APPENDIX F

HYDROLOGY STUDIES

- DOMESTIC WATER CALCULATIONS
- DRAFT STORM WATER CONTROL O&M PLAN
- FIRE FLOW CALCULATIONS
- HYDROLOGY STUDY
- STORM WATER CONTROL PLAN

DOMESTIC WATER CALCULATIONS

FOR

CALIBER CHARTER SCHOOL, VALLEJO CAMPUS

500 Oregon Street, Vallejo, CA

Prepared For:
Valle Vista Education, LLC
PO BOX 5244, Richmond, CA 94805
Contact: Whitney Blumenfeld at (310) 600 - 6804

Prepared By:
CSW/Stuber-Stroeh Engineering Group, Inc.
45 Leveroni Court
Novato, California 94949
(415)-883-9850

Prepared:
June 23, 2016

CSW|ST2 File No.:
4.1194.00

CSW | ST2

VALLE VISTA AVENUE

(E) PROPERTY BOUNDARY

LIMIT OF WORK

NAPA STREET

(N) BUILDING
FF 15.75
PAD 14.75

APN 0054-020-120

APN 0054-020-030

APN 0054-020-260

(E) PROPERTY BOUNDARY

LIMIT OF WORK

BUILDING POC

ELEV. 15.75
results: 80 gpm @
51 psi

259 LF 3"
PVC SCH 80
(TOTAL)

LIMIT OF WORK

EXISTING HYDRANT
(FLOW TEST HYDRANT)
ELEVATION: 13.60
STATIC: 75 PSI
FLOW: 840 GPM
PITOT READING 25 PSI

17 LF 2"
COPPER
(TOTAL)

(N) 2" AMES
ES-A-LF4000B BFP

(E) 2" WATER
METER ELEV 15.7

OREGON STREET

LIMIT OF WORK

Graphic Scale (in feet)

20 0 20 40

1 inch = 20 ft.

CSW | ST2

CSW/Stuber-Streeb Engineering Group, Inc.

45 Leveroni Court tel: 415.883.0850
Novato, CA 94949 fax: 415.883.9835

Civil & Structural Engineers
Surveying & Mapping
Environmental Planning
Land Planning
Construction Management

http://www.csw|st2.com

Rev	Date	Description	Designed	Drawn	Checked

CALIBER CHARTER SCHOOL, VALLEJO CAMPUS

WATER CALCS EXHIBIT

CALIBER SCHOOLS

City Of
Vallejo

County Of
Solano

State Of
California

Prepared Under the Direction of:

Sheet
EXH1

Scale:	AS NOTED
Date:	6/23/16
Project Number:	4119400
Plan File:	

P:\4411\4400\DWG\Exhibits\Water Calc Exhibit.DWG Last Plot:6/24/16 Water Calcs EXH.pdf Plot By:Ash Wallace

```
*********************************************************************
*                          E P A N E T                              *
*                  Hydraulic and Water Quality                      *
*                  Analysis for Pipe Networks                       *
*                        Version 2.0                                *
*********************************************************************

Input File: 3 in DW 80 gpm.net
```

Link - Node Table:

Link ID	Start Node	End Node	Length ft	Diameter in	
3	4	5	259	3	
1	1	3	24	2	
4	6	1	#N/A	#N/A	Pump
2	3	4	#N/A	2	Valve

Energy Usage:

Pump	Usage Factor	Avg. Effic.	Kw-hr /Mgal	Avg. Kw	Peak Kw	Cost /day
4	100.00	75.00	721.48	3.46	3.46	0.00
				Demand Charge:		0.00
				Total Cost:		0.00

Node Results:

Node ID	Demand GPM	Head ft	Pressure psi	Quality	
3	0.00	169.19	66.51	0.00	
4	0.00	139.19	53.51	0.00	
5	80.00	135.18	51.75	0.00	
1	0.00	172.24	68.74	0.00	
6	-80.00	0.00	0.00	0.00	Reservoir

Link Results:

Link ID	Flow GPM	Velocity fps	Unit Headloss ft/Kft	Status	
3	80.00	3.63	15.49	Open	
1	80.00	8.17	126.82	Open	
4	80.00	0.00	-172.24	Open	Pump
2	80.00	8.17	30.00	Open	Valve

minor losses: 10% total head losses = .66'
pressure available at Building POC: 51 PSI @ 80 GPM

City of VALLEJO California

PUBLIC WORKS
WATER DIVISION

DATE: February 16, 2016

Finance Department
Commercial Services Division
Account No.: 401-0000-310.36-24
Amount: $664.32 / $173.95
Check No.: 2138
Commercial Services return receipt To Water Division

TO: Preventative Maintenance Section
Shedrick Wilson, Utility Supervisor

FROM: Andrea Keirstead,
Water Division Engineer

SUBJECT: REQUEST FOR WATER FLOW DATA

FILE: 2016 Fire Flow Test

THE WATER DIVISION HAS BEEN REQUESTED TO CONDUCT A
X WATER FLOW TEST
_____ DETERMINE THE STATIC PRESSURE
FOR Incledon Consulting Group AT

Couch St. and Valle Vista Ave.
WHEN DONE PLEASE REPORT THE FINDINGS TO THE WATER DIVISION AND THE FIRE PREVENTION DIVISION.

----------LOCATION OF FIRE HYDRANTS TO BE TESTED----------

FLOW FIRE HYDRANT AT Napa St. and Oregon St. Intersection

READ FIRE HYDRANT AT 222 Couch St.

----------TEST RESULTS----------

STATIC PRESSURE IN PSI 75 RESIDUAL PRESSURE IN PSI 75

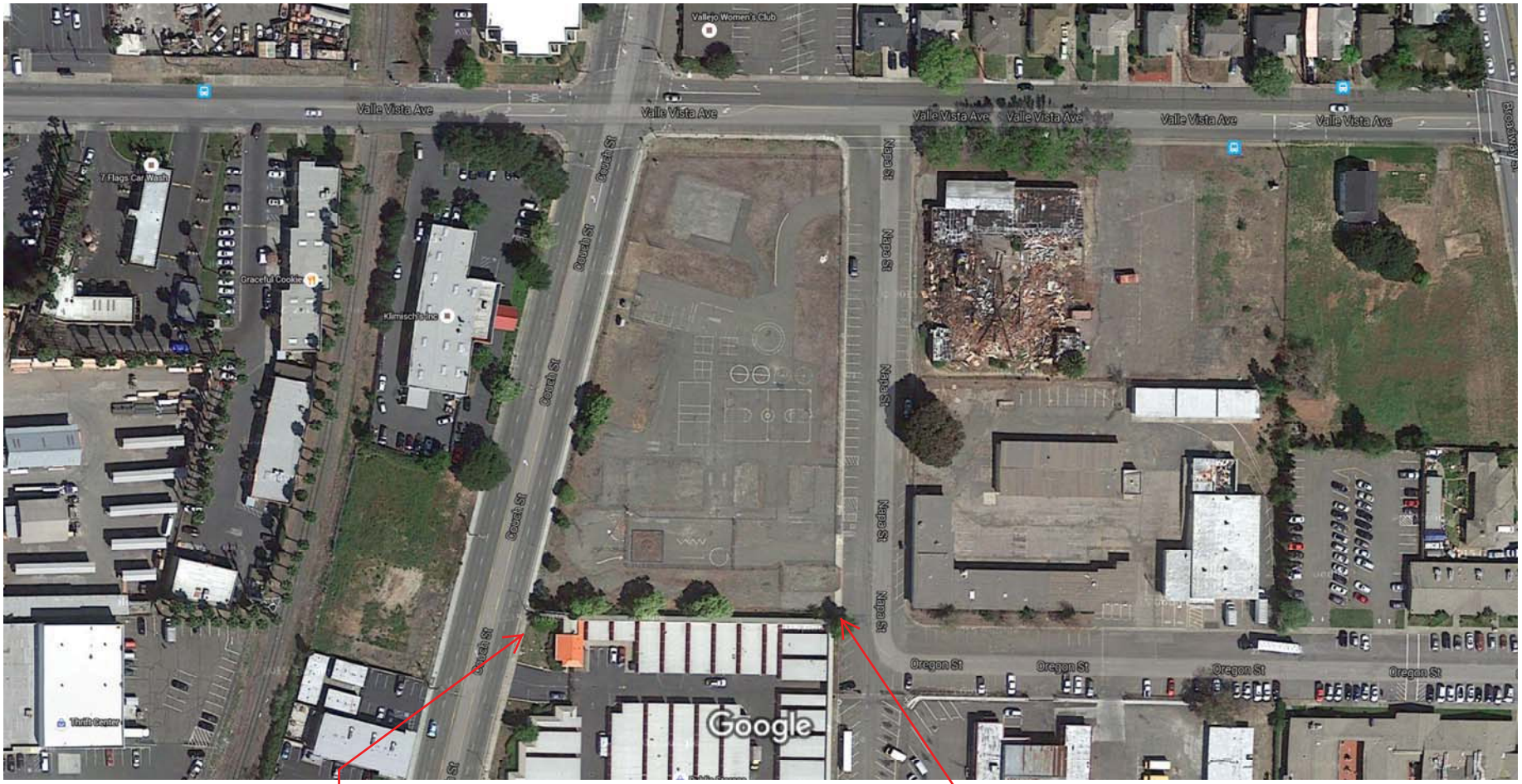
FLOW (GPM) 840 PITOT READING (PSI) 25 ORIFICE DIA (INCH) 2.5"

TEST DONE BY ONI BROWN / E. CARRILLO DATE 2-18-16

REMARKS

IF A DIAGRAM IS NEEDED FOR CLARIFICATION ATTACHED A SHEET.

Google Maps



Imagery ©2016 DigitalGlobe, U.S. Geological Survey, Map data ©2016 Google 50 ft

static and residual pressure reading hydrant

flow hydrant

DRAFT
STORM WATER CONTROL OPERATION AND MAINTENANCE PLAN

FOR

CALIBER CHARTER SCHOOL, VALLEJO CAMPUS

500 Oregon Street, Vallejo, CA

Prepared For:
Valle Vista Education, LLC
PO BOX 5244, Richmond, CA 94805
Contact: Whitney Blumenfeld at (310) 600 - 6804

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CSW | ST2

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   10.1 Inspection and Maintenance Log (Compile in this Section)
   10.2 Updates and Revisions (Compile in this Section)
   10.3 Inspection and Maintenance Checklist – Bioretention Facility
   10.4 Bioretention Facility Cutsheets
   10.5 Source and Treatment Control Operation and Maintenance Inspection Annual Report
   10.6 Storm Water Control Plan
   10.7 Owner's Certification
   10.8 Designation of Responsible Individuals

1. SUMMARY OF STORM WATER TREATMENT FACILITIES

The subject property is located at 500 Oregon Street, near the intersection of Napa Street and Valle Vista Avenue, in Vallejo, California. The existing site is currently vacant and developed with patchy ground cover, an existing building foundation near the north, four vacant buildings near the south, and hardscape in between. Underlying soils are dominated by expansive clays which prevent groundwater infiltration.

Stormwater treatment is provided by bioretention facilities. Proposed runoff will be directed towards bioretention facilities via pop-up emitters (runoff from roofs), sheet flow, or drainage swales. Bioretention facilities are sized using a sizing factor of 0.04 and designed to treat runoff from the subsheds that drain to them. Runoff is collected within bioretention areas and allowed to pond, where it then percolates through the engineered bioretention soil and eventually collects in a perforated subdrain. From there, the treated runoff is moved through the underground storm drain network and eventually discharges into the public storm drain system.

1.1 Functions of Bioretention Facilities

These facilities remove pollutants primarily by filtering runoff slowly through an active layer of soil. The bioretention facility consists of a vegetated surface, an engineered soil media mix, ponding area, mulch layer, storage layer, and under drain system. The runoff's velocity is reduced by being distributed evenly along a ponding area and interacting with the soil medium, vegetation, and soil microbes, as it passes through to the storage layer. Exfiltration of the stored water from the bioretention facility storage layer into the under drain system occurs over a period of days (after significant storm events).

1.2 Bioretention Facility – Inspection/ Maintenance Considerations

The bioretention facility requires frequent landscaping maintenance including measures to ensure that the facility is functioning properly as well as maintenance of the landscaping and removal of accumulated sediment, litter, and other floatables. Maintenance tasks can be completed by a qualified landscaping contractor. See the Inspection and Maintenance Checklist – Bioretention Facility in the appendices for information regarding how to care for the facility. Normal function of the facility may include retaining water for up to 72 hours after a storm event.

2. RESPONSIBILITY FOR MAINTENANCE

The property owner (Caliber Charter Schools) and any future owner are responsible for maintaining the bioretention facilities and the private drainage system, including rain downspouts, area drains, overflows, clean-outs, pipelines, and connectors that direct water to the stormwater treatment facilities. Any major maintenance (such as replanting, subdrain replacement, soil replacement, or similar effort) of the facilities should only be conducted by a competent professional such as a licensed landscape contractor.

Landscape contractors retained for maintenance must familiarize themselves with the purposes, design specifications, features, and mode of operation of the treatment facilities. Maintenance service providers (landscape maintenance and other maintenance), including maintenance supervisors and employees, need to be informed of the specific maintenance requirements for the treatment facilities and should review the Storm Water Control Operations and Maintenance Plan (this document).

3. SUMMARY OF DRAINAGE AREAS

The project is divided into five (5) drainage management areas (DMAs) identified as DMA 1 through DMA 5. DMA 1 discharges into the bioretention facility to the northeast. DMA 2 discharges into the bioretention facility to the southeast. DMA 3 discharges to the bioretention facility to the west. DMA 4 discharges to the bioretention facility to the northwest. DMA 5 discharges to the bioretention facilities located throughout the parking lot. Treatment facility locations are located on the Storm Water Control Plan, see Appendix 10.6.

4. GENERAL MAINTENANCE REQUIREMENTS

Landscape contractors retained for maintenance must familiarize themselves with the purposes, design specifications, features, and mode of operation of the treatment facilities and should review the Storm Water Control Plan (in addition to this document). As will be reflected in contracts for landscape maintenance and other maintenance services, maintenance supervisors and employees need to be informed of the following specific maintenance requirements for the treatment facilities. Maintenance instructions include the following (see Inspection and Maintenance Checklist for more detailed maintenance instructions).

Summary of Maintenance Requirements

The stormwater facilities proposed throughout the project site to meet runoff quality requirements include bioretention facilities. The following are minimum maintenance requirements for these types of facilities.

4.1 Bioretention Facilities

These facilities remove pollutants primarily by filtering runoff slowly through an active layer of soil. Routine maintenance is needed to ensure flow is unobstructed, erosion is prevented, and soils are held together by plant roots and are biologically active. Typical maintenance consists of the following:

- Inspect inlets for channels, exposure of soils, or other evidence of erosion. Clear any obstructions and remove any accumulation of sediment. Examine rock or other material used as a splash pad and replenish if necessary.

- Inspect outlets for erosion or plugging.

- Inspect side slopes for evidence of instability or erosion and correct as necessary.

- Observe soil at the bottom of the biofilter for uniform percolation throughout. If portions of the biofilter do not drain within 48 hours after the end of a storm, the soil should be tilled and replanted. Remove any debris or accumulations of sediment.

- Confirm that check dams and flow spreaders are in place and level and that channelization within the swale or filter is effectively prevented.

- Examine the vegetation to ensure that it is healthy and dense enough to provide filtering and to protect soils from erosion. Replenish mulch as necessary, and remove fallen leaves and debris. Confirm that irrigation is adequate and not excessive. Replace dead plants and remove noxious and invasive vegetation.

- Abate any potential vectors by filling holes in the ground in and around the biofilter and by insuring that there are no areas where water stands longer than 48 hours following a storm. If mosquito larvae are present and persistent, contact the Contra Costa Mosquito and Vector Control District for information and advice. Mosquito larvicides should be applied only when absolutely necessary and then only by a licensed individual or contractor.

Refer to Appendix 10.3 - Inspection and Maintenance Checklist – Bioretention Facility

5. DESIGN CALCULATIONS AND DOCUMENTATION

Bioretention Facilities were sized using a sizing factor of 0.04. A summary of sizing calculations are provided in the Stormwater Control Plan, Appendix 10.6.

6. INSPECTION AND MAINTENANCE SCHEDULE

Bioretention facilities should, at a minimum, be inspected twice a year, or more frequently. These inspections should occur prior to the start of the rainy season and after completion of the rainy season.

7. REPORTING AND UPDATES FOR PRIVATE STORMWATER FACILITIES

Each year the entity responsible for maintenance is required to complete an annual report. The report shall include copies of completed inspection and maintenance checklists to document the maintenance activities here conducted during the previous year. The annual report shall be retained for a period of at least five years and made available upon request by the City of Vallejo or the San Francisco Regional Water Quality Control Board (RWQCB).

Refer to Appendices 10.1 and 10.2.

The Storm Water Control Operations and Maintenance Plan will be a living document.

Operation and maintenance personnel may turn over; mechanical equipment may be replaced, and additional maintenance procedures may be needed as staff gains experience and equipment ages. Through these changes, Operations and Maintenance Plan must be kept up-to-date.

Updates may be transmitted to the City at any time. However, at a minimum, updates to the Operations and Maintenance Plan must accompany the annual inspection report. These updates should be placed in reverse chronological order (most recent on top) in Appendix 10.2 of this binder. If the entire Operations and Maintenance Plan is updated, as it should be from time to time, these updates should be removed from Appendix 10.2, but may be filed for possible future reference.

Annual inspection reports and updates must be 3-hole punched.

8. SPILL OBSERVATION AND CLEAN-UP

This section describes measures to clean up observed spills. Clean-up of spills should be immediate, automatic and routine. They should also be performed by a trained staff member or a licensed cleaning company, if appropriate.

8.1 Minor Spills

Minor spills are those which are likely to be controlled by on-site personnel. After contacting local emergency response agencies, the following actions should occur upon discovery of a minor spill:

- Contain the spread of the spill.
- If the spill occurs on paved or impermeable surfaces, clean up using dry methods (i.e., absorbent materials, cat litter and/or rags).
- If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
- If the spill occurs during rain, cover the impacted area to avoid runoff.
- Record all steps taken to report, contain and clean up the spill.

8.2 Major Spills

Major spills are those which are unlikely to be controlled by on-site personnel. On-site personnel should not attempt to control major spills until the appropriate and qualified emergency response staff have arrived at the site. In addition to local authorities, notify the Governor's Office of Emergency Services Warning Center at (800) 852-7550. For spills of federal reportable quantities, also notify the National Response Center at (800) 424-8802. A written report should be sent to all notified authorities.

9. CERTIFICATION

See Appendix 10.7 for Owner's Certification.

10.0 APPENDICES

Appendix 10.1 – Inspection & Maintenance Log

Stormwater BMP Inspection and Maintenance Log

Facility Name	
Address	
Begin Date	End Date

Date	BMP ID#	BMP Description	Inspected by:	Cause for Inspection	Exceptions Noted	Comments and Actions Taken

Instructions: Record all inspections and maintenance for all treatment BMPs on this form. Use additional log sheets and/or attach extended comments or documentation as necessary. Submit a copy of the completed log with the annual independent inspectors' report to the municipality, and start a new log at that time.

- BMP ID# — Always use ID# from the Operation and Maintenance Manual.
- Inspected by — Note all inspections and maintenance on this form, including the required independent annual inspection.
- Cause for inspection — Note if the inspection is routine, pre-rainy-season, post-storm, annual, or in response to a noted problem or complaint.
- Exceptions noted — Note any condition that requires correction or indicates a need for maintenance.
- Comments and actions taken — Describe any maintenance done and need for follow-up.

Appendix 10.2 – Updates & Revisions

Appendix 10.3 – Inspection & Maintenance Checklist – Bioretention Facility

Inspection and Maintenance Checklist
Bioretention Area

Property Address: _____ Property Owner: _____

Date of Inspection: _____ Type of Inspection: □ Pre-rainy season □ Monthly □ Quarterly

Inspector(s): _____ □ Annual □ Re-inspection

Item	Conditions When Maintenance is Needed	Maintenance Needed? (Y/N)	Typical Maintenance	Comments
General				
Trash & Debris	Trash and debris accumulated in basin. Visual evidence of dumping.		Trash and debris cleared from site.	
Contaminants and Polution	Any evidence of oil, gasoline, contaminants or other pollutants.		Remove contaminants or pollutants. Dispose of properly.	
Vegetation	When the planted vegetation impedes flow or causes standing water. When nuisance weeds and other vegetation start to take over. Dead, diseased, or dying vegetation.		Vegetation mowed per specifications or maintenance plan, or nuisance vegetation removed so that flow is not impeded. Vegetation should never be mowed lower than the design flow depth. Remove clippings from the area and dispose appropriately.	
Tree/Brush Growth and Hazard Trees	Growth does not allow maintenance access or interferes with maintenance activity. Dead, diseased, or dying trees.		Remove hazard trees as approved by the City. (Use a certified Arborist to determine health of tree or removal requirements)	
Erosion	Eroded over 2 in. deep where cause of damage is still present or where there is potential for continued erosion.		Add mulch to fill in void areas.	

