STORMWATER CONTROL PLAN (SWCP)

FOR

ATASCADERO ROAD HOTEL

June 8, 2018

This Stormwater Control Plan is based on the requirements set forth in the City of Morro Bay's Stormwater Management Guidance Manual for Low Impact Development and Post-Construction Requirements, dated July 1, 2017.

Prepared For:

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B. City of Morro Bay Stormwater Guidance Manual dated July 1, 2017.

(See reference documents on file at the Planning/Building Department).

I. Project Overview

Table 1. Project Overview

Project Name/Permit Number	Atascadero Road Hotel
Project Location	233 Atascadero Road, Morro Bay, CA 93442 APN: 066-332-003, 065-182-003 & 004
Project Phase No.	N/A
Project Type and Description	A hotel, parking stalls and asphalt drive aisles.
Total Project Site Area (acres)	2.0 acres = 88,025 square feet
Total Pre-project Impervious Area (SF)	1,109 square feet
Total New Impervious Area (SF)	69,037 square feet
Total Replaced Impervious Area (SF)	0 square feet
Total Post-Project Impervious Area (SF)	70,146 square feet
Net Impervious Area	69,037 square feet

II. Site Stormwater Assessment

a. Project Description

The project site is located at 233 Atascadero Road in the City of Morro Bay, county of San Luis Obispo. The project consists of one single phase including a hotel, parking stalls and asphalt drive aisles.

b. Existing/Proposed Site Features and Conditions

The existing site an undisturbed lot, with a sparse vegetation cover. The existing site topography is relatively flat with an average slope around 1%, with multiple low spots on the site. Due to the flat nature of the site, runoff has historically remained onsite where it has eventually infiltrated through the soil. The proposed drainage facilities currently consist of a bioretention facility located to the south of the site and two pervious paver areas located in the east and west portions of the site respectively. The underground storage volume component of the bioretention facility is anticipated to be crushed stone underlying the biofiltration soil mix. The bottom of the crushed stone layer is anticipated to be placed at a depth approximately 30 inches below the proposed finished grade. The underground storage component of the pervious paver section consists of concrete pavers underlain by 3 inches of No. 8 aggregate and 30 inches of No. 57 stone.

c. Opportunities and Constraints for Stormwater Control

A limitation in the site design was the existing flat nature of the site. As a result, the project was broken up into three drainage management areas, each treating the required retention volume on its own.

d. Geotechnical Considerations

In general, the surface soils consist of approximately 5 to 8 feet of sandy lean clay. The near surface soils are underlain by medium dense lean clays with gravel to a depth of approximately 14 feet. Free groundwater was encountered at an average depth of approximately 15 feet. However, seasonal groundwater in the project vicinity can become as shallow as 12 feet below existing grade. Infiltration testing was conducted within the project area, and the resulting rates varied from 0.5 to 8.5 inches per hour. To the best of our knowledge the following items are not present within the project area: an impervious area such as bedrock, the presence of unique geology, geotechnical hazards, soil or groundwater contamination, retaining walls, as well as hydrologic features including contiguous natural areas, wetlands, watercourses, seeps or springs. The reader should reference the Project Geotechnical Engineering Investigation for further information (See Reference A).

III. Design Strategy Narrative

a. Optimization of Site Layout

i. Limitation of development envelope

The front, rear, and side building setbacks limited the amount of space to locate buildings.

ii. Preservation of natural drainage features

The existing historical path of drainage has been preserved. Areas near the east and west property lines were left untouched to preserve the existing drainage patterns.

iii. Setbacks from creeks, wetlands, and riparian habitats

There were no setbacks set from creeks, wetlands, and riparian habitats.

iv. Minimization of imperviousness

The design concept for the hotel is to build to the maximum feasible building height and density rather than spreading the building across the site. This presents an opportunity to increase the amount of pervious area. Where possible, landscaped areas or pervious pavers were utilized instead of impervious surfaces.

v. Use of drainage as a design element

Site drainage was taken into account when determining which direction runoff will be dispersed and where the stormwater facilities will be located.

b. Use of Permeable Pavements

Permeable pavements were used where appropriate.

c. Low Impact Development (LID) Measures Used

Stormwater is being controlled using a bioretention basin, and two areas of pervious pavers. The bioretention basin utilizes permeable class II aggregate base to filter and retain storm water. The bioretention area and underlying layer of crushed stone have been sized in accordance with the City of Morro Bay's Stormwater Management Guidance Manual for Low Impact Development and Post-Construction Requirements.

IV. Documentation of Drainage Design

a. List of Performance Requirements that Apply to the Project

Performance Requirements 1 and 2 and 3.

Performance Requirement 1 requires that all projects are designed as to reduce stormwater runoff. The City of Morro Bay's Stormwater Management Guidance Manual for Low Impact Development and Post-Construction Requirements provides a detailed list of design requirements. The Site Design section of the Stormwater Control Plan Application explains how Performance Requirement 1 conditions have been met.

Performance Requirement 2 requires that all projects are designed to adequately manage the stormwater runoff generated from the 85th percentile 24-hour storm event. Per Appendix I in the City of Morro Bay's Stormwater Management Guidance Manual for Low Impact Development and Post-Construction Requirements, this results in a rainfall depth of 1.6 inches. See calculations presented in Appendix A for verification of compliance with Performance Requirement 2.

Performance Requirement 3 requires that all projects within Watershed Management Zone (WMZ) 4 should be designed infiltrate runoff generated by a 95th percentile 24-hour rainfall event. Per Appendix I in the City of Morro Bay's Stormwater Management Guidance Manual for Low Impact Development and Post-Construction Requirements, this results in a rainfall depth of 1.6 inches. See calculations presented in Appendix A for verification of compliance with Performance Requirement 3.

b. Description of each Drainage Management Areas (DMAs)

DMA 1: All site runoff will be safely directed through a combination of storm drain pipe and overland flow to the bioretention basin where it will be treated. The overland flow will travel through a combination of a valley gutter, and slotted curb located at the back of the parking area. Runoff from buildings will be directed away from foundations in a non-erosive manner. See Appendix C for a visual representation.

DMA 2 and 3: All site runoff will be safely directed to the pervious paver areas through overland flow. The stormwater runoff will travel across pavement surfaces and in valley gutters to their destination point. The paver areas have been designed to be as flat as possible to maximize infiltration through the paver structural section. Runoff from buildings will be directed away from foundations in a non-erosive manner. See Appendix C for a visual representation.

DMA Name/ Number	Surface Type	Area (square feet)	Drains [description of area]	Drains to			Notable or Exceptional characteristics or conditions
				Self-retaining/ treating	SCM (Name)	DMA (Name)	
1	Roof/Building	7,511	Roof run off		Bioretention basin		Roof runoff directed to bioretention area via overland flow and storm drain pipes.
1	Hardscape	758	In front of buildings and around ADA access points		Bioretention basin		Hardscape runoff directed to bioretention area via overland flow and storm drain pipes.
1	Asphalt	18,486	Parking area and drive aisles		Bioretention basin		Asphalt runoff directed to bioretention area via overland flow and storm drain pipes.
1	Landscape	7,601	In front of buildings and around parking area		Bioretention basin		Landscape runoff directed to bioretention area via overland flow and storm drain pipes.
2	Roof/Building	6,615	Roof run off		Paver area 1		Roof runoff directed to paver area 1 via overland flow
2	Hardscape	1,617	In front of buildings		Paver area 1		Hardscape runoff directed to paver area 1 via overland flow
2	Asphalt	9.245	Parking area and drive aisles		Paver area 1		Asphalt runoff directed to bioretention area via overland flow and storm drain pipes.
2	Landscape	4,035	In front of buildings		Paver area 1		Landscape runoff directed to paver area 1 via overland flow

