Oregon
Theodore Kulongoski, Governor

Department of Environmental Quality
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June 2, 2009

James Erlei
Willamette Graystone, Inc.
P.O. Box 7816
Eugene, OR 97401

The Oregon Department of Environmental Quality (Department) received the plans, specifications and other associated materials you provided for the following septic tank configuration manufactured by your company. I am pleased to advise you that the following tank may be installed in Oregon based on your certification that these tanks comply with all applicable Department rules and regulations:

- **1,000-Gallon Low Profile Septic Tank**
- **1,000-Gallon Low Profile Dosing Septic Tank**

Orenco Systems, Inc was the engineering firm for all the plans submitted. The plans were stamped by Tristian Bounds, PE and dated January 28, 2009. The plans, specifications, and an installation manual for the approved tank configurations have been attached to this letter. You are authorized to manufacture and distribute these tanks for use in onsite wastewater treatment systems in Oregon until further notice, providing the following conditions are met:

1. The tanks must be manufactured in compliance with Department rules, and the plans and design specifications provided. Any deviation from the plans and specifications shall not be permitted unless authorized in writing by the Department.

2. The concrete mix shall be in accordance with the mix description on the plans prepared by your engineer. The minimum concrete strength of $fc = 4{,}000$ psi specified by your engineer shall be achieved. Three concrete sample cylinders shall be taken and tested for each tank manufactured until the minimum compressive strength is obtained. Thereafter, compressive strength must be tested at a minimum of one of every 5 tanks, unless otherwise approved in writing by the design engineer. Samples shall be tested for compressive strength. Samples shall be alternately broken at 7 and 28 days. All samples shall be field cured where the tanks are stored. Laboratory curing of additional samples may be done at your option. All test results shall be made available for Department review upon request.

3. The tanks shall be cured and protected from premature drying and excessive hot or cold temperatures for the first ten days following casting. Tanks may be shipped from the casting yard after seven days, or earlier if the concrete has reached two-thirds of its design strength.

4. It is the responsibility of your company to insure that each assembled tank delivered to the construction site is watertight. It is expected that your company will pre-test some percentage of the tanks at the plant to verify they are watertight.

5. The riser(s) and lid(s) must be constructed of ribbed Poly Vinyl Chloride (PVC) or concrete as indicated on the engineered plans.

6. Each septic tank must be installed with one (1) twenty four (24) inch diameter water-tight riser, at the outlet locations of the tank extending to the ground surface when the soil cover does not exceed thirty six (36) inches. Burial depth greater than thirty six (36) inches from the top of the tank to the ground surface requires a thirty (30) inch PVC or concrete riser. All risers must be installed in accordance with Oregon Administrative Rule 340-071-0220(3)(b)(C).

7. A fully assembled and complete tank must be delivered to the purchaser, including the necessary tank risers and covers.

8. Each tank shall be delivered with the installation guide. The guide must be printed on waterproof paper or an equivalent method of keeping the guide legible in adverse weather conditions.

9. Each tank is only acceptable for use at locations where the top loading will not exceed the engineering design parameters. Tanks proposed for use at other locations must require an engineering analysis of the potential top loading, and may require preparation of site-specific plans and specifications.

10. Each tank must be marked on the uppermost tank surface over the outlet with the liquid capacity, date of manufacturer, burial depth limit, and either your full business name or the assigned number 220.

This determination should not be construed in any way as the Department's endorsement of this product or any advertising. Moreover, the Department is not responsible for any situation which may result from use or mis-application of your product.