Inspection and Maintenance Checklist
Bioretention Area

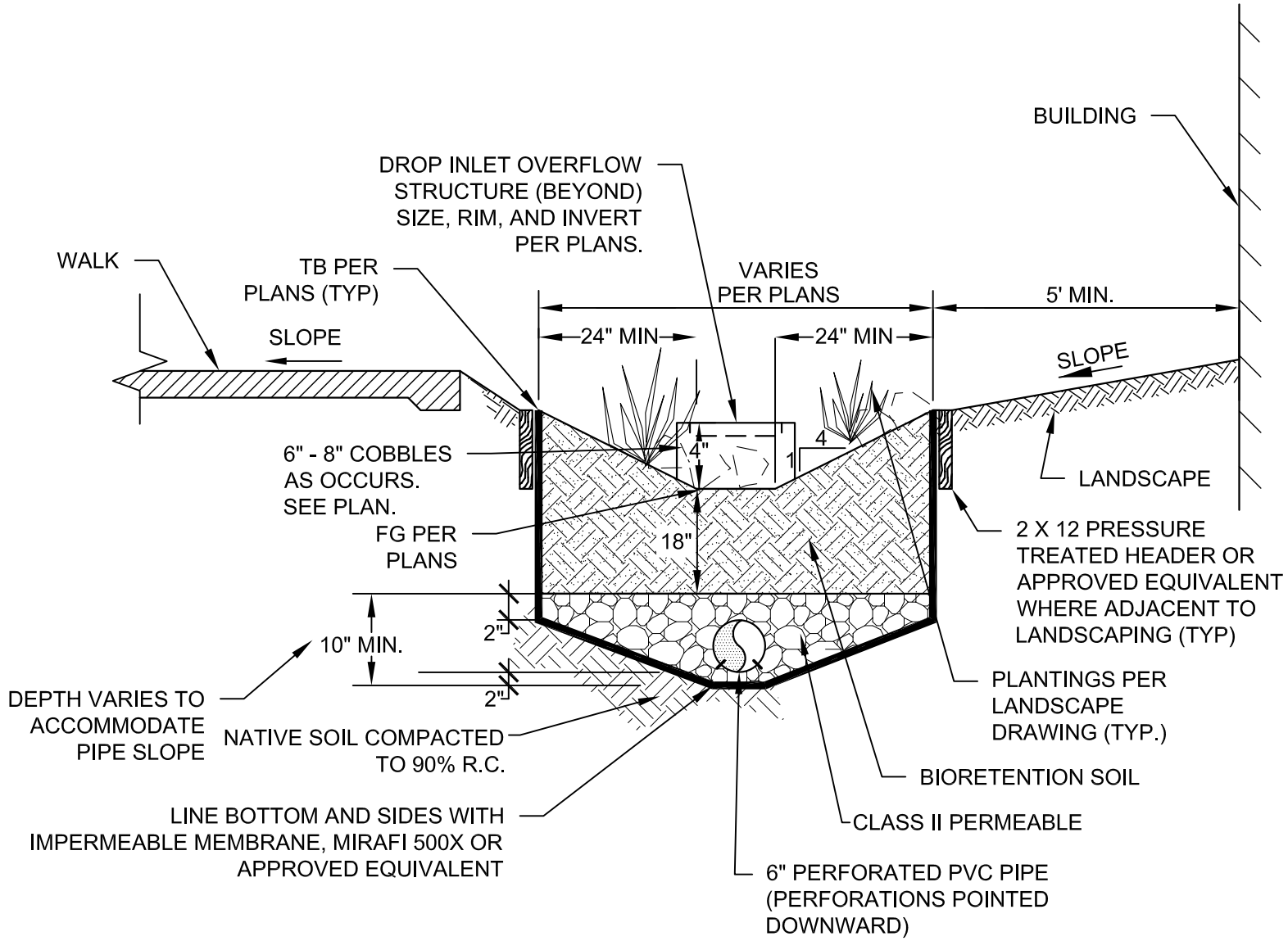
Property Address: _____ Inspection Date: _____

Treatment Measure No.: _____

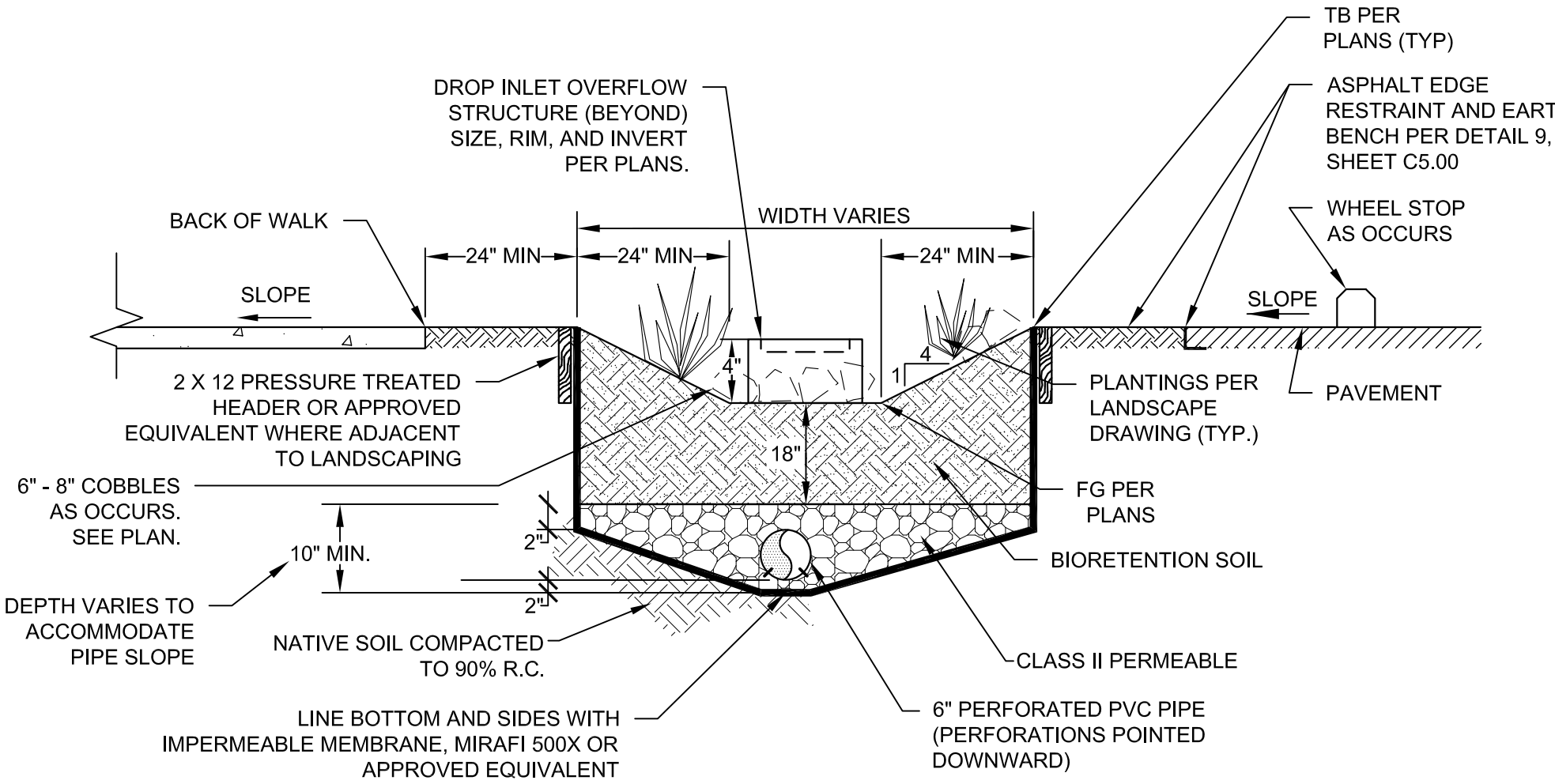
Item	Conditions When Maintenance is Needed	Maintenance Needed? (Y/N)	Typical Maintenance	Comments
Sediment	Accumulated sediment affects inletting or outletting condition of the facility.		Remove sediment. Reseed area.	
Damaged Pipes	Any part of the piping that is crushed or deformed more than 20% or any other failure to the piping.		Repair or replace pipe.	
Rodent Holes	If facility acts as a dam or berm, any evidence of rodent holes, or any evidence of water piping through dam or berm via rodent holes.		Repair damage until the design specifications are not compromised by holes. Rodent control activities must be in accordance with applicable laws and do not affect ay protected species.	

Appendix 10.4 – Bioretention Facility Cutsheets

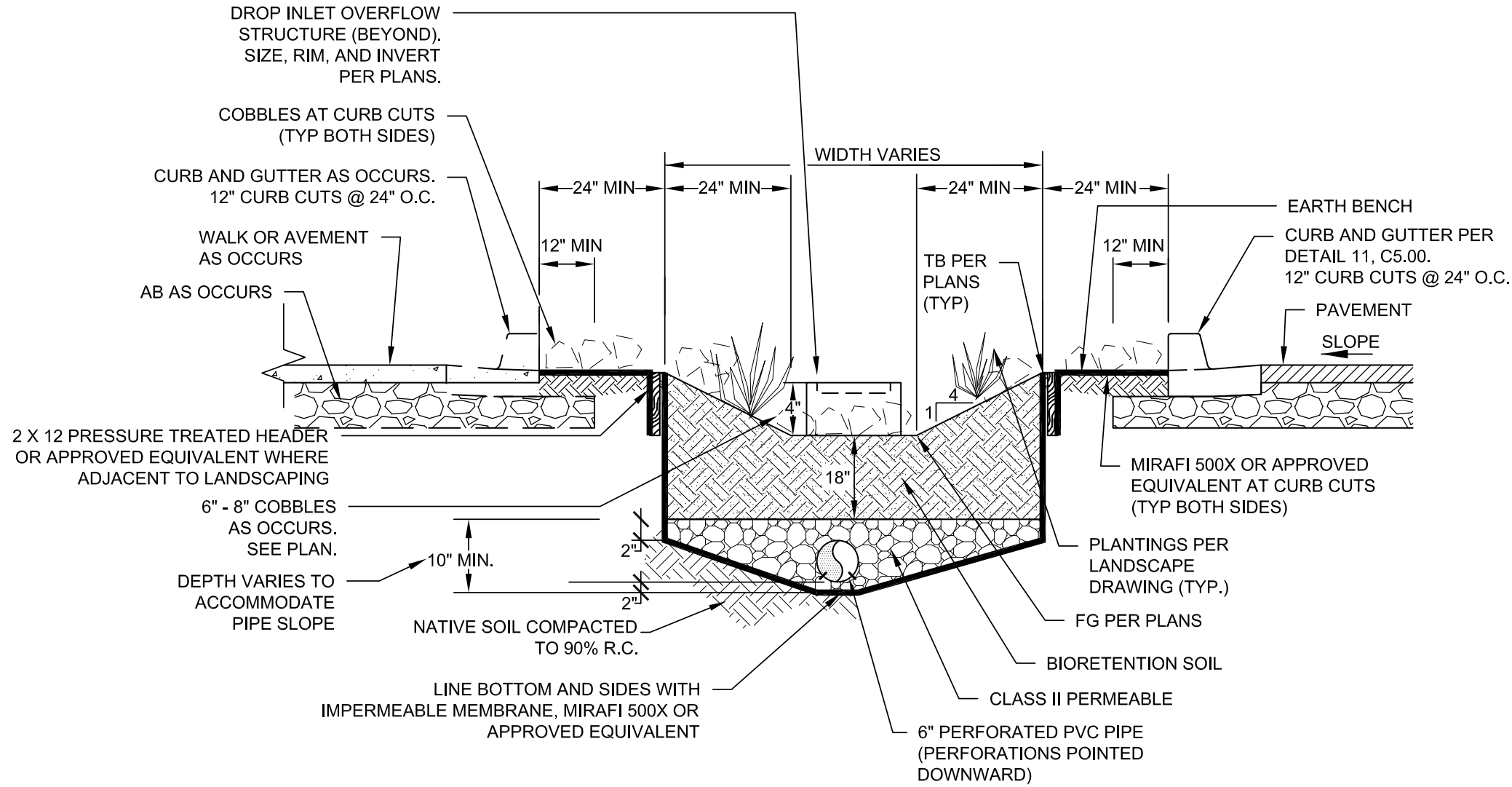
TYPICAL BIORETENTION ADJACENT TO BUILDING



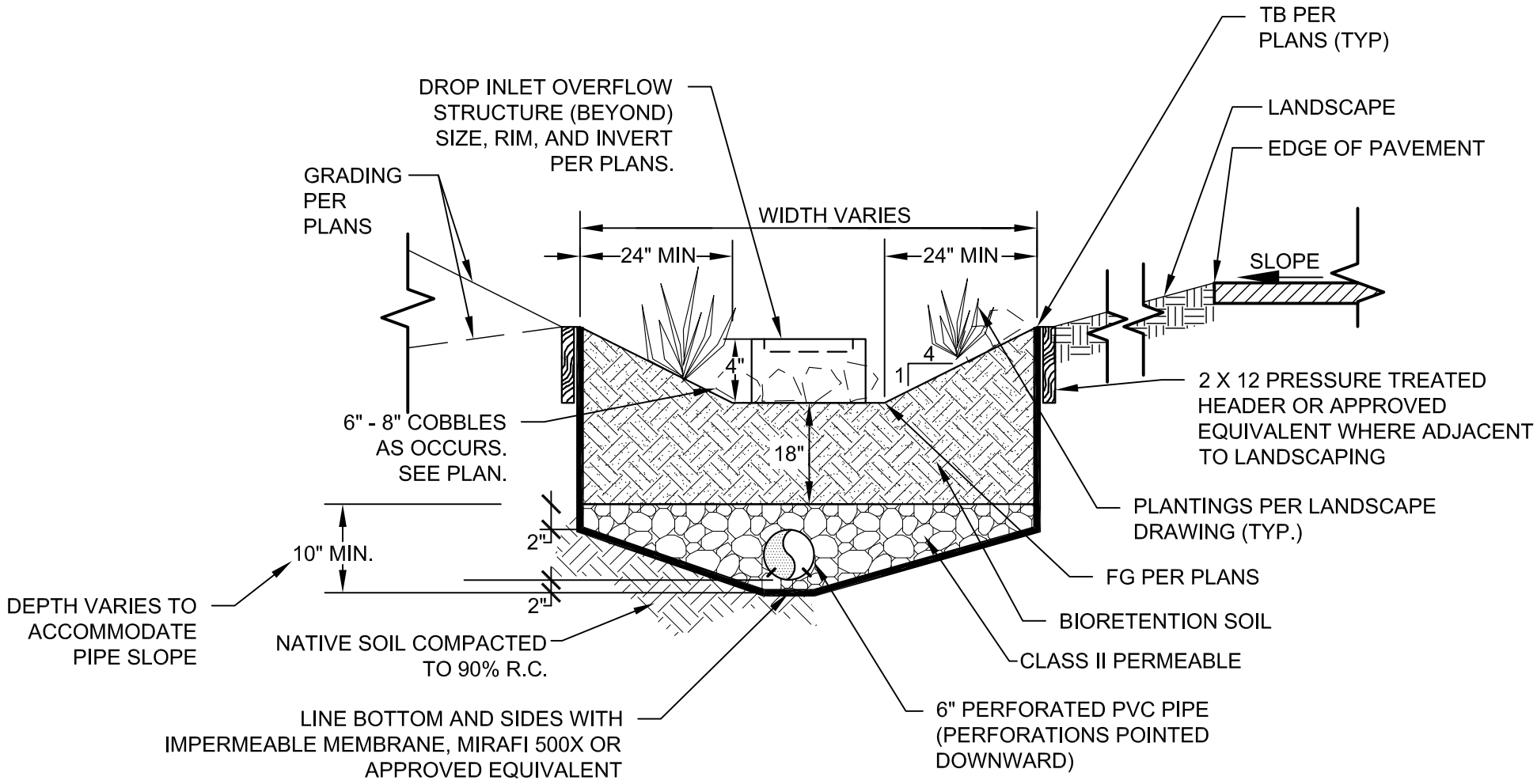
TYPICAL BIORETENTION FACILITY - WEST OF PARKING LOT



TYPICAL BIORETENTION FACILITY - IN PARKING LOT MEDIAN



TYPICAL BIORETENTION FACILITY - NORTHEAST AND SOUTHEAST ASPHALT COURTS



Appendix 10.5 – Source & Treatment Control Operation & Maintenance Inspection Annual Report

Source and Treatment Control Operation and Maintenance Inspection Annual Report

This report and attached Inspection and Maintenance Checklists document the inspection and maintenance conducted for the identified storm water source and treatment control(s) that are subject to the maintenance mechanism that assigns responsibility for maintenance. The report covers the annual reporting period indicated below.

I. Property Information:

Property Address or APN: _____

Property Owner: _____

II. Contact Information:

Name of person to contact regarding this report: _____

Phone number of contact person: _____ Email: _____

Address to which correspondence regarding this report should be directed:

_____

_____

III. Reporting Period:

This report, with the attached completed inspection checklists, documents the inspections and maintenance of the identified treatment measures during the time period from _____ to _____.

IV. Storm Water Source and Treatment Control Information:

The following storm water source and treatment controls are located on the property identified above and are subject to the Agreement:

Identifying Number of Source and Treatment Control	Type of Source and Treatment Control	Location of Source and Treatment Control on the Property

V. Summary of Inspections and Maintenance:

Summarize the following information using the attached Inspection and maintenances Checklists:

Identifying Number of Source and Treatment Control	Date of Inspection	Operation and Maintenance Activities Performed and Date(s) Conducted	Additional Comments

VI. Sediment Removal:

Total amount of accumulated sediment removed from the storm water treatment measure(s) during the reporting period: _____ cubic yards.

How was sediment disposed?

- □ landfill
- □ Other location on-site as described in and allowed by the maintenance plan
- □ Other, explain _____

VII. Inspector Information:

The inspections documented in the attached Inspection and Maintenance Checklists were conducted by the following inspector(s):

Inspector Name and Title	Inspector's Employer and Address

VIII. Certification:

I herby certify, under penalty of perjury, that the information presented in this report and attachments is true and complete:

Signature of property Owner or other Responsible Party

Date

Type or Print Name

Company Name

Appendix 10.6 – Storm Water Control Plan

STORMWATER CONTROL PLAN

for

CALIBER CHARTER SCHOOL – VALLEJO CAMPUS

June 23, 2016

Valle Vista Education, LLC

PO BOX 5244, Richmond, CA 94805
Contact: Whitney Blumenfeld at (310) 600 -6804

prepared by:

CSW/Stuber-Stroeh Engineering Group, Inc.

45 Leveroni Court, Novato, CA 94949

(415) 883 - 9850

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II.C. Opportunities and Constraints for Stormwater Control 2

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III.A. Optimization of Site Layout 2

III.A.1. The site development was limited to the building envelope, hardscape needed for accessibility, and utility upgrades. 2

III.A.2. The proposed site maintains existing drainage patterns. 2

III.A.3. No creeks, wetlands, and riparian habitats exist near the site. 2

III.A.4. Imperviousness was limited to the building envelope and hardscape needed for accessibility. 2

III.A.5. Biotreatment planters will have the added bonus of treating stormwater and decreasing peak runoff 2

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Stormwater Control Plan Exhibit

Appendix

HMP Compliance

I. PROJECT DATA

Table 1. Project Data

Project Name/Number	Caliber Charter School – Vallejo Campus
Application Submittal Date	June 23, 2016
Project Location	500 Oregon Street, APN 0054-020-140
Name of Developer	Pacific Charter School Development
Project Phase No.	N/A
Project Type and Description	Tilt up concrete building and site work for a new charter school
Project Watershed	Austin Creek Watershed
Total Project Site Area (acres)	5.45 acres
Total Area of Land Disturbed (acres)	3.92 acres
Total New Impervious Surface Area (sq. ft.)	9,470 sf
Total Replaced Impervious Surface Area	80,000 sf
Total Pre-Project Impervious Surface Area	203,575 sf
Total Post-Project Impervious Surface Area	152,900 sf
50% Rule[*]	Doesn't Apply
Project Density	2.6
Applicable Special Project Categories	none
Percent LID and non LID treatment	100% LID treatment
HMP Compliance [†]	Option 1

II. SETTING

II.A. Project Location and Description

The proposed project is located at 500 Oregon Street in Vallejo, California, near the intersection of Valle Vista Avenue and Napa Street. The proposed project will be the site for the Caliber Charter School, which consists of a school building for K-8 grades, accessible walkways, parking lot and student dropoff area, outdoor courts, outdoor seating areas, and landscaped pads.

