STORMWATER MANAGEMENT INSPECTION AND MAINTENANCE PLAN

prepared for

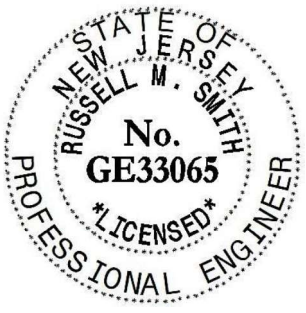
Nexus Spruce Street Apartments
Preliminary and Final Site Plan
Lawrence Township
Mercer County, New Jersey

Lot 39 in Block 701

November 18, 2021

Prepared by
Hopewell Valley Engineering, P.C.
P.O. Box 710
Pennington, NJ 08534

HVE Project No. 1107537C



Russell M. Smith

Russell M. Smith, P.E.
New Jersey License No. 33065

Digitally signed by Russell M Smith
Date: 2021.11.23 11:08:44 -05'00'

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Maintenance Plan for Marmalade Restaurant
Extended Detention/Infiltration Basin, Subsurface Basin and Filterra Bioretention Systems
Lawrence Township, Mercer County

As outlined below, regular and recorded inspections, reports and repairs for the above stated structures are required by the State of New Jersey and the Township of Lawrence.

System owner/responsible party:

At this time the proposed agent responsible to have the maintenance inspections and work performed is: Nexus Properties, Inc.
1333 Brunswick Pike
Lawrenceville, NJ 08648
(609) 656-4432

EMERGENCY AND GENERAL CONTACTS:

Are all names, addresses, and telephone numbers accurate for emergency response personal, governing bodies, and the responsible party of the systems: Yes/No

Emergency:	911
Lawrence Township Municipal Offices:	(609) 896-1111
Lawrence Township Engineer:	James F. Parvese, PE, CME
	(609) 844-7087
Current Responsible Party:	Nexus Properties, Inc
	1333 Brunswick Pike
	Lawrenceville, NJ 08648
	Joseph D. Kline, VP of Construction
	(609) 656-4432

Emergency Conditions – Emergency conditions include when injury or lives are at risk and/or major damage to property could occur. 911 should be called for emergencies.

Severe Conditions – Severe conditions include stagnate water in the subsurface stormwater basins or stormwater filters. These conditions require immediate notification to the municipal engineers and to the responsible party.

Stormwater Management Maintenance Requirements (Quantity and Quality Control):

A. Extended Detention/Infiltration Basin Maintenance:

The basin has been constructed to provide stormwater quantity control.

General Maintenance

- All structural components must be inspected, at least once annually, for cracking, subsidence, spalling, erosion and deterioration.
- Components expected to receive and/or trap debris and sediment must be inspected for clogging at least twice annually, as well as after every storm exceeding 1 inch of rainfall.
- Sediment removal should take place when all run-off has drained from the sand be and the sand bed is dry.
- Disposal of debris, trash, sediment and other waste material must be done at suitable disposal/recycling sites, and in compliance with all applicable local, state, and federal waste regulations.
- A detailed, written log of all preventative and corrective maintenance performed on the sand filter, including a record of all inspections and copies of maintenance-related work orders, and additional maintenance guidance can be found online at:

  https://www.njstormwater.org/maintenance_guidance.htm

- Access points for maintenance are required on all enclosed areas within a sand filter; these access points must be clearly identified in the maintenance plan. In addition, any special training required for maintenance personnel to perform specific tasks, e.g., confined space entry, must be included in the plan.
- Stormwater BMPs may not be used for stockpiling of plowed snow and ice, compost, or any other material.

Vegetated Areas

- In sand filter systems with vegetated surfaces, bi-weekly inspections are required when establishing/restoring vegetation.
- A minimum of one inspection during the growing season and one inspection during the non-growing season is required to ensure the health, density and diversity of the vegetation.

- Mowing/trimming of vegetation must be performed on a regular schedule based on specific site conditions; perimeter grass should be mowed at least once a month during growing season.

- Vegetated cover must be maintained at 85%; damage must be addressed through replanting in accordance with the original specifications.

- Vegetated areas must be inspected at least once annually for erosion, scour and unwanted growth; any unwanted growth should be removed with minimum disruption to the remaining vegetation.

- All use of fertilizers, pesticides, mechanical treatments and other means to ensure optimum vegetation health must not compromise the intended purpose of the sand filter.

Drain Time

- The sand bed must be inspected at least twice annually to determine if the permeability of the bed has decreased.

- Storm Drain Times

  2 Year Storm = Approximately 30 hours from the start of the storm
  10 Year Storm = Approximately 32 hours from the start of the storm
  100 Year Storm = Approximately 34 hours from the start of the storm

- If the actual drain time is significantly different from the design drain time, the components that could provide hydraulic control must be evaluated and appropriate measures taken to return the sand filter to minimum and maximum drain time requirements.

