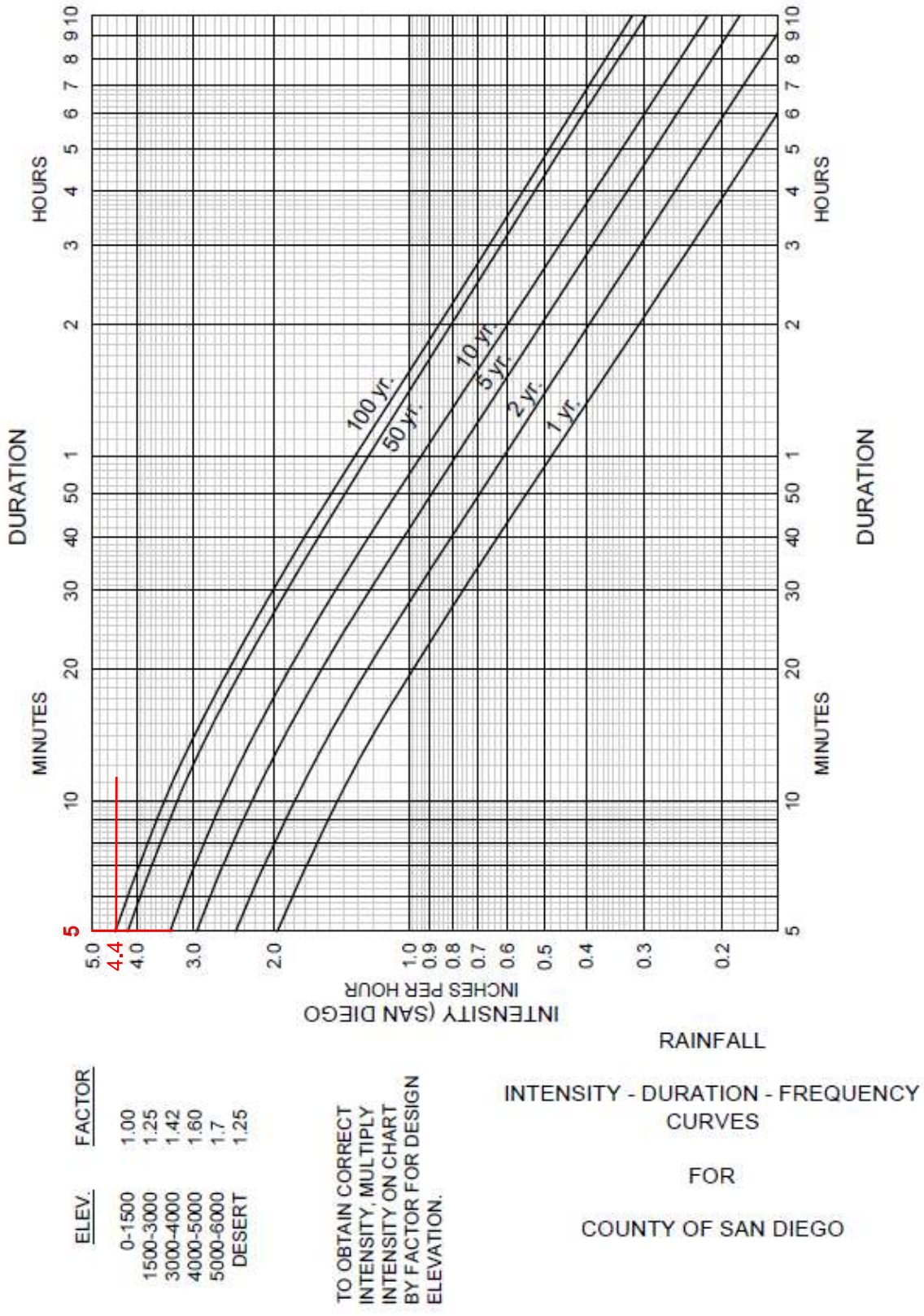


Figure A-1. Intensity-Duration-Frequency Design Chart

PR-1D

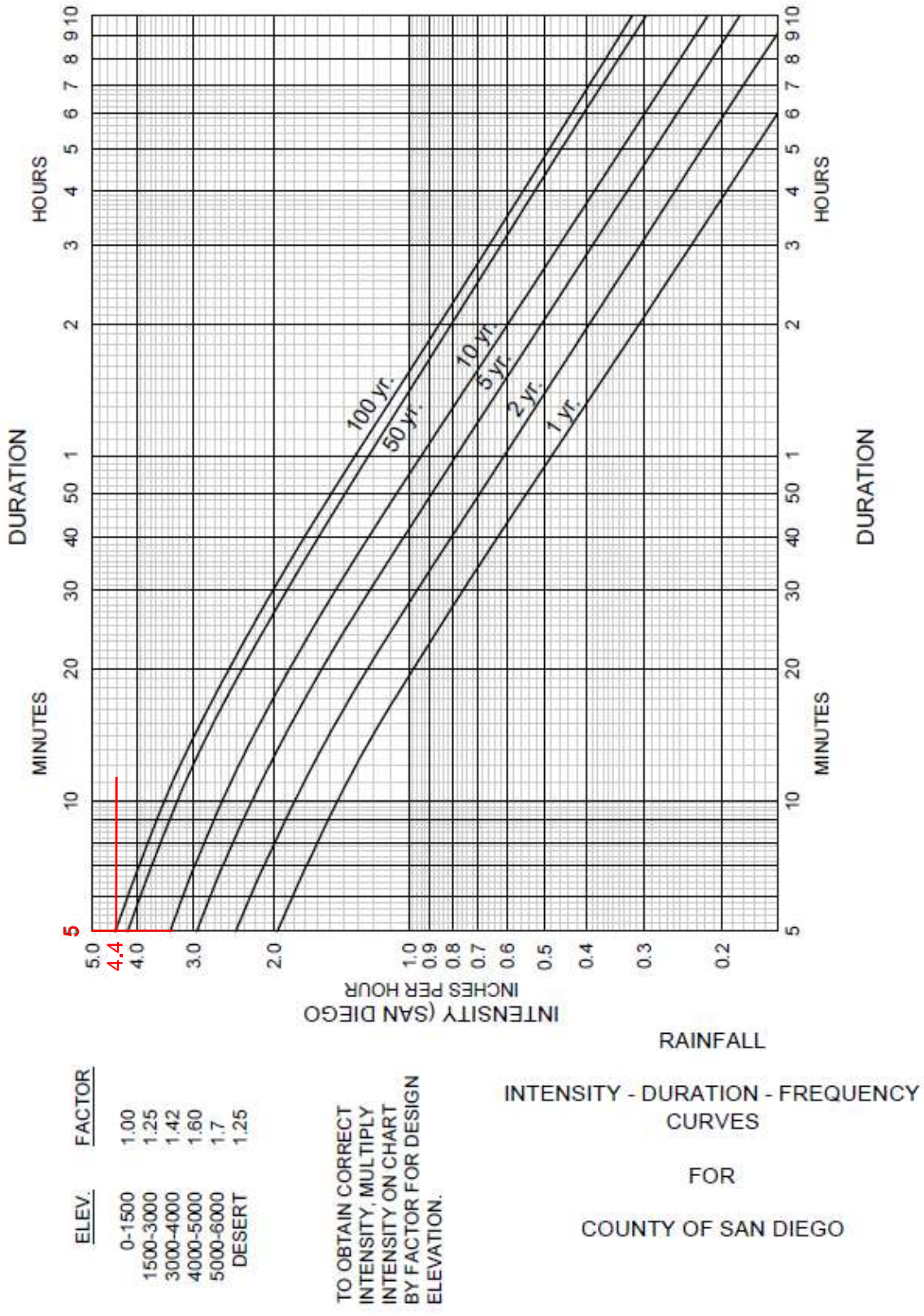


Figure A-1. Intensity-Duration-Frequency Design Chart

PR-1E

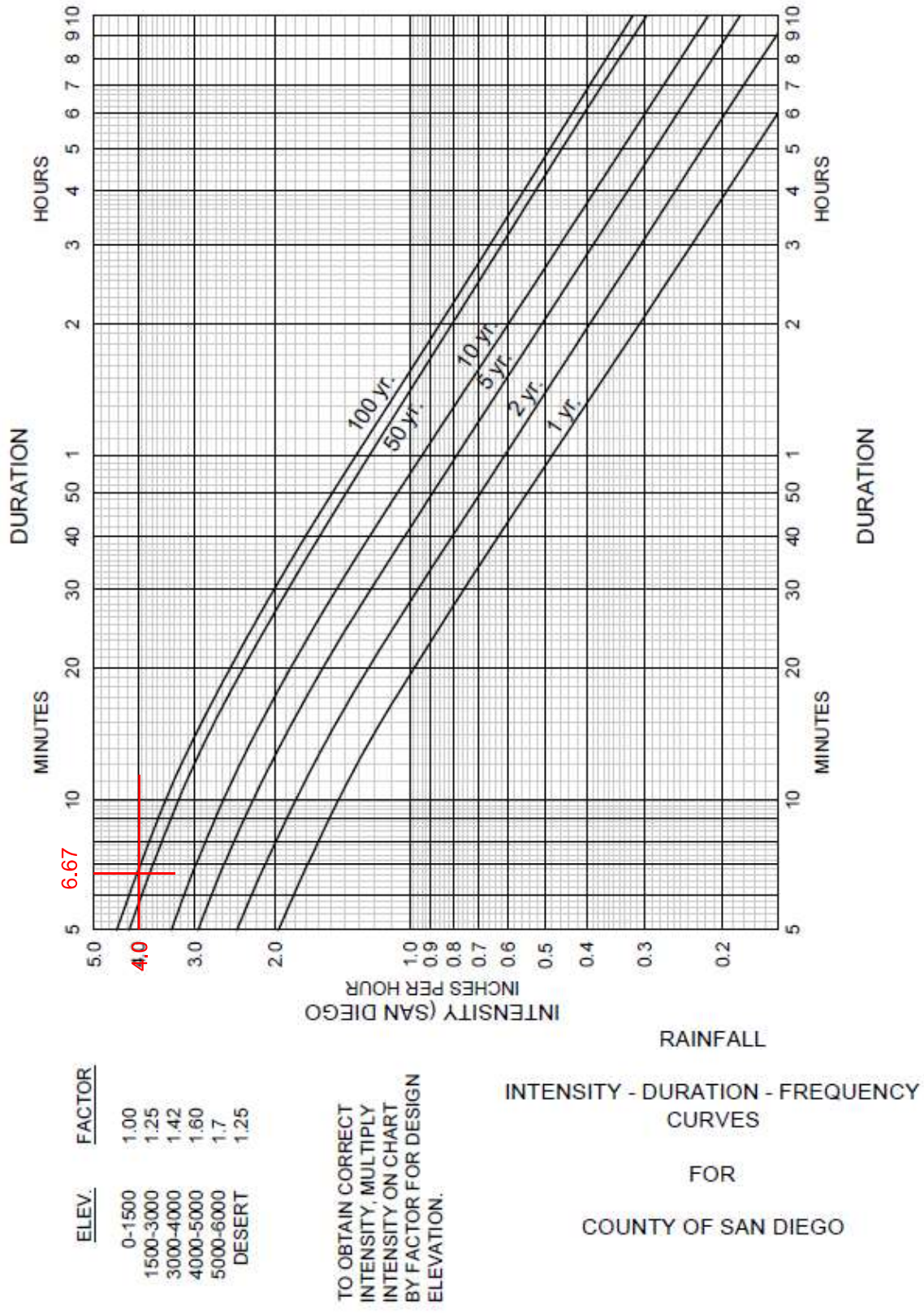


Figure A-1. Intensity-Duration-Frequency Design Chart

PR-1F

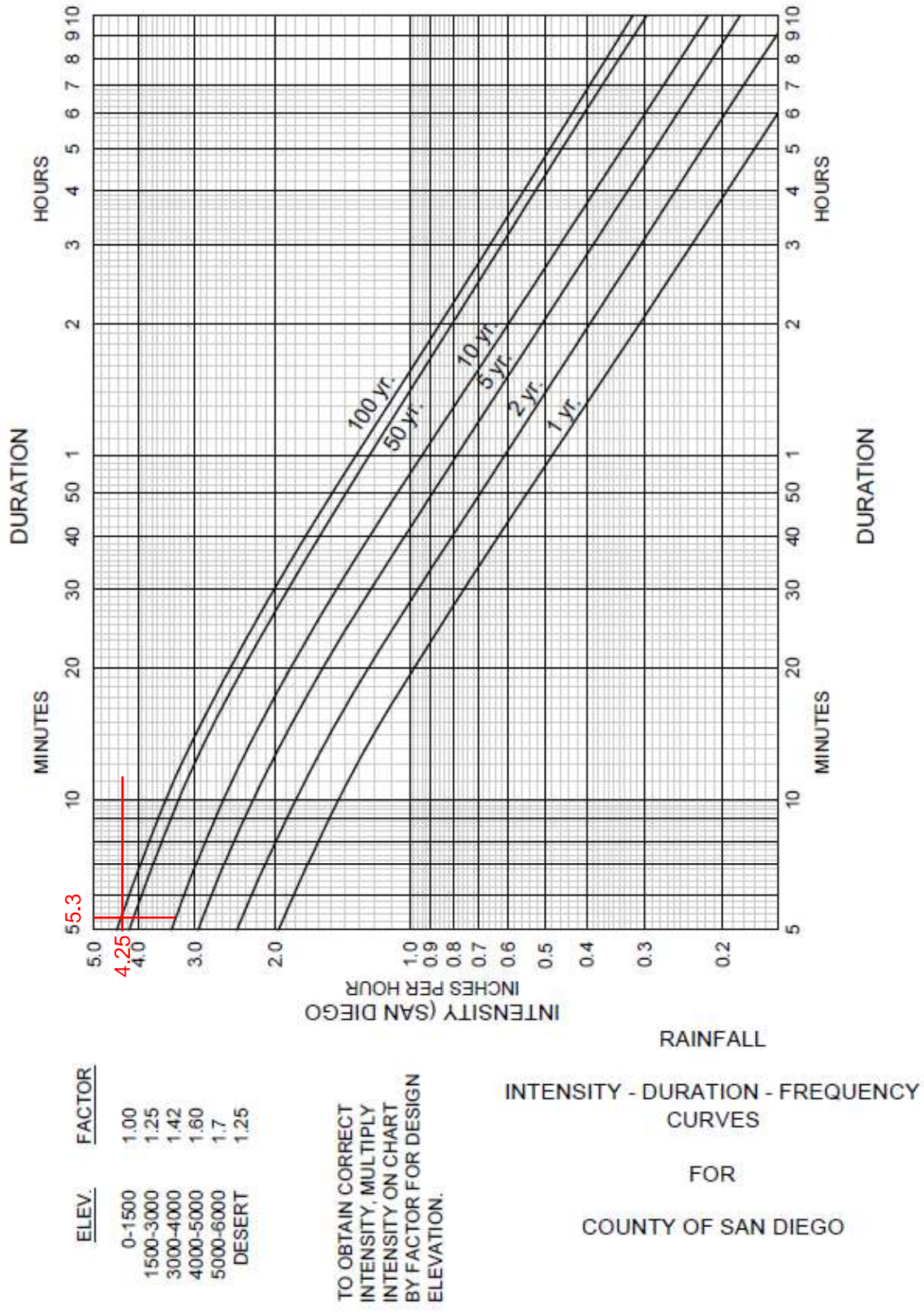


Figure A-1. Intensity-Duration-Frequency Design Chart

EX-2A

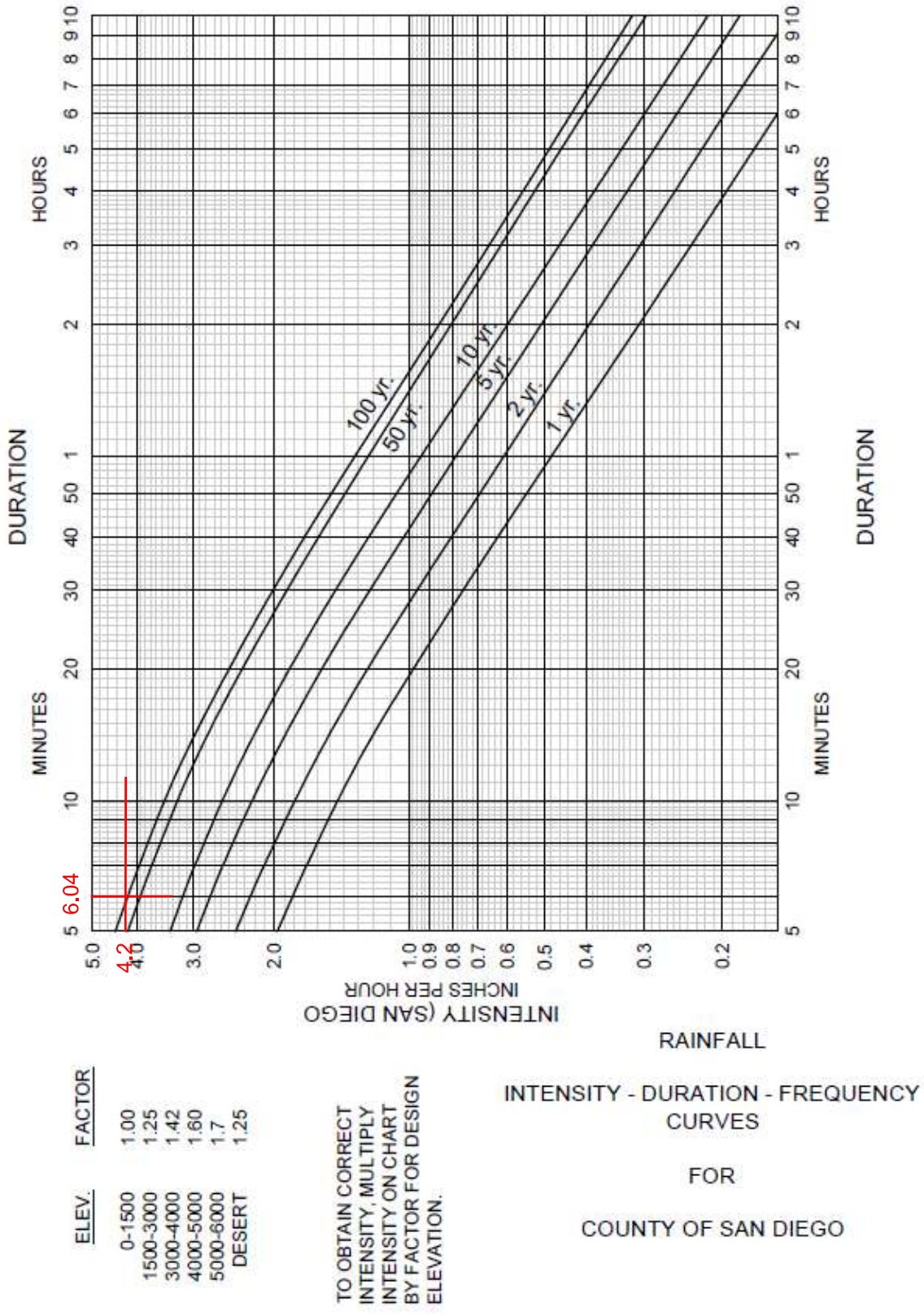


Figure A-1. Intensity-Duration-Frequency Design Chart

Appendix C – Reference Documents

Intensity Duration Frequency Design Chart, Time of Concentration, Runoff Coefficient

