SP-157004
(New)

SPECIAL PROVISIONS
FOR
NUTRIENT SEPARATING BAFFLE BOX

Dubuque County
TAP-U-2100(683)--8I-31

Effective Date
November 17, 2015

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

1 GENERAL

1.01 SCOPE

A. The work under this section shall consist of providing all work, materials, labor, equipment and supervision necessary to provide and construct the Nutrient Separating Baffle Box (NSBB) system in accordance with the plans and these specifications.

1.02 SUBMITTALS

A. Shop Drawings: Provide shop drawings showing details for vault construction, including reinforcing, joints, and cast-in-place appurtenances and for fabricated storm water separator element to be inserted in vault. 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. Shop drawings shall be prepared at a scale of not less than 3/16 inches per foot (1:75). Six hard copies of said shop drawings shall be submitted to Engineer for review and approval.

B. Structural design calculations and shop drawings shall be certified by a Professional Engineer retained by the system manufacturer or Contractor and licensed in the State of Iowa.

2 MATERIALS

2.01 NUTRIENT SEPARATING BAFFLE BOX MANUFACTURED BY SUNTREE TECHNOLOGIES, OR EQUAL

A. Vault: The stormwater separator structure shall be in-line to the stormwater flow and sized so that the entire flow of the inflow pipe will always receive treatment by passing it through the inside of the stormwater treatment structure. The system shall be comprised of a concrete vault and having a series of settling chambers formed below the inlet; and a screening chamber mounted over each settling chamber for collecting trash from stormwater passing through the system.

B. Screening Chamber:

1. The screening chamber shall include hinged access panels to allow access to settling chambers. A moveable inlet filter screen shall be mounted adjacent to the housing inlet for filtering stormwater entering the inlet, and a removable oil sorbent boom shall be mounted in the housing above one housing chamber for collecting oil in the stormwater entering the housing inlet. The screening chamber shall be designed to store captured solid debris such as leaves and litter in a dry state between rain events. Chamber shall be positioned approximately 3.5 inches above the static water level within the vault. Adjacent to the inflow, the screening chamber shall have openings on both sides that have a combined cross sectional area that exceeds the cross sectional area of the pipe. Openings will act as an internal bypass for water flow in the event that the screen system becomes full of debris.
2. Screen system shall have a minimum of 6 inches of vertical adjustment. Vertical adjustment of the screen system shall be via telescoping 3 inch by 3 inch aluminum square support poles along the sides of the screen system. The square support poles will be anchored to the baffle wall by stainless steel bolts.
3. Screen system shall have a minimum of 3 inches of horizontal adjustment in the direction of the length of the concrete structure.
4. Screen system shall have a bottom section adjacent to the inflow which is hinged and can be opened for cleaning. Bottom section shall function as a screened ramp to direct debris into the main body of the screened system. The sides of the screen system adjacent to the inflow shall be made with stainless steel screen and transition in vertical height from a minimum of 8 inches above the inflow invert to the height of the main body of the screen system.
5. Screen system shall give access from above grade to lower sediment collection chamber. The bottom of the screen system will contain hinged screened doors that can be opened in such a way as to allow adequate access for a vacuum truck to remove debris and sediment in all the lower collection chambers.
6. Screen system structure will be a welded aluminum framework spanned by stainless steel screen, be generally rectangular in shape, and be formed to make a bottom, two long sides, one end, and a top. The inflow end shall remain open so as to allow water to enter the screen system. Screen system shall consist of screened panel sections that are held together with stainless steel bolts. All the panels, access doors, and lids that make up the screen system shall be made with stainless steel screen. When the panel sections are unbolted and separated from each other they shall be able to pass through an access hatch or round manhole in the top of the baffle box for removal purposes. The aluminum framework will be made of mostly 2 inch by 2 inch b7 1/4 inch aluminum angle beam. The screen used to span the aluminum frame is described as follows: For the body of the screen system, flattened expanded stainless steel sheet 3/4 inch # 13 F; Open area = 75%; Grade = 304 Stainless Steel. The screen shall be attached to the screen system frame by sandwiching the screen to the aluminum frame between a series of 1 1/4 inch by 3/16 inch aluminum bars and welded in place. Aluminum screen material is not allowed.
7. The pivoting panel and pylon system, located within the screen system, shall prevent internal backflow currents and enhance the retention of captured debris within the screen system. The pivoting panel backflow current preventer shall be comprised of: screen housing suitable for a stormwater treatment environment. The housing shall have an inlet end and an outlet end; A backflow current preventer panel shall be pivotally attached to

the screen housing at the inlet end of the screen housing for diverting the incoming water downward through the screen system, wherein the panel pivots inside of the screen housing, and wherein the backflow current preventer stops debris from passing out of the screen system when incoming stormwater is flowing through the screen system. The pivoting panel shall be sloped at an angle to the incoming stormwater flowing through the screen system; but is substantially vertically oriented generally perpendicular to the incoming stormwater flow. A hinge will attach the top portion of the panel to the screen housing.