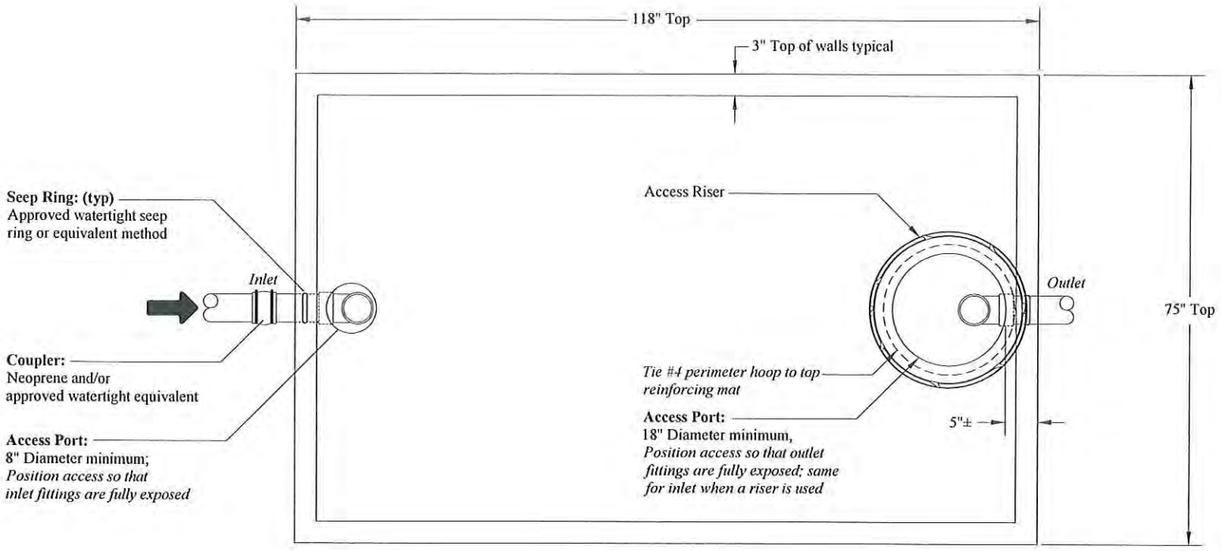
Please feel free to contact Randy Trox at (541) 687-7338 if you have any questions about this approval letter, or by email, (trox.randall@deq.state.or.us).

Sincerely,

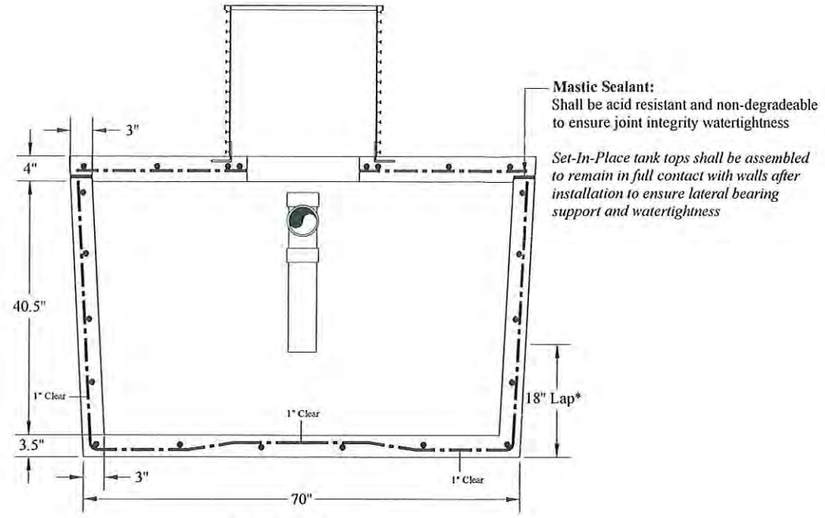
Michael E. Kucinski, Manager
Water Quality/Onsite

Enclosures: Approved Plans & Installation Guide

Electronic Copy: DEQ Direct Service Offices (w/Enclosures)
Contract County Offices (w/Enclosures)
Tristian Bounds, OSI, Inc.