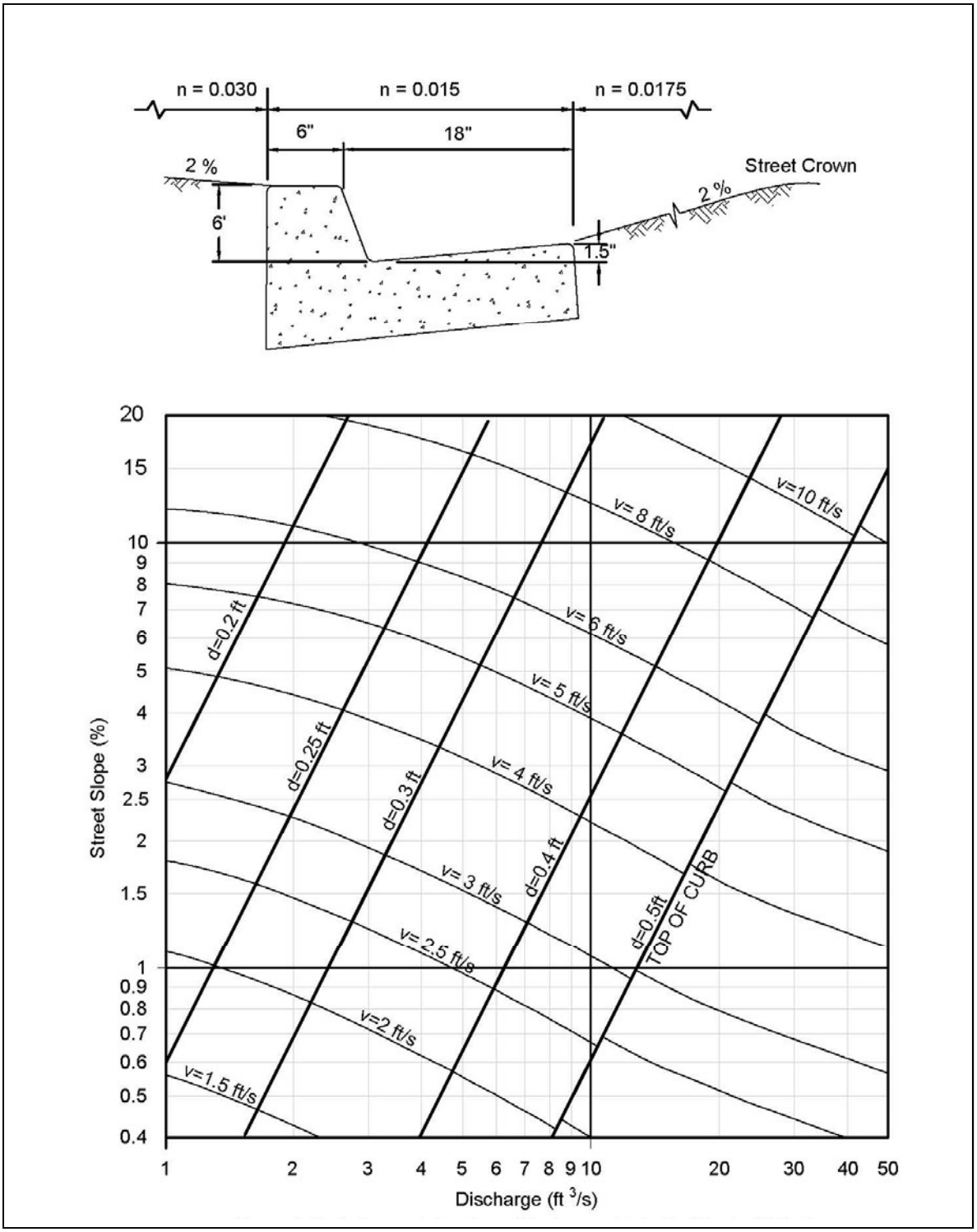


Figure 3-2: Gutter and Roadway Discharge-Velocity Chart (6" Curb)

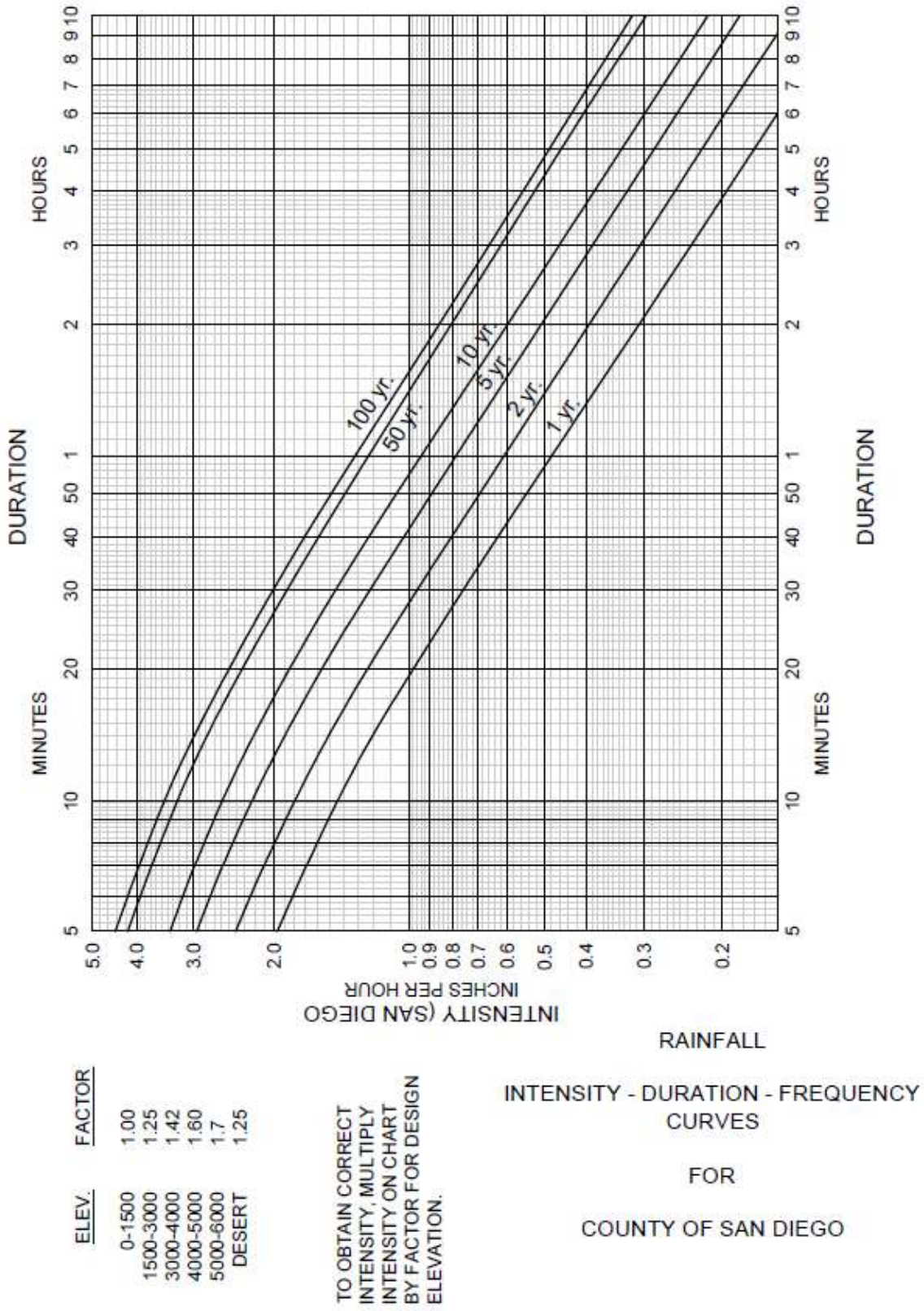


Figure A-1. Intensity-Duration-Frequency Design Chart

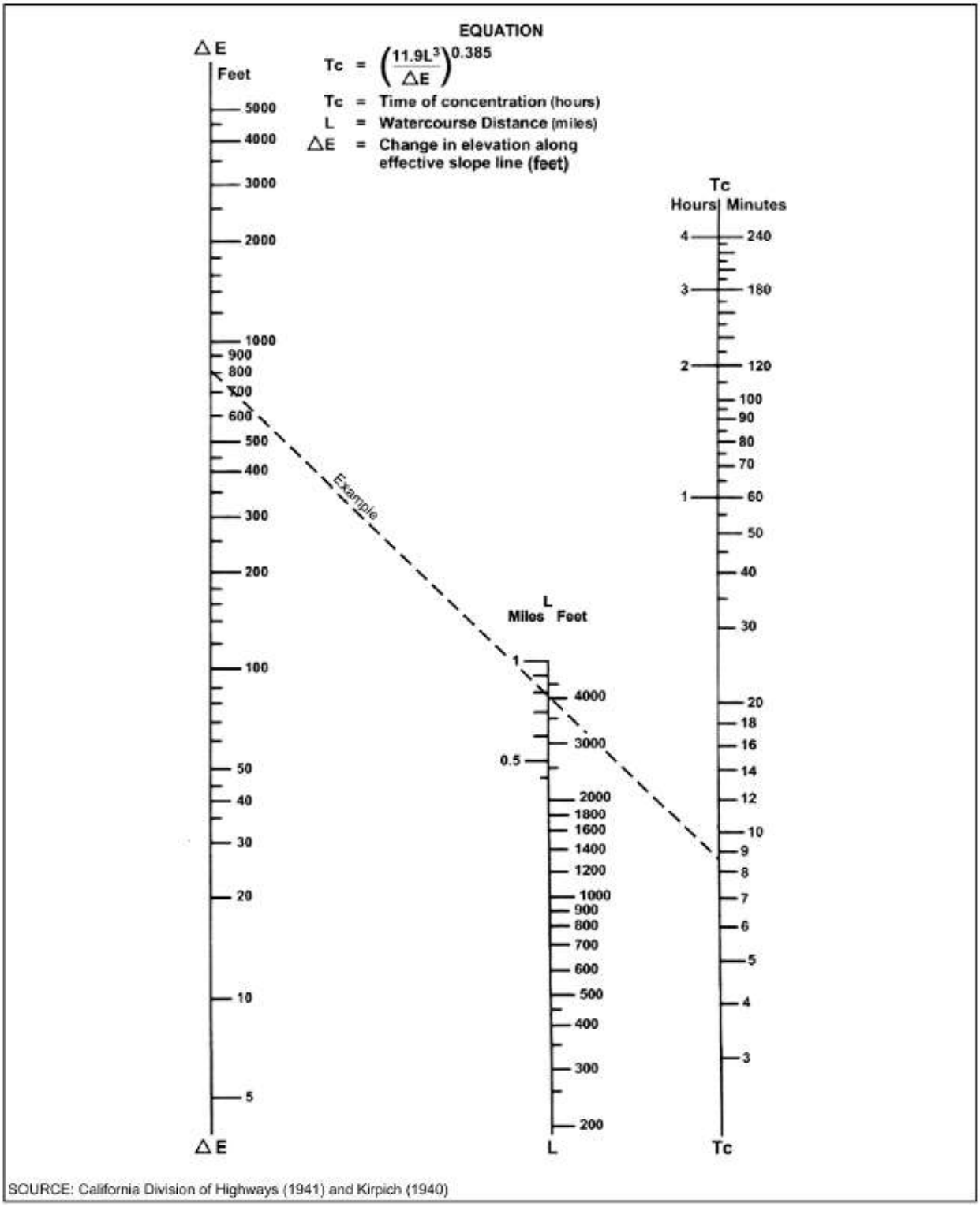


Figure A-2. Nomograph for Determination of T_c for Natural Watersheds

Note: Add ten minutes to the computed time of concentration from Figure A-2.

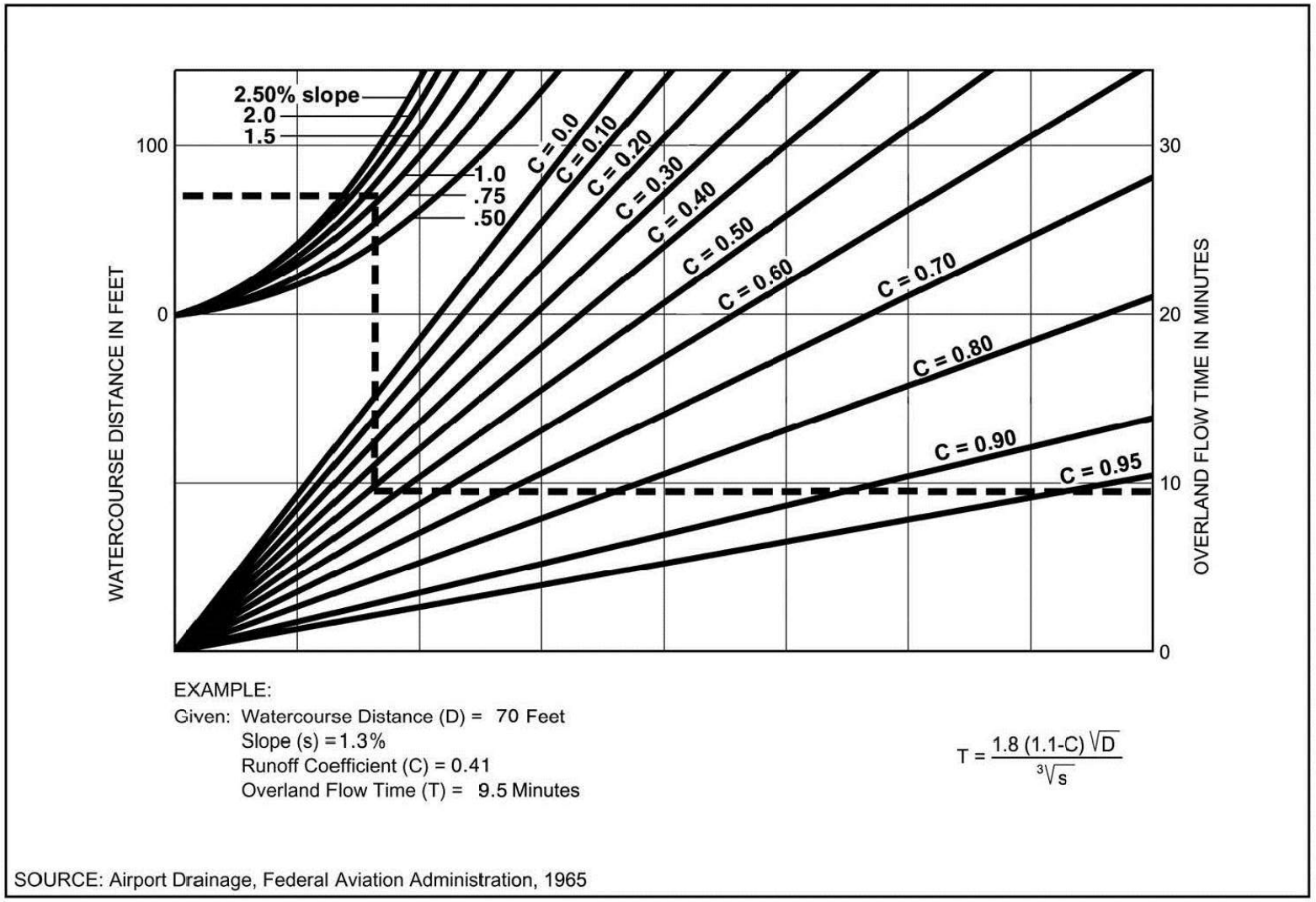


Figure A-4. Rational Formula – Overland Time of Flow Nomograph

Note: Use formula for watercourse distances in excess of 100 feet.

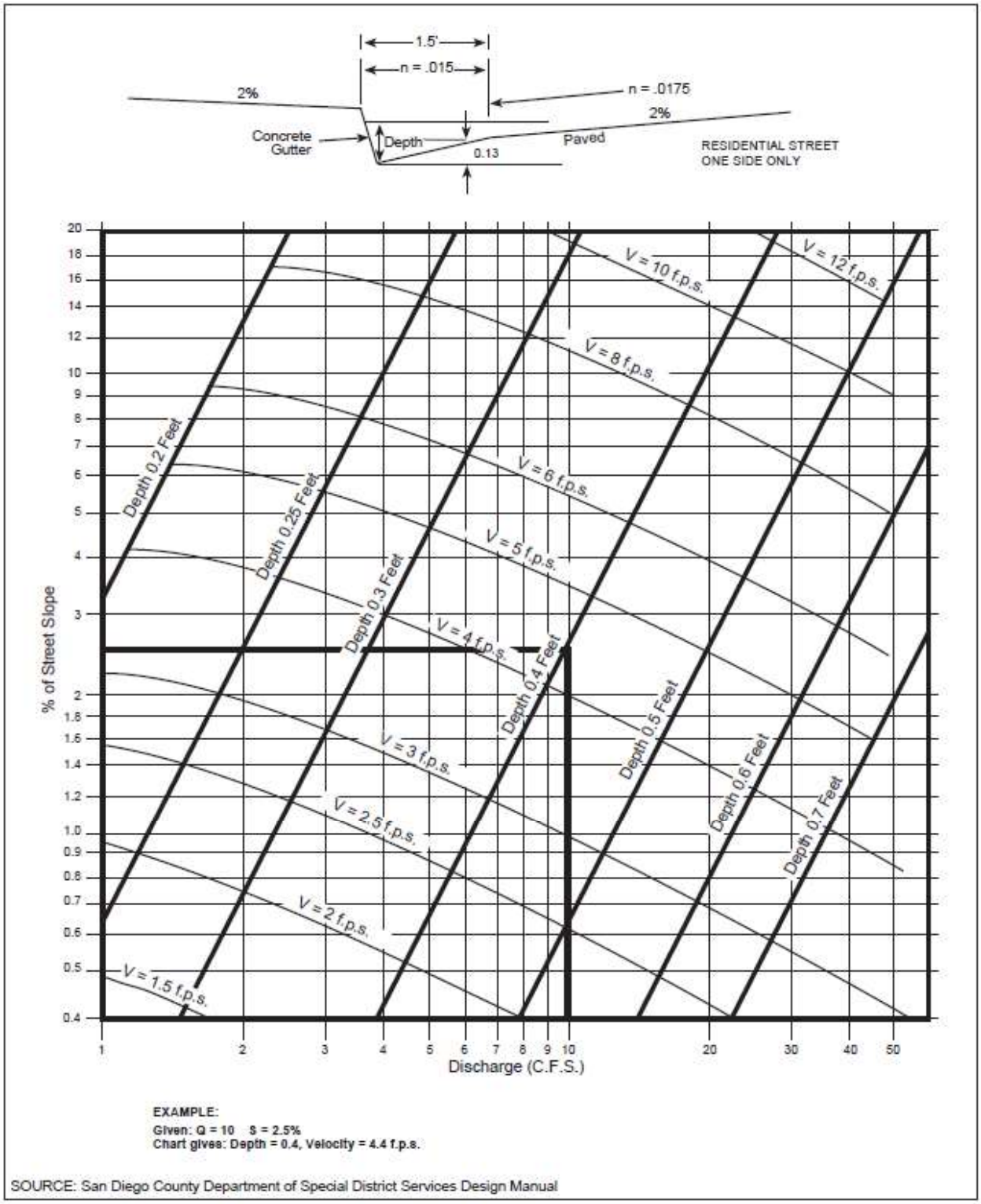


Figure A-5. Gutter and Roadway Discharge – Velocity Chart

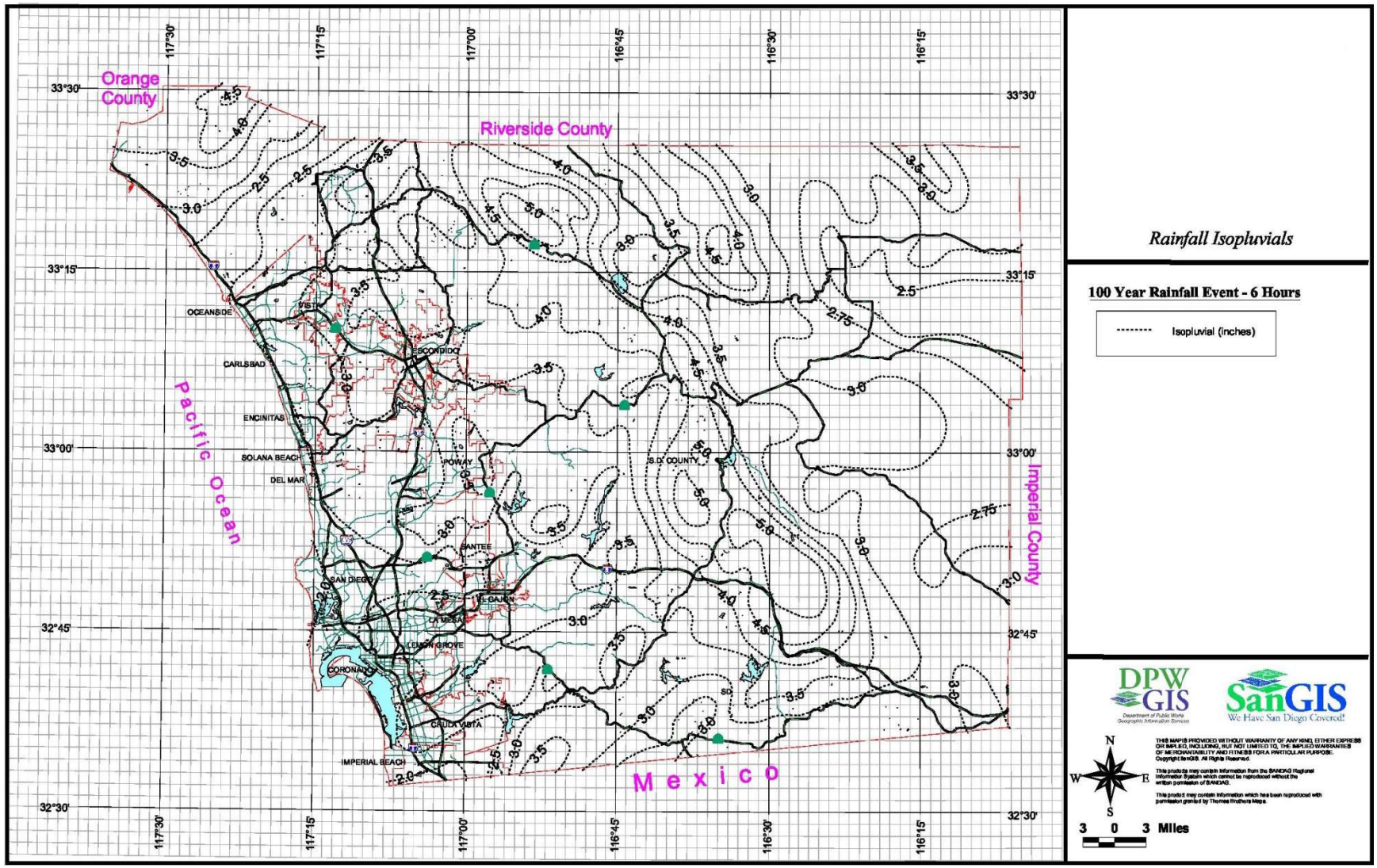


Figure B-2. 100-Year 6-Hour Isopluvials.