- If the sand filter fails to drain the WQDS within 72 hours, corrective action must be taken, up to and including the replacement of the upper layers of the sand bed. In addition, the anticipated frequency of this replacement must be indicated in the maintenance manual.

B. Subsurface Basin

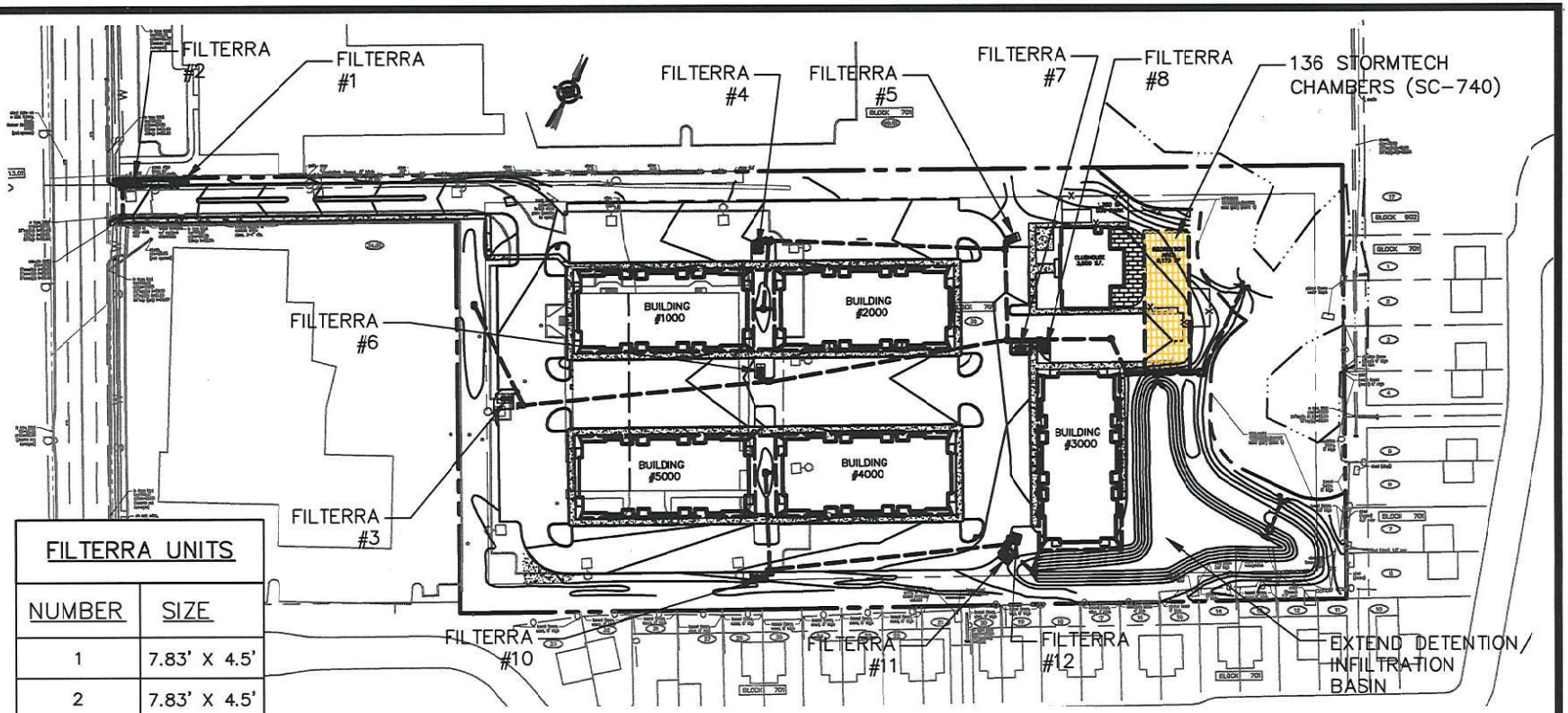
The Model SC-740 StormTech chambers (136 total) will provide additional storm storage volume to the Extended Detention/Infiltration Basin. The StormTech chambers shall be inspected and maintained as required by the manufacturer's recommendations. The stormwater flow to the basin will be treated for 80% TSS removal so a build-up of sediment is not expected. Any trash or debris shall be removed as required.

A. Filterra Bioretention Systems:

Eleven (11) Filterra Bioretention systems have been installed to provide water quality control for the stormwater run-off from the parking area. The systems will be installed in the parking lot upstream of the stormwater inlets. The units will be Filterra Bioretention units as manufactured by Contech Engineered Solutions (see the Owner's Manual at the end of this plan).

