[redacted]

Authorized Onsite Soil Evaluator / Professional Engineer Report for **Construction Permit**

Property Location:

Lot: [redacted] Section: [redacted] Subdivision: [redacted] Acreage: **.91+/- Acres**

Map Reference: **GPIN:** [redacted]

Other Property ID: [redacted]

Applicant / Client and Address:

[redacted]

Prepared by:

[redacted]

Date of Report: **5/7/14**

AOSE / P.E. Job Number: [redacted]

Revisions: ____

Health Dept. ID No.: ____

Contents / Index of this Report:

			Page(s):
Site Layout / Construction Drawings	☒ Yes	☐ No	**2**
Soil Summary Report	☒ Yes	☐ No	**3**
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Construction Specifications	☒ Yes	☐ No	**5**
AX20-RT Specifications	☒ Yes	☐ No	**6-8**
Abbreviated Design Form	☒ Yes	☐ No	**9**
Advantex Owner's Manual	☒ Yes	☐ No	**10-13**
Septic Care & Maintenance	☒ Yes	☐ No	**14**
Water Supply Design Specs	☐ Yes	☒ No	**--**

Certification Statement:

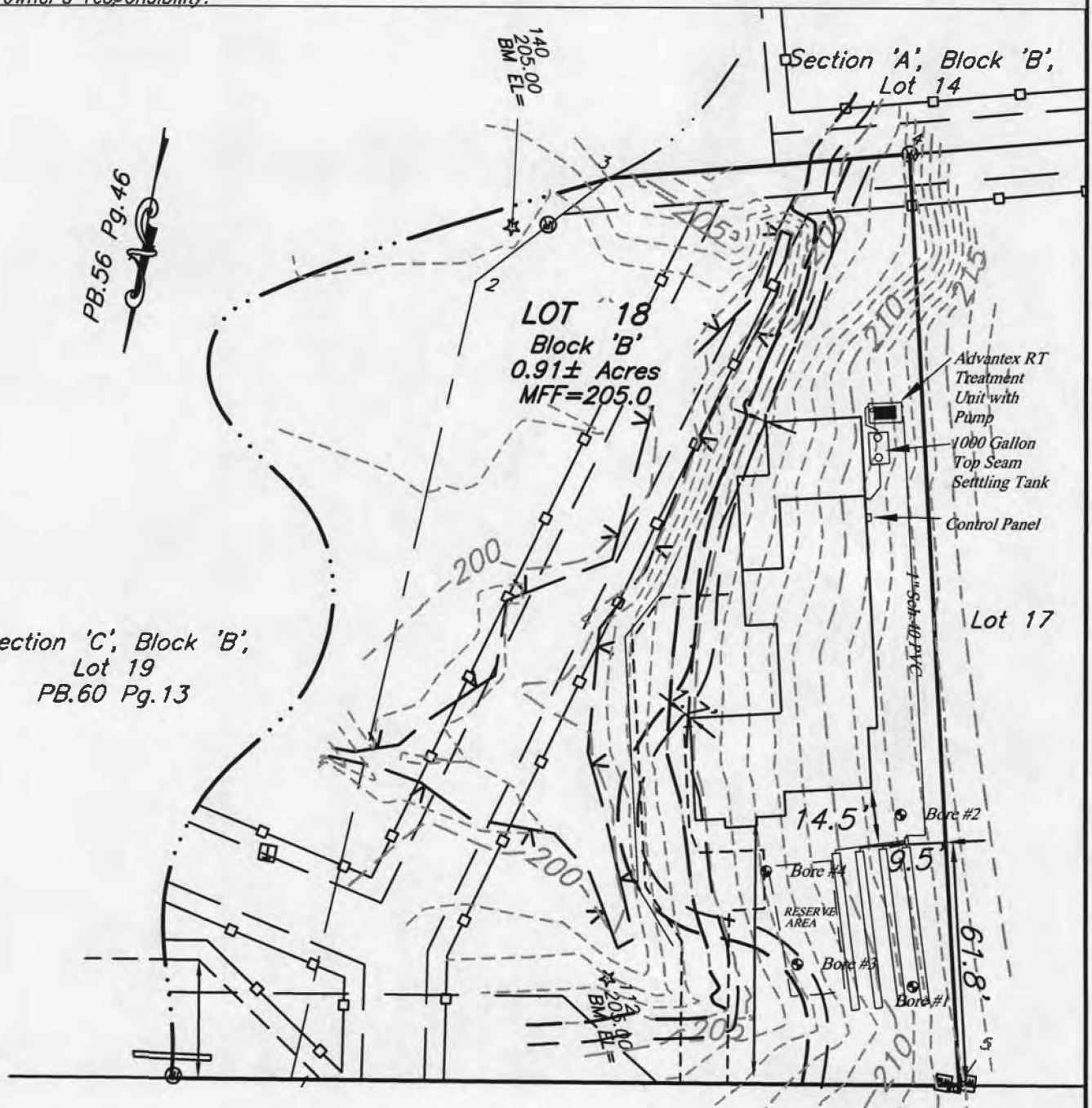
I hereby certify that the evaluations and/or designs contained herein were conducted in accordance with the Sewage Handling and Disposal Regulations (12 VAC5-610), the Private Well Regulations (12 VAC5-630) and all other applicable laws, regulations and policies implemented by the Virginia Department of Health. I further certify that I currently possess any professional license required by the laws and regulations of the Commonwealth that have been duly issued by the applicable agency charged with licensure to perform the work contained herein. The work attached to this cover page has been conducted under an exemption to the practice of engineering, specifically the exemption in The Code of Virginia Section 54.1-402.A.11.

