

AquaFilter – CSI Specification

Section (_____)

Stormwater Treatment Device

1. General

1.1. Summary

- A. This specification shall govern the performance, materials, and fabrication of stormwater treatment filtration devices(s) as indicated on the drawings and as specified herein.

1.2. References

- A. American Association of State Highway and Transportation Officials (AASHTO) Standard Specification for Highway Bridges.
- B. ASTM A798 - Standard Practice for Installing Factory-Made Corrugated Steel Pipe for Sewers and Other Applications.
- C. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
- D. Manufacturer's product literature and guidelines.

1.3. Related Sections:

- A. Section 02 24 00: Dewatering
- B. Section 31 23 00: Excavation and Fill
- C. Section 31 41 00: Shoring
- D. Section 33 08 40: Commissioning of Stormwater Utilities
- E. Section 33 42 00: Stormwater Conveyance

1.4. Quality Control

- A. All device(s) shall be inspected for general appearance, dimensions, soundness, etc.
- B. Device(s) rejected after delivery to the site shall be marked for identification and shall be removed from the site at once.
- C. Device(s) already installed shall be repaired to the specifying engineer's acceptance level, if permitted, or removed and replaced entirely at the contractor's expense.

1.5. Submittals

- A. Product Data
 - a) Manufacturer brochures and/or specification sheets
 - b) Manufacturer Inspection and Maintenance Manual
 - c) Brochures or cut sheets of accessories and related components as indicated on the submittal drawings.
- B. Submittal Drawings
 - a) The contractor shall be provided with drawings, including dimensions, elevations, connection locations, access openings, etc.
 - b) Shop drawings shall be annotated to indicate all materials to be used and all applicable standards for materials, required tests of materials, and design assumptions for structural analysis.

- c) A copy of the shop drawings shall be submitted to the specifying engineer for review and approval.
 - C. Any proposed equal alternative product substitution to this specification must be submitted for review and approved prior to bid opening. Review package should include third party reviewed performance data that meets or exceeds the design criteria.
- 1.6. Delivery, Storage and Handling
- A. The device(s) shall be delivered to the jobsite by the manufacturer.
 - B. The contractor shall furnish all labor, equipment and materials necessary to install the device(s) specified in the Drawings and these specifications.
 - C. The contractor shall protect the device(s) from damage during offloading. Handling is to be performed with equipment appropriate to the materials and site conditions.
 - D. All required safety precautions for the installation are the responsibility of the contractor and shall be per OSHA approved methods.
 - E. The contractor is responsible for any damage to the system during construction.

2. Products

2.1. Description

- A. The device(s) shall be provided by AquaShield, Inc., 2733 Kanasita drive, Suite 111, Chattanooga, TN, in accordance with the requirements of the plans and contract documents.
- B. The device(s) shall be comprised of an AquaSwirl Concentrator and one (1) or more Filter Chambers.
- C. The device(s) shall be housed in a polymer coated steel (PCS) structure with the structural capacity to withstand HS-25 surface loading and up to 8' of cover material.
- D. The inlets, outlets, and internal treatment components shall be MIG welded to the treatment chamber structure.
- E. All welds shall be free of porosity, pinholes, and obvious defects. Welded areas shall be thoroughly cleaned and coated with two coats of TPC-515-7 black synthetic coating.
- F. A service access shall be provided via 30-inch inner diameter (ID) access riser(s) over the treatment chamber.
- G. Lifting supports may be provided on the exterior of the device(s) in such a way as to allow the prevention of undue stress to critical components during loading, off-loading, and moving operations.
- H. Manufacturers shall be responsible for complete assembly of device(s) and verification of watertightness.
- I. AquaSwirl Concentrator:
 - a) The device(s) shall include a ____-inch inner diameter (ID) chamber to treat the incoming water.
 - b) For California: The device shall be fabricated from a single continuous piece. Protective coatings shall comply with Caltrans Section 66-1.02C. Vacuum testing of the finished unit is required.
 - c) The Concentrator shall be determined to be leak free prior to shipment to jobsite.

