



## Operation and Maintenance Manual

Tacoma Subaru MOD Facility



### Prepared For

SDEV23-0202

### Project Location

3812 S Tacoma Way

Tacoma, WA 98409

0220131004

### Prepared By

Name	Organization	Contact Telephone Number	Email Address
Daniel Hendrickson	Hendrickson Engineering PLLC	253.514.2413	dan@hendricksoncc.com

### Person(s) Responsible for Maintenance of Stormwater Facilities

Name	Organization	Contact Telephone Number	Email Address
(Insert Name)	Micky LLC	C/o Tacoma Subaru PO Box 111270 Tacoma, WA 98411	todd@toddwardllc.com

### Date Prepared

10.03.2023

**Operation and Maintenance Manual will be kept at:** 3812 S Tacoma Way, Tacoma, WA 98409. The O&M Manual must be made available for inspection by the City upon request.

10/5/2023

## **Facility Summary**

**Narrative Description of proposed stormwater system:** The proposed stormwater drainage facility consists of a closed pipe network connected to an underground infiltration system. The closed pipe network consists of an onsite drainage system connected to roof drains, footing drains, type 1 catch basins and type 2 catch basins. The proposed infiltration system is constructed using StormTech infiltrators. Runoff conveyed to the system is treated using a Modular Wetland system.

<b>Facility Location Identifier on associated figure.</b>	<b>Facility Type – Provide BMP Name and Number from SWMM. Include Manufacturer Name and Manufacturer Model Number, if applicable.</b>	<b>Facility Description – What Facility Does, How it Works, and applicable information such Number of Cartridges, Type of Cartridges, Height of Cartridges, etc. as applicable for Emerging Technologies</b>	<b>Estimated Operation and Maintenance Cost</b>
Type 1 and 2 Catch Basins	Storm Structure #6 Catch Basins and Manholes Oldcastle	Facilities collect stormwater runoff from the surface and discharge runoff into the conveyance system.	\$500

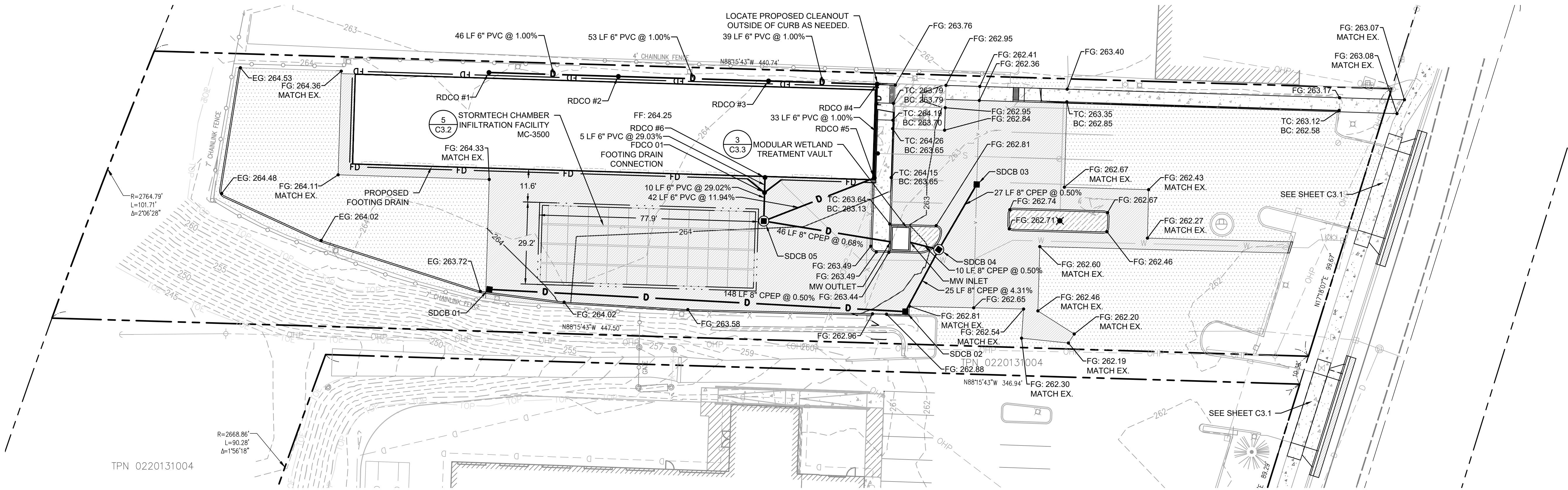
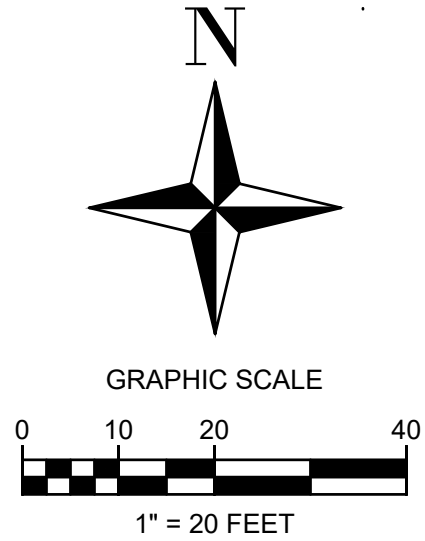
StormTech Infiltration System	#3 Standard Infiltration Trenches StormTech Isolator Row O and M Manual	Collects stormwater runoff and discharges stormwater into the native soils utilizing infiltration.	\$1500
----------------------------------	---	---	--------

## **Site Plan Showing Facility Locations**

Sheet C3.0 of Civil Drawings

ALL DISTURBED AREA TO BE COMPOST SOIL  
AMENDED PER CITY OF TACOMA BMP L613

4  
C3.3



## LEGEND

TYPE 1 CATCH BASIN

TYPE 2 MANHOLE

ROOF DRAIN CLEANOUT

PROPOSED STORM DRAIN PIPE

PROPOSED ROOF DRAIN PIPE

FOOTING DRAIN

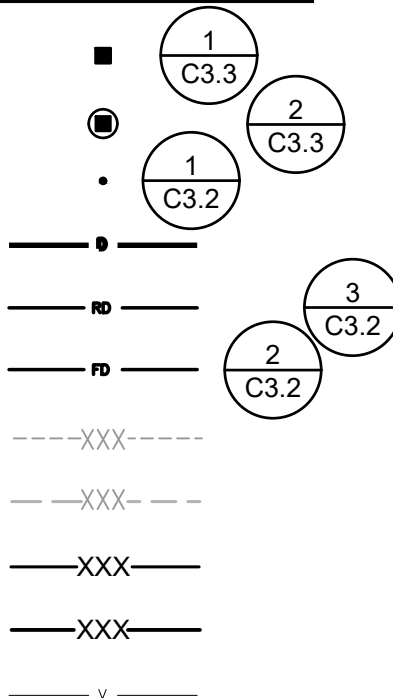
EXISTING MINOR CONTOUR

EXISTING MAJOR CONTOUR

PROPOSED MINOR CONTOUR

PROPOSED MAJOR CONTOUR

VALLEY FLOWLINE



## EARTHWORK QUANTITIES

CUT = 37 CU. YDS

FILL = 120 CU. YDS

NOTE: FILL = 83 CU. YDS (FILL)

NOTE:

THE ABOVE QUANTITIES ARE ESTIMATES ONLY INTENDED FOR THE PERMITTING PROCESS. DO NOT USE FOR BID PURPOSES. THE QUANTITIES DO NOT HAVE STRIPPING, COMPACTION, OR CUT OR FILL ADJUSTMENT FACTORS APPLIED TO THEM, NOR DO THEY ACCOUNT FOR ROADWAY SECTION.

## TOPOGRAPHIC NOTE

THE EXISTING CULTURAL AND TOPOGRAPHIC DATA SHOWN ON THESE DRAWINGS HAS BEEN PREPARED, IN PART, BASED UPON INFORMATION FURNISHED BY OTHERS. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, HENDRICKSON ENGINEERING PLLC CANNOT ENSURE ACCURACY AND THUS IS NOT RESPONSIBLE FOR THE ACCURACY OF THAT INFORMATION OR FOR ANY ERRORS OR OMISSIONS WHICH MAY HAVE BEEN INCORPORATED INTO THESE DRAWINGS AS A RESULT.

## BASIS OF BEARING

HELD SOUTH 88°42'01" EAST BETWEEN CITY OF TACOMA CONTROL MONUMENTS #1220 AND #1033

## HORIZONTAL DATUM

WASHINGTON STATE PLAN COORDINATE SYSTEM, SOUTH ZONE (NAD 83/91)

BASED ON TIES CITY OF TACOMA MONUMENTS #34, 1033, 1219 AND 1220.

COT MONUMENT #1220

N 695117.01

E 1147556.43

FOUND 3" BRASS DISK W/PUNCH ON SURFACE AT INTX. OF S. 38TH ST. AND UNION AVE.

## VERTICAL DATUM

CITY OF TACOMA NGVD 29

BENCHMARK 3760

DESC "X" ON SE BOLT OF STREET LIGHT POLE AT THE SE CORNER OF THE INTERSECTION OF S 38TH STREET AND SOUTH TACOMA WAY.  
ELEV: 263.28'

## DRAINAGE NOTE

- ALL CATCH BASINS SHALL HAVE VANED GRATES UNLESS OTHERWISE NOTED.
- PIPE COVER SHALL BE A MINIMUM OF 2' FOR CPEP AND 1' FOR DUCTILE IRON.
- ALL ROOF DRAINS TO BE RIGID PVC UNLESS OTHERWISE NOTED.
- PIPE BEDDING AND BACKFILL SHALL BE PER DETAIL.
- ALL STORM PIPES SHALL BE CPEP UNLESS OTHERWISE NOTED. CPEP PIPES SHALL BE ADS N-12 OR APPROVED EQUAL.
- PROPOSED PIPE LENGTHS AND HORIZONTAL CONTROL ARE PROVIDED TO CENTER OF STRUCTURE UNLESS OTHERWISE NOTED.
- ALL ELEVATIONS ARE TO FINISHED GRADE UNLESS OTHERWISE NOTED.
- ALL STORM PIPES SHALL BE CLEANED BEFORE FINAL ACCEPTANCE.
- CONTRACTOR TO CLEAN EXISTING STORM CATCH BASINS. REMOVE EXISTING LIQUIDS AND ANY ACCUMULATED SEDIMENT; DISPOSE OF AT AN APPROVED OFFSITE LOCATION AND PROVIDE COUNTY INSPECTOR WITH A COPY OF THE BILL OF LADING.
- MATERIALS FOR THE STORM DRAINAGE SYSTEM SHALL BE IN ACCORDANCE WITH THE 2021 CITY OF TACOMA STORMWATER MANAGEMENT MANUAL.
- ALL CATCH BASINS, INLETS, ETC SHALL BE MARKED WITH THE APPROVED COT CURB MARKERS / STENCILS. STENCILS ARE AVAILABLE FOR BOTH PRIVATE AND PUBLIC PROJECTS AS NEEDED.

