



## Section [ \_\_\_\_\_ ] Storm Water Treatment Device

### PART 1 – GENERAL

#### 01.01.00 Purpose

The purpose of this specification is to establish generally acceptable criteria for Storm Water Treatment Devices (SWTD) that treat storm water runoff including dry weather flows and other contaminated water sources. It is intended to serve as a guide to promote understanding regarding materials, manufacture and installation; and to identify devices complying with this specification.

#### 01.02.00 Description

The SWTD is used for filtering stormwater runoff including dry weather flows. The SWTD is a 3 stage inline pre-engineered water polishing system composed of multiple sediment removal chambers, a skimmer system to remove floating pollutants, and a water polishing upflow media filter to remove fine particulates and dissolved pollutants.

#### 01.03.00 Manufacturer

The manufacturer of the SWTD shall be one that is regularly engaged in the engineering design and production of systems developed for the treatment of stormwater runoff for at least (10) years, and have a history of successful production, acceptable to the engineer of work. In accordance with the drawings, the SWTD(s) shall be a device manufactured by Bio Clean Environmental Services, Inc., or assigned distributors or licensees. Bio Clean Environmental Services, Inc. can be reached at:

Bio Clean Environmental Services, Inc  
Corporate Headquarters:  
398 Via El Centro  
Oceanside, CA 92058  
Phone: (760) 433-7640  
Fax: (760) 433-3176  
[www.biocleanenvironmental.com](http://www.biocleanenvironmental.com)

#### 01.04.00 Submittals

- 01.04.01 Submittal drawings are to be provided with each order to the contractor and consulting engineer.
- 01.04.02 Submittal drawings are to detail the SWTD and all components required and the sequence for installation, including:
- System configuration with primary dimensions
  - Interior components
  - Any accessory equipment called out on submittal drawings
- 01.04.03 Inspection and maintenance documentation submitted upon request.

#### 01.05.00 Work Included

- 01.05.01 Specification requirements for installation of SWTD.
- 01.05.02 Manufacturer to supply components of the SWTD(s):
- Concrete structure (chambers)
  - Internal components
  - Risers, hatches, and manholes optional



01.06.00 Reference Standards

ASTM A 615	Standard Specifications for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM F 716.07	Standard Test Methods for Sorbent Performance of Absorbents
ASTM D 3787	Standard Test Method for Bursting Strength of Textiles-Constant-Rate-of- Traverse (CRT) Ball Burst Test

**PART 2 – COMPONENTS**

The Storm Water Treatment Device (SWTD) and all of its components shall be self-contained within a concrete structure constructed with a minimum 28 day compressive strength of 5,000 psi, with reinforcing per ASTM A 615, Grade 60, and supports a minimum H-20 loading as indicated by AASHTO. All seams and connection points shall be sealed water tight with non-shrink grout in accordance with manufactures recommendations and project specifications.

02.01.00 Skimmer System

The skimmer system shall be mounted to the skimmer wall and located between the end of the screening system and the outlet pipe. The skimmer wall shall be constructed of concrete with a minimum 28 day compressive strength of 5,000 psi, with reinforcing per ASTM A 615, Grade 60.

- 02.01.01 Storm Boom Housing shall be constructed of an aluminum grade 6061-T6 and/or stainless steel grade 304 frame with flattened expanded stainless steel grade 304 screen system. Housing shall have a hinged top section. Screen shall be attached to the Storm Boom Housing Frame by sandwiching the screen to the aluminum or stainless steel frame between a series of aluminum or stainless steel angle beams and welded in place. The Storm Boom Housing shall be secured to the skimmer wall with aluminum or stainless steel hardware.
- 02.01.02 Storm Boom
  - Storm Boom media shall be made of granulated oil absorbing polymers that have been tested in accordance with section 11.2 of ASTM F 716.07. Polymer granules must meet performance absorption standards in section 03.01.04.
  - Boom netting shall be 100% polyester with a number 16 sieve size, and strength tested per ASTM D 3787.

02.02.00 Sediment Removal Chambers

- 02.02.01 Baffle Walls shall be constructed of concrete with a minimum 28 day compressive strength of 5,000 psi, with reinforcing per ASTM A 615, Grade 60.

02.03.00 Upflow Media Filter

The upflow media filter shall be mounted to the skimmer wall on the opposite side of the skimmer system (02.02.00). The entire upflow media filter (frame and media) shall be located below the invert elevation of the outlet connection(s).

- 02.03.01 Media Filter Frame shall be constructed of aluminum grade 6061-T6 and/or stainless steel grade 304. All joints and seams are to be welded or fastened together with aluminum and/or stainless steel hardware. All sides of media filter frame shall be fixed. The top section of the media filter frame shall have a locking hinged top section to allow for removal of the media. The bottom section of the media filter frame shall be fixed. The media filter frame shall be located below the access hatches to allow access for maintenance. The

- media filter frame shall be secured to the concrete baffle(s) with aluminum or stainless steel concrete anchors.
- 02.03.02 Media Filter Screens shall be manufactured of flattened expanded stainless steel grade 304 and/or aluminum grade 6061-T6. As an alternate, the media filter screens may also be manufactured of perforated stainless steel or aluminum of the same grade mentioned previously. The media filter screen shall be attached to the media filter frame by sandwiching the screen to the media filter frame between a series of aluminum or stainless steel angle beams and welded in place.
- 02.03.03 Media - The Upflow Media Filter shall house one or more types of media specifically formulated by the manufacture to remove fine particulate and dissolved pollutants. The media mix and media specifications will be provided by the manufacturer.

### **PART 3 – PERFORMANCE**

The upflow media filter shall only meet performance specification listed on the submittal drawings.