[redacted]

I recommend a permit1 be approved2.

A.O.S.E. / P.E Stamp Signature & Date

This plat is for Health Department review only. The information provided herein does not constitute a certified survey, building permit plat, or record plat. All matters pertaining to easements, setbacks, right of ways, etc, are the owner's responsibility.



Proposed
Improvements on

DATE: 5/7/2014
SCALE: 1"=40'
JOB NO:
Pur:

Cross Creek, Sec B, Lot 18 AOSE\Drawings\C1400111 AOSE.dwg

[redacted]

Soil Summary Report

GENERAL INFORMATION

Date: **3/18/14** Submitted to [redacted] **County** Health Department

Applicant: [redacted] Phone: [redacted]
Address: [redacted]

Owner: [redacted]
Address: [redacted]

Location: [redacted]

Tax Map: **GPIN:** [redacted] Subdivision: [redacted] Block/Section: [redacted] Lot: [redacted]

SOIL INFORMATION SUMMARY

1. Position in landscape satisfactory: Yes ☒ No ☐
   Describe: **Side Slope**

2. Slope: **6-8%**

3. Depth to rock or impervious strata: Max. _____" Min. **30"** None --

4. Depth to seasonal water table (gray mottling or gray color): No ☒ Yes ☐ _____

5. Free water present: No ☒ Yes ☐ _____range in inches

6. Soil percolation rate estimated: Yes ☒ Texture group **II**
   No ☐ Estimated rate of **30** min/inch

7. Permeability test performed: Yes ☐
   No ☒

   If yes, note type of test performed and attach _____

☒ Site Approved: Drainfield to be placed at a depth of **18"**at site designated on permit.
☐ Site Disapproved:

Reasons for rejection:
1. ☐ Position in landscape subject to flooding or periodic situation.
2. ☐ Insufficient depth of suitable soil over hard rock.
3. ☐ Insufficient depth of suitable soil to seasonable water table.
4. ☐ Rates of absorption to slow.
5. ☐ Insufficient area of acceptable soil for required drainfield, and/or Reserve Area.
6. ☐ Proposed system too close to well.
7. ☐ _____ (attach additional pages if necessary)

SOIL PROFILE DESCRIPTION REPORT

Evaluation Location: [redacted]

☑ See application sketch ☐ See construction permit ☐ See sketch on reverse side or attached to this form.