STORM STRUCTURE TABLE	
STRUCTURE NAME	STRUCTURE DETAILS
FDCO 01 CO N 694944.64 E 1147237.65	RIM = 262.20 IE = 258.44 (6" N) IE = 258.44 (6" S) IE = 261.00 (4" NE) IE = 261.00 (4" NW)
MW INLET Null Structure N 694926.95 E 1147289.53	IE = 259.21 (8" E)
MW OUTLET Null Structure N 694927.13 E 1147282.53	IE = 255.81 (8" W)
RD CO #1 CO N 694987.35 E 1147139.55	RIM = 263.96 IE = 262.25 (6" E)
RD CO #2 CO N 694985.95 E 1147185.61	RIM = 264.36 IE = 261.79 (6" W) IE = 261.79 (6" E)
RD CO #3 CO N 694984.33 E 1147239.08	RIM = 264.32 IE = 261.26 (6" W) IE = 261.26 (6" E)
RD CO #4 CO N 694983.15 E 1147277.73	RIM = 263.95 IE = 260.87 (6" W) IE = 260.87 (6" S)
RD CO #5 CO N 694949.84 E 1147276.72	RIM = 264.23 IE = 260.54 (6" N) IE = 260.54 (6" W)
RD CO #6 CO N 694950.02 E 1147237.81	RIM = 264.27 IE = 260.00 (6" S)
SDCB 01 TYPE 1 N 694910.21 E 1147139.69	RIM = 263.75 IE = 261.08 (8" E)

STORM STRUCTURE TABLE	
STRUCTURE NAME	STRUCTURE DETAILS
SDCB 02 TYPE 1 N 694902.33 E 1147287.79	RIM = 262.81 IE = 260.34 (8" NE) IE = 260.34 (8" W)
SDCB 03 TYPE 1 N 694947.55 E 1147313.18	RIM = 262.06 IE = 259.39 (8" SW)
SDCB 04 48" TYPE 2 N 694924.38 E 1147299.67	RIM = 262.89 IE = 259.26 (8" W) IE = 259.26 (8" NE) IE = 259.26 (8" SW)
SDCB 05 48" TYPE 2 N 694934.52 E 1147237.39	RIM = 264.04 IE = 255.50 (8" E) IE = 255.50 (6" E) IE = 255.50 (6" N)



**HENDRICKSON**  
ENGINEERING  
6909 FORD DR NW, GIG HARBOR, WA 98335 TEL: 253.514.2413

NOTICE  
ALTERATION OF THIS DOCUMENT SHALL INVALIDATE THE PROFESSIONAL SEAL AND SIGNATURE. PUBLICATION OF THIS DOCUMENT DOES NOT DEPRECIATE FROM RESERVED OWNERSHIP RIGHTS IN IT. THIS DOCUMENT IS FOR USE ONLY FOR THE PROJECT IDENTIFIED IN THE TITLE BLOCK AND IS NOT TO BE USED FOR REPAIR, REMODEL, OR ADDITION TO THAT PROJECT OR FOR ANY OTHER PROJECT.



NO REVISION

DATE

APPD

FINAL  
CONSTRUCTION  
CHECKED

DATE  
10.5.2023

SCALE  
N/A

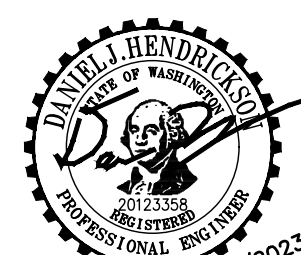
DESIGNED  
DJH

CHECKED  
DJH

DRAWN  
DJH

PROJECT NAME  
TACOMA SUBARU  
MOD FACILITY

DRAWING NAME  
GRADING AND  
DRAINAGE PLAN



CITY OF TACOMA  
DEPARTMENT OF PUBLIC WORKS

TACOMA SUBARU MOD FACILITY  
3812 SOUTH TACOMA WAY, TACOMA, WA 98409  
SITE DEVELOPMENT PERMIT SET

SDEV23-0202

SHEET NO.

C3.0

SHEET 7 OF 12

## **Maintenance Schedules**

Attach a description of all maintenance tasks and the frequency of each task for each facility. Include any manufacturer's recommendations. The appropriate Maintenance Standards from Volume 4, Appendix C of the SWMM can be used for this purpose where they are available for a given BMP.

## **Maintenance Activity Log**

Provide a sample maintenance activity log indicating emergency and routine actions to be taken. Attach to this document.

## **Covenant and Easement Agreement**

Include a copy of the recorded Covenant and Easement Agreement. Include a copy of recorded document if available.

## **Access and Easement Documentation**

Include all associated access and easement documents that may be associated with the permanent stormwater system. Include copy of recorded document if available.

**#3 - Maintenance Standard for Infiltration Trenches**

Recommended Inspection Frequency	Stormwater System Feature	Problem	Condition When Maintenance is Required	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General	Trash and Debris	Trash and debris in presettling basin, sump, or observation well/port.	Trash and debris cleared from site.
Annually (preferably Sept.)	General	Poisonous Vegetation and noxious weeds	Any poisonous or nuisance vegetation which may constitute a hazard to maintenance personnel or the public. Any evidence of noxious weeds as defined by State or Local Regulations. (Apply requirements of adopted integrated pest management policies for the use of herbicides.)	No danger of poisonous vegetation where maintenance personnel or the public might normally be. (Coordinate with the Pierce County Noxious Weed Control Board) Complete eradication of noxious weeds may not be possible. Compliance with state or local eradication policies required.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General	Contaminants and Pollution	Any evidence of oil, gasoline, contaminants or other pollutants	No contaminants or pollutants present. (Coordinate removal/cleanup with Environmental Services at 253.502.2222 and/or DOE Spill Response 800.424.8802.)
Annually (preferably Sept.)	General	Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.
Monthly from Oct. – Apr.	General	Water Not Infiltrating	Water ponding on surface or visible in observation well 24 hours after storm event.	Sediment is removed and/or facility is cleaned so that infiltration system works according to design. Remove any sediment from surface inlet if applicable.

Recommended Inspection Frequency	Stormwater System Feature	Problem	Condition When Maintenance is Required	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.) and after any major storm event (1" in 24 hours)	Trenches	Observation Well (Use surface of trench if well is not present)	Water ponds at surface during storm events. Water visible in observation well 48 hours after storm event.	Remove and Replace rock layer and geomembrane or clean rock and geomembrane. Check underdrain pipe for sediment accumulation and remove sediment.
Annually (preferably Sept.)	General	Tree Growth and Dense Vegetation	Tree growth and dense vegetation which impedes inspection, maintenance access or interferes with maintenance activity (i.e., slope mowing, silt removal, vactoring, or equipment movements).	Trees and vegetation that do not hinder inspection or maintenance activities. Harvested trees should be recycled into mulch or other beneficial uses.
Annually (preferably Sept.)	Emergency Overflow/Spillway	Erosion	Erosion damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion. Any erosion observed on a compacted berm embankment.	Slopes should be stabilized using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction. If erosion is occurring on compacted berms a Washington State Licensed Professional Engineer should be consulted to resolve source of erosion.
Monthly from Oct. – Apr.	Presetting Sump	Facility or sump filled with sediment and/or debris	6 inches or designed sediment trap depth of sediment.	Sediment is removed.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

**#6 - Maintenance Standard for Catch Basins/Manholes**

Recommended Inspection Frequency	Stormwater System Feature	Problem	Condition When Maintenance is Required	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	General	"Dump no pollutants" Stencil or stamp not visible	Stencil or stamp should be visible and easily read	Warning signs (e.g., "Dump No Waste-Drains to Stream") shall be painted or embossed on or adjacent to all storm drain inlets.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General	Trash and Debris	Trash or debris which is located immediately in front of the catch basin opening or is blocking inlet capacity of the basin by more than 10 percent.	No trash or debris located immediately in front of catch basin or on grate opening.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General	Trash and Debris	Trash or debris (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the debris surface to the invert of the lowest pipe.	No trash or debris in the catch basin.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General	Trash and Debris	Trash or debris in any inlet or outlet pipe blocking more than one-third of its height.	Inlet and outlet pipes free of trash or debris.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General	Trash and Debris	Dead animals or vegetation that could generate odors and cause complaints or dangerous gases (e.g., methane).	No dead animals or vegetation present within the catch basin.

Recommended Inspection Frequency	Stormwater System Feature	Problem	Condition When Maintenance is Required	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General	Sediment	Sediment (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the sediment surface to the invert of the lowest pipe.	No sediment in the catch basin.
Annually (preferably Sept.)	General	Structure Damage to Frame and/or Top Slab	Top slab has holes larger than 2 square inches or cracks wider than one-fourth inch (intent is to make sure no material is running into basin).	Top slab is free of holes and cracks.
Annually (preferably Sept.)	General	Structure Damage to Frame and/or Top Slab	Frame not sitting flush on top slab, i.e., separation of more than three-fourth inch of the frame from the top slab. Frame not securely attached.	Frame is sitting flush on the riser rings or top slab and firmly attached.
Annually (preferably Sept.)	General	Fractures or Cracks in Basin Walls/ Bottom	Maintenance person judges that structure is unsound.	Basin replaced or repaired to design standards.
Annually (preferably Sept.)	General	Fractures or Cracks in Basin Walls/ Bottom	Grout fillet has separated or cracked wider than one-half-inch and longer than 1 foot at the joint of any inlet/outlet pipe or any evidence of soil particles entering catch basin through cracks.	Pipe is regouted and secure at basin wall.
Annually (preferably Sept.)	General	Settlement/ Misalignment	If failure of basin has created a safety, function, or design problem.	Basin replaced or repaired to design standards.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General	Vegetation	Vegetation growing across and blocking more than 10 percent of the basin opening.	No vegetation blocking opening to basin.