3	Roof/Building	7,049	Roof run off		Paver area 2		Roof runoff directed to paver area 1 via overland flow
3	Hardscape	697	In front of buildings		Paver area 2		Hardscape runoff directed to paver area 1 via overland flow
3	Asphalt	17,059	In front of buildings		Paver area 2		Asphalt runoff directed to paver area 1 via overland flow
3	Landscape	4,035	In front of buildings		Paver area 2		Roof runoff directed to paver area 1 via overland flow
Outside of DMA		1,525					
	Total Area	88,025					

c. Construction Details for Stormwater Control Measures

See bioretention basin and pervious paver layout on grading and drainage plan sheet C1.0. Details for the bioretention area and paver structural section have been provided on plan sheets C3.0

d. Summary of Runoff Reduction Measures (PR 1) and Structural Control Measures, by DMA (and entire site)

See Appendix A for explanations on how Performance Requirement 1 conditions have been met.

e. Summary of Calculations Meeting Water Treatment Requirements (PR 2) (Refer to Appendix B)

All projects subject to Performance Requirement 2 must adequately manage the stormwater runoff generated from the 85th percentile 24-hour storm event. The volume of runoff generated from this storm has been calculated in Appendix B.

f. Summary of Calculations Meeting Runoff Retention Requirements (PR 3) (Refer to Appendix B)

All projects subject to Performance Requirement 3 located within WMZ 4 must infiltrate the 95th percentile 24-hour rainfall event. The volume of runoff generated from this storm as well as treatment measures have been calculated in Appendix B.

V. Source Control Measures

a. Site activities and identification of potential sources of pollutants

The anticipated list of pollutant sources along with the source control BMPs have been presented in Table 3 below.

b. Table 3. Pollutant Sources and Source Control Measures Table

Potential Source of runoff pollutants (note DMA)	**Permanent source control BMPs proposed**	**Operational source control BMPs proposed**
On-site storm drain inlets (unauthorized non-stormwater discharges and accidental spills or leaks)	Post signs with prohibitive language and/or graphical icons, which prohibit illegal dumping. Examples include "NO DUMPING - DRAINS TO OCEAN."	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-44, “Drainage

		System Maintenance," in the CASQA Stormwater Quality Handbooks (Industrial and Commercial) 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 and elevator shaft sump pumps	State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.	Inspect and maintain drains to prevent blockages and overflow.
Landscape/ Outdoor Pesticide Use/Building and Grounds Maintenance	State that 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 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 (Industrial and Commercial) at www.casqa.org/resources/bmp-handbooks 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.	
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 (Industrial and Commercial) at www.casqa.org/resources/bmp-handbooks
Miscellaneous Drain or Wash Water or: o Boiler drain lines o Condensate drain lines o Rooftop equipment o Drainage sumps o Roofing, gutters, and trim. o Other sources	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 landscaped 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 metals that may leach into runoff. 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 washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.

VI. Preliminary Stormwater Facilities Operations and Maintenance

a. Ownership and Responsibility for Maintenance in Perpetuity

The owner is committed to execute any necessary agreements. 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.

b. Narrative and Summary of Maintenance Requirements of each Stormwater Facility

The bioretention basin and drainage basin must both be checked regularly to make sure: the vegetation is appropriate and healthy, the areas are free of debris, the inlets and outlets are free of obstructions, the drainage area and slopes leading to the basins are free of debris and sediment, and there is not any trapped sediment in need of removal.

ATTACHMENTS

A. Performance Requirement Determination Form and SWCP Checklists

B. Support Calculations

C. Drainage Management Area (DMA) Exhibits

Attachment A: Performance Requirement Determination Form and SWCP Checklists

APPENDIX C

PERFORMANCE REQUIREMENT DETERMINATION FORM

The following form shall be completed for all development and redevelopment projects. Projects that are exempt from performance requirements are required to complete Sections 1 & 2 only.

Section 1: General Information	
Project name	Atascadero Road Hotel
Project Address	233 Atascadero Road Morro Bay, CA 93442
Assessor's Parcel Number(s)	066-332-003, 065-182-003 & 004
Name of Applicant	Hemant Patel, AZSA Hospitality LLC
Applicant email address:	hemant96@yahoo.com
Applicant phone:	590 Morro Avenue, Morro Bay CA. 93442
Project Type (e.g. single-family residential, commercial, etc.)	commercial
Section 2: Area Information	
Total Project Area	2.02 acres
Total Existing impervious surface area	1109 sf
Proposed Gross Impervious Area (list only the surface areas that are being created or replaced)	69,646 sf
a. Rooftops	21,175 SF
b. Driveways	33,431 SF
c. Patios	3,072 SF
d. Parking Lots	10,859 SF
e. Other	3,072 SF
Total Gross Impervious Area	68,537 SF
If Gross Impervious Area <2,500 ft^2, write "EXEMPT". Otherwise continue to Sec. 3	
Section 3: PR Determination	
Watershed Management Zone (App. B)	Zone 4*
Net Impervious Area (from page 10)	68,537 SF
Performance Requirements (from Flow Charts)	1, 2, 3 (85%=1", 95%=1.6")

APPENDIX K

STORMWATER CONTROL PLAN CHECKLIST

A Stormwater Control Plan (SWCP) prepared by a Professional Engineer is required for all non-exempt projects. A preliminary SWCP is required for Planning Permit approval and a final SWCP shall be required prior to issuance of a Building Permit. The SWCP shall include the following (check all that apply or mark N/A):

Preliminary SWCP for Planning Permit application	COMPLETED
1. Project Information	
a. Project name	x
b. Application number	N/A
c. Address and assessor's parcel number	x
d. Name of Applicant	x
e. Name of Owner	x
f. Project Phase number (if project is being constructed in phases)	N/A
g. Project Type (e.g., commercial, industrial, multi-unit residential, mixed-use, public), and description	x
2. Project Areas	
a. Total project site area	x
b. Total new impervious surface area	x
c. Total replaced impervious surface area	N/A
d. Total new pervious area	x
e. Calculation of Net Impervious Area	x
3. Acknowledgement of the Performance Requirements that apply:	
a. PR No.1 – Site Design and Runoff Reduction	X
b. PR No.2 – Water Quality Treatment	X
c. PR No. 3 – Runoff Retention	X
d. PR No. 4 – Peak Management	N/A
4. Site Assessment Summary	x
5. Summary of Site Design and Stormwater Control Measures selected for the project.	x
6. Location and general configuration of all SCMs used shown on the plans	x

Final SWCP for Building Permit application (all of above plus the following):	COMPLETED
1. List and describe all LID Measures Used	
a. List all site design measure incorporated into the design of the project	x
b. Location and detail for all runoff reduction measures used	x
c. Location and detail for all post-construction structural SCMs	x
2. Summary Table of Runoff Reduction Measures and Structural Stormwater Control Measures, by Drainage Management Area and the entire site	x
3. Supporting Calculations used to comply with the applicable on-site performance requirements	x
4. Documentation demonstrating infeasibility where on-site compliance cannot be achieved	N/A
5. Documentation demonstrating percentage of the project's Equivalent Impervious Surface Area dedicated to retention-based Stormwater Control Measures	x
6. Documentation certifying that the selection, sizing, and design of the Stormwater Control Measures meet the applicable full or partial performance requirements.	x
7. O&M Plan for all structural SCMs to ensure long-term performance	N/A
8. Statement of Compliance: Statement that Performance Requirements has been met on-site, or, if not achievable:	x
a. Documentation of the volume of runoff for which compliance cannot be achieved on-site and the associated off-site compliance requirements.	N/A
b. Statement of intent to comply with Performance Requirements through Alternative Compliance	N/A

Section 1

Performance Requirement No. 1

Site Design and Runoff Reduction

Projects subject to Performance Requirement No. 1 (PR.1) are:

Projects that create and/or replace ≥ 2,500 square feet of impervious surface (collectively over the entire project site), including detached single-family homes.