Hole #	Horizon	Depth in inches	Descriptions of color, texture, etc.	Texture Group
Bore #1	A	0-6	Very Dark Grayish Brown 10YR 3/2, loam	II
	B1	6-24	Light Yellowish Brown 10YR 6/4, sandy clay loam	II b
	B2	24-55	Mix of Pale Yellow 2.5Y 7/4 and Light Yellowish Brown	I
			10YR 6/4 sandy loam with reddish yellow 5YR 6/8	
			mottles and loose sand and increasing gravel	
	C	55+	Auger Resistance due to gravel	
Bore #2	A	0-4	Very Dark Grayish Brown 10YR 3/2, loam	II
	B1	4-20	Yellowish Brown 10YR 5/6, sandy clay loam	II b
	B2	20-30	Mix of Yellowish Brown 10YR 5/6 and Strong Brown	I
			7.5YR 5/8, sandy loam with loose sand, increasing	
			gravel	
		30+	Auger Resistance due to gravel	
Bore #3	A	0-4	Very Dark Grayish Brown 10YR 3/2, loam	II
	B1	4-21	Light Yellowish Brown 10YR 6/4, sandy clay loam	II b
	B2	21-41	Light Yellowish Brown 10YR 6/4, sandy clay loam	II b
			with reddish yellow 5YR 6/8 mottles, increasing gravel	
		41+	Auger Resistance due to gravel	
Bore #4	A	0-3	Very Dark Grayish Brown 10YR 3/2, loam	II
	B1	3-18	Yellowish Brown 10YR 5/6, sandy clay loam	II b
	B2	18-30	Mix of Yellowish Brown 10YR 5/6 and Strong Brown	I
			7.5YR 5/8, sandy loam with loose sand, increasing	
			gravel	
		30+	Auger Resistance due to gravel	

[redacted]

Sewage Disposal System
Construction Specifications

General Information

Use:
Residential ☒ Commercial ☐
New ☒ Repair ☐ Expanded ☐
Gravity Conventional ☐ Pump Conventional ☐
Alternative **Advantex AX20-RT** ☒

Number of Bedrooms **3**
Termite Treatment ☒ Yes ☐ No
Basement ☒ Yes ☐ No
Fixtures in Basement ☒ Yes ☐ No

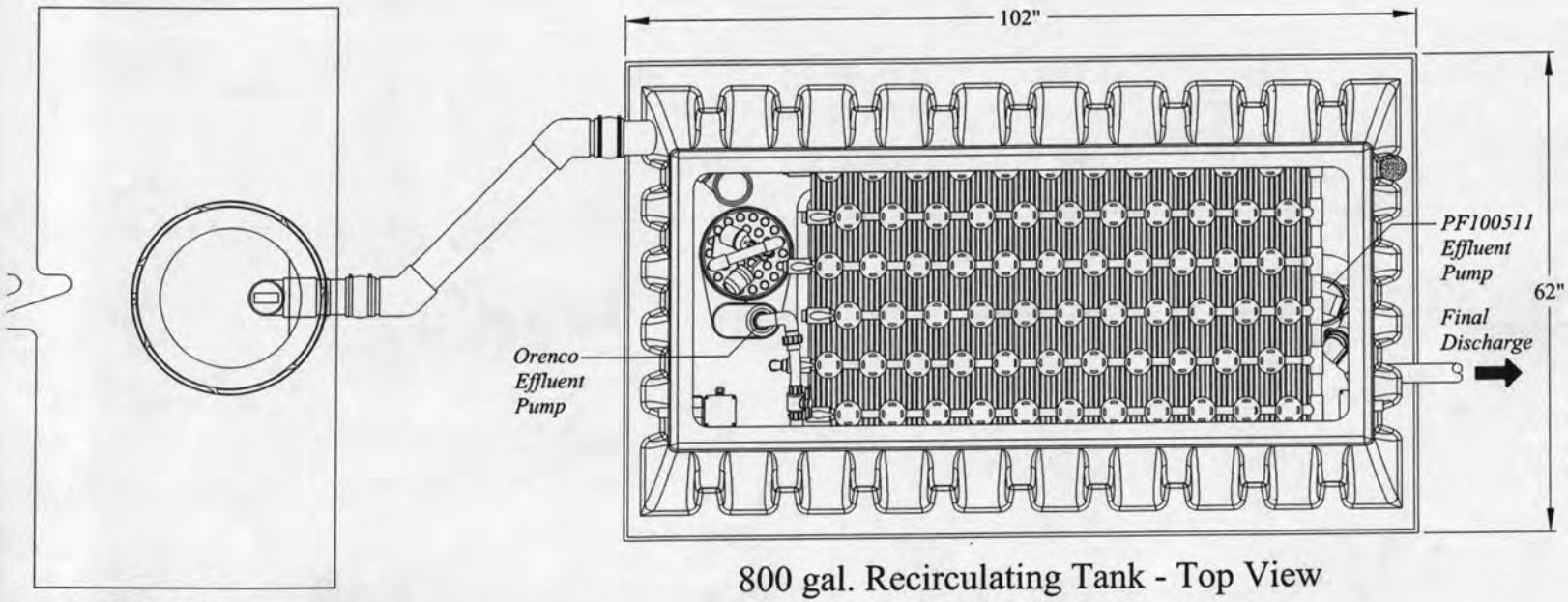
Owner: [redacted]
Address: [redacted]

