ROTONDO ENVIRONMENTAL SOLUTIONS, LLC
PERIMETER STYLE SANDFILTER *
INSTALLATION PROCEDURES

***Patent Pending**

Thank you for selecting Rotondo Environmental Solutions, LLC for your storm water management remediation requirements.

At Rotondo, we dedicate ourselves to supplying high quality, innovative products to our customers. Our systems are designed to be efficient, durable and cost effective. We also strive to make our structures as user friendly and easy to install and maintain as possible.

This guide has been provided to give clear directions for the installation of the Perimeter Sand Filter system. However, should you have any questions or concerns that are not covered in this guide, please do not hesitate to contact us.

Our goal is to ensure that your experience with our company and our products is a positive one and that you will look to us again for your future storm water management needs.

Regards,
Richard Rotondo
John Rotondo
Rotondo Environmental Solutions, LLC

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1) REQUIRED MATERIALS

a. Materials to be supplied by contractor

- Crane or excavator of sufficient capacity to safely handle the precast structures. (Maximum section weight is approximately 7 tons.)

NOTE: ***Attempting to install this system with lifting equipment of insufficient capacity could result in injury and/or damage to structures.***

- Four way lifting slings/chains with a minimum leg length of 8'-0" and of sufficient capacity to safely handle the precast structures. Lifting slings connect to the base units and end enclosure panels with standard hooks or shackles of sufficient load rating that will fit (Fig 1) in the structures connection points.

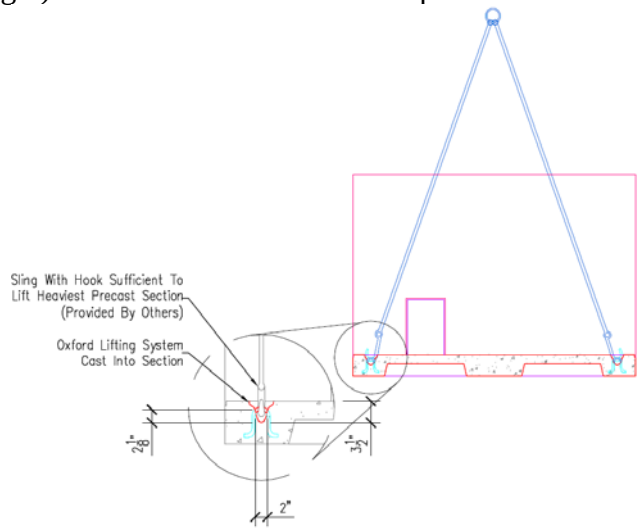


Figure 1 Lifter connection dimensions

- (2) ¾" swivel lifting plates for handling extensions (if applicable) Conac SWLP-71 or equivalent.

Illustration 1 Swivel lifting loop

- One supervisor and a crew of 4 or more people (minimum).
- Shovels, rakes and a digging bar.
- 4' level
- Ladders and tag lines.
- Sika Flex1a (or approved equivalent). Sufficient quantity to seal all joints per approved submittal drawings (allow two 20 oz tubes per joint).
- Sika Flex Primer 429/202 (or approved equivalent) Sufficient quantity to prime all joints if required (follow manufacturers recommendations for wet conditions).

Illustration 2 Sika 1A

- Caulk applicator(s). The Milwaukee cordless 20 oz caulk gun Model 6562-24 (or equivalent) is recommended for projects with large numbers of sections.
- Ratchet and wrenches. The system utilizes ¾" galvanized hardware which requires a 1 1/8" socket and/or wrench.
- A copy of page one (layout) of the approved submittal drawings for reference.

b. Materials supplied by Rotondo Environmental Solutions, LLC

- Complete Perimeter Sand filter system including base units, baffles, end enclosure panels, extensions, top slabs, grates, frames and covers and collars/risers as specified in the approved submittal drawings.
- Connection hardware (3/4"x10" galvanized bolts, washers and nuts). The connection hardware will normally be shipped directly to the contractor ahead of time. If not, it will be scheduled to arrive with the first delivery truck.

- (4) ¾" coil lifting eyes for handling top slabs (not required for systems with top slabs below grade) Conac ¾ x 2 Eye Bolt or equivalent

- Onsite Technical assistance.