8. The pivoting panel shall be approximately one-half the height of the body of the screen housing when at rest against the fixed pylon, span the width of the screen housing, and be constructed of 1/4 inch extruded fiberglass. The pivoting panel shall be attached to the top of the screen housing adjacent to the inflow by means of a stainless steel piano hinge. The pylon shall prevent backflow currents during stormwater treatment. A screen housing having an inlet end and an outlet end; and a backflow current preventer attached to the screen housing at the inlet end of the screen housing shall be installed. The backflow current preventer includes: a fixed pylon at the inlet end of the screen housing for diverting the incoming stormwater by spreading the flow laterally to the left and right sides inside of the screen housing. The fixed pylon shall be constructed of fiberglass and bolted to the floor of the screen housing with stainless steel bolts. The pivoting panel shall have the articulation to rest against the fixed pylon and be horizontal and parallel with the floor of the screen housing.
9. A screened lid system shall cover the top of the screen system. Lids shall consist of two panels that cover the body of the screen system in order to prevent floatables from escaping during large rain events during which the hydraulic grade line inside the treatment vault system rises above the top of the screen system. There shall be a left panel covering the left side of the screen system and a right panel covering the right side of the screen system. To open the lids for access into the screen system each lid panel will slide toward the side of the vault along a track toward the wall of the vault. The left panel shall slide toward the left side of the vault and the right panel shall slide toward the right side of the vault. For frictionless movement of the screened panels along the track, a wheel system consisting of wheels made of Delrin spinning on stainless steel axles shall be attached to each end of each panel. Vertical adjustment of the screen system shall be via telescoping support poles along the sides of the screen system. The treatment vault system shall be comprised of the following: a below grade treatment chamber having an inlet; a filter system positioned within the treatment chamber to receive stormwater. The filter system shall include: a filter basket having a rigid frame with screen sides and a top and a bottom; an opening door lid attached across the top of the filter basket having a closed position with the door lid covering the top of the filter basket and an open position; and a series of post members extending below the bottom edges of the filter basket, and a series of leg members attached to the chamber, wherein the post members and leg members are telescoped within one another so that the post members are adjustable to different vertical heights in the chamber, allowing the filter basket to be vertically mounted along different vertical heights of the treatment chamber.
10. The screened lids in the top of the screen system shall consist of two side by side panels. The aluminum frame work of the screened lid panels shall be made of 2-inch by 2 inch by 1/4 inch aluminum angle beam. The screen used to span the aluminum frame is described as follows: flattened expanded stainless steel sheet 3/4 inch # 13 F; Open area = 75%; Grade = 304 Stainless Steel. The stainless steel screen shall be welded to the aluminum frame work by sandwiching the screen between the 2 inch by 2 inch by 1/4 inch aluminum angle framing beam and an aluminum match plate. The screened lids shall be hinged along the long side of each panel with stainless steel piano hinge and attached to the top outside of the screen system so that when opened the entire inside of the screen system is easily accessible by service personnel. An inlet feed chute will be attached to the filter basket open front end, and have a pair of sides and a bottom all screened. The inlet feed chute will be positioned in front of the stormwater

housing inlet for directing stormwater into the filter basket where an in-line stormwater drain system will filter materials from the stormwater.

