Modular Wetlands® Linear
Operation & Maintenance Manual
**Maintenance Summary**

Remove Trash from Screening Device – average maintenance interval is 6 to 12 months.
- *(5 minute average service time)*.

Remove Sediment from Separation Chamber – average maintenance interval is 12 to 24 months.
- *(10 minute average service time)*.

Replace Cartridge Filter Media – average maintenance interval 12 to 24 months.
- *(10-15 minute per cartridge average service time)*.

Replace Drain Down Filter Media – average maintenance interval is 12 to 24 months.
- *(5 minute average service time)*.

Trim Vegetation – average maintenance interval is 6 to 12 months.
- *(Service time varies)*.

*System Diagram*
Maintenance Procedures

**Screening Device**

1. Remove grate or manhole cover to gain access to the screening device in the Pre-Treatment Chamber. Vault type units do not have screening device. Maintenance can be performed without entry.

2. Remove all pollutants collected by the screening device. Removal can be done manually or with the use of a vacuum truck.

3. Screening device can easily be removed from the Pre-Treatment Chamber to gain access to separation chamber and media filters below. Replace grate or manhole cover when completed.

**Separation Chamber**

1. Perform maintenance procedures of screening device listed above before maintaining the separation chamber.

2. With a pressure washer, spray down pollutants accumulated on walls and cartridge filters.

3. Vacuum out Separation Chamber and remove all accumulated pollutants. Replace screening device, grate or manhole cover when completed.

**Cartridge Filters**

1. Perform maintenance procedures on screening device and separation chamber before maintaining cartridge filters.

2. Enter separation chamber.

3. Unscrew the two bolts holding the lid on each cartridge filter and remove lid.

4. Remove each of 4 to 8 media cages holding the media in place.

5. Spray down the cartridge filter to remove any accumulated pollutants.

6. Vacuum out old media and accumulated pollutants.

7. Reinstall media cages and fill with new media from manufacturer or outside supplier. Manufacturer will provide specification of media and sources to purchase.

8. Replace the lid and tighten down bolts. Replace screening device, grate or manhole cover when completed.

**Drain Down Filter**

1. Remove hatch or manhole cover over discharge chamber and enter chamber. Entry into chambers may require confined space training based on state and local regulations.

2. Unlock and lift drain down filter housing and remove old media block. Replace with new media block. Lower drain down filter housing and lock into place.

3. Exit chamber and replace hatch or manhole cover.
Maintenance Notes

1. Following maintenance and/or inspection, it is recommended 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 require irrigation.

Maintenance Procedure Illustration

Screening Device

The screening device is located directly under the manhole or grate over the Pre-Treatment Chamber. It’s mounted directly underneath for easy access and cleaning. Device can be cleaned by hand or with a vacuum truck.

Separation Chamber

The separation chamber is located directly beneath the screening device. It can be quickly cleaned using a vacuum truck or by hand. A pressure washer is useful to assist in the cleaning process.
Cartridge Filters

The cartridge filters are located in the Pre-Treatment chamber connected to the wall adjacent to the biofiltration chamber. The cartridges have removable tops to access the individual media filters. Once the cartridge is open media can be easily removed and replaced by hand or a vacuum truck.

Drain Down Filter

The drain down filter is located in the Discharge Chamber. The drain filter unlocks from the wall mount and hinges up. Remove filter block and replace with new block.

Trim Vegetation

Vegetation should be maintained in the same manner as surrounding vegetation and trimmed as needed. No fertilizer shall be used on the plants. Irrigation per the recommendation of the manufacturer and or landscape architect. Different types of vegetation requires different amounts of irrigation.
**Inspection Report**

**Modular Wetlands Linear**

Project Name: [Redacted]

Project Address: [Redacted]

Owner / Management Company: [Redacted]

Contact: [Redacted]

Phone: [Redacted]

Inspector Name: [Redacted]

Date: [Redacted]

Time: [Redacted] AM / PM

Type of Inspection: [Redacted]

Storm Event in Last 72-hours: [Redacted]

Weather Condition: [Redacted]

Additional Notes: [Redacted]

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### Inspection Checklist

**Modular Wetland System Type (Curb, Grate or UG Vault):** [Redacted]  
**Size (22', 14' or etc.):** [Redacted]

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<td>Damage to discharge chamber access cover (manhole/grate) or cannot be opened using normal lifting pressure?</td>
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<td>Does the MWS unit show signs of structural deterioration (cracks in the wall, damage to frame)?</td>
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<td>Is the inlet/outlet pipe or drain down pipe damaged or otherwise not functioning properly?</td>
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</table>

| Working Condition: | |
|-------------------| |
| 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. | |

| Other Inspection Items: | |
|------------------------| |
| 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? | |

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<td>Green Waste / Leaves / Foliage</td>
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**Recommended Maintenance**

| Waste | No Cleaning Needed | Schedule Maintenance as Planned | Needs Immediate Maintenance | |
|-------|--------------------|-------------------------------|-----------------------------|

**Plant Information**

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**Additional Notes:** [Redacted]
Cleaning and Maintenance Report  
Modular Wetlands Linear

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Comments: 

Office personnel to complete section to the left.