II.B. Existing Site Features and Conditions

The existing site is divided up into a northern portion and southern portion separated by a chain link fence. The northern portion of the site is currently vacant with the exception of a former building foundation, and the southern portion of the site is currently developed with four vacant buildings. Napa Street abuts the site to the west and Oregon Street abuts the site to the south. The existing site is developed with patchy ground cover which is expected to behave imperviously more or less because it appears compacted. Additionally, underlying soils are expansive clays which are impermeable and prevent groundwater infiltration. Existing surface runoff flows overland in sheet flows, shallow concentrated flows, and channelized flows (curb and gutter) where it eventually discharges into the valley gutter in Valle Vista. From there it flows westward via curb and gutter to the drop inlet just before Couch street. Existing storm drainage was not found adjacent to the site in neither Valle Vista Avenue, Napa Street, nor Oregon Street.

II.C. Opportunities and Constraints for Stormwater Control

The existing site is underlain with expansive clays which are impermeable and prevent groundwater infiltration. Additionally, there is no underground storm drainage located on the site or in the streets located adjacent the property. Therefore, bioretention facilities with perforated subdrains and impermeable liners are proposed.

Stormwater treatment is provided by bioretention facilities. Proposed runoff will be directed towards bioretention facilities via pop-up emitters (runoff from roofs), sheet flow, or drainage swales. Bioretention facilities are sized using a sizing factor of 0.04 and strategically located to capture runoff from hardscape. Runoff is collected within bioretention areas and allowed to pond, where it then percolates through the engineered bioretention soil and eventually collects in a perforated subdrain. From there, the treated runoff is conveyed through the underground storm drain network where it eventually discharges into the public storm drain system.

III. LOW IMPACT DEVELOPMENT DESIGN STRATEGIES

III.A. Optimization of Site Layout

III.A.1. The site development was limited to the building envelope, hardscape needed for programming, hardscape needed for accessibility, and utility upgrades.

III.A.2. The proposed site maintains existing drainage patterns.

III.A.3. No creeks, wetlands, and riparian habitats exist near the site.

III.A.4. Imperviousness was limited to the building envelope and hardscape needed for accessibility.

III.A.5. Biotreatment planters will have the added bonus of treating stormwater and decreasing peak runoff.

III.B. Use of Permeable Pavements

Permeable Pavers not used.

III.C. Dispersal of Runoff to Pervious Areas

Runoff is dispersed into biotreatment areas.

III.D. Stormwater Control Measures

Biotreatment areas will be sized to treat runoff from the roof and site hardscape.

IV. DOCUMENTATION OF DRAINAGE DESIGN

IV.A. Descriptions of each Drainage Management Area

IV.A.1. Table of Drainage Management Areas

DMA Name	Surface Type	Area (square feet)
DMA 1	Roof / Concrete/ Asphalt	18,226
DMA 2	Roof / Concrete/ Asphalt	14,038
DMA 3	Roof/ Concrete	18,122
DMA 4	Roof/ Concrete	7,197
DMA 5	Concrete/ Asphalt	28,000

IV.A.2. Drainage Management Area Descriptions

DMA 1, totaling 18,226 square feet, drains roof, concrete, and asphalt. DMA 1 drains to IMP 1.

DMA 2, totaling 14,038 square feet, drains roof, concrete, and asphalt. DMA 2 drains to IMP 2.

DMA 3, totaling 18,122 square feet, drains roof and concrete. DMA 3 drains to IMP 3.

DMA 4, totaling 7,197 square feet, drains roof and concrete. DMA 4 drains to IMP 4.

DMA 5, totaling 28,000 square feet, drains concrete and asphalt. DMA 5 drains to IMP 5.

IV.B. Tabulation and Sizing Calculations

IV.B.1. Information Summary for IMP Design

Total Project Area (Square Feet)	237,520
IMPs Designed For:	Treatment only

IV.B.2. Areas Draining to IMPs

DMA Name	*DMA Area (square feet)*	*Post-project surface type*	*DMA Runoff factor*	*DMA Area × runoff factor*	*Soil Type:* D	*IMP Name* IMP 1			
DMA1	18,226	Roof, Concrete, and Asphalt	1.0	18,226					
					IMP Sizing factor	*Rain Adjust-ment Factor*	*Minimum Area or Volume*	*Proposed Area or Volume*	
			Total	18,226	***.04***	***n/a***	***730***	***730***	***IMP Area***

DMA Name	*DMA Area (square feet)*	*Post-project surface type*	*DMA Runoff factor*	*DMA Area × runoff factor*	*Soil Type:* D	*IMP Name* IMP 2			
DMA2	14,038	Roof, Concrete, and Asphalt	1.0	14,038					
					IMP Sizing factor	*Rain Adjust-ment Factor*	*Minimum Area or Volume*	*Proposed Area or Volume*	
			Total	14,038	***.04***	***n/a***	***562 SF***	***1,057 sf***	***IMP Area***

DMA Name	*DMA Area (square feet)*	*Post-project surface type*	*DMA Runoff factor*	*DMA Area × runoff factor*	*Soil Type:*	*IMP Name*			
					D	IMP 3			
DMA3	18,122	Roof and Concrete	1.0	18,122	*IMP Sizing factor*	*Rain Adjust-ment Factor*	*Minimum Area or Volume*	*Proposed Area or Volume*	
			Total	18,122	***.04***	***n/a***	***725***	***1,411 sf***	***IMP Area***

DMA Name	*DMA Area (square feet)*	*Post-project surface type*	*DMA Runoff factor*	*DMA Area × runoff factor*	*Soil Type:*	*IMP Name*			
					D	IMP 4			
DMA4	7,197	Roof and Concrete	1.0	7,197	*IMP Sizing factor*	*Rain Adjust-ment Factor*	*Minimum Area or Volume*	*Proposed Area or Volume*	
			Total	7,197	***.04***	***n/a***	***288***	***326 sf***	***IMP Area***

DMA Name	*DMA Area (square feet)*	*Post-project surface type*	*DMA Runoff factor*	*DMA Area × runoff factor*	*Soil Type:*	*IMP Name*			
					D	IMP 5			
DMA5	28,000	Concrete and Asphalt	1.0	28,000	*IMP Sizing factor*	*Rain Adjust-ment Factor*	*Minimum Area or Volume*	*Proposed Area or Volume*	
			Total	28,000	***.04***	***n/a***	***1,120***	***1,530 sf***	***IMP Area***

V. SOURCE CONTROL MEASURES

V.A. Site activities and potential sources of pollutants

V.B. Source Control Table

Potential source of runoff pollutants	*Permanent source control BMPs*	*Operational source control BMPs*
On site storm drain inlets	Mark all inlets with the words "No dumping! Flows to Bay." or similar.	Maintain and periodically repaint or replace inlet markings. Provide stormwater pollution prevention information to new site owners, lessees, or operators. See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."
Interior floor drains and elevator shaft sump pumps	Interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.	Inspect and maintain drains to prevent blockages and overflow.
Need for future indoor & structural pest control	Building design features that discourage entry of pests.	
Landscape/Outdoor Pesticide Use	Final landscape plans will accomplish all of the following. Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. Design landscaping to minimize Design irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions.	Maintain landscaping using minimum or no pesticides. See applicable operational BMPs in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com Provide IPM information to new owners, lessees and operators.

	Consider using pest-resistant plants, especially adjacent to hardscape. To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	
Refuse areas	Signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	The following will be implemented: Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available onsite. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
Fire Sprinkler Test Water	Provide a means to drain fire sprinkler test water to the sanitary sewer.	See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
Plazas, sidewalks, and parking lots.		Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.

V.C. Features, Materials, and Methods of Construction of Source Control BMPs

Furnish per manufacturer's recommendations.

VI. STORMWATER FACILITY MAINTENANCE

VI.A. Ownership and Responsibility for Maintenance in Perpetuity

The applicant accepts responsibility for interim operation and maintenance of stormwater treatment and flow-control facilities until such time as this responsibility is formally transferred to a subsequent owner.

VI.B. Summary of Maintenance Requirements for Each Stormwater Facility

Bioretention Areas

These facilities remove pollutants primarily by filtering runoff slowly through an active layer of soil. Routine maintenance is needed to ensure that flow is unobstructed, that erosion is prevented, and that soils are held together by plant roots and are biologically active. Typical maintenance consists of the following:

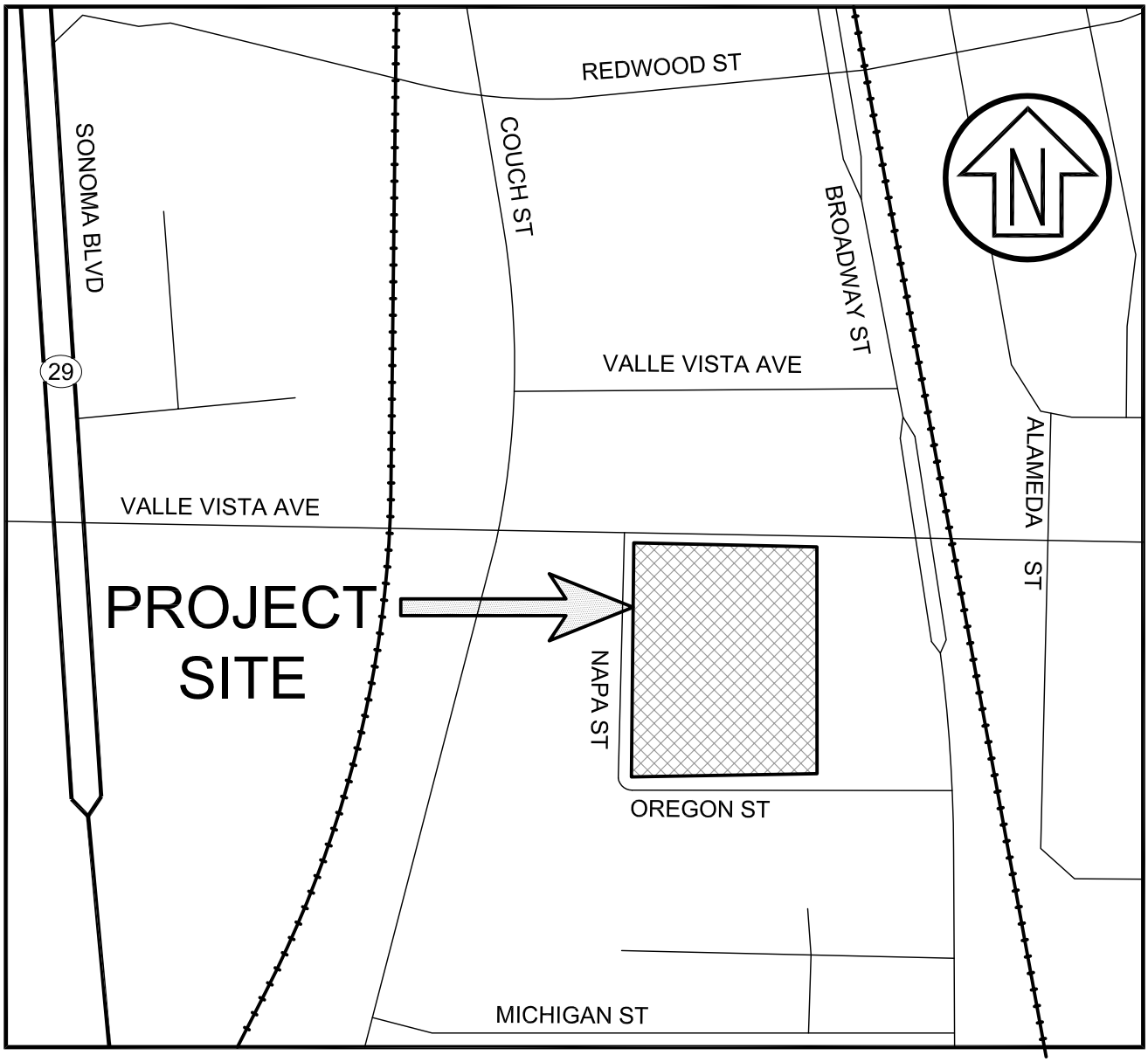
- Inspect **inlets** for channels, exposure of soils, or other evidence of erosion. Clear any obstructions and remove any accumulation of sediment. Examine rock or other material used as a splash pad and replenish if necessary.
- Inspect **outlets** for erosion or plugging.
- Inspect **side slopes** for evidence of instability or erosion and correct as necessary.
- Observe soil at the bottom of the swale or filter for uniform **percolation** throughout. If portions of the swale or filter do not drain within 48 hours after the end of a storm, the soil should be tilled and replanted. Remove any debris or accumulations of sediment.
- Confirm that **check dams** and **flow spreaders** are in place and level and that channelization within the swale or filter is effectively prevented.
- Examine the **vegetation** to ensure that it is healthy and dense enough to provide filtering and to protect soils from erosion. Replenish mulch as necessary, remove fallen leaves and debris, prune large shrubs or trees, and mow turf areas. When mowing, remove no more than 1/3height of grasses. Confirm that irrigation is adequate and not excessive. Replace dead plants and remove noxious and invasive vegetation.
- Abate any potential **vectors** by filling holes in the ground in and around the swale and by insuring that there are no areas where water stands longer than 48 hours following a storm. If mosquito larvae are present and persistent, contact the Contra Costa Mosquito and Vector Control District for information and advice. Mosquito larvicides should be applied only when absolutely necessary and then only by a licensed individual or contractor.

VII. CONSTRUCTION PLAN C.3 CHECKLIST

Stormwater Control Plan Page #	*BMP Description*	*See Plan Sheet #s*
3	Bioretention Treatment Areas	

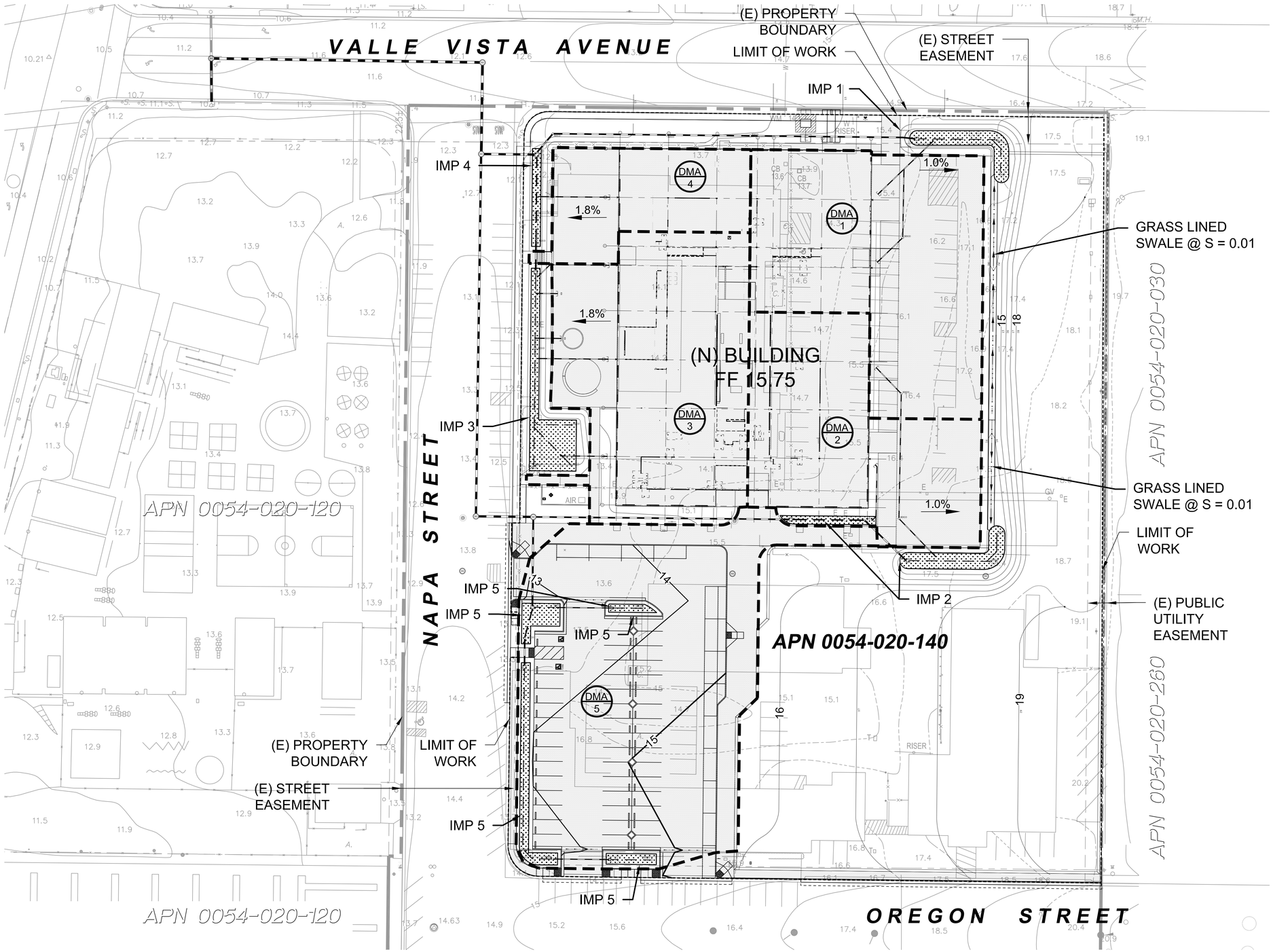
VIII. CERTIFICATIONS

The selection, sizing, and preliminary design of stormwater treatment and other control measures in this plan meet the requirements of Regional Water Quality Control Board Order R2-2009-0074 and Order R2-2011-0083.



VICINITY MAP

SCALE: NTS



Graphic Scale (in feet)

1 inch = 30 ft.

STORMWATER CONTROL PLAN NOTES

1. STORMWATER CONTROL PLAN EXHIBIT TO BE USED IN CONJUNCTION WITH DOCUMENTS ENTITLED "STORMWATER CONTROL PLAN FOR CALIBER CHARTER SCHOOL, DATED JUNE 23, 2016, AND "OPERATIONS AND MAINTENANCE MANUAL FOR CALIBER CHARTER SCHOOL - VALLEJO CAMPUS", DATED JUNE 23, 2016, PREPARED BY CSW / STUBER STROEH.
2. ALL STORM DRAIN INLETS TO MARKED WITH THE WORDS "NO DUMPING! FLOWS TO BAY." OR SIMILAR
3. INTERIOR FLOOR DRAINS AND ELEVATOR SHAFT SUMP PUMPS WILL BE PLUMBED TO SANITARY SEWER.
4. ANY DRAINS FROM DUMPSTERS SHALL BE CONNECTED TO SANITARY SEWER.
5. FIRE SPRINKLER TEST WATER SHALL DISCHARGE TO SANITARY SEWER.