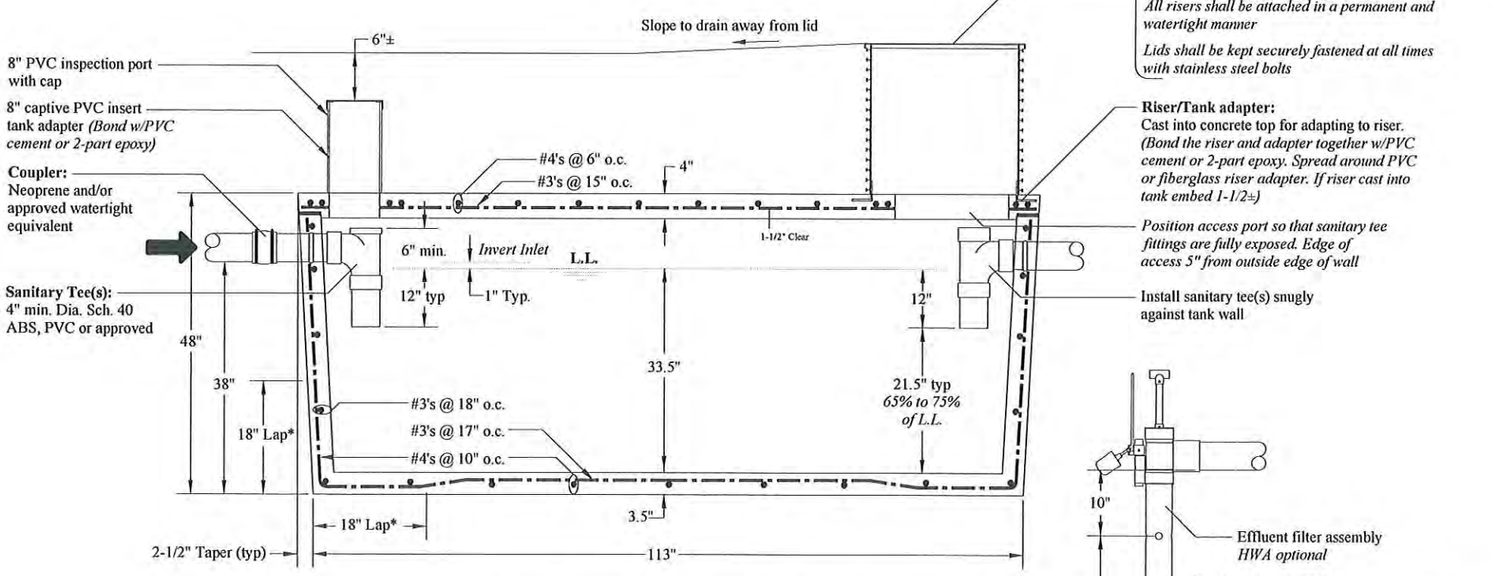
Top View



End View

PLAN APPROVED

Date 6/2/09 Signed



Side View 1000 Gallon Tank

*18" Minimum Lap Typical at all corners top and bottom

Dimensions and specs for OSI filter

Model #	*FT0436-28	*FT0836-36	*FT1236-54
nominal Diameter (in.)	4	8	12
Overall Height (in.)	36	36	36
Mesh Screen Height (in.)	28	36	54

*Biotube® Screen Technology. Other sizes per DEQ approval letter November 9, 1995

Optional Effluent Filter Detail

General Notes:

Tank Volumes: Total Volume: 1277 gal±
Operating Volume: 1037 gal±
Average unit Volume: 31.5 gal./in.±

Loads: Top = 400 psf
Lateral Load = 62.4 pcf
Concentrated Wheel Load = 2500 lb.
The septic tank shall be capable of withstanding long-term hydrostatic loading, in addition to the soil loading, due to a water table maintained at ground surface. Soil Bearing = 1500 psf *(re-evaluate support base if soil bearing is less or unequal)*

The walls and bottom slab shall be poured monolithically.
Reinforcing steel shall be ASTM A-615 Grade 60, fy = 60,000 psi.

Concrete: The concrete shall achieve a minimum compressive strength of 4,000 psi in 28 days; fc' = 4,000 psi. Concrete shall be ready mix with cement conforming to ASTM C-150, Type II. There shall be a content of not less than six and one half (6 1/2) sacks per cubic yards and maximum aggregate size of 3/4 inch. Water/Cement ratio shall be kept below 0.4, (W:C 0.35±). Air-entraining agents and fibrous reinforcement will enhance workability, curing and watertightness of the tank; however, their usage is optional.

Tanks shall not be moved from the manufacturing site to the job site until the tank has cured for seven (7) days, or has reached two-thirds of the design strength. Proper curing techniques must be used to ensure watertight tanks.

Installation: Installation, bedding, compaction, etc., shall be in strict compliance with the manufacturers standards and state of Oregon's on-site rules 340-71 and 73. All tanks shall be set level on a minimum 3 inch thick compacted sand or approved granular bedding overlying a firm uniform base. The base shall be stable and uniform in order to ensure equal bearing across the tank bottom. Installations with 18 inches or less of ground cover may require additional buoyancy considerations as described in the manufacturers instructions. A minimum cover of 18 inches is required over the tank in areas subject to occasional light wheel loads.