The Project Engineer shall submit a stamped and signed copy of the Performance Requirement No.1 Certification, as included on the following page; certifying Low Impact Development design strategies are included in the project design. Each strategy that has been incorporated into the design should be initialed by the project engineer, or marked NA if not applicable.

PERFORMANCE REQUIREMENT NO. 1 CERTIFICATION		
	LOW IMPACT DEVELOPMENT (LID) DESIGN STRATEGY	INCORPORATED
1.	Limit disturbance of creeks and natural drainage features.	x
2.	Minimize compaction of highly permeable soils.	x
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.	x
4.	Minimize impervious surfaces by concentrating improvements on the least sensitive areas of the site, while leaving the remaining land in a natural undisturbed state.	x
5.	Minimize stormwater runoff by implementing one or more of the following design measures:	x
	a) Direct roof runoff into cisterns or rain barrels for reuse.	x
	b) Direct roof runoff onto vegetated areas safely away from building foundations and footings.	x
	c) Direct runoff from sidewalks, walkways, and/or patios onto vegetated areas safely away from building foundations and footings.	x
	d) Direct runoff from driveways and/or uncovered parking lots onto vegetated areas safely away from building foundations and footings.	x
	e) Construct bike lanes, driveways, uncovered parking lots, sidewalks, walkways, and patios with permeable surfaces.	x

I, Matthew Walsh, acting as the Project Engineer for Atascadero Road Hotel project, located at 233 Atascadero Road, hereby state that the Site Design and Runoff Reductions design strategies initialed above have been incorporated into the design of the project.

Signature

06/08/2018

Date

Section 2

Performance Requirement No. 2

Water Quality Treatment

Projects subject to Performance Requirement No. 2 (PR.2) are:

Projects with ≥ 5,000 square feet of Net Impervious Area, except detached single-family homes.

Detached single-family homes ≥ 15,000 square feet of Net Impervious Area.

Projects subject to PR.2 are also subject to PR.1. Applicant is required to submit PERFORMANCE REQUIREMENT NO.1 CERTIFICATION.

PR.2 requires the applicant to provide Water Quality Treatment design measures to reduce pollutant loads and concentrations using physical, biological, and chemical removal.

A Stormwater Control Plan is required and must follow the outline provided in Appendix K. The Project Engineer shall identify which of the on-site water quality treatment measures on the following page is included in the design. The on-site water quality treatment measures are listed in order of preference. The plans shall clearly identify the type, location, and size of all on-site water quality treatment measures. Initial each on-site water quality treatment measure and note the page of the plans that shows the location and size, that has been incorporated into the design or mark NA if not applicable. Submit a stamped and signed copy of the PR.2 Certification together with the Stormwater Control Plan.

PERFORMANCE REQUIREMENT NO. 2 CERTIFICATION		
	ON-SITE WATER QUALITY TREATMENT MEASURES	INCORPORATED
1.	Low Impact Development (LID) Treatment Systems designed to retain stormwater runoff generated by the 85th percentile 24-hour storm (see Appendix I). Stormwater Control Measures Implemented (check all that apply, design documentation is required): ☐ Harvesting and Use, ☒ Infiltration, ☐ Evapotranspiration	x
2.	Biofiltration Treatment Systems – with the following design parameters: (1) Maximum surface loading rate appropriate to prevent erosion, scour and channeling within the biofiltration treatment system itself and equal to 5 inches per hour, based on the flow of runoff produced from a rain event equal to or at least 0.2 inches per hour intensity	x
	(2) Follow Central Coast LIDI Bioretention Design Guidance for other parameters. If site conditions warrant, an underdrain with discharge to a storm drainage facility is allowed.	x
3.	Non-Retention Based Treatment Systems – designed to meet at least one of the following hydraulic sizing criteria:	
	(a) Volume Hydraulic Design Basis – Treatment systems whose primary mode of action depends on volume capacity shall be designed to treat stormwater runoff equal to the volume of runoff generated by the 85th percentile 24-hour storm event (see Appendix I)	N/A
	(b) Flow Hydraulic Design Basis – Treatment systems whose primary mode of action depends on flow capacity shall be sized to treat the flow of runoff resulting from a rain event equal to at least 0.2 inches per hour intensity.	N/A
4.	Stormwater Control Plan is required – see Appendix K	X

I, Matthew Walsh, acting as the Project Engineer for Atascadero Road Hotel project, located at 233 Atascadero Road, hereby state that the On-Site Water Quality Treatment Measures initialed above have been incorporated into the design of the project.

Signature

06/08/2018

Date

Section 3

Performance Requirement No. 3

Runoff Retention

Projects subject to Performance Requirement No. 3 (PR.3) are:

Single Family Residential Projects that create and/or replace ≥15,000 square feet of Net Impervious Area and other projects which create and/or replace ≥15,000 square feet of Gross Impervious Area in Watershed Management Zones (WMZ) 1, 2, 4*, 5, 6, 7* 8, 9, and 10*

(* Applicable only to those areas that overlay designated Groundwater Basins.)

PR. 3 requires the applicant to manage Runoff Retention from the site.

Adjustment to PR.3 Requirements for Redevelopment Projects – Where the Project includes replaced impervious surface, the following adjustment applies. This adjustment is accounted for in the Tributary Area calculation in Appendix E:

i) The total amount of replaced impervious surface shall be multiplied by 0.5 when calculating the volume of runoff subject to PR.3 requirements.

The Project Engineer shall certify that the Runoff Retention requirements were included in the design either onsite or through an Alternative Compliance agreement.

Compliance with PR.3:

- Identify WMZ and treatment requirements
- LID Site Assessment Check List
- LID Site Design Measures Certification
- A Stormwater Control Plan is required (see Appendix K) and shall include discrete Drainage Management Areas (DMAs), structural Stormwater Control Measures (SCM), hydraulic sizing calculations, and off-site mitigation.

Design Rainfall Events & Treatment Requirement for WMZs

WMZ	Treatment Options & Design Rainfall	Check Applicable WMZs
WMZ 1	Via Infiltration, prevent offsite discharge from events up to the 95th percentile 24-hour rainfall event as determined from local rainfall data.	
WMZ 2	Via storage, rainwater harvesting, infiltration, and/or evapotranspiration, prevent offsite discharge from events up to the 95th percentile 24-hour rainfall event as determined from local rainfall data.	
WMZ 3	Not Applicable	
WM 4*, 7* & 10*	Via Infiltration, prevent offsite discharge from events up to the 95th percentile 24-hour rainfall event as determined from local rainfall data.	x
WMZ 9	Via storage, rainwater harvesting, infiltration, and/or evapotranspiration, prevent offsite discharge from events up to the 85th percentile 24-hour rainfall event as determined from local rainfall data.	
* Applicable only to those areas that overlay designated Groundwater Basins		

LID Site Assessment Checklist

		Included
1.	Site topography	x
2.	Hydrologic features including contiguous natural areas, wetlands, watercourses, seeps, or springs	N/A
3.	Depth to seasonal high groundwater	
4.	Locations of groundwater wells used for drinking water	x
5.	Depth to an impervious layer such as bedrock	N/A
6.	Presence of unique geology (e.g., karst)	N/A
7.	Geotechnical hazards	N/A
8.	Documented soil and/or groundwater contamination	N/A
9.	Soil types and hydrologic soil groups	x
10.	Vegetative cover/trees	x
11.	Run-on characteristics (source and estimated runoff from offsite which discharges to the project area)	
12.	Existing drainage infrastructure for the site and nearby areas including the location of municipal storm drains	x
13.	Structures including retaining walls	N/A
14.	Utilities	x
15.	Easements	x
16.	Covenants	x
17.	Zoning/Land Use	x
18.	Setbacks	x
19.	Open space requirements	x
20.	Other pertinent overlay(s)	x