LEGEND

- 14 — MINOR CONTOUR
- 15 — MAJOR CONTOUR
- SWALE FLOWLINE
- SITE HARDSCAPE
- (N) BIOTREATMENT AREA.
- X.X% — SLOPE ARROW
- DMA X — DRAINAGE MANAGEMENT AREAS
- DRAINAGE MANAGEMENT AREA BOUNDARY

Rev	Date	Description	Designed	Drawn	Checked
A	6/23/16	SUBMITTED FOR BUILDING PERMIT	JKS	JKS	AGC

CSW | ST2
CSW/Stuber-Stroeh Engineering Group, Inc.
Civil & Structural Engineers | Surveying & Mapping | Environmental Planning
Land Planning | Construction Management
45 Leveroni Court
Novato, CA 94949
tel: 415.883.9850
fax: 415.883.9835
http://www.cswst2.com

City	Vallejo
County	Solano
State	California

CALIBER CHARTER SCHOOL - VALLEJO

STORMWATER CONTROL PLAN EXHIBIT

CALIBER SCHOOLS

Prepared Under the Direction of:

Sheet
EXH1

Scale:	AS NOTED
Date:	6/23/16
Project Number:	4119400
Plan File:	

P:\04\41194\00\WORD\Exhibits\Stormwater Control Plan Exhibit\Construction Documents\EXH1 Stormwater Control Plan 11x17.dwg 06/23/2016 - 10:21 AM shyk 1:1

Rev.: June 22, 2016
Date: April 15, 2016
File: 4.1194.00

CALIBER CHARTER SCHOOL – VALLEJO CAMPUS
HYDROMODIFICATION PLAN COMPLIANCE

The following analysis is intended to demonstrate compliance with the City of Vallejo's Hydromodification Plan by showing that the proposed project will not increase the existing quantity of impervious area and that it will not facilitate the efficiency of drainage collection and conveyance (Option 1 from Table 1-2, Stormwater C.3 Guidebook, 6th Edition, dated February 15, 2012).

Impervious Area Inventory (Pre and Post Condition):

Impervious Area (Pre-project Condition): 203,575 sf

Impervious Area (Post-project Condition): 152,900 sf

Measures Used to Reduce Imperviousness:

Biotreatment is provided and sized to treat runoff from the roof and site hardscape. Roof runoff and site hardscape are designed to direct runoff into biotreatment areas.

Imperviousness is limited to the building envelope, hardscape needed for programming, and hardscape needed for accessibility. Landscaping replaces existing hardscape near the southeast and east areas of the site.

Qualitative Comparison of Drainage Efficiency (Pre and Post Condition)

A. Predevelopment Condition:

The existing site is developed with buildings, asphalt, and patchy ground cover which are expected to behave imperviously because it is developed and compacted. Existing surface runoff is expected to flow overland in sheet flows, shallow concentrated flows, and channelized flows because underlying soils are expansive clays, which are impermeable and the existing site is developed. The majority of the site runoff is expected to flow offsite.

B. Postdevelopment Condition:

The proposed site increases the total landscaped area and provides biotreatment for runoff from the building roof and site hardscape. Runoff is directed towards biotreatment which is sized for roof and hardscape. This is expected to decrease peak discharge and runoff quantity compared to the pre-development condition.

An added bonus to biotreatment is it allows runoff to percolate through the engineered media which slows time of concentration and treats stormwater.

Analysis:

Proposed finish grades are designed for the minimum slopes needed for proper drainage. At conform conditions, proposed grades are designed to match existing.

Proposed storm drain lines are designed for the minimum slopes needed for proper drainage.

Proposed surface types are impervious surfaces needed for the building, site programming, and accessibility only. Proposed landscaping will replace existing hardscape elsewhere.

Proposed hardscape and roofs drain towards bioretention treatment areas which decreases collection efficiency by slowing runoff and retaining runoff in the porous engineered media.

Conclusion:

The post-development condition is expected to decrease drainage collection efficiency.

CSW/STUBER-STROEH ENGINEERING GROUP, INC.

Jeff K. Shu
R.C.E. # 79802

JKS:rte

Appendix 10.7 – Owner's Certification

Owner's Certification

The selection, sizing, and design of stormwater treatment and other control measures in this plan meet the requirements of Regional Water Quality Control Board Order R2*2003*0022 and subsequent amendments.

All stormwater treatment facilities will be inspected and maintained in accordance with this document.

Signed: _____ Date: _____

Title: _____

Appendix 10.8 – Designation of Responsible Individuals

Designation of Individuals Responsible for Stormwater Treatment BMP Operation and Maintenance	
Date Completed	
Facility Name	
Facility Address	
Designated Contact for Operation and Maintenance	
Name:	Title or Position:
Telephone:	Alternate Telephone:
Email:	
Off-Hours or Emergency Contact	
Name:	Title or Position:
Telephone:	Alternate Telephone:
Email:	
Corporate Officer (authorized to execute contracts with the City, Town, or County)	
Name:	Title or Position:
Address:	
Telephone:	Alternate Telephone:
Email:	

FIRE FLOW CALCULATIONS

FOR

CALIBER CHARTER SCHOOL, VALLEJO CAMPUS

500 Oregon Street, Vallejo, CA

Prepared For:
Valle Vista Education, LLC
PO BOX 5244, Richmond, CA 94805
Contact: Whitney Blumenfeld at (310) 600 - 6804

Prepared By:
CSW/Stuber-Stroeh Engineering Group, Inc.
45 Leveroni Court
Novato, California 94949
(415)-883-9850

Prepared:
June 23, 2016

CSW|ST2 File No.:
4.1194.00

CSW | ST2

PROPOSED HYDRANT
ELEVATION: 14.0
FLOW: 875 GPM @ 20 PSI

VALLE VISTA AVENUE

(E) PROPERTY BOUNDARY

LIMIT OF WORK

Graphic Scale (in feet)

20 0 20 40

1 inch = 20 ft.

NAPA STREET

(N) BUILDING
FF 15.75
PAD 14.75

APN 0054-020-120

APN 0054-020-030

(E) PROPERTY BOUNDARY

LIMIT OF WORK

PROPOSED 6" FIRE SERVICE POINT OF CONNECTION AT BUILDING
elev 15.75
results: 760 gpm @ 20 psi

(E) PROPERTY BOUNDARY

LIMIT OF WORK

244 LF 6" PVC C900 (total)

EXISTING HYDRANT
(FLOW TEST HYDRANT)
ELEVATION: 13.60
STATIC: 75 PSI
FLOW: 840 GPM
PITOT READING 25 PSI

APN 0054-020-120

6" ames 3000 civ

connection to existing 6" water

OREGON STREET

LIMIT OF WORK

APN 0054-020-260

CSW | ST2

CSW/Stuber-Stroeh Engineering Group, Inc.

45 Leveroni Court tel: 415.883.0850
Novato, CA 94949 fax: 415.883.9835

Civil & Structural Engineers
Surveying & Mapping
Environmental Planning
Land Planning
Construction Management

http://www.csw-st2.com

Rev	Date	Description	Designed	Drawn	Checked

CALIBER CHARTER SCHOOL, VALLEJO CAMPUS

WATER CALCS EXHIBIT

CALIBER SCHOOLS

City Of
Vallejo

County Of
Solano

State Of
California

Prepared Under the Direction of:

Sheet
EXH1

Scale:	AS NOTED
Date:	6/23/16
Project Number:	4119400
Plan File:	

P:\4411\9400\DWG\Exhibits\Water Calc Exhibit.DWG 6/24/2016 - 8:01 PM dvp9.11

```
******************************************************************
*                          E P A N E T                           *
*                  Hydraulic and Water Quality                   *
*                  Analysis for Pipe Networks                    *
*                        Version 2.0                             *
******************************************************************

Input File: Fire Service off Oregon - 6 in line 760 GPM.NET
```

Link - Node Table:

Link ID	Start Node	End Node	Length ft	Diameter in	
3	4	5	244	6	
1	2	3	#N/A	#N/A	Pump
2	3	4	#N/A	6	Valve

Energy Usage:

Pump	Usage Factor	Avg. Effic.	Kw-hr /Mgal	Avg. Kw	Peak Kw	Cost /day
1	100.00	75.00	335.58	15.30	15.30	0.00
				Demand Charge:		0.00
				Total Cost:		0.00

Node Results:

Node ID	Demand GPM	Head ft	Pressure psi	Quality	
3	0.00	80.11	28.82	0.00	
4	0.00	72.39	25.47	0.00	
5	760.00	64.04	20.92	0.00	
1	0.00	0.00	0.00	0.00	Reservoir
2	-760.00	0.00	0.00	0.00	Reservoir

Link Results:

Link ID	Flow GPM	Velocity fps	Unit Headloss ft/Kft	Status	
3	760.00	8.62	34.23	Open	
1	760.00	0.00	-80.11	Open	Pump
2	760.00	8.62	7.72	Open	Valve

MINOR LOSSES = 10% TOTAL HEADLOSSES = 0.8'
TOTAL AVAILABLE PRESSURE AT BUILDING POC: 20 PSI @ 760 GPM

```
*********************************************************************
*                            E P A N E T                            *
*                     Hydraulic and Water Quality                   *
*                     Analysis for Pipe Networks                    *
*                           Version 2.0                             *
*********************************************************************

Input File: Hydrant off Valle Vista.NET
```

Link - Node Table:

Link ID	Start Node	End Node	Length ft	Diameter in	
2	3	1	7	6	
3	1	4	5	6	
1	2	3	#N/A	#N/A	Pump

Energy Usage:

Pump	Usage Factor	Avg. Effic.	Kw-hr /Mgal	Avg. Kw	Peak Kw	Cost /day
1	100.00	75.00	199.12	10.45	10.45	0.00
				Demand Charge:		0.00
				Total Cost:		0.00

Node Results:

Node ID	Demand GPM	Head ft	Pressure psi	Quality	
3	0.00	47.53	14.70	0.00	
1	0.00	47.13	20.42	0.00	
4	875.00	46.84	14.01	0.00	
2	-875.00	0.00	0.00	0.00	Reservoir

Link Results:

Link ID	Flow GPM	Velocity fps	Unit Headloss ft/Kft	Status	
2	875.00	9.93	57.92	Open	
3	875.00	9.93	57.92	Open	
1	875.00	0.00	-47.53	Open	Pump

MINOR LOSSES = 10% TOTAL HEADLOSSES = 0.7'
TOTAL AVAILABLE PRESSURE AT HYDRANT: 20 PSI @ 875 GPM

City of VALLEJO California

PUBLIC WORKS
WATER DIVISION

DATE: February 16, 2016

Finance Department
Commercial Services Division
Account No.: 401-0000-310.36-24
Amount: $664.32 / $173.95
Check No.: 2138
Commercial Services return receipt To Water Division

TO: Preventative Maintenance Section
Shedrick Wilson, Utility Supervisor

FROM: Andrea Keirstead,
Water Division Engineer

SUBJECT: REQUEST FOR WATER FLOW DATA

FILE: 2016 Fire Flow Test

THE WATER DIVISION HAS BEEN REQUESTED TO CONDUCT A
X WATER FLOW TEST
_____ DETERMINE THE STATIC PRESSURE
FOR Incledon Consulting Group AT

Couch St. and Valle Vista Ave.
WHEN DONE PLEASE REPORT THE FINDINGS TO THE WATER DIVISION AND THE FIRE PREVENTION DIVISION.

----------LOCATION OF FIRE HYDRANTS TO BE TESTED----------

FLOW FIRE HYDRANT AT Napa St. and Oregon St. Intersection

READ FIRE HYDRANT AT 222 Couch St.

----------TEST RESULTS----------

STATIC PRESSURE IN PSI 75 RESIDUAL PRESSURE IN PSI 75

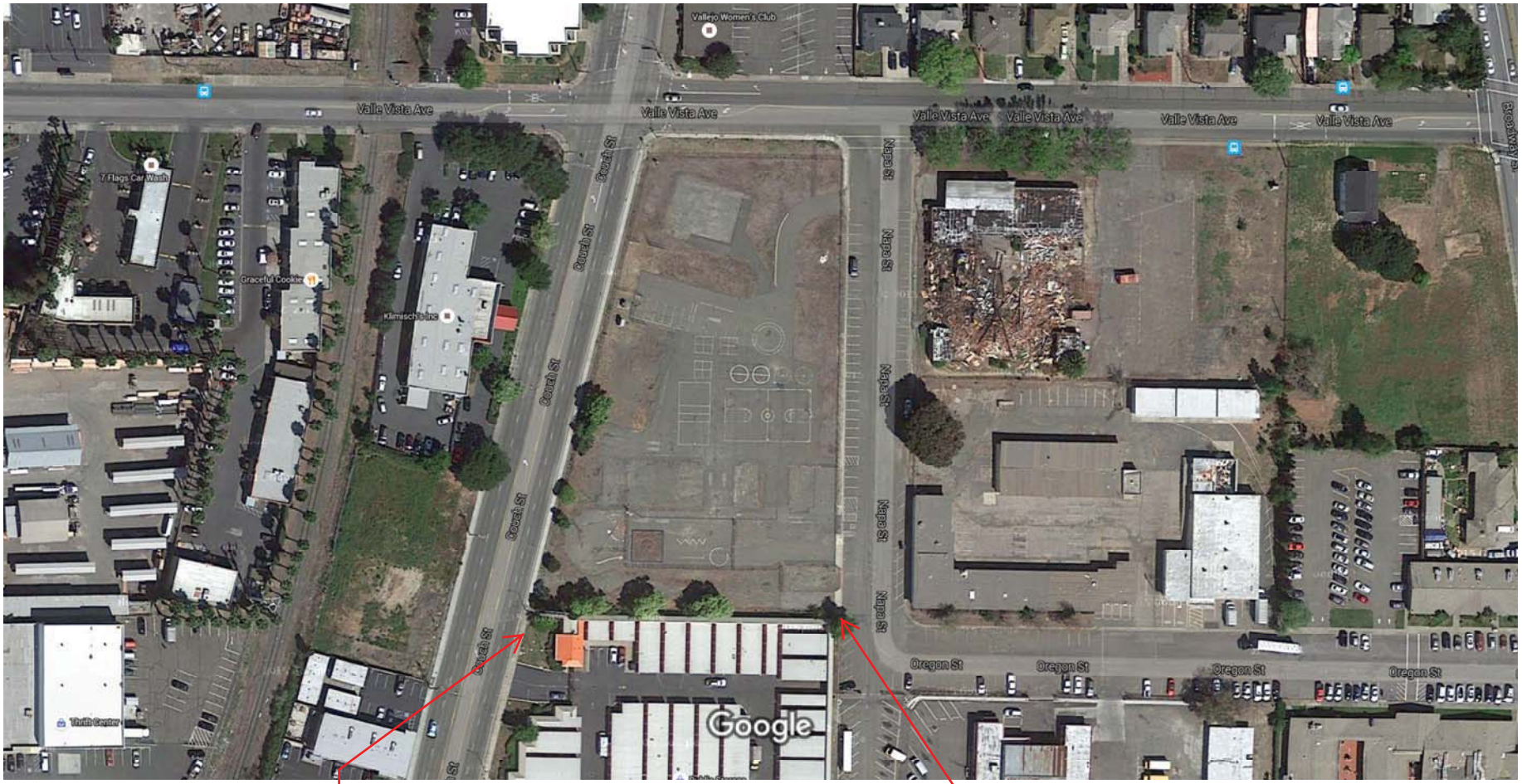
FLOW (GPM) 840 PITOT READING (PSI) 25 ORIFICE DIA (INCH) 2.5"

TEST DONE BY ONI BROWN / E. CARRILLO DATE 2-18-16

REMARKS

IF A DIAGRAM IS NEEDED FOR CLARIFICATION ATTACHED A SHEET.

Google Maps



Imagery ©2016 DigitalGlobe, U.S. Geological Survey, Map data ©2016 Google 50 ft

static and residual pressure reading hydrant

flow hydrant

HYDROLOGY STUDY

FOR

CALIBER CHARTER SCHOOL

500 Oregon Street, Vallejo, CA

Prepared For:
Valle Vista Education, LLC
PO BOX 5244, Richmond, CA 94805
Contact: Whitney Blumenfeld at (310) 600 - 6804

Prepared By:
CSW/Stuber-Stroeh Engineering Group, Inc.
45 Leveroni Court
Novato, California 94949
(415) 883-9850

Prepared:
June 23, 2016

CSW|ST2 File No.:
4.1194.00

CSW | ST2

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   - 4.3 Rainfall Intensity
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   - 7.2 Exhibit – Hydrology (for Pipe Sizing)
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   - 7.5 Example Pipe Sizing Calculations
   - 7.6 FEMA Flood Insurance Rate Map

1. EXECUTIVE SUMMARY

The purpose of this report is to present the results of the Hydrology Study for the Caliber Charter School, Vallejo Campus. Based on information from the Improvement Plans prepared by CSW/Stuber-Stroeh Engineering Group, Inc. dated June 23, 2016 the Study analyzed pre-development and post-development hydrology and found that the proposed improvements are in compliance with the Solano County Water Agency standards for flood prevention, drainage, and storm water quality.

The study found that there was an overall decrease in the site runoff. The site's proposed drainage design, which includes stormwater bioretention facilities and landscaping, decreases the peak runoff rate by decreasing overall site imperviousness, providing the minimum slopes required for proper drainage, and by routing runoff through bioretention before discharging into the surrounding public storm drain system.

2. EXISTING CONDITIONS

The existing site, located at 500 Oregon Street, is divided up into a northern portion and southern portion separated by a chain link fence. The northern portion of the site is currently vacant with the exception of a former building foundation, and the southern portion of the site is currently developed with four vacant buildings. Napa Street abuts the site to the west and Oregon Street abuts the site to the south. The existing site is covered with patchy ground cover. Underlying soils are expansive clays which are impermeable and prevent significant groundwater infiltration. Existing surface runoff flows overland as sheet flow, in shallow concentrated flows, and channelized flows (curb and gutter) where it eventually discharges into the valley gutter in Valle Vista. From there the curb and gutter convey the flow westward to the catch basin just before Couch Street. Existing storm drainage was not found adjacent to the site in either Valle Vista Avenue, Napa Street, or Oregon Street.

3. PROPOSED CONDITIONS

The proposed Project will redevelop the vacant lot into the Caliber Charter School's Vallejo Campus. The Campus will consist of a school building for K-8 grades, accessible walkways, parking lot and student dropoff area, outdoor courts, outdoor seating areas, and landscaping.

Proposed grading and drainage will be designed to decrease overall runoff collection efficiency. Bioretention facilities will be strategically located so that runoff is directed towards them. An underground storm drain network will be constructed to collect and convey the treated stormwater. New storm drain mains will be constructed in Napa Street and Valle Vista Avenue to convey the site drainage to the surrounding public storm drain system.

4. HYDROLOGY CALCULATIONS, PIPE SIZING

4.1 Hydrology Methodology and Standards, Rational Method

The Study was based on the Solano County Water Agency (SCWA) Hydrology Manual. The study was performed using the 15-year design storm and the Rational Method.

The Rational Method was used in conjunction with the Hydrograph Method to model the pre-development and post-development drainage of the site. Runoff coefficients and drainage areas were calculated using AutoCAD and rainfall intensities were based on the criteria specified by the Hydrology Manual. Data was then input into Excel and Hydrographs software to generate runoff quantities.

The terms of the Rational Method are defined as follows:

$$Q=CIA$$

Where:

Q = Flow Rate (cubic feet per second, cfs)
C = Runoff Coefficients
I = Rainfall Intensity (inches per hour, in/hr)
A = Tributary Area (acres, ac)

The proposed runoff quantities were modeled using the Hydrographs program. The Hydrographs program models runoff from watersheds and generates hydrographs which are used to calculate peak discharge.

4.2 Runoff Coefficient

The runoff coefficients used in this report come from the standards issued by the SCWA Hydrology Manual. C=0.65 was used for the existing ground cover, The C=0.90 was used for impervious areas, C=0.65 for proposed landscaped areas, and C=0.35 for proposed stormwater bioretention areas. A weighted runoff coefficient was calculated using the terms below:

Weighted Runoff Coefficients are defined as follows:

$$C_{\text{weighted}} = \frac{C_1A_1 + C_2A_2 + C_3A_3 \ \ldots}{A_1 + A_2 + A_3 \ldots}$$

4.3 Rainfall Intensity

Intensities for a 15-year frequency storm come from the mean annual precipitation (MAP) from Figure 2-2, and the time of concentration.

Time of Concentration was calculated as follows:

$T_c = T_t$ (overland flow) $+T_t$ (channelized flow) $+ T_t$ (pipe flow)

Where:

T_c = total time (minutes)
T_t (overland flow) = initial time of concentration (minutes, length limit <300feet)
T_t (shallow concentrated flow) = shallow concentrated flow travel time (minutes)
T_t (channelized flow) = channelized flow travel time (minutes)
T_t (pipe flow) = pipe flow travel time (minutes)

The initial time of concentration was calculated using Equation3-2 from the Hydrology Manual, or 10 minutes, whichever was greater. Equation 3-2 is defined as follows:

$$T_c = \sqrt{\frac{D}{(80\ x\ S^{1/2})}} * (18.5 - 16.5 * C) \qquad \text{(Equation } 3-2\text{)}$$

Channelized flow travel time and pipe flow travel time were calculated from Manning's Equation in conjunction with hand calculations, Hydrographs, Express software, and Excel.

