STANDARD PLAN P.1

STORMWATER CONTROL PLAN

APPLICATION AND COVERSHEET

Public Works Department City of Grover Beach
154 S. Eighth Street, Grover Beach, CA 9343 ● (805) 473-4520

1) APPLICATION INFORMATION

Applicant Name: Cam Boyd (Coastal Community Builders)
Mailing Address: 330 James Way, Suite 270, Pismo Beach, CA 93449
Daytime Phone: 805.556.3060 x164
Email Address: cboyd@ccb1.net

2) PROJECT INFORMATION

☑ **PRELIMINARY** – Subdivision or Land Use Permit ☐ **FINAL** – Construction Permit

Permit Number:
Property APN: 060-203-003, -006

For items # 3, 4, and 5 – Please refer to Chapter 3 of the SLO County LID Handbook

3) IMPERVIOUS SURFACE VALUES – *Refer to the Glossary or Appendix C in the SLO County LID Handbook*

Pre-Project (sqft)

Impervious Area: 23,000 Total Project Area: 44,867

Post-Project (sqft)

Total Impervious Area: 31,201 Pervious Area: 6,606
New Imp. Surface: 8,201 *Removed Imp. Surface:* 0
Replaced Imp. Surface: 23,000
Total Site Disturbance: 42,688

4) REVIEW FOR EXCEPTION – *Refer to Figure 3-2 in the SLO County LID Handbook*

☑ **SWCP REQUIRED** – The project involves at least 2,500 square feet of impervious surface area.

☐ **SWCP EXEMPT** – The project is exempt from a Stormwater Control Plan for the following reason:

- ☐ The project creates or replaces less than 2, 500 square feet of impervious area.
- ☐ Previous land use approval. The project has received land use approval prior to March 6, 2014. List project number: _____

5) PERFORMANCE REQUIREMENTS

☐ **Exempt from SWCP**

☐ **#1 – Site Design**	Performance Requirement Met?	☐ YES	☐ NO
☐ **#2 - Water Quality Treatment**	Performance Requirement Met?	☐ YES	☐ NO
☐ **#3 – Runoff Retention**	Performance Requirement Met?	☐ YES	☐ NO
☑ **#4 – Peak Management**	Performance Requirement Met?	☑ YES	☐ NO

Are structural stormwater control measures proposed? ☑ YES ☐ NO

6) DESIGN CRITERIA

☐ **EXEMPT from SWCP**

Watershed Management Zone No.: _____ *Refer to Appendix A*

Applicable Rainfall Event (percentile): _____ *Refer to table 3-3 in the SLO County LID Handbook*

24-hour Rainfall Isohyetal Line (in): _____ *Refer to Appendix A, Figure 2 and/or 3.*

7) CERTIFICATION

☐ **Exempt.** This project is exempt from submitting a SWCP.

☑ **Full Compliance.** This project fully complies with all applicable Performance Requirements.

☐ **Alternative Compliance.** This project is unable to fully comply with all applicable Performance Requirements. As such, the applicant is requesting to use methods of alternative compliances:

Reason for non-compliance:

_____

_____

_____

_____

_____

Method for alternative compliances:

_____

_____

_____

_____

_____

This SWCP was prepared by a Registered Civil Engineer: ☑ YES ☐ NO

Engineer Name: Trevor K. Lauridsen License No. 90409

I have completed this form accurately and declare that all statements here are true.

Prepare signature Date 11/16/2023

Preparer's name (if other than the Engineer listed above)

STORMWATER SITE DESIGN ANALYSIS

Public Works Department City of Grover Beach File No. _____

SITE DESCRIPTION

Is the project site located with the Business District?	☐ YES	☑ NO
Was the project site previously developed?	☑ YES	☐ NO
Is the project site surrounded on all sides by development?	☑ YES	☑ NO

SITE DESIGN

For each of the following, describe how this project has complied to the maximum extent practicable with the following site design and runoff reductions strategies (attach additional pages if necessary)

1. Limit disturbance of creeks and natural drainage features.

   The project will maintain the natural drainage features surrounding the development. The property was previously developed and the proposed project will mitigate peak flows more efficiently than the existing property.

2. Minimize compaction of highly permeable soils.

   The proposed project proposes to develope the majority of the property but areas of established landscaping will be installed to facilitate infiltration into the soils.

3. Limit clearing and grading of native vegetation at the site to the minimum area needed to build the project, allow access, and provide fire protection.

   There is no existing vegetation on the property. The proposed project will install landscaping.

4. Minimize impervious surfaces by concentrating improvements on the least-sensitive portions of the site, while leaving the remaining land in a natural, undisturbed state.

   The entire site is developed as an existing business that has left the site bare. The proposed project has minimized the impervious surfaces as much as feasible through the use of permeable pavers and landscaping.

Stormwater Control Plan (SWCP) Checklist

Report

- ☑ Stormwater Control Plan (SWCP) Application (**Pages 1 and 2 of this package**)
- ☑ Stormwater Site Design Analysis (**Page 3 of this package**)
- ☐ SWCP Completed according to SWCP Template (**Appendix G of the SLO County LID Handbook**)

Attachments

- ☐ Supporting Calculations
- ☐ Completed checklists (**Pages 5-11 of this package**) for SWCP and each applicable Performance Requirement or Alternative Compliance, as appropriate
- ☐ Site Stormwater Assessment Exhibit
  - o Site map with (existing and proposed) topographic information
  - o Delineation of sensitive areas, native vegetation and soils types. (Can be provided on multiple exhibits to supplement design strategy narrative)

For projects subject to Performance Requirements 2, 3 and/or 4:

- ☐ Drainage Management Area (DMA) Exhibit.
  - o Uniquely identify each DMA and indicate if the DMA is self-retaining (zero discharge), self-treating, or draining to a treatment/flow control facility.
  - o Include location of all infiltration, treatment, or flow-control facilities, their tributary area and basis for sizing (rational C, NRCS CN value, Tc, etc.)
  - o Potential pollutant source areas (if applicable), including loading docks, food service areas, refuse areas, outdoor processes and storage, vehicle cleaning, repair or maintenance, fuel dispensing, equipment washing, etc.
  - o Plan Set with Construction Details for drainage related items (as appropriate)
- ☐ Operation and Maintenance Documentation (if applicable) (**Appendix B, this package**)
  - o Constructive Notification
  - o EXHIBIT A – Post Construction Stormwater Management System Operations & Maintenance Plan
    - PART 1 – General Information and Specifications
    - PART 2 – Drawings & Photos
    - PART 3 – Certification and Approval
  - o EXHIBIT B – Post Construction Stormwater Management System Operations & Maintenance Checklist

Performance Requirement 1: Site Design and Runoff Reduction SWCP Checklist				
DESIGN STRATEGY (SLO CO HANDBOOK LOCATION)			MEANS OF DEMONSTRATING COMPLIANCE	
1.	Limit disturbance of creeks and natural drainage features. (4.2.1)		Pre and post drainage feature map. Delineate natural drainage features on-site stormwater assessment exhibit and DMA exhibit, as applicable.	
2.	Minimize compaction of highly permeable soils. (4.2.2)		Site Stormwater Assessment Exhibit of soil types, overlain with development footprint	
3.	Limit clearing and grading of native vegetation at the site to the minimum area needed to build the project, allow access, and provide fire protection. (4.2.3)		Site Stormwater Assessment Exhibit with native vegetation, overlain with development footprint	
4.	Minimize impervious surfaces by concentrating improvements on the least-sensitive portions of the site, while leaving the remaining land in a natural undisturbed state. (4.2.4)		Site Stormwater Assessment Exhibit with delineated sensitive areas overlain with development footprint	
MINIMIZE STORMWATER RUNOFF BY IMPLEMENTING ONE OR MORE OF THE FOLLOWING DESIGN MEASURES:				
5.	MANDATORY SITE DESIGN MEASURES SELECT AT LEAST ONE, (CO. HANDBOOK LOCATION)		Selected	Reason, for not selecting
	a.	Roof runoff directed into cisterns or rain barrels for reuse? (5.2.1)		Site uses underground chambers
	b.	Roof runoff directed into vegetated areas (safely away from building foundations and footings)? (5.2.2)	Yes	
	c.	Runoff from sidewalks, walkaways, and/or patios directed onto vegetated areas (safely away from the building foundations and footings)? (5.2.3)	Yes	
	d.	Runoff from driveways and/or uncovered parking lots onto vegetated areas (safely away from the building foundations and footings)? (5.2.4)		Directed to permeable pavers and underground chambers.
	e.	Are bike lanes, driveways, uncovered parking lots, sidewalks, walkways, and patios constructed with permeable surfaces? (5.2.5)	Yes	

This checklist must be included with every project application (except for projects deemed EXEMPT). See Figure 3-2 of Chapter 3, SLO County Handbook to determine if your project is considered exempt, or regulated.

Performance Requirement 2: Water Quality Treatment SWCP Checklist

Project Level Documentation, identify

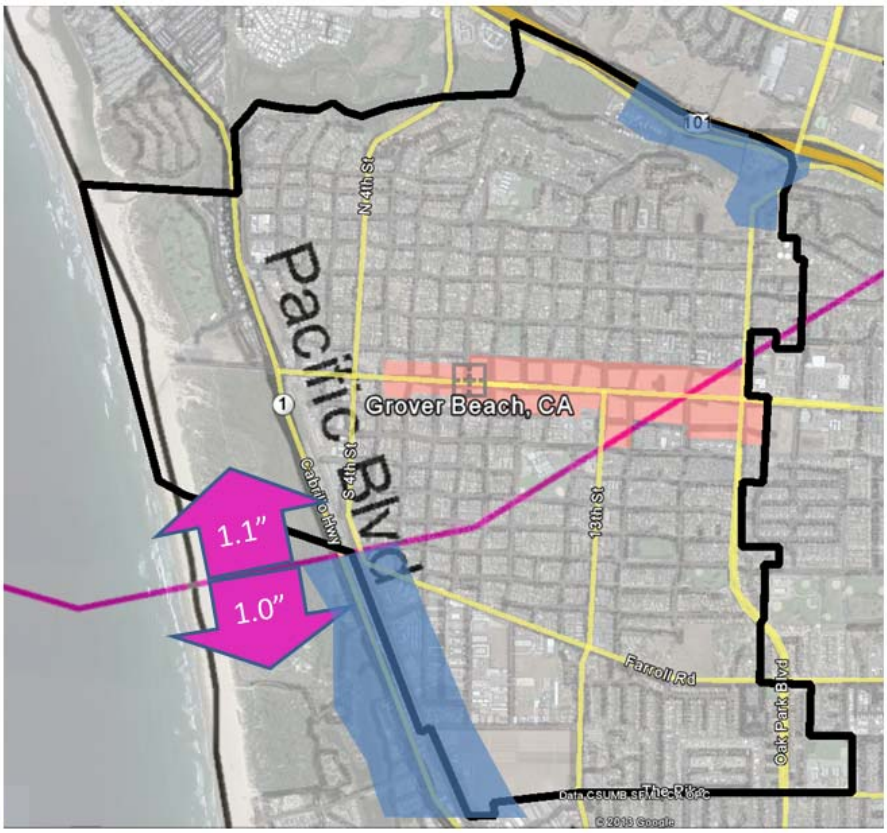
- ☑ Project Net Impervious Area
- ☑ Certification that on-site water quality treatment measures have been met on-site, or if not achievable:
  - o Documentation of the volume of runoff for which compliance cannot be achieved on site and the associated off-site compliance requirements
  - o Statement of intent to comply with Water Quality Treatment Performance Requirement through Alternative Compliance