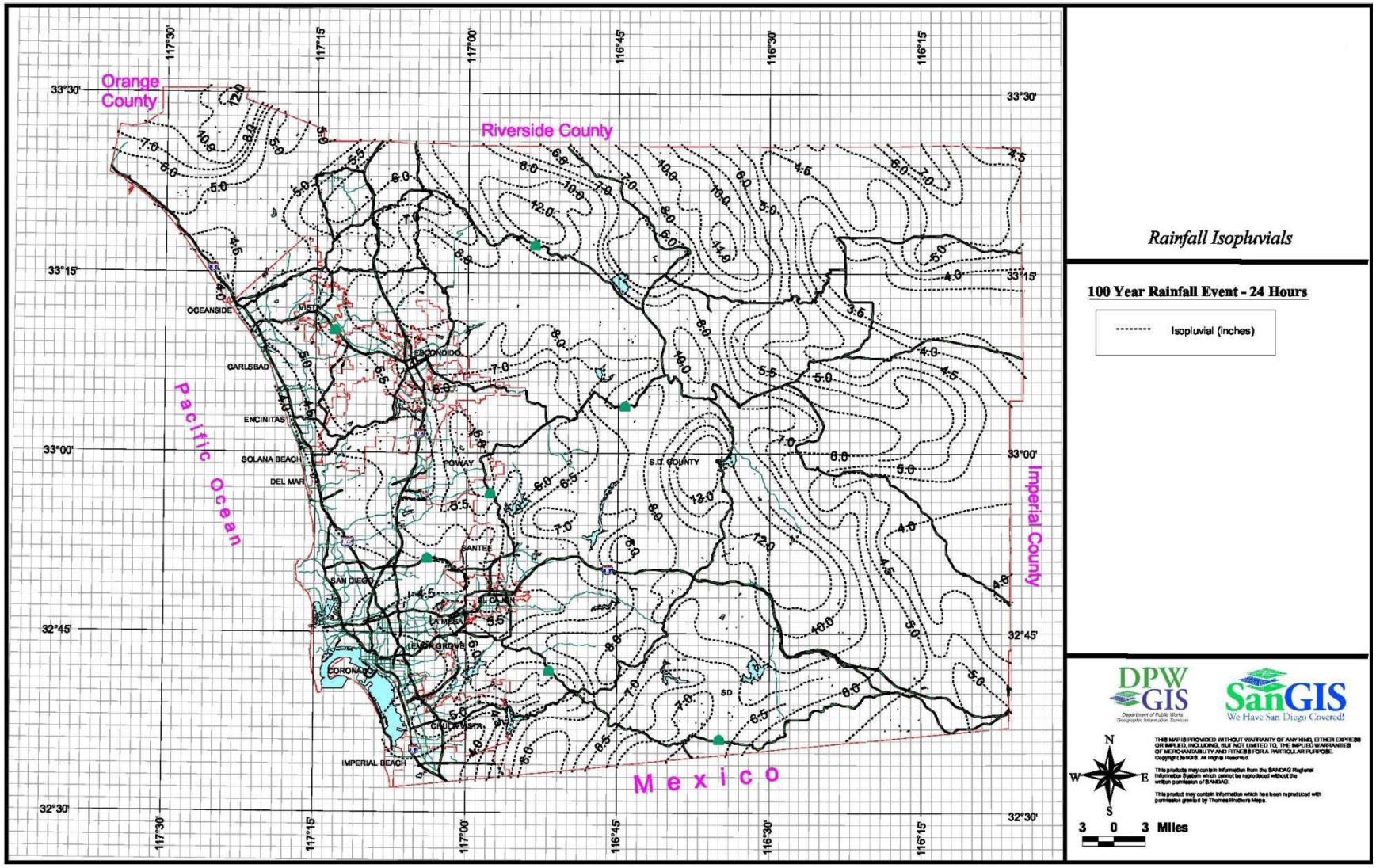


Figure B-3. 100-Year 24-Hour Isopluvials

Attachment 6
Geotechnical and Groundwater Investigation Report

Attach project's geotechnical and groundwater investigation report. Refer to Appendix C.4 to determine the reporting requirements.

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GEOTECHNICAL INVESTIGATION

JUNIPERO SERRA MUSEUM ADA IMPROVEMENTS

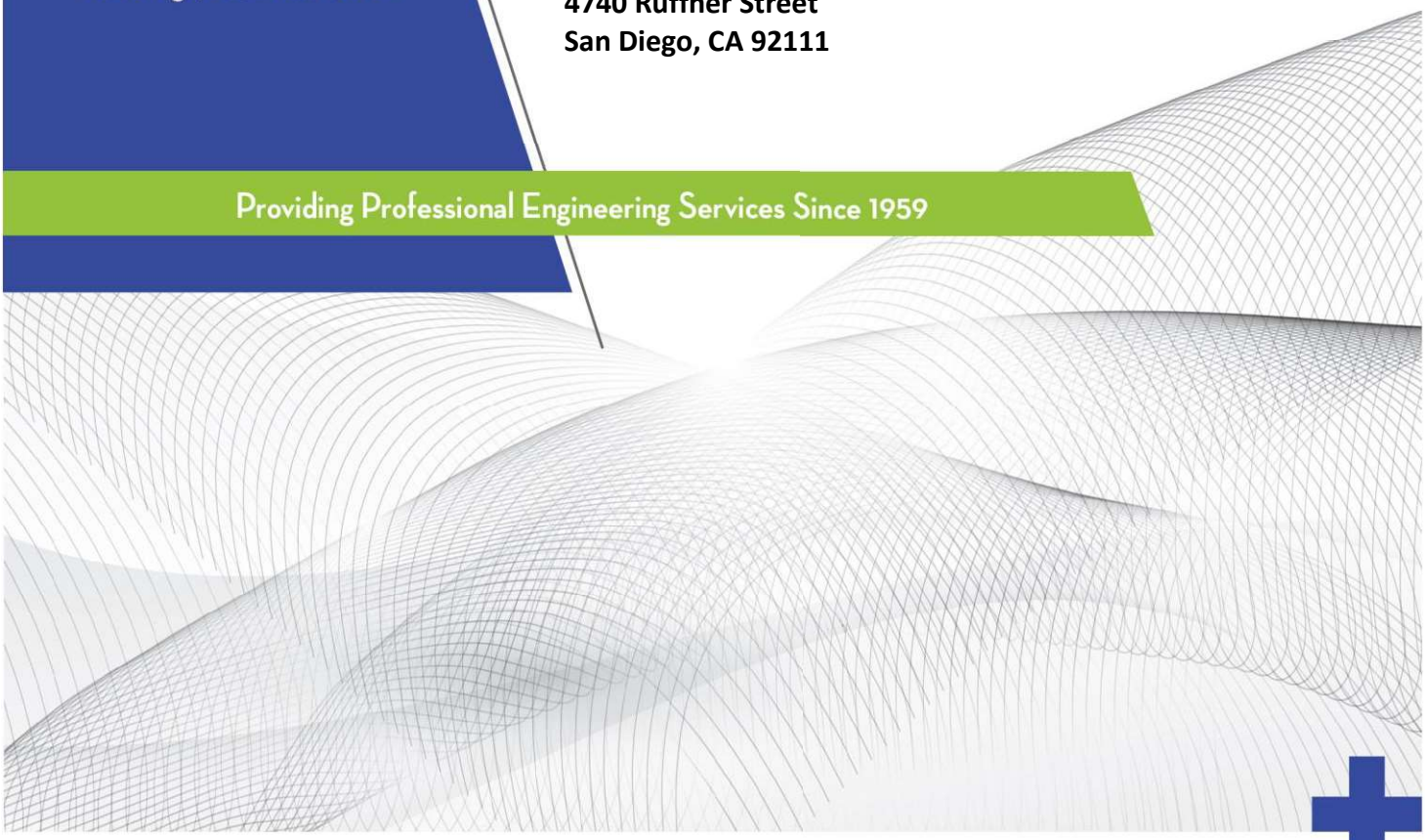
San Diego, California

Prepared By:
SCST, LLC
6280 Riverdale Street
San Diego, California 92120

Prepared For:

Larry Thornburgh, PE, PLS
Director of Engineering
Nasland Engineering
4740 Ruffner Street
San Diego, CA 92111

Providing Professional Engineering Services Since 1959



March 27, 2019

SCST No. 180320P4.1
Report No. 1

Larry Thornburgh, PE, PLS
Director of Engineering
Nasland Engineering
4740 Ruffner Street
San Diego, CA 92111

Subject: GEOTECHNICAL INVESTIGATION
JUNIPERO SERRA MUSEUM ADA IMPROVEMENTS
2727 PRESIDIO DRIVE
SAN DIEGO, CALIFORNIA

Dear Larry:

SCST, LLC (SCST) is pleased to present our report describing the geotechnical investigation performed for the subject project. We conducted the investigation in general conformance with the scope of work presented in our proposal dated November 30, 2017. Based on the results of our investigation, we consider the planned development feasible from a geotechnical standpoint, provided the recommendations of this report are followed. If you have any questions, please call us at (619) 280-4321.

Respectfully submitted,
SCST, LLC

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Figure 1 ..... Site Vicinity Map
Figure 2 ..... Subsurface Exploration Map
Figure 3 ..... Regional Geology Map
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Figure 5 ..... Geologic Map
Figure 6 ..... Typical Retaining Wall Backdrain Details
Figure 7 ..... Typical MSE Retaining Wall Detail

APPENDICES

Appendix I ..... Field Investigation
Appendix II ..... Laboratory Testing
Appendix III ..... Infiltration Rate Test Results
Appendix IV ..... Form I-8A

1. INTRODUCTION

This report presents the results of the geotechnical investigation SCST, LLC (SCST) performed for the subject project. We understand the project will consist of the design and construction of a new concrete ADA accessible path, driveway, parking area, landscaping, and biofiltration basins located south of the main terrace of Junipero Serra Museum. The purpose of our work is to provide conclusions and recommendations regarding the geotechnical aspects of the project. Figure 1 presents the site vicinity map.

2. SCOPE OF WORK

2.1 FIELD INVESTIGATION

We explored the subsurface conditions by drilling four borings and 3 percolation test borings to depths between about 3 and 5 feet below the existing ground surface using a hand auger. Auger refusal was encountered in each boring except B-4. Figure 2 presents the approximate locations of the borings. An SCST geologist logged the borings and collected samples of the materials encountered for laboratory testing. Logs of the borings are presented in Appendix I. Soils are classified according to the Unified Soil Classification System illustrated on Figure I-1.

2.2 LABORATORY TESTING

We tested selected samples to evaluate soil classification and engineering properties and develop geotechnical conclusions and recommendations. The laboratory tests consisted of in situ moisture and density, particle-size distribution, Atterberg limits, R-value, expansion index, and corrosivity. The results of the laboratory tests and brief explanations of the test procedures are presented in Appendix II.

2.3 BOREHOLE PERCOLATION TESTING

We performed borehole percolation testing in general conformance with the City of San Diego BMP Design Manual at three locations (P-1, P-2, and P-3) to assess stormwater infiltration feasibility. The results of the testing are presented in Appendix III.

2.4 ANALYSIS AND REPORT

The results of the field and laboratory tests were evaluated to develop conclusions and recommendations regarding:

- Subsurface conditions beneath the site
- Potential geologic hazards
- Criteria for seismic design in accordance with the 2016 California Building Code (CBC)
- Site preparation and grading

- Excavation characteristics
- Concrete slabs-on-grade
- Pavement sections
- Foundation support, potential foundation settlement, resistance to lateral loads, and lateral earth pressures for retaining wall design
- Pipelines
- Soil corrosivity
- Infiltration test results and feasibility

3. SITE DESCRIPTION

The site is within a eucalyptus tree grove located in Presidio Park at 2727 Presidio Drive in the City of San Diego, California. The existing park consists of historic buildings, pavements, hardscape, and landscape areas. The site is located on a mesa south of Mission Valley. Existing site elevations range from about 175 feet near the top of the mesa with gradual slopes down to about 145 feet to the north and northwest, and gradual slopes down to about 165 feet to the southwest of the mesa.

4. PROPOSED DEVELOPMENT

We understand the project will consist of the design and construction of a new concrete ADA accessible path, driveway, parking area, landscaping, and biofiltration basins located south of the main terrace of Junipero Serra Museum. Current grading plans indicate that cuts up to about 9 feet and fills up to about 4 feet will be required to achieve finish site grades.

5. GEOLOGY AND SUBSURFACE CONDITIONS

The materials encountered in our borings consist of fill and very old paralic deposits. Descriptions of the materials encountered are presented below. Figure 3 presents the regional geology in the vicinity of the site.

Fill: Fill was encountered in each boring except for P-1. The fill encountered in the borings extends to depths varying from about 1 foot below the existing ground surface to the maximum-explored depth of 5 feet and consists of loose to medium dense silty to clayey sand and soft to stiff sandy clay with varying amounts of gravel and cobbles.

Very Old Paralic Deposits: Very old paralic deposits underlie the entire site. These deposits consist of weathered, moderately to strongly cemented silty sandstone.

Groundwater: Groundwater was not encountered in the borings. The groundwater table is expected to be below a depth that will influence the planned construction. However, groundwater levels may fluctuate in the future due to rainfall, irrigation, broken pipes, or changes in site drainage. Because groundwater rise or seepage is difficult to predict, such conditions are typically mitigated if and when they occur.

6. GEOLOGIC HAZARDS

6.1 CITY OF SAN DIEGO SEISMIC SAFETY STUDY

Figure 4 shows the approximate site location on the City of San Diego Seismic Safety Study map. The site is located in Geologic Hazard Category 53, defined as level or sloping terrain and unfavorable geologic structure with moderate to low risk. In our opinion, the geologic risk is low.

6.2 FAULTING AND SURFACE RUPTURE

No active faults are known to underlie or project toward the site. However, the potentially active Rose Canyon fault zone is located about 800 feet southwest of the site. The site is not located in an Alquist-Priolo Earthquake Fault Zone. Therefore, the probability of fault rupture is low.

6.3 CBC SEISMIC DESIGN PARAMETERS

A geologic hazard likely to affect the project is ground shaking as a result of movement along an active fault zone in the vicinity of the subject site. The site coefficients and maximum considered earthquake (MCE_R) spectral response acceleration parameters in accordance with the 2016 CBC are presented below:

Site Coordinates: Latitude 32.758357°
Longitude -117.193069°
Site Class: C
Site Coefficients, F_a = 1.000
F_v = 1.307
Mapped Spectral Response Acceleration at Short Period, S_s = 1.273g
Mapped Spectral Response Acceleration at 1-Second Period, S_1 = 0.493g
Design Spectral Acceleration at Short Period, S_{DS} = 0.849g
Design Spectral Acceleration at 1-Second Period, S_{D1} = 0.429g
Site Peak Ground Acceleration, PGA_M = 0.578g

6.4 LIQUEFACTION AND DYNAMIC SETTLEMENT

Liquefaction occurs when loose, saturated sands and silts are subjected to strong ground shaking. The soils lose shear strength and become liquid, resulting in large total and differential ground surface settlements and possible lateral spreading during an earthquake. Given the dense nature of the materials beneath the site, and due to the lack of a shallow groundwater table, the potential for liquefaction and dynamic settlement to occur is low.

6.5 LANDSLIDES AND SLOPE STABILITY

Evidence of landslides or slope instabilities was not observed during our investigation. However, Kennedy and Tan (2008) have noted that the Presidio Park area is underlain by an ancient landslide. Mike Hart (2014) conducted a detailed fault and landslide study of the Presidio Park area and noted that although probable ancient landslides do exist in the Presidio Park area, the mapped landslides are much smaller in size than what Kennedy and Tan mapped in 2008. Hart's mapped areas of landslides are presented in Figure 5 and are outside of the project limits. The potential for landslides or slope instabilities to occur at the site is considered low.

6.6 TSUNAMIS, SEICHES, AND FLOODING

The site is not located within a mapped area on the State of California Tsunami Inundation Maps (Cal EMA, 2009); therefore, damage due to tsunamis is considered low. Seiches are periodic oscillations in large bodies of water such as lakes, harbors, bays, or reservoirs. The site is not located adjacent to lakes or confined bodies of water; therefore, the potential for a seiche to affect the site is considered negligible. The site is not located within a flood zone or dam inundation area (County of San Diego, 2012).

6.7 SUBSIDENCE

The site is not located in an area of known subsidence associated with fluid withdrawal (groundwater or petroleum); therefore, the potential for subsidence due to the extraction of fluids is considered low.

6.8 HYDRO-CONSOLIDATION

Hydro-consolidation can occur in recently deposited sediments (less than 10,000 years old) that were deposited in a semi-arid environment. Examples of such sediments are aeolian sands, alluvial fan deposits, and mudflow sediments deposited during flash floods. The pore spaces between the particle grains can re-adjust when inundated by groundwater causing the

material to consolidate. The relatively dense materials underlying the site are not considered susceptible to hydro-consolidation.

7. CONCLUSIONS

Based on the results of our investigation, we consider the proposed construction feasible from a geotechnical standpoint provided the recommendations of this report are followed. The main geotechnical considerations affecting the proposed ADA access path, driveway, parking area, and other improvements are the presence of potentially compressible fill and potentially expansive soils. Remedial grading is recommended to reduce the potential for distress to the planned improvements. Remedial grading recommendations are provided herein. The recommendations presented herein may need to be updated once final plans are developed.