4.4 Area of Calculation

Area of calculation was calculated using AutoCAD software. The Area of Calculation is the area bound by the subshed that drains to a certain drainage outlet. Subsheds within the limits of development were included in the Study.

4.5 Pipe Sizing

Pipe Sizes were sized using AutoCAD Express Tools. Pipe parameters (diameter, slope, manning's roughness coefficient, etc.), were input into Express and pipes were sized based on Marin County CA Code of Ordinances described below.

Pipe sizes were based upon the 15-year storm passing eighty percent as open channel flow with no head allowed at the inlet.

5. BASE FLOOD HYDRAULIC STUDY

5.1 Standards and Methodology

100-year flood information (the base flood information) for existing conditions were taken from FEMA Flood Insurance Rate Map (FIRM) for Solano County, California, and Incorporated Areas, Map Number 06095C0610E, dated May 4, 2009.

Base flood elevations are expected to remain unchanged by the proposed development.

6. RESULTS OF HYDROLOGY ANALYSIS

6.1 Storm Peak Runoff, 100-year storm

Stormwater Peak Runoff 100-year storm	Existing (cfs)	Proposed (cfs)	% Difference
Subshed 1	13.4	11.0	-18%

The Study indicates there is an overall decrease in peak runoff for the 100-year storm. The decrease in runoff is due a decrease in imperviousness and time of concentration. Because there is a decrease in peak runoff in the post-development condition, there are no anticipated impacts downstream.

6.2 Pipe Sizes, 15-year storm

Stormwater Peak Runoff 15-year storm	Outlet Pipe slope (percent)	Proposed Peak Runoff (cfs)	Minimum Pipe Size @ outlet (inches)	80% Pipe Capacity (cfs)	80% Pipe Capacity > Peak Runoff? (y/n)
Subshed 1	0.5%	1.67	10"	1.77	y
Subshed 2	0.5%	1.45	10"	1.77	y
Subshed 3	0.5%	1.25	10"	1.77	y
Subshed 4	0.5%	0.50	10"	1.77	y
Subshed 5	0.5%	2.85	12"	2.91	y
Outlet 1	0.5%	3.37	15"	4.50	y
Outlet 2	0.5%	4.45	15"	4.50	y
Outlet 3	0.5%	7.29	18"	7.30	y

Drainage from Subshed 1 drains a portion of the roof, ashphalt, concrete walks, and landscaping to the east. Drainage is directed towards the bioretention area to the northeast of the site, which is fitted with an overflow device. The study indicates the pipe size required at the overflow device will be 10" minimum.

Drainage from Subshed 2 drains a portion of the roof, asphalt, concrete walks, and landscaping to the east. Drainage is directed towards the bioretention area to the south, which is fitted with an overflow device. The study indicates the pipe size required at the overflow device will be 10" minimum.

Drainage from Subshed 3 drains a portion of the roof, concrete, and landscaping. Drainage is directed towards the bioretention area to the west, which is fitted with an overflow device. The study indicates the pipe sized required at the overflow device will be 10" minimum.

Drainage from Subshed 4 drains a portion of the roof, concrete, and landscaping. Drainage is directed towards the bioretention area to the west, which is fitted with an overflow device. The study indicates the pipe sized required at the overflow device will be 10" minimum.

Drainage from Subshed 5 drains the parking lot, concrete walks, and the field to the east. Drainage is directed towards bioretention areas in the parking lot, which are fitted with overflow devices. The study indicates the pipe size required at the most downstream overflow device, located near the northwest of the parking lot, will be 12" minimum.

At Outlet 1, drainage from Subsheds 1, 3, and converge at a drop inlet, where it is then piped across the property boundary. The study indicates the pipe size of Outlet 1 will be 15" minimum.

At Outlet 2, drainage from Subsheds 2 and 5 converge at a stormdrain manhole, where it is then piped across the property boundary. The study indicates the pipe size of Outlet 2 will be 15" minimum.

At Outlet 3, drainage from Subsheds 1 through 5 converge at a storm drain manhole within Napa Street. The study indicates the pipe size of Outlet 3 will be 18" minimum.

APPENDIX 7.1

VALLE VISTA AVENUE

NAPA STREET

OREGON STREET

OUTLET #1

(E) PROPERTY BOUNDARY

LIMIT OF WORK

APN 0054-020-120

APN 0054-020-030

APN 0054-020-260

SUBSHED ID #1
3.98 AC
0.85

Graphic Scale (in feet)
20 0 20 40
1 inch = 20 ft.

LEGEND

SUBSHED BOUNDARY

SUBSHED ID X — SUBSHED ID
YYY — DRAINAGE AREA (ACRES)
0.ZZ — COMPOSITE RUNOFF COEFFICIENT

CSW/ST2
CSW/Stuber-Stroeh Engineering Group, Inc.
45 Leveroni Court, Novato, CA 94949
tel: 415.883.0850
fax: 415.883.9835
Civil & Structural Engineers
Surveying & Mapping
Environmental Planning
Land Planning
Construction Management
http://www.csw-st2.com

Rev	Date	Description	Designed	Drawn	Checked
-	6/23/16	PERMIT SET	JKS	JKS	AGC

CALIBER CHARTER SCHOOL, VALLEJO CAMPUS

HYDROLOGY EXHIBIT

BASE FLOOD STUDY (EXISTING CONDITIONS)

CALIBER CHARTER SCHOOL

City Of
Novato

County Of
Marin

State Of
California

Prepared Under the Direction of:

Sheet
EXH

Scale:	1" = 20'
Date:	6/23/16
Project Number:	4.1194.00
Plan File:	

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VALLE VISTA AVENUE

(N) SD

(N) SD

(E) PROPERTY BOUNDARY

LIMIT OF WORK

OUTLET 1

(N) BIORETENTION (TYP)

(N) CONCRETE

NAPA STREET

(N) BUILDING
FF 15.75
PAD 14.75

SUBSHED ID 1
3.98 AC
0.77

(N) AC

APN 0054-020-120

APN 0054-020-030

(N) BIORETENTION (TYP)

(E) PROPERTY BOUNDARY

LIMIT OF WORK

(N) BIORETENTION (TYP)

(N) GROUND COVER

LIMIT OF WORK

(N) BIORETENTION (TYP)

APN 0054-020-120

APN 0054-020-260

OREGON STREET

LIMIT OF WORK

Graphic Scale (in feet)

20 0 20 40

1 inch = 20 ft.

LEGEND

SUBSHED BOUNDARY

SUBSHED ID X — SUBSHED ID

XXXX AC — DRAINAGE AREA (ACRES)

0.XX — COMPOSITE RUNOFF COEFFICIENT

Drawn Checked

CSW | ST2

CSW/Stuber-Stroeh Engineering Group, Inc.

45 Leveroni Court Novato, CA 94949 tel: 415.883.9850 fax: 415.883.9835

Civil & Structural Engineers
Surveying & Mapping
Environmental Planning
Land Planning
Construction Management

http://www.csw-st2.com

Rev	Date	Description	Designed	Drawn	Checked
-	6/23/16	PERMIT SET	JKS	JKS	AGC

CALIBER CHARTER SCHOOL, VALLEJO CAMPUS

HYDROLOGY EXHIBIT

BASE FLOOD STUDY (PROPOSED CONDITIONS)

CALIBER CHARTER SCHOOL

City Of
Novato

County Of
Marin

State Of
California

Prepared Under the Direction of:

Sheet
EXH

Scale:	1" = 20'
Date:	6/23/16
Project Number:	4.1194.00
Plan File:	

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APPENDIX 7.2

VALLE VISTA AVENUE

NAPA STREET

OREGON STREET

(N) SD

(E) PROPERTY BOUNDARY

LIMIT OF WORK

(N) BIORETENTION

OUTLET #1

OUTLET #2

OUTLET #3

(N) BUILDING
FF 15.75
PAD 14.75

SUBSHED ID 1
0.70 AC
0.77

SUBSHED ID 2
0.61 AC
0.76

SUBSHED ID 3
0.53 AC
0.80

SUBSHED ID 4
0.2 AC
0.84

SUBSHED ID 5
1.37 AC
0.74

(N) BIORETENTION (TYP IN PARKING LOT)

APN 0054-020-120

APN 0054-020-030

APN 0054-020-260

Graphic Scale (in feet)

20 0 10 20 40

1 inch = 20 ft.

LEGEND

SUBSHED BOUNDARY

SUBSHED ID X — SUBSHED ID

XXXX AC — DRAINAGE AREA (ACRES)

0.XX — COMPOSITE RUNOFF COEFFICIENT

OUTLET #X — CALCULATION POINT

CSW/Stuber-Stroeh Engineering Group, Inc.

45 Leveroni Court Novato, CA 94949 tel: 415.883.9850 fax: 415.883.9835

Civil & Structural Engineers
Surveying & Mapping
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Land Planning
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http://www.cswst2.com

Rev	Date	Description	Designed	Drawn	Checked
-	6/23/16	PERMIT SET	JKS	JKS	AGC

Drawn Checked

CALIBER CHARTER SCHOOL, VALLEJO CAMPUS
HYDROLOGY
(FOR PIPE SIZING, PROPOSED CONDITIONS)
CALIBER CHARTER SCHOOL

City Of
Novato

County Of
Marin

State Of
California

Prepared Under the Direction of:

Sheet
EXH

Scale:	1" = 20'
Date:	6/23/16
Project Number:	4.1194.00
Plan File:	

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APPENDIX 7.3

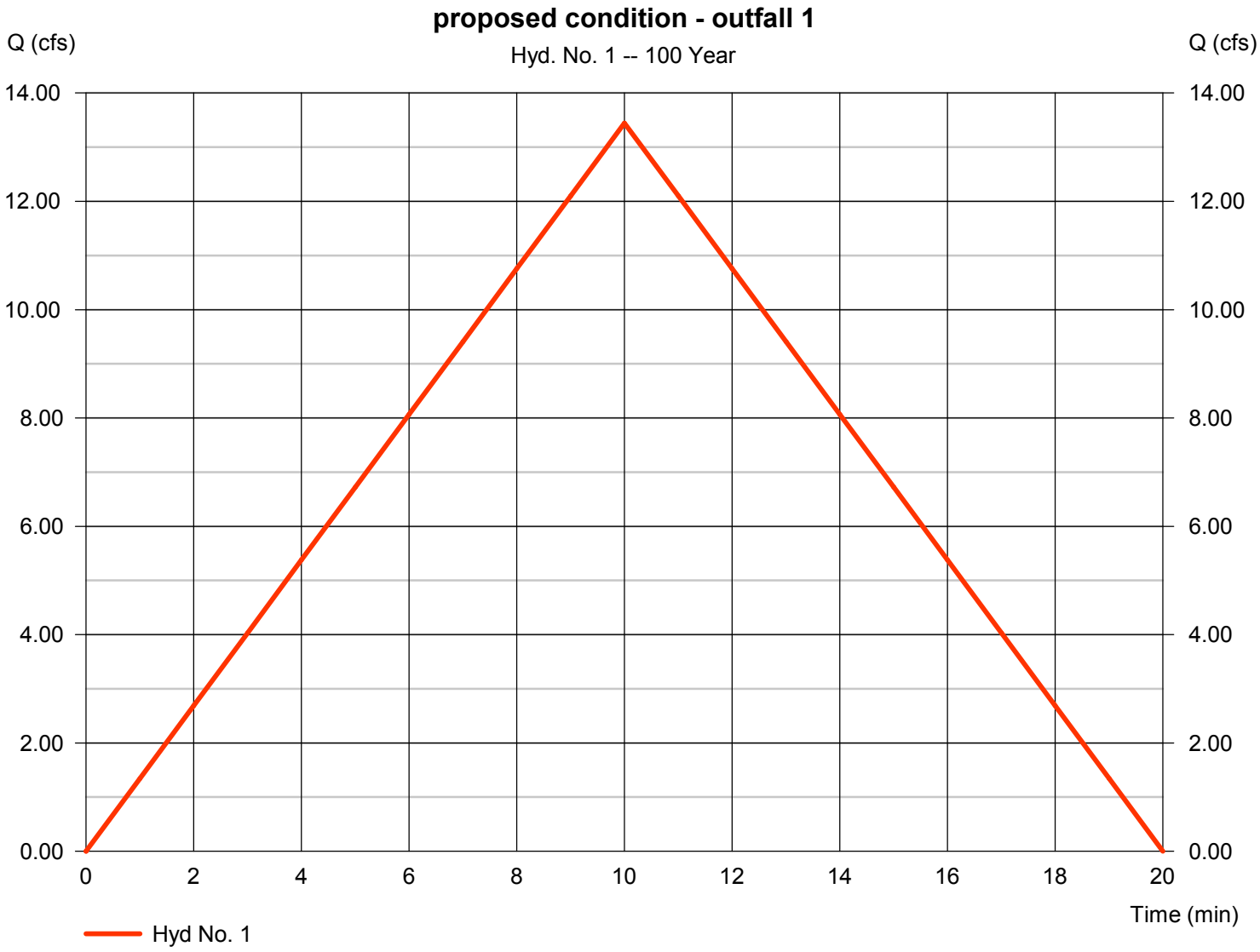
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Thursday, 06 / 23 / 2016

Hyd. No. 1

proposed condition - outfall 1

Hydrograph type	= Rational	Peak discharge	= 13.44 cfs
Storm frequency	= 100 yrs	Time to peak	= 10 min
Time interval	= 1 min	Hyd. volume	= 8,066 cuft
Drainage area	= 3.980 ac	Runoff coeff.	= 0.85
Intensity	= 3.974 in/hr	Tc by User	= 10.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/1



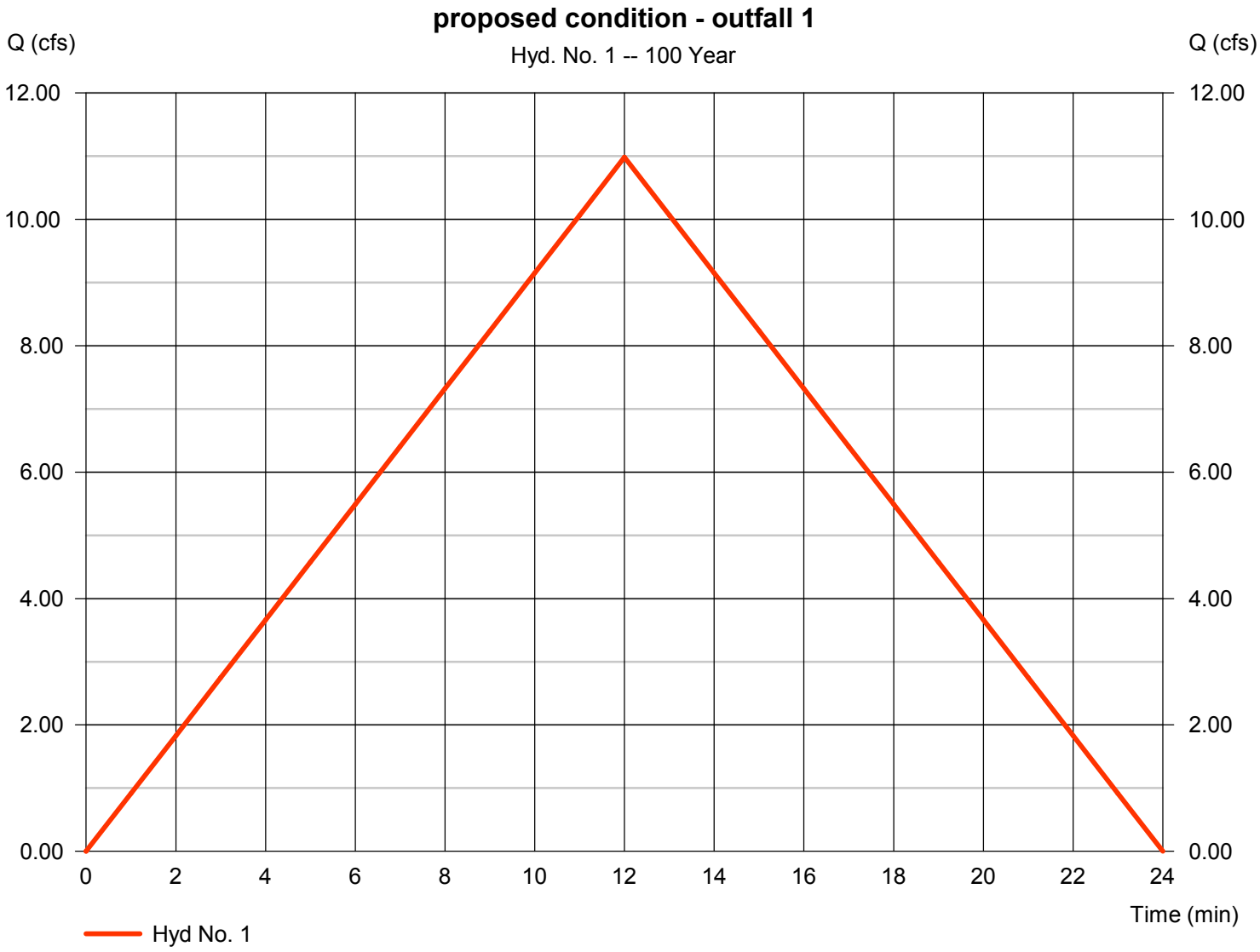
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Wednesday, 06 / 22 / 2016

Hyd. No. 1

proposed condition - outfall 1

Hydrograph type	= Rational	Peak discharge	= 10.98 cfs
Storm frequency	= 100 yrs	Time to peak	= 12 min
Time interval	= 1 min	Hyd. volume	= 7,908 cuft
Drainage area	= 3.980 ac	Runoff coeff.	= 0.77
Intensity	= 3.584 in/hr	Tc by User	= 12.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/1



APPENDIX 7.4

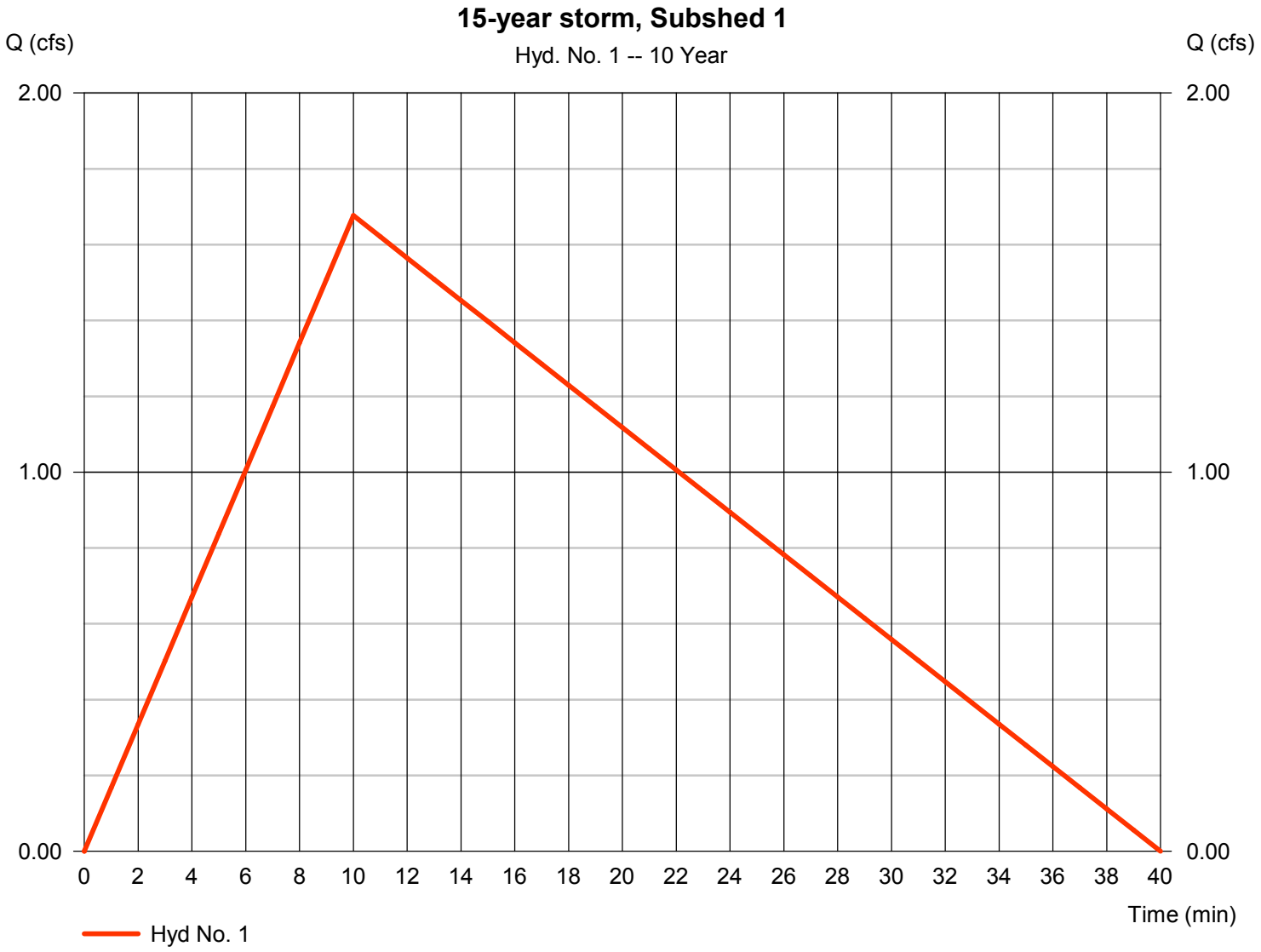
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Thursday, 06 / 23 / 2016