Recommended Inspection Frequency	Stormwater System Feature	Problem	Condition When Maintenance is Required	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General	Vegetation	Vegetation growing in inlet/outlet pipe joints that is more than 6 inches tall and less than 6 inches apart.	No vegetation or root growth present.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General	Contamination and Pollution	Any evidence of oil, gasoline, contaminants or other pollutants.	No contaminants or pollutants present. (Coordinate removal/cleanup with Environmental Services at 253.502.2222 and/or DOE Spill Response 800.424.8802.)
Annually (preferably Sept.)	Catch Basin Cover	Cover Not in Place	Cover is missing or only partially in place.	Catch basin cover is in place.
Annually (preferably Sept.)	Catch Basin Cover	Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than one-half-inch of thread.	Mechanism opens with proper tools.
Annually (preferably Sept.)	Catch Basin Cover	Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. (Intent is keep cover from sealing off access to maintenance.)	Cover can be removed by one maintenance person.
Annually (preferably Sept.)	Ladder	Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, not securely attached to basin wall, misalignment, rust, cracks, or sharp edges.	Ladder meets design standards and allows maintenance person safe access.
Annually (preferably Sept.)	Grates	Grate opening Unsafe	Grate with opening wider than seven-eighths of an inch.	Grate opening meets design standards.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	Grates	Trash and Debris	Trash and debris that is blocking more than 20 percent of grate surface inletting capacity.	Grate free of trash and debris.

Recommended Inspection Frequency	Stormwater System Feature	Problem	Condition When Maintenance is Required	Maintenance Activities and Conditions that Should Exist
Annually (preferably Sept.)	Grates	Damaged or Missing.	Grate missing or broken member(s) of the grate.	Grate is in place , meets design standards, and is installed and aligned with flowpath.
Annually (preferably Sept.)	General	Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.

If you are unsure whether a problem exists, please contact Environmental Services at 253.591.5588.

Comments:

**#19 - Maintenance Standard for Fencing/Shrubbery Screen/Other Landscaping**

Recommended Inspection Frequency	Stormwater System Feature	Problem	Condition When Maintenance is Required	Maintenance Activities and Conditions that Should Exist
Monthly from Oct. – Apr.	General	Missing or broken parts/ dead shrubbery	Any defect in the fence or screen that permits easy entry to a facility.	Fence is mended or shrubs replaced to form a solid barrier to entry.
Monthly from Oct. – Apr. and after any major storm event (1" in 24 hours)	General	Erosion	Erosion has resulted in an opening under a fence that allows entry by people or pets.	Replace soil under fence so that no opening exceeds 4 inches in height.
Monthly from Oct. – Apr.	General	Unruly Vegetation	Shrubbery is growing out of control or is infested with weeds.	Shrubbery is trimmed and weeded to provide appealing aesthetics. Do not use chemicals to control weeds.
Annually (preferably Sept.)	Fences	Damaged Parts	Posts out of plumb more than 6 inches.	Posts are within 1.5 inches of plumb.
Annually (preferably Sept.)	Fences	Damaged Parts	Top rails bent more than 6 inches.	Top rail free of bends greater than 1 inch.
Annually (preferably Sept.)	Fences	Damaged Parts	Any part of fence (including posts, top rails, and fabric) more than 1 foot out of design alignment.	Fence is aligned and meets design standards.
Annually (preferably Sept.)	Fences	Damaged Parts	Missing or loose tension wire.	Tension wire in place and holding fabric.
Annually (preferably Sept.)	Fences	Damaged Parts	Missing or loose barbed wire that is sagging more than 2.5 inches between posts.	Barbed wire in place with less than three-fourth inch sag between posts.
Annually (preferably Sept.)	Fences	Damaged Parts	Extension arm missing, broken, or bent out of shape more than 1.5 inches.	Extension arm in place with no bends larger than three-fourth inch.
Annually (preferably Sept.)	Fences	Deteriorated Paint or Protective Coating	Part or parts that have a rusting or scaling condition that has affected structural adequacy.	Structurally adequate posts or parts with a uniform protective coating.
Annually (preferably Sept.)	General	Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted integrated pest management policies.

# Isolator<sup>®</sup> Row Plus

## O&M Manual

---



# The Isolator<sup>®</sup> Row Plus

## Introduction

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

## The Isolator Row Plus

The Isolator Row Plus is a row of StormTech chambers, either SC-160, SC-310, SC-310-3, SC-740, DC-780, MC-3500 or MC-7200 models, that is surrounded with filter fabric and connected to a closely located manhole for easy access. The fabric-wrapped chambers provide for sediment settling and filtration as stormwater rises in the Isolator Row Plus and passes through the filter fabric. The open bottom chambers and perforated sidewalls (SC-310, SC-310-3 and SC-740 models) allow stormwater to flow both vertically and horizontally out of the chambers. Sediments are captured in the Isolator Row Plus protecting the adjacent stone and chambers storage areas from sediment accumulation.

ADS geotextile fabric is placed between the stone and the Isolator Row Plus chambers. The woven geotextile provides a media for stormwater filtration, a durable surface for maintenance, prevents scour of the underlying stone and remains intact during high pressure jetting. A non-woven fabric is placed over the chambers to provide a filter media for flows passing through the chamber's sidewall. The non-woven fabric is not required over the SC-160, DC-780, MC-3500 or MC-7200 models as these chambers do not have perforated side walls.

The Isolator Row Plus is designed to capture the "first flush" runoff and offers the versatility to be sized on a volume basis or a flow-rate basis. An upstream manhole provides access to the Isolator Row Plus and includes a high/low concept such that stormwater flow rates or volumes that exceed the capacity of the Isolator Row Plus bypass through a manifold to the other chambers. This is achieved with an elevated bypass manifold or a high-flow weir. This creates a differential between the Isolator Row Plus row of chambers and the manifold to the rest of the system, thus allowing for settlement time in the Isolator Row Plus. After Stormwater flows through the Isolator Row Plus and into the rest of the chamber system it is either exfiltrated into the soils below or passed at a controlled rate through an outlet manifold and outlet control structure.

The Isolator Row FLAMP<sup>™</sup> (patent pending) is a flared end ramp apparatus attached to the inlet pipe on the inside of the chamber end cap. The FLAMP provides a smooth transition from pipe invert to fabric bottom. It is configured to improve chamber function performance by enhancing outflow of solid debris that would otherwise collect at the chamber's end. It also serves to improve the fluid and solid flow into the access pipe during maintenance and cleaning and to guide cleaning and inspection equipment back into the inlet pipe when complete.

The Isolator Row Plus may be part of a treatment train system. The treatment train design and pretreatment device selection by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, StormTech recommend using the Isolator Row Plus to minimize maintenance requirements and maintenance costs.

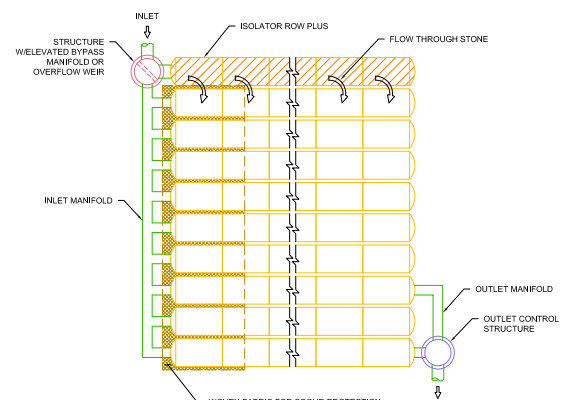
**Note:** See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row Plus.



**Looking down the Isolator Row PLUS from the manhole opening, ADS PLUS Fabric is shown between the chamber and stone base.**



**StormTech Isolator Row PLUS with Overflow Spillway (not to scale)**



# Isolator Row Plus Inspection/Maintenance

## 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 Plus 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 Plus 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.

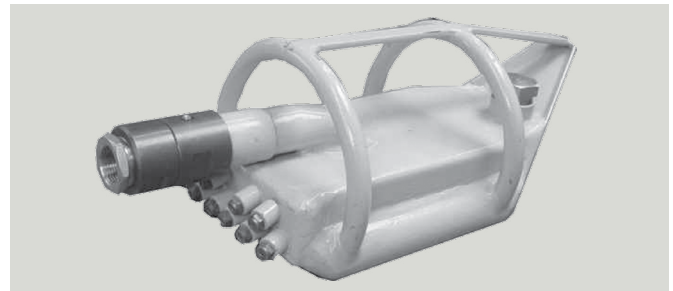
If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3 inches throughout the length of the Isolator Row Plus, clean-out should be performed.

## Maintenance

The Isolator Row Plus 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

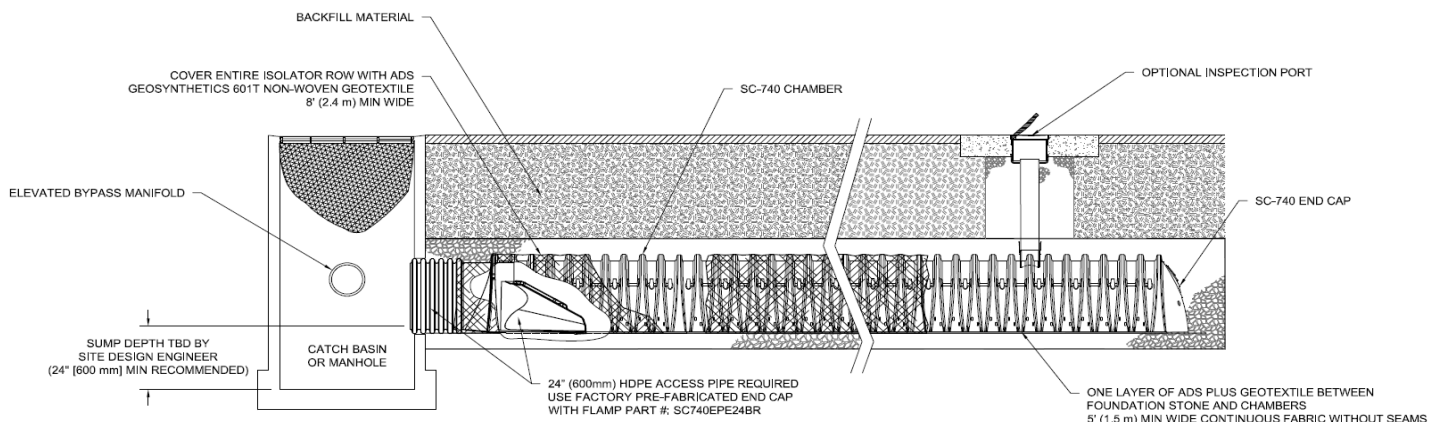
via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entries.

