

Appendix F

Stormwater Control Plan

Storm Water Control Plan

For

Lakshmi Hotel Partners, Inc.

2102 N. Fremont

Parcel "B", Volume 10, Parcel Maps, Page 86

APN 013-112-045

Monterey

Job #19-100

November 9, 2020

Owner:

Lakshmi Hotel Partners, Inc.

4258 Cesar Chavez Street

San Francisco, CA 94131

Prepared by:

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Monterey Bay Engineers, Inc.

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- A. Existing & Proposed Condition Exhibit
- B. Drainage Management Area
- C. Civil Improvement Plan / Storm Water Disposal
- D. StormTech Isolator Row O&M Manual

I. Project Data

Table 1. Project Data

Project Name / Number	Lakshmi Hotel Partners, Inc.
Application Submittal Date [to be verified by municipal staff]	
Project Location [street address if available, or intersection and/or APN]	2101 N. Fremont, Monterey APN 013-012-045
Name of Owner or Developer	Lakshmi Hotel Partners, Inc.
Project Type and Description	Commercial Redevelopment 4-Story Hotel with parking lot
Total Project Site Area (acres)	0.58 (total including public streets)
Total New Impervious Surface Area [Sum of currently pervious areas that will be covered with new impervious surfaces]	1,505 s.f.
Total Replaced Impervious Surface Area [Sum of currently impervious areas that will be covered with new impervious surfaces.]	20,956 s.f. → Tier 3
Total Pre-Project Impervious Surface Area	23,245 s.f.
Total Post-Project Impervious Surface Area	22,461 s.f.
Net Impervious Area	N/A
Watershed Management Zone(s)	Zone 1 – Monterey Urban Area
Design Storm Frequency and Depth	95% - 1.2"
Urban Sustainability Area	NA

II. Setting

II.A. Project Location and Description

The project site is located on the northeast corner of North Fremont Street and Casa Verde Way in the City of Monterey. The project is zoned “Visitor Accommodating Facility.” The north project boundary is adjacent to residential apartments, and the east side of the property is “Planned Community.” Casa Verde Way is sloped steeply (>9%) to the north. Shasta Avenue is sloped at greater than 5% towards Contra Costa Street to the west. North Fremont Street is a 100’ wide commercial avenue with curb, gutter & sidewalk improvements. Casa Verde Way is a 50’ public street with curb, gutter & sidewalk improvements.

II.B. Existing Site Features and Conditions

The total project site area includes 25,267 s.f. The adjacent public streets are fully improvement with concrete curbs, gutter & sidewalks, and a municipal storm drain system.

Private Property – The total project site is 25,267 s.f. parcel. The project property is already fully developed with a restaurant, motel rooms, offices, and parking lot. There is not a current geotechnical report for the project, but the underlying soil is likely native soil over decomposed granite with low percolation rates for storm water.

II.C. Opportunities and Constraints for Stormwater Control

The underlying native soil will likely have low percolation ability for stormwater disposal. The property slopes steeply from south to north, and toward the adjacent parking complex. There is approximately 14’ of elevation difference across the property.

This is an infill redevelopment project that must match the existing grades at the property perimeter.

III. Low Impact Development Design Strategies

III.A. Optimization of Site Layout

III.A.1. Limitation of development envelope

The existing property is already fully developed for motel use. The property is surrounded by medium to high density residential properties. The business redevelopment must evaluate the requirements for vehicle parking and the loss of usable area for landscaping and bioswales, and the on-going maintenance required for various storm water treatment methods.

III.A.2. Preservation of natural drainage features

There are no drainage features on the project site. The site is graded to direct all surface water off the property to the railroad right-of-way.

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

N/A

III.A.4. Minimization of imperviousness

The landscaping and impervious surfaces on the project property will be increased by approximately 1,400 s.f.

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

The landscape areas on the south side of the property (adjacent North Fremont Street) shall be graded to detain rain water. This landscaping area is on the highest elevation of the property, and not suitable for additional storm water disposal. Introducing additional storm water on the north side of the new hotel building may also create problems with drainage around the new basement walls.

Roof storm water will be collected by rain gutters and downspouts, then directed to a retention/disposal system north of the project building.

III.B. Use of Permeable Pavement

Opportunities for permeable paving are limited with this project.