Hyd. No. 1

15-year storm, Subshed 1

Hydrograph type	= Rational	Peak discharge	= 1.677 cfs
Storm frequency	= 15 yrs	Time to peak	= 10 min
Time interval	= 1 min	Hyd. volume	= 2,012 cuft
Drainage area	= 0.700 ac	Runoff coeff.	= 0.77
Intensity	= 3.110 in/hr	Tc by User	= 10.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/3



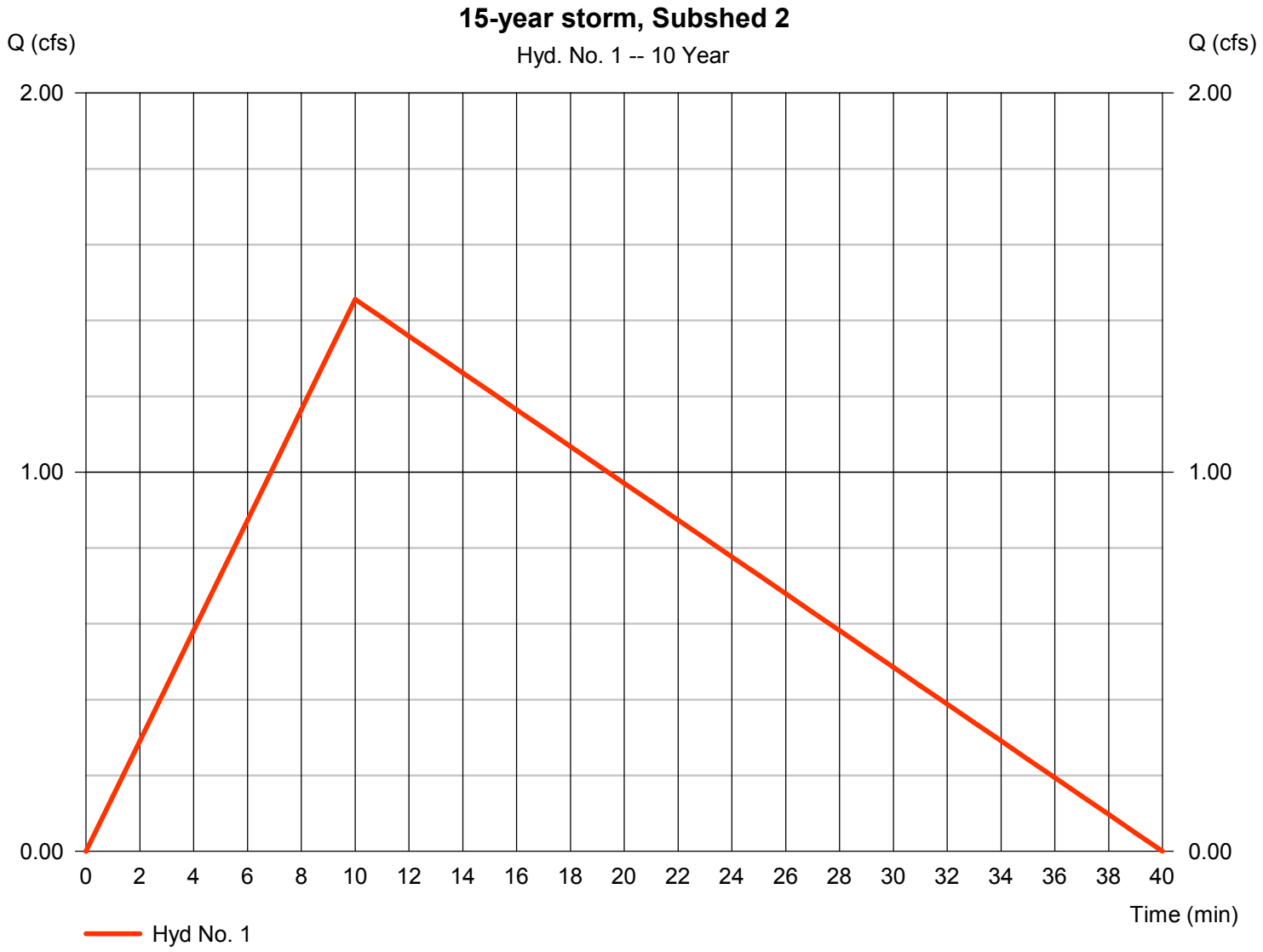
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Wednesday, 06 / 22 / 2016

Hyd. No. 1

15-year storm, Subshed 2

Hydrograph type	= Rational	Peak discharge	= 1.456 cfs
Storm frequency	= 15 yrs	Time to peak	= 10 min
Time interval	= 1 min	Hyd. volume	= 1,747 cuft
Drainage area	= 0.600 ac	Runoff coeff.	= 0.78
Intensity	= 3.110 in/hr	Tc by User	= 10.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/3



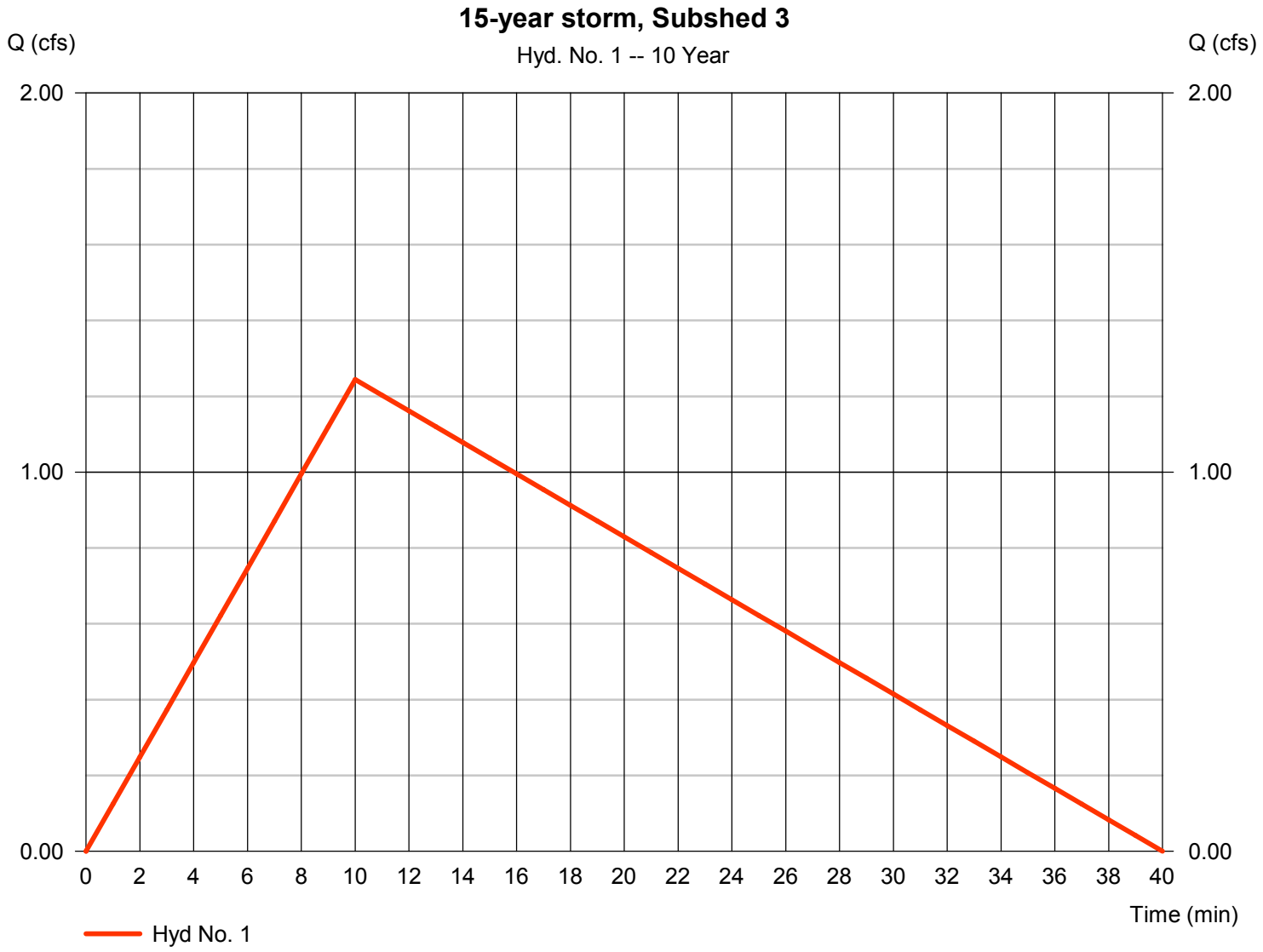
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Wednesday, 06 / 22 / 2016

Hyd. No. 1

15-year storm, Subshed 3

Hydrograph type	= Rational	Peak discharge	= 1.244 cfs
Storm frequency	= 15 yrs	Time to peak	= 10 min
Time interval	= 1 min	Hyd. volume	= 1,493 cuft
Drainage area	= 0.500 ac	Runoff coeff.	= 0.8
Intensity	= 3.110 in/hr	Tc by User	= 10.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/3



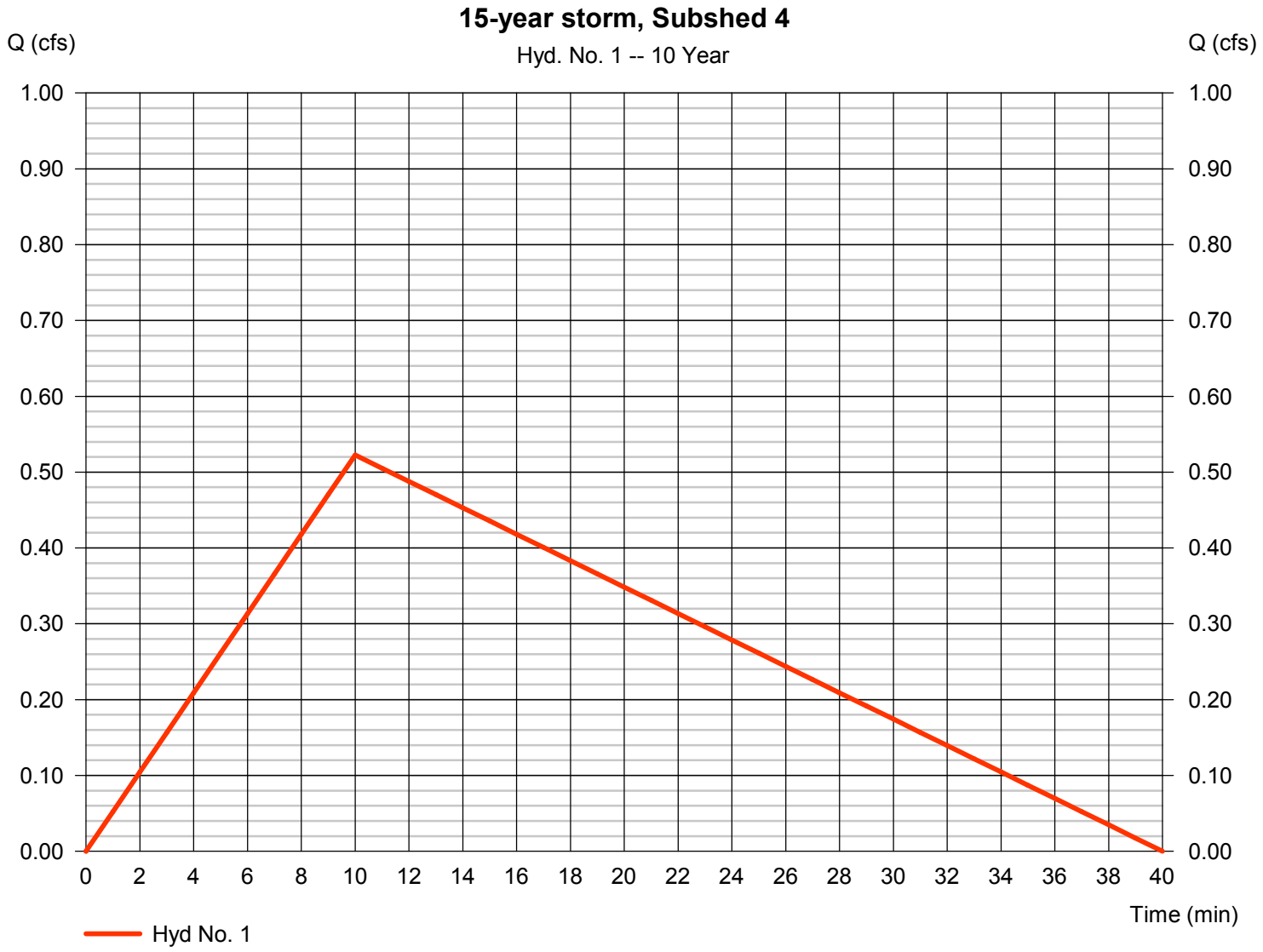
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Wednesday, 06 / 22 / 2016

Hyd. No. 1

15-year storm, Subshed 4

Hydrograph type	= Rational	Peak discharge	= 0.523 cfs
Storm frequency	= 15 yrs	Time to peak	= 10 min
Time interval	= 1 min	Hyd. volume	= 627 cuft
Drainage area	= 0.200 ac	Runoff coeff.	= 0.84
Intensity	= 3.110 in/hr	Tc by User	= 10.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/3



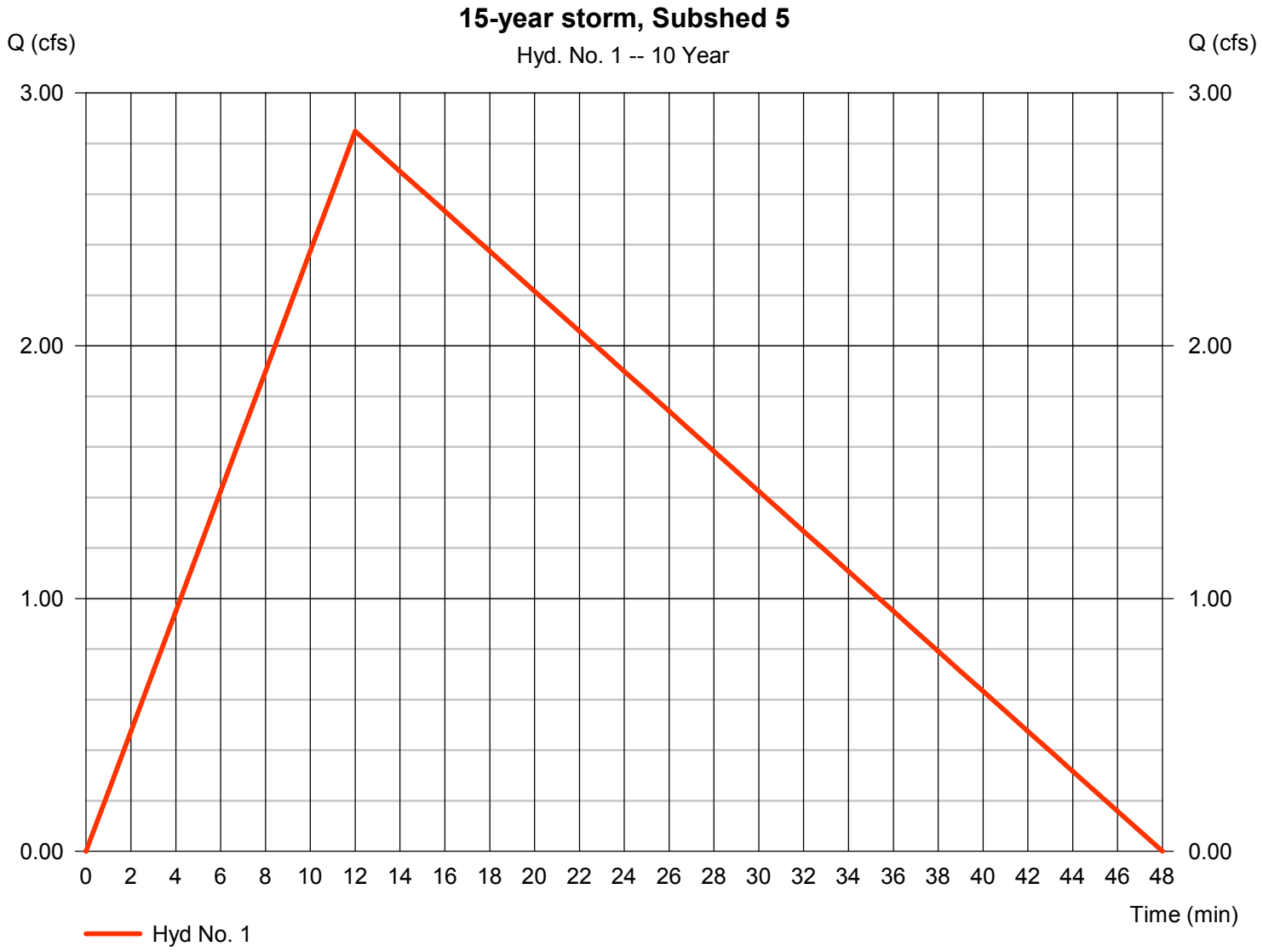
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Thursday, 06 / 23 / 2016

Hyd. No. 1

15-year storm, Subshed 5

Hydrograph type	= Rational	Peak discharge	= 2.849 cfs
Storm frequency	= 15 yrs	Time to peak	= 12 min
Time interval	= 1 min	Hyd. volume	= 4,102 cuft
Drainage area	= 1.370 ac	Runoff coeff.	= 0.74
Intensity	= 2.810 in/hr	Tc by User	= 12.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/3