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row Plus 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. StormTech recommends a maximum nozzle pressure of 2000 psi be utilized during cleaning. JetVac reels can vary in length. For ease of maintenance, ADS recommends Isolator Row Plus lengths up to 200' (61 m). **The JetVac process shall only be performed on StormTech Isolator Row Plus that have ADS Plus Fabric (as specified by StormTech) over their angular base stone.**



## StormTech Isolator Row PLUS (not to scale)

**Note:** Non-woven fabric is only required over the inlet pipe connection into the end cap for SC-160LP, DC-780, MC-3500 and MC-7200 chamber models and is not required over the entire Isolator Row PLUS.



# Isolator Row Plus Step By Step Maintenance Procedures

## Step 1

Inspect Isolator Row Plus 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 Row Plus
  - i. Remove cover from manhole at upstream end of Isolator Row Plus
  - ii. Using a flashlight, inspect down Isolator Row Plus 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.

## Step 2

Clean out Isolator Row Plus using the JetVac process.

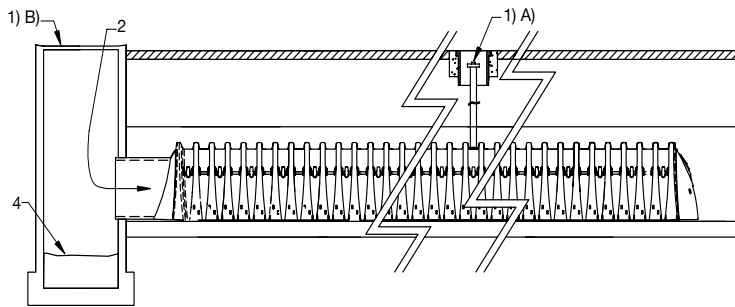
- A) A fixed floor cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable
- B) Apply multiple passes of JetVac until backflush water is clean
- C) Vacuum manhole sump as required

## 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		Sedi- ment Depth (1)-(2)	Observations/Actions	Inspector
	Fixed point to chamber bottom (1)	Fixed point to top of sediment (2)			
3/15/11	6.3 ft	none		New installation. Fixed point is CI frame at grade	DJM
9/24/11		6.2	0.1 ft	Some grit felt	SM
6/20/13		5.8	0.5 ft	Mucky feel, debris visible in manhole and in Isolator Row PLUS, maintenance due	NV
7/7/13	6.3 ft		0	System jetted and vacuumed	DJM

adspipe.com

800-821-6710

## Modular Wetlands<sup>®</sup> Linear Operation & Maintenance Manual



**MODULAR WETLANDS® LINEAR  
OPERATION & MAINTENANCE MANUAL**

**TABLE OF CONTENTS**

Overview ..... 3

Inspection Summary..... 4

Inspection Process ..... 5

Maintenance Indicators ..... 6

Inspection Process ..... 7

Maintenance Summary ..... 8

    Pretreatment Chamber ..... 9

    Prefilter Cartridge ..... 10

    Biofiltration Chamber ..... 11

    Discharge Chamber ..... 12

Inspection Report..... 13

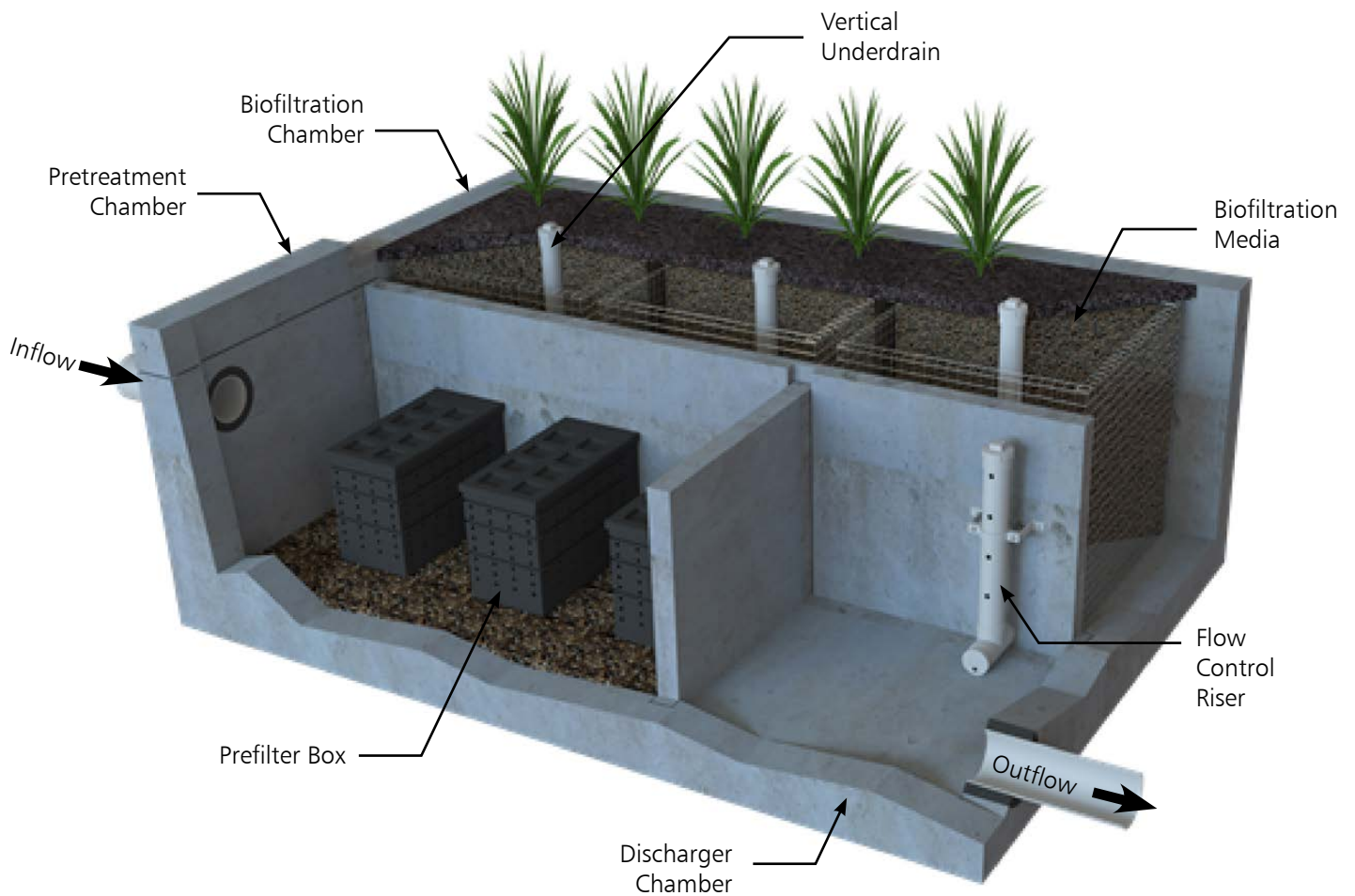
Cleaning and Maintenance Report..... 14

## OVERVIEW

The Modular Wetlands® Linear Biofilter is designed to remove high levels of trash, debris, sediments, nutrients, metals, and hydrocarbons. Its simple design allows for quick and easy installation. The system is housed in a standard precast structure and can be installed at various depths to meet site-specific conditions.

## INTRODUCTION

This is the Modular Wetlands Linear Biofilter operation and maintenance manual. Before starting, read the instructions and equipment lists closely. It is important to follow all necessary safety procedures associated with state and local regulations. Some steps required confined space entry. Please contact Contech for more information on pre-authorized third party contractors who can provide installation services in your area. For a list of service providers in your area please visit: [www.conteches.com/maintenance](http://www.conteches.com/maintenance).



# INSTRUCTIONS

## ***INSPECTION SUMMARY***

Stormwater regulations require BMPs be inspected and maintained to ensure they are operating as designed to allow for effective pollutant removal and provide protection to receiving water bodies. It is recommended that inspections be performed multiple times during the first year to assess the site specific loading conditions. The first year of inspections can be used to set inspection and maintenance intervals for subsequent years to ensure appropriate maintenance is provided.

- Inspect pre-treatment, biofiltration, and discharge chambers an average of once every six to twelve months. Varies based on site specific and local conditions.
- Average inspection time is approximately 15 minutes. Always ensure appropriate safety protocol and procedures are followed.

The following is a list of equipment required to allow for simple and effective inspection of the Modular Wetlands Linear:

- Modular Wetlands Linear Inspection Form
- Flashlight
- Manhole hook or appropriate tools to remove access hatches and covers
- Appropriate traffic control signage and procedures
- Measuring pole and/or tape measure
- Protective clothing and eye protection
- 7/16" open or closed ended wrench
- Large permanent black marker (initial inspections only - first year)

Note: entering a confined space requires appropriate safety and certification. It is generally not required for routine inspections of the system

## **INSPECTION AND MAINTENANCE NOTES**

1. Following maintenance and/or inspection, it is recommended that the maintenance operator prepare a maintenance/inspection record. The record should include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.
2. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.
3. Transport all debris, trash, organics, and sediments to approved facility for disposal in accordance with local and state requirements.
4. Entry into chambers may require confined space training based on state and local regulations.
5. No fertilizer shall be used in the biofiltration chamber.
6. Irrigation should be provided as recommended by manufacturer and/or landscape architect. Amount of irrigation required is dependent on plant species. Some plants may not require irrigation after initial establishment.

## INSPECTION PROCESS

1. Prepare the inspection form by writing in the necessary information including project name, location, date & time, unit number and other information (see inspection form).
2. Observe the inside of the system through the access covers. If minimal light is available and vision into the unit is impaired, utilize a flashlight to see inside the system and all of its chambers.
3. Look for any out of the ordinary obstructions in the inflow pipe, pre-treatment chamber, biofiltration chamber, discharge chamber or outflow pipe. Write down any observations on the inspection form.
4. Through observation and/or digital photographs, estimate the amount of trash, debris accumulated in the pre-treatment chamber. Utilizing a tape measure or measuring stick, estimate the amount of sediment in this chamber. Record this depth on the inspection form.
5. Through visual observation, inspect the condition of the pre-filter cartridges. Look for excessive build-up of sediment on the cartridges, any build-up on the tops of the cartridges, or clogging of the holes. Record this information on the inspection form. The prefilter cartridges can be further inspected by removing the cartridge tops and assessing the color of the BioMediaGREEN filter cubes (requires entry into pre-treatment chamber - see notes previous notes regarding confined space entry). Record the color of the material. New material is a light green color. As the media becomes clogged, it will turn darker in color, eventually becoming dark brown or black. The closer to black the media is the higher percentage that the media is exhausted and is in need of replacement.