C. Deflectors:

1. Within the settling chambers of the vault; deflectors will be configured with specific sizes located at specific locations to reduce turbulence within said settling chambers, and to minimize the likelihood of re-suspension of previously captured debris.
2. In the first chamber a series of deflectors will be installed to reduce turbulence in the chamber. The deflectors shall be positioned directly under the inflow pipe and inflow of the screen system at the inflow wall. This deflector will be attached with stainless steel wedge bolts onto the wall. On the inflow side of the first baffle, provide a V-shaped deflector to spread water flow across the entire inflow side of the first baffle. Under the V-shaped flow spreader provide a deflector shape that prevents water that impacts the first baffle from flowing down toward the bottom of the first chamber. This deflector can be aligned at an angle or horizontal as needed. Adjacent to the left and right of the inflow pipe provide a corner deflector attached to the inflow wall approximately midway between the inflow invert and the bottom of the settling chamber. All deflectors will be made of fiberglass of approximately 3/8-inch thickness and be attached by stainless steel wedge bolts. The horizontal deflectors are to be supported from underneath by stainless steel stanchions.
3. In the second chamber a series of deflectors will be installed to reduce turbulence in the chamber. The configuration of the deflectors is as follows: On the downstream side of the first baffle provide a deflector attached near the top of the baffle. This deflector shall be angled. On the inflow side of the second baffle provide a deflector that is angled. This deflector will be attached at an elevation approximately 6 inches down from the top of the baffle. All deflectors will be made of fiberglass of approximately 3/8 inch thickness and be attached by stainless steel wedge bolts. The horizontal deflectors are to be supported from underneath by stainless steel stanchions.
4. In the Third chamber a deflectors will be installed to reduce turbulence in the chamber. Deflectors shall be attached at angles on the downstream side of the second baffle and to the outflow wall. Deflectors will be made of fiberglass of approximately 3/8-inch thickness and be attached by stainless steel wedge bolts. The horizontal deflector is to be supported from underneath by stainless steel stanchions.
5. Along each side of the screen system will be a deflector that extends between the inflow wall and the top of the first baffle. This deflector will be angled so as to facilitate the settling of sediments into the settling chambers. All deflectors will be made of fiberglass of approximately 3/8 inch thickness and be attached by stainless steel wedge bolts.
6. Deflector sizing shall be as recommended by the manufacturer. Nominal deflector sizing, design flow, and storage volumes shall be as follows:

Flow (CFS)	Dry Storages (CF)	Wet Storage (CF)	Chamber 1 Deflector (inches)	Chamber 2 Deflector (inches)	Chamber 3 Deflector (inches)	Screen Deflector (inches)
45	108	600	69x12	94x18 94x12	94x12 94x18	61x18

D. Skimmer:

1. The skimmer will be the Suntree SkimBoss™ System, or equal. The stormwater treatment system shall have a floatable skimmer apparatus for preventing floatable debris from escaping the treatment vault. The skimmer will be the Suntree SkimBoss™ System, or equal. The skimmer shall include chamber having an inlet and outlet; a skimmer panel having a top and bottom and being positioned between the inlet and

outlet of the housing chamber; movable skimmer panel in the housing chamber on a pair of skimmer tracks for movement and positioned in the housing chamber to form a channel under the skimmer panel. The skimmer panel shall have a niche formed along the top; and at least one floatation member shall be mounted in the skimmer panel niche on the inlet side of the skimmer panel and spaced from the skimmer panel to allow water in the housing chamber between the floatation member and the skimmer panel to raise and lower the skimmer panel in the skimmer track with the rise and fall of stormwater in the housing chamber to thereby hold the top of the skimmer panel above the water level in the housing chamber; whereby stormwater is forced under the bottom of the floating skimmer panel while blocking floatable debris from escaping the housing chamber.

2. As the water level in the vault changes, the SkimBoss floating skimmer shall automatically move vertically, floating on the changing water level as needed to prevent water flow from topping the skimmer. On each end of the skimmer a track system is attached to the wall to hold the skimmer in place and provide for vertical movement. Wheels made of Delrin are attached to the ends of the skimmer and fit into the tracks and act to reduce the frictional forces between the skimmer and the tracks so that the skimmer can easily move vertically with the changing water elevations. There shall be two types of wheels that turn perpendicular to each other which are used to reduce the frictional forces. The centering wheels roll against the sides of the vault walls and work to reduce the frictional force of the vault walls. The load wheels reduce the friction produced from the water flow pushing the skimmer against the track in the direction of water flow.
3. The body of the skimmer shall be rigid and made of laminated fiberglass. The buoyancy of the skimmer comes from two components. The primary buoyancy components are the floats on the upstream side of the skimmer. These floats are located along the top of the skimmer. Another buoyancy component will be PVC structural foam laminated within the fiberglass layers of the body of the skimmer. The body of the skimmer shall be shaped so that the floats fit within the shape of the skimmer which combines to form a relatively flat surface on the upstream side. The floats shall be attached to the body of the skimmer within a cavity along the top of the skimmer. The floats shall be spaced away from the surface of the skimmer body so water can flow around on all sides of the float. The space between the float and the body of the skimmer shall allow the skimmer to remain buoyant relative to the water level on the upstream side of the skimmer.
4. On the face of each end of the skimmer a rubber seal shall be provided to prevent the passage of oils or other floating chemicals. A hydrocarbon absorption boom shall be positioned along the face of the skimmer to absorb hydrocarbons. The hydrocarbon absorption boom shall be held in position by brackets that allow for the vertical movement of the boom along the face of the skimmer. The boom shall float on the water surface and rise up and down with the changing water levels. Adjacent to the skimmer shall be a horizontal filter screen system. This horizontal filter screen system shall be made of aluminum framing spanned by stainless steel perforated screen. The screen system shall be hinged using a stainless steel piano hinge adjacent to the skimmer so that it can be raised so that the bottom of the setting chamber can be vacuumed out during servicing. A winch in the ceiling of the vault shall be provided to raise the horizontal screen system.