Subdivision: [redacted] Section: [redacted] Block: [redacted] Lot: [redacted]

Actual or estimated water use: **450 GPD**

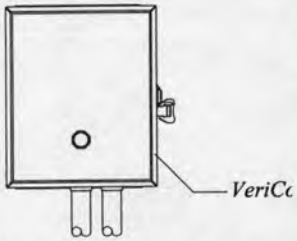
DESIGN	NOTES
Water Supply: ☒ Public ☐ Private ☐ New ☐ Existing **To be installed:**	County Water
Building sewer: **4** I.D. PVC 40 or equivalent. Slope 1.25" per 10" (minimum). ☐ Other _____	
Septic tank: Capacity **(1) 1000 Gallon To Seam Settling Tank** (minimum) ☒ Other **AX-RT Treatment Tank with Pump Package**	
Inlet-outlet structure: PVC 40, 4" tees or equivalent. ☐ Other _____	
Pump and pump station: No ☐ Yes ☒ describe and show design. If Yes: **Integrated Pump Package (See Pages 7-8)**	
Gravity mains: 3" or larger I.D., minimum 6" fall per 100', 1500 lb. Crush strength or equivalent. ☐ Other _____	
Distribution Box: *Pre-cast concrete* with **8** ports. ☐ Other _____	
Header Lines: Material: 4" I.D.1500 lb Crush strength plastic or equivalent from distribution box to 2' into absorption trench Slope: 2"/100' minimum ☒ Other **PVC**	Sch 40 PVC Headers
Percolation Lines: Gravity 4" plastic 1000 lb. Per foot bearing load or equivalent, slope 2" 4" (min. max.) per 100' ☐ Other _____	
Absorption Trenches: Square ft. required: **320 ft²**; Depth to bottom of trench: **18 "**; Trench width: **2 '** Depth of aggregate: **13"**; Trench length: **40'**; Number of trenches: **4**	