For each Drainage Management Area, provide:

- ☑ Unique DMA Number, area, and likely pollutant(s) of concern
- ☑ Water Quality Treatment Approach
  N/A if self-treating, or,
  Through the use of LID, Biofiltration or Non-retention Based Treatment System)
- ☑ Supporting calculations demonstrating compliance with Treatment Performance Requirement
- ☑ Plan sheet page and detail number (if appropriate) of Drainage Management Areas (DMA) Exhibit where construction details are provided for each DMA.

For DMAs using Low Impact Development Treatment Systems, provide:

- ☑ 85th percentile 24-hour storm event value, and basis on the rainfall depths provided in figure below.



Projects subject to PR2 must treat the 85th percentile storm event.
For projects above the pink line, the 85th percentile storm is a 1.1-inch storm.
For projects below the pink line, the 85th percentile storm is a 1.0-inch storm.
For projects in the blue shaded area, the 85th percentile storm is a 0.9-inch storm.

Performance Requirement 2: Water Quality Treatment SWCP Checklist

For DMAs using Biofiltration Systems, provide:

- ☐ Statement indicating why an LID treatment system was not appropriate
- ☐ Surface loading rate approach, and basis of determination (0.2 x per hour intensity, or 2 x 85th percentile hourly rainfall intensity)
- ☐ Calculations to demonstrate that the minimum surface reservoir volume is equal to the biofiltration treatment system surface area time a depth of 6-inches
- ☐ Construction detail (or reference to page on plans) which provides:
  - o Minimum planting depth
  - o Planting medium specifications. Either:
    - Specify 60 to 70% ASTM C33 sand, with 30-40% compost , or
    - Provide testing documentation demonstrating planting medium specified can minimally infiltrate at a rate of 5 inches per hour)
  - o Plant selection consistent with Appendix L
  - o Subsurface drainage/storage (gravel) layer with an area equal to the biofiltration treatment system surface area and having a minimum depth of 12 inches;
  - o Underdrain with discharge elevation at top of gravel layer;
  - o No compaction of soils beneath the biofiltration facility (ripping/loosening of soils required if compacted)
  - o No liners or other barriers interfering with infiltration, except for situations where lateral infiltration is not technically feasible.

For **DMAs using Non-Retention Based Treatment Systems**, provide:

- ☑ Statement indicating why an LID, or Biofiltration treatment system was not appropriate
- ☑ Hydraulic Sizing Criteria used, and basis of determination (Volume = to 85th percentile, 24-hour storm, or flow basis (2 x 85th percentile hourly rainfall intensity or 0.2 x inches per hour intensity)

Performance Requirement 3: Runoff Retention SWCP Checklist

SITE ASSESSMENT MEASURES: (see table 3.5 SLO Co Handbook)
Include an exhibit and narrative of the opportunities and constraints to implementing LID Stormwater Control measures based on the following items (as applicable):

☑ Site topography	☑ Run-on characteristics (source and estimated runoff from offsite which discharges to the project area)
☑ Hydrologic features including contiguous natural areas, wetlands, watercourses, seeps, or springs	☑ Existing drainage infrastructure for the site and nearby areas, including the location of municipal storm drains
☑ Depth to seasonal high groundwater	☑ Structures, including retaining walls
☑ Locations of groundwater wells used for drinking water	☑ Utilities
☑ Depth to an impervious layer such as bedrock	☑ Easements
☑ Presence of unique geology (e.g., karst)	☑ Covenants
☑ Geotechnical hazards	☐ Zoning/Land Use
☑ Documented soil and/or groundwater contamination	☑ Setbacks
☑ Soil types and hydrologic soil groups	☑ Open space requirements
☑ Vegetative cover/trees	☐ Other pertinent overlay(s)

SITE DESIGN MEASURES
Include in narrative, and provide supporting exhibits as necessary, to demonstrate that the project design has implemented the following design strategies (as applicable)

	DESIGN STRATEGY	MEANS OF DEMONSTRATING COMPLIANCE
1.	Define the development envelope and protected areas, identifying areas that are most suitable for development and areas to be left undisturbed.	Site Stormwater Assessment Exhibit.
2.	Conserve natural areas, including existing trees, other vegetation, and soils	Site Stormwater Assessment Exhibit with native vegetation, overlain with development footprint
3.	Limit the overall impervious footprint of the project	Discussion regarding other building configurations considered (and ultimately rejected)
4.	Construct streets, sidewalks, or parking lot aisles to the minimum widths necessary, provided that public safety or mobility uses are not compromised	Discussion on minimum allowable widths, and rationale for using larger values (if applicable) or confirmation that minimum values were used (where applicable).
5	Set back development from creeks, wetlands, and riparian habitats	Discussion on set-back dimensions chosen.
6	Conform the site layout along natural landforms	Within the Drainage Management Area (DMA) Exhibit, show Topo survey with existing and planned contours cut and fill lines. Discussion of grading approach.
7	Avoid excessive grading and disturbance of vegetation and soils	Exhibit with native vegetation, overlain with planned disturbed area limits.

Performance Requirement 3: Runoff Retention SWCP Checklist Continued

STORMWATER STRUCTURAL CONTROL MEASURE SIZING

For Overall project,

☑ Certification statement indicating that the selection, sizing, and design of Stormwater Control measures meets the applicable Water Quality Treatment and Runoff Retention Performance Requirements, or, if not achievable

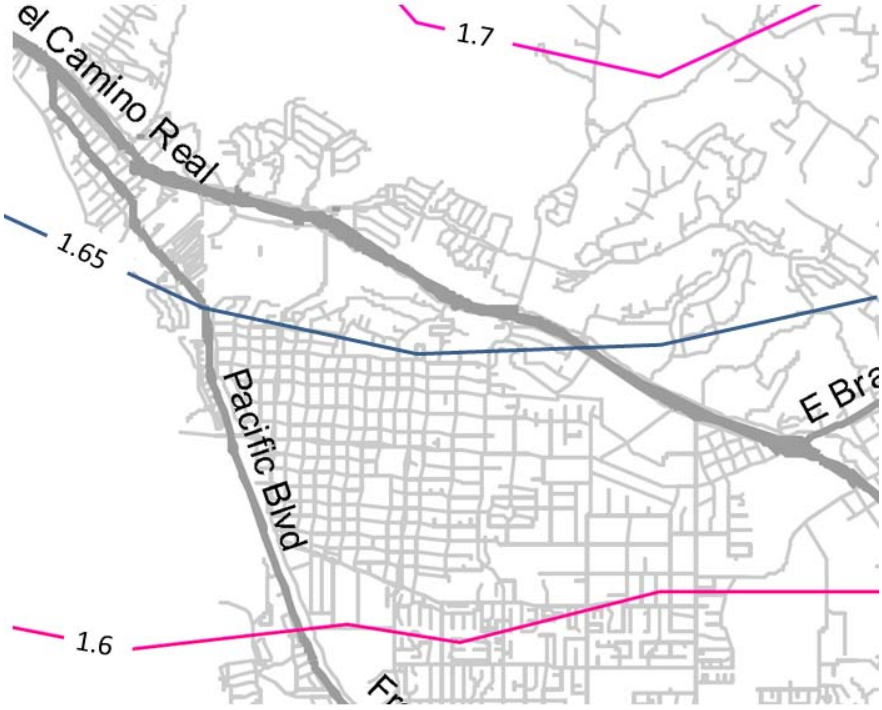
- o Provide documentation of the volume of runoff for which compliance cannot be achieved on-site and the associated off-site compliance volume
- o Statement of intent to comply with Water Quality Treatment and Runoff Retention Performance Requirements through an Alternative Compliance Agreement

☑ Documentation demonstrating percentage of the project's Equivalent Impervious Surface Area dedicated to retention-based Stormwater Control Measures

For each DMA,

☑ Indicate sizing strategy used

- 0 Hydrologic analysis and sizing methods as outline in **Attachment C, SLO Co Handbook**
- 0 Locally/regionally calibrated continuous simulation model that results in equivalent optimization of on-site runoff retention volumes
- 0 Hydrologic analysis and sizing methods, equally effective in optimizing on-site retention volumes of the runoff generated by the rainfall events specified below:



Projects subject to PR3 must retain the 95th percentile storm event.
The required infiltration storm is between 1.6 and 1.65 inches, 24-hour rainfall depth event.