LID Site Design Measures

In addition to site design measures listed in PR1, the Project Engineer shall certify the Project design optimizes the use of the following design measures. Initial each runoff retention measure that has been incorporated and optimized into the design or mark NA if not applicable

PERFORMANCE REQUIREMENT NO. 3 CERTIFICATION OF LID SITE DESIGN MEASURES		
	DESIGN MEASURE	INCORPORATED/OPTIMIZED
1.	Defining the development envelope, identifying the protected areas, and identifying areas that are most suitable for development and areas to be left undisturbed	X
2.	Identifying conserved natural areas, including existing trees, other vegetation, and soils (shown on the plans)	X
3.	Limit the overall impervious footprint of the project	X
4.	Design of streets, sidewalks, or parking lot aisles to the minimum widths necessary, provided that public safety or mobility uses are not compromised	X
5.	Set back development from creeks, wetlands, and riparian habitats	X
6.	Design conforms the site layout along natural landforms	X
7.	Design avoids excessive grading and disturbance of vegetation and soils	X

I, Matthew Walsh, acting as the Project Engineer for Atascadero Road Hotel project, located at 233 Atascadero Road, hereby state that LID Site Design Measures initialed above have been incorporated into the design of the project.

Signature

06/08/2018

Date

Attachment B: Support Calculations

Total Site Runoff

Reference Manual: Resolution No. R3-2013-0032 Post-Construction Stormwater Management Requirements For Development Projects In The Central Coast Region dated July 12, 2013, Attachment D Hydrologic Analysis and Stormwater Control Measure Sizing Guidance [excerpts from reference shown in italics below for reference.]

Project:	Morro Bay Hotel
Date:	6/8/2018

Resolution No. R3-2013-0032 - Attachment D: Hydrologic Analysis & Stormwater Control Measure Sizing Guidance

1) Determination of Retention Tributary Area

a) Compute the Retention Tributary Area, using the equation:
Retention Tributary Area = (Entire Project Area) – (Undisturbed or Planted Areas) –(Impervious Surface Areas that Discharge to Infiltrating Areas)***
**As defined in Section B.4.d.iv.1.*
*** As defined in Section B.4.d.iv.2.*
b) Adjustments for Redevelopment Project Retention Tributary Area – Where the Regulated Project includes replaced impervious surface, the following Retention Tributary Area adjustments apply:
i) Redevelopment Projects located outside an approved Urban Sustainability Area, as described in Section C.3. – The total amount of replaced impervious surface area shall be multiplied by 0.5 when calculating the Retention Tributary Area.
ii) Redevelopment Projects located within an approved Urban Sustainability Area, as described in Section C.3 – The replaced impervious surface areas may be subtracted from the Retention Tributary Area. The total amount of runoff volume to be retained from replaced impervious surfaces shall be equivalent to the pre-project runoff volume retained.

Note: Check with local agency to confirm project site is in an approved Urban Sustainability Area (USA) or satisfies the agency's definition of a Redevelopment Project outside of an approved Urban Sustainability Area.

Table 1a. Pre-Development Tributary Areas

Type	Total Site (sf)	Impervious Area (sf)	Pervious Area (sf)
Building			
Pavement		1,109	
Hardscape			
Landscape			86,916
Subtotal		1,109	86,916
Total DMA's	88,025		
Percent Impervious			1.26%
Total Site Area			88,025

Table 1b. Post-Development Tributary Areas

Type	Total Site (sf)	Impervious Area (sf)	Pervious Area (sf)
Building		21,175	
Hardscape		3,072	
Pavement		44,790	
Landscape			17,463
Pervious Pavement			
Subtotal		69,037	17,463
Total DMA's	86,500		
Percent Impervious			79.81%
Total Site Area			86,500

Notes:
(See Hydrology Exhibits Attached)

Total New Impervious =	69,037 sf
Total Replaced Impervious =	1,548 sf

	(Yes or No)								
Standard Project?	YES	Retention Tributary Area =	86,500 *Total Site*	-	17,463 *Landscape/Pervious Areas*				
Redevelopment Project	NO	Retention Tributary Area =	86,500 *Total Site*	-	17,463 *Landscape/Pervious Areas*	-	[0.5 x	1,548	] *Adjustment for Replaced Impervious Area*

Retention Tributary Area =	69,037	square feet

2) Determine Retention Volume

a) Determine applicable rainfall event and corresponding rainfall depth
b) Determine composite runoff coefficient (Composite runoff coefficients = 0.858i^3 - 0.78i^2 + 0.774i + 0.04). (i) is the fraction of the tributary area that is impervious.
c) Compute Retention Volume:
Retention Volume = C x Rainfall Depth x Tributary Area

Performance Requirement No. =	2	3	
Applicable Rainfall Event =	85%	95%	*(The duration for both rainfall events is 24-hours)*
Rainfall Depth =	1	1.6	inches
Composite Runoff Coefficient =	0.63		
Tributary Area =	69,037 sf		
Retention Volume =	3600	5800	cubic feet

STORMWATER CONTROL MEASURE SIZING (DMA 1)

Reference Manual: Resolution No. R3-2013-0032 Post-Construction Stormwater Management Requirements For Development Projects In The Central Coast Region dated July 12, 2013, Attachment D Hydrologic Analysis and Stormwater Control Measure Sizing Guidance [excerpts from reference shown in italics below for reference.]

Project:	Morro Bay Hotel
Date:	6/8/2018

1) Determination of Retention Tributary Area

a) Compute the Retention Tributary Area, using the equation:
Retention Tributary Area = (Entire Project Area) – (Undisturbed or Planted Areas) –(Impervious Surface Areas that Discharge to Infiltrating Areas)***
**As defined in Section B.4.d.iv.1.*
*** As defined in Section B.4.d.iv.2.*
b) Adjustments for Redevelopment Project Retention Tributary Area – Where the Regulated Project includes replaced impervious surface, the following Retention Tributary Area adjustments apply:
i) Redevelopment Projects outside an approved Urban Sustainability Area, as described in Section C.3. – The total amount of replaced impervious surface area shall be multiplied by 0.5 when calculating the Retention Tributary Area.
ii) Redevelopment Projects located within an approved Urban Sustainability Area (Section C.3) – The replaced impervious surface areas may be subtracted from the Retention Tributary Area. The total amount of runoff volume to be retained from replaced impervious surfaces shall be equivalent to the pre-project runoff volume retained.

Note: Check with local agency to confirm project site is in an approved Urban Sustainability Area (USA) or satisfies the agency's definition of a Redevelopment Project outside of an approved Urban Sustainability Area.

Table 1b. Post-Development Tributary Areas

Type	Total Site (sf)	Impervious Area (sf)	Pervious Area (sf)
Building		7,511	
Pavement		18,486	
Hardscape		758	
Open Space			7,601
Subtotal		26,755	7,601
Total DMA's	34,356		
Percent Impervious			77.88%
Non-Contributing*			1,998.81
Total Site Area			36,355

Total New Impervious =	26,755	sf
Total Replaced Impervious =	0	sf

2) Determine Retention Volume

a) Based on the Regulated Project's Watershed Management Zone, determine the Regulated Project's Runoff Retention Requirement (e.g., Retain 95th Percentile 24-hour Rainfall Event, or, Retain 85th Percentile 24-hour Rainfall Event).
b) Determine the 85th or 95th percentile 24-hour rainfall event:
Use either the methodology provided in Part I.D of the December 2009 Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act,9 or, rainfall statistics provided by the Central Coast Water Board, whichever produces a more accurate value for rainfall depth.
c) Compute the Runoff Coefficient "C" for the area tributary to the SCMs, using the equation:
$C = 0.858i^3 - 0.78i^2 + 0.774i + 0.04$
Where "i" is the fraction of the tributary area that is impervious.
d) Compute Retention Volume:
Retention Volume for 95th Percentile 24-hr Rainfall Depth = C x Rainfall Depth 95th x Retention Tributary Area
or,
Retention Volume for 85th Percentile 24-hr Rainfall Depth = C x Rainfall Depth 85th x Retention Tributary Area
All rainfall directly incident to each SCM must be considered in determining runoff, including: tributary landscaping, impervious areas, pervious pavements, and bioretention features.
Note: For redevelopment projects (Section C.3.), the total amount of runoff volume to be retained from replaced impervious surfaces shall be equivalent to the pre-project runoff volume retained.