Required Inspection Interval of the Basins and Filterra Bioretention Systems: 2 times per year and after every rain event exceeding 1 inch of rainfall.

STORMWATER MANAGEMENT SYSTEM LOCATION MAP



FILTERRA UNITS	
NUMBER	SIZE
1	7.83' X 4.5'
2	7.83' X 4.5'
3	6' X 12'
4	6' X 12'
5	6' X 12'
6	6' X 12'
7	16' X 8'
8	7.83' X 4.5'
10	13' X 7'
11	6' X 10'
12	6' X 8'

6

STORMWATER MANAGEMENT SYSTEM LOCATION MAP
SPRUCE STREET APARTMENTS

HOPEWELL VALLEY ENGINEERING, PC
ENGINEERS, PLANNERS & LAND SURVEYORS
1600 Reed Road, Suite A
Pennington, NJ 08534-5002
Tel.: 609-745-5800
Fax: 609-745-5807
www.hopewellvalleyengineering.com

Cost Estimate for Inspection & Maintenance

Assume the extended detention/infiltration basin and the Filterra units will be inspected and maintained at the same time.

Inspection & Report	8 times @ $500 each =	$4,000/year
Remove sediment & debris from Basin & StormTech Chambers Subsurface Basin (inc. equipment & disposal 2 days)	2 times @ $1,000 each =	$2,000/year
Clean-out Filterra Units -Remove trash/replace mulch	2 times @ $1,000 each=	$2,000/year
Repairs to structural items, eroded areas, etc.		To be determined at time of inspection

STORMWATER MANAGEMENT SYSTEMS
SITE SPECIFIC VISUAL OBSERVATION CHECKLIST
Date of Inspection

____/____/____

Description and Pertinent Data

Location: Nexus Residential Apartments
1052 Spruce Street
Lawrence Township, Mercer County

Items Being Inspected:

A) Extended Detention/Infiltration Basin
B) StormTech Stormwater Chambers
C) Filterra Bioretention Systems
D) Overall Observation

Inspection Personnel: *

Name	Firm	Address	Phone #

Weather Conditions:

_____

_____

*The firm/persons hired to inspect, clean and/or repair any part of the Stormwater Management System shall be knowledgeable with, and adhere to, any federal, state and local regulations including complying with all confined space entry safety regulations.

A) Extended Detention/Infiltration Basin

Inspected by Entering Basin: Yes/No

(Give specific location within basin for all remarks)

Basin ID and
General Condition: _____

_____

Water Level: _____

Debris Level: _____

Sediment Level: _____

Sand (Infiltration) Area: _____

Unusual Conditions or Additional Remarks: _____

_____

_____

_____

Outlet Structure #1:

Inspected by Entering Structure: Yes/No

Structure ID and
General Condition: _____

_____

Water Level: _____

Debris Level: _____

Sediment Level: _____

Any cracks present in walls or invert: Yes/No

If Yes, explain _____

Condition of Pipe Connections: _____

Any signs of erosion or leaks around structure: Yes/No

If Yes, explain _____

Condition of Frame & Grate: _____

Condition of Concrete Outlet Structure Wall: _____

Condition of Rectangular Weirs: _____

Condition of Trash racks: _____

Unusual Conditions of Conveyance System or Additional Remarks: _____

_____

_____

_____

Outlet Structure #2:

Inspected by Entering Structure: Yes/No

Structure ID and
General Condition: _____

_____

Water Level: _____

Debris Level: _____

Sediment Level: _____

Any cracks present in walls or invert: Yes/No

If Yes, explain _____

Condition of Pipe Connections: _____

Any signs of erosion or leaks around structure: Yes/No

If Yes, explain _____

Condition of Frame & Grate: _____

Condition of Concrete Outlet Structure Wall: _____

Condition of Rectangular Weirs: _____

Condition of Trash racks: _____

Unusual Conditions of Conveyance System or Additional Remarks: _____

_____

_____

_____

B) StormTech Stormwater Chambers

Inspected by Entering Basin: YES/NO

(Give Specific location within basin for all remarks)

Basin ID and
General Condition:_____

_____

Water Level: _____ (Design Drain Times: 2 YEAR Storm = 30 hours; 10 YEAR Storm = 32 hours; 100 YEAR Storm = 34 hours)

Debris Level_____

Sediment Level_____

StormTech Maintenance Log

Project Name:
Location:

StormTech®

www.stormtech.com

	Stadia Rod	Readings			
Date	Fixed point to chamber bottom (1)	Fixed point to top of sediment (2)	Sediment Depth (1) - (2)	Observations/Actions	Inspector

Unusual Conditions or Additional Remarks:_____

_____

_____

_____

_____

C) Filterra Bioretention Systems

See the *Filterra HC Owner's Manual* information provided by Contech Engineered Solutions at the end of this maintenance plan for a description of the required maintenance procedures.