III.C. Dispersal of Runoff to Pervious Areas

The proposed landscape areas around the perimeter of the property will be graded to be self-retaining. This landscaping area is on the highest elevation of the property, and not suitable for additional storm water disposal.

III.D. Stormwater Control Measures

This project replaces/creates over 15,000 s.f. of surface area, but less than 22,500 s.f. Therefore it must comply with Tier 3 requirements.

There are storm drain inlets on the property that convey surface water from the parking lots to the public streets. The existing connections for site water to the municipal storm drain system will be removed. Roof water from the existing buildings discharge storm water to the surrounding hardscape surfaces.

The strategy proposed to meet the required storm water treatment will be to connect roof water from the new building and parking lot to a series of underground infiltration chambers. The underground infiltrators will provide approximately 965 cubic feet of water retention. Overflow from the storm drain infiltrators will surface flow to adjacent landscaping, with overflow from landscaping to sidewalk underdrains on Casa Verde Way. This treatment area is in excess of 5% of the total disturbed surface, including public right-of-way. The storage volume in the infiltrator chambers is also in excess of the Tier 3 requirements.

Self-retaining landscaped areas along the street frontages are many times larger than the adjacent impervious concrete walkways.

IV. Documentation of Drainage Design

IV.A. Descriptions of each Drainage Management Area

IV.A.1. Table of Drainage Management Areas

DMA Name	Surface Type	Area (square feet)
Building	Building roof	6,640 s.f.
Frontage	Concrete	1,598 s.f.
Landscape	Landscaping	2,233 s.f.
Parking	Asphalt / Concrete	14,474 s.f.
Overflow	Landscaping	322 s.f.

IV.A.2. Drainage Management Area Descriptions

DMA Building, totaling 6,640 s.f. is the roof of the new building. DMA Building is collected by rain gutters and down spouts, and discharges to underground infiltrators for storm water retention, with overflow to DMA Overflow.

DMA Frontage, totaling 1,598 s.f., is the frontage driveway approaches, concrete walks, and areas adjacent to property lines (with minimal widths) that can not be back-flowed into the property. DMA Frontage will drain to the public right-of-ways.

DMA Landscape, totaling 2,233 s.f., is the pervious landscaped areas around the proposed building and at the exterior edges of the parking lot. Most of the landscape areas are adequate for self-retention, but are located behind the top of retaining walls and basements, and not appropriate for excessive water disposal.

DMA Parking, totaling 14,474 s.f., is the asphalt/concrete parking and walkway improvements of the new parking lot. Surface water from DMA Parking drains to an onsite collection system that discharges to underground infiltrators for storm water retention. Overflow from the onsite detention will surface flow to DMA Overflow.

DMA Overflow, totaling 322 s.f., is the landscaped area that accepts overflow water from the underground infiltrators.

IV.B. Tabulation and Sizing Calculations

IV.B.1. Information Summary for LID Facility Design

Total Project Area (square feet)	0.58 acres 25,267 s.f.
Design Storm Depth	1.2 inches (95% storm)
Applicable Requirements	Tier 3

IV.B.2. Self-Treating / Self-Retaining Areas

DMA Name	Area (square feet)
Landscape	2,233 s.f.
Overflow	322 s.f.

IV.B.3. Areas Draining to Self-Retaining Areas - N/A

IV.B.4. 95% Storm Storage Volume (Tier 3 Projects)

DMA Name	Area (square feet)	Surface Type	Runoff factor	Area x Runoff Factor [A]	SCM Name		
					MC-3500 Infiltrator Chambers		
Building	6,640	Building Roof	1.0	6,640	95% Storm Depth (inches)	Minimum Retention Volume (c.f.)	Proposed Retention Volume (c.f.)
Parking	14,474	Concrete / Asphalt	1.0	14,474			
* Volume Reduction	20,956	Various	0.5	-10,478			
Total →				10,636	1.2"	1,064	1,140 **

*50% reduction for replaced impervious area in accordance with Attachment 1, B.4)b)i)

**6 MC-3500 chambers @ 175 c.f. each = 1,050 c.f.
 2 MC-3500 end caps @ 45.1 c.f. each = 90.2 c.f.
 Total = 1,140 c.f.

V. Source Control Measures

V.A. Site activities and potential sources of pollutants

The site will be used for automobile service and repair.