☑ Provide supporting calculations demonstrating compliance with Runoff Retention Performance Requirement

☑ Indicate if a ten percent adjustment (based on technical infeasibility) is included in design approach (see **Appendix D, SLO Co Handbook**)

☑ Indicate if off-site mitigation is included in design approach (see **Appendix D, SLO Co Handbook**)

Performance Requirement 4: Peak Management SWCP Checklist

Project Level Documentation, identify

- ☑ Point source discharge locations
- ☑ Hydraulic Report demonstrating that post development storm water runoff peak flows discharged from the site do not exceed pre-project peak flows for the 2- through 10-year storm events)
- ☑ Certification that on-site water quality treatment measures have been met on-site, or if not achievable:
  - o Documentation of the volume of runoff for which compliance cannot be achieved on site and the associated off-site compliance requirements
  - o Statement of intent to comply with Water Quality Treatment Performance Requirement through Alternative Compliance

Stormwater Control Plan
For
197 West Grand Avenue

March 1, 2024

Prepared for:

Cam Boyd
Coastal Community Builders, Inc.
330 James Way
Pismo Beach, CA 93449
(805) 556-3060

Prepared by:

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Drainage Management Areas (DMAs) Exhibit

Drainage Calculations Report for Tier 4 (Run-off Reduction and Retention)

Stormwater Maintenance Plan

I. Project Data

Table 1: Project Data

Project Name/Number	197 West Grand Avenue
Application Submittal Date	3/1/2024
Project Location	Highland Way and S. 13th Street APN: 060-203-006 & 060-203-003
Project Phase No.	N/A
Project Type and Description	Residential with 14 (2-Story) detached single family and 2 (2-Story) attached residences of 2-units each, for a total of 18 residential units.
Total Project Site Area (acres)	1.03 Acres (0.95 Total Disturbed)
Total New Impervious Surface Area	8,201 S.F.
Total Replaced Impervious Surface Area	23,000 S.F.
Total Pre-Project Impervious Surface Area	23,000 S.F.
Total Post-Project Impervious Surface Area	31,201 S.F.
Net Impervious Area (Exhibit shall be provided to justify net impervious area results)	31,201 S.F. *As a result of site being stripped, all impervious area will be considered for retention requirements.
Watershed Management Zone(s)	WMZ-2
Design Storm Frequency and Depth	95th Percentile (1.6 inches)
Drainage Report Name	197 West Grand Avenue Drainage Calculations

II. Setting

II.A. Project Location and Description



The 197 West Grand Avenue project is located in Grover Beach, CA at the intersection of West Grand Avenue and North 2nd Street. The property consists of one parcel (APN: 060-215-001). The intended use of the site is for 23 residential townhomes and two (2) retail spaces. The site will also include 13 onsite parking spaces as well as resident and fire access drive aisles. The proposed residential project is bordered by existing residential homes along the north, commercial properties along the east and south and the railroad on the west. There will be no proposed phasing for this project.

II.B. Existing Site Features and Conditions

The existing is rectangular in shape and consists of an existing Recreational Rental Facility. The property consists mostly of asphalt or concrete paving that slopes to the west at approximately 1-2%. The highest point of the site is located at the southeast corner and the low point is located at the north property line.

The property was previously used for commercial purposes and consisted of buildings and structures that will be removed and a parking area. There are no existing hydrologic features, contiguous natural areas, wetlands or water courses located on the existing property.

The existing drainage of the property freely drains into an existing storm drain system to the north of the property at the knuckle of Ramona Avenue. There are existing drainage inlets in North 2nd Street, West Grand Avenue and Ramona Avenue along the property frontage.

II.C. Opportunities and Constraints for Stormwater Control

As a result of this property being previously developed and the substantial amount of impervious area there is opportunity to improve the sites current drainage patterns. The impervious area allows

stormwater to flow un-impeded off the site. The proposed project will have the opportunity to install various areas where stormwater can be captured and slowed down allowing for percolation on-site through the use of well-established vegetated areas, pervious pavers and underground storage chambers.

Stormwater Control constraints that exist on the property are confined spaces this does not allow for a feasible above ground stormwater storage. Which has led the design to choose the underground storage option.

III. Low Impact Development Design Strategies

III.A. Optimization of Site Layout

The 197 West Grand Avenue project incorporates features designed to decrease the amount of stormwater run-off.

III.A.1. Limitation of development envelope

The development envelope is limited to the allowable extent under the City of Grover Beach Standards and will incorporate landscape areas that will occupy ~26% of the project area.

III.A.2. Preservation of natural drainage features

The project maintains the existing drainage patterns and will direct flows to the existing public storm drain system.

III.A.3. Setbacks from creeks, wetlands, and riparian habitats

There are no creeks, wetlands, or riparian habitats located on-site.

III.A.4. Minimization of imperviousness

Although this project will develop the entire parcel, the imperviousness of the site will only increase by 8,201 S.F. (a 36% increase). However, the run-off from the site will be decreased through the use of strategically placed landscaping, pervious pavers, and underground stormwater storage that are designed to handle the volume of stormwater from all impervious areas.

III.A.5. Use of drainage as a design element

III.B. Use of Permeable Pavements (self-treating areas)

Permeable pavers have been used in the design of this site in order to achieve a higher amount of stormwater control. There is approximately 2,024 S.F. of parking area that will be permeable pavers that will assist in the stormwater control goals for the site.

III.C. Dispersal of Runoff to Pervious Areas (self-retaining areas)

All of the impermeable areas of this site, where possible, will drain into pervious areas, such as landscaping or self-retaining permeable pavers systems prior to reaching the underground stormwater storage chambers.

III.D. Stormwater Control Measures

The stormwater control measures used for this site are permeable paver systems that allow for stormwater storage in addition to the self-retaining storage they provide. A system of underground

storage chambers with an isolation row are also proposed to contain the required 10,140 C.F. of stormwater, refer to attached drainage calculations.

IV. Documentation of Drainage Design

IV.A. Drainage Management Area Characterization

The DMA numbers below correspond with DMA numbers of DMA exhibit. Each DMA has only one surface type. DMAs listed include all impervious surfaces and all vegetated areas except those designated as structural control measures (SCMs).

Pervious areas are further categorized as either self-treating or self-retaining areas.

- Areas designated as self-treating areas are undisturbed areas, or areas planted with native, drought-tolerant, or LID-appropriate vegetation and do not receive runoff from other areas.
- Areas designated as self-retaining are low-lying areas that receive runoff from adjoining areas. Site retaining areas may have natural vegetation, or be landscape, or may be porous pavements (where the soils underlying the porous pavements drain well enough to handle the additional run-on).

DMA 1 consists of the roof area of the residences and commercial buildings (18,141 S.F.). These roofs will drain via downspouts into the permeable pavers (SCM 1) and/or the underground chambers (SCM 2), where the water will be retained and will infiltrate into the underlying soil.

DMA 2 consists of the hardscape area that is tributary to SCM 1 (6,050 S.F.). This area will sheet flow into landscaping or permeable pavers. This run-off will be retained in SCM 1 and 2 for up to the 95th percentile storm.

DMA 3 consists of the asphalt drive aisle that is tributary to SCM 1 (7,010 S.F.). This area will sheet flow into the permeable pavers (SCM 1). From there the run-off will be directed to SCM 2.

DMA 4 consists of the landscaped areas around the site (4,582 S.F.). These areas are not designed to retain run-off but will allow where possible stormwater run-off to infiltrate into the soil prior to reaching the site SCM's.

Table 2: Table of Drainage Management Areas

DMA ID	SURFACE TYPE & DESCRIPTION	AREA (SF)	DRAINS TO (PROVIDE DMA OR SCM DMA ID)			NOTABLE OR EXCEPTION CHARACTERISTICS OR CONDITIONS
			SELF-TREATING	SELF-RETAINING	SCM	
1	Roof/Impervious	18,141	-	-	2	
2	Hardscape/Impervious	6,050	-	-	1	
3	Asphalt/Impervious	7,010	-	-	1	
4	Landscape/Pervious	4,582	4	-	-	

Table 3: Table of Runoff Reduction and Structural Control Measures

DMA ID	SCM	SCM TYPE	VOLUME PROVIDED (CF)	VOLUME REQUIRED (CF)
-	1	PERMEABLE PAVERS	1,214	-
-	2	UNDERGROUND STORAGE CHAMBERS	8,975	-
		TOTAL	10,189	10,140

IV.B. Sizing Calculations

The SCM's were sized using the HydroCAD program which uses the Santa Barbara Unit Hydrograph Method. The program uses different sub-catchments that drain to ponds. The sub-catchments are the DMA's and the Ponds are the SCM's. Each sub-catchment is given the area and surface type and it is routed to the corresponding SCM. The volume of run-off from these DMA's is used to size the storage volume of the SCM's. The retention volume requirement is from the Grover Beach City Standards which uses the equation (Impervious Area (S.F.) x 0.325 = Cubic Feet of Required Storage) this volume is greater than the volume that results from a 1.6" 24-hour storm event (95th percentile). As a result of this the equation will govern the required storage volume, refer to attached Drainage Calculations.

The design storm (inches): 1.6 inches (95th Percentile)

Saturated Soil Infiltration Rates (in/hr) 0.75 in/hr (A/B Soils)

V. Source Control Measures

V.A. Site activities and potential sources of pollutants

V.B. Source Control Table

Table 4: Source Control Table

Potential source of runoff pollutants	**Permanent source control BMPs**	**Operational Source Control BMPs**
On-site storm drain inlet (unauthorized non-stormwater discharges and accidental spills or leaks)	Mark all inlets with the words "No Dumping! Flows to Bay" or similar	Maintain and periodically replace inlet markings. Provide stormwater pollution prevention information to new site owners, lessees or operators See applicable operational BMPs in Fact Sheet SC-10, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbook at www.casqa.org/resources/bmp-handbooks 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	State that interior floor drains will be plumbed to the sanitary sewer.	Inspect and maintain drains to prevent blockages and overflow.
Need for future indoor & structural pest control	Note building design features that discourage entry of pests.	Provide Integrated Pest Management information to owners, lessees, and operators.
Landscape/ Outdoor Pesticide Use/Building and Grounds Maintenance	State that final landscape plans will accomplish all the following. Preserve existing native trees, shrubs, and ground cover to the maximum extent possible.	Maintain landscaping using minimum or no pesticides. See applicable operational BMPs in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA

	Design landscaping to minimize 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. 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.	Stormwater Quality Handbooks at www.cabmphandbooks.com Provide IPM information to new owners, lessees and operators.
Refuse Areas	State how site refuse will be handled and provide supporting detail to what is shown on plans. State that signs will be posted on or near the dumpsters with the words "Do not dump hazardous materials here" or similar.	State how 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 waste. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbook at www.casqa.org/resources/bpm-handbooks
Outdoor storage of equipment or materials. (See Vehicle and Equipment Cleaning and Vehicle/Equipment Repair and Maintenance for source control measures for vehicle	• Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains.	See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

cleaning, repair, and maintenance.)	• Where appropriate, reference documentation of compliance with the requirements of programs for: Hazardous Waste Generation Hazardous Materials Release Response and Inventory California Accidental Release (CalARP) Aboveground Storage Tank Uniform Fire Code Article 80 Section 103(b) & (c) 1991 Underground Storage Tank	
Vehicle and Equipment Cleaning	If a car wash area is not provided, describe measures taken to discourage on-site car washing and explain how these will be enforced.	Describe operational measures to implement the following (if applicable): • Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system. • Car dealerships and similar may rinse cars with water only. • See Fact Sheet SC-21, "Vehicle and Equipment Cleaning," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
Vehicle/Equipment Repair and Maintenance	• State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area. • State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements. • State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if	In the Stormwater Control Plan, note that all of the following restrictions apply to use the site: • No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains. • No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of

	there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.	secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately. • No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.
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 Ground Maintenance," in the CASQA Stormwater Quality Handbook
Miscellaneous Drain or Wash Water or other Sources • Boiler Drains • Condensate drain lines • Rooftop Equipment • Drainage Sumps • Roofing, gutters and trim	Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system. Condensate drain lines may discharge to landscape areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system. Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment. Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water. Avoid roofing, gutters, and trim made of copper or other unprotected metal that ay leach into runoff.	See SC-10

	Include controls for other sources as specified by local reviewer.	
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 wash water 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

The stormwater features are to be built per the grading, landscape and architectural plans and material and methods of construction are to be determined by the owner/developer and contractors.