D) <u>Overall Observation:</u>

Are the Systems Functioning Adequately: YES/NO

If NO, what action must be taken and under what time frame:

GREEN INFRASTRUCTURE
MANUFACTURED TREATMENT DEVICE

Filterra Bioretention Systems
by
Contech Engineered Solutions

Filterra HC
Owner's Manual

filterra®

Bioretention Systems

CONTECH®
ENGINEERED SOLUTIONS

filterra®
Bioretention Systems

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CONTECH®
ENGINEERED SOLUTIONS

Introduction

Thank you for your purchase of the Filterra® HC Bioretention System. Filterra HC is a specially engineered stormwater treatment system incorporating high performance biofiltration media to remove pollutants from stormwater runoff. All components of the system work together to provide a sustainable long-term solution for treating stormwater runoff.

The Filterra HC system has been delivered to you with protection in place to resist intrusion of construction related sediment which can contaminate the biofiltration media and result in inadequate system performance. These protection devices are intended as a best practice and cannot fully prevent contamination. It is the purchaser's responsibility to provide adequate measures to prevent construction related runoff from entering the Filterra HC system.

Included with your purchase is Activation of the Filterra HC system by the manufacturer as well as a 1-year warranty from delivery of the system and 1-year of routine maintenance (mulch replacement, debris removal, and pruning of vegetation) up to twice during the first year after activation.

Design and Installation

Each project presents different scopes for the use of Filterra HC systems. Information and help may be provided to the design engineer during the planning process. Correct Filterra HC box sizing (per local regulations) is essential to predict pollutant removal rates for a given area. The engineer shall submit calculations for approval by the local jurisdiction. The contractor is responsible for the correct installation of Filterra HC units as shown in approved plans. A comprehensive installation manual covering all Filterra configurations is available at www.ContechES.com.

Activation Overview

Activation of the Filterra HC system is a procedure completed by the manufacturer to place the system into working condition. This involves the following items:

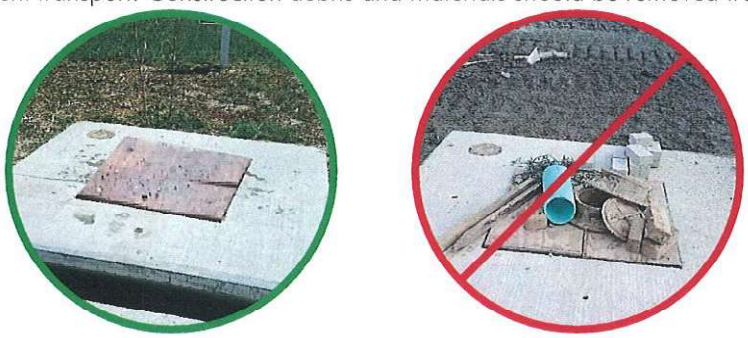
- Removal of construction runoff protection devices
- Planting of the system's vegetation
- Placement of pretreatment mulch layer using mulch certified for use in Filterra HC systems.

Activation MUST be provided by the manufacturer to ensure proper site conditions are met for Activation, proper installation of the vegetation, and use of pretreatment mulch certified for use in Filterra HC systems.

Minimum Requirements

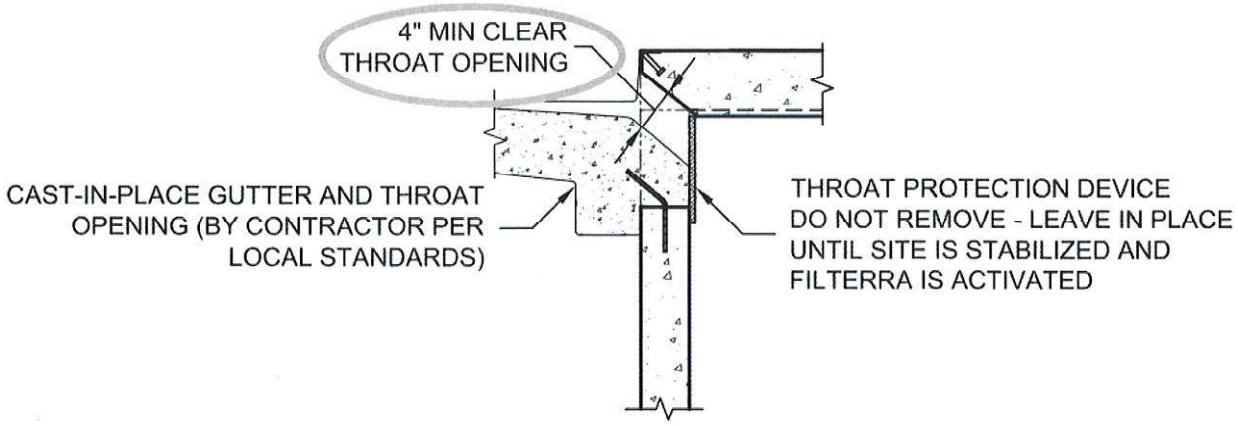
The minimum requirements for Filterra HC Activation are as follows:

1. The site landscaping must be fully stabilized, i.e. full landscaping installed and some grass cover (not just straw and seed) is required to reduce sediment transport. Construction debris and materials should be removed from surrounding area.