V.B. Source Control Table

Potential Source of runoff pollutants	Permanent source control BMP's	Operational source control BMP's
A.1. On-site storm drain inlets (unauthorized non-stormwater discharges and accidental spills or leaks)	<ul style="list-style-type: none"> ◆ Mark all inlets with the words “No Dumping! Flows to Bay” or similar 	<ul style="list-style-type: none"> ◆ Maintain and periodically repaint or replace inlet marking ◆ Provide stormwater pollution prevention information to new site owners, lessees, or operators. ◆ See applicable operational BMP's in Fact Sheet SC-44, “Drainage System Maintenance,” in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
A.2. On-site storm drain inlets (cleaning and maintenance)	<ul style="list-style-type: none"> ◆ Install a silt/oil trap in the storm water drop inlet immediately prior to conveying water to the underground infiltrator chambers. ◆ Install a storm drain manhole at the end of the StormTech infiltrator Isolation Row. The base of the manhole shall be 24” minimum below the outlet pipe to the infiltrator chambers. 	<ul style="list-style-type: none"> ◆ Inspect all storm drain drop inlets and manholes prior to the start of the rainy season and periodically during rain events. ◆ Clean storm drain drop inlets of any accumulated silt / oil when indicated at any inspection. ◆ Clean storm drain manhole at the end of the StormTech infiltrator Isolation Row of any accumulated silt when indicated at any inspection.
A.3. Storm Drain Infiltrator Chambers	<ul style="list-style-type: none"> ◆ Install storm drain infiltrator chambers for the disposal of surface water from the parking lot. ◆ Per City of Sand City requirements, all storm water from a 10-year storm event shall be retained of and disposed of on the project site. 	<p>If entry into the manhole is required, please follow local and OSHA rules for confined space entries.</p> <ul style="list-style-type: none"> ◆ Prior to the start of the rainy season, inspect Isolator Row for sediment via the storm drain manhole and inlet pipe and the inspection ports.

		<ul style="list-style-type: none"> ◆ Clean out the Isolator Row using the JetVac process. Provide stormwater pollution prevention information to new site owners, lessees, or operators. ◆ See the Isolator Row O&M Manual and the Design Manual published by StormTech.
B. Interior floor drains and elevator shaft sump pumps	◆ Interior floor drains and elevator sumps will be plumbed to the sanitary sewer	◆ Inspect and maintain drains to prevent blockages and overflow
C. Interior parking garages	◆ Parking garage floor drains will be plumbed to the sanitary sewer	◆ Inspect and maintain drains to prevent blockages and overflow
D.1. 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
D.2. Landscape / Outdoor Pesticide Use / Building and Grounds Maintenance	<p>Final landscape plans will accomplish the following:</p> <ul style="list-style-type: none"> ◆ 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 ◆ Where landscaped areas are used to retain or detain stormwater ◆ Consider using pest-resistant plants, especially adjacent to hardscape ◆ Select plants appropriate to the site soil, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency and plant interactions 	<ul style="list-style-type: none"> ◆ Maintain landscaping using minimum or no pesticides ◆ See applicable BMP's in Fact Sheet SC-41, "Building and Grounds Maintenance" in the CASQA Stormwater Quality Handbook at www.cabmphandbooks.com ◆ Provide IPM information to new owners, lessees and operators

<p>G. Refuse areas</p>	<ul style="list-style-type: none"> ◆ The designated dumpster areas will be covered, graded and paved to prevent run-on ◆ Any drains from dumpsters, compactors, and tallow bin areas shall be connected to sanitary sewer ◆ Post signs on or near the dumpsters with the words “Do not dump hazardous materials here,” or similar 	<ul style="list-style-type: none"> ◆ Provide adequate number of receptacles. ◆ Inspect receptacles regularly and 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 applicable BMP’s in Fact Sheet SC-34, “Waste Handling and Disposal” in the CASQA Stormwater Quality Handbook at www.cabmphandbooks.com
<p>H. Industrial processes</p>	<ul style="list-style-type: none"> ◆ If industrial processes are to be located on site, state: “All process activities to be performed indoors. No processes to drain to exterior or to storm drain system.” 	<ul style="list-style-type: none"> ◆ See applicable BMP’s in Fact Sheet SC-10, “Non-Stormwater Discharges” in the CASQA Stormwater Quality Handbook at www.cabmphandbooks.com
<p>J. Vehicle and Equipment Cleaning</p>	<ul style="list-style-type: none"> ◆ There is no designated car wash outside the building area. ◆ The on-site car wash shall be connected to the sanitary sewer system 	<ul style="list-style-type: none"> ◆ Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system ◆ Car dealerships and repair facilities may rinse cars with water only. ◆ See Fact Sheet SC-21, “Vehicle and Equipment Cleaning” in the CASQA Stormwater Quality Handbook at www.cabmphandbooks.com