#### **03.01.00 General**

- 03.01.01 Function - The SWTD is a 3 stage pre-engineered inline hydrodynamic separation system and water polisher unit composed of multiple sediment removal chambers, a skimmer system to capture oils, grease, and floating pollutants, and a water polishing upflow media filter to remove fine particulate and dissolved pollutants.
- 03.01.02 Removal Efficiencies - The SWTD's sediment removal chambers shall be capable of achieving a minimum of 80% total suspended solids removal (of the size fractions typical for urban runoff) from the design flow rate. The SWTD shall be capable of capturing and retaining 90% of oils and grease. All removal efficiencies shall be tested in accordance with section 03.02.00.
- 03.01.03 Hydraulic Capacity - The SWTD shall provide a rated hydraulic capacity, which is consistent with governing water treatment regulations.
- 03.01.04 Storage Capacity - The SWTD must have multiple sediment removal chambers for storage of sediments and other non-floatable pollutants. The volume of each sediment removal chamber will be called out on the submittal drawings. The SWTD must have a skimmer to capture floatable pollutants. The skimmer shall be equipped with storm booms per section 02.02.02. The storm boom must be capable of capturing up to 180% of its weight in oils & grease along with other emulsified and free floating hydrocarbons and tested per section 03.02.03.
- 03.01.05 Upflow Media Filter - The SWTD must be equipped with an upflow media filter. The upflow media filter will house one or more types of media specifically formulated by the manufacture to remove the project specific pollutants. All upflow media filter performance specifications will be provided by the manufacture. All water flows less than or equal to the project treatment flow rate must pass through the filter media in an upward direction. Flows greater than the project treatment flow rate must bypass the upflow media filter without restriction. The media filter must be capable of bypassing high flows without scouring of previously captured pollutants.



## **PART 4 - EXECUTION**

### **04.01.00 General**

The installation of the SWTD shall conform to all applicable national, state, state highway, municipal and local specifications.

### **04.02.00 Installation**

The Contractor shall furnish all labor, equipment, materials and incidentals required to install the SWTD device(s) and appurtenances in accordance with the drawings and these specifications.

- 04.02.01 Grading and Excavation site shall be properly surveyed by a registered professional surveyor, and clearly marked with excavation limits and elevations. After site is marked it is the responsibility of the contractor to contact local utility companies and/or DigAlert to check for underground utilities. All grading permits shall be approved by governing agencies before commencement of grading and excavation. Soil conditions shall be tested in accordance with the governing agencies requirements. All earth removed shall be transported, disposed, stored, and handled per governing agencies standards. It is the responsibility of the contractor to install and maintain proper erosion control measures during grading and excavation operations.
- 04.02.02 Compaction – All soil shall be compacted per registered professional soils engineer's recommendations and per governing agencies standards, prior to installation of SWTD unit(s).
- 04.02.03 Backfill shall be placed according to a registered professional soils engineer's recommendations and per governing agencies standards, and with a minimum of 6" of gravel under all concrete structures.
- 04.02.04 Concrete Structures – After backfill has been inspected by the governing agency and approved the concrete structures shall be lifted and placed in proper position per plans.

### **04.03.00 Shipping, Storage and Handling**

- 04.03.01 Shipping – The SWTD unit(s) shall be shipped to the contractor's address or job site., The contractor is responsible for offloading and placing the units(s) in the exact site of installation.
- 04.03.02 Storage and Handling– The contractor shall exercise care in the storage and handling of the SWTD and all components prior to and during installation. Any repair or replacement costs associated with events occurring after delivery is accepted and unloading has commenced shall be born by the contractor. The SWTD(s) and all components shall always be stored indoors and transported inside the original shipping container until the unit(s) are ready to be installed. The SWTD shall always be handled with caution and lifted according to OSHA and NIOSA lifting recommendations and/or the contractor's workplace safety professional recommendation's.

### **04.04.00 Maintenance and Inspection**

- 04.04.01 Inspection – After installation, the contractor shall demonstrate that the SWTD has been properly installed at the correct location(s), elevations, and with appropriate components. All components associated with the SWTD and its installation shall be subject to inspection by the engineer at the place of installation. In addition, the contractor shall demonstrate that the SWTD has been installed per the manufacturer's specifications and recommendations.



- All components shall be inspected by a qualified professional once a year and results of inspection shall be kept in an inspection log.
- 04.04.02 Maintenance – The manufacturer recommends cleaning and debris removal and replacement of the storm booms as needed. The maintenance shall be performed by a qualified professional. A maintenance manual is available upon request from the manufacturer. The manual has detailed information regarding the maintenance of the SWTD. A maintenance/inspection record shall be kept by the maintenance operator. The record shall include any maintenance activities performed, amount and description of debris collected, and the condition of the storm booms.
- 04.04.03 Material Disposal - All debris, trash, organics, and sediments captured by the SWTD shall be transported and disposed of at an approved facility for disposal site in accordance with local and state requirements. Please refer to state and local regulations for the proper disposal of toxic and non-toxic materials.

## **PART 5 – QUALITY ASSURANCE**

### **05.01.00 Warranty**

The Manufacturer shall guarantee the SWTD against all manufacturing defects in materials and workmanship for a period of (8) years from the date of delivery to the customer. The manufacturer shall be notified of repair or replacement issues in writing within the warranty period. The SWTD is limited to recommended application for which it was designed.

### **05.02.00 Performance Certification**

The SWTD manufacturer shall submit to the Engineer of Record a “Manufacturer’s Performance Certificate” certifying the SWTD is capable of achieving the specified removal efficiency for suspended solids as typically found in storm water runoff.

**END OF SECTION**