2. Final paving must be completed. Final paving ensures that paving materials will not enter and contaminate the Filterra HC system during the paving process, and that the plant will receive runoff from the drainage area, assisting with plant survival for the Filterra HC system.

3. Filterra HC throat opening (if applicable) should be at least 4" in order to ensure adequate capacity for inflow and debris.



An Activation Checklist is included on page 12 to ensure proper conditions are met for Contech to perform the Activation services. A charge of $500.00 will be invoiced for each Activation visit requested by Customer where Contech determines that the site does not meet the conditions required for Activation.

Filterra HC Plant Selection Overview

Plant Lists are available on the Contech website highlighting recommended plants for Filterra systems in your area. Keep in mind that plants are subject to availability due to seasonality and required minimum size for the Filterra HC system. Plants installed in the Filterra HC system are container plants (max 15 gallon) from nursery stock and will be immature in height and spread at Activation.

It is the responsibility of the owner to provide adequate irrigation when necessary to the plant of the Filterra HC system.

The "Planting Requirements for Filterra HC Systems" document is included as an appendix and discusses proper selection and care of the plants within Filterra HC systems.

Warranty Overview

Refer to the Contech Engineered Solutions LLC Stormwater Treatment System LIMITED WARRANTY for further information. The following conditions may void the Filterra HC system's warranty and waive the manufacturer provided Activation and Maintenance services:

- Unauthorized activation or performance of any of the items listed in the activation overview
- Any tampering, modifications or damage to the Filterra HC system or runoff protection devices
- Removal of any Filterra HC system components
- Failure to prevent construction related runoff from entering the Filterra HC system
- Failure to properly store and protect any Filterra HC components (including media and underdrain stone) that may be shipped separately from the vault

Routine Maintenance Guidelines

Routine maintenance is included by the manufacturer on all Filterra HC systems for the first year after activation. This includes a maximum of 2 visits to remove debris, replace pretreatment mulch, and prune the vegetation. More information is provided in the Operations and Maintenance Guidelines. Some Filterra HC systems also contain diversion bypass or outlet bays. Depending on site pollutant loading, these bays may require periodic removal of debris, however this is not included in the first year of maintenance and would likely not be required within the first year of operation.

These services, as well as routine maintenance outside of the included first year, can be provided by certified maintenance providers listed on the Contech website. Training can also be provided to other stormwater maintenance or landscape providers.

Why Maintain?

All stormwater treatment systems require maintenance for effective operation. This necessity is often incorporated in your property's permitting process as a legally binding BMP maintenance agreement. Other reasons to maintain are:

- Avoiding legal challenges from your jurisdiction's maintenance enforcement program.
- Prolonging the expected lifespan the media in the Filterra HC system.
- Avoiding more costly media replacement.
- Helping reduce pollutant loads leaving your property.

Simple maintenance of the Filterra HC is required to continue effective pollutant removal from stormwater runoff before discharge into downstream waters. This procedure will also extend the longevity of the living biofilter system. The Filterra HC system is also subjected to various materials entering the inlet, including trash, silt, leaves, etc. which will be contained above the mulch layer. Too much silt may inhibit the Filterra HC system flow rate, which is the reason for site stabilization before activation. Regular replacement of the mulch stops accumulation of such sediment.

If the system is not maintained on regular intervals, is subject to a catastrophic spill or other event, or subject to unusual pollutant loading, full media bed replacement could be required. Please contact Contech for further evaluation if you feel this may be necessary.

When to Maintain?

Contech includes a 1-year maintenance plan with each system purchase. Annual included maintenance consists of a maximum of two (2) scheduled visits. Additional maintenance may be necessary depending on sediment and trash loading (by Owner or at additional cost). The start of the maintenance plan begins when the system is activated.

Maintenance visits are scheduled seasonally; the spring visit aims to clean up after winter loads including salts and sands while the fall visit helps the system by removing excessive leaf litter.

It has been found that in regions which receive between 30-50 inches of annual rainfall, (2) two visits are generally required; regions with less rainfall often only require (1) one visit per annum. Varying land uses can affect maintenance frequency;

e.g. some fast food restaurants require more frequent trash removal. Contributing drainage areas which are subject to new development wherein the recommended erosion and sediment control measures have not been implemented may require additional maintenance visits.