New  
BioMediaGREEN  
0%

Exhausted  
BioMediaGREEN  
100%

85%



6. The biofiltration chamber is generally maintenance-free due to the system's advanced pre-treatment chamber. For units which have open planters with vegetation, it is recommended that the vegetation be inspected. Look for any plants that are dead or showing signs of disease or other negative stressors. Record the general health of the plants on the inspection form and indicate through visual observation or digital photographs if trimming of the vegetation is required.
7. The discharge chamber houses the orifice control structure, drain down filter (only in California - older models), and is connected to the outflow pipe. It is important to check to ensure the orifice is in proper operating conditions and free of any obstructions. It is also important to assess the condition of the drain down filter media which utilizes a block form of the BioMediaGREEN. Assess in the same manner as the cubes in the pre-filter cartridge as mentioned above. Generally, the discharge chamber will be clean and free of debris. Inspect the water marks on the side walls. If possible, inspect the discharge chamber during a rain event to assess the amount of flow leaving the system while it is at 100% capacity (pre-treatment chamber water level at peak HGL - top of bypass weir). The water level of the flowing water should be compared to the watermark level on the side walls, which is an indicator of the highest discharge rate the system achieved when initially installed. Record on the form if there is any difference in level from the watermark in inches.

*NOTE: During the first few storms, the water level in the outflow chamber should be observed and a 6" long horizontal watermark line drawn (using a large permanent marker) at the water level in the discharge chamber while the system is operating at 100% capacity. The diagram below illustrates where the line should be drawn. This line is a reference point for future inspections of the system.*

*Water level in the discharge chamber is a function of flow rate and pipe size. Observation of the water level during the first few months of operation can be used as a benchmark level for future inspections. The initial mark and all future observations shall be made when the system is at 100% capacity (water level at maximum level in the pre-treatment chamber). If future water levels are below this mark when the system is at 100% capacity, this is an indicator that maintenance to the pre-filter cartridges may be needed.*

8. Finalize the inspection report for analysis by the maintenance manager to determine if maintenance is required.



## MAINTENANCE INDICATORS

Based upon the observations made during inspection, maintenance of the system may be required based on the following indicators:

- Missing or damaged internal components or cartridges
- Obstructions in the system or its inlet and/or outlet pipes
- Excessive accumulation of floatables in the pretreatment chamber in which the length and width of the chamber is fully impacted more than 18". See photo below.
- Excessive accumulation of sediment in the pretreatment chamber of more than 6" in depth.
- Excessive accumulation of sediment on the BioMediaGREEN media housed within the pretreatment cartridges. The following chart shows photos of the condition of the BioMediaGREEN contained within the pre-filter cartridges. When media is more than 85% clogged, replacement is required.
- Excessive accumulation of sediment on the BioMediaGREEN media housed within the pretreatment cartridges. When media is more than 85% clogged, replacement is required. The darker the BioMediaGREEN, the more clogged it is and in need of replacement.



## INSPECTION PROCESS

- Excessive accumulation of sediment on the BioMediaGREEN media housed within the drain down filter (California only - older models). The following photos show the condition of the BioMediaGREEN contained within the drain down filter. When media is more than 85% clogged, replacement is required.



- Overgrown vegetation.



- Water level in the discharge chamber during 100% operating capacity (pretreatment chamber water level at max height) is lower than the water mark by 20%.

## MAINTENANCE SUMMARY

The time has come to maintain your Modular Wetlands® Linear. All necessary pre-maintenance steps must be carried out before maintenance occurs. Once traffic control has been set up per local and state regulations and access covers have been safely opened, the maintenance process can begin. It should be noted that some maintenance activities require confined space entry. All confined space requirements must be strictly followed before entry into the system. In addition, the following is recommended:

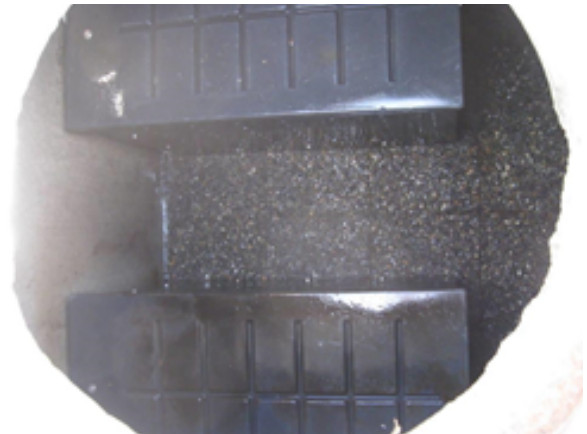
- Prepare the maintenance form by writing in the necessary information including project name, location, date & time, unit number and other info (see maintenance form).
- Set up all appropriate safety and cleaning equipment.
- Ensure traffic control is set up and properly positioned.
- Prepared pre-checks (OSHA, safety, confined space entry) are performed.

The following is a list of equipment to required for maintenance of the Modular Wetlands® Linear:

- Modular Wetlands Linear Maintenance Form
- Manhole hook or appropriate tools to access hatches and covers
- Protective clothing, flashlight, and eye protection
- 7/16" open or closed ended wrench
- Vacuum assisted truck with pressure washer
- Replacement BioMediaGREEN for pre-filter cartridges if required (order from one of Contech's Maintenance Team members at <https://www.conteches.com/maintenance>).

## MAINTENANCE | PRETREATMENT CHAMBER

1. Remove access cover over pre-treatment chamber and position vacuum truck accordingly.
2. With a pressure washer, spray down pollutants accumulated on walls and pre-filter cartridges.
3. Vacuum out pre-treatment chamber and remove all accumulated pollutants including trash, debris, and sediments. Be sure to vacuum the floor until the pervious pavers are visible and clean.
4. If pre-filter cartridges require media replacement, continue to step 5. If not, replace access cover and move to step 11.



## MAINTENANCE | PREFILTER CARTRIDGES

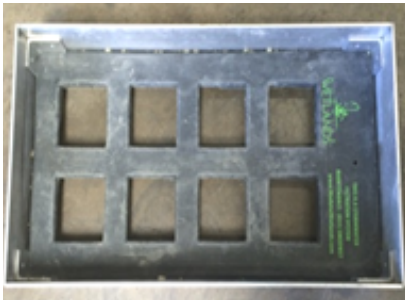
5. After successfully cleaning out the pre-treatment chamber (previous page) enter the pre-treatment chamber.
6. Unscrew the two bolts (circles shown below) holding the lid on each cartridge filter and remove lid.



7. Place the vacuum hose over each individual media filter to suck out filter media.



8. Once filter media has been sucked out, use a pressure washer to spray down the inside of the cartridge and it's media cages. Remove cleaned media cages and place to the side. Once removed, the vacuum hose can be inserted into the cartridge to vacuum out any remaining material near the bottom of the cartridge.
9. Reinstall media cages and fill with new media from the manufacturer or outside supplier. Manufacturer will provide specification of media and sources to purchase. Utilize the manufacture-provided refilling tray and place on top of the cartridge. Fill the tray with new bulk media and shake down into place. Using your hands, lightly compact the media into each filter cage. Once the cages are full, remove the refilling tray and replace the cartridge top, ensuring bolts are properly tightened.



10. Exit the pre-treatment chamber. Replace access hatch or manhole cover.

## MAINTENANCE | BIOFILTRATION CHAMBER

11. In general, the biofiltration chamber is maintenance-free with the exception of maintaining the vegetation. The Modular Wetlands Linear utilizes vegetation similar to surrounding landscape areas, therefore trim vegetation to match surrounding vegetation. If any plants have died, replace them with new ones.



12. Each vertical under drain on the biofiltration chamber has a removable (threaded cap) that can be taken off to check any blockages or root growth. Once removed, a jetting attachment can be used to clean out the under drain and orifice riser.
13. As with all biofilter systems, at some point the biofiltration media (WetlandMedia) will need to be replaced. Either because of physical clogging of sorptive exhaustion of the media ion exchange capacity (to remove dissolved metals and phosphorous). The general life of this media is 10 to 20 years based on site specific conditions and pollutant loading. Utilize the vacuum truck to vacuum out the media by placing the hose into the chamber. Once all the media is removed use the power washer to spray down all the netting on the outer metal cage. Inspect the netting for any damage or holes. If the netting is damaged it can be repaired or replaced with guidance by the manufacturer.
14. Contact one of Contech's Maintenance Team members at <https://www.conteches.com/maintenance> to order new WetlandMedia. The quantity of media needed can be determined by providing the model number and unit depth. Media will be provided in super sacks for easy installation. Each sack will weigh between 1000 and 2000 lbs. A lifting apparatus (backhoe, boom truck, or other) is recommended to position the super sack over the biofiltration chamber. Fill the media cages up to the same level as the old media. Replant with vegetation.



## MAINTENANCE | DISCHARGE CHAMBER

15. Remove access hatch or manhole cover over discharge chamber.
16. Enter chamber to gain access to the drain down filter. Unlock the locking mechanism and lift up drain down filter housing to remove used BioMediaGREEN filter block as shown below. *NOTE: Drain down filter is only found on units installed in California prior to 2023. If no drain down filter is present, skip steps 16 and 17.*



17. Insert a new BioMediaGREEN filter block and lock drain down filter housing back in place.
18. Replace access hatch or manhole cover over discharge chamber.

