

SECTION 02721

GRIT AND FLOATABLES

PRECAST CONCRETE, HYDRODYNAMIC STORMWATER TREATMENT SYSTEM

PART 1.00 GENERAL

1.01 DESCRIPTION

A. Work included:

The Contractor, and/or a manufacturer selected by the Contractor and approved by the Engineer, shall furnish all labor, materials; equipment and incidentals required and install all precast concrete stormwater treatment structures and appurtenances in accordance with the Drawings and these specifications.

B. Related work described elsewhere:

1. Unit Masonry
2. Miscellaneous Materials
3. Water Tight Joints

1.02 QUALITY CONTROL INSPECTION

A. The hydrodynamic stormwater treatment system shall be dry fitted in the manufacturer's yard prior to shipment to the project site. The unit, when dry fitted, shall have all component connections pre-drilled and anchored. Section joints shall be clearly marked for the contractor to properly install and align the unit in the field.

B. The quality of materials, the process of manufacture, and the finished sections shall be subject to inspection by the Engineer. Such inspection may be made at the place of manufacture, or on the work site after delivery, or at both places. Sections rejected after delivery to the site shall be marked for identification and shall be removed from the site at once. All sections, which have been damaged after delivery will be rejected and, if already installed, shall be acceptably repaired, if permitted, or removed and replaced, entirely at the Contractor's expense.

C. All sections shall be inspected for general appearance, dimensions, soundness, etc. The surface shall be dense, close textured and free of blisters, cracks, roughness and exposure of reinforcement.

D. Imperfections may be repaired subject to the acceptance of the Engineer. Repairs shall be carefully inspected before final acceptance.

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1.03 SUBMITTALS

A. Shop Drawings

The Contractor shall submit to the Engineer six (6) sets of shop drawings showing details for construction, reinforcing, joints, any cast-in-place appurtenances and method of sealing pipe openings.

B. Site-specific Site Data Sheet with Sketch Plan

The contractor shall submit to the Engineer one (1) Site-specific Site Data Sheet with (a) site hydrology specifications and (b) Sketch Plan depicting pertinent site surface features and integration of the stormwater treatment system with upstream and downstream facilities.

C. Site-specific Technical Report

The Contractor shall submit to the Engineer one (1) Site-specific Technical Report summarizing Site-specific design calculations for Sediment Removal Efficiency, Pumpout Interval, and Design Storm Backwater Analysis.

PART 2.00 PRODUCTS

2.01 PRECAST CONCRETE STRUCTURES

The hydrodynamic stormwater treatment system shall be made of precast concrete. The manufacturer shall be a member of and have plant certification from the National Precast Concrete Association. Structures shall meet the following manufacturing requirements:

A. **Manhole Design and Manufacture:** shall comply with ASTM Designation C-478.

B. **Sealing joints in manhole sections:** joints shall be watertight joints of either an "O ring" or a butyl mastic sealant conforming to ASTM C 990.

C. **Cement used to cast manholes:** cement shall be Type III Portland cement conforming to ASTM Designation C 150.

D. **Pipe- to- wall sealing:** openings for pipes shall be provided with a flexible rubber sleeve or shall be sealed by the Contractor with cement mortar and shall be sized to accept pipes of the specified size(s) and material(s).

E. **Brick or masonry used to raise the manhole frame to finish grade:** brick or masonry shall conform to (1) ASTM Designation C 32 or ASTM Designation C 139 and the Masonry Section of these Specifications.

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- F. **Castings:** castings for manhole frames and covers shall be vented and in accordance with the Miscellaneous Metals Section of these Specifications.
- G. **Concrete curing:** all precast concrete actions shall be cured by an approved method. Sections shall not be shipped until the concrete has attained a compressive strength of 4,000 psi or until 5 days after fabrication and/or repair, whichever is the longer.

2.02 INTERNAL PIPING AND APPURTENANCES

Materials for internal piping and appurtenances shall not corrode from exposure to stormwater. Size and orientation of the internal piping and appurtenances shall be adequate to meet the performance specifications.

2.03 PERFORMANCE SPECIFICATIONS

- The Hydrodynamic Stormwater Treatment System (HSTS) shall be designed for:
- (A) 50-80% removal efficiency for sandy sediment (specific gravity of 2.65) at a Water Quality Event Peak Flow Rate of 0.70 cfs per impervious acre.
 - (B) Less than 0.75 feet of internal operating loss (headwater at HSTS inlet minus headwater at HSTS outlet) during the Design Storm Event.
 - (C) Unless specified by the owner, pavement washoff of sediment solids shall be assumed equal to 300- 500# per year per acre of pavement draining to the HSTS. Sediment solids accumulation rate in the HSTS shall be assumed to be 200 – 400 # per year per acre of pavement draining to the HSTS.
 - (D) Storage density of sediment solids shall be assumed to be 100# /cf.
 - (E) Sediment sump capacity when full (top of sediment solids pile at invert of inlet pipe) will be adequate to provide to five years of operation at the sediment solids accumulation rate in 2.03(C) and storage density in 2.03D.

Site-specific performance specifications and design calculations shall be summarized in a Technical Report and made available for review by the Site Engineer (see Part 1.03).

2.04 SIZING METHODOLOGY VERIFICATION REPORT

Sizing methodology shall be consistent with treatment science and verified by Evaluating Annual Retained Pollutants (EARP) for an installed system. Pollutant sampling and analysis shall be performed by a Geotechnical Consultant or other third party qualified to sample and analyze submerged sediment.

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PART 3.00 EXECUTION

3.01 INSTALLATION

- A. **Installation Drawings:** the hydrodynamic stormwater treatment system shall be constructed according to the sizes shown on the Drawings and as specified herein. Install at elevations and locations shown on the Drawings or as otherwise directed by the Engineer.
- B. **Base slab leveling:** Place the precast base units on a granular subbase with a minimum thickness of six inches after compaction or of greater thickness and compaction if specified elsewhere. The granular subbase shall be checked for level prior to setting and the floor of the installed precast base section shall be checked for level at all four perimeter locations. Floor should be within 0.50" of level.
- C. **Watertight joints:** all structural system components and system piping shall be made watertight by the means mentioned previously in this document.
- D. **Baffle wall caulking:** prior to setting the precast roof section apply non-shrink grout or an approved caulking material (e.g. Sika Flex) to the joints at the side edges of the baffle wall.
- E. **Holes in the concrete sections:** holes made for handling or other purposes shall be filled with a nonshrink grout or by grout in combination with concrete plugs.
- F. **Cutting of pipe openings:** where holes must be cut in the precast sections to accommodate pipes, do all cutting before setting the sections in place to prevent any subsequent jarring which may loosen the mortar joints. The Contractor shall make all pipe connections.

3.02 FIELD TESTING

- A. **Leak Testing:** manholes shall be tested for exfiltration as required by the local municipality.

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