2) BED / SUB GRADE PREPARATION FOR SYSTEM INSTALLATION

NOTE: ***Correct bed preparation is vital to ensure that the precast sections align with no deviations or gaps between sections. Uneven or improper bed preparation will lead to excessive separations (more than ¼") between sections and could adversely affect the watertight integrity of the structure.***

a. Recommended materials

- The stone for the sub grade can be a clean granular material with a maximum aggregate size of 1 ¼" (57's).

- The final bed should be sand.

b. Sub grade

- The excavation sub grade must be transit level with no variances.

- Prepare the sub grade per the site engineer's requirement, 5" to 6" below the grade on which the precast system will be installed (More stone or additional preparation may be required depending on the soil bearing capacity of the site as determined by the project geo technical engineer).

- Place 4" to 5" of granular aggregate and tamp.

b. Final bed preparation

- Set and level side rails, at grade, 12" outside of structure perimeter.

- Fill remaining 1" to 2" with coarse sand. Tamp and screed between side rails. Repeat sand application as necessary to achieve final grade.

Illustration 3 Completed Bed

- The sub grade must support the filter without differential settlement between precast sections.

- Clearly mark on the bed the position for the placement of the first section (string line, paint etc).

NOTE: ***The sub grade may freeze if exposed to cold temperatures for extended periods prior to system installation. If so, the subgrade must be allowed to thaw completely or all materials must be replaced prior to system installation.***

NOTE: ***This is a proven method of bed preparation for this system installation. Other methods can result in uneven grades that in turn will result in lost installation time while the grade is corrected. The added costs of equipement and crew while the grade is corrected can easily be greater than the cost of using the method described above.***

3) SYSTEM DELIVERY

a. Setting or changing delivery schedule

- Deliveries are scheduled from the manufacturing facility on a first come, first served basis dependant on available trucking. The farther in advance that you can communicate your desired delivery dates the better.

- All deliveries (or changes to scheduled deliveries) are handled thru the corporate office at (703)-212-4830

b. Order of arrival

- Trucks are scheduled from the manufacturing facility loaded in the order of installation. They are typically spaced at 30-45 minute intervals to allow sufficient time for offloading and installation of sections prior to the next scheduled loads arrival.

NOTE: ***Weather, traffic, and distance from the manufacturing facility can all affect arrival times and spacing between scheduled deliveries. A suitable staging area, either on the jobsite or nearby should be identified ahead of the scheduled delivery to allow for the possibility of more than one truck arriving at the same time.***

c. Truck access and offloading requirements

- There is a 1 ½ hour wait time included with each load. Wait time is from the scheduled delivery time or actual arrival time, whichever is later. Any additional time required in offloading trucks will incur wait time charges.

- All trucks MUST be able to get to the unloading point under their own power. Drivers may refuse to deliver if site conditions are deemed unsafe or impassable.

4) INSTALLATION PROCEDURES

NOTE: ***During the installation process it is critical that the lifting rigging be applied in such a manner as to allow the sections to be installed as close to level as possible. Uneven loads increase the time required for installation and can lead to damage and unacceptable gaps between sections***.

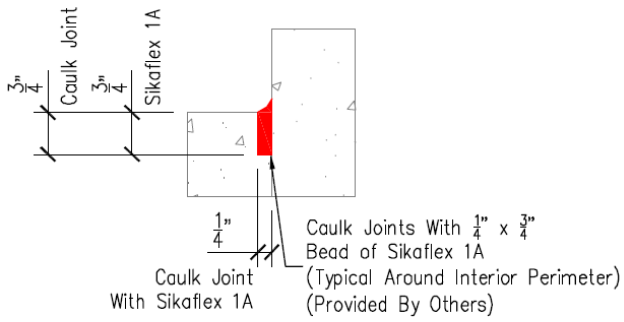
a. Base units and end enclosure panels

- The effluent end section should be set first.

- Once in place, check and assure the location and alignment of the first section. This is particularly critical as this system does not allow for directional adjustments during the installation process.

- Attach the end enclosure panel to the effluent base section utilizing two ¾" x10" galvanized bolts, washers and nuts. Nuts should be snugged down hand tight and then backed off ¼ turn to allow for expansion.

- Seal joint between base unit and end enclosure panel with Sika Flex 1a (or an approved equivalent) in accordance with the manufacturers recommended procedures (See Fig.2). All joints must be dry and free of debris prior to sealant application to ensure proper adhesion.