Some sites may be subjected to extreme sediment or trash loads, requiring more frequent maintenance visits. This is the reason for detailed notes of maintenance actions per unit, helping the Supplier and Owner predict future maintenance frequencies, reflecting individual site conditions.

Owners must promptly notify the (maintenance) Supplier of any damage to the plant(s), which constitute(s) an integral part of the bioretention technology. Owners should also advise other landscape or maintenance contractors to leave all maintenance to the Supplier (i.e. no pruning or fertilizing) during the first year.

Exclusion of Services

Clean up due to major contamination such as oils, chemicals, toxic spills, etc. will result in additional costs and are not covered under the Supplier maintenance contract. Should a major contamination event occur the Owner must block off the outlet pipe of the Filterra HC (where the cleaned runoff drains to, such as drop inlet) and block off the inlet of the Filterra HC. The Supplier should be informed immediately.

Maintenance Visit Summary

Each maintenance visit consists of the following simple tasks (detailed instructions below).

1. Inspection of Filterra HC and surrounding area
2. Removal of tree grate and erosion control stones
3. Removal of debris, trash and mulch
4. Mulch replacement
5. Plant health evaluation & pruning or replacement as necessary
6. Clean area around Filterra HC
7. Complete paperwork

Maintenance Tools, Safety Equipment and Supplies

Ideal tools include camera, bucket, shovel, broom, pruners, hoe/rake, and tape measure. Appropriate Personal Protective Equipment (PPE) should be used in accordance with local or company procedures. This may include impervious gloves where the type of trash is unknown, high visibility clothing and barricades when working near traffic and also safety hats and shoes. A T-Bar or crowbar should be used for moving the tree grates (up to 170 lbs ea.). Most visits require minor trash removal and a full replacement of mulch. See below for actual number of bagged mulch that is required in each media bay size. Mulch should be a double shredded, hardwood variety. Some visits may require additional Filterra engineered soil media for the Filterra HC system, available from the Supplier.

	Available Filterra® HC Media Bay Sizes (feet)	Filter Surface Area (ft^2)	Mulch Volume at 3" Depth (ft^2)	# of 2 ft^2 Mulch Bags
Standard Configuration Filterra and Filterra Biosape Vaults	4x4	16	4	2
	4x6 or 6x4	24	6	3
	4.5x7.83 or 7.83x4.5 (Nominal 4x8/8x4)	35.24	9	5
	6x6	36	9	5
	6x8 or 8x6	48	12	6
	6x10 or 10x6	60	15	8
	6x12 or 12x6	72	18	9
	7x13 or 13x7	91	23	12
	14x8	112	28	14
	16x8	128	32	16
	18x8	144	36	18
	20x8	160	40	20
	22x8	176	44	22
Peak Diversion Filterra Vaults	4x4	16	4	2
	4.5x5.83 or 5.83x4.5 (Nominal 4x6/6x4)	26.24	7	4
	6x6	36	9	5
	6x8	48	12	6
	6x10 or 10x6	60	15	8
	7x10	70	18	9
	8x10.5	84	21	11
	8x12.5	100	25	13
	Custom and/or Filterra Bioscape	Media Area in ft^2	0.25 x (Media Area in ft^2)	0.125 x (Media Area in ft^2)

Maintenance Visit Procedure

Keep sufficient documentation of maintenance actions to predict location specific maintenance frequencies and needs. An example Maintenance Report is included in this manual.

1. Inspection of Filterra HC and surrounding area

- Record individual unit before maintenance with photograph (numbered). Record on Maintenance Report (see example in this document) the following:

Record on Maintenance Report the following:

Standing Water	yes | no
Damage to Box Structure	yes | no
Damage to Grate	yes | no
Is Bypass Clear	yes | no

If yes answered to any of these observations, record with close-up photograph (numbered).

2. Removal of tree grate and erosion control stones

- Remove cast iron grates for access into Filterra HC box.
- Dig out silt (if any) and mulch and remove trash & foreign items.

3. Removal of debris, trash and mulch

Record on Maintenance Report the following:

Silt/Clay	yes | no
Cups/ Bags	yes | no
Leaves	yes | no
Buckets Removed	_____

- After removal of mulch and debris, measure distance from the top of the Filterra engineered media soil to the top of the top slab. Compare the measured distance to the distance shown on the approved Contract Drawings for the system. Add Filterra media (not top soil or other) to bring media up as needed to distance indicated on drawings.