Rev: 9/07



800 gal. Recirculating Tank - Top View

Tank - Top View



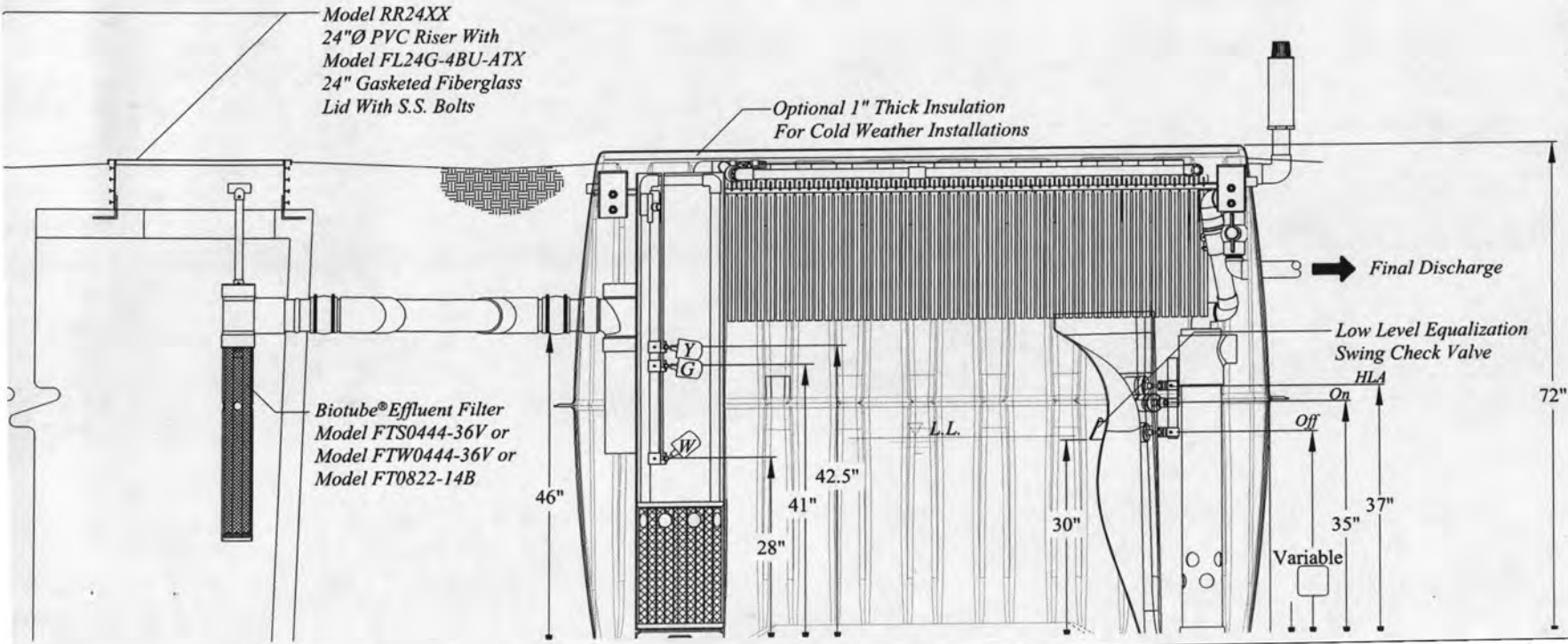
Pump Discharge Control Panel Detail

Not To Scale

Note: *Only tanks from the manuf below shall be used.*

Tank Manufacturer	Septic T Size
Orenco Fiberglass Tank	1000 G
C.T. Jamison	1000 G
Hanover Precast	1000 G
Rockingham Precast	1000 G
Wrights Ready Mix	1000 G
Beasley Concrete	1000 G

Note: *All tanks shall be tested fo All concrete tanks shall have PR tank for acceptance of Model RR*



Technical Data Sheet

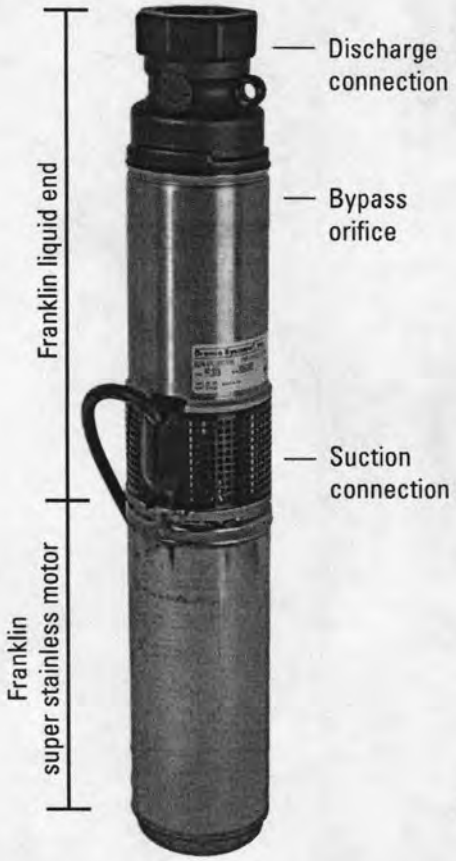
PF Series 4" (100 mm) Submersible Effluent Pumps

Orenco Systems® Incorporated
800-348-9843

Applications

Our 4" (100 mm) Submersible Effluent Pumps are designed to transport screened effluent (with low TSS counts) from septic tanks or separate dosing tanks. All our pumps are constructed of lightweight, corrosion-resistant stainless steel and engineered plastics; all are field-serviceable and repairable with common tools; and all 60-Hz PF Series models are CSA certified to the U.S. and Canadian safety standards for effluent pumps, meeting UL requirements.

Orenco's Effluent Pumps are used in a variety of applications, including pressurized drainfields, packed bed filters, mounds, aerobic units, effluent irrigation, effluent sewers, wetlands, lagoons, and more. These pumps are designed to be used with a Biotube® pump vault or after a secondary treatment system.