SECTION TO ENDWALL
JOINT DETAILS

Figure 2 Typical caulk application between base and end wall

NOTE: ***Do not over torque connection hardware as structural damage could result.***

- Remove a trough of material approximately 1" deep by 6" wide in front of the bottom lip of the structure where the sections will come together to prevent the possibility of pulling bed material into the joint during the installation of the next section.

Illustration 4 Trenching between sections

- Bring the next section into the hole and align it with the previous section while supporting all or most of the weight with the lifting equipment. Light concrete to concrete contact is okay.

Illustration 5 Placement of Base units

- Attach the two sections and draw together utilizing the ¾”x10”galvanized bolts, washers and nuts (see Fig. 2). The sections should come together concrete to concrete **with no gap exceeding ¼”** between pieces.

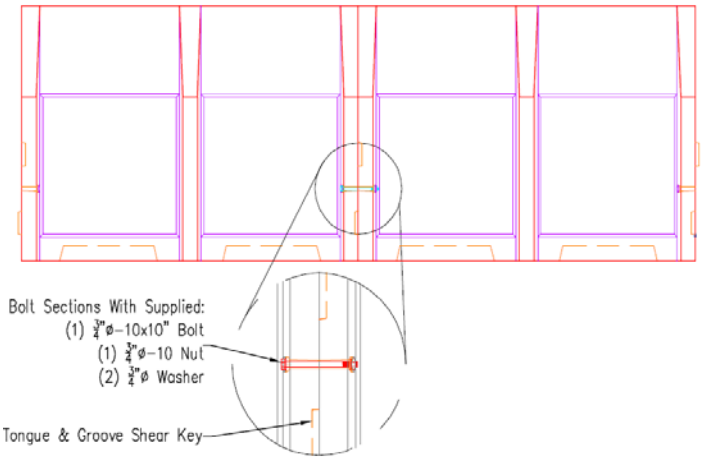


Figure 3 Typical bolt connection

- Release the section from the lifting equipment. Nuts should be snugged down hand tight and then backed off ¼ turn to allow for expansion.

NOTE: ***Do not over torque connection hardware as structural damage could result***.

- During assembly it is imperative to refer often to the approved submittal drawings to ensure that the sections are being placed in the correct order and orientation.

- Set all remaining sections as described in steps above and finish with the end enclosure panel.

- Seal all joints with Sika Flex 1a (or an approved equivalent) in accordance with the manufacturers recommended procedures (See Fig.4). All joints must be dry and free of debris with concrete temperature between 40 and 100 Deg F prior to sealant application to ensure proper adhesion.

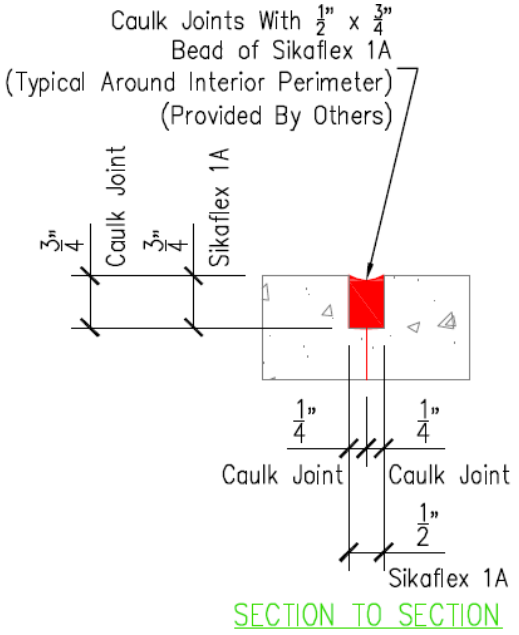


Figure 4 Typical caulk application between sections

- Allow the joint caulking material to cure completely prior to filling the structure with water.

- Fill all lifting pockets with a suitable non-shrink grout per manufacturers recommendations.

- The structure can be backfilled as soon as assembly is complete (including the installation of top slabs) .

b. Extensions

NOTE: ***Extensions will normally arrive in sequence following the final base section.***

- Apply a generous bead (1/2” dia. or greater) of Sikaflex1a to both outside walls on the lower plane of the shiplap joint.

Illustration 6 Outside wall sealant application

NOTE: ***Ensure that the concrete is dry and free of any loose materials or contaminants prior to sealant application***

- Apply a generous bead (1/2" dia. or greater) of Sikaflex1a to the center wall on both lower planes of the shiplap joint.