VI. Stormwater Facility Maintenance

VI.A. Ownership and Responsibility for Maintenance in Perpetuity

Signed ownership and responsibility for maintenance agreement to be on file at City of Grover Beach Utilities Department

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

The maintenance for each SCM shall be done periodically throughout the year. The short-term maintenance of the proposed SCM's are the same as the long-term maintenance with the exception of possible repairs of damaged materials.

The maintenance for the underground chambers (SCM 2) will be to, inspect the Isolator Row every 6 months (inspections may need to be increased depending on annual sediment accumulation). When visible accumulation of sediment occurs and exceeds 3 inches the isolator row will need to be cleaned out. Maintenance is accomplished with the JetVac process which utilizes a high pressure water nozzle which will wash out the sediment into the manhole for vacuuming.

The maintenance for the permeable paver systems (SCM 1) will be to maintain the permeable paver SCM's, every three months (four times a year). Street sweepers with vacuum and brushes shall sweep and vacuum the area. This will help clean out the voids and restore permeability. Once a year, prior to the rain season, pressure wash the pavers after the site has been swept and vacuumed and replace gravel between pavers as necessary. Individual pavers or sections can be replaced as necessary.

VII. Construction Checklist

Layout (to be confirmed prior to beginning excavation)

❒ Square footage of the facility meets or exceeds minimum shown in Stormwater Control Plan

- ❒ Site grading and grade breaks are consistent with the boundaries of the tributary Drainage Management Area(s) (DMAs) shown in the Stormwater Control Plan
- ❒ Inlet elevation of the facility is low enough to receive drainage from the entire tributary DMA
- ❒ Locations and elevations of overland flow or piping, including roof leaders, from impervious areas to the facility have been laid out and any conflicts resolved
- ❒ Locations for vaults, utility boxes, and light standards have been identified so that they will not conflict with the facility
- ❒ Facility is protected as needed from construction-phase runoff and sediment

Excavation (to be confirmed prior to backfilling or pipe installation)

- ❒ Excavation conducted with materials and techniques to minimize compaction of soils within the facility area
- ❒ Excavation is to accurate area and depth
- ❒ Vertical moisture barrier, if specified, has been added to protect adjacent pavement or structures.
- ❒ Native soils at bottom of excavation are ripped or loosened to promote infiltration

Overflow or Surface Connection to Storm Drainage
(to be confirmed prior to backfilling with any materials)

- ❒ Overflow is at specified elevation
- ❒ No knockouts or side inlets are in overflow riser
- ❒ Overflow location selected to minimize surface flow velocity (near, but offset from, inlet recommended)

Underground connection to storm drain/outlet orifice

(to be confirmed prior to backfilling with any materials)

- ❒ Perforated pipe underdrain (PVC SDR 35 or approved equivalent) is installed with holes facing down
- ❒ Perforated pipe is connected to storm drain at specified elevation (typ. bottom of soil elevation)
- ❒ Cleanouts are in accessible locations and connected via sweep bends
- ❒ Monitoring well, if required, is installed.
- ❒ Structures (arches or large diameter pipes) for additional surface storage are installed as shown in plans and specifications and have the specified volume

Drain Rock/Subdrain (to be confirmed prior to installation of soil mix)

- ❒ Rock is installed as specified. Class 2 permeable, Caltrans specification 68-2.02(F)(3) recommended, or 3" depth of pea gravel is installed at the top of the crushed rock layer to prevent migration of fines into gravel layer
- ❒ Rock is smoothed to a level top elevation. Depth and top elevation are as shown in plans
- ❒ Slopes or side walls protect from sloughing of native soils into the facility

Final Engineering Inspection

- ❒ Drainage Management Area(s) are free of construction sediment and landscaped areas are stabilized
- ❒ Inflows from roof leaders and pipes are connected and operable
- ❒ Temporary flow diversions are removed
- ❒ Overflow outlets are configured to allow the facility to flood and fill to near rim before overflow
- ❒ Facility drains rapidly; no surface ponding is evident
- ❒ Any accumulated construction debris, trash, or sediment is removed from facility

Table 5 Construction Checklist Table

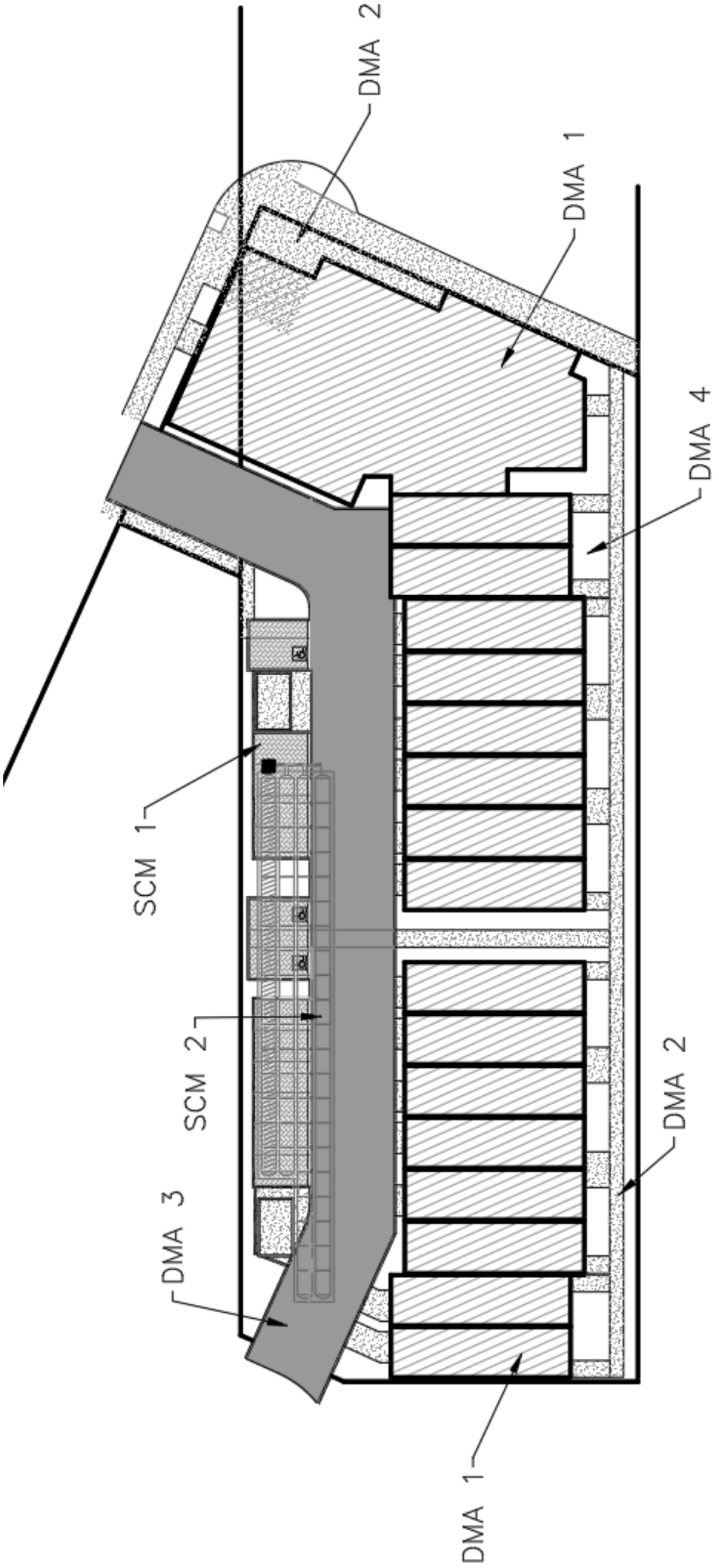
Page Number in Stormwater Control Plan	Source or Treatment Control Measure.	Plan Sheet #
8	Mark all inlets with the words "No Dumping! Flows to Bay" or similar.	GRP sheet# TBD
10	Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution.	Landscape Plan Sheet # TBD
10	Specify plants that are tolerant to saturated soil conditions, where landscaped areas are used to retain or detain stormwater.	Landscape Plan Sheet # TBD
10	Consider using pest-resistant plants, especially adjacent to hardscapes.	Landscape Plan Sheet # TBD
10	To insure successful establishment, select plants appropriate to site soil, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency and plant interactions.	Landscape Plan Sheet # TBD
11	Describe the items to be cleaned in this facility and how it has been sized to insure the largest items can be accommodated.	Architectural Plans Sheet # TBD
11	State how site refuse will be handled and provide supporting detail to what is shown on plans.	Grading Plans Sheet # TBD
13	Provide a means to drain fire sprinkler test water to the sanitary sewer.	Architectural Plans Sheet # TBD
13	Condensate drain lines may discharge to landscape areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system.	Architectural Plans Sheet # TBD

13	Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment.	Architectural Plans Sheet # TBD
13	Avoid roofing, gutters, and trim made of copper or other unprotected metal that ay leach into runoff.	Architectural Plans Sheet # TBD

VIII. Certifications

The design of stormwater treatment facilities and other stormwater pollution control measures in this plan are in accordance with the Post-Construction Stormwater Management Resolution R3-2013-0032 and the current edition of the County's LID Handbook.

DMA EXHIBIT



STORM WATER MAINTENANCE PLAN

FOR

197 West Grand Avenue

Coastal Community Builders, Inc.
330 JAMES WAY
PISMO BEACH, CA
(03/01/2024)

March 1, 2024

BETHEL engineering

2624 Airpark Drive, Santa Maria • California 93455 • Tel 805-934-5767 • Fax 805-934-3448

Purpose

This plan is intended to identify the methods and features contained in the storm water quality design of the project and provide maintenance guidelines to insure proper operation of those facilities. The purpose and scope of this plan is to address specific on-site maintenance mitigation beyond the construction activity and address them in an ongoing long-term basis.