Note: Projects required to comply with Performance Requirement No. 2: Water Quality Treatment ONLY, shall have LID systems designed to retain stormwater runoff equal to the volume of runoff generated by the 85th percentile 24-hour storm event, based on local rainfall data. Projects required to comply with Performance Requirement No. 3: Runoff Retention shall design to the 85th percentile 24-hour storm event or the 95 percentile 24-hour storm event based on the Watershed Management Zone (WMZ) and underlying groundwater basin conditions.

Performance Requirement No. =	3	*(if Performance Requirement No. 2, design to 85% 24-hour event, otherwise continue with steps to define WMZ)*
Watershed Management Zone =	4	
Site Above Groundwater Basin?	Yes	*(Yes or No)*
Runoff Retention Rainfall Event =	85% 24-hour	*(95% for WMZ=1,2,4*,7*,10*; 85% for WMZ=5,6,8,9; *=N/A if not above groundwater basin)*
Rainfall Depth of Runoff Retention Event =	1.6 inches = 0.133 feet	

$C = 0.858i^3 - 0.78i^2 + 0.774i + 0.04$

where, i = 0.779 *(fraction of impervious tributary area per calculations in Step 1, Table 1b above)*

C = 0.575

Retention Volume Required = 2,051 cubic feet

3) Stormwater Control Measure (SCM) Area Sizing

Does SCM include a subdrain?	NO	*(Yes or No)*				
Depth of rock layer =	18	inches	=	1.5	feet	*(12 inches min.)*
Rock void ratio =	0.25					
Depth of retention stored in rock =		0.375	feet			
Depth of ponding =	6	inches	=	0.5	feet	*(6 inches min.)*
Depth of retention stored in ponding =		0.5	feet	*(zero storage in ponding if subdrains are present)*		

Minimum Area of SCM = Retention Volume / [Depth of retention stored in rock + Depth of retention stored in ponding]

Minimum Area of SCM = 2,344 square feet

4) Time to Infiltrate

Volume Retained =	2051	cf	*(95th percentile 24-hour storm)*
Infiltration Rate =	0.5	in/hr	*(minimum infiltration rate from soils report)*
Time to Drain Completely =	21.0	hr	

SCM will completely drain within 48 hours.

STORMWATER CONTROL MEASURE SIZING (DMA 2)

Reference Manual: Resolution No. R3-2013-0032 Post-Construction Stormwater Management Requirements For Development Projects In The Central Coast Region dated July 12, 2013, Attachment D Hydrologic Analysis and Stormwater Control Measure Sizing Guidance [excerpts from reference shown in italics below for reference.]

Project:	Morro Bay Hotel
Date:	6/8/2018

1) Determination of Retention Tributary Area

a) Compute the Retention Tributary Area, using the equation:
Retention Tributary Area = (Entire Project Area) – (Undisturbed or Planted Areas) –(Impervious Surface Areas that Discharge to Infiltrating Areas)***
**As defined in Section B.4.d.iv.1.*
*** As defined in Section B.4.d.iv.2.*
b) Adjustments for Redevelopment Project Retention Tributary Area – Where the Regulated Project includes replaced impervious surface, the following Retention Tributary Area adjustments apply:
i) Redevelopment Projects outside an approved Urban Sustainability Area, as described in Section C.3. – The total amount of replaced impervious surface area shall be multiplied by 0.5 when calculating the Retention Tributary Area.
ii) Redevelopment Projects located within an approved Urban Sustainability Area (Section C.3) – The replaced impervious surface areas may be subtracted from the Retention Tributary Area. The total amount of runoff volume to be retained from replaced impervious surfaces shall be equivalent to the pre-project runoff volume retained.

Note: Check with local agency to confirm project site is in an approved Urban Sustainability Area (USA) or satisfies the agency's definition of a Redevelopment Project outside of an approved Urban Sustainability Area.

Post-Development Tributary Areas			
Type	Total Site (sf)	Impervious Area (sf)	Pervious Area (sf)
Building		6,615	
Pavement		9,245	
Hardscape		1,617	
Open Space			4,035
Subtotal		17,477	4,035
Total DMA's	21,512		
Percent Impervious			81.24%
Non-Contributing*			1,998.81
Total Site Area			25,547

Total New Impervious =	17,477 sf
Total Replaced Impervious =	0 sf

2) Determine Retention Volume

a) Based on the Regulated Project's Watershed Management Zone, determine the Regulated Project's Runoff Retention Requirement (e.g., Retain 95th Percentile 24-hour Rainfall Event, or, Retain
Note: Projects required to comply with Performance Requirement No. 2: Water Quality Treatment ONLY, shall have LID systems designed to retain stormwater runoff equal to the volume of runoff

Performance Requirement No. =	3	*(if Performance Requirement No. 2, design to 85% 24-hour event, otherwise continue with steps to define WMZ)*
Watershed Management Zone =	4	
Site Above Groundwater Basin?	Yes	*(Yes or No)*
Runoff Retention Rainfall Event =	95% 24-hour	*(95% for WMZ=1,2,4*,7*,10*; 85% for WMZ=5,6,8,9; *=N/A if not above groundwater basin)*

Rainfall Depth of Runoff Retention Event =	1.6	inches	=	0.133 feet

$C = 0.858i^3 - 0.78i^2 + 0.774i + 0.04$

where, i = 0.812 *(fraction of impervious tributary area per calculations in Step 1, Table 1b above)*

C = 0.614

Retention Volume Required = 1,431 cubic feet

3) Stormwater Control Measure (SCM) Area Sizing

Paver surface area =	1382	ft			
Depth of rock layer =	36	inches	=	3 feet	*(12 inches min.)*
Rock void ratio =	0.35				
Depth of retention stored in rock =		1.05 feet			

Minimum Area of SCM = Retention Volume / [Depth of retention stored in rock + Depth of retention stored in ponding]

Volume Retained = 1,451 square feet

4) Time to Infiltrate

Volume Retained =	1431	cf	*(95th percentile 24-hour storm)*
Infiltration Rate =	0.5	in/hr	*(minimum infiltration rate from soils report)*
Time to Drain Completely =	24.9	hr	

SCM will completely drain within 48 hours.

STORMWATER CONTROL MEASURE SIZING (DMA 3)

Reference Manual: Resolution No. R3-2013-0032 Post-Construction Stormwater Management Requirements For Development Projects In The Central Coast Region dated July 12, 2013, Attachment D Hydrologic Analysis and Stormwater Control Measure Sizing Guidance [excerpts from reference shown in italics below for reference.]

Project:	Morro Bay Hotel
Date:	6/8/2018

1) Determination of Retention Tributary Area

a) Compute the Retention Tributary Area, using the equation:
Retention Tributary Area = (Entire Project Area) – (Undisturbed or Planted Areas) –(Impervious Surface Areas that Discharge to Infiltrating Areas)***
**As defined in Section B.4.d.iv.1.*
*** As defined in Section B.4.d.iv.2.*
b) Adjustments for Redevelopment Project Retention Tributary Area – Where the Regulated Project includes replaced impervious surface, the following Retention Tributary Area adjustments apply:
i) Redevelopment Projects outside an approved Urban Sustainability Area, as described in Section C.3. – The total amount of replaced impervious surface area shall be multiplied by 0.5 when calculating the Retention Tributary Area.
ii) Redevelopment Projects located within an approved Urban Sustainability Area (Section C.3) – The replaced impervious surface areas may be subtracted from the Retention Tributary Area. The total amount of runoff volume to be retained from replaced impervious surfaces shall be equivalent to the pre-project runoff volume retained.