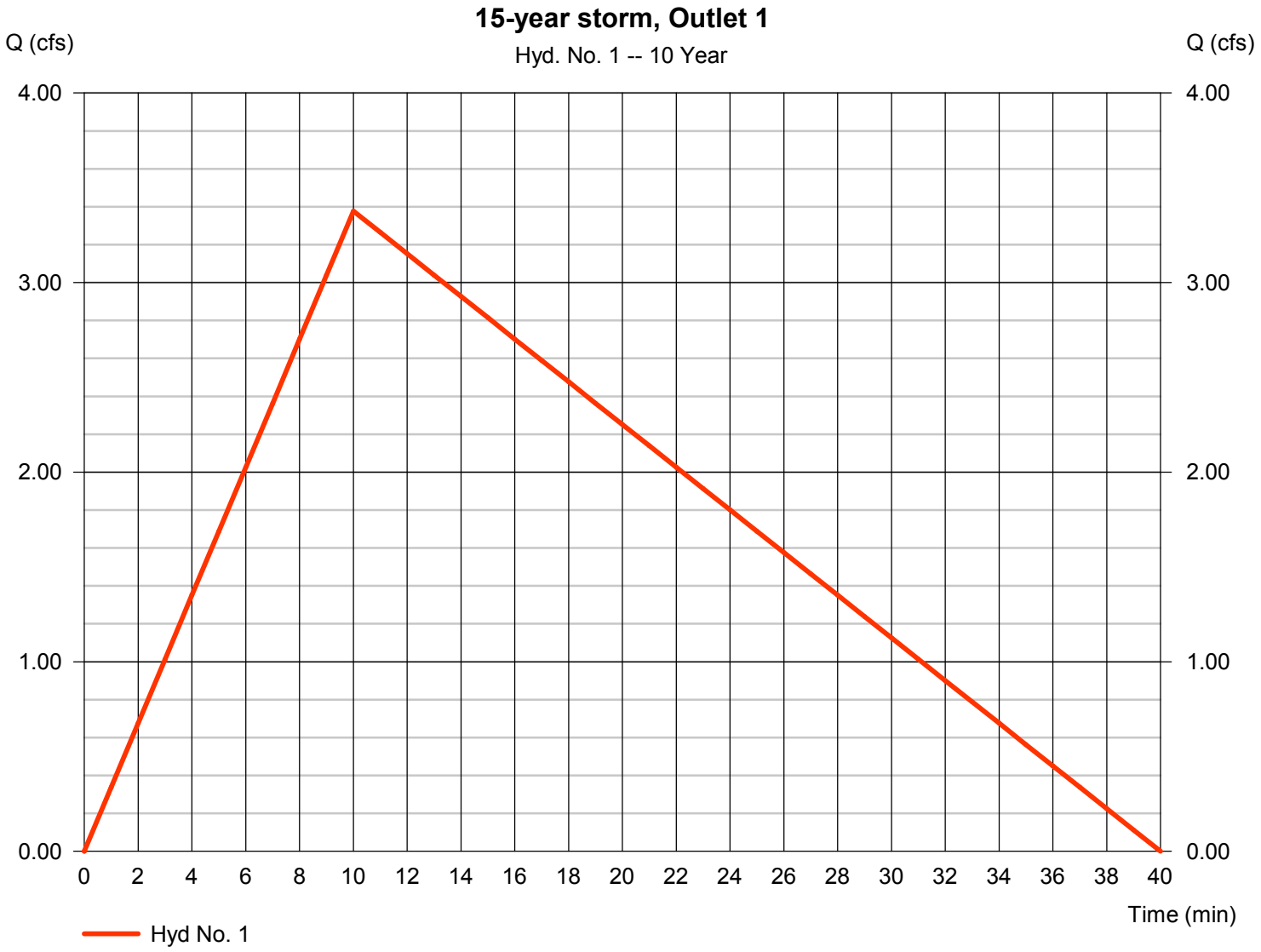
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Thursday, 06 / 23 / 2016

Hyd. No. 1

15-year storm, Outlet 1

Hydrograph type	= Rational	Peak discharge	= 3.377 cfs
Storm frequency	= 15 yrs	Time to peak	= 10 min
Time interval	= 1 min	Hyd. volume	= 4,052 cuft
Drainage area	= 1.410 ac	Runoff coeff.	= 0.77
Intensity	= 3.110 in/hr	Tc by User	= 10.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/3



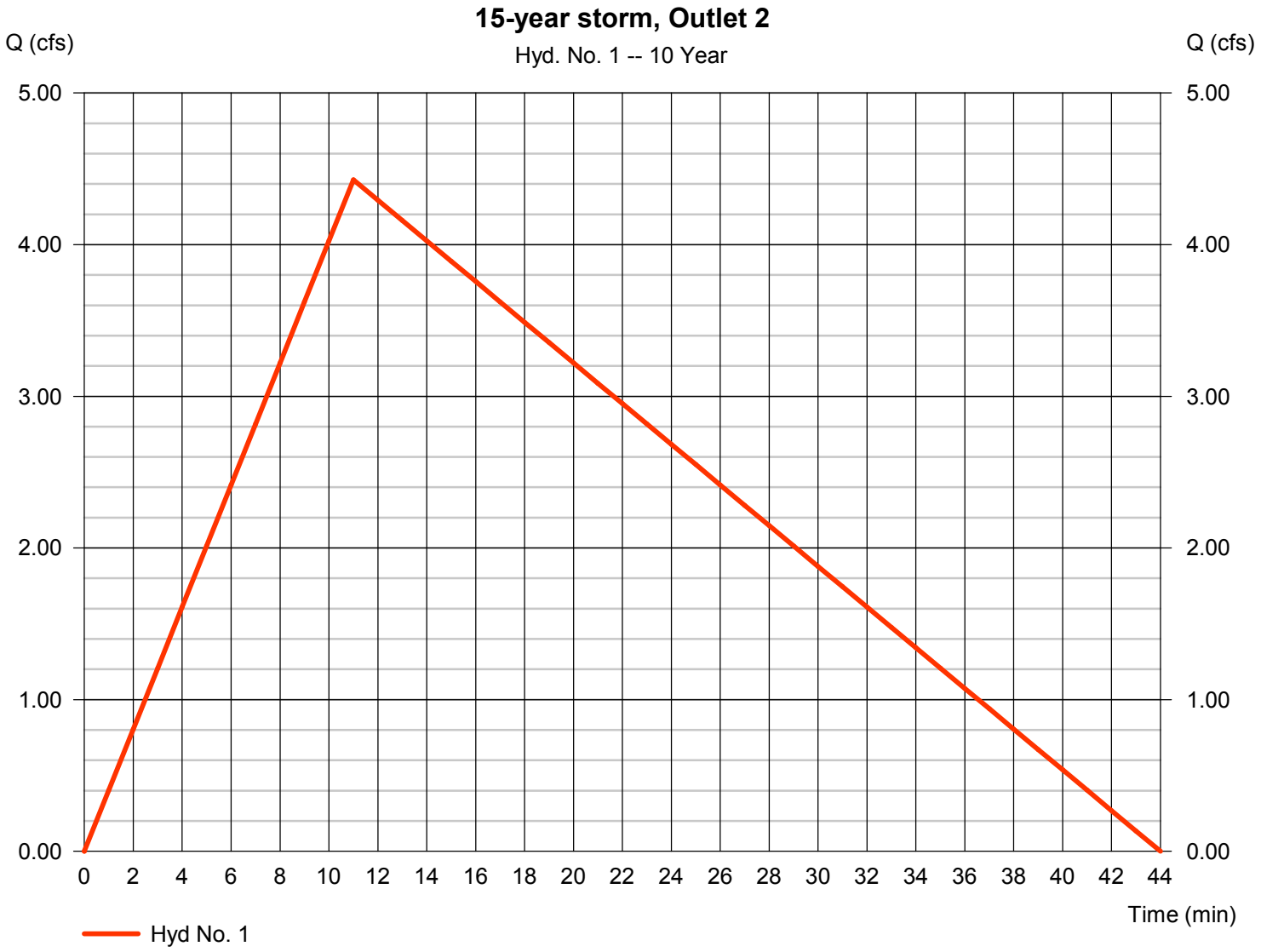
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Thursday, 06 / 23 / 2016

Hyd. No. 1

15-year storm, Outlet 2

Hydrograph type	= Rational	Peak discharge	= 4.428 cfs
Storm frequency	= 15 yrs	Time to peak	= 11 min
Time interval	= 1 min	Hyd. volume	= 5,845 cuft
Drainage area	= 2.000 ac	Runoff coeff.	= 0.75
Intensity	= 2.952 in/hr	Tc by User	= 11.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/3



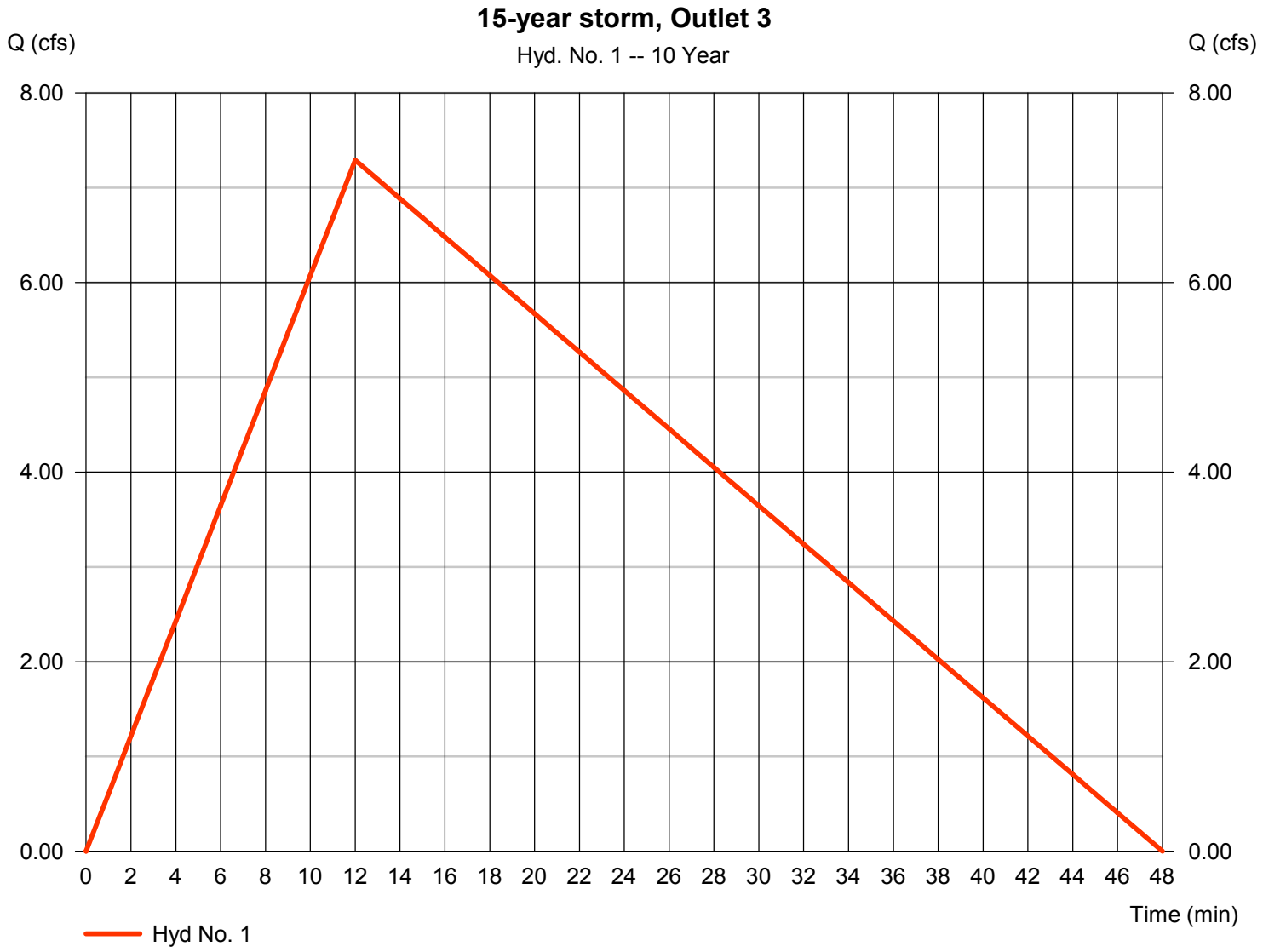
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2014 by Autodesk, Inc. v10.3 Thursday, 06 / 23 / 2016

Hyd. No. 1

15-year storm, Outlet 3

Hydrograph type	= Rational	Peak discharge	= 7.292 cfs
Storm frequency	= 15 yrs	Time to peak	= 12 min
Time interval	= 1 min	Hyd. volume	= 10,500 cuft
Drainage area	= 3.370 ac	Runoff coeff.	= 0.77
Intensity	= 2.810 in/hr	Tc by User	= 12.00 min
IDF Curve	= SampleFHA.idf	Asc/Rec limb fact	= 1/3



APPENDIX 7.5

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Thursday, Jun 23 2016

Overflow at Subshed 1 - pipe outlet calclulation

Circular

Diameter (ft)	= 0.83
Invert Elev (ft)	= 1.00
Slope (%)	= 0.50
N-Value	= 0.011

Calculations

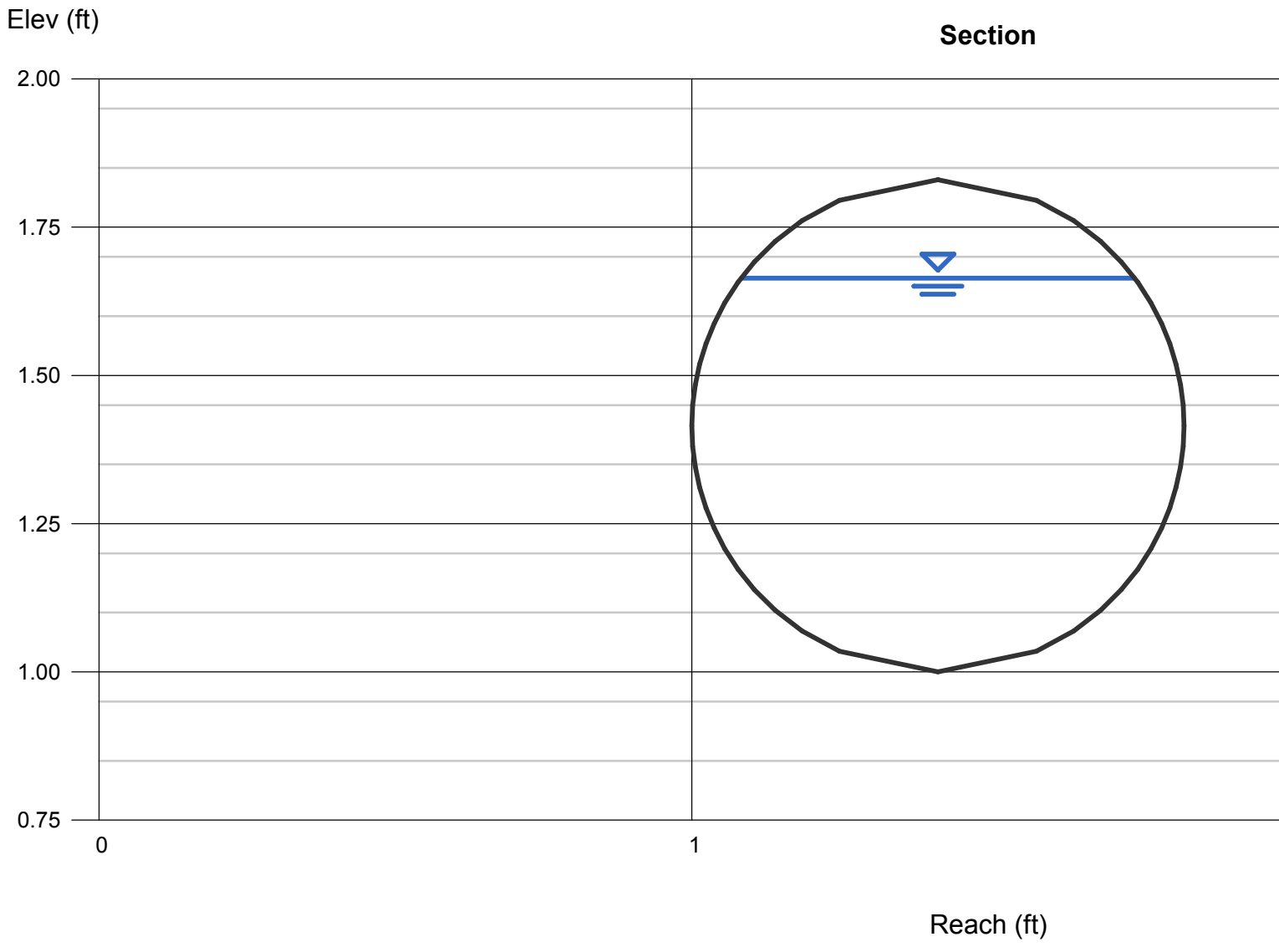
Compute by:	Q vs Depth
No. Increments	= 10

Highlighted

Depth (ft)	= 0.66
Q (cfs)	= 1.770
Area (sqft)	= 0.46
Velocity (ft/s)	= 3.81
Wetted Perim (ft)	= 1.84
Crit Depth, Yc (ft)	= 0.60
Top Width (ft)	= 0.66
EGL (ft)	= 0.89

Qpeak: 1.67 CFS
Q capacity: 1.77 CFS

is Q capacity > Q peak? yes.
therefore, OK



APPENDIX 7.6

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 10N. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was provided in digital format by the USDA National Agriculture Imagery Program (NAIP). This information was photogrammetrically compiled at a scale of 1:24,000 from aerial photography dated 2005.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513 — Base Flood Elevation line and value; elevation in feet*

(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

A — A — Cross section line

23 — — — 23 — Transect line

87°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere

4276 000mN — 1000-meter Universal Transverse Mercator grid values, zone 10N

600000 FT — 5000-foot grid ticks: California State Plane coordinate system, zone II (FIPSZONE 0402), Lambert Conformal Conic projection

DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)

●M1.5 — River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
May 4, 2009

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

PANEL 0610E

FIRM

FLOOD INSURANCE RATE MAP

SOLANO COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 610 OF 730

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SOLANO COUNTY	060631	0610	E
VALLEJO, CITY OF	060374	0610	E

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

MAP NUMBER
06095C0610E

EFFECTIVE DATE
MAY 4, 2009

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

STORMWATER CONTROL PLAN

for

CALIBER CHARTER SCHOOL – VALLEJO CAMPUS

June 23, 2016

Valle Vista Education, LLC

PO BOX 5244, Richmond, CA 94805
Contact: Whitney Blumenfeld at (310) 600 -6804

prepared by:

CSW/Stuber-Stroeh Engineering Group, Inc.

45 Leveroni Court, Novato, CA 94949

(415) 883 - 9850

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Appendix

HMP Compliance

I. PROJECT DATA

Table 1. Project Data

Project Name/Number	Caliber Charter School – Vallejo Campus
Application Submittal Date	June 23, 2016
Project Location	500 Oregon Street, APN 0054-020-140
Name of Developer	Pacific Charter School Development
Project Phase No.	N/A
Project Type and Description	Tilt up concrete building and site work for a new charter school
Project Watershed	Austin Creek Watershed
Total Project Site Area (acres)	5.45 acres
Total Area of Land Disturbed (acres)	3.92 acres
Total New Impervious Surface Area (sq. ft.)	9,470 sf
Total Replaced Impervious Surface Area	80,000 sf
Total Pre-Project Impervious Surface Area	203,575 sf
Total Post-Project Impervious Surface Area	152,900 sf
50% Rule[*]	Doesn't Apply
Project Density	2.6
Applicable Special Project Categories	none
Percent LID and non LID treatment	100% LID treatment
HMP Compliance [†]	Option 1

II. SETTING

II.A. Project Location and Description

The proposed project is located at 500 Oregon Street in Vallejo, California, near the intersection of Valle Vista Avenue and Napa Street. The proposed project will be the site for the Caliber Charter School, which consists of a school building for K-8 grades, accessible walkways, parking lot and student dropoff area, outdoor courts, outdoor seating areas, and landscaped pads.

II.B. Existing Site Features and Conditions

The existing site is divided up into a northern portion and southern portion separated by a chain link fence. The northern portion of the site is currently vacant with the exception of a former building foundation, and the southern portion of the site is currently developed with four vacant buildings. Napa Street abuts the site to the west and Oregon Street abuts the site to the south. The existing site is developed with patchy ground cover which is expected to behave imperviously more or less because it appears compacted. Additionally, underlying soils are expansive clays which are impermeable and prevent groundwater infiltration. Existing surface runoff flows overland in sheet flows, shallow concentrated flows, and channelized flows (curb and gutter) where it eventually discharges into the valley gutter in Valle Vista. From there it flows westward via curb and gutter to the drop inlet just before Couch street. Existing storm drainage was not found adjacent to the site in neither Valle Vista Avenue, Napa Street, nor Oregon Street.

II.C. Opportunities and Constraints for Stormwater Control

The existing site is underlain with expansive clays which are impermeable and prevent groundwater infiltration. Additionally, there is no underground storm drainage located on the site or in the streets located adjacent the property. Therefore, bioretention facilities with perforated subdrains and impermeable liners are proposed.

Stormwater treatment is provided by bioretention facilities. Proposed runoff will be directed towards bioretention facilities via pop-up emitters (runoff from roofs), sheet flow, or drainage swales. Bioretention facilities are sized using a sizing factor of 0.04 and strategically located to capture runoff from hardscape. Runoff is collected within bioretention areas and allowed to pond, where it then percolates through the engineered bioretention soil and eventually collects in a perforated subdrain. From there, the treated runoff is conveyed through the underground storm drain network where it eventually discharges into the public storm drain system.

III. LOW IMPACT DEVELOPMENT DESIGN STRATEGIES

III.A. Optimization of Site Layout

III.A.1. The site development was limited to the building envelope, hardscape needed for programming, hardscape needed for accessibility, and utility upgrades.

III.A.2. The proposed site maintains existing drainage patterns.