Test: Tanks shall be tested and certified watertight per Oregon On-Site Rules 340-71 and 73.

Tank Markings: Manufacturers name: Willamette Graystone, Inc.
Liquid capacity: 1000 gal.
Max burial depth: 4ft.
Min burial depth: 1.5ft.
Max traffic (wheel): 2500 lbs.
Date manufactured:
Permit no.:

WILLAMETTE GRAYSTONE, INC.
P.O. Box 7816
EUGENE, OR 97401
PHONE: 541-726-7666

ORENCO SYSTEMS, INC.
814 AIRWAY AVENUE
SUTHERLIN, OR 97479
PHONE: 541-459-4449

REGISTERED PROFESSIONAL ENGINEER 14747PE OREGON Dec. 31, 2007 NATHAN TRISTIAN BOUNDS

EXPIRES: 12-31-2009

Willamette Graystone, Inc.
1000 Gallon Low Profile Septic Tank

Approved By: NTB P.E.	Designed By: NTB P.E.
Drawing By: BS	Drawing #: 1 of 1
Date: 1/28/2009	Project #:
Scale: 1" = 2'	Revision #:

1000 Gallon Single Compartment Low Profile Septic Tank Installation Manual

1) **Hole Preparation**
Ensure hole is at least 12" longer and wider than the size of the tank, providing the excavated walls are straight up and down. If over digging depth occurs or you have unstable soils, you must use sand, crushed rock, or pea gravel, to bring up to grade. Grade from the house is ¼" per foot. From the bottom of said pipe, measure down the distance to the excavation, the same that is on the manufacturers card for inlet elevation. This would be the grade. Level from that point lengthwise, and crossways, to finish grading the bottom of the hole. All tanks shall be set level on a minimum 3-inch thick compacted ¾ minus, pea gravel or approved granular material overlying a firm uniform base.

2) **Setting the tank**
OSHA restrictions apply. Do not stand in hole while tank is being placed. Watch for water coming into the hole and walls sliding off in the hole. Stay away from edge of hole and watch the equipment operator. Be sure the tank is level. Check for proper alignment between inlet pipe and tank inlet

3) **Risers and Installation**
Plastic Risers: Plastic risers are either poured into the concrete, or attached to a poured in flanged adapter, to facilitate the holding of a 24" diameter access riser. If a groove is in the concrete top around the manhole, a riser can be attached by using a 2-part epoxy (Weld-On 812).

4) **Lid**
The lid of the riser shall be attached with stainless steal bolts.

5) **Pipe Connection**
Pipe connection is done by applying ABS cement to the inside of the 4" coupler in the tank wall, and applying ABS cement to the pipe to be fitted; push together and hold for a few seconds. If PVC 3034 pipe is coming into the tank, an adapter (ASTM D2751) is supplied with the tank, and weld-on glue (Weld-On 794 ABS to PVC) is applied to the inside of the coupler in the tank and on the pipe coming in. This adapter makes up the difference in outside measurements of the two pipes.

6) **Buoyancy Countermeasures**
Installations with 18 inches or less ground cover may require additional buoyancy considerations. Shallower applications will require buoyancy calculations and counter measures by a professional engineer.

7) **Test Procedures**
If possible, backfill the tank to a point 10" down from the top of the tank. Fill the tank with water to point 2" above the top surface of the tank. No more than 2" of water into the riser. If water level drops in 24 hours--which may be due to concrete absorption, refill to the same mark for a re-test. The water level should not drop more than 1" in the riser.

8) **Backfill Instructions**
Backfill should be of proper size and gradation. No stones over 2 1/2" in diameter No deleterious materials (i.e., any material that might puncture or damage the tank). Each layer should contain sufficient moisture to allow for proper compaction. If possible, the layers should be compacted with a hand tamper. Make sure inlet and outlet pipes have a compacted base under them to help provide support for the pipes. Ensure the final grade slopes away from the access riser.

Special Precautions
When backfilling with loader or backhoe bucket, be especially careful not to disturb riser, inspection port, or any unit that may be attached to the tank.

6/4/09 RT