Project Description

The 197 West Grand Avenue project is located in Grover Beach, CA at the intersection of West Grand Avenue and North 2nd Street. The property consists of one parcel (APN: 060-215-001). The intended use of the site is for 23 residential townhomes and two (2) retail spaces. The site will also include 13 onsite parking spaces as well as resident and fire access drive aisles. The proposed residential project is bordered by existing residential homes along the north, commercial properties along the east and south and the railroad on the west. The project will install several areas of permeable pavers and underground storage chambers to retain and infiltrate stormwater run-off.

Drainage Impedance & Pollution

In rain events, possible contaminates produced from the building and residents coming and going from the site will flow to the sites drainage features. Accumulation of these occurrences mentioned above will result in significant loss of drainage capacity. Therefore, the site's drainage system shall be maintained by clearing/or removing hampering material from drainage inlets and outlets.

The permeable pavers and underground storage chambers effectiveness will be reduced by accumulating silts. This can cause pollutants, such as oil and grease from vehicles to infiltrate the drainage system and discharge off site. Therefore, maintenance to these devices should consist of removing excess sand and silt settlement, as well as maintain vegetation for pollutant mitigation. Original drainage design, design dimensions, proportions, and pollutant control mitigation methods shall be maintained as mentioned above.

The site's underground storage chambers, (see "Exhibit A" for locations) are designed to retain and infiltrate minor storm rain water and discharge larger storm events at a controlled amount. Therefore, maintenance of these areas is critical for proper design function.

Possible drainage obstructions and pollutants include the following:

Sands	Silts	Aggregate
Rock	Gravel	Oil
Trash	Litter	Grease

Soil Stabilization

As a part of this development, erosion control measures are required during construction. Those include standard "Best Management Practices" such as hydroseeding/hydromulching, erosion control blankets, and grading techniques. These measures address not only the construction phase of the project, but long-term erosion prevention for post-construction phase of development. All areas previously mentioned, should be maintained to insure not only the aesthetics of the site, but the erosion control aspects as well. Landscaping has been designed to address soil stability and includes generous planting, hydroseeding of exposed slopes, and mulching.

Inspection and Maintenance Program

The project owner is responsible for executing maintenance of landscaping and drainage features. This recorded Maintenance Agreement (between the City of Grover Beach and the Owner provides the enforcement mechanism to ensure compliance with these maintenance requirements.

Owner Responsibilities

1) The property owner will ensure that the permeable pavers and underground storage chambers are operational and maintain drainage toward it's intended designed direction. No ponded water is to remain for more than 72 hours.
2) If landscape activity requires ground disturbance in the landscape areas, ground disturbance is to be kept at a minimum. Erosion and sediment control measures are to be put in place and inspected throughout the rainy season (Oct. 1 – April 30) to prevent soils/silts from entering the permeable pavers, underground storage chambers and/or offsite storm drain system. Mulch, ground cover, or plant material is to be replaced as soon as possible to avoid bare soil from being transported away from the planting areas.
3) Inspections of the underground chambers inlets and outlets, as well as all catch basins throughout the entire site shall be performed prior to the rainy season (Oct. 1 – April 30) and should identify potential problems such as silt build-up inside structures and blockages within conveyance systems.
4) Records of all maintenance activities for a minimum of 5 years prior associated with the storm water control measures are to be documented and retained and be made available to the City upon request. Any deviations from this recommended maintenance are to be documented.
5) Landscape areas are to be inspected at least twice annually for erosion, damage to vegetation, sediment and debris accumulation. Maintenance may include watering during drought periods, reseeding of bare areas, and clearing of debris and blockages.
6) Prior to and after the rainy season (Oct. 1 – April 30), and after rainfall greater than 1.6"/24 hours, inspect the underground chambers, including chambers access as well as the inspection ports for the isolation rows. If needed, remove leaves, litter, and all debris from inlets and outlets. Refer to attached manual for maintenance of the underground isolator row.
7) The underground storage chamber access port is to be inspected every 6-months and/or after any rain event that produces 1.6"/24 hours. If there is silt and debris build up greater than 6" in sump of access port, maintenance will be required. Maintenance is performed by a vacuum truck that will remove silt and debris from bottom of port.
8) To maintain the permeable paver SCM's, every three months (four times a year) street sweepers with vacuum and brushes shall sweep and vacuum the area. This will help clean out the voids and restore permeability. Once a year, prior to the rain season, pressure wash the pavers after the site has been swept and vacuumed and replace gravel between pavers as necessary. Individual pavers or sections can be replaced as necessary.

**Refer to attached maintenance information for Underground Chambers and Permeable Pavers (SCM's 1-2)

Underground Chambers/Permeable Pavers/Planter Box Inspection and Maintenance Checklist

Date: _____Work Order # _____

Type of Inspection: □ post-storm □ annual □ routine □ post-wet season □ pre-wet season

Facility: _____ Inspector(s): _____

Defect	Conditions When Maintenance Is Needed	Inspection Result (0,1, or 2) †	Date Maintenance Performed	Comments or Action(s) taken to resolve issue
Appearance	Untidy			
Trash and Debris Accumulation	Trash, plant litter and dead leaves accumulated on surface.			
Vegetation	Unhealthy plants and appearance.			
Irrigation	Functioning incorrectly (if applicable).			
Inlet	Inlet pipe blocked or impeded.			
Splash Blocks	Blocks or pads correctly positioned to prevent erosion.			
Overflow	Overflow pipe blocked or broken.			
Inspection Ports	Depth of accumulated Silts and Debris			

†Maintenance: Enter 0 if satisfactory, 1 if maintenance is needed and include WO#. Enter 2 if maintenance was performed same day.

These guidelines may be reviewed and amended as needed to address specific conditions for the project. New technology developments and techniques may replace the mitigation measures proposed in this plan if they provide equal or greater efficiency of storm water conveyance. The Owner should examine the effectiveness of each maintenance measure and continue to improve the methods for maximum efficiency of the system. The failure to maintain or the physical removal of any feature described herein is a zoning violation and can result in penalties including, but not limited to fines, property liens, and other actions for enforcement of a civil judgment.

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Save Valuable Land and Protect Water Resources



Isolator® Row O&M Manual

StormTech® Chamber System for Stormwater Management

1.0 The Isolator® Row

1.1 INTRODUCTION

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row is a patented technique to inexpensively enhance Total Suspended Solids (TSS) removal and provide easy access for inspection and maintenance.



Looking down the Isolator Row from the manhole opening, woven geotextile is shown between the chamber and stone base.

1.2 THE ISOLATOR ROW

The Isolator Row is a row of StormTech chambers, either SC-310, SC-310-3, SC-740, DC-780, MC-3500 or MC-4500 models, that is surrounded with filter fabric and connected to a closely located manhole for easy access. The fabric-wrapped chambers provide for settling and filtration of sediment as storm water rises in the Isolator Row and ultimately passes through the filter fabric. The open bottom chambers and perforated sidewalls (SC-310, SC-310-3 and SC-740 models) allow storm water to flow both vertically and horizontally out of the chambers. Sediments are captured in the Isolator Row protecting the storage areas of the adjacent stone and chambers from sediment accumulation.

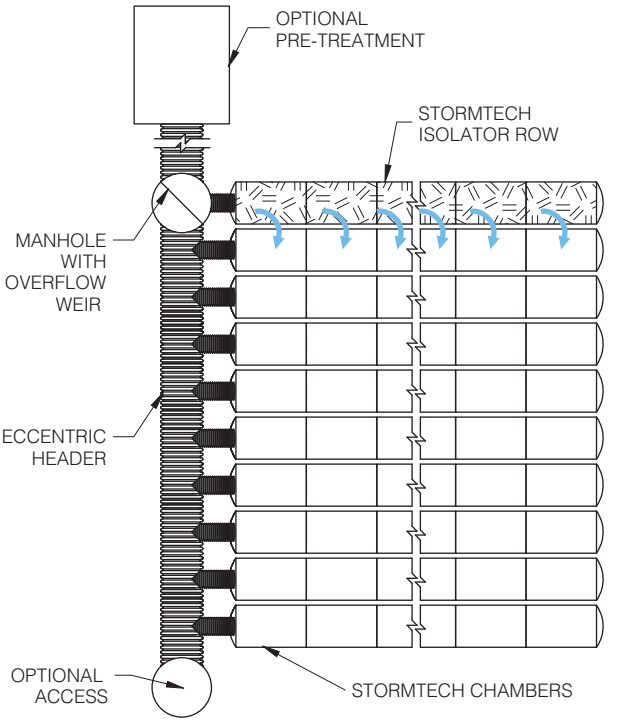
Two different fabrics are used for the Isolator Row. A woven geotextile fabric is placed between the stone and the Isolator Row chambers. The tough geotextile provides a media for storm water filtration and provides a durable surface for maintenance operations. It is also designed to prevent scour of the underlying stone and remain intact during high pressure jetting. A non-woven fabric is placed over the chambers to provide a filter media for flows passing through the perforations in the sidewall of the chamber. The non-woven fabric is not required over the DC-780, MC-3500 or MC-4500 models as these chambers do not have perforated side walls.

The Isolator Row is typically designed to capture the "first flush" and offers the versatility to be sized on a volume basis or flow rate basis. An upstream manhole not only provides access to the Isolator Row but typically includes a high flow weir such that storm water flowrates or volumes that exceed the capacity of the Isolator Row overtop the over flow weir and discharge through a manifold to the other chambers.

The Isolator Row may also be part of a treatment train. By treating storm water prior to entry into the chamber system, the service life can be extended and pollutants such as hydrocarbons can be captured. Pre-treatment best management practices can be as simple as deep sump catch basins, oil-water separators or can be innovative storm water treatment devices. The design of the treatment train and selection of pretreatment devices by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, the Isolator Row is recommended by StormTech as an effective means to minimize maintenance requirements and maintenance costs.

Note: See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row.

StormTech Isolator Row with Overflow Spillway
(not to scale)



2.0 Isolator Row Inspection/Maintenance

2.1 INSPECTION

The frequency of Inspection and Maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the actual frequency of inspection and maintenance practices.

