



Operation & Maintenance Manual

January 2008



Reclaiming the world's water.

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Portland, OR 97214
(800) 680-3543

Installed Aquip Project Specifications



Project Name: Pacific Fisherman
Address: 5351 24th Ave. NW
Seattle, WA 98107

In Operation Date: January 2008

Design Flow: 5 gpm

Model Number: 10TB

Footprint: 3 Ft X 4 Ft

System Type: ☒ Above Ground ☐ Below Ground

Vault Material: Tote

Upstream Storage Tank: ☐ Yes, Dimensions: _____

☒ No

Pre-treatment Chamber: ☒ Yes, Media:

☒ Buffering, Number of Bags: 6

☐ Coalescing, Dimensions: _____

☐ No

Filtration Chamber: Operating Rate: 0.5 gpm/sf

Media: Sand, Alumina, Carbon

Pump Specifications:

If there is an upstream pump provided by StormwaterRx then complete the following information.

Pump Manufacturer: _____

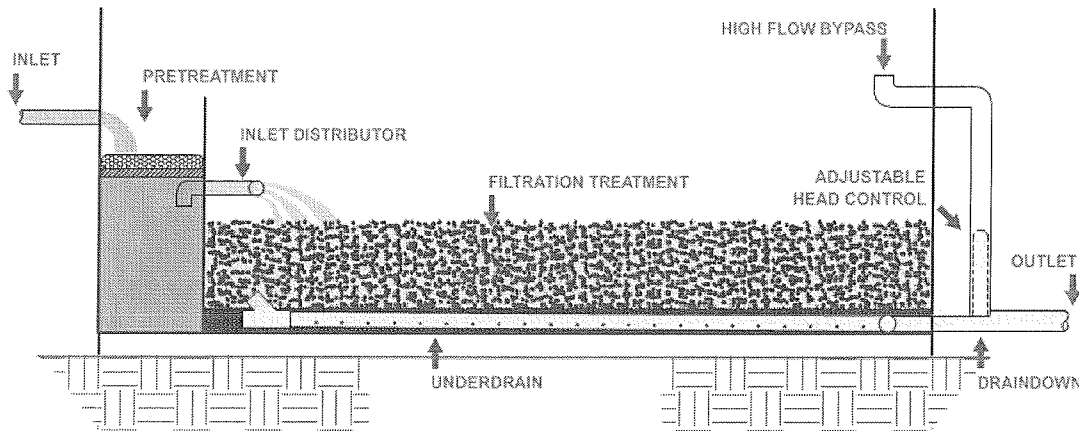
Pump Model Number: _____

Location of Pump: _____

Other Notes:

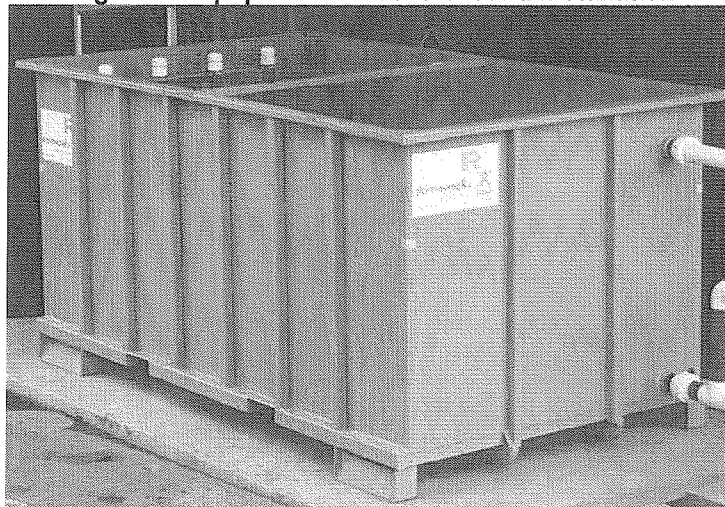
Introduction and System Description

Aquip is a passive adsorptive filtration technology designed specifically for reduction of stormwater pollutants such as suspended solids, turbidity, heavy metals and oils from industrial and construction sites. Aquip is a patented system that uses a pre-treatment chamber followed by a series of inert and adsorptive filtration media to effectively trap pollutants in a package that is flexible and affordable. Pollutant removal within the pre-treatment chamber occurs by gravity settling and in the filtration chamber pollutant removal occurs through a combination of chemical complexing, adsorption, micro-sedimentation and filtration. Aquip effectively removes both particulate and dissolved metals.



The engineered filtration media layers within the Aquip filter provides optimal hydraulics and pollutant removal throughout the system. The foundation of the Aquip design is an amended sand filter, a technology with widely known performance characteristics and broad regulatory recognition.