<p>N. Fire Sprinkler Test Water</p>	<ul style="list-style-type: none"> ◆ Provide a means to drain fire sprinklers test water to sanitary sewer 	<ul style="list-style-type: none"> ◆ See Fact Sheet SC-41, “Building and Grounds Maintenance” in the CASQA Stormwater Quality Handbook at www.cabmphandbooks.com
<p>O. Miscellaneous Drain or Wash Water or Other Sources</p>	<ul style="list-style-type: none"> ◆ 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 	
<p>P. Plazas, sidewalks, and parking lots</p>		<ul style="list-style-type: none"> ◆ 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. Stormwater Facility Maintenance

VI.A. Ownership and Responsibility for Maintenance in Perpetuity

The owner shall be responsible for the operation and maintenance of storm water treatment and disposal BMP's, consistent with the development plans approved by the City of Sand City.

VI.B. Operation and Maintenance Plan

Prior to occupancy, the owner shall develop and submit to the City for approval an Operation and Maintenance Plan for Stormwater Control Measures.

VI.C. Ongoing Maintenance

Prior to issuing approval for final occupancy, the owner shall develop and implement a mechanism to provide annual verification of ongoing maintenance provision for Structural Stormwater Control Measures (SCMs). Annual certification will also be required of SCM maintenance on the project site and submitted to the City of Sand City, Department of Public Works.

VI.D. Summary of Maintenance Requirements

BMP Description	Action	Reference
Storm Drain Inlets	◆ Mark all inlets with the words “No Dumping! Flows to Bay” or similar	◆ Fact Sheet SC-44, “Drainage System Maintenance,” in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
	◆ Clean and Inspect. Clear any silt/debris and inspect for function prior to rainy season and periodically during rain events	
Storm Drain Infiltrator Chambers	<p>If entry into the manhole is required, please follow local and OSHA rules for confined space entries.</p> <p>◆ Prior to the start of the rainy season, inspect Isolator Row for sediment via the storm drain manhole and inlet pipe and the inspection ports.</p> <p>◆ When the average depth of sediment in the Isolator Row exceeds 3”, clean out the Isolator Row using the JetVac process.</p>	<p>◆ Design Manual published by StormTech.</p> <p>◆ Isolator Row O&M Manual published by StormTech.</p>

Landscape and Pest Control	<ul style="list-style-type: none"> ◆ Provide Integrated Pest Management information to owners, lessees, and operators ◆ Mark all inlets with the words “No Dumping! Flows to Bay” or similar 	<ul style="list-style-type: none"> ◆ Fact Sheet SC-41, “Building and Grounds Maintenance” in the CASQA Stormwater Quality Handbook at www.cabmphandbooks.com
Refuse Areas	<ul style="list-style-type: none"> ◆ Provide adequate number of receptacles. ◆ Inspect receptacles regularly and 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 	<ul style="list-style-type: none"> ◆ Fact Sheet SC-34, “Waste Handling and Disposal” in the CASQA Stormwater Quality Handbook at www.cabmphandbooks.com
Industrial Processes	<ul style="list-style-type: none"> ◆ If industrial processes are to be located on site, state: “All process activities to be performed indoors. No processes to drain to exterior or to storm drain system.” 	<ul style="list-style-type: none"> ◆ Fact Sheet SC-10, “Non-Stormwater Discharges” in the CASQA Stormwater Quality Handbook at www.cabmphandbooks.com
Fire Sprinkler Test Water	<ul style="list-style-type: none"> ◆ Provide a means to drain fire sprinklers test water to sanitary sewer 	<ul style="list-style-type: none"> ◆ Fact Sheet SC-41, “Building and Grounds Maintenance” in the CASQA Stormwater Quality Handbook at www.cabmphandbooks.com
Parking Lots	<ul style="list-style-type: none"> ◆ 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 	