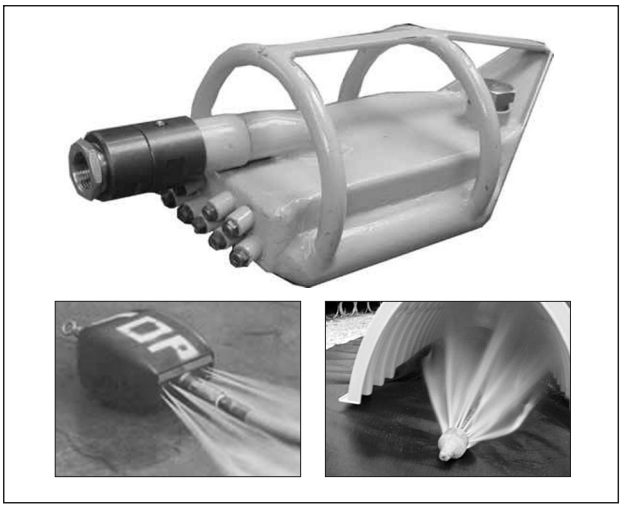
At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

The Isolator Row incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3 inches throughout the length of the Isolator Row, clean-out should be performed.

2.2 MAINTENANCE

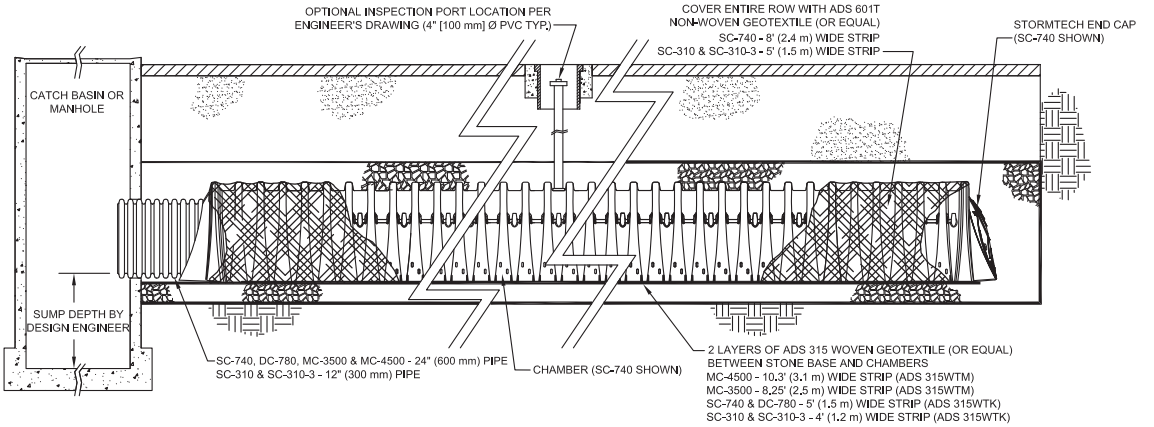
The Isolator Row was designed to reduce the cost of periodic maintenance. By "isolating" sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entries.



Examples of culvert cleaning nozzles appropriate for Isolator Row maintenance. (These are not StormTech products.)

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45" are best. Most JetVac reels have 400 feet of hose allowing maintenance of an Isolator Row up to 50 chambers long. **The JetVac process shall only be performed on StormTech Isolator Rows that have AASHTO class 1 woven geotextile (as specified by StormTech) over their angular base stone.**

StormTech Isolator Row (not to scale)



NOTE: NON-WOVEN FABRIC IS ONLY REQUIRED OVER THE INLET PIPE CONNECTION INTO THE END CAP FOR DC-780, MC-3500 AND MC-4500 CHAMBER MODELS AND IS NOT REQUIRED OVER THE ENTIRE ISOLATOR ROW.

3.0 Isolator Row Step By Step Maintenance Procedures

Step 1) Inspect Isolator Row for sediment

A) Inspection ports (if present)

i. Remove lid from floor box frame

ii. Remove cap from inspection riser

iii. Using a flashlight and stadia rod, measure depth of sediment and record results on maintenance log.

iv. If sediment is at, or above, 3 inch depth proceed to Step 2. If not proceed to step 3.

B) All Isolator Rows

i. Remove cover from manhole at upstream end of Isolator Row

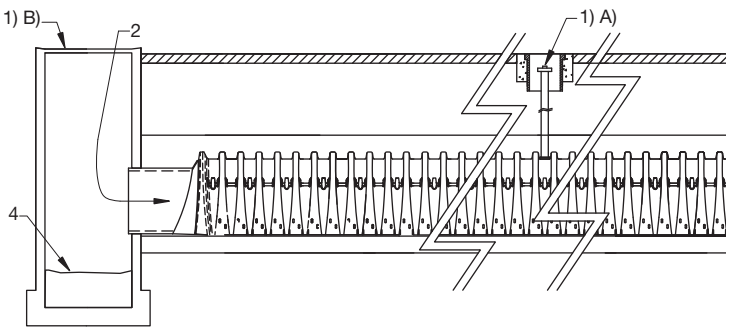
ii. Using a flashlight, inspect down Isolator Row through outlet pipe

1. Mirrors on poles or cameras may be used to avoid a confined space entry

2. Follow OSHA regulations for confined space entry if entering manhole

iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches) proceed to Step 2. If not proceed to Step 3.

StormTech Isolator Row (not to scale)



Step 2) Clean out Isolator Row using the JetVac process

A) A fixed culvert cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable

B) Apply multiple passes of JetVac until backflush water is clean

C) Vacuum manhole sump as required

Step 3) Replace all caps, lids and covers, record observations and actions

Step 4) Inspect & clean catch basins and manholes upstream of the StormTech system

Sample Maintenance Log

Date	Stadia Rod Readings		Sediment Depth (1) - (2)	Observations/Actions	Inspector
	Fixed point to chamber bottom (1)	Fixed point to top of sediment (2)			
3/15/01	6.3 ft.	none		New installation. Fixed point is CI frame at grade	djm
9/24/01		6.2	0.1 ft.	Some grit felt	sm
6/20/03		5.8	0.5 ft.	Mucky feel, debris visible in manhole and in Isolator row, maintenance due	rv
7/7/03	6.3 ft.		0	System jetted and vacuumed	djm

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DRAINAGE STUDY

for

197 WEST GRAND AVENUE
APN 060-203-006 & 060-203-003

Coastal Community Builders, Inc.
330 JAMES WAY
PISMO BEACH, CA
(3/1/2024)

These drainage calculations were done to comply with the City of Grover Beach Development Code Chapter 5.50 “Grading and Drainage”. The 197 West Grande Avenue project will be constructing 23 residential units and 2 commercial units on a 1 acre lot that is currently an existing commercial property. This project proposes to redevelop the property increasing the impervious surface area by 8,201 SF.

Table 1: Existing vs. Proposed impervious area.

	Impervious Area (SF)
Existing	23,000
Proposed	31,201
Net	31,201

This project will result in a net increase of impervious area and as a result will be required to comply with Section 5.50.080 “Drainage Standards”. The net impervious surface area falls above 22,500 SF of net impervious using Table 2. Post-Construction-Related Requirements Regulated Projects and Table 3. Drainage Standards-Retention Requirements the project will be required to comply with Performance Requirement 4 (PR4) and the volume that will need to be retained will be found using the net impervious area (10,140 CF).

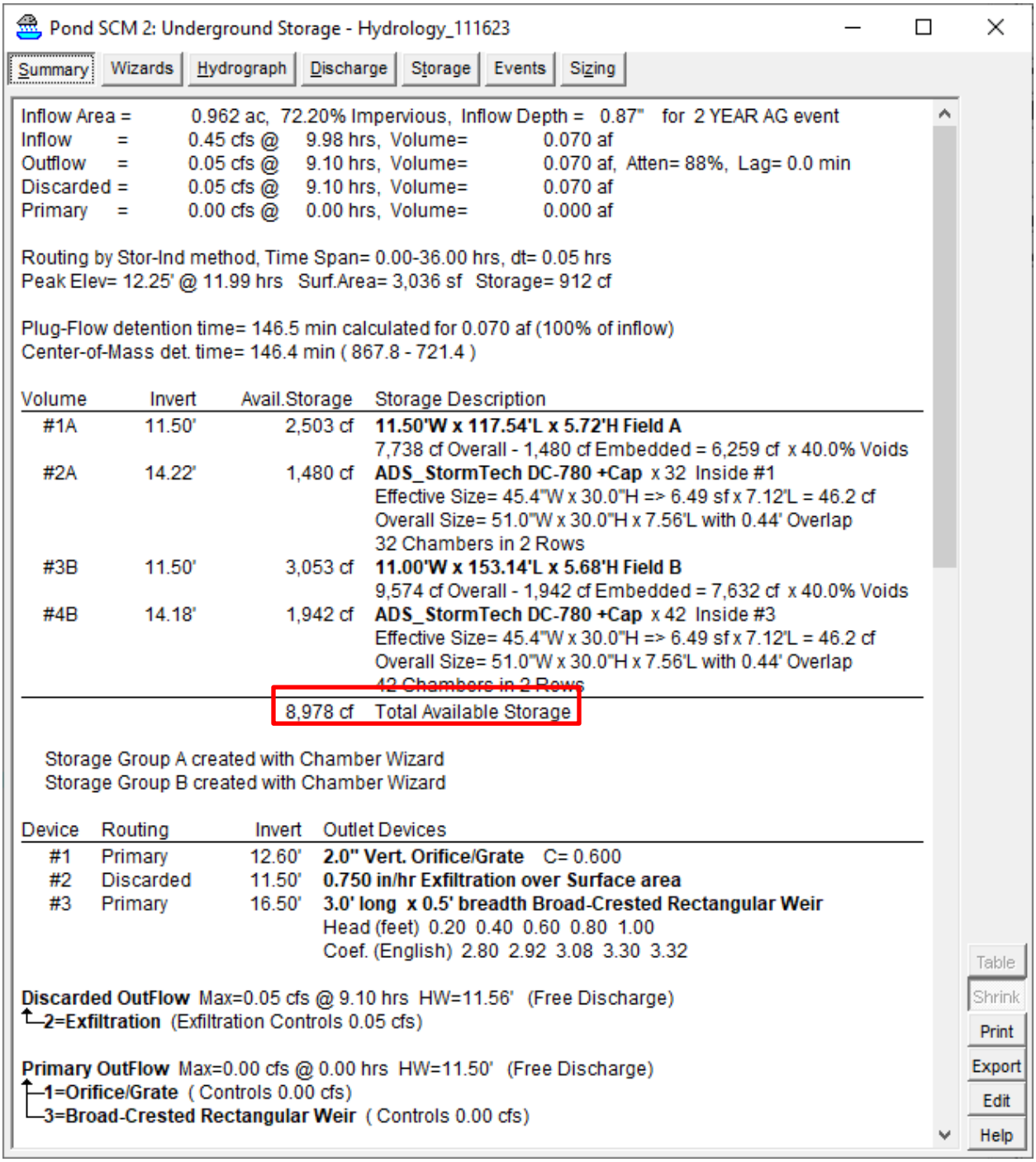
The proposed type of retention will be a series of underground chambers and permeable paver sections that will contain the required volume of stormwater, see Sheet 1 of Preliminary Application Exhibit. The chambers will have an isolator row that is easily accessible from a manhole. This isolator row will assist in capturing and reducing the amounts of Total Suspended Solids (TSS) that flows to the adjacent chambers reducing the amount of maintenance required in the other rows. The chambers will retain a volume of 8,935 CF and will allow this volume of water to infiltrate into the ground acting much like a Low Impact Development Treatment System. The remainder of the required volume storage will be within the permeable paver section for a volume of 1,214 CF.