8. RECOMMENDATIONS

8.1 SITE PREPARATION AND GRADING

8.1.1 Site Preparation

Site preparation should begin with the removal of existing improvements, vegetation, and debris. Subsurface improvements that are to be abandoned should be removed, and the resulting excavations should be backfilled and compacted in accordance with the recommendations of this report. Pipeline abandonment can consist of capping or rerouting at the project perimeter and removal within the project perimeter. If appropriate, abandoned pipelines can be filled with grout or slurry as recommended by and observed by the geotechnical consultant.

8.1.2 Remedial Grading

To improve subgrade support, the existing soils should be excavated to a depth of at least 1 foot below finish subgrade elevation for hardscape and pavements and at least 2 feet below the footing bottom elevation for retaining walls. Horizontally, the excavations should extend a distance equal to the depth of excavation, up to existing improvements or the limits of disturbance, whichever is less. An SCST representative should observe conditions exposed in the bottom of the excavation to determine if additional excavation is required.

8.1.3 Expansive Soil

The on-site soils tested have expansion indexes of 6 and 59. To reduce the potential for expansive heave, the top 2 feet of material beneath hardscape, pavements, and retaining wall footings should have an expansion index (EI) of 20 or less determined in accordance

with ASTM D4829. The on-site silty to clayey sands are expected to meet this expansion index criteria. However, the on-site sandy clay is not expected to meet the expansion index criteria.

8.1.4 Compacted Fill

Prior to placing fill, the exposed surface should be scarified to a depth of 12 inches, moisture conditioned to near optimum moisture content, and compacted to at least 90% relative compaction. Excavated material, except for vegetation, debris, soils with an EI greater than 20, or rocks greater than 6 inches can be used as compacted fill. Fill should be placed in horizontal lifts at a thickness appropriate for the equipment spreading, mixing, and compacting the material, but generally should not exceed 8 inches in loose thickness. Fill should be moisture conditioned to near optimum moisture content and compacted to at least 90% relative compaction. The maximum density and optimum moisture content for the evaluation of relative compaction should be determined in accordance with ASTM D1557. The top 12 inches of subgrade beneath pavements subjected to vehicular traffic should be compacted to at least 95%.

8.1.5 Imported Soil

Imported soil should consist of predominately granular soil free of organic matter and rocks greater than 6 inches. Imported soil should be observed and, if appropriate, tested by SCST prior to transport to the site to determine suitability for the intended use.

8.1.6 Excavation Characteristics

It is anticipated that excavations can be achieved with conventional earthwork equipment in good working order. Difficult excavation should be anticipated in cemented zones within the very old paralic deposits. Gravel and cobbles should also be anticipated.

8.1.7 Oversized Material

Excavations may generate oversized material. Oversized material is defined as rocks or cemented clasts greater than 6 inches in largest dimension. Oversized material should be broken down to no greater than 6 inches in largest dimension for use in fill, used as landscape material, or disposed of off-site.

8.1.8 Temporary Excavations

Temporary excavations 3 feet deep or less can be made vertically. Deeper temporary excavations in fill should be laid back no steeper than 1:1 (horizontal:vertical). Deeper temporary excavations in formational materials should be laid back no steeper than ¾:1

(horizontal:vertical). The faces of temporary slopes should be inspected daily by the contractor's Competent Person before personnel are allowed to enter the excavation. Zones of potential instability, sloughing, or raveling should be brought to the attention of the Engineer and corrective action implemented before personnel begin working in the excavation. Excavated soils should not be stockpiled behind temporary excavations within a distance equal to the depth of the excavation. SCST should be notified if other surcharge loads are anticipated so that lateral load criteria can be developed for the specific situation. If temporary slopes are to be maintained during the rainy season, berms are recommended along the tops of slopes to prevent runoff water from entering the excavation and eroding the slope faces.

Slopes steeper than those described above will require shoring. Additionally, temporary excavations that extend below a plane inclined at 1½:1 (horizontal:vertical) downward from the outside bottom edge of existing structures or improvements will require shoring. Soldier piles and lagging, internally braced shoring, or trench boxes could be used. If trench boxes are used, the soil immediately adjacent to the trench box is not directly supported. Ground surface deformations immediately adjacent to the pit or trench could be greater where trench boxes are used compared to other methods of shoring.

As an alternative to shoring/underpinning, maximum 10-foot-wide slots can be excavated and immediately backfilled adjacent to existing structures and improvements. Care should be taken to not undermine existing footings. Slot excavations should be filled prior to performing adjacent excavations.

8.1.9 Temporary Shoring

For design of cantilevered shoring with level backfill, an active earth pressure equal to a fluid weighing 35 pounds per cubic foot (pcf) can be used. An additional 20 pcf should be added for shoring with 2:1 sloping ground. The surcharge loads on shoring from traffic and construction equipment working adjacent to the excavation can be modeled by assuming an additional 2 feet of soil behind the shoring. For design of soldier piles, an allowable passive pressure of 350 pounds per square foot (psf) per foot of embedment over two times the pile diameter up to a maximum of 5,000 psf can be used. Soldier piles should be spaced at least three pile diameters, center to center. Continuous lagging will be required throughout. The soldier piles should be designed for the full anticipated lateral pressure; however, the pressure on the lagging will be less due to arching in the soils. For design of lagging, the earth pressure can be limited to a maximum value of 400 psf.

8.1.10 Slopes

Permanent slopes should be constructed no steeper than 2:1 (horizontal:vertical). Faces of fill slopes should be compacted either by rolling with a sheepsfoot roller or other suitable equipment or by overfilling and cutting back to design grade. Fills should be benched into sloping ground inclined steeper than 5:1 (horizontal:vertical). In our opinion, slopes constructed no steeper than 2:1 (horizontal:vertical) will possess an adequate factor of safety. An engineering geologist should observe cut slopes during grading to ascertain that no unforeseen adverse geologic conditions are encountered that require revised recommendations. Slopes are susceptible to surficial slope failure and erosion. Water should not be allowed to flow over the top of slope. Additionally, slopes should be planted with vegetation that will reduce the potential for erosion.

8.1.11 Surface Drainage

Final surface grades around structures should be designed to collect and direct surface water away from the structure and toward appropriate drainage facilities. The ground around the structure should be graded so that surface water flows rapidly away from the structure without ponding. In general, we recommend that the ground adjacent to the structure slope away at a gradient of at least 2%. Densely vegetated areas where runoff can be impaired should have a minimum gradient of at least 5% within the first 5 feet from the structure. Roof gutters with downspouts that discharge directly into a closed drainage system are recommended on structures. Drainage patterns established at the time of fine grading should be maintained throughout the life of the proposed structures. Site irrigation should be limited to the minimum necessary to sustain landscape growth. Should excessive irrigation, impaired drainage, or unusually high rainfall occur, saturated zones of perched groundwater can develop.

8.1.12 Grading Plan Review

SCST should review the grading plans and earthwork specifications to ascertain whether the intent of the recommendations contained in this report have been implemented and that no revised recommendations are needed due to changes in the development scheme.

8.2 PAVEMENT SECTION RECOMMENDATIONS

The pavement support characteristics of the fill soils encountered during our investigation are considered poor. An R-value of 5 was used for design of preliminary pavement sections based on R-value testing conducted from on-site soils sampled. The actual R-value of the subgrade soils should be determined after grading, and the final pavement sections should be provided.

Based on an R-value of 5, the following preliminary pavement structural sections are provided for the assumed Traffic Indexes.

Traffic Type	Traffic Index	Asphalt Concrete (inches)	Portland Cement Concrete (inches)
Bikeways and Light Vehicles	4.5	3 AC / 8 AB	6 PCC
Medium Trucks	6.0	5½ AC / 9 AB	7 PCC / 6 AB

AC - Asphalt Concrete
AB - Aggregate Base
PCC - Portland Cement Concrete

The top 12 inches of subgrade should be scarified, moisture conditioned to near optimum moisture content, and compacted to at least 95% relative compaction. Soft or yielding areas should be stabilized or removed and replaced with compacted fill or aggregate base. Aggregate base and asphalt concrete should conform to the Caltrans Standard Specifications or the "Greenbook" and should be compacted to at least 95% relative compaction. Aggregate base should have an R-value of not less than 78. Materials and methods of construction should conform to good engineering practices and the minimum local standards.

8.3 PERVIOUS PAVEMENT SECTION RECOMMENDATIONS

Pervious pavement section recommendations are based on Caltrans (2014) pavement structural design guidelines. The pavement sections below are based on the strength of the materials. However, the actual thickness of the sections may be controlled by the reservoir layer design, which the project civil engineer should determine.

Pervious Asphalt Pavement

Traffic Type	Category	*Asphalt Treated Permeable Base (ATPB) (inches)	Class 4 Aggregate Base (inches)
Landscape Areas, Sidewalks and Bike path (no vehicular access)	A	0**	6
Bike path and Light Vehicles	B	6	10

***1¼ inches of an open-graded friction course (OGFC) should be placed on top of the ATPB.**
****2½ inches of an open-graded friction course (OGFC) should be placed on top of the Class 4 Agg Base.**

Pervious Concrete Pavement

Traffic Type	Category	Pervious Concrete (inches)	Class 4 Aggregate Base (inches)
Landscape Areas, Sidewalks and Bike path (no vehicular access)	A	4½	0
Bike path and Light Vehicles	B	6	8½

Permeable Interlocking Concrete Pavers (PICP)

Traffic Type	Category	PICP (inches)	Class 3 Permeable (inches)	Class 4 Aggregate Base (inches)
Landscape Areas, Sidewalks and Bike path (no vehicular access)	A	2⅜*	4½	0
Bike path and Light Vehicles	B	3⅛*	4½	8½

***2 inches of bedding layer should be placed between Class 3 permeable material and pavers.**

The top 12 inches of subgrade should be scarified, moisture conditioned to near optimum moisture content, and compacted to at least 95% relative compaction. Soft or yielding subgrade areas should be stabilized or removed and replaced with compacted fill or permeable base. Materials and methods of construction should conform to good engineering practices and the minimum local standards.

Deepened curbs or vertical cutoff membranes consisting of 30 mil HDPE or PVC should be installed at the edges of pervious pavements to reduce the potential for water-related distress to adjacent structures or improvements.

8.4 CONCRETE PEDESTRIAN WALKS

Exterior concrete slabs should be underlain by at least 2 feet of material with an EI of 20 or less. Exterior slabs not subjected to vehicular weight should be at least 4 inches thick and reinforced with at least No. 3 bars at 18 inches on center each way. Slabs should be provided with weakened plane joints. Joints should be placed in accordance with the American Concrete Institute (ACI) guidelines. The project architect should select the final joint patterns. A 1-inch maximum size aggregate mix is recommended for concrete for exterior slabs. The corrosion potential of on-site soils with respect to reinforced concrete will need to be taken

into account in concrete mix design. Coarse and fine aggregate in concrete should conform to the “Greenbook” Standard Specifications for Public Works Construction.

8.5 CONVENTIONAL RETAINING WALLS

8.5.1 Foundations

The planned retaining walls can be supported on spread footings with bottom levels on compacted fill or very old paralic deposits. Footings should extend at least 18 inches below lowest adjacent finished grade and be at least 24 inches wide. Footings located adjacent to or within slopes should be extended to a depth such that a minimum horizontal distance of 7 feet exists between the lower outside footing edge and the face of the slope.

8.5.2 Allowable Soil Bearing

An allowable bearing capacity of 2,500 psf can be used. The allowable bearing capacity can be increased by 500 psf for each foot of depth below the minimum and 250 psf for each foot of width beyond the minimum up to a maximum of 5,000 psf. The bearing value can be increased by ⅓ when considering the total of all loads, including wind or seismic forces.

8.5.3 Resistance to Lateral Loads

Lateral loads will be resisted by friction between the bottoms of footings and passive pressure on the faces of footings and other structural elements below grade. An allowable coefficient of friction of 0.35 can be used. Passive pressure can be computed using an allowable lateral pressure of 350 psf per foot of depth below the ground surface for level ground conditions. The passive pressure can be increased by ⅓ when considering the total of all loads, including wind or seismic forces. The upper 1 foot of soil should not be relied on for passive support unless the ground is covered with pavements or slabs.

8.5.4 Settlement Characteristics

Total foundation settlements are estimated to be less than 1 inch. Differential settlements across continuous footings are estimated to be less than ¾ inch over a distance of 40 feet. Settlements should be completed shortly after structural loads are applied.

8.5.5 Foundation Plan Review

SCST should review the foundation plans to ascertain that the intent of the recommendations in this report has been implemented and that revised recommendations are not necessary as a result of changes after this report was completed.

8.5.6 Foundation Excavation Observations

A representative from SCST should observe the foundation excavations prior to forming or placing reinforcing steel.

8.5.7 Lateral Earth Pressures

The active earth pressure for the design of unrestrained retaining walls with level backfill can be taken as equivalent to the pressure of a fluid weighing 35 pcf. The at-rest earth pressure for the design of restrained retaining walls with level backfills can be taken as equivalent to the pressure of a fluid weighing 55 pcf. These values assume a granular and drained backfill condition. Higher lateral earth pressures would apply if walls retain clay soils. An additional 20 pcf should be added to these values for walls with a 2:1 (horizontal:vertical) sloping backfill. An increase in earth pressure equivalent to an additional 2 feet of retained soil can be used to account for surcharge loads from light traffic. The above values do not include a factor of safety. Appropriate factors of safety should be incorporated into the design. If other surcharge loads are anticipated, SCST should be contacted for the necessary increase in soil pressure.

Retaining walls should be designed to resist hydrostatic pressures or be provided with a backdrain to reduce the accumulation of hydrostatic pressures. The backdrain can consist of a 2-foot-wide zone of ¾-inch crushed rock. The backdrain should be separated from the adjacent soils using a non-woven filter fabric, such as Mirafi 140N or equivalent. Weep holes should be provided, or a perforated pipe should be installed at the base of the backdrain and sloped to discharge to a suitable storm drain facility. As an alternative, a geocomposite drainage system such as Miradrain 6000 or equivalent placed behind the wall and connected to a suitable storm drain facility can be used. The project architect should provide damp proofing specifications and details. Figure 6 presents typical conventional retaining wall backdrain details.

8.5.8 Seismic Earth Pressure

If required, the seismic earth pressure can be taken as equivalent to the pressure of a fluid weighing 20 pcf. This value is for level backfill and does not include a factor of safety. Appropriate factors of safety should be incorporated into the design. This pressure is in addition to the un-factored, static active earth pressure. The passive pressure and bearing capacity can be increased by ⅓ in determining the seismic stability of the wall.

8.5.9 Backfill

Wall backfill should consist of granular, free-draining material having a sand equivalent of 20 or more. The backfill zone is defined by a 1:1 plane projected upward from the heel of the wall. Expansive or clayey soil should not be used. Additionally, backfill within 3 feet from the back of the wall should not contain rocks greater than 3 inches in dimension. Backfill should be compacted to at least 90% relative compaction. Backfill should not be placed until walls have achieved adequate structural strength. Compaction of wall backfill will be necessary to minimize settlement of the backfill and overlying settlement sensitive improvements. However, some settlement should still be anticipated. Provisions should be made for some settlement of concrete slabs and pavements supported on backfill. Additionally, utilities supported on backfill should be designed to tolerate differential settlement.

8.6 MECHANICALLY STABILIZED EARTH RETAINING WALLS

The following soil parameters can be used for design of mechanically stabilized earth (MSE) retaining walls.

MSE Wall Design Parameters

Soil Parameter	Reinforced Soil	Retained Soil	Foundation Soil
Internal Friction Angle (degrees)	32°	32°	32°
Cohesion (psf)	0	0	0
Moist Unit Weight (pcf)	130	130	130

The reinforced soil should consist of granular, free-draining material with an expansion index of 20 or less. The bottom of MSE walls should extend to such a depth that a total of 5 feet exists between the bottom of the wall and the face of the slope. Figure 7 presents a typical MSE retaining wall backdrain detail. MSE retaining walls may experience lateral movement over time. The wall engineer should review the configuration of proposed improvements adjacent to the wall and provide measures to help reduce the potential for distress to these improvements from lateral movement.

8.7 PIPELINES

8.7.1 Thrust Blocks

For level ground conditions, a passive earth pressure of 350 psf per foot of depth below the lowest adjacent final grade can be used to compute allowable thrust block resistance. A value of 150 psf per foot should be used below groundwater level, if encountered.

8.7.2 Modulus of Soil Reaction

A modulus of soil reaction (E') of 2,000 psi can be used to evaluate the deflection of buried flexible pipelines. This value assumes that granular bedding material is placed adjacent to the pipe and is compacted to at least 90% relative compaction.

8.7.3 Pipe Bedding

Pipe bedding as specified in the "Greenbook" Standard Specifications for Public Works Construction can be used. Bedding material should consist of clean sand having a sand equivalent not less than 20 and should extend to at least 12 inches above the top of pipe. Alternative materials meeting the intent of the bedding specifications are also acceptable. Samples of materials proposed for use as bedding should be provided to the engineer for inspection and testing before the material is imported for use on the project. The on-site materials are not expected to meet "Greenbook" bedding specifications. The pipe bedding material should be placed over the full width of the trench. After placement of the pipe, the bedding should be brought up uniformly on both sides of the pipe to reduce the potential for unbalanced loads. No voids or uncompacted areas should be left beneath the pipe haunches. Ponding or jetting the pipe bedding should not be allowed.

8.8 SOIL CORROSIVITY

Representative samples of the on-site soil were tested to evaluate corrosion potential. The test results are presented in Appendix II. The project design engineer can use the sulfate results in conjunction with ACI 318 to specify the water/cement ratio, compressive strength, and cementitious material types for concrete exposed to soil. A corrosion engineer should be contacted to provide specific corrosion control recommendations.

8.9 INFILTRATION FEASIBILITY

Figure 2 shows the approximate locations of the three borehole percolation tests we performed to assess stormwater infiltration feasibility. Appendix III presents the field data and test results. The table below presents the observed tested infiltration rates.

Infiltration Rate Test Results

Test Location	Test Depth (feet)	Material Type at Test Depth	Infiltration Rate (inch/hour)
P-1	3	Very Old Paralic Deposits: Silty Sandstone	0.0
P-2	3	Very Old Paralic Deposits: Silty Sandstone	0.0
P-3	3	Very Old Paralic Deposits: Silty Sandstone	0.0

The observed tested infiltration rates do not support stormwater infiltration in an appreciable quantity. Based on our test results, the feasibility screening category is No Infiltration. BMP facilities should be lined with an impermeable geomembrane to reduce the potential for water-related distress to adjacent structures or improvements. A subdrain system should be installed at the bottom of BMP facilities. Foundations should be set back at least 10 feet from BMP facilities, or the foundation should be depended to a depth that extends below the bottom of the BMP.

9. GEOTECHNICAL ENGINEERING DURING CONSTRUCTION

The geotechnical engineer should review project plans and specifications prior to bidding and construction to check that the intent of the recommendations in this report has been incorporated. Observations and tests should be performed during construction. If the conditions encountered during construction differ from those anticipated based on the subsurface exploration program, the presence of the geotechnical engineer during construction will enable an evaluation of the exposed conditions and modifications of the recommendations in this report or development of additional recommendations in a timely manner.

10. CLOSURE

SCST should be advised of changes in the project scope so that the recommendations contained in this report can be evaluated with respect to the revised plans. Changes in recommendations will be verified in writing. The findings in this report are valid as of the date of this report. Changes in the condition of the site can, however, occur with the passage of time, whether they are due to natural processes or work on this or adjacent areas. In addition, changes in the standards of practice and government regulations can occur. Thus, the findings in this report may be invalidated wholly or in part by changes beyond our control. This report should not be relied upon after a period of two years without a review by us verifying the suitability of the conclusions and recommendations to site conditions at that time.