Note: Check with local agency to confirm project site is in an approved Urban Sustainability Area (USA) or satisfies the agency's definition of a Redevelopment Project outside of an approved Urban Sustainability Area.

Post-Development Tributary Areas

Type	Total Site (sf)	Impervious Area (sf)	Pervious Area (sf)
Building		7,049	
Pavement		17,059	
Hardscape		697	
Open Space			5,827
Subtotal		24,805	5,827
Total DMA's	30,632		
Percent Impervious			80.98%
Non-Contributing*			1,998.81
Total Site Area			36,459

Total New Impervious =	24,805	sf
Total Replaced Impervious =	0	sf

2) Determine Retention Volume

a) Based on the Regulated Project's Watershed Management Zone, determine the Regulated Project's Runoff Retention Requirement (e.g., Retain 95th Percentile 24-hour Rainfall Event, or, Retain 85th Percentile 24-hour Rainfall Event).
b) Determine the 85th or 95th percentile 24-hour rainfall event:
Use either the methodology provided in Part I.D of the December 2009 Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act,9 or, rainfall statistics provided by the Central Coast Water Board, whichever produces a more accurate value for rainfall depth.
c) Compute the Runoff Coefficient "C" for the area tributary to the SCMs, using the equation:
$C = 0.858i^3 - 0.78i^2 + 0.774i + 0.04$
Where "i" is the fraction of the tributary area that is impervious.
d) Compute Retention Volume:
Retention Volume for 95th Percentile 24-hr Rainfall Depth = C x Rainfall Depth 95th x Retention Tributary Area
or,
Retention Volume for 85th Percentile 24-hr Rainfall Depth = C x Rainfall Depth 85th x Retention Tributary Area
All rainfall directly incident to each SCM must be considered in determining runoff, including: tributary landscaping, impervious areas, pervious pavements, and bioretention features.
Note: For redevelopment projects (Section C.3.), the total amount of runoff volume to be retained from replaced impervious surfaces shall be equivalent to the pre-project runoff volume retained.

Note: Projects required to comply with Performance Requirement No. 2: Water Quality Treatment ONLY, shall have LID systems designed to retain stormwater runoff equal to the volume of runoff generated by the 85th percentile 24-hour storm event, based on local rainfall data. Projects required to comply with Performance Requirement No. 3: Runoff Retention shall design to the 85th percentile 24-hour storm event or the 95 percentile 24-hour storm event based on the Watershed Management Zone (WMZ) and underlying groundwater basin conditions.

Performance Requirement No. =	3	*(if Performance Requirement No. 2, design to 85% 24-hour event, otherwise continue with steps to define WMZ)*
Watershed Management Zone =	4	
Site Above Groundwater Basin?	Yes	*(Yes or No)*
Runoff Retention Rainfall Event =	95% 24-hour	*(95% for WMZ=1,2,4*,7*,10*; 85% for WMZ=5,6,8,9; *=N/A if not above groundwater basin)*
Rainfall Depth of Runoff Retention Event =	1.6 inches = 0.133 feet	

$C = 0.858i^3 - 0.78i^2 + 0.774i + 0.04$

where, i = 0.810 *(fraction of impervious tributary area per calculations in Step 1, Table 1b above)*

C = 0.611

Retention Volume Required = 2,020 cubic feet

3) Stormwater Control Measure (SCM) Area Sizing

Paver surface area =	2430	ft				
Depth of rock layer =	36	inches	=	3	feet	*(12 inches min.)*
Rock void ratio =	0.35					
Depth of retention stored in rock =		1.05	feet			
Minimum Area of SCM =	Retention Volume / [Depth of retention stored in rock + Depth of retention stored in ponding]					
Volume Retained =	**2,552**	**square feet**				

4) Time to Infiltrate

Volume Retained =	2020	cf	*(95th percentile 24-hour storm)*
Infiltration Rate =	0.5	in/hr	*(minimum infiltration rate from soils report)*
Time to Drain Completely =	20.0	hr	

SCM will completely drain within 48 hours.

APPENDIX E

Hydrologic Analysis and Stormwater Control Measure Sizing Guidance

Project site conditions will influence the ability to comply with the Water Quality Treatment and Runoff Retention Performance Requirements. This Appendix provides the acceptable Stormwater Control Measure (SCM) sizing methodology to evaluate runoff characteristics. This guidance provides a simple event-based approach and a runoff routing approach. Both of these approaches are based on sizing for a single-event and avoid the necessity of using calibrated, continuous simulation modeling. The project applicant may use a locally/regionally calibrated continuous simulation-based model to improve hydrologic analysis and SCM sizing.

1) Determination of Retention Tributary Area

Determining the Retention Tributary Area is the basis for calculating the runoff volumes subject to Performance Requirement Number 3. Retention Tributary Area should be calculated for each individual Drainage Management Area to facilitate the design of SCMs for each Drainage Management Area. The generic equation below illustrates how various portions of the site are addressed when determining the Retention Tributary Area. The Retention Tributary Area calculation must also account for the adjustments for Redevelopment Projects subject to Performance Requirement No. 3.

a) Compute the Retention Tributary Area, using the equation:

Retention Tributary Area = (Entire Project Area) – (Undisturbed or Planted Areas) – (Impervious Surface Areas that Discharge to Infiltrating Areas)***

* As defined under Drainage Management Areas 2.a (in Section 3)

** As defined under Drainage Management Areas 2.b. (in Section 3)

a) Adjustments for Redevelopment Project Retention Tributary Area – Where the Regulated Project includes replaced impervious surface, the following Retention Tributary Area adjustments apply:

i) Redevelopment Projects outside an approved Urban Sustainability Area, as described in the Alternative Compliance Section. – The total amount of replaced impervious surface area shall be multiplied by 0.5 when calculating the Retention Tributary Area.

ii) Redevelopment Projects located within an approved Urban Sustainability Area, as described in the Alternative Compliance Section. – The replaced impervious surface areas may be subtracted from the Retention Tributary Area. The total amount of runoff volume to be retained from replaced impervious surfaces shall be equivalent to the pre-project runoff volume retained.

2) Determination of Retention Volume

a) Based on the Regulated Project's Watershed Management Zone, determine the Regulated Project's Runoff Retention Requirement (e.g., Retain 95th Percentile 24-hour Rainfall Event, or, Retain 85th Percentile 24-hour Rainfall Event).

b) Determine the 85th or 95th percentile 24-hour rainfall event (Appendix I)

c) Compute the Runoff Coefficient[3] "C" for the area tributary to the SCMs, using the equation:

$$C = 0.858i^3 - 0.78i^2 + 0.774i + 0.04$$

Where "i" is the fraction of the tributary area that is impervious[4]

d) Compute Retention Volume:

Retention Volume for 95th Percentile 24-hr Rainfall Depth = C x Rainfall Depth$_{95th}$ x Retention Tributary Area

or,

Retention Volume for 85th Percentile 24-hr Rainfall Depth = C x Rainfall Depth$_{85th}$ x Retention Tributary Area

All rainfall directly incident to each SCM must be considered in determining runoff, including: tributary landscaping, impervious areas, pervious pavements, and bioretention features.

Note: For redevelopment projects located within an approved Urban Sustainability Area the total amount of runoff volume to be retained from replaced impervious surfaces shall be equivalent to the pre-project runoff volume retained.