Record on Maintenance Report the following:

Distance to Top of Top Slab (inches)	_____
Inches of Media Added	_____

4. Mulch replacement

- Add double shredded mulch evenly across the entire unit to a depth of 3".
- Refer to Filterra Mulch Specifications for information on acceptable sources.
- Ensure correct repositioning of erosion control stones by the Filterra HC inlet to allow for entry of trash during a storm event.
- Replace Filterra HC grates correctly using appropriate lifting or moving tools, taking care not to damage the plant.

5. Plant health evaluation and pruning or replacement as necessary

- Examine the plant's health and replace if necessary.
- Prune as necessary to encourage growth in the correct directions

Record on Maintenance Report the following:

Height above Grate	_____ (ft)
Width at Widest Point	_____ (ft)
Health	healthy | unhealthy
Damage to Plant	yes | no
Plant Replaced	yes | no

6. Clean area around Filterra HC

- Clean area around unit and remove all refuse to be disposed of appropriately.

7. Complete paperwork

- Deliver Maintenance Report and photographs to appropriate location (normally Contech during maintenance contract period).
- Some jurisdictions may require submission of maintenance reports in accordance with approvals. It is the responsibility of the Owner to comply with local regulations.

Maintenance Checklist

Drainage System Failure	Problem	Conditions to Check	Condition that Should Exist	Actions
Inlet	Excessive sediment or trash accumulation.	Accumulated sediments or trash impair free flow of water into Filterra HC.	Inlet should be free of obstructions allowing free distributed flow of water into Filterra HC HC.	Sediments and/or trash should be removed.
Mulch Cover	Trash and floatable debris accumulation.	Excessive trash and/or debris accumulation.	Minimal trash or other debris on mulch cover.	Trash and debris should be removed and mulch cover raked level. Ensure bark nugget mulch is not used.
Mulch Cover	"Ponding" of water on mulch cover.	"Ponding" in unit could be indicative of clogging due to excessive fine sediment accumulation or spill of petroleum oils.	Stormwater should drain freely and evenly through mulch cover.	Recommend contact manufacturer and replace mulch as a minimum.
Vegetation	Plants not growing or in poor condition.	Soil/mulch too wet, evidence of spill. Incorrect plant selection. Pest infestation. Vandalism to plants.	Plants should be healthy and pest free.	Contact manufacturer for advice.
Vegetation	Plant growth excessive.	Plants should be appropriate to the species and location of Filterra HC.		Trim/prune plants in accordance with typical landscaping and safety needs.
Structure	Structure has visible cracks.	Cracks wider than 1/2 inch or evidence of soil particles entering the structure through the cracks.		Vault should be repaired.
Maintenance is ideally to be performed twice annually.				

Filterra HC Inspection & Maintenance Log

Filterra HC System Size/Model: _____ **Location:** _____

Date	Mulch & Debris Removed	Depth of Mulch Added	Mulch Brand	Height of Vegetation Above Grate	Vegetation Species	Issues with System	Comments
1/1/17	*5 – 5 gal Buckets*	*3"*	*Lowe's Premium Brown Mulch*	*4'*	*Galaxy Magnolia*	*- Standing water in downstream structure*	*- Removed blockage in downstream structure*

Appendix 1 – Filterra® Activation Checklist

CONTECH
ENGINEERED SOLUTIONS

Project Name: ______________________ Company: ______________________

Site Contact Name: ______________________ Site Contact Phone/Email: ______________________

Site Owner/End User Name: ______________________ Site Owner/End User Phone/Email: ______________________

Preferred Activation Date: ______________________ (provide 2 weeks minimum from date this form is submitted)

Site Designation	System Size	Final Pavement / Top Coat Complete	Landscaping Complete / Grass Emerging	Construction materials / Piles / Debris Removed	Throat Opening Measures 4" Min. Height	Plant Species Requested
		☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	
		☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	
		☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	
		☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	
		☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	
		☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	
		☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	
		☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	
		☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	

Attach additional sheets as necessary.

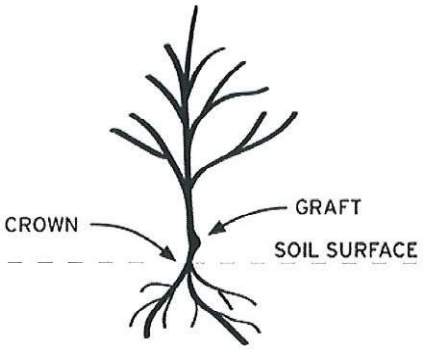
NOTE: A charge of $500.00 will be invoiced for each Activation visit requested by Customer where Contech determines that the site does not meet the conditions required for Activation. ONLY Contech authorized representatives can perform Activation of Filterra HC systems; unauthorized Activations will void the system warranty and waive manufacturer supplied Activation and 1st Year Maintenance.