Illustration 7 Center wall sealant application

NOTE: ***Ensure that the concrete is dry and free of any loose materials or contaminants prior to sealant application***

- Lower the extension onto the base unit, adjusting line up as necessary.

Illustration 8 Installation of extension

- During assembly it is imperative to refer often to the approved submittal drawings to ensure that the extensions are being placed in the correct order and orientation.

- Repeat until all extensions are in place.

NOTE: ***Both end extensions will normally have second cast end walls which will line up with the tops of the end enclosure panels.***

c. Top slabs

- Place the top slabs directly onto the base units or extensions paying particular attention to the orientation of any openings or grates as indicated on the approved submittal drawings.

Illustration 9 Installation of top slab

- No sealant is required between the top slabs and base units/extensions.

d. Collars and risers (if applicable)

- If the system is to be underground (vice at grade) the required collars and risers will either arrive with the rest of the structures or be shipped separately to the jobsite in advance. Collars and risers should be mortared to grade.

5) BACK FILL INSTRUCTIONS

a. Sequence

NOTE: ***The excavation must remain de-watered until the structure has been completely back filled to eliminate any possibility of floatation.***

- The ends of the short walls must be back filled prior to the long walls to assure even pressure is applied to the joints and to prevent lateral movement of the structure while backfilling the long walls. Any lateral movement after

installation could cause separation in the joints and adversely affect the watertight integrity of the system.

b. Recommended equipment for backfilling.

- It is strongly recommended that nothing larger than a walk behind vibratory roller be used to compact backfill materials within 10 feet of the structure to prevent inadvertent contact with, and possible damage to, the structure.

6) WATER INTEGRITY TEST

NOTE: ***Rotondo Environmental Solutions, LLC does not require, and will not conduct, any water testing of these systems. Local and state regulatory agencies should be consulted to determine test requirements. The following procedures are supplied as a typical example for informational purposes only and may not satisfy all the requirements set forth by the governing regulatory agency.***

- Ensure that the joint caulking material is completely cured prior to conducting the water integrity test.
- The structure must be completely back filled prior to performing the water test.
- Some regulatory agencies require that the structure be tested for water tightness before installing the filter media. This test is the responsibility of the contractor.
- Typically an agency requires the structure to be filled to a specific level. After the structure has been filled, allow 24 hours for the water level to stabilize before monitoring the test. The concrete will absorb some amount of water.
- Once the water level has stabilized refill the structure to the level specified and monitor for a further 24 hour period. Water loss should not exceed 5% of total volume during the testing period.

7) FILRATION MEDIA

NOTE: ***The following is provided for informational purposes only. Refer to the approved submittal drawings for specifics concerning the filter media for your particular application.***

NOTE: ***In most cases, filter media installation should not take place until all other site work is complete to prevent contamination from construction runoff.***

a. Materials specifications

- Sand. Clean AASTHO-M-6 or ASTCM-C-33 concrete sand. 0.02” to 0.04” in size. Sand substitutions are not acceptable unless approved by the governing regulatory agency.
- Underdrain gravel. AASHTO-M-43 0.375” to 0.75” in size
- Geotextile fabric. ASTM-D-4833 (puncture strength-125lbs) or ASTM-D-4632 (puncture strength 300lbs) 0.08” thick. Must maintain a 125 GPM per Sq. ft. flow rate.
- Underdrain Piping. F 758, type PS 28 or AASHTO-M-278 4”-6” schedule 40 PVC or SDR35 with 3/8” perforations @ 6” on center, 4 holes per row. Minimum of 3” of gravel over pipes. Not necessary under pipes.

b. Typical installation layout

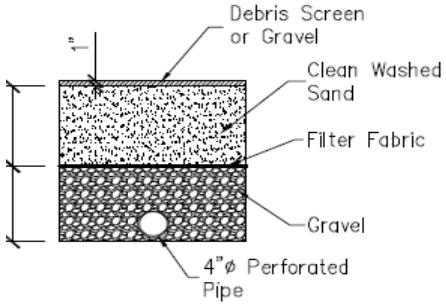


Figure 5 Media detail

NOTE: ***Refer to approved Submittals for actual pipe size and thickness of layers for your specific application.***

8) MAINTANANCE DURING CONSTRUCTION PERIOD

NOTE: Rotondo Environmental Solutions, LLC is not responsible for any inspection or maintenance of this sand-filter structure. Refer to contract drawings for proper erosion and sediment control practices to protect this sand-filter structure from contamination through the construction period.