Conclusion:

The proposed underground chamber system will consist of 76 chambers and the permeable pavers will have a 30 inch section of gravel for 2,024 SF. This will give a cumulative retention volume of 10,189CF, see attached Underground Storage Calculations. The volume and flows were calculated using the software HydroCAD which uses the Santa Barbara Unit Hydrograph method (SBUH). The volume required per Section 5.50.080 is 10,140 CF, refer to attachment for calculations. The proposed volume of chambers will satisfy the volume required per City standards. Also, included in this report is an analysis of pre- vs post- stormwater run-off for the 2-10 year events. see Figures 4 and 5 of attachment.

CALCULATIONS:

Figure 1, available volume within storage chambers.



Pond SCM 2: Underground Storage - Hydrology_111623

Summary | Wizards | Hydrograph | Discharge | Storage | Events | Sizing

Inflow Area = 0.962 ac, 72.20% Impervious, Inflow Depth = 0.87" for 2 YEAR AG event
Inflow = 0.45 cfs @ 9.98 hrs, Volume= 0.070 af
Outflow = 0.05 cfs @ 9.10 hrs, Volume= 0.070 af, Atten= 88%, Lag= 0.0 min
Discarded = 0.05 cfs @ 9.10 hrs, Volume= 0.070 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 12.25' @ 11.99 hrs Surf.Area= 3,036 sf Storage= 912 cf

Plug-Flow detention time= 146.5 min calculated for 0.070 af (100% of inflow)
Center-of-Mass det. time= 146.4 min (867.8 - 721.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	11.50'	2,503 cf	**11.50'W x 117.54'L x 5.72'H Field A** 7,738 cf Overall - 1,480 cf Embedded = 6,259 cf x 40.0% Voids
#2A	14.22'	1,480 cf	**ADS_StormTech DC-780 +Cap** x 32 Inside #1 Effective Size= 45.4"W x 30.0"H => 6.49 sf x 7.12'L = 46.2 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 32 Chambers in 2 Rows
#3B	11.50'	3,053 cf	**11.00'W x 153.14'L x 5.68'H Field B** 9,574 cf Overall - 1,942 cf Embedded = 7,632 cf x 40.0% Voids
#4B	14.18'	1,942 cf	**ADS_StormTech DC-780 +Cap** x 42 Inside #3 Effective Size= 45.4"W x 30.0"H => 6.49 sf x 7.12'L = 46.2 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 42 Chambers in 2 Rows
		8,978 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

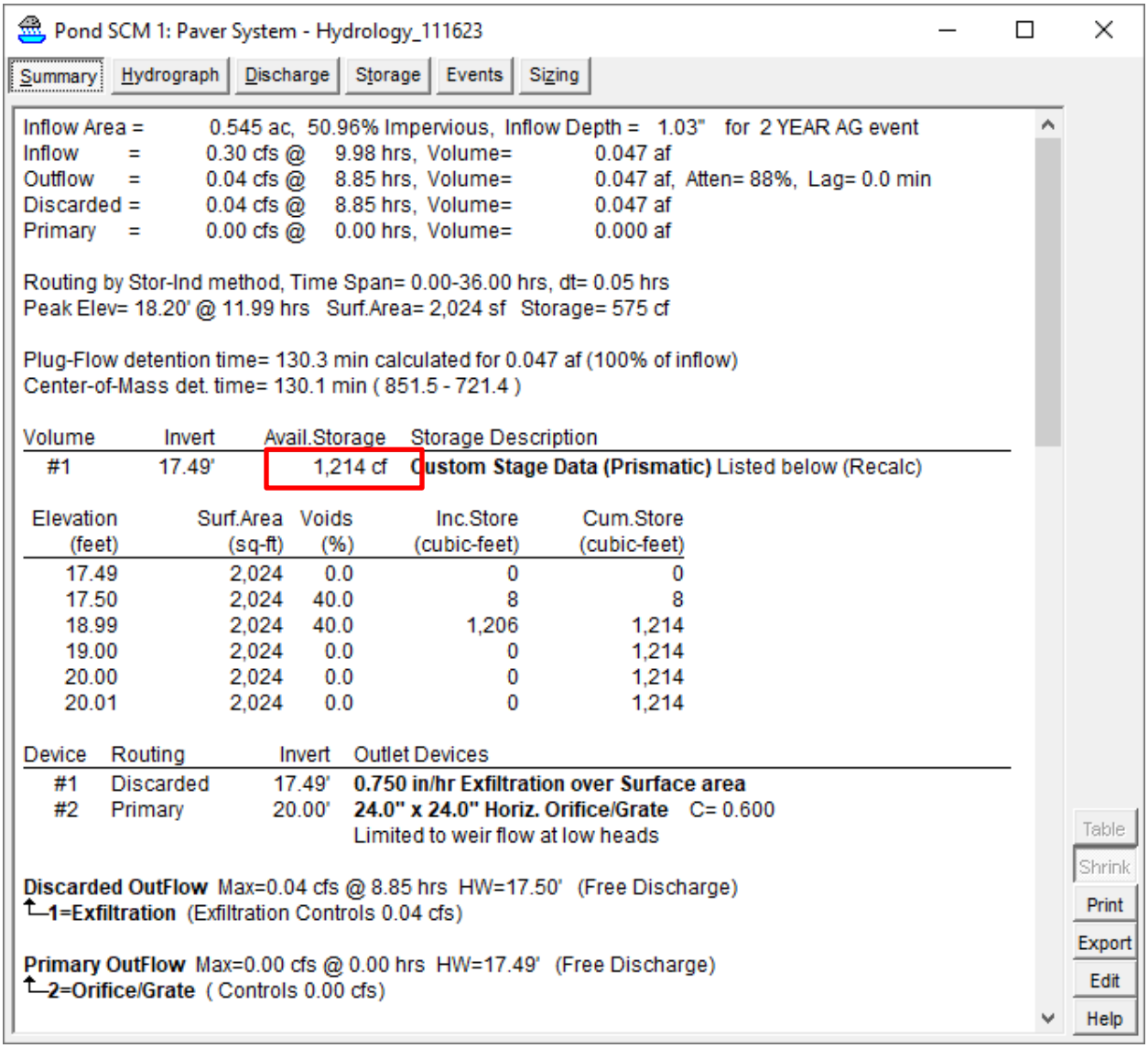
Device	Routing	Invert	Outlet Devices
#1	Primary	12.60'	**2.0" Vert. Orifice/Grate** C= 0.600
#2	Discarded	11.50'	**0.750 in/hr Exfiltration over Surface area**
#3	Primary	16.50'	**3.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Discarded OutFlow Max=0.05 cfs @ 9.10 hrs HW=11.56' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=11.50' (Free Discharge)
├**1=Orifice/Grate** (Controls 0.00 cfs)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Table | Shrink | Print | Export | Edit | Help

Figure 2, available volume within permeable pavers.



Pond SCM 1: Paver System - Hydrology_111623

Summary | Hydrograph | Discharge | Storage | Events | Sizing

Inflow Area = 0.545 ac, 50.96% Impervious, Inflow Depth = 1.03" for 2 YEAR AG event
Inflow = 0.30 cfs @ 9.98 hrs, Volume= 0.047 af
Outflow = 0.04 cfs @ 8.85 hrs, Volume= 0.047 af, Atten= 88%, Lag= 0.0 min
Discarded = 0.04 cfs @ 8.85 hrs, Volume= 0.047 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 18.20' @ 11.99 hrs Surf.Area= 2,024 sf Storage= 575 cf

Plug-Flow detention time= 130.3 min calculated for 0.047 af (100% of inflow)
Center-of-Mass det. time= 130.1 min (851.5 - 721.4)

Volume	Invert	Avail.Storage	Storage Description
#1	17.49'	1,214 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
17.49	2,024	0.0	0	0
17.50	2,024	40.0	8	8
18.99	2,024	40.0	1,206	1,214
19.00	2,024	0.0	0	1,214
20.00	2,024	0.0	0	1,214
20.01	2,024	0.0	0	1,214

Device	Routing	Invert	Outlet Devices
#1	Discarded	17.49'	**0.750 in/hr Exfiltration over Surface area**
#2	Primary	20.00'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.04 cfs @ 8.85 hrs HW=17.50' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.04 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=17.49' (Free Discharge)
2=Orifice/Grate (Controls 0.00 cfs)

Table | Shrink | Print | Export | Edit | Help

The required volume to be retained per Section 5.50.080 is;

$$Net\ Impervious\ area\ (sf) \times 0.325\ ft = Volume\ of\ Onsite\ Drainage\ retention\ required\ (cf)$$

$$31{,}201\ SF \times 0.325\ ft = 10{,}140\ CF$$

The volume required to be retained is 10,140 CF. As seen in Figure 3, the storm chamber system and permeable pavers retains a cumulative volume of 10,247 CF which satisfies the retention requirement.

Figure 3, HydroCAD Model.