3) Structural Stormwater Control Measure Sizing

The Project engineer shall use structural SCMs that optimize retention and result in optimal protection and restoration of watershed processes, such as Structural Control Measures associated with small-scale, decentralized facilities designed to infiltrate, evapotranspirate, filter, or capture and use stormwater, to address the volumes calculated in 2 (above). Where the Project is within a Watershed Management Zone where infiltration is required, SCM designs that optimize infiltration of the entire Retention Volume is required, to minimize the potential need for off-site mitigation. Various resources provide design guidance for fully infiltrative SCMs including:

- The Contra Costa C.3 Manual
- The City of Santa Barbara LID BMP Manual
- The City of San Diego LID Design Manual, July 2011
- Central Coast LID Initiative Bioretention Design Guidance

[3] As set forth in WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87, (1998), pages 175-178 and based on the translation of rainfall to runoff using a runoff regression equation developed using two years of data from more than 60 urban watersheds nationwide.

[4] As defined in Post-Construction Requirements Attachment D.

a) Calculate SCM Capture Volume – Calculate the required SCM Capture Volume, associated with the Regulated Project's Runoff Retention Requirement, by one of the following methods:

Method 1: Simple Method

SCM Capture Volume = Retention Volume for 95th Percentile 24-hr Rainfall Depth

or,

SCM Capture Volume = Retention Volume for 85th Percentile 24-hr Rainfall Depth

Method 2: Routing Method

Use a hydrograph analysis[5] to determine the SCM Capture Volume needed to retain the Retention Volume for 95th or 85th Percentile 24-hr Rainfall Depth calculated in 2 (above). The SCM Capture Volume shall be based on both the rate of flow from tributary areas into the SCM, and the rate of flow out of the SCM through infiltration into the underlying soil during the rain event. When conducting the hydrograph analysis, adhere to the criteria included in Table 1. The SCM shall be designed such that a single 95th or 85th Percentile 24-hr Rainfall Event will not overflow the SCM.

If the Retention Volume cannot infiltrate within 48-hours, a multiplier of 1.20 shall be applied to the SCM Capture Volume calculated through the routing method.

TABLE 1: Routing Method Criteria

Parameter	Criteria
Hydrograph Analysis Method	National Resources Conservation Service
Pond Routing Method	Storage-indication, unless otherwise justified to be more correct based on site and storage conditions.
Infiltration Rate	Underlying soil saturated infiltration rate, as indicated by on-site testing.
Rainfall Distribution	National Resources Conservation Service Type I[6] or based on local rainfall data
Time of Concentration	No less than 10 minutes
Time Increment	0.10 hour, unless otherwise justified to be more correct based on rainfall distribution

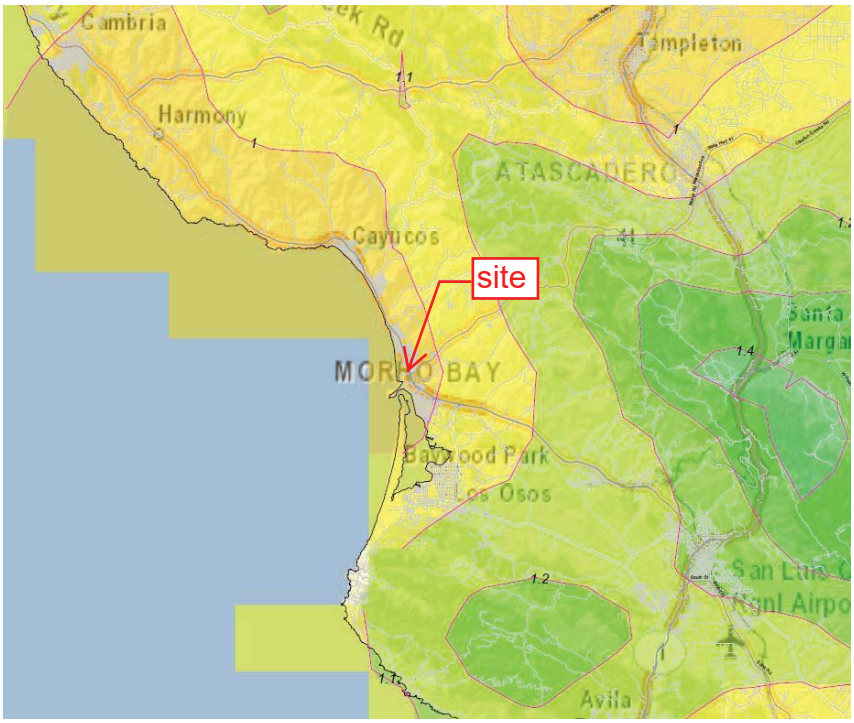
[5] HydroCAD is an example of a commonly used and widely accepted program for performing hydrograph analyses and design of stormwater infrastructure. HydroCAD is based on U.S. Department of Agriculture Soil Conservation Service's (now Natural Resources Conservation Service) TR-55: Urban Hydrology for Small Watersheds.

[6] The National Resources Conservation Service developed standard 24-hour rainfall distributions for hydrograph analyses. These rainfall distributions were intended to represent intensities associated with shorter duration storms, ranging from durations of 30 minutes to 12 hours. The National Resources Conservation Service Type 1 storm applies to the California West Coast, including the Central Coast Region. The Type 1 rainfall distribution was derived using National Oceanic Atmospheric Administration Atlas 2 rainfall statistics for the 1-year through 100-year storm.

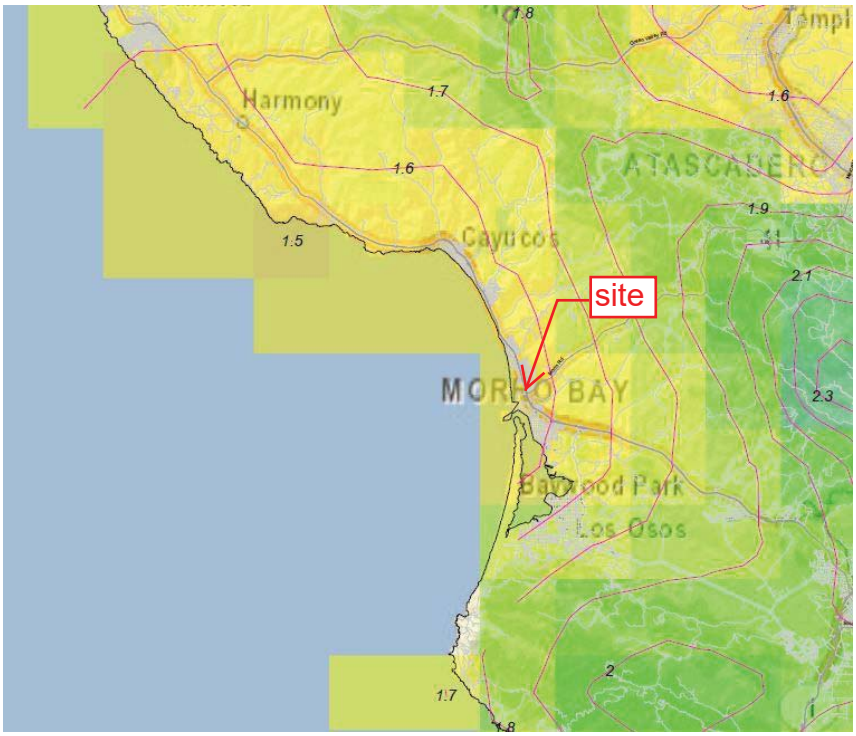
b) Demonstration of Compliance – Project engineer shall demonstrate that site SCMs: a) will infiltrate and/or evapotranspirate the Retention Volume or, b) will provide sufficient Capture Volume to retain the Retention Volume. Any outlet (i.e., underdrain) installed in a structural SCM shall be installed above the elevation of any portion of the structural SCM dedicated to Retention Volume storage.