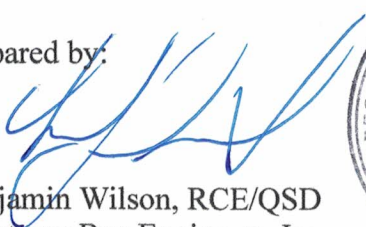
VII. Construction Checklist

Stormwater Control Plan Page #	BMP Description	See Plan Sheet #s
9	◆ Mark all inlets with the words “No Dumping! Flows to Bay” or similar	Civil Plans
9	◆ Install a silt/oil trap in the storm water drop inlet or manhole immediately prior to conveying water to the underground infiltrator chambers.	Civil Plans
9	◆ Install storm drain infiltrator chambers for the disposal of impervious surface water from the project.	Civil Improvement Plans
10	◆ Elevator sump drains will be plumbed to the sanitary sewer	Architectural Plans
10	◆ Note building design features that discourage entry of pests	Architectural or Tenant Improvement Plans
11	◆ The designated dumpster areas will be covered, graded and paved to prevent run-on ◆ Any drains from dumpsters, compactors, and tallow bin areas shall be connected to sanitary sewer ◆ Post signs on or near the dumpsters with the words “Do not dump hazardous materials here,” or similar	Architectural or Tenant Improvement Plans
12	◆ Provide a means to drain fire sprinklers test water to sanitary sewer	Note: Civil Plans

VIII. Certifications

The design of stormwater treatment facilities and other stormwater pollution control measures in this plan are in accordance with the current edition of the Monterey Regional Stormwater Management Program's Stormwater Technical Guide.

Prepared by:

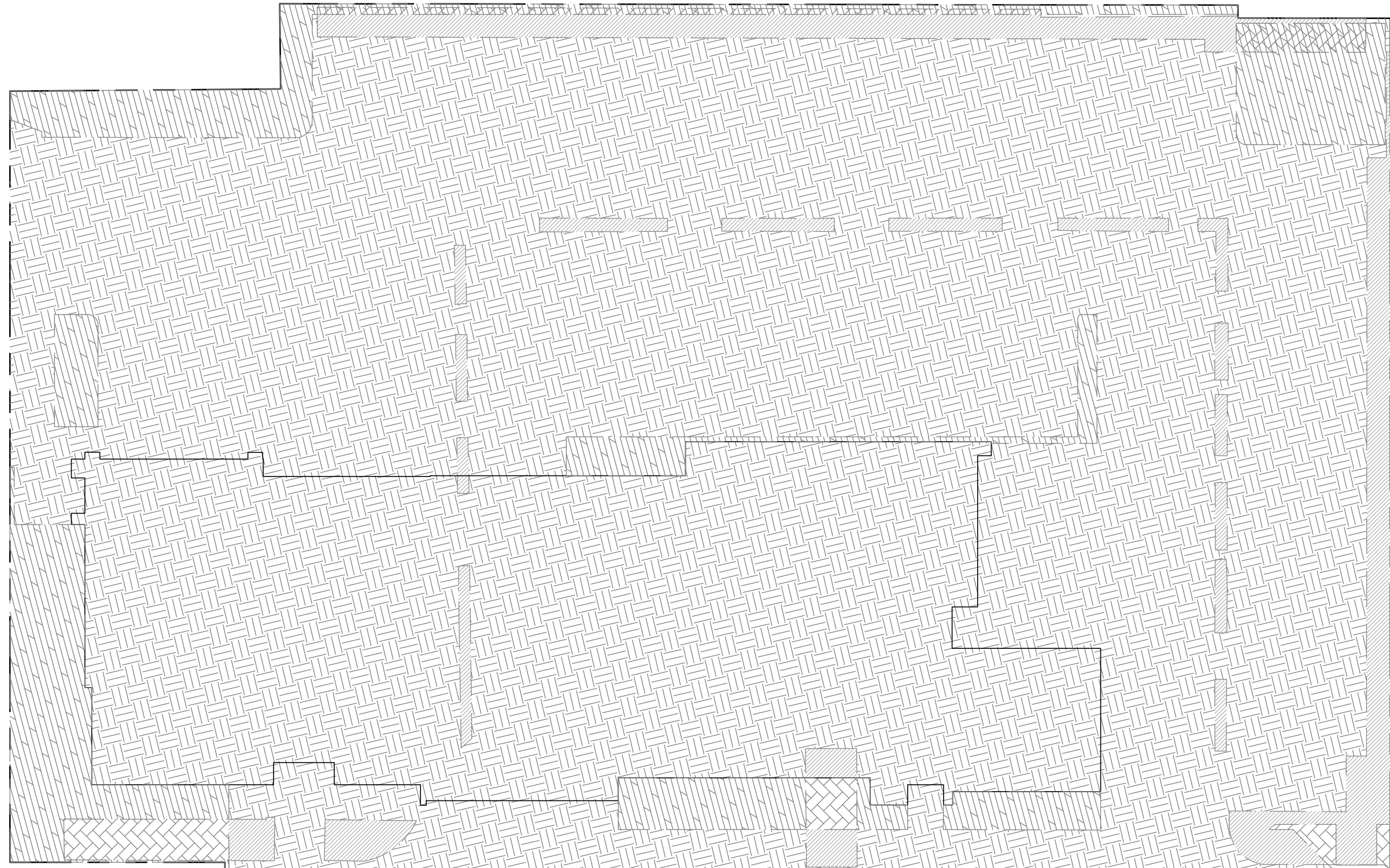

Benjamin Wilson, RCE/QSD
Monterey Bay Engineers, Inc.



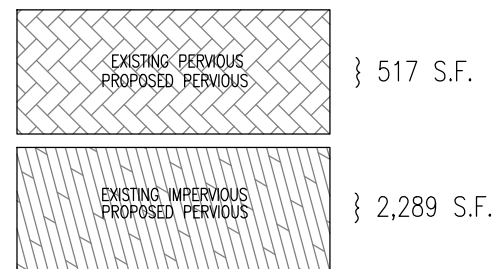
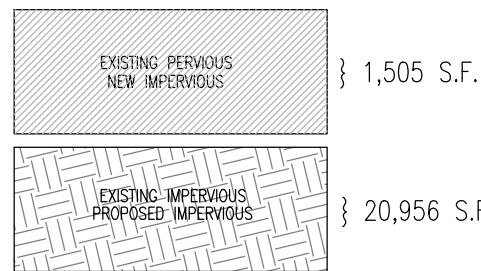
Certified and Accepted:

Lakshmi Hotel Partners, Inc.
Owner

CASA VERDE WAY



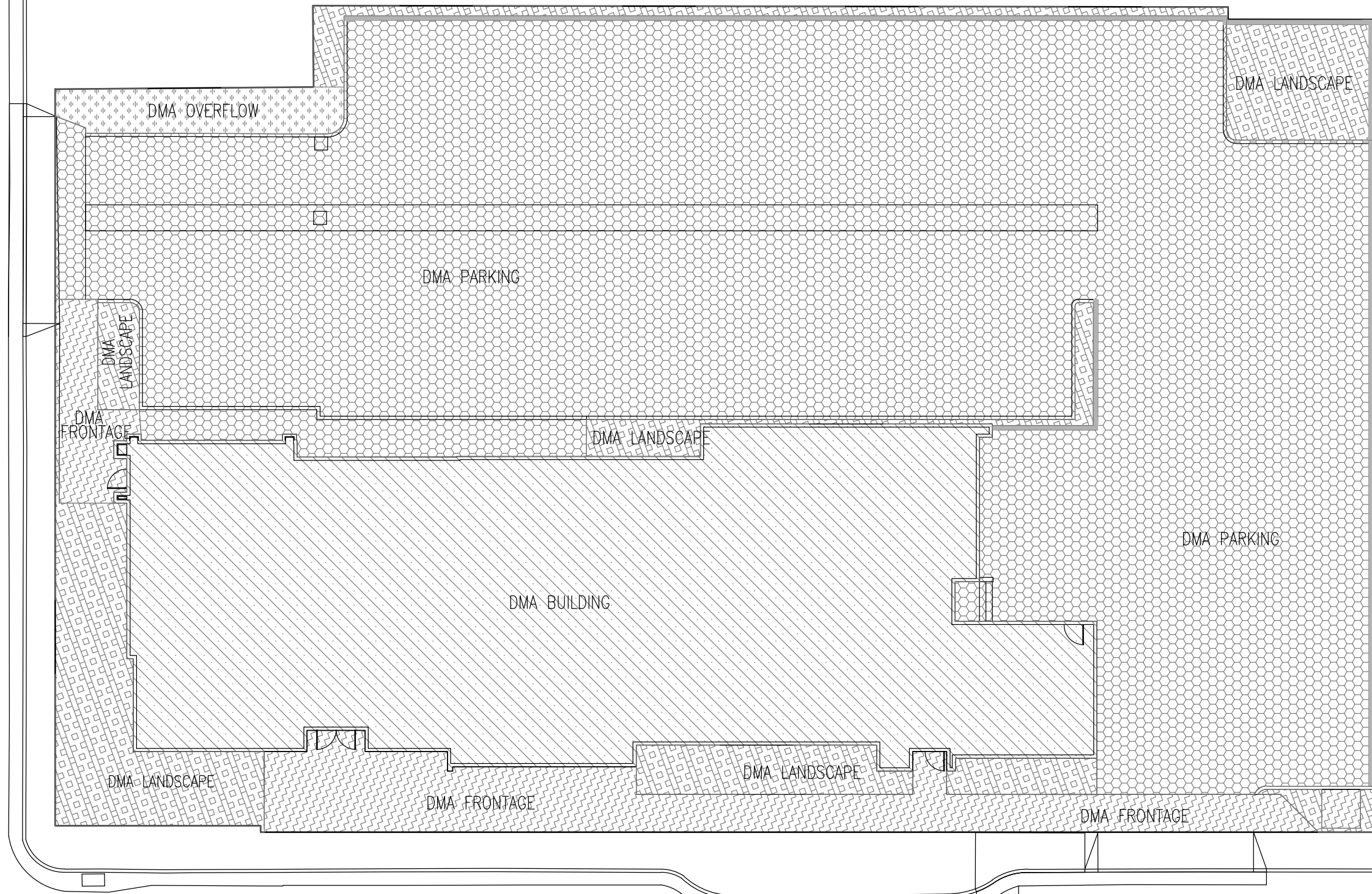
NORTH FREMONT STREET




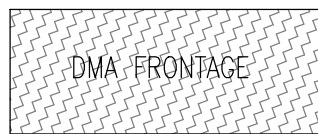
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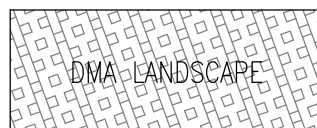

REVISIONS		CHANGED AREA EXHIBIT			
DATE	BY	STORM WATER CONTROL PLAN			
		2101 N. FREMONT STREET			
		PARCEL "B", 10PM86			
		APN: 013-112-045			
		CITY OF MONTEREY	COUNTY OF MONTEREY	STATE OF CALIFORNIA	
		PREPARED FOR			
		LAKSHMI HOTEL PARTNERS, INC.			
		BY			
		MONTEREY BAY ENGINEERS, INC.			
		CIVIL ENGINEERING • SUBDIVISIONS • LAND SURVEYING • CONSTRUCTION STAKING			
		607 CHARLES AVE SUITE B	(831) 899-7899	SEASIDE, CALIFORNIA	93955
SCALE	DATE	DRAWN BY	SHEET		
NOT TO SCALE	NOV, 2020	BCW	A		
JOB No. 19-100					

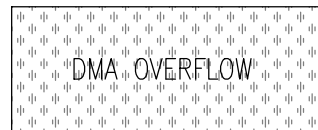
CASA VERDE WAY



NORTH FREMONT STREET

 - 6,640 S.F.
 - 1,598 S.F.

 - 2,233 S.F.
 - 14,474 S.F.

 - 322 S.F.



.PDF REDUCTION

REVISIONS		DRAINAGE MANAGEMENT AREAS			
DATE	BY	STORM WATER CONTROL PLAN			
		2101 N. FREMONT STREET			
		PARCEL "B", 10PM86			
		APN: 013-112-045			
		CITY OF MONTEREY	COUNTY OF MONTEREY	STATE OF CALIFORNIA	
		PREPARED FOR			
		LAKSHMI HOTEL PARTNERS, INC.			
		BY			
		MONTEREY BAY ENGINEERS, INC.			
		CIVIL ENGINEERING • SUBDIVISIONS • LAND SURVEYING • CONSTRUCTION STAKING			
		607 CHARLES AVE SUITE B	(831) 899-7899	SEASIDE, CALIFORNIA 93955	
SCALE	DATE	DRAWN BY	SHEET		
NOT TO SCALE	MAY, 2020	BCW	B		
JOB No. 19-100					