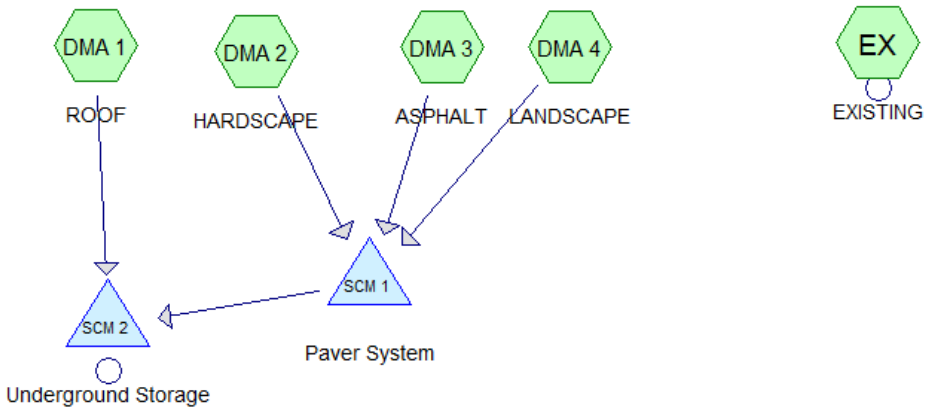


Figure 4, Runoff and Volume Data for the proposed storage chamber system from a 95th percentile storm event.

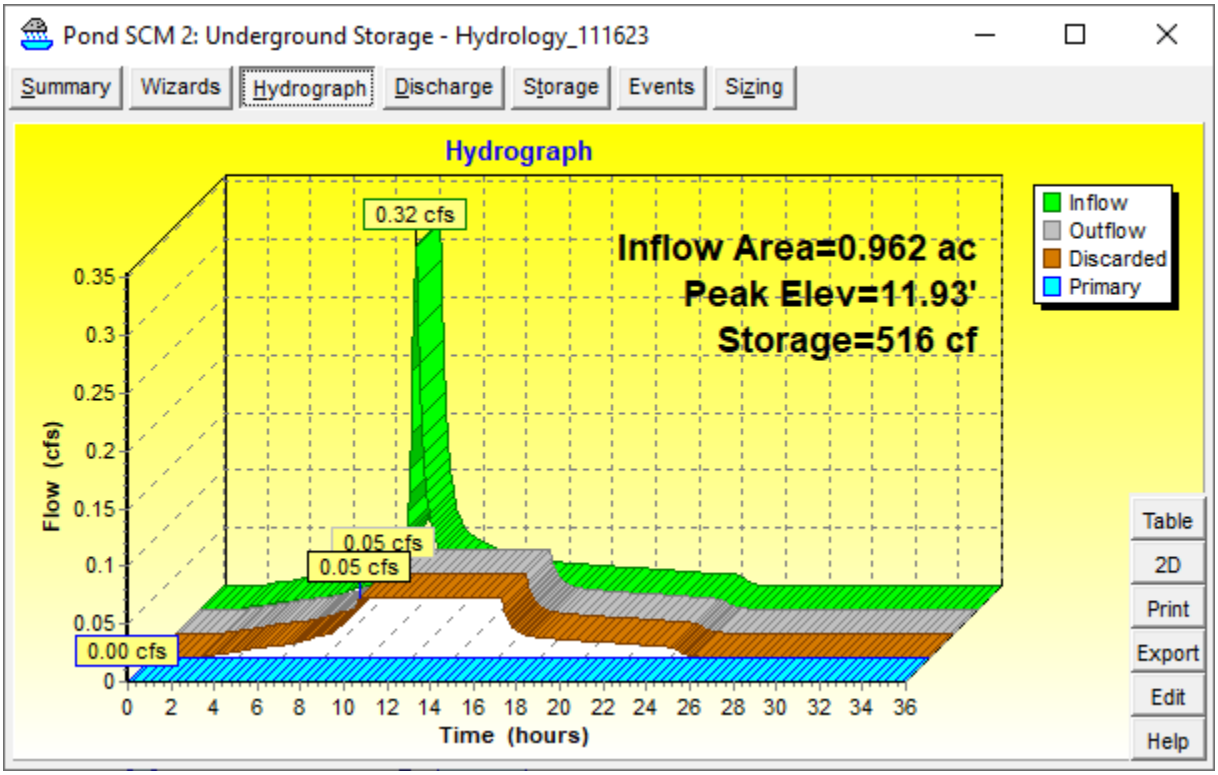
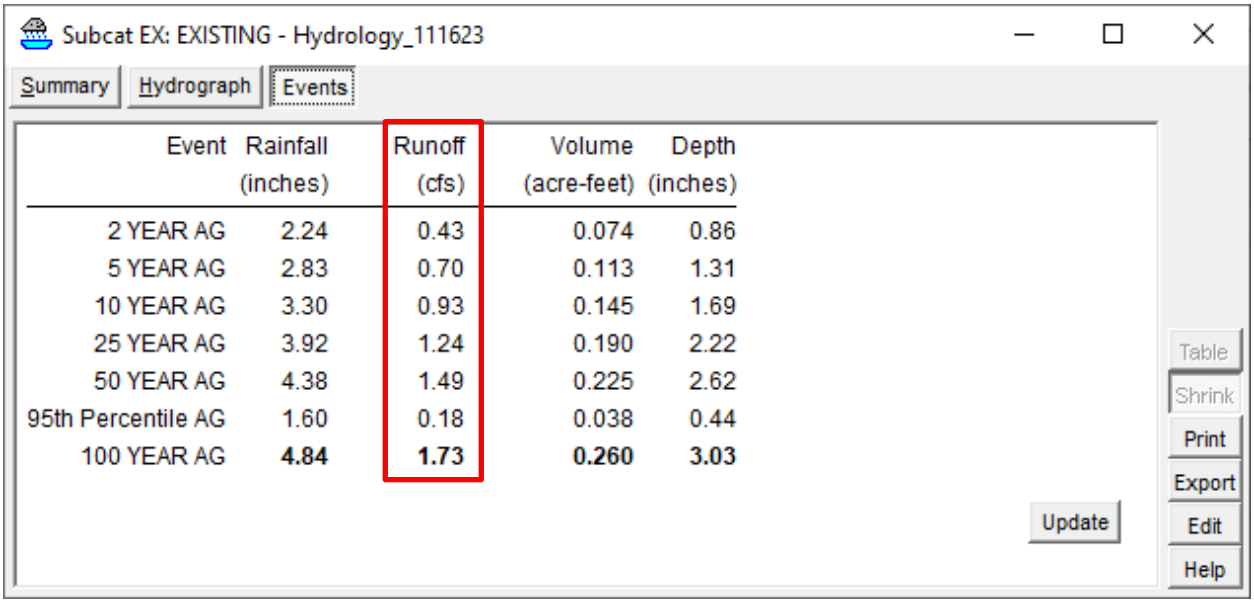
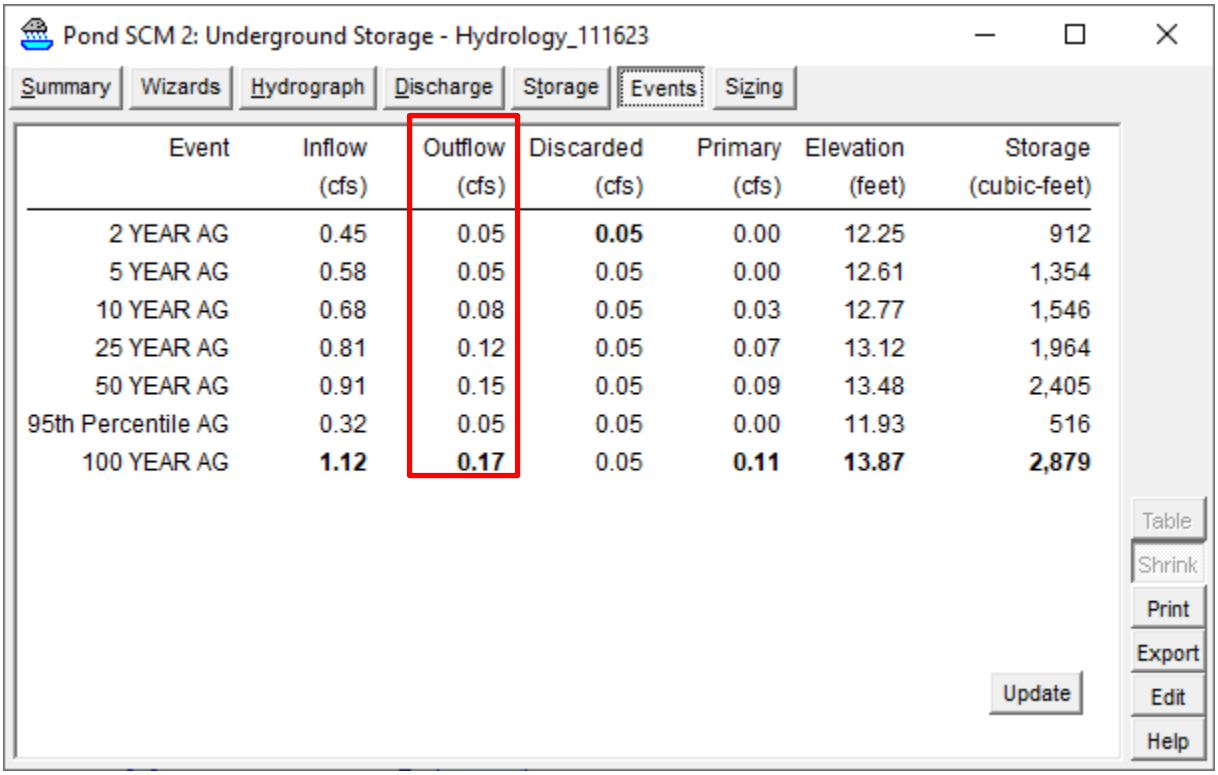


Figure 5, Runoff from existing site for 95th percentile to 100-year storm event.



Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2 YEAR AG	2.24	0.43	0.074	0.86
5 YEAR AG	2.83	0.70	0.113	1.31
10 YEAR AG	3.30	0.93	0.145	1.69
25 YEAR AG	3.92	1.24	0.190	2.22
50 YEAR AG	4.38	1.49	0.225	2.62
95th Percentile AG	1.60	0.18	0.038	0.44
100 YEAR AG	**4.84**	**1.73**	**0.260**	**3.03**

Figure 6, Runoff from proposed chamber systems for 95th percentile to 100-year storm event.



Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (cubic-feet)
2 YEAR AG	0.45	0.05	**0.05**	0.00	12.25	912
5 YEAR AG	0.58	0.05	0.05	0.00	12.61	1,354
10 YEAR AG	0.68	0.08	0.05	0.03	12.77	1,546
25 YEAR AG	0.81	0.12	0.05	0.07	13.12	1,964
50 YEAR AG	0.91	0.15	0.05	0.09	13.48	2,405
95th Percentile AG	0.32	0.05	0.05	0.00	11.93	516
100 YEAR AG	**1.12**	**0.17**	0.05	**0.11**	**13.87**	**2,879**