[illegible]

## Inspection Report Modular Wetlands Linear

Project Name _____		For Office Use Only  (Reviewed By) _____  (Date) _____ Office personnel to complete section to the left.
Project Address _____ (city) (Zip Code)		
Owner / Management Company _____		
Contact _____	Phone (     )     -     _____	
Inspector Name _____	Date ____ / ____ / ____	Time ____ AM / PM
Type of Inspection <input type="checkbox"/> Routine <input type="checkbox"/> Follow Up <input type="checkbox"/> Complaint <input type="checkbox"/> Storm    Storm Event in Last 72-hours? <input type="checkbox"/> No <input type="checkbox"/> Yes		
Weather Condition _____		Additional Notes _____

### Inspection Checklist

Modular Wetland System Type (Curb, Grate or UG Vault): \_\_\_\_\_ Size (22', 14' or etc.): \_\_\_\_\_

Structural Integrity:	Yes	No	Comments
Damage to pre-treatment access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Damage to discharge chamber access cover (manhole cover/grate) or cannot be opened using normal lifting pressure?			
Does the MWS unit show signs of structural deterioration (cracks in the wall, damage to frame)?			
Is the inlet/outlet pipe or drain down pipe damaged or otherwise not functioning properly?			
<b>Working Condition:</b>			
Is there evidence of illicit discharge or excessive oil, grease, or other automobile fluids entering and clogging the unit?			
Is there standing water in inappropriate areas after a dry period?			
Is the filter insert (if applicable) at capacity and/or is there an accumulation of debris/trash on the shelf system?			
Does the depth of sediment/trash/debris suggest a blockage of the inflow pipe, bypass or cartridge filter? If yes specify which one in the comments section. Note depth of accumulation in in pre-treatment chamber.			Depth:
Does the cartridge filter media need replacement in pre-treatment chamber and/or discharge chamber?			Chamber:
Any signs of improper functioning in the discharge chamber? Note issues in comments section.			
<b>Other Inspection Items:</b>			
Is there an accumulation of sediment/trash/debris in the wetland media (if applicable)?			
Is it evident that the plants are alive and healthy (if applicable)? Please note Plant Information below.			
Is there a septic or foul odor coming from inside the system?			

Waste:	Yes	No
Sediment / Silt / Clay		
Trash / Bags / Bottles		
Green Waste / Leaves / Foliage		

Recommended Maintenance	
No Cleaning Needed	
Schedule Maintenance as Planned	
Needs Immediate Maintenance	

Plant Information	
Damage to Plants	
Plant Replacement	
Plant Trimming	

Additional Notes: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



## Cleaning and Maintenance Report Modular Wetlands Linear

Project Name \_\_\_\_\_

Project Address \_\_\_\_\_  
(city) (Zip Code)

Owner / Management Company \_\_\_\_\_

Contact \_\_\_\_\_

Phone ( ) -

Inspector Name \_\_\_\_\_

Date \_\_\_\_ / \_\_\_\_ / \_\_\_\_ Time \_\_\_\_ AM / PM

Type of Inspection ☐ Routine ☐ Follow Up ☐ Complaint

☐ Storm Storm Event in Last 72-hours? ☐ No ☐ Yes

Weather Condition \_\_\_\_\_

Additional Notes \_\_\_\_\_

For Office Use Only
(Reviewed By)
(Date) Office personnel to complete section to the left.

Site Map #	GPS Coordinates of Insert	Manufacturer / Description / Sizing	Trash Accumulation	Foliage Accumulation	Sediment Accumulation	Total Debris Accumulation	Condition of Media 25/50/75/100 (will be changed @ 75%)	Operational Per Manufactures' Specifications (If not, why?)
	Lat:	MWS Catch Basins						
	Long:							
		MWS Sedimentation Basin						
		Media Filter Condition						
		Plant Condition						
		Drain Down Media Condition						
		Discharge Chamber Condition						
		Drain Down Pipe Condition						
		Inlet and Outlet Pipe Condition						

Comments:




© 2023 CONTECH ENGINEERED SOLUTIONS LLC, A QUIKRETE COMPANY

800-338-1122

[WWW.CONTECHES.COM](http://WWW.CONTECHES.COM)

ALL RIGHTS RESERVED. PRINTED IN THE USA.

CONTECH ENGINEERED SOLUTIONS LLC PROVIDES SITE SOLUTIONS FOR THE CIVIL ENGINEERING INDUSTRY. CONTECH'S PORTFOLIO INCLUDES BRIDGES, DRAINAGE, SANITARY SEWER, STORMWATER AND EARTH STABILIZATION PRODUCTS. FOR INFORMATION ON OTHER CONTECH DIVISION OFFERINGS, VISIT [CONTECHES.COM](http://CONTECHES.COM) OR CALL 800-338-1122.

NOTHING IN THIS CATALOG SHOULD BE CONSTRUED AS A WARRANTY. APPLICATIONS SUGGESTED HEREIN ARE DESCRIBED ONLY TO HELP READERS MAKE THEIR OWN EVALUATIONS AND DECISIONS, AND ARE NEITHER GUARANTEES NOR WARRANTIES OF SUITABILITY FOR ANY APPLICATION. CONTECH MAKES NO WARRANTY WHATSOEVER, EXPRESS OR IMPLIED, RELATED TO THE APPLICATIONS, MATERIALS, COATINGS, OR PRODUCTS DISCUSSED HEREIN. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND ALL IMPLIED WARRANTIES OF FITNESS FOR ANY PARTICULAR PURPOSE ARE DISCLAIMED BY CONTECH. SEE CONTECH'S CONDITIONS OF SALE (AVAILABLE AT [WWW.CONTECHES.COM/COS](http://WWW.CONTECHES.COM/COS)) FOR MORE INFORMATION.

## SUPPORT

DRAWINGS AND SPECIFICATIONS ARE AVAILABLE AT [WWW.CONTECHES.COM](http://WWW.CONTECHES.COM)

Modular Wetlands Maintenance Guide 1/2023



**April 2014**

## **GENERAL USE LEVEL DESIGNATION FOR BASIC, ENHANCED, AND PHOSPHORUS TREATMENT**

**For the**

**MWS-Linear Modular Wetland**

### **Ecology's Decision:**

Based on Modular Wetland Systems, Inc. application submissions, including the Technical Evaluation Report, dated April 1, 2014, Ecology hereby issues the following use level designation:

1. General use level designation (GULD) for the MWS-Linear Modular Wetland Stormwater Treatment System for Basic treatment
  - Sized at a hydraulic loading rate of 1 gallon per minute (gpm) per square foot (sq ft) of wetland cell surface area. For moderate pollutant loading rates (low to medium density residential basins), size the Prefilters at 3.0 gpm/sq ft of cartridge surface area. For high loading rates (commercial and industrial basins), size the Prefilters at 2.1 gpm/sq ft of cartridge surface area.
2. General use level designation (GULD) for the MWS-Linear Modular Wetland Stormwater Treatment System for Phosphorus treatment
  - Sized at a hydraulic loading rate of 1 gallon per minute (gpm) per square foot (sq ft) of wetland cell surface area. For moderate pollutant loading rates (low to medium density residential basins), size the Prefilters at 3.0 gpm/sq ft of cartridge surface area. For high loading rates (commercial and industrial basins), size the Prefilters at 2.1 gpm/sq ft of cartridge surface area.
3. General use level designation (GULD) for the MWS-Linear Modular Wetland Stormwater Treatment System for Enhanced treatment
  - Sized at a hydraulic loading rate of 1 gallon per minute (gpm) per square foot (sq ft) of wetland cell surface area. For moderate pollutant loading rates (low to medium density residential basins), size the Prefilters at 3.0 gpm/sq ft of cartridge surface area. For high loading rates (commercial and industrial basins), size the Prefilters at 2.1 gpm/sq ft of cartridge surface area.

4. Ecology approves the MWS - Linear Modular Wetland Stormwater Treatment System units for Basic, Phosphorus, and Enhanced treatment at the hydraulic loading rate listed above. Designers shall calculate the water quality design flow rates using the following procedures:

- Western Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using the latest version of the Western Washington Hydrology Model or other Ecology-approved continuous runoff model.
- Eastern Washington: For treatment installed upstream of detention or retention, the water quality design flow rate is the peak 15-minute flow rate as calculated using one of the three methods described in Chapter 2.2.5 of the Stormwater Management Manual for Eastern Washington (SWMM EW) or local manual.
- Entire State: For treatment installed downstream of detention, the water quality design flow rate is the full 2-year release rate of the detention facility.

5. These use level designations have no expiration date but may be revoked or amended by Ecology, and are subject to the conditions specified below.

**Ecology's Conditions of Use:**

Applicants shall comply with the following conditions:

1. Design, assemble, install, operate, and maintain the MWS – Linear Modular Wetland Stormwater Treatment System units, in accordance with Modular Wetland Systems, Inc. applicable manuals and documents and the Ecology Decision.
2. Each site plan must undergo Modular Wetland Systems, Inc. review and approval before site installation. This ensures that site grading and slope are appropriate for use of a MWS – Linear Modular Wetland Stormwater Treatment System unit.
3. MWS – Linear Modular Wetland Stormwater Treatment System media shall conform to the specifications submitted to, and approved by, Ecology.
4. Maintenance: The required maintenance interval for stormwater treatment devices is often dependent upon the degree of pollutant loading from a particular drainage basin. Therefore, Ecology does not endorse or recommend a “one size fits all” maintenance cycle for a particular model/size of manufactured filter treatment device.

- Typically, Modular Wetland Systems, Inc. designs MWS - Linear Modular Wetland systems for a target prefilter media life of 6 to 12 months.
- Indications of the need for maintenance include effluent flow decreasing to below the design flow rate or decrease in treatment below required levels.
- Owners/operators must inspect MWS - Linear Modular Wetland systems for a minimum of twelve months from the start of post-construction operation to determine site-specific maintenance schedules and requirements. You must conduct inspections monthly during the wet season, and every other month during the dry season. (According to the SWMM WW, the wet season in western Washington is October 1 to April 30. According to SWMM EW, the wet season in eastern Washington is October 1 to June 30). After the

first year of operation, owners/operators must conduct inspections based on the findings during the first year of inspections.

- Conduct inspections by qualified personnel, follow manufacturer's guidelines, and use methods capable of determining either a decrease in treated effluent flowrate and/or a decrease in pollutant removal ability.
- When inspections are performed, the following findings typically serve as maintenance triggers:

- Standing water remains in the vault between rain events, or
- Bypass occurs during storms smaller than the design storm.
- If excessive floatables (trash and debris) are present (but no standing water or excessive sedimentation), perform a minor maintenance consisting of gross solids removal, not prefilter media replacement.
- Additional data collection will be used to create a correlation between pretreatment chamber sediment depth and pre-filter clogging (see *Issues to be Addressed by the Company* section below)

6. Discharges from the MWS - Linear Modular Wetland Stormwater Treatment System units shall not cause or contribute to water quality standards violations in receiving waters.

Applicant: Modular Wetland Systems, Inc.  
Applicant's Address: P.O. Box 869  
Oceanside, CA 92054

#### **Application Documents:**

- *Original Application for Conditional Use Level Designation*, Modular Wetland System, Linear Stormwater Filtration System Modular Wetland Systems, Inc., January 2011
- *Quality Assurance Project Plan: Modular Wetland system – Linear Treatment System performance Monitoring Project*, draft, January 2011.
- *Revised Application for Conditional Use Level Designation*, Modular Wetland System, Linear Stormwater Filtration System Modular Wetland Systems, Inc., May 2011
- *Memorandum: Modular Wetland System-Linear GULD Application Supplementary Data*, April 2014
- *Technical Evaluation Report: Modular Wetland System Stormwater Treatment System Performance Monitoring*, April 2014.