In the performance of our professional services, we comply with that level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions and in the same locality. The client recognizes that subsurface conditions may vary from those encountered at the boring locations and that our data, interpretations, and recommendations are based solely on the information obtained by us. We will be responsible for those data, interpretations, and recommendations, but shall not be responsible for interpretations by others of the information developed. Our services consist of professional consultation and observation only, and no warranty whatsoever, express or implied, is made or intended in connection with the work performed or to be performed by us, or by our proposal for consulting or other services, or by our furnishing of oral or written reports or findings.

11. REFERENCES

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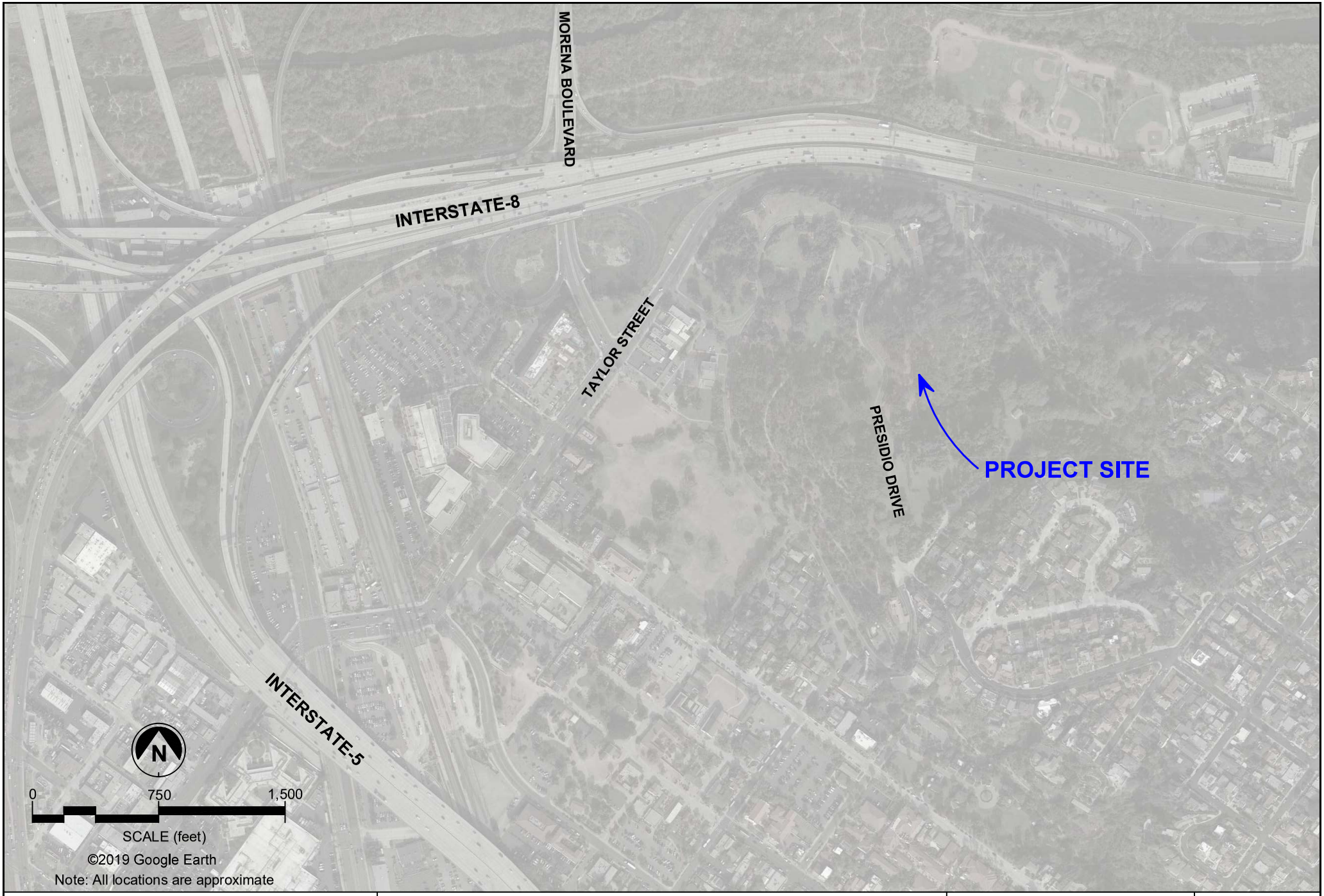
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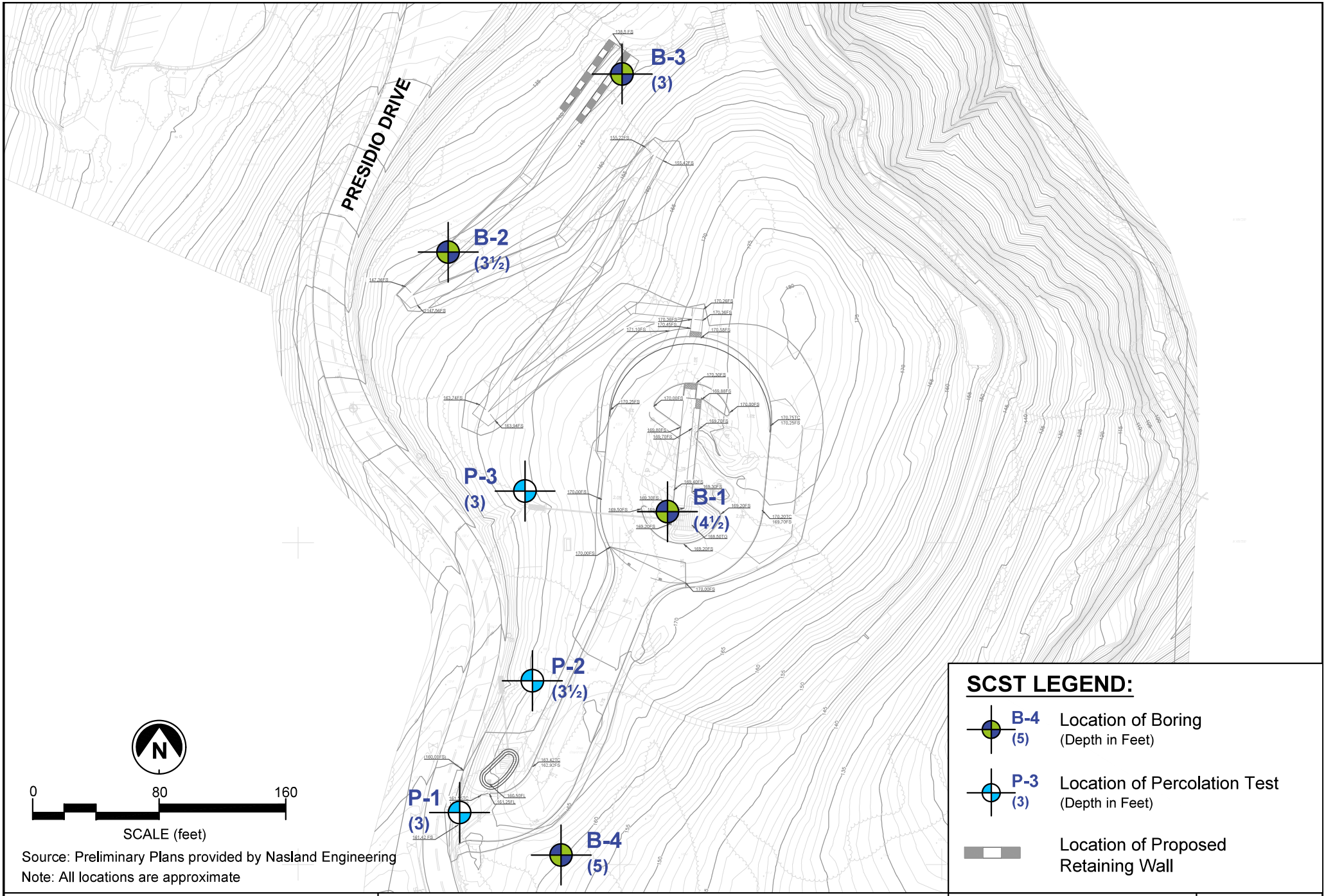
SCST, LLC

SITE VICINITY MAP

Junipero Serra Museum ADA Improvements
San Diego, California

Date: March, 2019
By: NDK/NNW
Job No.: 180320P4.1

Figure: 1



Source: Preliminary Plans provided by Nasland Engineering
Note: All locations are approximate

SCST LEGEND:

- B-4 (5) — Location of Boring (Depth in Feet)
- P-3 (3) — Location of Percolation Test (Depth in Feet)
- Location of Proposed Retaining Wall

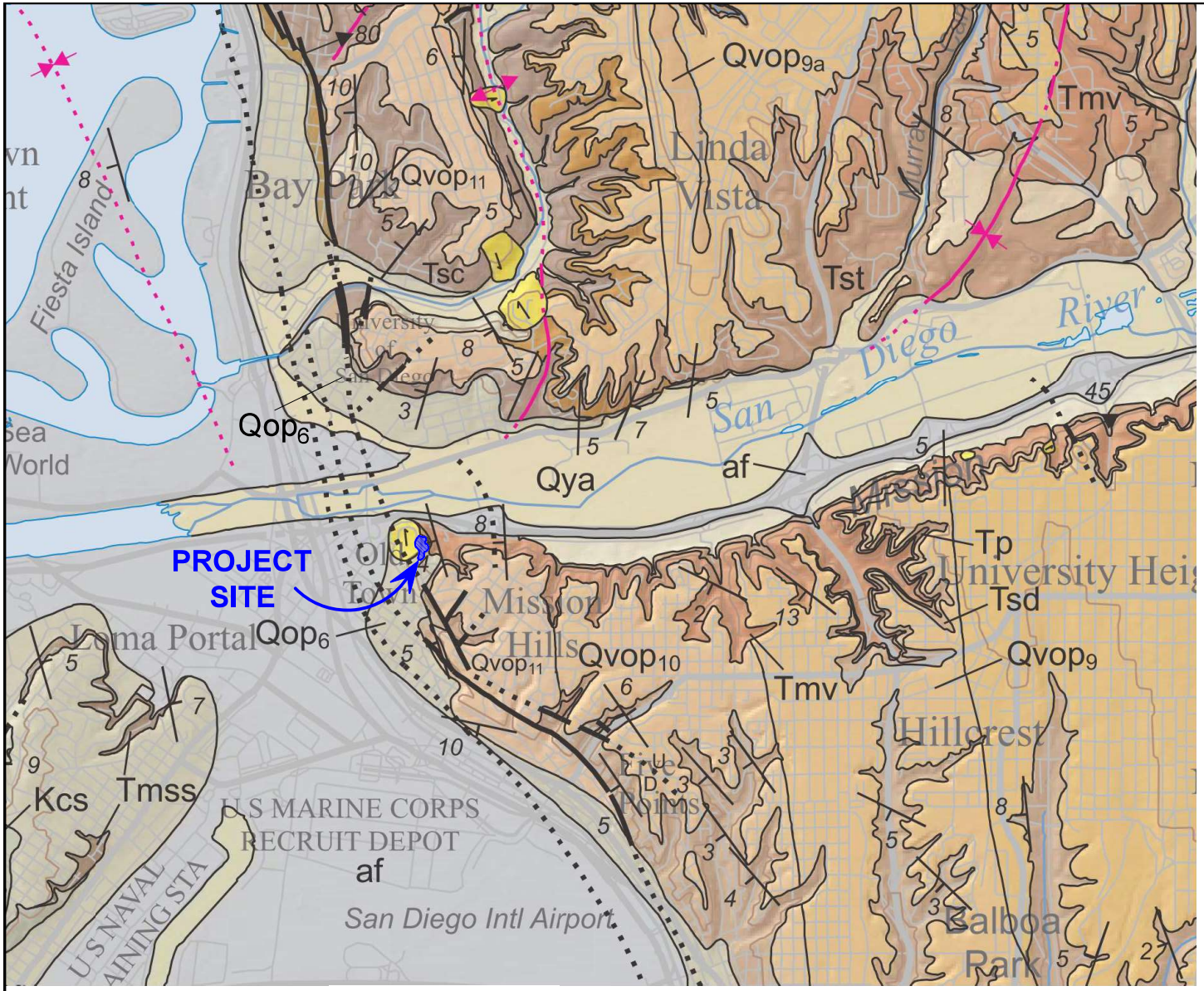
SCST, LLC

SUBSURFACE EXPLORATION MAP

Junipero Serra Museum ADA Improvements
San Diego, California

Date: March, 2019
By: NDK/NNW
Job No.: 180320P4.1

Figure: 2



EXPLANATION:

af	Artificial fill
Qya	Young alluvial flood-plain deposits
Qop_6	Old paralic deposits, undivided Unit 6
Qvop	Very old paralic deposits, undivided
Tsd	San Diego Formation, undivided
Tp	Pomerado Conglomerate
Tmv	Mission Valley Formation
Tsc	Scripps Formation
Tmss	Mount Soledad Formation, sandstone
Kcs	Cabrillo Formation, sandstone

Anticline Fold - Solid where well defined; short dash where inferred

Syncline Fold - Solid where well defined; short dash where inferred

4

Strike and **dip** of beds
Inclined

Qls?

Landslide - Arrows indicate principal direction of movement. Queried where existence is questionable.

N

0 1.5 3.0
SCALE (miles)

Note: All locations are approximate

Reference:
Kennedy, M.P. and Tan, S.S. (2008), Geologic Map of the San Diego 30' x 60' Quadrangle, California, California Geological Survey, Scale 1:100,000

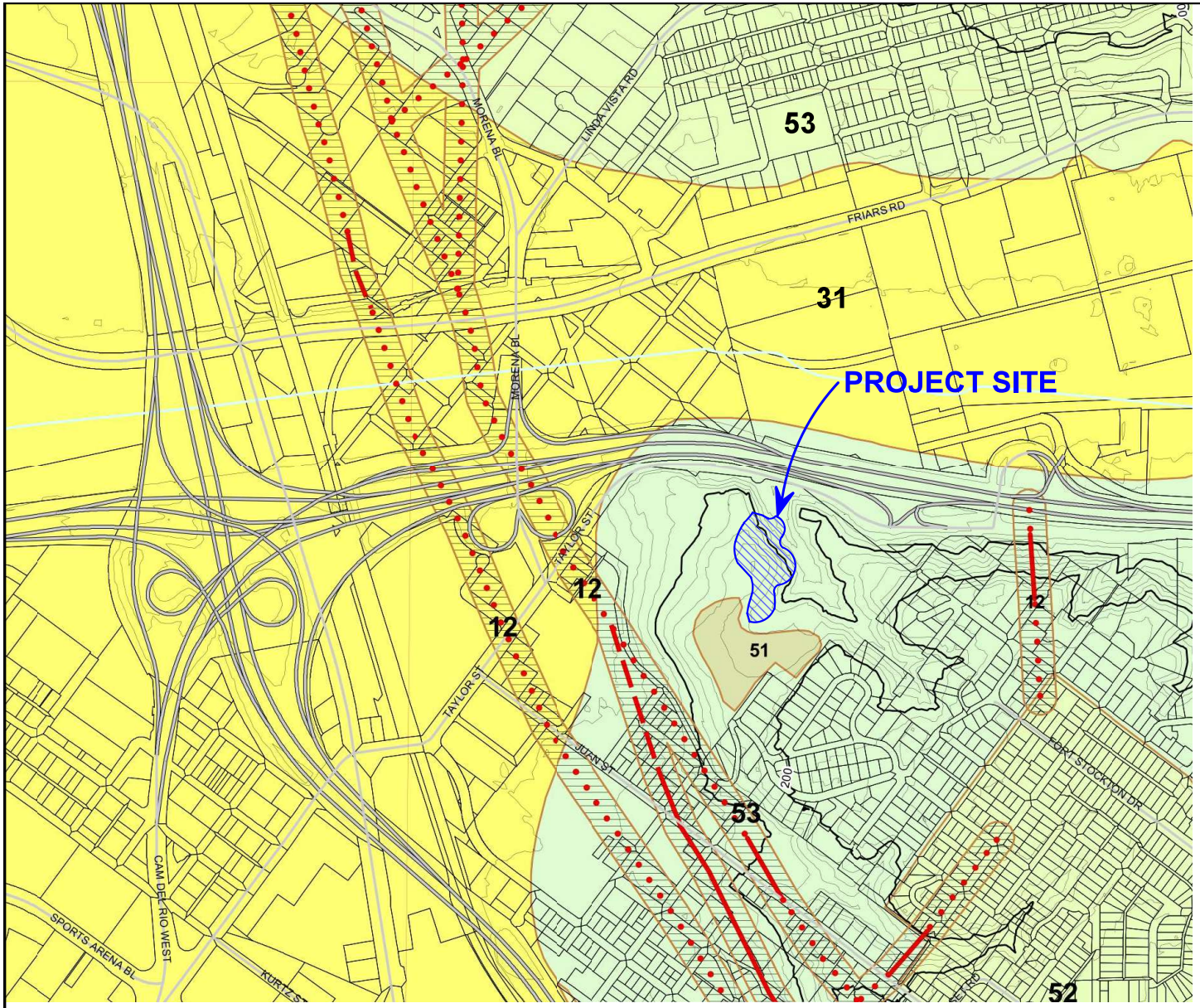
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REGIONAL GEOLOGY MAP

Junipero Serra Museum ADA Improvements
San Diego, California

Date: March, 2019
By: NDK/NNW
Job No.: 180320P4.1

Figure: 3



EXPLANATION:

FAULT ZONES

- 11 — Active, Alquist-Priolo Earthquake Fault Zone
- 12 — Potentially Active, Inactive, Presumed Inactive, or Activity Unknown

LIQUEFACTION

- 31 — High Potential -- shallow groundwater; major drainages, hydraulic fills

OTHER TERRAIN

- 51 — Level mesas -- underlain by terrace deposits and bedrock; nominal risk
- 52 — Other level areas, gently sloping to steep terrain, favorable geologic structure; Low risk
- 53 — Level or sloping terrain, unfavorable geologic structure; Low to moderate risk

FAULTS

- Fault
- Inferred Fault
- Concealed Fault

N

0 1,000 2,000

SCALE (feet)

Note: All locations are approximate

Reference:
City of San Diego (2008), Seismic Safety Study, Geologic Hazards and Faults, Grid Tile: **20**, Development Services Department, April 3, Scale 1:800.