C SP US
LR80980
LR2053896

Powered by Franklin Electric

Features/Specifications

To specify this pump for your installation, require the following:

- Minimum 24-hour run-dry capability with no deterioration in pump life or performance*
- ⅛-inch (3-mm) bypass orifice (patent pending) to ensure flow recirculation for motor cooling and to prevent air bind
- Liquid end repair kits available for better long-term cost of ownership
- TRI-SEAL™ floating impeller design on 10, 15, 20, and 30 gpm (0.6, 1.3, and 1.9 L/sec) models; floating stack design on 50 and 75 gpm (3.2 and 4.7 L/sec) models
- Super stainless Franklin Electric motor, rated for continuous use and frequent cycling
- Type SOOW 600-V motor cable (suitable for Class I, Division 1 and Division 2 applications)
- Five-year warranty on pump or retrofit liquid end from date of manufacture against defects in materials or workmanship

** Not applicable for 5-hp (3.73 kW) models*

Standard Models

See specifications chart, pages 2-3, for a list of standard pumps. For a complete list of available pumps, call Orenco.

Nomenclature

PF [10] [5] [1] [1] - [20]

Cord length, ft (m):
Blank = 10 (3) 20[1] = 20 (6)
30 = 30 (9) 50 = 50 (15)

Voltage, nameplate:
1 = 115[2] 200 = 200
2 = 230[3] 4 = 460

Frequency:
1 = single-phase 60 Hz 3 = three-phase 60 Hz
5 = single-phase 50 Hz

Horsepower (kW):
03 = ⅓ hp (0.25) 05 = ½ hp (0.37)
07 = ¾ hp (0.56) 10 = 1 hp (0.75)
15 = 1-½ hp (1.11) 20 = 2 hp (1.50)
30 = 3 hp (2.24) 50 = 5 hp (3.73)

Nominal flow, gpm (L/sec):
10 = 10 (0.6) 15 = 15 (1.0)
20 = 20 (1.3) 30 = 30 (1.9)
50 = 50 (3.2) 75 = 75 (4.7)

Pump (PF Series)

[1] Note: 20-foot cords are available only for single-phase pumps through 1-½ hp
[2] ½-hp (0.37kW) only
[3] 220 volts for 50 Hz pumps

Pump Selection for a Non-Pressurized System - Single Family Residence Project

Parameters

Discharge Assembly Size	1.0FC	inches
Transport Length	90	feet
Transport Pipe Class	40	
Transport Line Size	1.00	inches
Distributing Valve Model	None	
Max Elevation Lift	12	feet
Design Flow Rate	10	gpm
Flow Meter	None	inches
'Add-on' Friction Losses	0	feet

Calculations

Transport Velocity	3.7	fps

Frictional Head Losses

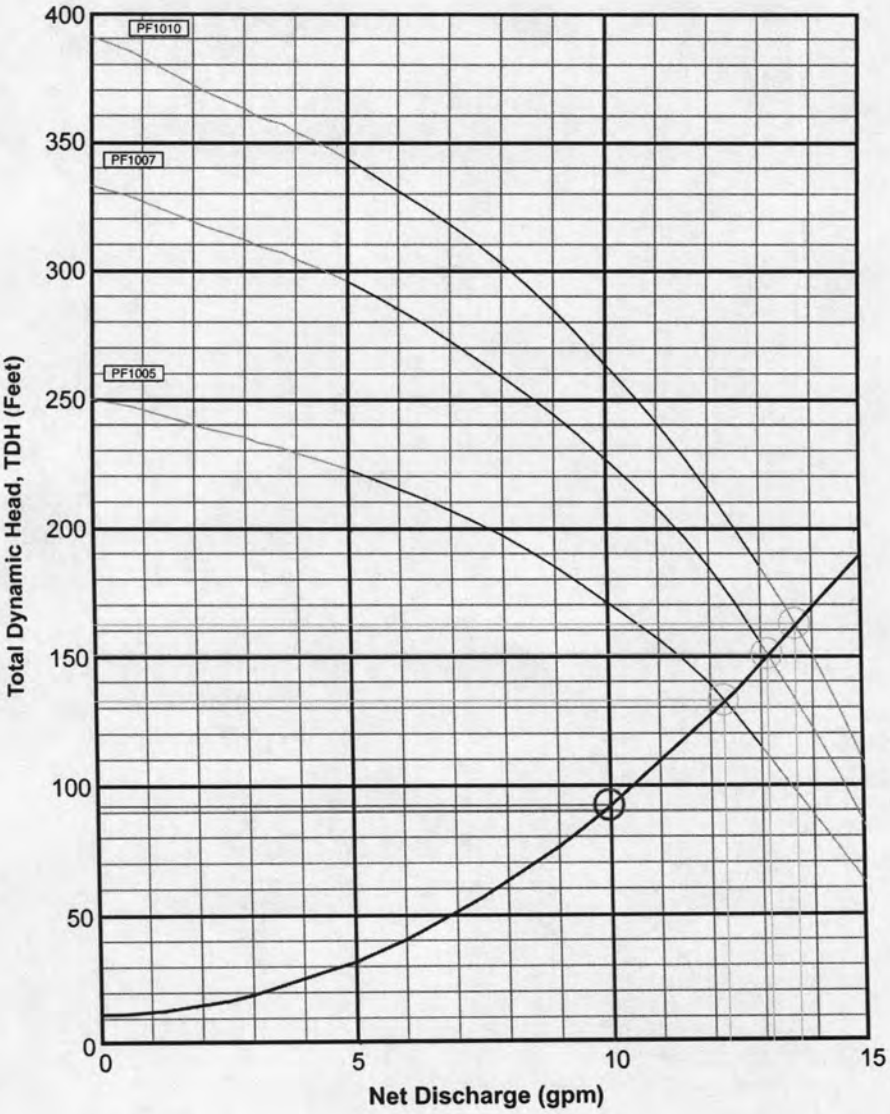
Loss through Discharge	75.0	feet
Loss in Transport	4.9	feet
Loss through Valve	0.0	feet
Loss through Flowmeter	0.0	feet
'Add-on' Friction Losses	0.0	feet