III.A.3. No creeks, wetlands, and riparian habitats exist near the site.

III.A.4. Imperviousness was limited to the building envelope and hardscape needed for accessibility.

III.A.5. Biotreatment planters will have the added bonus of treating stormwater and decreasing peak runoff.

III.B. Use of Permeable Pavements

Permeable Pavers not used.

III.C. Dispersal of Runoff to Pervious Areas

Runoff is dispersed into biotreatment areas.

III.D. Stormwater Control Measures

Biotreatment areas will be sized to treat runoff from the roof and site hardscape.

IV. DOCUMENTATION OF DRAINAGE DESIGN

IV.A. Descriptions of each Drainage Management Area

IV.A.1. Table of Drainage Management Areas

DMA Name	Surface Type	Area (square feet)
DMA 1	Roof / Concrete/ Asphalt	18,226
DMA 2	Roof / Concrete/ Asphalt	14,038
DMA 3	Roof/ Concrete	18,122
DMA 4	Roof/ Concrete	7,197
DMA 5	Concrete/ Asphalt	28,000

IV.A.2. Drainage Management Area Descriptions

DMA 1, totaling 18,226 square feet, drains roof, concrete, and asphalt. DMA 1 drains to IMP 1.

DMA 2, totaling 14,038 square feet, drains roof, concrete, and asphalt. DMA 2 drains to IMP 2.

DMA 3, totaling 18,122 square feet, drains roof and concrete. DMA 3 drains to IMP 3.

DMA 4, totaling 7,197 square feet, drains roof and concrete. DMA 4 drains to IMP 4.

DMA 5, totaling 28,000 square feet, drains concrete and asphalt. DMA 5 drains to IMP 5.

IV.B. Tabulation and Sizing Calculations

IV.B.1. Information Summary for IMP Design

Total Project Area (Square Feet)	237,520
IMPs Designed For:	Treatment only

IV.B.2. Areas Draining to IMPs

DMA Name	*DMA Area (square feet)*	*Post-project surface type*	*DMA Runoff factor*	*DMA Area × runoff factor*	*Soil Type:* D	*IMP Name* IMP 1			
DMA1	18,226	Roof, Concrete, and Asphalt	1.0	18,226					
					IMP Sizing factor	*Rain Adjust-ment Factor*	*Minimum Area or Volume*	*Proposed Area or Volume*	
			Total	18,226	***.04***	***n/a***	***730***	***730***	***IMP Area***

DMA Name	*DMA Area (square feet)*	*Post-project surface type*	*DMA Runoff factor*	*DMA Area × runoff factor*	*Soil Type:* D	*IMP Name* IMP 2			
DMA2	14,038	Roof, Concrete, and Asphalt	1.0	14,038					
					IMP Sizing factor	*Rain Adjust-ment Factor*	*Minimum Area or Volume*	*Proposed Area or Volume*	
			Total	14,038	***.04***	***n/a***	***562 SF***	***1,057 sf***	***IMP Area***

DMA Name	*DMA Area (square feet)*	*Post-project surface type*	*DMA Runoff factor*	*DMA Area × runoff factor*	*Soil Type:*	*IMP Name*			
					D	IMP 3			
DMA3	18,122	Roof and Concrete	1.0	18,122	*IMP Sizing factor*	*Rain Adjust-ment Factor*	*Minimum Area or Volume*	*Proposed Area or Volume*	
			Total	18,122	***.04***	***n/a***	***725***	***1,411 sf***	***IMP Area***

DMA Name	*DMA Area (square feet)*	*Post-project surface type*	*DMA Runoff factor*	*DMA Area × runoff factor*	*Soil Type:*	*IMP Name*			
					D	IMP 4			
DMA4	7,197	Roof and Concrete	1.0	7,197	*IMP Sizing factor*	*Rain Adjust-ment Factor*	*Minimum Area or Volume*	*Proposed Area or Volume*	
			Total	7,197	***.04***	***n/a***	***288***	***326 sf***	***IMP Area***

DMA Name	*DMA Area (square feet)*	*Post-project surface type*	*DMA Runoff factor*	*DMA Area × runoff factor*	*Soil Type:*	*IMP Name*			
					D	IMP 5			
DMA5	28,000	Concrete and Asphalt	1.0	28,000	*IMP Sizing factor*	*Rain Adjust-ment Factor*	*Minimum Area or Volume*	*Proposed Area or Volume*	
			Total	28,000	***.04***	***n/a***	***1,120***	***1,530 sf***	***IMP Area***

V. SOURCE CONTROL MEASURES

V.A. Site activities and potential sources of pollutants

V.B. Source Control Table

Potential source of runoff pollutants	*Permanent source control BMPs*	*Operational source control BMPs*
On site storm drain inlets	Mark all inlets with the words "No dumping! Flows to Bay." or similar.	Maintain and periodically repaint or replace inlet markings. Provide stormwater pollution prevention information to new site owners, lessees, or operators. See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."
Interior floor drains and elevator shaft sump pumps	Interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.	Inspect and maintain drains to prevent blockages and overflow.
Need for future indoor & structural pest control	Building design features that discourage entry of pests.	
Landscape/Outdoor Pesticide Use	Final landscape plans will accomplish all of the following. Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. Design landscaping to minimize Design irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions.	Maintain landscaping using minimum or no pesticides. See applicable operational BMPs in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com Provide IPM information to new owners, lessees and operators.

	Consider using pest-resistant plants, especially adjacent to hardscape. To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	
Refuse areas	Signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	The following will be implemented: Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available onsite. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
Fire Sprinkler Test Water	Provide a means to drain fire sprinkler test water to the sanitary sewer.	See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
Plazas, sidewalks, and parking lots.		Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.

V.C. Features, Materials, and Methods of Construction of Source Control BMPs

Furnish per manufacturer's recommendations.

VI. STORMWATER FACILITY MAINTENANCE

VI.A. Ownership and Responsibility for Maintenance in Perpetuity

The applicant accepts responsibility for interim operation and maintenance of stormwater treatment and flow-control facilities until such time as this responsibility is formally transferred to a subsequent owner.

VI.B. Summary of Maintenance Requirements for Each Stormwater Facility

Bioretention Areas

These facilities remove pollutants primarily by filtering runoff slowly through an active layer of soil. Routine maintenance is needed to ensure that flow is unobstructed, that erosion is prevented, and that soils are held together by plant roots and are biologically active. Typical maintenance consists of the following:

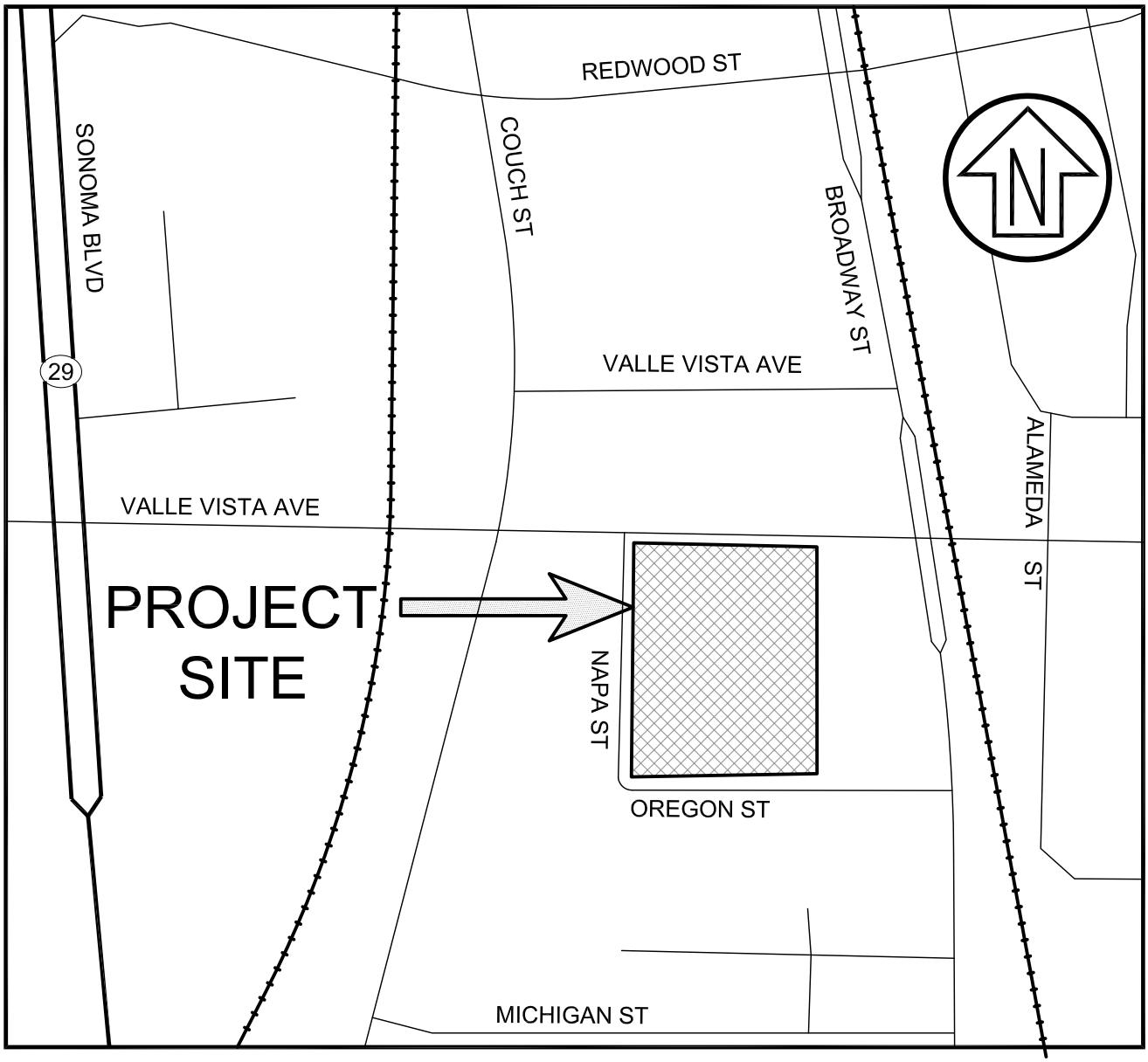
- Inspect **inlets** for channels, exposure of soils, or other evidence of erosion. Clear any obstructions and remove any accumulation of sediment. Examine rock or other material used as a splash pad and replenish if necessary.
- Inspect **outlets** for erosion or plugging.
- Inspect **side slopes** for evidence of instability or erosion and correct as necessary.
- Observe soil at the bottom of the swale or filter for uniform **percolation** throughout. If portions of the swale or filter do not drain within 48 hours after the end of a storm, the soil should be tilled and replanted. Remove any debris or accumulations of sediment.
- Confirm that **check dams** and **flow spreaders** are in place and level and that channelization within the swale or filter is effectively prevented.
- Examine the **vegetation** to ensure that it is healthy and dense enough to provide filtering and to protect soils from erosion. Replenish mulch as necessary, remove fallen leaves and debris, prune large shrubs or trees, and mow turf areas. When mowing, remove no more than 1/3height of grasses. Confirm that irrigation is adequate and not excessive. Replace dead plants and remove noxious and invasive vegetation.
- Abate any potential **vectors** by filling holes in the ground in and around the swale and by insuring that there are no areas where water stands longer than 48 hours following a storm. If mosquito larvae are present and persistent, contact the Contra Costa Mosquito and Vector Control District for information and advice. Mosquito larvicides should be applied only when absolutely necessary and then only by a licensed individual or contractor.

VII. CONSTRUCTION PLAN C.3 CHECKLIST

Stormwater Control Plan Page #	*BMP Description*	*See Plan Sheet #s*
3	Bioretention Treatment Areas	

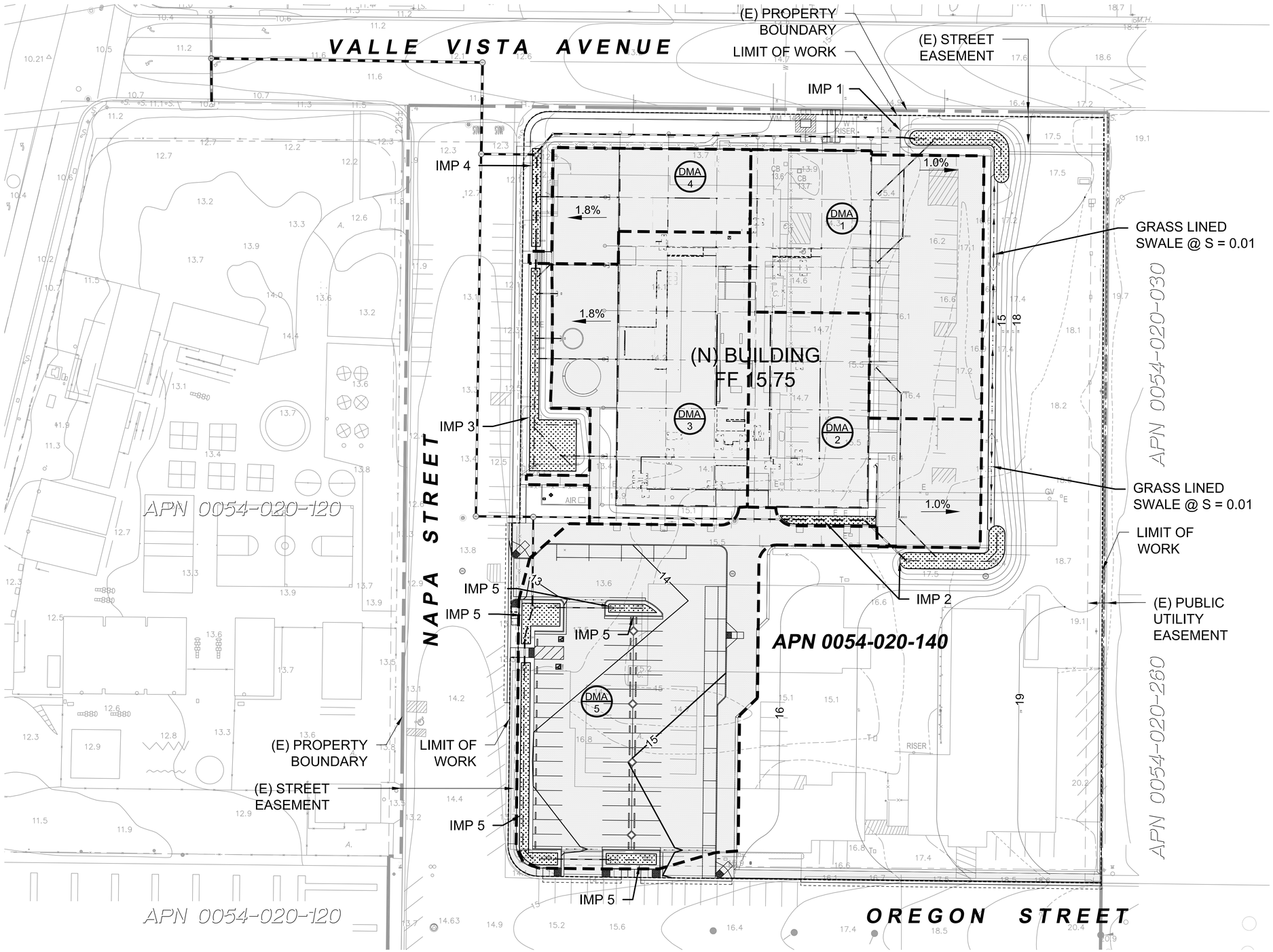
VIII. CERTIFICATIONS

The selection, sizing, and preliminary design of stormwater treatment and other control measures in this plan meet the requirements of Regional Water Quality Control Board Order R2-2009-0074 and Order R2-2011-0083.



VICINITY MAP

SCALE: NTS



Graphic Scale (in feet)

1 inch = 30 ft.

STORMWATER CONTROL PLAN NOTES

1. STORMWATER CONTROL PLAN EXHIBIT TO BE USED IN CONJUNCTION WITH DOCUMENTS ENTITLED "STORMWATER CONTROL PLAN FOR CALIBER CHARTER SCHOOL, DATED JUNE 23, 2016, AND "OPERATIONS AND MAINTENANCE MANUAL FOR CALIBER CHARTER SCHOOL - VALLEJO CAMPUS", DATED JUNE 23, 2016, PREPARED BY CSW / STUBER STROEH.
2. ALL STORM DRAIN INLETS TO MARKED WITH THE WORDS "NO DUMPING! FLOWS TO BAY." OR SIMILAR
3. INTERIOR FLOOR DRAINS AND ELEVATOR SHAFT SUMP PUMPS WILL BE PLUMBED TO SANITARY SEWER.
4. ANY DRAINS FROM DUMPSTERS SHALL BE CONNECTED TO SANITARY SEWER.
5. FIRE SPRINKLER TEST WATER SHALL DISCHARGE TO SANITARY SEWER.

LEGEND

- 14 — MINOR CONTOUR
- 15 — MAJOR CONTOUR
- SWALE FLOWLINE
- SITE HARDSCAPE
- (N) BIOTREATMENT AREA.
- X.X% — SLOPE ARROW
- DMA X — DRAINAGE MANAGEMENT AREAS
- DRAINAGE MANAGEMENT AREA BOUNDARY

Rev	Date	Description	Designed	Drawn	Checked
A	6/23/16	SUBMITTED FOR BUILDING PERMIT	JKS	JKS	AGC

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Land Planning | Construction Management
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City	Vallejo
County	Solano
State	California

CALIBER CHARTER SCHOOL - VALLEJO

STORMWATER CONTROL PLAN EXHIBIT

CALIBER SCHOOLS

Prepared Under the Direction of:

Sheet
EXH1

Scale:	AS NOTED
Date:	6/23/16
Project Number:	4119400
Plan File:	

P:\04\41194\00\WORD\Exhibits\Stormwater Control Plan Exhibit\Construction Documents\EXH1 Stormwater Control Plan 11x17.dwg 06/23/2016 - 10:21 AM shyk 1:1

Rev.: June 22, 2016
Date: April 15, 2016
File: 4.1194.00

CALIBER CHARTER SCHOOL – VALLEJO CAMPUS
HYDROMODIFICATION PLAN COMPLIANCE

The following analysis is intended to demonstrate compliance with the City of Vallejo's Hydromodification Plan by showing that the proposed project will not increase the existing quantity of impervious area and that it will not facilitate the efficiency of drainage collection and conveyance (Option 1 from Table 1-2, Stormwater C.3 Guidebook, 6th Edition, dated February 15, 2012).

Impervious Area Inventory (Pre and Post Condition):

Impervious Area (Pre-project Condition): 203,575 sf

Impervious Area (Post-project Condition): 152,900 sf

Measures Used to Reduce Imperviousness:

Biotreatment is provided and sized to treat runoff from the roof and site hardscape. Roof runoff and site hardscape are designed to direct runoff into biotreatment areas.

Imperviousness is limited to the building envelope, hardscape needed for programming, and hardscape needed for accessibility. Landscaping replaces existing hardscape near the southeast and east areas of the site.

Qualitative Comparison of Drainage Efficiency (Pre and Post Condition)

A. Predevelopment Condition:

The existing site is developed with buildings, asphalt, and patchy ground cover which are expected to behave imperviously because it is developed and compacted. Existing surface runoff is expected to flow overland in sheet flows, shallow concentrated flows, and channelized flows because underlying soils are expansive clays, which are impermeable and the existing site is developed. The majority of the site runoff is expected to flow offsite.

B. Postdevelopment Condition:

The proposed site increases the total landscaped area and provides biotreatment for runoff from the building roof and site hardscape. Runoff is directed towards biotreatment which is sized for roof and hardscape. This is expected to decrease peak discharge and runoff quantity compared to the pre-development condition.

An added bonus to biotreatment is it allows runoff to percolate through the engineered media which slows time of concentration and treats stormwater.

Analysis:

Proposed finish grades are designed for the minimum slopes needed for proper drainage. At conform conditions, proposed grades are designed to match existing.

Proposed storm drain lines are designed for the minimum slopes needed for proper drainage.

Proposed surface types are impervious surfaces needed for the building, site programming, and accessibility only. Proposed landscaping will replace existing hardscape elsewhere.

Proposed hardscape and roofs drain towards bioretention treatment areas which decreases collection efficiency by slowing runoff and retaining runoff in the porous engineered media.

Conclusion:

The post-development condition is expected to decrease drainage collection efficiency.

CSW/STUBER-STROEH ENGINEERING GROUP, INC.

Jeff K. Shu
R.C.E. # 79802

JKS:rte