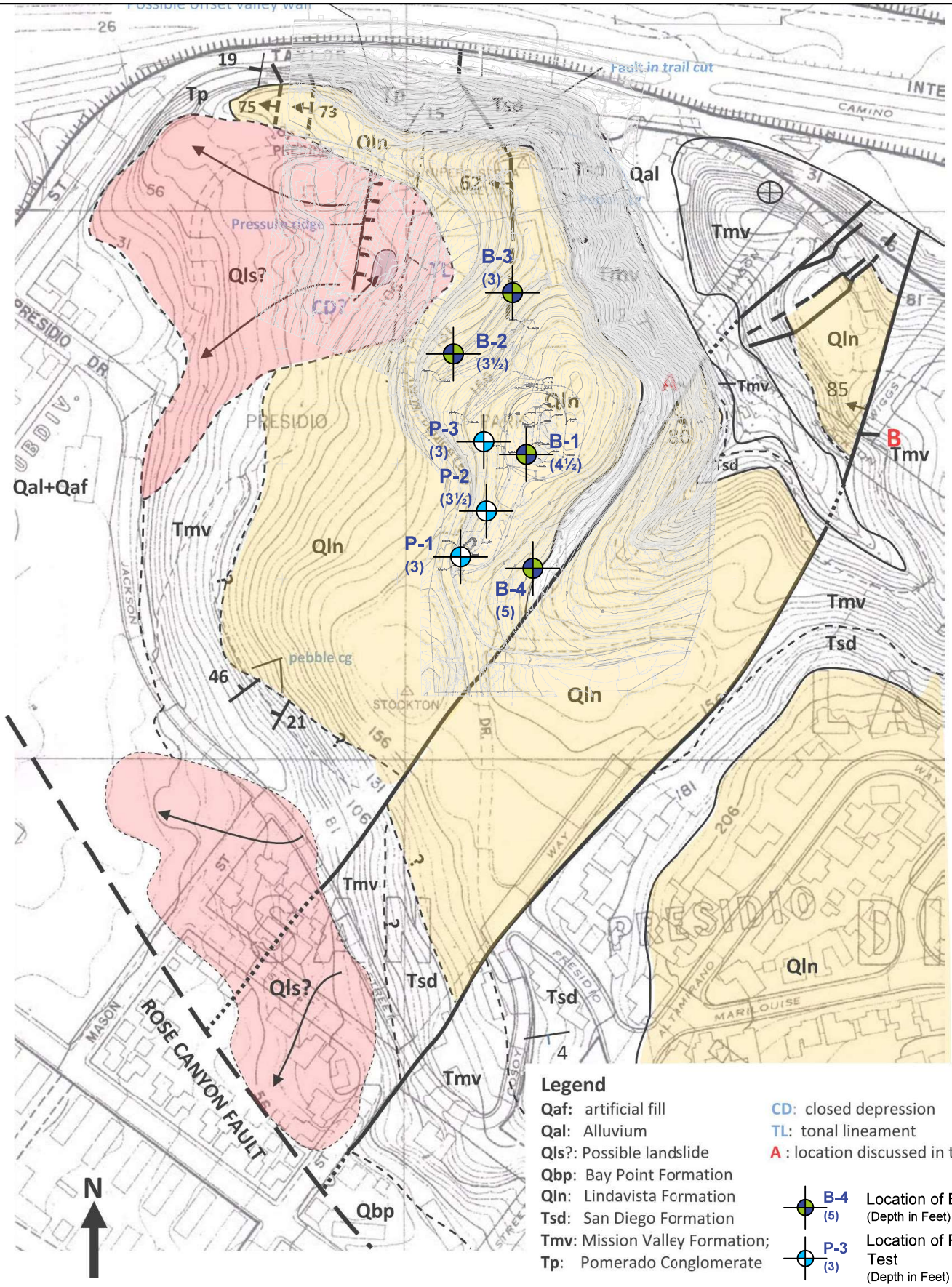
SCST, LLC

CITY OF SAN DIEGO SEISMIC SAFETY STUDY

Junipero Serra Museum ADA Improvements
San Diego, California

Date: March, 2019
By: NDK/NNW
Job No.: 180320P4.1

Figure: 4



Legend

- **Qaf:** artificial fill
- **Qal:** Alluvium
- **Qls?:** Possible landslide
- **Qbp:** Bay Point Formation
- **Qln:** Lindavista Formation
- **Tsd:** San Diego Formation
- **Tmv:** Mission Valley Formation;
- **Tp:** Pomerado Conglomerate
- **CD:** closed depression
- **TL:** tonal lineament
- **A** : location discussed in text
- **B-4 (5)** Location of Boring (Depth in Feet)
- **P-3 (3)** Location of Percolation Test (Depth in Feet)

0 250 500

SCALE (feet)

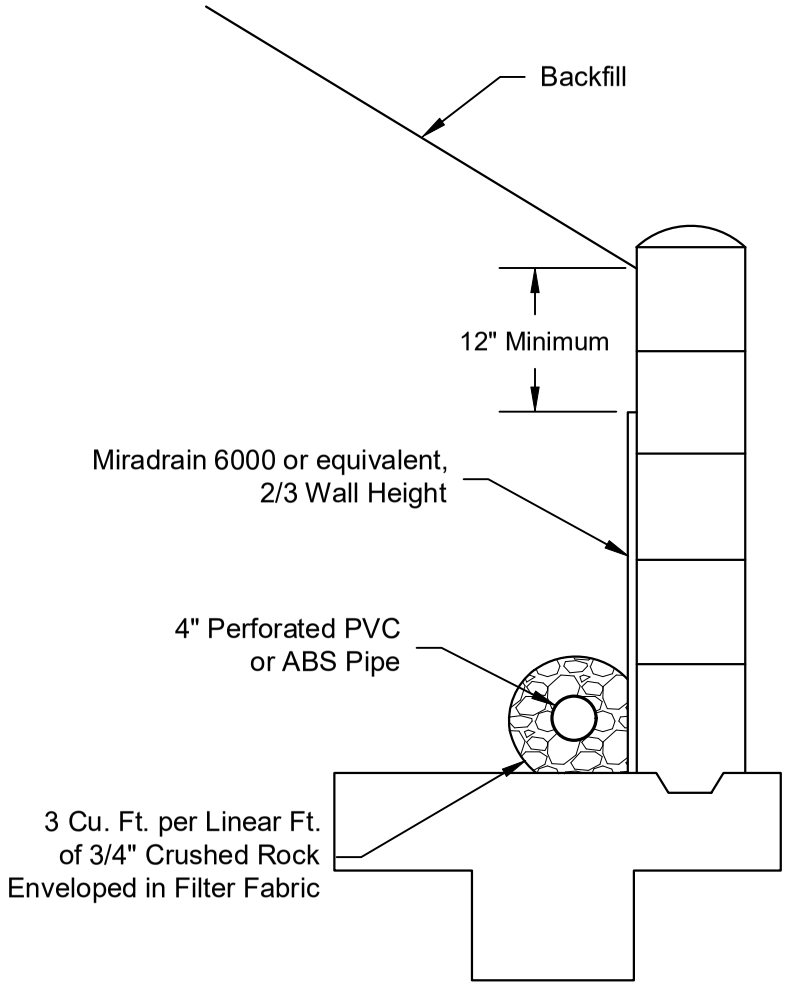
Note: All locations are approximate.
Reference: Hart, MW. Geologic Map Presidio Park, San Diego California, Figure 1

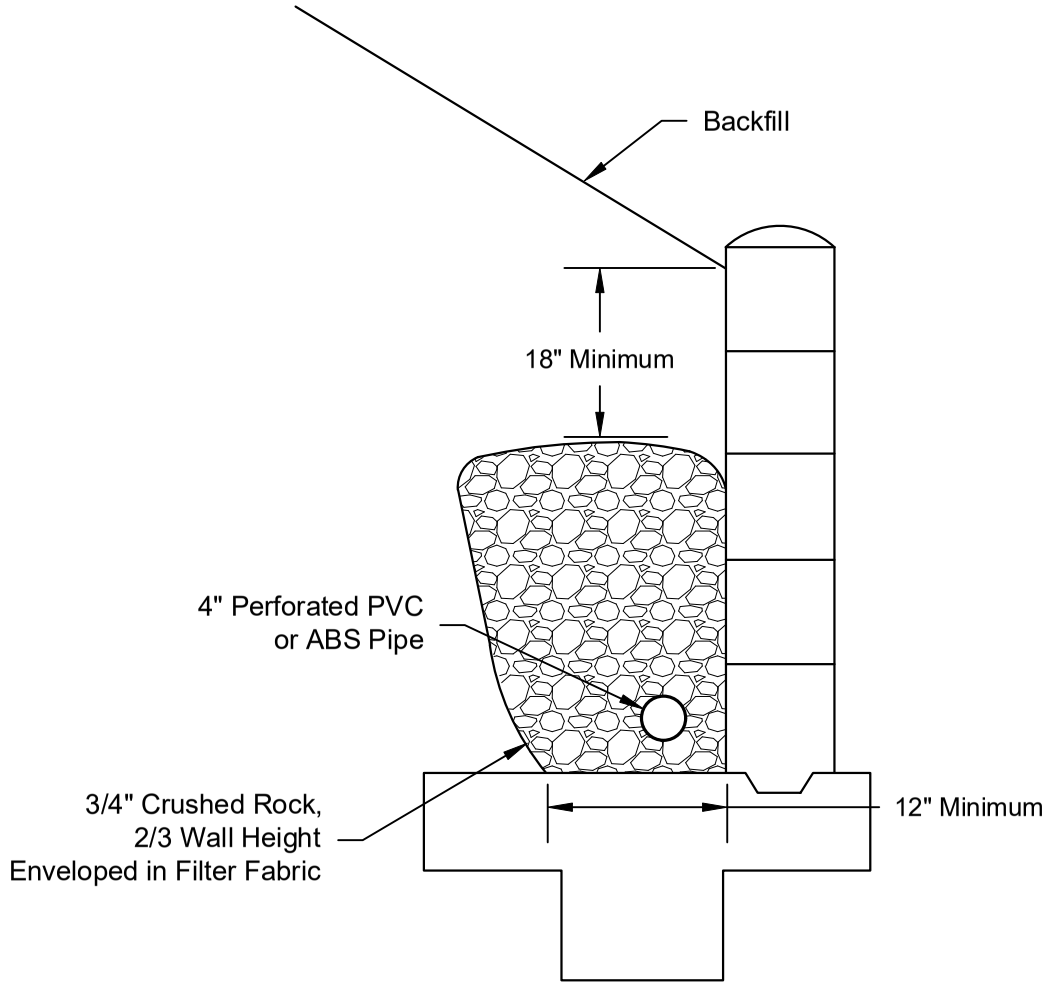
SCST, LLC

GEOLOGIC MAP
Junipero Serra Museum
ADA Improvements
San Diego, California

Date: March, 2019
By: DTC
Job No.: 180320P4-1

Figure: 5



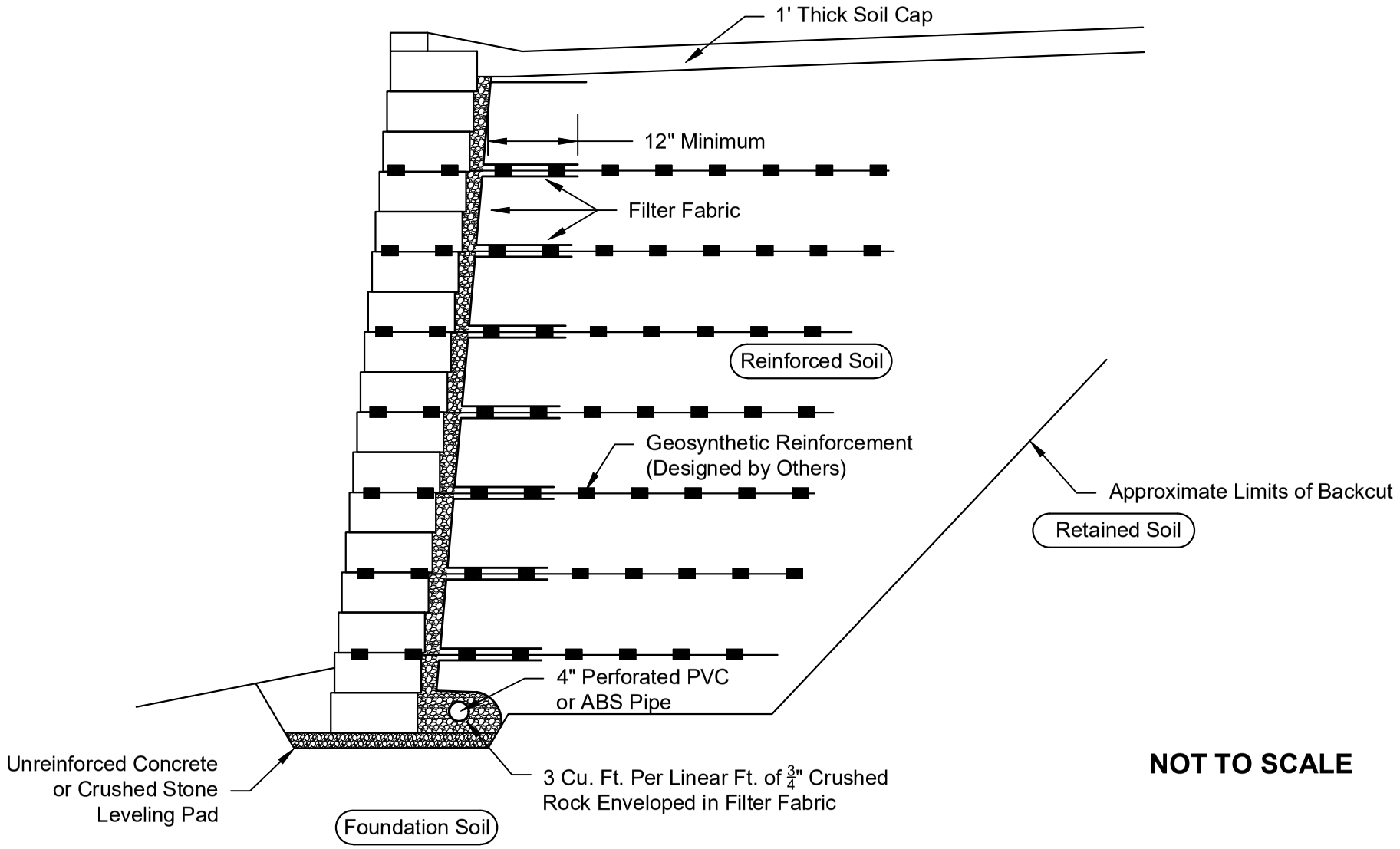


NOT TO SCALE

NOTES:

1) Dampproof or waterproof back of wall following architect's specifications.
2) 4" minimum perforated pipe, SDR35 or equivalent, holes down, 1% fall to outlet. Provide solid outlet pipe at suitable locations.
3) Drain installation and outlet connection should be observed by the geotechnical consultant.

SCST, LLC	**TYPICAL RETAINING WALL BACKDRAIN DETAILS** Junipero Serra Museum ADA Improvements San Diego, California	Date: March, 2019 By: NDK/NNW Job No.: 180320P4.1	Figure: 6



NOT TO SCALE

NOTES:

1) Backcut as recommended by the geotechnical report or field evaluation
2) Additional drain at excavation backcut may be recommended base on conditions observed during construction.
3) Filter fabric should be installed between crushed rock and soil. Filter fabric should consist of Mirafi 140N or equivalent. Filter fabric should be overlapped approximately 6 inches.
4) Perforated pipe should outlet through a solid pipe to an appropriate gravity outfall. Perforated pipe and outlet pipe should have a fall of at least 1%.

SCST, LLC	**TYPICAL MSE RETAINING WALL DETAIL** Junipero Serra Museum ADA Improvements San Diego, California	Date: March, 2019 By: NDK/NNW Job No.: 180320P4.1	Figure: 7

APPENDIX I
FIELD INVESTIGATION

Our field investigation consisted of a visual reconnaissance of the site and drilling four borings and three percolation tests borings on February 25, 2019 to a depth of about 3 to 5 feet below the existing ground surface using a hand auger. Auger refusal was encountered in all but one of the borings (B-4). Figure 2 presents the approximate locations of the borings. Our field investigation was performed under the observation of an SCST geologist who also logged the borings and obtained samples of the materials encountered. Disturbed bulk samples were obtained from the drill cuttings. The soils are classified in accordance with the Unified Soil Classification System as illustrated on Figure I-1. Logs of the borings are presented in the following Figures I-2 through I-8.

SUBSURFACE EXPLORATION LEGEND

UNIFIED SOIL CLASSIFICATION CHART

SOIL DESCRIPTION		GROUP SYMBOL	TYPICAL NAMES
I. COARSE GRAINED, more than 50% of material is larger than No. 200 sieve size.			
GRAVELS More than half of coarse fraction is larger than No. 4 sieve size but smaller than 3".	CLEAN GRAVELS	GW	Well graded gravels, gravel-sand mixtures, little or no fines
		GP	Poorly graded gravels, gravel sand mixtures, little or no fines.
	GRAVELS WITH FINES (Appreciable amount of fines)	GM	Silty gravels, poorly graded gravel-sand-silt mixtures.
		GC	Clayey gravels, poorly graded gravel-sand, clay mixtures.
SANDS More than half of coarse fraction is smaller than No. 4 sieve size.	CLEAN SANDS	SW	Well graded sand, gravelly sands, little or no fines.
		SP	Poorly graded sands, gravelly sands, little or no fines.
		SM	Silty sands, poorly graded sand and silty mixtures.
		SC	Clayey sands, poorly graded sand and clay mixtures.
II. FINE GRAINED, more than 50% of material is smaller than No. 200 sieve size.			
	SILTS AND CLAYS (Liquid Limit less than 50)	ML	Inorganic silts and very fine sands, rock flour, sandy silt or clayey-silt-sand mixtures with slight plasticity.
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		OL	Organic silts and organic silty clays or low plasticity.
	SILTS AND CLAYS (Liquid Limit greater than 50)	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
		CH	Inorganic clays of high plasticity, fat clays.
		OH	Organic clays of medium to high plasticity.
III. HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils.

SAMPLE SYMBOLS

- ☒ - Bulk Sample
- CAL - Modified California Sampler
- CK - Undisturbed Chunk sample
- MS - Maximum Size of Particle
- ST - Shelby Tube
- SPT - Standard Penetration Test sampler

GROUNDWATER SYMBOLS

- ▽ - Water level at time of excavation or as indicated
- ≈ - Water seepage at time of excavation or as indicated

LABORATORY TEST SYMBOLS

- AL - Atterberg Limits
- CON - Consolidation
- COR - Corrosivity Tests (Resistivity, pH, Chloride, Sulfate)
- DS - Direct Shear
- EI - Expansion Index
- MAX - Maximum Density
- RV - R-Value
- SA - Sieve Analysis

SCST, LLC

Junipero Serra Museum ADA Improvements
San Diego, California

By:	CLF/DJM	Date:	March, 2019
Job Number:	180320P4.1	Figure:	I-1

LOG OF BORING B-1

Date Drilled: 2/25/2019 | Logged by: DJM
Equipment: 6-Inch Hand Auger | Reviewed by: DR
Elevation (ft): 175 MSL | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	CL	**FILL (Qf):** SANDY lean CLAY, soft to medium stiff, dark reddish brown, moist, fine to coarse grained, trace gravel.		X					AL SA EI RV COR
2				X					
3				X					
4		**VERY OLD PARALIC DEPOSITS (Qvop):** SILTY SANDSTONE, reddish brown, moist, strongly cemented, weathered.	CAL				22.1	98.6	
5		**REFUSAL ENCOUNTERED AT 4½ FEET ON CEMENTED HORIZON**							
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

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Junipero Serra Museum ADA Improvements
San Diego, California

By:	CLF/DJM	Date:	March, 2019
Job Number:	180320P4.1	Figure:	I-2

LOG OF BORING B-2

Date Drilled: 2/25/2019 | Logged by: DJM
Equipment: 6-Inch Hand Auger | Reviewed by: DR
Elevation (ft): 145 MSL | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SM	**FILL (Qf):** SILTY SAND, loose to medium dense, brown, moist, fine to coarse grained, trace gravel.		X					EI COR
2									
3		**VERY OLD PARALIC DEPOSITS (Qvop):** SILTY SANDSTONE, reddish brown, moist, strongly cemented, weathered.	CAL				6.1	111.4	
4									
5		**REFUSAL ENCOUNTERED AT 3½ FEET ON CEMENTED HORIZON AND COBBLES**							
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

SCST, LLC

Junipero Serra Museum ADA Improvements
San Diego, California

By:	CLF/DJM	Date:	March, 2019
Job Number:	180320P4.1	Figure:	I-3

LOG OF BORING B-3

Date Drilled: 2/25/2019 | Logged by: DJM
Equipment: 6-Inch Hand Auger | Reviewed by: DR
Elevation (ft): 145 MSL | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SM	**FILL (Qf):** SILTY SAND, loose to medium dense, brown, moist, fine to coarse grained, few gravel, few cobbles.							
2		**VERY OLD PARALIC DEPOSITS (Qvop):** SILTY SANDSTONE, light gray to yellowish brown, moist, strongly cemented, weathered.		X					SA
3			CAL				11.5	81.4	
		REFUSAL ENCOUNTERED AT 3 FEET ON CEMENTED HORIZON							
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