E. Aluminum Plates: Internal aluminum plate components shall be aluminum alloy 5052-H32 in accordance with ASTM B 209.

F. Sealants:

1. Sealant to be utilized at the base of the swirl chamber shall be 60 durometer extruded nitrile butadiene rubber (Buna N) and shall be provided to the concrete precaster for installation.
2. A bitumen (butyl mastic) sealant in conformance with ASTM C 990 shall be utilized in affixing the aluminum swirl chamber to the concrete vault.

G. Castings:

1. Casting for manhole frames and covers shall be as shown on the plans.

2.02 PERFORMANCE DOCUMENTATION

A. The following documentation must be submitted by Contractor and approved by Engineer prior to the manufacture and delivery of any materials.

B. The stormwater treatment system supplier shall provide documentation of Total Suspended Solids (TSS) removal efficiency from laboratory testing conducted on the supplier's full-scale system. Overall TSS removal efficiencies shall be at least 80%. The documentation shall include:

1. TSS removal efficiency versus operating rate for the full operating range of the stormwater treatment system for a particle size gradation which is typical of stormwater sediment defined as follows:

Table 1.03 Particle Size Gradation

Percent of Sample	Particle Size Range
27%	> 250 micron
11%	150 – 250 micron
7%	100 – 150 micron
9%	75 – 100 micron
4%	63 – 75 micron
42%	< 63 micron

2. TSS removal calculations for each system specified herein. The calculations must demonstrate that the system(s) is capable of achieving a net annual TSS removal efficiency as required by local regulations and as based upon the particle size gradation shown in Table 1.03 and the best available rainfall data for the project site location.

C. Field Test Data: The stormwater treatment system supplier shall provide documentation of TSS removal efficiency from field testing conducted on an installed system. The documentation shall be in accordance with the following:

1. The testing and documentation shall have been conducted by an independent third party.
2. The testing and documentation shall include at least 10 storms.
3. The testing and documentation must show TSS removal results that meet or exceed the performance requirements for the system(s) specified herein.
4. The unit shall have field data certified as having met TARP Tier II Protocol for Stormwater Best Management Practice Demonstration by the New Jersey Corporation for Advanced Technology (NJCAT) Technical Director.

D. Manufacturing Experience: The stormwater treatment supplier shall provide evidence of at least 5 years of successful product design and use. The supplier shall provide an installation list of projects, model sizes installed and installation dates where the same type systems as specified herein have been designed and produced by the supplier.

2.03 WASHDOWN SYSTEM

A. Separator structure shall be provided with an internal piping system that can be charged by a vacuum truck for washing down accumulated debris in the structure to the center of the structure floor, HydroSlide, or equal. System shall be capable of operating at 300 psi and be fabricated with schedule 80 pipe and fittings. Piping shall be securely fastened to structure walls with appropriate clamps and SS anchors, and terminate with a quick connect fitting for connection at the surface to service vehicle.

3 EXECUTION

3.01 INSTALLATION

A. Each NSBB shall be constructed according to the sizes shown on the plans and as specified herein. Install at elevations and locations shown on the plans or as otherwise requested by Engineer.

B. Maintenance During Construction: Contractor shall allow Contracting Authority access to NSBB for cleaning during construction as necessary.

C. Cost for NSBB shall be paid for according to the various unit prices bid. Prices bid shall include all overhead, materials, labor and equipment for a complete installation except cast in place concrete vaults, excavation, dewatering, and compacted granular backfill. Cast in place vaults shall be provided under Contract 2-2015. Contractor shall coordinate with contractor for Contract 2-2015 to insure vault is constructed to the required dimensions. Excavation, dewatering, and compacted granular backfill will be paid for under separate bid prices. Place permeable pavers and fill joints with joint material.

4 MEASUREMENT AND PAYMENT

4.01 METHOD OF MEASUREMENT

A. Cost for work under this Section shall be paid for in accordance with the lump sum price bidfor the Nutrient Separating Baffle Box.

4.02 BASIS OF PAYMENT

A. Prices bid shall include all labor, materials, and equipment, necessary to complete the work for the individual items as specified herein and as shown on the plans.