#### **Applicant's Use Level Request:**

General use level designation as a Basic, Enhanced, and Phosphorus treatment device in accordance with Ecology's Guidance for Evaluating Emerging Stormwater Treatment Technologies Technology Assessment Protocol – Ecology (TAPE) January 2011 Revision.

**Applicant's Performance Claims:**

- The MWS – Linear Modular wetland is capable of removing a minimum of 80-percent of TSS from stormwater with influent concentrations between 100 and 200 mg/l.
- The MWS – Linear Modular wetland is capable of removing a minimum of 50-percent of Total Phosphorus from stormwater with influent concentrations between 0.1 and 0.5 mg/l.
- The MWS – Linear Modular wetland is capable of removing a minimum of 30-percent of dissolved Copper from stormwater with influent concentrations between 0.005 and 0.020 mg/l.
- The MWS – Linear Modular wetland is capable of removing a minimum of 60-percent of dissolved Zinc from stormwater with influent concentrations between 0.02 and 0.30 mg/l.

**Ecology Recommendations:**

- Modular Wetland Systems, Inc. has shown Ecology, through laboratory and field-testing, that the MWS - Linear Modular Wetland Stormwater Treatment System filter system is capable of attaining Ecology's Basic, Total phosphorus, and Enhanced treatment goals.

**Findings of Fact:**Laboratory Testing

The MWS-Linear Modular wetland has the:

- Capability to remove 99 percent of total suspended solids (using Sil-Co-Sil 106) in a quarter-scale model with influent concentrations of 270 mg/L.
- Capability to remove 91 percent of total suspended solids (using Sil-Co-Sil 106) in laboratory conditions with influent concentrations of 84.6 mg/L at a flow rate of 3.0 gpm per square foot of media.
- Capability to remove 93 percent of dissolved Copper in a quarter-scale model with influent concentrations of 0.757 mg/L.
- Capability to remove 79 percent of dissolved Copper in laboratory conditions with influent concentrations of 0.567 mg/L at a flow rate of 3.0 gpm per square foot of media.
- Capability to remove 80.5-percent of dissolved Zinc in a quarter-scale model with influent concentrations of 0.95 mg/L at a flow rate of 3.0 gpm per square foot of media.
- Capability to remove 78-percent of dissolved Zinc in laboratory conditions with influent concentrations of 0.75 mg/L at a flow rate of 3.0 gpm per square foot of media.

Field Testing

- Modular Wetland Systems, Inc. conducted monitoring of an MWS-Linear (Model # MWS-L-4-13) from April 2012 through May 2013, at a transportation maintenance facility in Portland, Oregon. The manufacturer collected flow-weighted composite

samples of the system's influent and effluent during 28 separate storm events. The system treated approximately 75 percent of the runoff from 53.5 inches of rainfall during the monitoring period. The applicant sized the system at 1 gpm/sq ft. (wetland media) and 3gpm/sq ft. (prefilter).

- Influent TSS concentrations for qualifying sampled storm events ranged from 20 to 339 mg/L. Average TSS removal for influent concentrations greater than 100 mg/L (n=7) averaged 85 percent. For influent concentrations in the range of 20-100 mg/L (n=18), the upper 95 percent confidence interval about the mean effluent concentration was 12.8 mg/L.
- Total phosphorus removal for 17 events with influent TP concentrations in the range of 0.1 to 0.5 mg/L averaged 65 percent. A bootstrap estimate of the lower 95 percent confidence limit (LCL95) of the mean total phosphorus reduction was 58 percent.
- The lower 95 percent confidence limit of the mean percent removal was 60.5 percent for dissolved zinc for influent concentrations in the range of 0.02 to 0.3 mg/L (n=11). The lower 95 percent confidence limit of the mean percent removal was 32.5 percent for dissolved copper for influent concentrations in the range of 0.005 to 0.02 mg/L (n=14) at flow rates up to 28 gpm (design flow rate 41 gpm). Laboratory test data augmented the data set, showing dissolved copper removal at the design flow rate of 41 gpm (93 percent reduction in influent dissolved copper of 0.757 mg/L).

#### **Issues to be addressed by the Company:**

1. Modular Wetland Systems, Inc. should collect maintenance and inspection data for the first year on all installations in the Northwest in order to assess standard maintenance requirements for various land uses in the region. Modular Wetland Systems, Inc. should use these data to establish required maintenance cycles.
2. Modular Wetland Systems, Inc. should collect pre-treatment chamber sediment depth data for the first year of operation for all installations in the Northwest. Modular Wetland Systems, Inc. will use these data to create a correlation between sediment depth and pre-filter clogging.

#### **Technology Description:**

Download at <http://www.modularwetlands.com/>

#### **Contact Information:**

Applicant: Greg Kent  
Modular Wetland Systems, Inc.  
P.O. Box 869  
Oceanside, CA 92054  
[gkent@biocleanenvironmental.net](mailto:gkent@biocleanenvironmental.net)

Applicant website: <http://www.modularwetlands.com/>

sWhen Recorded Return To:

City of Tacoma  
Planning and Development Services  
747 Market Street, Room 620  
Tacoma, WA 98402

**Document Title: MAINTENANCE COVENANT AND ACCESS EASEMENT**  
3812 S Tacoma Way, Tacoma, WA 98409

**Grantor:**

Micky LLC

**Grantee:**

**CITY OF TACOMA, a Municipal Corporation**

**Legal Description (abbreviated):**

Section 13, Township 20, Range 2, Quarter 14. Section 13 Township 20 Range 02 Quarter 14 : BEG AT A PT ON WLY LI SO TAC WAY 296.02 FT N OF E & W C/L OF SEC TH NELY ALG WLY LI SO TAC WAY 100 FT WHICH IS 392.04 FT N OF E & W C/L OF SEC TH W PAR WITH SD C/L 442 FT TO ELY LI N P R/W TH SWLY ALG ELY LI SD R/W TO PT 296.02 FT N OF C/L OF SEC TH E 450 FT TO BEG BEING TR OF UNREC PLAT.

**See Page 10**, Exhibit "A", for Complete Legal Description of Subject Property

**Reference Number(s):**

City of Tacoma Site Development Permit No. SDEV23-0202

**Assessor's Parcel Number:**

0220131004

**MAINTENANCE COVENANT AND ACCESS EASEMENT**

3812 S Tacoma Way

Tacoma, WA 98409

Grantor as fee simple owner of the herein described Property, hereby freely and voluntarily grants to the City of Tacoma, a municipal corporation operating under the laws of the state of Washington (**City**), and its successors and assignees, the following maintenance covenant and access easement, which covenant and easement shall run with the land and be binding on all current and future owners or any portion of, or interest in, Grantor's real property situated in Pierce County, Washington and legally described in **Exhibit A** .

**RECITALS**

A. Grantor is the owner of certain real property situated in the City of Tacoma, Pierce County, Washington, legally described on **Exhibit A** attached hereto and commonly known as 0220131004, the "**Property**".

B. As a condition of permit approval No. SDEV23-0202 type permit number the following private stormwater management system ("**Stormwater System**") was constructed or will be constructed at the Property in accordance with approved construction plans and as further described below and depicted in the approved permit.

The Stormwater System on the Property consists of:

Catch basins, Manholes, roof drains, footing drains, closed underground pipe conveyance system, a Modular Wetland and a StormTech Infiltration System.

---

---

---

C. The City has approved the Permit submitted by Grantor, or Grantor's tenant, for the new development or redevelopment of the Property, including Stormwater System as described above. The Stormwater System is designed in accordance with City's stormwater regulations. Any damages caused by the failure of the Stormwater System shall be the sole responsibility of the Grantor or Grantor's successors-in-interest.

D. Failure to inspect, maintain, repair, and replace the Stormwater System after construction can result in an unacceptable impact to the public stormwater system or receiving waters. The City requires Grantor to enter into this Agreement as a condition to the City's approval of Permit(s) for the development or redevelopment of the Property. This Agreement confirms Grantor's, and Grantor's successors and assigns', obligation to inspect, maintain, repair, and replace the Stormwater System. The term "**Owner(s)**" is used herein to refer to the owner or owners of any part of the Property on which Stormwater System are located. "Owner(s)" include Grantor while Grantor owns any part of the Property on which Stormwater System are located and, to the extent applicable, includes any homeowners association owning common areas on the Property on which Stormwater System are located.

E. In connection with its new development or redevelopment of the Property, Grantor may divide the property into individual lots (each a "**Lot**" and collectively the "**Lots**"). The Stormwater System for the Property will be maintained by the Owner(s). Therefore, although Grantor will be the sole owner responsible for constructing, inspecting, maintaining, repairing, and replacing the Stormwater System while Grantor owns the entirety of the Property, upon Grantor's sale or transfer of ownership of any Lot, or part of the Property, those responsibilities will be transferred jointly and severally to the subsequent Owner(s).

F. "Emergency" shall mean and refer to any time that the Stormwater System, or a discharge into or therefrom, pose an imminent threat to the health, well-being or safety of person's or property and immediate remedial action is required.

## **COVENANTS AND EASEMENT**

**NOW, THEREFORE**, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the City and Grantor agree as follows:

1. Incorporation of Recitals and Exhibits. The Recitals and exhibits attached to this Agreement are incorporated into and made a part of this Agreement as though fully set forth herein.
2. Run with the Land. The parties' rights, duties and obligations contained herein shall run with the land and shall be binding upon the Grantor and its successors and assigns (including, without limitation, the Owner(s) of the Lot(s) and any homeowner's association owning common areas in the Property). Those rights and obligations shall inure to the benefit of the City, as well

as its successors and assigns and provide a public benefit.

3. Agreement to Maintain and Repair. The Owner(s) shall, at their sole expense, themselves or through qualified independent contractors or through Owners' tenants, at all times during their ownership of the Property, or any portion thereof, maintain the Stormwater System in good working order, condition and repair, clear of all debris, and in compliance with the Permit and all applicable state and local rules, regulations, and guidelines (including those adopted from time to time by the City and including the City's Stormwater regulations) and the Stormwater System Operation and Maintenance Manual (the "**O&M Manual**") required to be provided by the Grantor pursuant to the City's stormwater regulations. The O&M Manual shall be retained within reasonable access to the site of the Stormwater System and shall be transferred with the Property, or any portion thereof, to a new Owner(s).