For Office Use Only

Owner / Management Company

Contact

Inspector Name

Phone

Date

Time

Type of Inspection

Weather Condition

Storm Event in Last 72-hours?

Additional Notes
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) FOR MORE INFORMATION.
Inspection Guidelines for Modular Wetland System - Linear

**Inspection Summary**

- Inspect Pre-Treatment, Biofiltration and Discharge Chambers – average inspection interval is 6 to 12 months.
  - *(15 minute average inspection time).*
- **NOTE:** Pollutant loading varies greatly from site to site and no two sites are the same. Therefore, the first year requires inspection monthly during the wet season and every other month during the dry season in order to observe and record the amount of pollutant loading the system is receiving.

**System Diagram**

[Diagram of modular wetland system with labeled chambers and access points]

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Inspection Overview

As with all stormwater BMPs inspection and maintenance on the MWS Linear is necessary. Stormwater regulations require that all 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. This is recommended because pollutant loading and pollutant characteristics can vary greatly from site to site. Variables such as nearby soil erosion or construction sites, winter sanding on roads, amount of daily traffic and land use can increase pollutant loading on the system. The first year of inspections can be used to set inspection and maintenance intervals for subsequent years to ensure appropriate maintenance is provided. Without appropriate maintenance a BMP will exceed its storage capacity which can negatively affect its continued performance in removing and retaining captured pollutants.

Inspection Equipment

Following is a list of equipment to allow for simple and effective inspection of the MWS Linear:

- Modular Wetland 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 Steps**

The core to any successful stormwater BMP maintenance program is routine inspections. The inspection steps required on the MWS Linear are quick and easy. As mentioned above the first year should be seen as the maintenance interval establishment phase. During the first year more frequent inspections should occur in order to gather loading data and maintenance requirements for that specific site. This information can be used to establish a base for long term inspection and maintenance interval requirements.

The MWS Linear can be inspected though visual observation without entry into the system. All necessary pre-inspection steps must be carried out before inspection occurs, especially traffic control and other safety measures to protect the inspector and near-by pedestrians from any dangers associated with an open access hatch or manhole. Once these access covers have been safely opened the inspection process can proceed:

- Prepare the inspection form by writing in the necessary information including project name, location, date & time, unit number and other info (see inspection form).
- Observe the inside of the system through the access hatches. 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.
- 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.
- Through observation and/or digital photographs estimate the amount of trash, debris and sediment accumulated in the pre-treatment chamber. Utilizing a tape measure or measuring stick estimate the amount of trash, debris and sediment in this chamber. Record this depth on the inspection form.
Through visual observation inspect the condition of the pre-filter cartridges. Look for excessive build-up of sediments on the cartridges, any build-up on the top of the cartridges, or clogging of the holes. Record this information on the inspection form. The pre-filter cartridges can further be inspected by removing the cartridge tops and assessing the color of the BioMediaGREEN filter cubes (requires entry into pre-treatment chamber – see notes above regarding confined space entry). Record the color of the material. New material is a light green in color. As the media becomes clogged it will turn darker in color, eventually becoming dark brown or black. Using the below color indicator record the percentage of media exhausted.

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 and indicate through visual observation or digital photographs if trimming of the vegetation is needed.

The discharge chamber houses the orifice control structure, drain down filter 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 hydraulic grade lines or HGL). 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 is there is any difference in level from watermark in inches.

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• NOTE: During the first few storms the water level in the outflow chamber should be observed and a 6 inch 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 a line should be drawn. This line is a reference point for future inspections of the system:

Using a permanent marker draw a 6 inch long horizontal line, as shown, at the higher water level in the MWS Linear discharge chamber.

• Water level in the discharge chamber is a function of flow rate and pipe size. Observation of 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 system is at 100% capacity (water level at maximum level in pre-treatment chamber). If future water levels are below this mark when system is at 100% capacity this is an indicator that maintenance to the pre-filter cartridges may be needed.

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

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Maintenance Indicators

Based upon 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 or outlet.
- Excessive accumulation of floatables in the pre-treatment chamber in which the length and width of the chamber is fully impacted more than 18”.

Excessive accumulation of sediment in the pre-treatment chamber of more than 6 inches in depth.