**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.

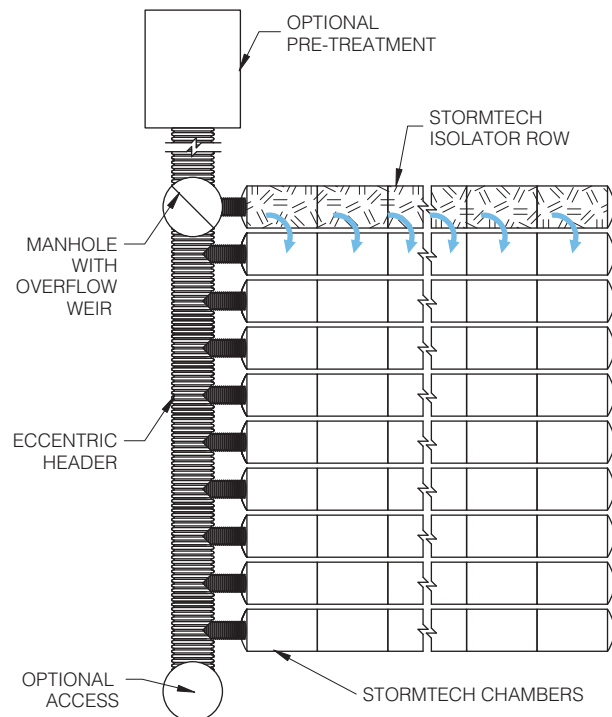
Two different fabrics are used for the Isolator Row. A woven geotextile fabric is placed between the stone and the Isolator Row chambers. The tough geotextile provides a media for storm water filtration and provides a durable surface for maintenance operations. It is also designed to prevent scour of 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

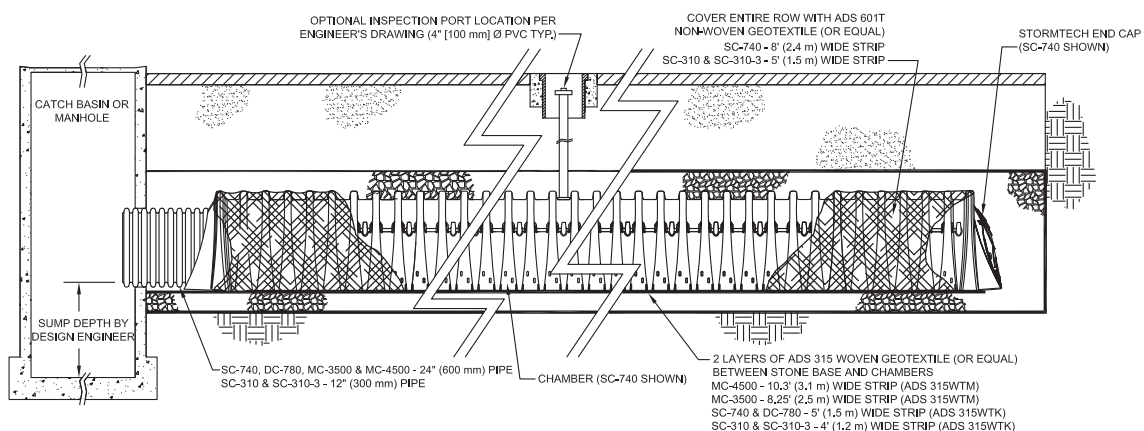
The Isolator Row was designed to reduce the cost of periodic maintenance. By “isolating” sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via 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)



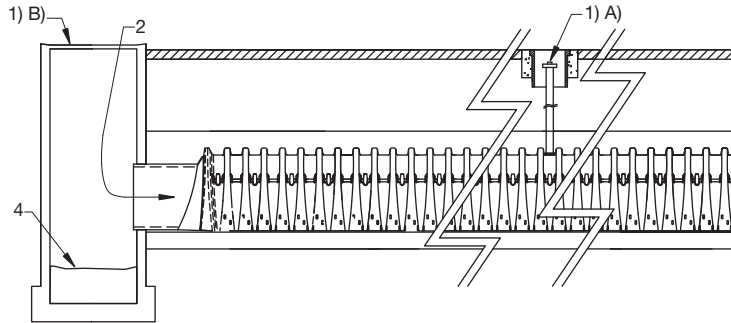
NOTE: NON-WOVEN FABRIC IS ONLY REQUIRED OVER THE INLET PIPE CONNECTION INTO THE END CAP FOR DC-780, MC-3500 AND MC-4500 CHAMBER MODELS AND IS NOT REQUIRED OVER THE ENTIRE ISOLATOR ROW.

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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