4. Agreement to Inspect. The Owner(s) shall perform, at a minimum, regular inspections of all Stormwater System covered by this Agreement, in accordance with the O&M Manual and applicable stormwater regulations and guidelines. The regular inspection required by this Agreement shall identify work necessary to repair or maintain the Stormwater System in good working order. The Owner(s) shall maintain records of inspection, maintenance activities (including identification of the corrective actions taken in response to the regular inspection), monitoring activities and results (if applicable), and receipts for such activities when contracted for. Such records shall be maintained for six years and made available to the City for inspection and copying upon request.

5. Easement. Grantor hereby grants the City, its employees, independent contractors and designees, a nonexclusive easement for ingress and egress over, across and under the Property from time to time at the City's sole discretion to inspect, sample, and monitor components of the Stormwater System and discharges therefrom to ensure that the Stormwater System are being maintained and operated in accordance with the O&M Manual and applicable stormwater regulations and guidelines. Grantor hereby grants to the City permission to undertake the actions described in Sections 7 and 8 of this Agreement. The City agrees that, except in case of Emergency, it shall conduct such inspections at Reasonable Times and that City, its employees, independent contractors and designees, shall conduct their activities in compliance with Owner's reasonable rules associated with access over and across the Property; provided that, such rules shall be in writing and provided to the City upon request (except to the extent prohibited by law), and shall not impair or prevent access to the

Stormwater System for the purposes set forth in this Agreement. Owner(s) shall cooperate with the City, its employees, independent contractors and designees, to ensure safe and secure access to the Stormwater System for the purposes set forth herein. The term “**reasonable times**” as used herein, shall mean between the hours of 7:00 a.m. to 6:00 p.m., Monday through Friday, excluding holidays, but may also include the days and hours that commercial activities are conducted on the Property by the Owner, or its tenant’s.

6. Improvements by Grantor. Owner(s) shall not place or construct any permanent structures, landscaping or other improvements on the Property that would restrict or interfere with the proper functioning of the Stormwater System or the City’s access to perform the inspection, maintenance, or repair authorized under this Agreement. Any permanent structures or improvements subsequent to this agreement shall be permitted when required by the City set forth in the Building Code and Stormwater Management Manual.

7. Failure to Perform Agreement. If the City, in its sole and reasonable discretion, determines that the Owner(s) are not in compliance with the duties or obligations described in Sections 3 and 4 of this Agreement, the City or its designee shall provide the non-complying Owner(s) written notice to perform the maintenance and/or repair work specified in the notice. Provided, however, no prior written notice shall be required in the case of an Emergency, which shall be governed by Section 8. If such work is not performed to the City’s reasonable satisfaction within thirty (30) days after the date of such notice, or such other time as the City may in its sole discretion determine, exercise its rights under the Easement described in Section 5 of this Agreement to enter the Property, with all materials and construction equipment determined by the City to be necessary to perform any and all work required to bring the Stormwater System into compliance with this Agreement. Grantee may, in its sole discretion, extend said thirty day time period upon receipt of Owner’s written formal request for same, given good cause.

8. Emergency. If the City, in its sole discretion, determines that there exists or will likely exist an emergency on or about the Property with respect to the Stormwater System, the City, may immediately exercise its rights under the Easement described in Section 5 of this Agreement to immediately enter the Property, with all material and necessary construction equipment determined to be necessary to perform any and all work required to bring the Stormwater System into compliance with this Agreement, and in such case the City shall use reasonable efforts to notify the affected Owner(s) prior to entering the Property. Owner(s) shall

cooperate with the City, its employees, independent contractors and designees, to ensure safe and secure access to the Stormwater System on Property for the purposes set forth herein. Notwithstanding the above, the work performed may consist only of avoiding or mitigating the emergency and/or cleaning and/or repairing the Stormwater System to their original condition and standards.

9. City under No Obligation. The City, as well as its departments, employees, independent contractors and/or designees shall have no obligation to exercise its rights under this Agreement, including the right under Sections 7 and 8 of this Agreement, to perform the work required of the Owner(s), or to perform any other maintenance or repair of the Stormwater System. In addition, neither the City, nor any of its departments, employees, independent contractors and/or designees shall have any liability to any Owner(s) in connection with the exercise or non-exercise of such rights, the maintenance or repair of the Stormwater System, or the failure to perform the same.

10. Grantor Obligations. Grantor and each Owner agree that, prior to sale of any portion of the Property, they will make specific references to this Agreement and the O&M Manual in a separate notice paragraph in any contract, deed, lease or other legal instrument by which any possessory or equitable interest in the Property is conveyed.

11. Reimbursement. If the City exercises its rights as described in Section 7 and Section 8 to perform compliance work and enters the Property pursuant to the Easement described in Section 5 of this Agreement, the Owner(s) shall reimburse the City for all its costs and expenses incurred in connection therewith within thirty (30) days after receipt of an invoice. If the Property is owned by more than one owner (i.e., multiple lot owners), for each property or Lot where the City exercises its rights as described in Section 6 and Section 7, the Owner(s) shall be severally liable for reimbursing the City for all its costs and expenses incurred in connection therewith within. If any of the Owner(s) fail to pay the invoiced amount within such period, such amount shall thereafter accrue interest at the statutory rate. Such amount, together with interest, shall be a lien on the Property (and each of the Lots within the Property) that may be foreclosed in accordance with applicable law.

12. Enforcement. In the event of a breach of any of the terms, covenants, agreements and/or conditions of this Agreement, the parties shall be entitled to any and all remedies available at law or in equity, including but not limited to the equitable remedies of specific performance or

mandatory or prohibitory injunction issued by a court of appropriate jurisdiction. In the event it becomes necessary for any party to defend or institute legal proceedings as a result of the failure of either party to comply with the terms, covenants, agreements and/or conditions of this Agreement, the prevailing party in such litigation shall be entitled to be reimbursed for all costs incurred or expended in connection with such legal proceedings, including, but not limited to, reasonable attorneys' fees (including appellate fees) and court costs.

13. Modification or Termination. No change or modification of, or waiver under, this Agreement shall be valid unless it is in writing and signed by authorized representative of the City. No waiver of a breach or violation of any term, covenant, agreement or condition contained in this Agreement shall be deemed to be a waiver of any subsequent breach or violation of the same or any other term, covenant, agreement or condition in this Agreement. If the conditions at the Property requiring this Agreement have changed or no longer exist, then the Owner(s) may submit a request to the City that this Agreement be amended or terminated.

14. All Writings Contained Herein. This Agreement, together with all exhibits, constitutes the complete and final agreement of the parties, replaces and supersedes all oral and/or written proposals and agreements heretofore made on the subject matter.

15. Assignment. The obligations of Grantor under this Agreement shall run with the land and therefore shall bind the purchasers of the Property, in whole or in part, without the necessity of any separate agreement evidencing or confirming the assignment and the purchaser's assumption of the obligations.

16. Choice of Law; Venue; Severability. This Agreement shall be construed under the laws of the State of Washington and venue for any dispute related to this Agreement shall be in Pierce County, Washington. If any provision of this Agreement shall be determined to be invalid or unenforceable, the remaining provisions of this Agreement shall not be affected thereby, and every provision of this Agreement shall remain in full force and effect and enforceable to the fullest extent permitted by law. This Agreement shall be construed as covenants applicable to the Property and a violation hereof shall not be construed as causing a reversion of title.

17. Authority. If Grantor is an entity, the individual executing this Agreement on behalf of Grantor represents and warrants to the City that said individual the full power and authority to do so and that Grantor has full right and authority to enter into this Agreement and perform its

obligations under this Agreement.

18. Effective Date. This Easement shall become effective on the date it is recorded by the Pierce County Auditor's Office.

IN WITNESS WHEREOF, the GRANTOR has executed this instrument this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

**DO NOT SIGN PRIOR TO CITY REVIEW**

\_\_\_\_\_  
Type name of signing authority for Grantor  
Type title of signing authority for Grantor

**ACKNOWLEDGEMENT**

STATE OF WASHINGTON    )  
  ) SS.  
COUNTY OF                    )

I, the undersigned, a Notary Public, do hereby certify that on this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, personally appeared before me \_\_\_\_\_ to me known to be the \_\_\_\_\_ (title of the grantor or grantor representative who executed the within instrument) and acknowledged that he/she/they signed and sealed the same, on oath stated that he/she/they was authorized to execute the instrument and acknowledged it as his/her/their free and voluntary act and deed for the uses and purposes therein mentioned.

Given under my hand and official seal this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Notary Public in and for the State of Washington  
residing at \_\_\_\_\_  
My Commission expires \_\_\_\_\_

**GRANTEE**  
**CITY OF TACOMA**

---

Corey Newton, P.E.  
Environmental Services Division Manager,  
PDS Site & Building Division

Approved as to Form:

---

Deputy City Attorney

## EXHIBIT A

### SUBJECT PROPERTY LEGAL DESCRIPTION

Section 13 Township 20 Range 02 Quarter 14 : BEG AT A PT ON WLY LI SO TAC WAY  
296.02 FT N OF E & W C/L OF SEC TH NELY ALG WLY LI SO TAC WAY 100 FT WHICH IS  
392.04 FT N OF E & W C/L OF SEC TH W PAR WITH SD C/L 442 FT TO ELY LI N P R/W TH  
SWLY ALG ELY LI SD R/W TO PT 296.02 FT N OF C/L OF SEC TH E 450 FT TO BEG BEING  
TR OF UNREC PLAT

With Tax Parcel No, 0220131004 , Situated in the City of Tacoma, County of  
Pierce, State of Washington.

Ecology web link: <http://www.ecy.wa.gov/programs/wg/stormwater/newtech/index.html>

Ecology: Douglas C. Howie, P.E.  
Department of Ecology  
Water Quality Program  
(360) 407-6444  
[douglas.howie@ecy.wa.gov](mailto:douglas.howie@ecy.wa.gov)

#### **Revision History**

<b>Date</b>	<b>Revision</b>
June 2011	Original use-level-designation document
September 2012	Revised dates for TER and expiration
January 2013	Modified Design Storm Description, added Revision Table, added maintenance discussion, modified format in accordance with Ecology standard
December 2013	Updated name of Applicant
April 2014	Approved GULD designation for Basic, Phosphorus, and Enhanced treatment