SCST, LLC

Junipero Serra Museum ADA Improvements
San Diego, California

By:	CLF/DJM	Date:	March, 2019
Job Number:	180320P4.1	Figure:	I-4

LOG OF BORING B-4

Date Drilled: 2/25/2019 | Logged by: DJM
Equipment: 6-Inch Hand Auger | Reviewed by: DR
Elevation (ft): 148 MSL | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SC	**FILL (Qf):** CLAYEY SAND, loose to medium dense, brown, moist, fine to coarse grained, few gravel.		X					SA RV
2									
3		Medium dense, trace cobble, more clay.							
4									
5	CL	SANDY lean CLAY, stiff, brown, moist, fine to medium grained.	CAL				18.3	92.9	
		BORING TERMINATED AT 5 FEET							
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

SCST, LLC

Junipero Serra Museum ADA Improvements
San Diego, California

By:	CLF/DJM	Date:	March, 2019
Job Number:	180320P4.1	Figure:	I-5

LOG OF PERCOLATION BORING P-1

Date Drilled: 2/25/2019 | Logged by: DJM
Equipment: 6-Inch Hand Auger | Reviewed by: DR
Elevation (ft): 160 | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1		**VERY OLD PARALIC DEPOSITS (Qvop):** SILTY SANDSTONE, reddish brown, moist, weakly cemented, weathered.							
2				X					
3		Strongly cemented, weathered, oxidized. **REFUSAL ENCOUNTERED AT 3 FEET ON CEMENTED HORIZON**							
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

SCST, LLC

Junipero Serra Museum ADA Improvements
San Diego, California

By:	CLF/DJM	Date:	March, 2019
Job Number:	180320P4.1	Figure:	I-6

LOG OF PERCOLATION BORING P-2

Date Drilled: 2/25/2019 | Logged by: DJM
Equipment: 6-Inch Hand Auger | Reviewed by: DR
Elevation (ft): 169 MSL | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SM	**FILL (Qf):** SILTY SAND, loose to medium dense, brown, moist, fine to coarse grained, few gravel, some cobbles							
2									
3		**VERY OLD PARALIC DEPOSITS (Qvop):** SILTY SANDSTONE, reddish brown, moist, moderately cemented, weathered, oxidized.		X					
4		**REFUSAL ENCOUNTERED AT 3½ FEET ON CEMENTED HORIZON**							
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

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Junipero Serra Museum ADA Improvements
San Diego, California

By:	CLF/DJM	Date:	March, 2019
Job Number:	180320P4.1	Figure:	I-7

LOG OF PERCOLATION BORING P-3

Date Drilled: 2/25/2019 | Logged by: DJM
Equipment: 6-Inch Hand Auger | Reviewed by: DR
Elevation (ft): 167 MSL | Depth to Groundwater (ft): Not Encountered

DEPTH (ft)	USCS	SUMMARY OF SUBSURFACE CONDITIONS	SAMPLES: DRIVEN	SAMPLES: BULK	DRIVING RESISTANCE (blows/ft of drive)	N_{60}	MOISTURE CONTENT (%)	DRY UNIT WEIGHT (pcf)	LABORATORY TESTS
1	SM	**FILL (Qf):** SILTY SAND, loose to medium dense, brown, moist, fine to coarse grained, trace gravel.							
2	SC	CLAYEY SAND, medium dense, reddish brown, moist, fine to medium grained, few gravel.							
3		**VERY OLD PARALIC DEPOSITS (Qvop):** SILTY SANDSTONE, light reddish brown, moist, moderately cemented, weathered.		X					
4		**REFUSAL ENCOUNTERED AT 3 FEET**							
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

SCST, LLC

Junipero Serra Museum ADA Improvements
San Diego, California

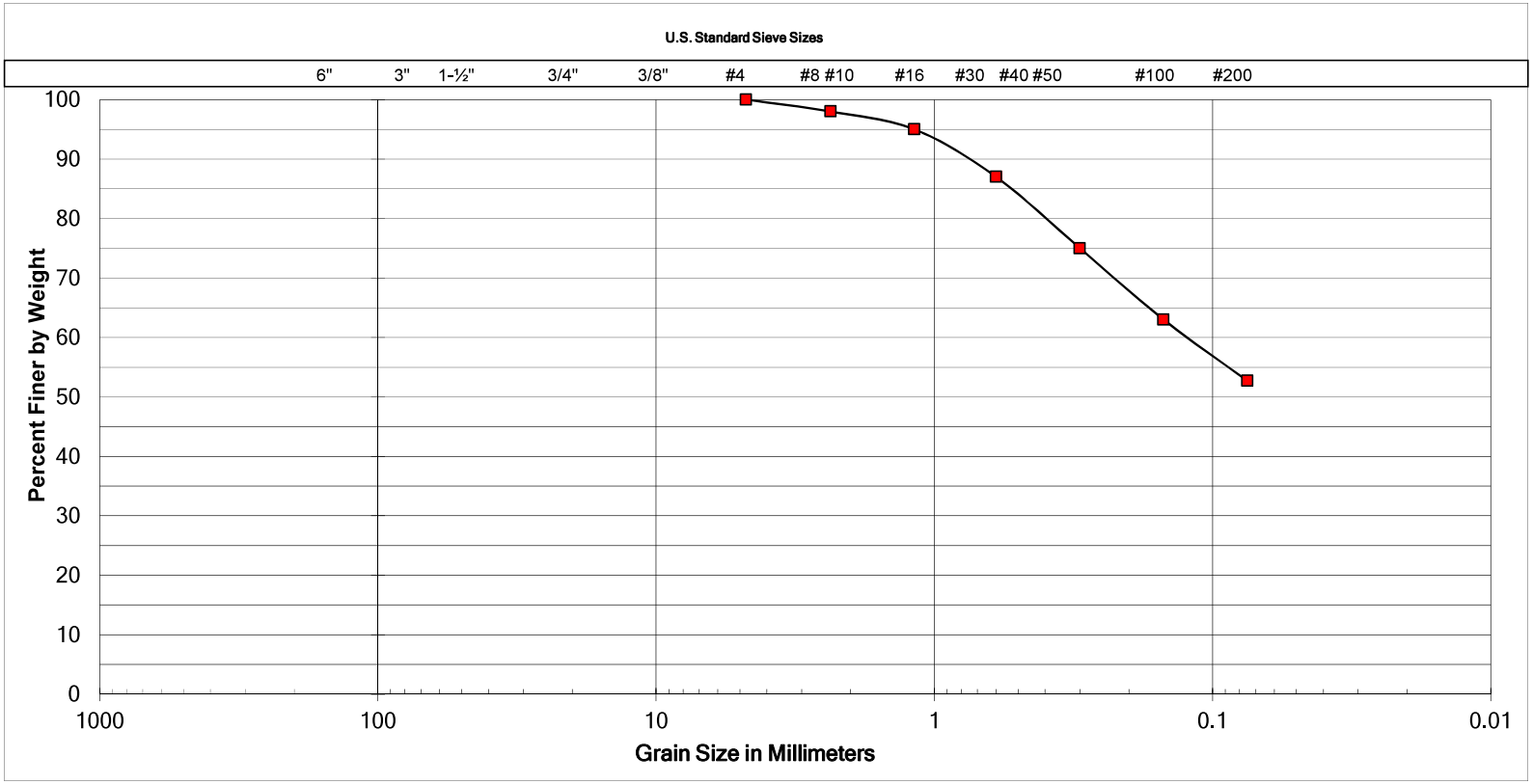
By:	CLF/DJM	Date:	March, 2019
Job Number:	180320P4.1	Figure:	I-8

APPENDIX II
LABORATORY TESTING

Laboratory tests were performed to provide geotechnical parameters for engineering analyses. The following tests were performed:

- **CLASSIFICATION:** Field classifications were verified in the laboratory by visual examination. The final soil classifications are in accordance with the Unified Soil Classification System.
- **IN SITU MOISTURE AND DENSITY:** The in situ moisture content and dry unit weight were evaluated on samples collected from the borings. The test results are presenting on the boring logs in Appendix I.
- **PARTICLE-SIZE DISTRIBUTION:** The particle-size distribution was determined on selected soil samples in accordance with ASTM D6913.
- **ATTERBERG LIMITS:** The Atterberg limits were determined on one soil sample in accordance with ASTM D4318.
- **R-VALUE:** R-value tests were performed on selected soil samples in accordance with California Test Method 301.
- **EXPANSION INDEX:** The expansion index was determined on selected soil samples in accordance with ASTM D4829.
- **CORROSIVITY**: Corrosivity tests were performed on selected soil samples. The pH and minimum resistivity were determined in accordance with California Test 643 and ASTM G51. The total chloride ion content was determined in accordance with California Test 422. The soluble sulfate content was determined in accordance with California Test 417.

Soil samples not tested are now stored in our laboratory for future reference and analysis, if needed. Unless notified to the contrary, all samples will be disposed of 30 days from the date of this report.



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
B-1 at 0 to 3 Feet
SAMPLE NUMBER
38757

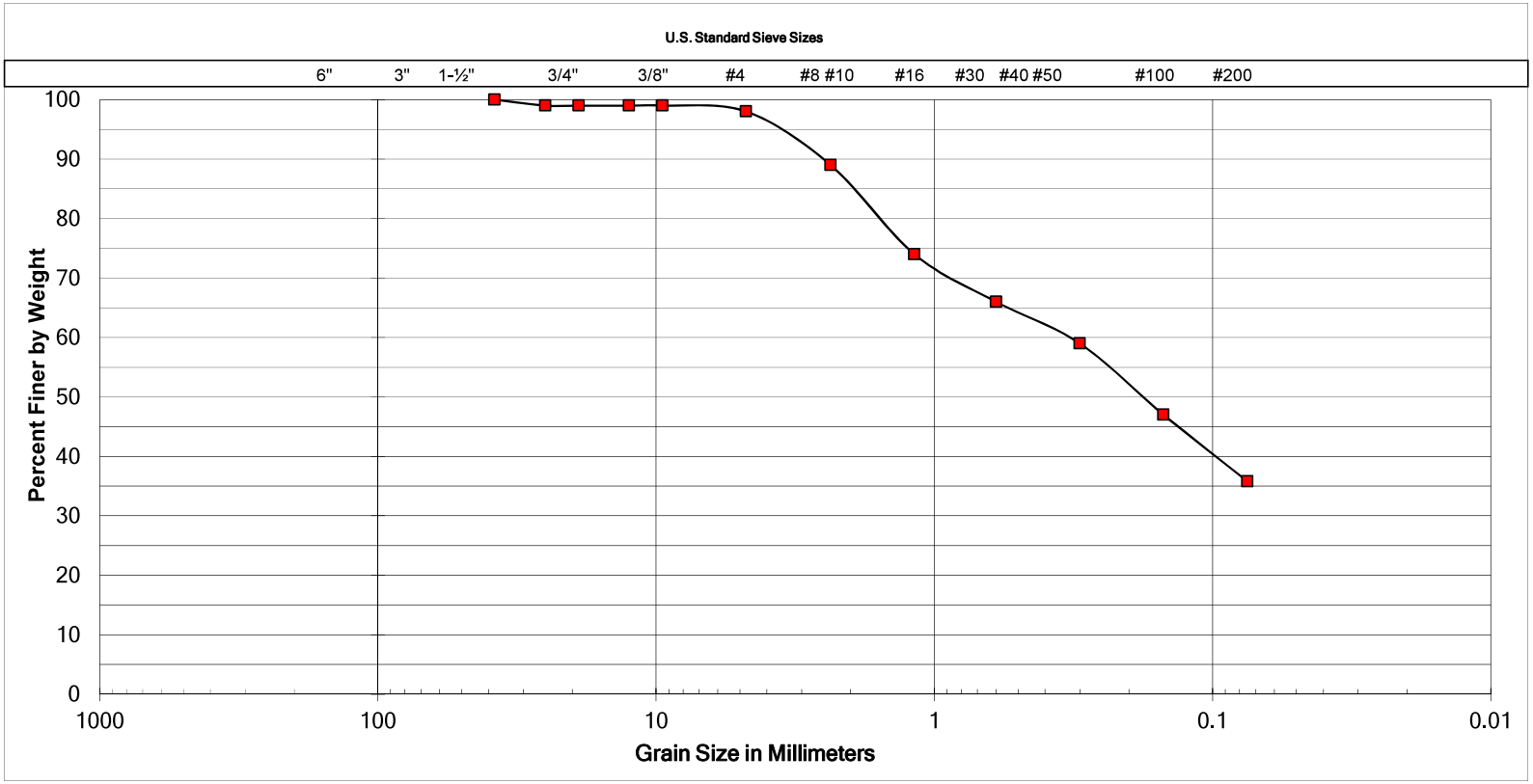
UNIFIED SOIL CLASSIFICATION:	CL
DESCRIPTION	SANDY lean CLAY

ATTERBERG LIMITS	
LIQUID LIMIT	48
PLASTIC LIMIT	19
PLASTICITY INDEX	29

SCST, LLC

Junipero Serra Museum ADA Improvements
San Diego, California

By:	CLF	Date:	March, 2019
Job Number:	180320P4.1	Figure:	II-1



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
B-3 at 1 to 2 ½ Feet
SAMPLE NUMBER
38761

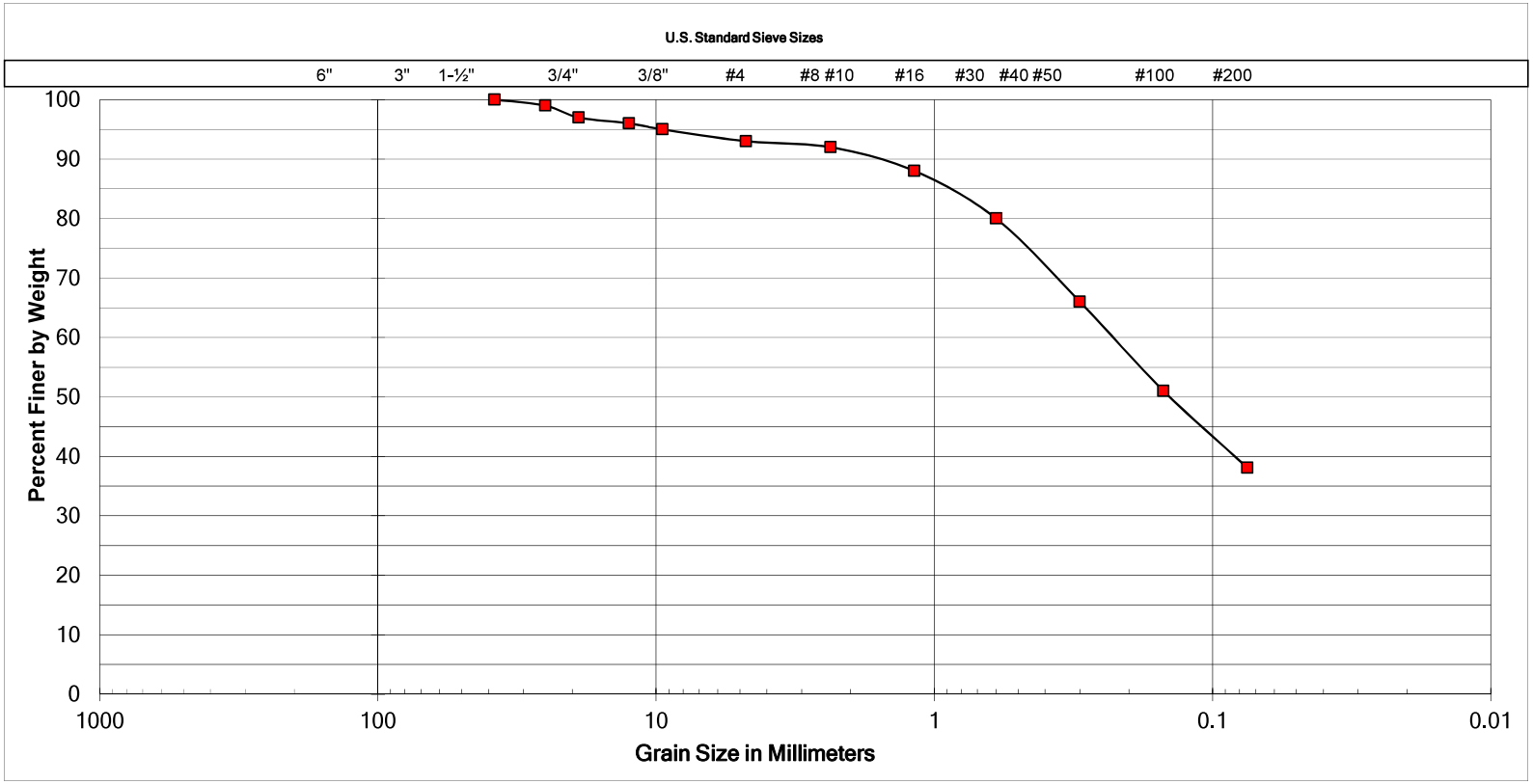
UNIFIED SOIL CLASSIFICATION:	SM
DESCRIPTION	SILTY SAND

ATTERBERG LIMITS	
LIQUID LIMIT	-
PLASTIC LIMIT	-
PLASTICITY INDEX	-

SCST, LLC

Junipero Serra Museum ADA Improvements
San Diego, California

By:	CLF	Date:	March, 2019
Job Number:	180320P4.1	Figure:	II-2



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

SAMPLE LOCATION
B-4 at 0 to 4½ Feet
SAMPLE NUMBER
38763

UNIFIED SOIL CLASSIFICATION:	SC
DESCRIPTION	CLAYEY SAND

ATTERBERG LIMITS	
LIQUID LIMIT	-
PLASTIC LIMIT	-
PLASTICITY INDEX	-

SCST, LLC

Junipero Serra Museum ADA Improvements
San Diego, California

By:	CLF	Date:	March, 2019
Job Number:	180320P4.1	Figure:	II-3

EXPANSION INDEX

ASTM D2489

SAMPLE	DESCRIPTION	EI
B-1 at 0 to 3 Feet	SANDY lean CLAY	59
B-2 at 0 to 3 Feet	SILTY SAND	6

Classification of Expansive Soil [1]

EXPANSIVE INDEX	POTENTIAL EXPANSION
1-20	Very Low
21-50	Low
51-90	Medium
91-130	High
Above 130	Very High

1. ASTM - D4829

R-VALUE

CALIFORNIA TEST 301

SAMPLE	DESCRIPTION	R-VALUE
B-1 at 0 to 3 Feet	SANDY lean CLAY	<5
B-4 at 0 to 4½ Feet	CLAYEY SAND	14

RESISTIVITY, pH, SOLUBLE CHLORIDE and SOLUBLE SULFATE

pH & Resistivity (Cal 643, ASTM G51)

Soluble Chlorides (Cal 422)

Soluble Sulfate (Cal 417)

SAMPLE	RESISTIVITY (Ω-cm)	pH	CHLORIDE (%)	SULFATE (%)
B-1 at 0 to 3 Feet	206	7.28	0.109	0.384
B-2 at 0 to 3 Feet	2180	6.36	0.017	0.001

WATER-SOLUBLE SULFATE (SO_4^{2-}) EXPOSURE

Modified from ACI 318-14 Table 19.3.1.1 and Table 19.3.2.1

Water-soluble sulfate (SO_4^{2-}) in soil, percent by weight	Exposure Severity	Exposure Class	Cement Type (ASTM C150)	Max. w/cm	Min. f_c' (psi)
$SO_4^{2-} < 0.10$	Not applicable	S0	No type restriction	N/A	2,500
$0.10 \le SO_4^{2-} < 0.20$	Moderate	S1	II	0.50	4,000
$0.20 \le SO_4^{2-} < 2.00$	Severe	S2	V	0.45	4,500
$SO_4^{2-} > 2.00$	Very Severe	S3	V plus pozzolan or slag cement	0.45	4,500

APPENDIX III
INFILTRATION RATE TEST RESULTS

We performed borehole percolation testing at three locations (P-1 through P-3) in general conformance with the City of San Diego BMP Design Manual. Prior to starting the testing, the test hole was presoaked with clean potable water for about 24 hours. The infiltration test was performed after presoaking by placing clean potable water in the hole and measuring the drop in the water level. Figures III-1 through III-3 present the results of the testing.