______________________ Signature

______________________ Date

Appendix 2 – Planting Requirements for Filterra® HC Systems

Plant Material Selection



- Select plant(s) as specified in the engineering plans and specifications.
- Select plant(s) with full root development but not to the point where root bound.
- Use local nursery container plants only. Ball and burlapped plants are not permitted.
- For precast Filterra HC systems with a tree grate, plant(s) must not have scaffold limbs at least 14 inches from the crown due to spacing between the top of the mulch and the tree grate. Lower branches can be pruned away provided there are sufficient scaffold branches for tree or shrub development.
- For precast Filterra HC systems with a tree grate, at the time of installation, it is required that plant(s) must be at least 6" above the tree grate opening at installation for all Filterra configurations. This DOES NOT apply to Full Grate Cover designs.
- Plant(s) shall not have a mature height greater than 25-30 feet.
- A 7-15 gallon container size shall be used.
- For precast Filterra HC systems, plant(s) should have a single trunk at installation, and pruning may be necessary at activation and maintenance for some of the faster growing species, or species known to produce basal sprouts

Plant Installation

- During transport protect the plant leaves from wind and excessive jostling.
- Prior to removing the plant(s) from the container, ensure the soil moisture is sufficient to maintain the integrity of the root ball. If needed, pre-wet the container plant.
- Cut away any roots which are growing out of the container drain holes. Plants with excessive root growth from the drain holes should be rejected.
- Plant(s) should be carefully removed from the pot by gently pounding on the sides of the container with the fist to loosen root ball. Then carefully slide out. Do not lift plant(s) by trunk as this can break roots and cause soil to fall off. Extract the root ball in a horizontal position and support it to prevent it from breaking apart. Alternatively, the pot can be cut away to minimize root ball disturbance.
- Remove any excess soil from above the root flare after removing plant(s) from container.
- Excavate a hole with a diameter 4" greater than the root ball, gently place the plant(s).
- If plant(s) have any circling roots from being pot bound, gently tease them loose without breaking them.
- If root ball has a root mat on the bottom, it should be shaved off with a knife just above the mat line.
- Plant the tree/shrub/grass with the top of the root ball 1" above surrounding media to allow for settling.
- All plants should have the main stem centered in the tree grate (where applicable) upon completion of installation.
- With all trees/shrubs, remove dead, diseased, crossed/rubbing, sharply crotched branches or branches growing excessively long or in wrong direction compared to majority of branches.
- To prevent transplant shock (especially if planting takes place in the hot season), it may be necessary to prune some of the foliage to compensate for reduced root uptake capacity. This is accomplished by pruning away some of the smaller secondary branches or a main scaffold branch if there are too many. Too much foliage relative to the root ball can dehydrate and damage the plant.
- Plant staking may be required.

Mulch Installation

- Only mulch that has been meeting Contech Engineered Solutions' mulch specifications can be used in the Filterra HC system.
- Mulch must be applied to a depth of 3" evenly over the surface of the media.

Irrigation Requirements

- Each Filterra HC system must receive adequate irrigation to ensure survival of the living system during periods of drier weather.
- Irrigation sources include rainfall runoff from downspouts and/or gutter flow, applied water through the tree grate or in some cases from an irrigation system with emitters installed during construction.
- At Activation: Apply about one (cool climates) to two (warm climates) gallons of water per inch of trunk diameter over the root ball.
- During Establishment: In common with all plants, each Filterra HC plant will require more frequent watering during the establishment period. One inch of applied water per week for the first three months is recommended for cooler climates (2 to 3 inches for warmer climates). If the system is receiving rainfall runoff from the drainage area, then irrigation may not be needed. Inspection of the soil moisture content can be evaluated by gently brushing aside the mulch layer and feeling the soil. Be sure to replace the mulch when the assessment is complete. Irrigate as needed**.
- Established Plants: Established plants have fully developed root systems and can access the entire water column in the media. Therefore, irrigation is less frequent but requires more applied water when performed. For a mature system assume 3.5 inches of available water within the media matrix. Irrigation demand can be estimated as 1" of irrigation demand per week. Therefore, if dry periods exceed 3 weeks, irrigation may be required. It is also important to recognize that plants which are exposed to windy areas and reflected heat from paved surfaces may need more frequent irrigation. Long term care should develop a history which is more site specific.

** Five gallons per square yard approximates 1 inch of water. Therefore, for a 6' by 6' Filterra HC approximately 20-60 gallons of water is needed. To ensure even distribution of water it needs to be evenly sprinkled over the entire surface of the filter bed, with special attention to make sure the root ball is completely wetted. NOTE: if needed, measure the time it takes to fill a five-gallon bucket to estimate the applied water flow rate then calculate the time needed to irrigate the Filterra HC system. For example, if the flow rate of the sprinkler is 5 gallons/minute then it would take 12 minutes to irrigate a 6' by 6' filter.

Notes

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Bioretention Systems

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