Pipe Volumes

Vol of Transport Line	4.0	gals

Minimum Pump Requirements

Design Flow Rate	10.0	gpm
Total Dynamic Head	91.9	feet



PumpData

PF1005 High Head Effluent Pump
10 GPM, 1/2HP
115/230V 1Ø 60Hz, 200V 3Ø 60Hz

PF1007 High Head Effluent Pump
10 GPM, 3/4HP
230V 1Ø 60Hz, 200V 3Ø 60Hz

PF1010 High Head Effluent Pump
10 GPM, 1HP
230V 1Ø 60Hz, 200V 3Ø 60Hz

Legend

System Curve:
Pump Curve:
Pump Optimal Range:
Operating Point:
Design Point:

Orenco Systems®
Incorporated
Changing the Way the World Does Wastewater®

[redacted]

Abbreviated Design Form

For use with gravity and pump drainfields, enhanced flow systems and low-pressure distribution systems when applying for a certification letter or subdivision approval.

Design Basis: TL-III Alternative to 2' Trenches

A. Estimated Percolation Rate: **30 min/inch**

B. Hydraulic Loading Rate **1.5 ft²/gpd**

C. Number of bedrooms: **3**

Area Calculations

D. Length of trench: **40'**

E. Width of trench: **2'**

F. Number of trenches: **4**

G. Center-to-center spacing: **6'**

H. Width required: **20'**
G (F-1)+E

I. Total square footage required:
(line B / total GPD) **300 ft²**

J. Square footage in design: **320 ft²**
(D*E*F)

K. Is a reserve area required: ☒ Yes ☐ No **(2) 7x35' Pads**

AdvanTex® O&M MANUAL

SUPPLEMENTAL INFORMATION, AX20-RT

Introduction: AdvanTex® AX20-RT Treatment Unit Operation

This supplement contains information to help you successfully operate and maintain an AdvanTex® AX20-RT Treatment Unit. The AX20-RT operates similarly to the AdvanTex AX20 Treatment System, but there are some differences to be aware of when performing O&M activities. A big difference is that the AX20-RT consists of a single, self-contained module for recirculation, treatment, and dosing, instead of separate units.

Another difference is that the AX20-RT has no Recirculating Splitter Valve (RSV). Effluent percolates down through the textile media and is split — by means of a tank baffle — between the recirculating side and the discharge side of the AX20-RT recirculating treatment tank.