Compliance with Water Quality Treatment Performance Requirement – Projects that propose to use the retention-based structural Stormwater Control Measures, shall also meet the Water Quality Treatment Performance Requirement, and demonstrate in the Stormwater Control Plan, that the Water Quality Treatment Performance Requirement is being fully met.

APPENDIX I
85th and 95th Percentile 24-hr Rainfall Depth Maps

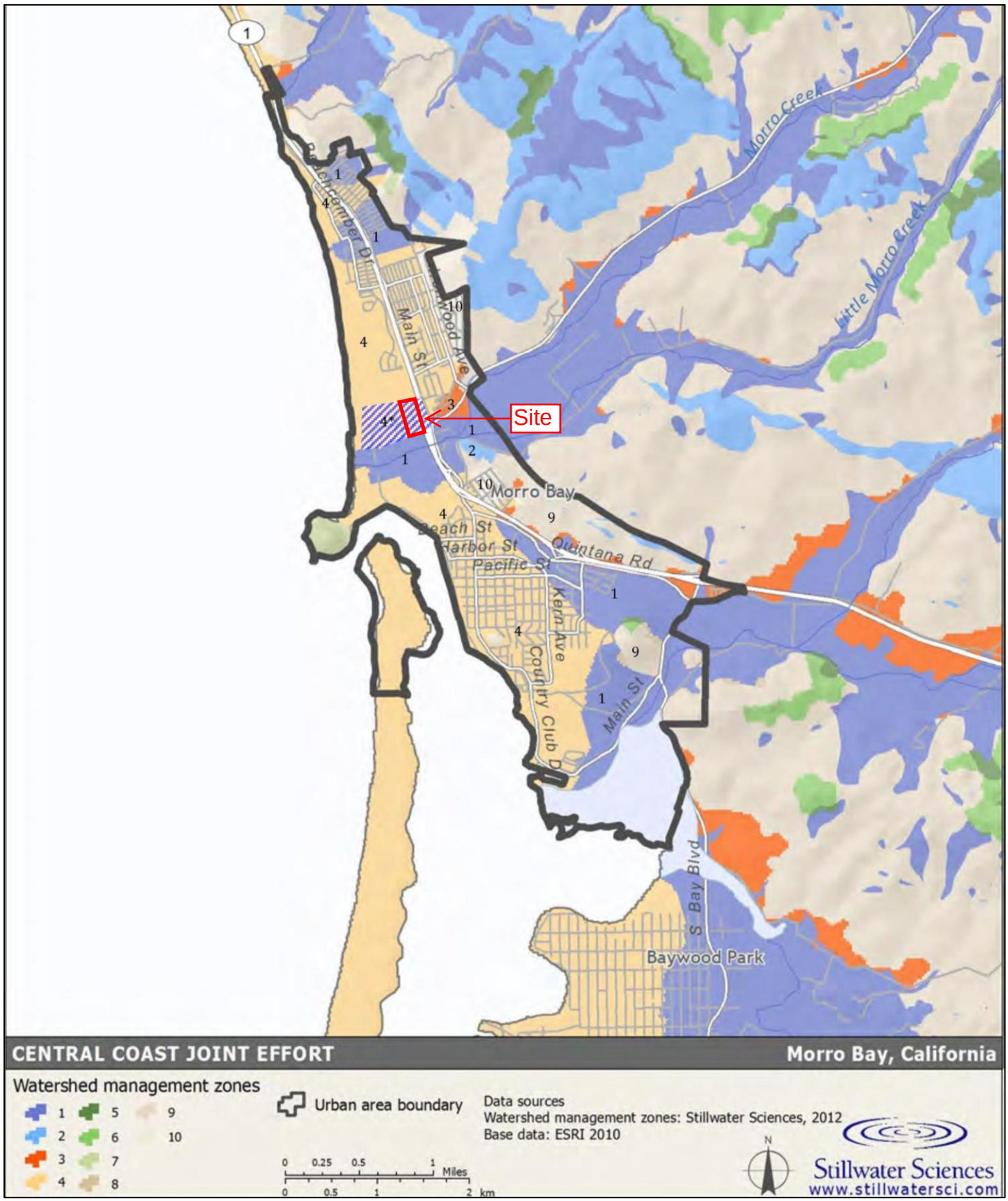


85th Percentile



95th Percentile

APPENDIX B
WATERSHED MANAGEMENT ZONES



Attachment C: Drainage Management Area (DMA) Exhibits

PROPERTY : 1
88,025 SF
2.02 AC

GENERAL LEGEND

- LIMIT OF TRIBUTARY AREA
- BUILDING/ROOF
- HARDSCAPE
- ASPHALT
- LANDSCAPE/PERVIOUS AREA
- PERVIOUS PAVEMENT
- BIO-RETENTION AREA
- ONSITE AREA OUTSIDE OF TRIBUTARY AREA
- DIRECTION OF SURFACE FLOW
- DIRECTION OF PIPE FLOW

DMA SITE AREAS	
SURFACE TYPE	DMA 1
BUILDING/ROOF	0 SF
HARDSCAPE	0 SF
ASPHALT	1,109 SF
LANDSCAPE/PERVIOUS AREAS	86,916 SF
TOTAL AREA	88,025 SF

NO.	DATE	REVISIONS
1		
2		
3		
4		

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233 ATASCADERO ROAD, MORRO BAY, CA 93442

REGISTERED PROFESSIONAL ENGINEER
MATTHEW R. WALSH
C 79026
CIVIL
STATE OF CALIFORNIA

DESIGNED BY: DAP
DRAFTED BY: DAP
CHECKED BY: MRW
DATE: 06/08/18

PRE DEVELOPMENT HYDROLOGY EXHIBIT

SHEET
1 OF 2

saved: 6/11/2018, plotted: 6/11/2018, path: s:\projects_eng\2018250_morro_bay_hotel_atascadero_rd\drawings\hydrology exhibit.dwg

PAVER AREA 1

DMA 2

DMA 1

DMA 3

PROPERTY : 1
88,025 SF
2.02 AC

BIORETENTION BASIN

PAVER AREA 2

GENERAL LEGEND

- LIMIT OF TRIBUTARY AREA
- BUILDING/ROOF
- HARDSCAPE
- ASPHALT
- LANDSCAPE/PERVIOUS AREA
- PERVIOUS PAVEMENT
- BIO-RETENTION AREA
- ONSITE AREA OUTSIDE OF TRIBUTARY AREA
- DIRECTION OF SURFACE FLOW
- DIRECTION OF PIPE FLOW

DMA SITE AREAS

SURFACE TYPE	AREA DRAINING TO BIORETENTION BASIN (DMA 1)	AREA DRAINING TO PERVIOUS PAVER AREA 1 (DMA 2)	AREA DRAINING TO PERVIOUS PAVER AREA 2 (DMA 3)	TOTAL
BUILDING/ROOF	7,511 SF	6,615 SF	7,049 SF	21,175 SF
HARDSCAPE	758 SF	1,617 SF	697 SF	3,072 SF
ASPHALT	18,486 SF	9,245 SF	17,059 SF	44,790 SF
LANDSCAPE/PERVIOUS AREAS	7,601 SF	4,035 SF	5,827 SF	17,463 SF
AREA OUTSIDE OF TRIBUTARY AREA	–	–	–	1,525 SF
TOTAL AREA	33,143 SF	21,512 SF	30,632 SF	88,025 SF

NO.	DATE	REVISIONS
1		
2		
3		
4		

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C 79026
CIVIL
STATE OF CALIFORNIA

DESIGNED BY: DAP
DRAFTED BY: DAP
CHECKED BY: MRW
DATE: 06/08/18

POST DEVELOPMENT HYDROLOGY EXHIBIT

SHEET
2 OF 2