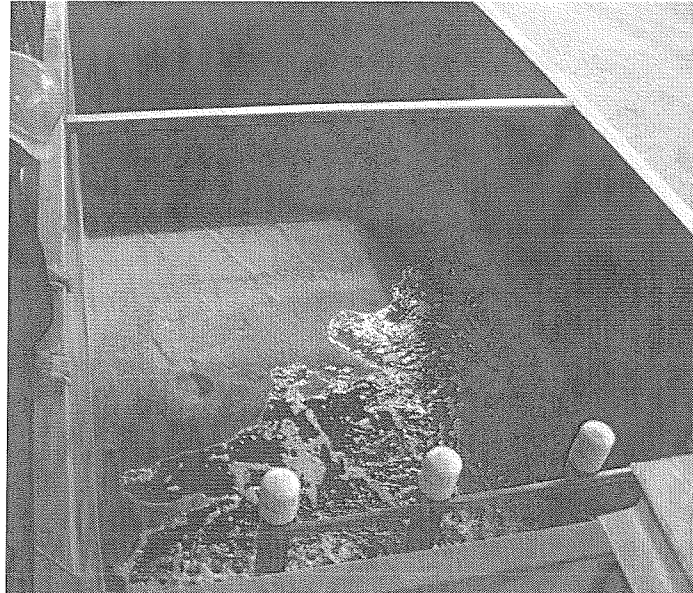
Figure 1: Aquip 100S – Above Ground Installation



Aquip uses an optional passive pH compensation process that is a benefit of one of its adsorptive filtration media. The media causes a pH buffering effect within the Aquip such that heavy metals are near their minimum

Figure 2: Top View of Aquip

solubility prior to entering the inert media filter layer where the metals are removed as precipitates by micro-sedimentation. Because of the low alkalinity common to most stormwater, particularly those from facilities where most of the surface is impervious, the pH buffering effect is temporary and the pH is near neutral prior to discharge from the filtration chamber. This feature, in concert with the patented flow regime within the Aquip promotes high suspended solids and heavy metal removal efficiency for this passive stormwater reclamation process.



For some sites the pH buffering is not necessary but a high level of oil is of primary concern. In these cases an optional oil separation module in place of the pH buffering allows for pre-treatment of oils prior to the filtration chamber.

The "Installed Aquip Project Specifications" sheet will provide the exact details of the system installed on your site. Refer to this document for details on your site specific Aquip system.

Maintenance Guidelines

The Aquip, like all filtration systems, requires maintenance to restore the system to its original effectiveness. StormwaterRx has provided a site specific design dependent on the pollutants of concern and site use. Therefore, the maintenance interval will vary depending on the site and rainfall conditions. Regular inspections of the system can help determine the typical maintenance interval. Maintenance of the system includes removal of the accumulated sediment and spent filter media.

Inspection and Maintenance Timing

Upon installation, the Aquip should be inspected monthly during the first wet season to determine the long-term maintenance timing. There after, inspections should be completed before the wet weather season and after a major storm event. An Inspection Report is included at the end of this manual and should be completed with each inspection. A copy should also be added to your SWPPP or SWPCP.

The following inspection procedure is for above ground systems:

1. Safety equipment should be set up if the system is near vehicle and pedestrian traffic.
2. Note the condition of the pre-treatment chamber. Determine the depth of sediment in the sump.

3. If system is equipped with buffering media bags, inspect the condition of the bags. Buffering media is in good condition if 50% of the bags are still full. Bags should be replaced if they are completely empty.
4. Note the condition of the inlet distributor to determine if the system is being plugged by any trapped debris.
5. Note the water scum line inside the structure.
6. Inspect the geotextile filter fabric covering the top layer of media for level sediment loading.
7. Turn back filter fabric and note the level of sediment accumulated on and within the top layer of media. Do so by raking the top media layer until a layer is reached in which the sediment has not occluded the media (sediment will cause a discoloration of the media). Note the depth of the sediment within the top media layer.

Figure 3: Discolored Media



Partial maintenance is required if the top three (3) inches of the top media layer is occluded and/or there is more than one (1) foot of standing water above the filter surface 12 hours after a rain event.

Full maintenance is required if one of the following is determined from inspection:

1. The most recent scum line is at the same height as the overflow bypass elbow and/or
2. The top media layer is fully occluded by sediment.
3. Partial maintenance does not restore flow capacity.
4. Pollutants in effluent exceed the pre-designated acceptable pollution removal limits.

Maintenance Procedure

This maintenance procedure is meant to provide general guidelines for maintenance of the Aquip. Please refer to your Stormwater Pollution Prevention Plan for additional information concerning maintenance procedures at your site.