Report of Borehole Percolation Testing

Storm Water Infiltration

Project Name:	Junipero Serra Museum ADA Improvements	Test Number:	**P-1**
Job Number:	180320P4.1	Tested By:	DJM
Date Drilled:	2/25/2019	Date Tested:	2/26/2019
Drilling Method:	6" Hand Auger	Presoak Time:	18 HR
Drilled Depth (feet):	3.0		
Test Hole Diameter (inches):	6		
Gravel Pack:	Y		
Pipe Diameter (inches):	3		

Trial No.	Time	Time Interval, ΔT (min)	Initial Water Height, H_o (ft)	Final Water Height, H_f (ft)	Change in Water Height, ΔH (in)	Percolation Rate (min/in)
1	9:30 10:00	0:30	1.25	1.25	0.00	0
2	10:00 10:30	0:30	1.25	1.25	0.00	0

Observed Percolation Rate:	0 0.0	min/in in/hr
Gravel Correction Factor:	1.98	
Corrected Percolation Rate:	0 0.0	min/in in/hr
***Tested Infiltation Rate, I_t:**	**0.0**	**in/hr**

*Tested infiltration rate using the Porchet Method:

$$I_t = \frac{\Delta H(60r)}{\Delta T(r + 2H_{avg})}$$

ΔH = Change in water head height over the time interval [in] = 0.0

r = Test hole radius [in] = 3

ΔT = Time interval [min] = 30

H_{avg} = Average water height over time interval = $12(H_o + H_f)/2$ [in] = 15.0

SCST, LLC	Junipero Serra Museum ADA Improvements San Diego, California		
	By: CLF	Date:	March, 2019
	Job No: 180320P4.1	Figure:	III-1

Report of Borehole Percolation Testing

Storm Water Infiltration

Project Name:	Junipero Serra Museum ADA Improvements	Test Number:	**P-2**
Job Number:	180320P4.1	Tested By:	DJM
Date Drilled:	2/25/2019	Date Tested:	2/26/2019
Drilling Method:	6" Hand Auger	Presoak Time:	18 HR
Drilled Depth (feet):	3.0		
Test Hole Diameter (inches):	6		
Gravel Pack:	Y		
Pipe Diameter (inches):	3		

Trial No.	Time	Time Interval, ΔT (min)	Initial Water Height, H_o (ft)	Final Water Height, H_f (ft)	Change in Water Height, ΔH (in)	Percolation Rate (min/in)
1	10:33 11:03	0:30	0.58	0.58	0.00	0
2	11:05 11:35	0:30	0.58	0.58	0.00	0

Observed Percolation Rate:	0 0.0	min/in in/hr
Gravel Correction Factor:	1.98	
Corrected Percolation Rate:	0 0.0	min/in in/hr
***Tested Infiltation Rate, I_t:**	**0.0**	**in/hr**

*Tested infiltration rate using the Porchet Method:

$$I_t = \frac{\Delta H(60r)}{\Delta T(r + 2H_{avg})}$$

ΔH = Change in water head height over the time interval [in] = 0.0

r = Test hole radius [in] = 3

ΔT = Time interval [min] = 30

H_{avg} = Average water height over time interval = $12(H_o + H_f)/2$ [in] = 7.0

Report of Borehole Percolation Testing

Storm Water Infiltration

Project Name:	Junipero Serra Museum ADA Improvements	Test Number:	**P-3**
Job Number:	180320P4.1	Tested By:	DJM
Date Drilled:	2/25/2019	Date Tested:	2/26/2019
Drilling Method:	6" HSA	Presoak Time:	18 HR
Drilled Depth (feet):	3.0		
Test Hole Diameter (inches):	6		
Gravel Pack:	Y		
Pipe Diameter (inches):	3		

Trial No.	Time	Time Interval, ΔT (min)	Initial Water Height, H_o (ft)	Final Water Height, H_f (ft)	Change in Water Height, ΔH (in)	Percolation Rate (min/in)
1	10:50 11:20	0:30	1.54	1.54	0.00	0
2	11:20 11:50	0:30	1.54	1.54	0.00	0

Observed Percolation Rate:	0 0.0	min/in in/hr
Gravel Correction Factor:	1.98	
Corrected Percolation Rate:	0 0.0	min/in in/hr
***Tested Infiltation Rate, I_t:**	**0.0**	**in/hr**

*Tested infiltration rate using the Porchet Method:

$$I_t = \frac{\Delta H(60r)}{\Delta T(r + 2H_{avg})}$$

ΔH = Change in water head height over the time interval [in] = 0.0

r = Test hole radius [in] = 3

ΔT = Time interval [min] = 30

H_{avg} = Average water height over time interval = $12(H_o + H_f)/2$ [in] = 18.5

APPENDIX IV
FORM I-8A

This appendix is the form from the City of San Diego's BMP Design Manual filled out for this project. It is used to help evaluate infiltration conditions.

Worksheet C.4-1: Categorization of Infiltration Feasibility Condition Based on Geotechnical Conditions[9]

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions	Worksheet C.4-1: Form I-8A[10]
Part 1 - Full Infiltration Feasibility Screening Criteria	
DMA(s) Being Analyzed:	Project Phase:
Junipero Serra Museum ADA Improvements	Planning
Criteria 1: Infiltration Rate Screening	
1A	Is the mapped hydrologic soil group according to the NRCS Web Soil Survey or UC Davis Soil Web Mapper Type A or B and corroborated by available site soil data[11]? ☐ Yes; the DMA may feasibly support full infiltration. Answer "Yes" to Criteria 1 Result or continue to Step 1B if the applicant elects to perform infiltration testing. ☐ No; the mapped soil types are A or B but is not corroborated by available site soil data (continue to Step 1B). ☒ No; the mapped soil types are C, D, or "urban/unclassified" and is corroborated by available site soil data. Answer "No" to Criteria 1 Result. ☐ No; the mapped soil types are C, D, or "urban/unclassified" but is not corroborated by available site soil data (continue to Step 1B).
1B	Is the reliable infiltration rate calculated using planning phase methods from Table D.3-1? ☐ Yes; Continue to Step 1C. ☐ No; Skip to Step 1D.
1C	Is the reliable infiltration rate calculated using planning phase methods from Table D.3-1 greater than 0.5 inches per hour? ☐ Yes; the DMA may feasibly support full infiltration. Answer "Yes" to Criteria 1 Result. ☐ No; full infiltration is not required. Answer "No" to Criteria 1 Result.
1D	**Infiltration Testing Method.** Is the selected infiltration testing method suitable during the design phase (see Appendix D.3)? Note: Alternative testing standards may be allowed with appropriate rationales and documentation. ☐ Yes; continue to Step 1E. ☐ No; select an appropriate infiltration testing method.

[9] Note that it is not required to investigate each and every criterion in the worksheet, a single "no" answer in Part 1, Part 2, Part 3, or Part 4 determines a full, partial, or no infiltration condition.

[10] This form must be completed each time there is a change to the site layout that would affect the infiltration feasibility condition. Previously completed forms shall be retained to document the evolution of the site storm water design.

[11] Available data includes site-specific sampling or observation of soil types or texture classes, such as obtained from borings or test pits necessary to support other design elements.

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions	Worksheet C.4-1: Form I-8A[10]
1E	**Number of Percolation/Infiltration Tests.** Does the infiltration testing method performed satisfy the minimum number of tests specified in Table D.3-2? ☐ Yes; continue to Step 1F. ☐ No; conduct appropriate number of tests.
IF	**Factor of Safety.** Is the suitable Factor of Safety selected for full infiltration design? See guidance in D.5; Tables D.5-1 and D.5-2; and Worksheet D.5-1 (Form I-9). ☐ Yes; continue to Step 1G. ☐ No; select appropriate factor of safety.
1G	**Full Infiltration Feasibility.** Is the average measured infiltration rate divided by the Factor of Safety greater than 0.5 inches per hour? ☐ Yes; answer "Yes" to Criteria 1 Result. ☐ No; answer "No" to Criteria 1 Result.
Criteria 1 Result	Is the estimated reliable infiltration rate greater than 0.5 inches per hour within the DMA where runoff can reasonably be routed to a BMP? ☐ Yes; the DMA may feasibly support full infiltration. Continue to Criteria 2. ☒ No; full infiltration is not required. Skip to Part 1 Result.

Summarize infiltration testing methods, testing locations, replicates, and results and summarize estimates of reliable infiltration rates according to procedures outlined in D.5. Documentation should be included in project geotechnical report.

Soils mapped as D and corroborated by our 3 borehole percolation tests performed on the west and southwest areas of project. See project geotechnical report.

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
Criteria 2: Geologic/Geotechnical Screening			
2A	If all questions in Step 2A are answered "Yes," continue to Step 2B. For any "No" answer in Step 2A answer "No" to Criteria 2, and submit an "Infiltration Feasibility Condition Letter" that meets the requirements in Appendix C.1.1. The geologic/geotechnical analyses listed in Appendix C.2.1 do not apply to the DMA because one of the following setbacks cannot be avoided and therefore result in the DMA being in a no infiltration condition. The setbacks must be the closest horizontal radial distance from the surface edge (at the overflow elevation) of the BMP.		
2A-1	Can the proposed full infiltration BMP(s) avoid areas with existing fill materials greater than 5 feet thick below the infiltrating surface?	☐ Yes	☐ No
2A-2	Can the proposed full infiltration BMP(s) avoid placement within 10 feet of existing underground utilities, structures, or retaining walls?	☐ Yes	☐ No
2A-3	Can the proposed full infiltration BMP(s) avoid placement within 50 feet of a natural slope (>25%) or within a distance of 1.5H from fill slopes where H is the height of the fill slope?	☐ Yes	☐ No
2B	When full infiltration is determined to be feasible, a geotechnical investigation report must be prepared that considers the relevant factors identified in Appendix C.2.1. If all questions in Step 2B are answered "Yes," then answer "Yes" to Criteria 2 Result. If there are "No" answers continue to Step 2C.		
2B-1	**Hydroconsolidation.** Analyze hydroconsolidation potential per approved ASTM standard due to a proposed full infiltration BMP. Can full infiltration BMPs be proposed within the DMA without increasing hydroconsolidation risks?	☐ Yes	☐ No
2B-2	**Expansive Soils.** Identify expansive soils (soils with an expansion index greater than 20) and the extent of such soils due to proposed full infiltration BMPs. Can full infiltration BMPs be proposed within the DMA without increasing expansive soil risks?	☐ Yes	☐ No

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
2B-3	**Liquefaction**. If applicable, identify mapped liquefaction areas. Evaluate liquefaction hazards in accordance with Section 6.4.2 of the City of San Diego's Guidelines for Geotechnical Reports (2011 or most recent edition). Liquefaction hazard assessment shall take into account any increase in groundwater elevation or groundwater mounding that could occur as a result of proposed infiltration or percolation facilities. Can full infiltration BMPs be proposed within the DMA without increasing liquefaction risks?	☐ Yes	☐ No
2B-4	**Slope Stability**. If applicable, perform a slope stability analysis in accordance with the ASCE and Southern California Earthquake Center (2002) Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Landslide Hazards in California to determine minimum slope setbacks for full infiltration BMPs. See the City of San Diego's Guidelines for Geotechnical Reports (2011) to determine which type of slope stability analysis is required. Can full infiltration BMPs be proposed within the DMA without increasing slope stability risks?	☐ Yes	☐ No
2B-5	**Other Geotechnical Hazards.** Identify site-specific geotechnical hazards not already mentioned (refer to Appendix C.2.1). Can full infiltration BMPs be proposed within the DMA without increasing risk of geologic or geotechnical hazards not already mentioned?	☐ Yes	☐ No
2B-6	**Setbacks.** Establish setbacks from underground utilities, structures, and/or retaining walls. Reference applicable ASTM or other recognized standard in the geotechnical report. Can full infiltration BMPs be proposed within the DMA using established setbacks from underground utilities, structures, and/or retaining walls?	☐ Yes	☐ No

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
2C	**Mitigation Measures.** Propose mitigation measures for each geologic/geotechnical hazard identified in Step 2B. Provide a discussion of geologic/geotechnical hazards that would prevent full infiltration BMPs that cannot be reasonably mitigated in the geotechnical report. See Appendix C.2.1.8 for a list of typically reasonable and typically unreasonable mitigation measures. Can mitigation measures be proposed to allow for full infiltration BMPs? If the question in Step 2 is answered "Yes," then answer "Yes" to Criteria 2 Result. If the question in Step 2C is answered "No," then answer "No" to Criteria 2 Result.	☐ Yes	☐ No
Criteria 2 Result	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geologic or geotechnical hazards that cannot be reasonably mitigated to an acceptable level?	☐ Yes	☐ No
Summarize findings and basis; provide references to related reports or exhibits.			

Part 1 Result – Full Infiltration Geotechnical Screening [12]	Result
If answers to both Criteria 1 and Criteria 2 are "Yes", a full infiltration design is potentially feasible based on Geotechnical conditions only. If either answer to Criteria 1 or Criteria 2 is "No", a full infiltration design is not required.	☐ Full infiltration Condition ☒ Complete Part 2

[12] To be completed using gathered site information and best professional judgement considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings.

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions	Worksheet C.4-1: Form I-8A[10]
Part 2 – Partial vs. No Infiltration Feasibility Screening Criteria	
DMA(s) Being Analyzed:	Project Phase:
Junipero Serra Museum ADA Improvements	Planning
Criteria 3 : Infiltration Rate Screening	
3A	**NRCS Type C, D, or "urban/unclassified":** Is the mapped hydrologic soil group according to the NRCS Web Soil Survey or UC Davis Soil Web Mapper is Type C, D, or "urban/unclassified" and corroborated by available site soil data? ☐ Yes; the site is mapped as C soils and a reliable infiltration rate of 0.15 in/hr. is used to size partial infiltration BMPS. Answer "Yes" to Criteria 3 Result. ☐ Yes; the site is mapped as D soils or "urban/unclassified" and a reliable infiltration rate of 0.05 in/hr. is used to size partial infiltration BMPS. Answer "Yes" to Criteria 3 Result. ☒ No; infiltration testing is conducted (refer to Table D.3-1), continue to Step 3B.
3B	**Infiltration Testing Result:** Is the reliable infiltration rate (i.e. average measured infiltration rate/2) greater than 0.05 in/hr. and less than or equal to 0.5 in/hr? ☐ Yes; the site may support partial infiltration. Answer "Yes" to Criteria 3 Result. ☒ No; the reliable infiltration rate (i.e. average measured rate/2) is less than 0.05 in/hr., partial infiltration is not required. Answer "No" to Criteria 3 Result.
Criteria 3 Result	Is the estimated reliable infiltration rate (i.e., average measured infiltration rate/2) greater than or equal to 0.05 inches/hour and less than or equal to 0.5 inches/hour at any location within each DMA where runoff can reasonably be routed to a BMP? ☐ Yes; Continue to Criteria 4. ☒ No: Skip to Part 2 Result.
Summarize infiltration testing and/or mapping results (i.e. soil maps and series description used for infiltration rate).	

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
Criteria 4: Geologic/Geotechnical Screening			
4A	If all questions in Step 4A are answered "Yes," continue to Step 2B. For any "No" answer in Step 4A answer "No" to Criteria 4 Result, and submit an "Infiltration Feasibility Condition Letter" that meets the requirements in Appendix C.1.1. The geologic/geotechnical analyses listed in Appendix C.2.1 do not apply to the DMA because one of the following setbacks cannot be avoided and therefore result in the DMA being in a no infiltration condition. The setbacks must be the closest horizontal radial distance from the surface edge (at the overflow elevation) of the BMP.		
4A-1	Can the proposed partial infiltration BMP(s) avoid areas with existing fill materials greater than 5 feet thick?	☐ Yes	☐ No
4A-2	Can the proposed partial infiltration BMP(s) avoid placement within 10 feet of existing underground utilities, structures, or retaining walls?	☐ Yes	☐ No
4A-3	Can the proposed partial infiltration BMP(s) avoid placement within 50 feet of a natural slope (>25%) or within a distance of 1.5H from fill slopes where H is the height of the fill slope?	☐ Yes	☐ No
4B	When full infiltration is determined to be feasible, a geotechnical investigation report must be prepared that considers the relevant factors identified in Appendix C.2.1 If all questions in Step 4B are answered "Yes," then answer "Yes" to Criteria 4 Result. If there are any "No" answers continue to Step 4C.		
4B-1	**Hydroconsolidation.** Analyze hydroconsolidation potential per approved ASTM standard due to a proposed full infiltration BMP. Can partial infiltration BMPs be proposed within the DMA without increasing hydroconsolidation risks?	☐ Yes	☐ No
4B-2	**Expansive Soils.** Identify expansive soils (soils with an expansion index greater than 20) and the extent of such soils due to proposed full infiltration BMPs. Can partial infiltration BMPs be proposed within the DMA without increasing expansive soil risks?	☐ Yes	☐ No

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
4B-3	**Liquefaction**. If applicable, identify mapped liquefaction areas. Evaluate liquefaction hazards in accordance with Section 6.4.2 of the City of San Diego's Guidelines for Geotechnical Reports (2011). Liquefaction hazard assessment shall take into account any increase in groundwater elevation or groundwater mounding that could occur as a result of proposed infiltration or percolation facilities. Can partial infiltration BMPs be proposed within the DMA without increasing liquefaction risks?	☐ Yes	☐ No
4B-4	**Slope Stability**. If applicable, perform a slope stability analysis in accordance with the ASCE and Southern California Earthquake Center (2002) Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Landslide Hazards in California to determine minimum slope setbacks for full infiltration BMPs. See the City of San Diego's Guidelines for Geotechnical Reports (2011) to determine which type of slope stability analysis is required. Can partial infiltration BMPs be proposed within the DMA without increasing slope stability risks?	☐ Yes	☐ No
4B-5	**Other Geotechnical Hazards.** Identify site-specific geotechnical hazards not already mentioned (refer to Appendix C.2.1). Can partial infiltration BMPs be proposed within the DMA without increasing risk of geologic or geotechnical hazards not already mentioned?	☐ Yes	☐ No
4B-6	**Setbacks.** Establish setbacks from underground utilities, structures, and/or retaining walls. Reference applicable ASTM or other recognized standard in the geotechnical report. Can partial infiltration BMPs be proposed within the DMA using recommended setbacks from underground utilities, structures, and/or retaining walls?	☐ Yes	☐ No
4C	**Mitigation Measures.** Propose mitigation measures for each geologic/geotechnical hazard identified in Step 4B. Provide a discussion on geologic/geotechnical hazards that would prevent partial infiltration BMPs that cannot be reasonably mitigated in the geotechnical report. See Appendix C.2.1.8 for a list of typically reasonable and typically unreasonable mitigation measures. Can mitigation measures be proposed to allow for partial infiltration BMPs? If the question in Step 4C is answered "Yes," then answer "Yes" to Criteria 4 Result. If the question in Step 4C is answered "No," then answer "No" to Criteria 4 Result.	☐ Yes	☐ No

Categorization of Infiltration Feasibility Condition based on Geotechnical Conditions		Worksheet C.4-1: Form I-8A[10]	
Criteria 4 Result	Can infiltration of greater than or equal to 0.05 inches/hour and less than or equal to 0.5 inches/hour be allowed without increasing the risk of geologic or geotechnical hazards that cannot be reasonably mitigated to an acceptable level?	☐ Yes	☐ No
Summarize findings and basis; provide references to related reports or exhibits.			

Part 2 – Partial Infiltration Geotechnical Screening Result[13]	Result
If answers to both Criteria 3 and Criteria 4 are "Yes", a partial infiltration design is potentially feasible based on geotechnical conditions only. If answers to either Criteria 3 or Criteria 4 is "No", then infiltration of any volume is considered to be infeasible within the site.	☐ Partial Infiltration Condition ☒ No Infiltration Condition

[13] To be completed using gathered site information and best professional judgement considering the definition of MEP in the MS4 Permit. Additional testing and/or studies may be required by City Engineer to substantiate findings.