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- Excessive accumulation of sediment on the BioMediaGREEN media housed within the pre-filter 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 drain down filter. The following photos show of 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 discharge chamber during 100% operating capacity (pre-treatment chamber water level at max height) is lower than the watermark by 20%.
**Inspection Notes**

1. Following maintenance and/or inspection, it is recommended 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.
Maintenance Guidelines for Modular Wetland System - Linear

Maintenance Summary

- **Remove Sediment from Pre-Treatment Chamber** – average maintenance interval is 12 to 24 months.
  - *(10 minute average service time).*
- **Replace Pre-Filter Cartridge Media** – average maintenance interval 12 to 24 months.
  - *(10-15 minute per cartridge average service time).*
- **Trim Vegetation** – average maintenance interval is 6 to 12 months.
  - *(Service time varies).*

System Diagram

1. Pre-treatment Chamber
2. Biofiltration Chamber
3. Discharge Chamber

Access to separation chamber and pre-filter cartridge

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Maintenance Overview

The time has come to maintain your Modular Wetland System Linear (MWS Linear). To ensure successful and efficient maintenance on the system we recommend the following. The MWS Linear can be maintained by removing the access hatches over the systems various chambers. All necessary pre-maintenance steps must be carried out before maintenance occurs, especially traffic control and other safety measures to protect the inspector and near-by pedestrians from any dangers associated with an open access hatch or manhole. 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.
- Prepare a pre-checks (OSHA, safety, confined space entry) are performed.

Maintenance Equipment

Following is a list of equipment required for maintenance of the MWS Linear:

- Modular Wetland 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 manufacturer).
Maintenance Steps

1. **Pre-treatment Chamber** *(bottom of chamber)*

   A. Remove access hatch or manhole cover over pre-treatment chamber and position vacuum truck accordingly.

   B. With a pressure washer spray down pollutants accumulated on walls and pre-filter cartridges.

   C. Vacuum out Pre-Treatment Chamber and remove all accumulated pollutants including trash, debris and sediments. Be sure to vacuum the floor until pervious pavers are visible and clean.

   D. If Pre-Filter Cartridges require media replacement move onto step 2. If not, replace access hatch or manhole cover.

![Removal of access hatch to gain access below.](image1)

![Insertion of vacuum hose into separation chamber.](image2)

![Removal of trash, sediment and debris.](image3)

![Fully cleaned separation chamber.](image4)
2. **Pre-Filter Cartridges (attached to wall of pre-treatment chamber)**

A. After finishing step 1 enter pre-treatment chamber.

B. Unscrew the two bolts holding the lid on each cartridge filter and remove lid.

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

D. Once filter media has been sucked use a pressure washer to spray down inside of the cartridge and it's containing 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.

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E. Reinstall media cages and fill with new media from manufacturer or outside supplier. Manufacturer will provide specification of media and sources to purchase. Utilize the manufacture provided refilling trey and place on top of cartridge. Fill trey with new bulk media and shake down into place. Using your hands slightly compact media into each filter cage. Once cages are full removed refilling trey and replace cartridge top ensuring bolts are properly tightened.

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

3. **Biofiltration Chamber (middle vegetated chamber)**

A. In general, the biofiltration chamber is maintenance free with the exception of maintaining the vegetation. Using standard gardening tools properly trim back the vegetation to healthy levels. The MWS Linear utilizes vegetation similar to surrounding landscape areas therefore trim vegetation to match surrounding vegetation. If any plants have died replace plants with new ones:
B. Over time, sediment will accumulate in the perimeter void area and will need to be vacuumed out. The media surface may also require power washing if it becomes occluded with sediment. In addition, the wetland media will eventually need to be replaced after 10 plus years of service. A vacuum truck is recommended to fully remove all wetland media. Once old media is removed the entire chamber, media cage, and netting should be power washed. The netting may require replacement before installing new media. New wetland media should be purchased directly from the manufacture. It can be delivered either in bulk or in super sacks for easy installation.

4. **Discharge Chamber (contains drain down cartridge & connected to pipe)**

   A. Remove access hatch or manhole cover over discharge chamber.
   
   B. Enter chamber to gain access to the drain down filter. Unlock the locking mechanism and left up drain down filter housing to remove used BioMediaGREEN filter block as shown below:

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

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**Inspection Notes**

1. Following maintenance and/or inspection, it is recommended 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 Form

Modular Wetland System, Inc.
P. 760.433-7640
F. 760-433-3176
E. Info@modularwetlands.com

www.modularwetlands.com
## Inspection Report
### Modular Wetlands System

**Project Name**

**Project Address**

**Owner / Management Company**

**Contact**

**Inspector Name**

**Type of Inspection**

**Weather Condition**

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**Inspection Checklist**

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**Additional Notes:**
Maintenance Report

Modular Wetland System, Inc.
P. 760.433-7640
F. 760-433-3176
E. Info@modularwetlands.com

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# Cleaning and Maintenance Report
## Modular Wetlands System

**Project Name**

**Project Address**

**Owner / Management Company**

**Contact**

**Inspector Name**

**Type of Inspection**

- Routine
- Follow Up
- Complaint
- Storm

**Storm Event in Last 72-hours?**

- No
- Yes

**Weather Condition**

**Additional Notes**

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**Comments:**

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