- d) An inlet shall be provided to induce a flow pattern that will cause flow to pass through the internal treatment structure and allow sedimentary solids to accumulate at the bottom of the chamber in such a way as to prevent re-suspension of captured particles.
- J. Filter Chamber
 - a) The Stormwater Filtration System shall include a 52-inch inner height Filtration Chamber with a filter bed no less than _____ feet long and six feet in width containing _____ filter containers.
 - b) Each row of filter bags shall be comprised of 12 filter bags, with layers stacked perpendicular to each other. Each filter bag shall be a nominal 12" x 24" x 6".
 - c) A distribution system shall be provided in such a way as to evenly distribute low flows across the filter containers.
 - d) The filter media shall be provided by AquaShield™ Inc.
- 2.2. Performance
 - A. Performance of the MTD shall be based on independent, third-party, commercial scale laboratory testing.
 - B. The filtration system shall have a treatment capacity of _____ cubic feet per second (cfs).
- 2.3. Other Materials:
 - A. Manufacturer shall supply traffic rated, standard manhole frame(s) and cover(s).
 - B. Contractor shall supply pipe couplings to and from the device(s) which shall be a flexible boot with stainless steel tension bands and shear guard.

3. Execution

- 3.1. Project Conditions
 - A. The contractor shall be responsible for preparing the site for the system installation including, but not limited to, temporary shoring, excavation, cutting and removing pipe, new pipe, bedding, and compaction.
 - B. The contractor shall be responsible for providing any concrete anti-floatation/anti-creep restraints, anchors, collars, etc. with any straps or connection devices required.
 - C. The contractor shall be responsible for sealing the pipe connections to the (s), backfilling and furnishing all labor, tools, and materials needed.
 - D. Do not install on frozen ground or wet, saturated or muddy subgrade.
- 3.2. Bedding Preparation
 - A. The excavation bottom shall be constructed in accordance with ASTM A 798 Section 5, Trench Excavation, Section 6, Foundation, and Section 7, Bedding.
 - B. The device shall be installed on a stable base consisting of at least 6-inches of fine, readily compacted soil or granular fill material, and compacted to 95% proctor density.
 - C. Bedding shall not contain stones retained on a 3-inch ring, frozen lumps, highly plastic clay, organic material, corrosive material, or other deleterious foreign materials.
- 3.3. Installation of Stormwater Treatment Device(s)
 - A. If necessary to accommodate field adjustments, Contractor may cut riser to match finish grade. The exposed metal of the cut riser must be recoated using the touch up kit

supplied with each device. If necessary to extend riser, Contractor should use adjusting rings to bring top of structure to grade.

- B. Where traffic loading (HS-25) is required or anticipated, a 4-foot diameter, 14-inch thick reinforced concrete pad must be placed to support and level the manhole frame. The top of riser pipe must be wrapped with compressible expansion joint material to a minimum 1/2-inch thickness to allow transfer of wheel loads from manhole cover to concrete slab. Manhole cover shall bear on concrete slab and not on riser pipe. The concrete slab shall have a minimum strength of 3,000 psi and be reinforced with #4 reinforcing steel (per drawing). Minimum cover over reinforcing steel shall be 1-inch. Top of manhole cover and concrete slab shall be level with finish grade.

3.4. Backfill in Units

- A. Backfill materials shall be fine, readily compacted soil or granular fill material, and compacted to 90% proctor density. Processed granular materials with excellent structural characteristics are preferred. Coarse grained soils of USCS Groups GW, GP, GM, GC, SW, and SP as described in ASTM D 2487 are generally acceptable materials.
- B. Backfill shall not contain stones retained on a 3-inch ring, frozen lumps, highly plastic clay, organic material, corrosive material, or other deleterious foreign materials.
- C. Backfilling shall conform to ASTM A 798, Section 10. Backfill shall be placed in 6-to-12-inch lifts and compacted before adding the next lift.
- D. Backfill shall extend at least 18 inches outward from the device and for the full height of the device (including riser(s)) extending laterally to undisturbed soils.

3.5. Maintenance

- A. The maintenance of the device(s) shall be the responsibility of the Owner.
- B. Each installation site is unique. Therefore, the Owner shall establish a maintenance schedule according to site conditions and regulatory requirements. It is recommended that the Owner review the manufacturer's inspection and Maintenance documentation when determining the maintenance schedule.
- C. It is the responsibility of the Owner to properly document all performance, inspections, and maintenance records.
- D. All material removed during routine maintenance shall be disposed of in accordance with local, state, and federal requirements.

3.6. End of Section