Important: OSHA rules for confined space entry must be followed if the Aquip is housed in an enclosed structure.

Partial Maintenance

1. If system is near vehicle and pedestrian traffic, set up safety equipment.
2. Remove and dispose of the top layer of geotextile filter fabric.
3. Rake the top 3 inches of media to regenerate the filter media. This should reclaim approximately 75% of the hydraulic capacity and 90% of the performance capacity.
4. Install new filter fabric layer on top layer of media (available from StormwaterRx).

Full Maintenance

1. If system is near vehicle and pedestrian traffic, than set up safety equipment.

StormwaterRx

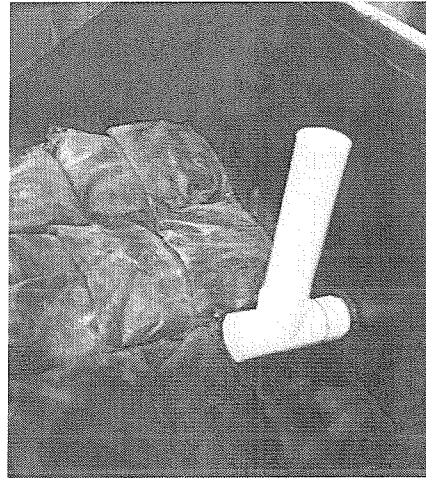
2. If needed, flush out inlet distributor to remove any trapped debris.
3. Remove and dispose of the top layer of geotextile filter fabric. A vacuum truck or shovel can be used to remove all spent media down to the bottom geotextile fabric layer. The bottom gravel layer should not be removed.
4. Install new filter fabric layer on top of gravel media.
5. Refill media layers as specified by StormwaterRx. Media should be added in uniform level layers. Each media layer should be level before adding the next media layer.
6. Install a new geotextile fabric layer on top layer of media.

Pre-treatment Chamber Maintenance

If the system is equipped with buffering media bags in the pre-treatment chamber the buffering media bags will need to be replaced over time.

1. Remove the empty media bags.
2. Replace any empty bags with new media bags (available from StormwaterRx).
3. Media bags should be installed flat with no visible gaps.

Figure 4: Buffer Media Bags



Material Disposal

Water and sediment removed from the Aquip filter must be disposed of in accordance with all applicable waste disposal regulations. The removed accumulated sediment in the Aquip can typically be sent to the local landfill. Follow local regulations for standard guidelines for solid waste disposal.

Maintenance Support

If you have any questions about maintenance procedures contact StormwaterRx at (800) 680-3543.

Inspection Report



Inspection Date: _____

Location: _____

Months in Service: _____

Personnel: _____

System Size: _____

System Type: ☐ Above Ground ☐ Below Ground

Condition of Buffer Media Bags: ☐ Good ☐ Replacement Bags Needed

Details: _____

Condition of Inlet Distributor: ☐ Free of Debris ☐ Plugged with Debris

Details: _____

Height of Scum Line: _____

Condition of Filter Fabric: ☐ Good ☐ Fair ☐ Poor

Details: _____

Accumulated Sediment Depth: _____

Depth of Occlusion in Filter Media: _____

Minor Maintenance Activities Completed:

Unplugged Inlet Distributor: ☐ Yes ☐ No Details: _____

Replace Filter Fabric ☐ Yes ☐ No Details: _____

Raked Top Media Layer: ☐ Yes ☐ No Details: _____

Maintenance Required: ☐ None ☐ Partial ☐ Full

Other Notes:

Maintenance Report



Maintenance Date: _____

Location: _____

Months in Service: _____

Personnel: _____

System Size: _____

System Type: ☐ Above Ground ☐ Below Ground

Condition of Inlet Distributor: ☐ Free of Debris ☐ Plugged with Debris
Details: _____

Height of Scum Line: _____

Accumulated Sediment Depth: _____

Maintenance Activities Completed:

- | | | |
|------------------------------|--|----------------|
| Replaced Buffer Media Bags: | <input type="checkbox"/> Yes <input type="checkbox"/> No | Details: _____ |
| Unplugged Inlet Distributor: | <input type="checkbox"/> Yes <input type="checkbox"/> No | Details: _____ |
| Replaced Filter Fabric | <input type="checkbox"/> Yes <input type="checkbox"/> No | Details: _____ |
| Replaced Top Media Layer: | <input type="checkbox"/> Yes <input type="checkbox"/> No | Details: _____ |
| Replaced All Media Layers: | <input type="checkbox"/> Yes <input type="checkbox"/> No | Details: _____ |

Other Notes: _____