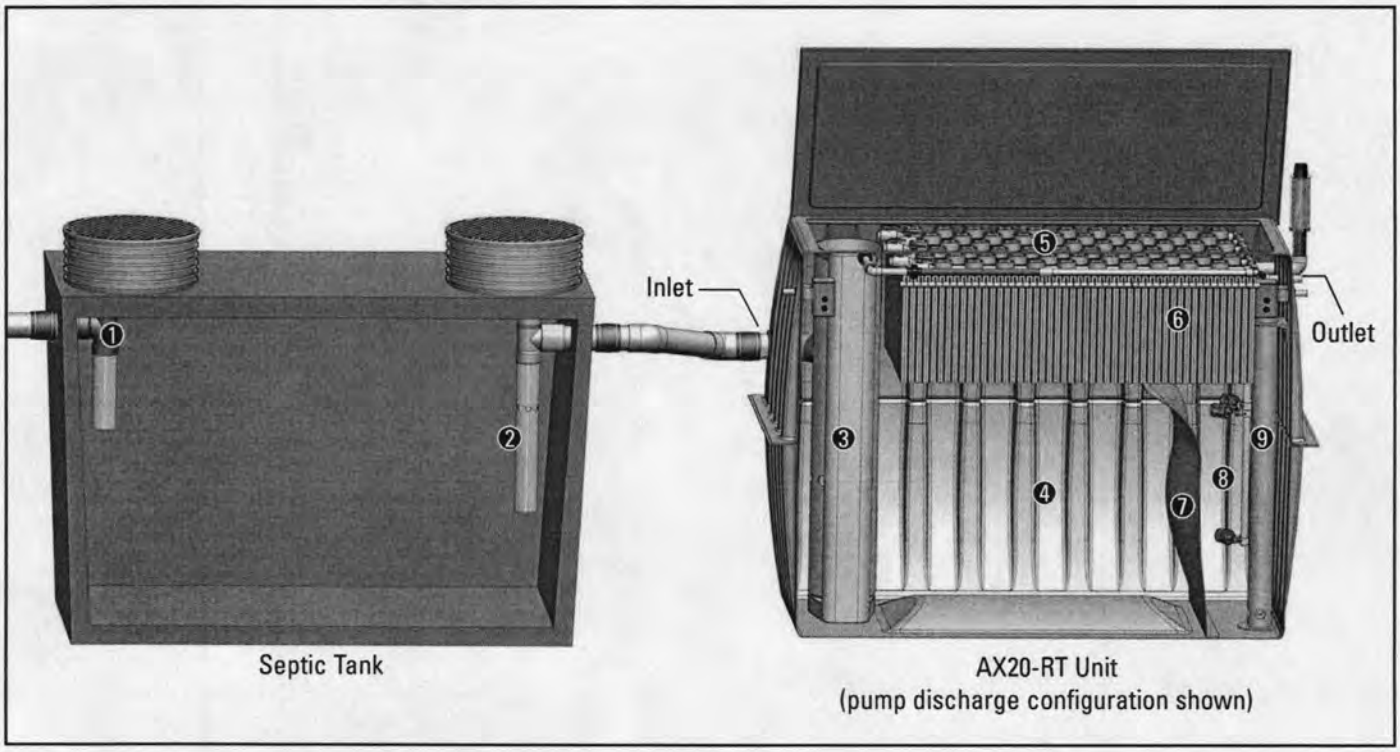
The Advantex AX20-RT Treatment System has 10 main functional areas and components:

1. Septic Tank Inlet Tee
2. Biotube® Effluent Filter
3. Biotube Pump Package
4. Recirculating Treatment Tank (recirc side)
5. Manifold and Laterals
6. Textile Media
7. Tank Baffle
8. Recirculating Treatment Tank (discharge side)
9. Flow Inducer and Discharge Pump Assembly
10. Control Panel (not shown)

Effluent from the clear layer in the septic tank passes through a Biotube® effluent filter and is discharged by gravity to the recirc side of the AX20-RT unit, which contains a Biotube Pump Package. The Biotube Pump Package pumps filtered effluent from the recirc side of the AX20-RT unit's recirculating treatment tank to the distribution manifold in the top of the unit.

The operation of the pump on the recirc side of the tank baffle is controlled by a timer in the control panel, which allows the pump to dose the textile media for short periods (usually a half-minute or less), typically 72 times a day. This frequent "microdosing," which optimizes the treatment process, occurs 24 hours a day to maintain the proper biological environment.

Treated effluent can be discharged to the drainfield by means of a flow inducer and discharge pump or by gravity discharge. The "High Level Alarm" and "ON" floats for the discharge pump are set at the factory and are non-adjustable. Dose volume for the pump discharge is determined by adjustments to the "OFF" float. AX20-RT units with gravity discharge simply discharge when the level of treated effluent in the discharge side of the tank is at the level of the discharge outlet.



Septic Tank

AX20-RT Unit
(pump discharge configuration shown)

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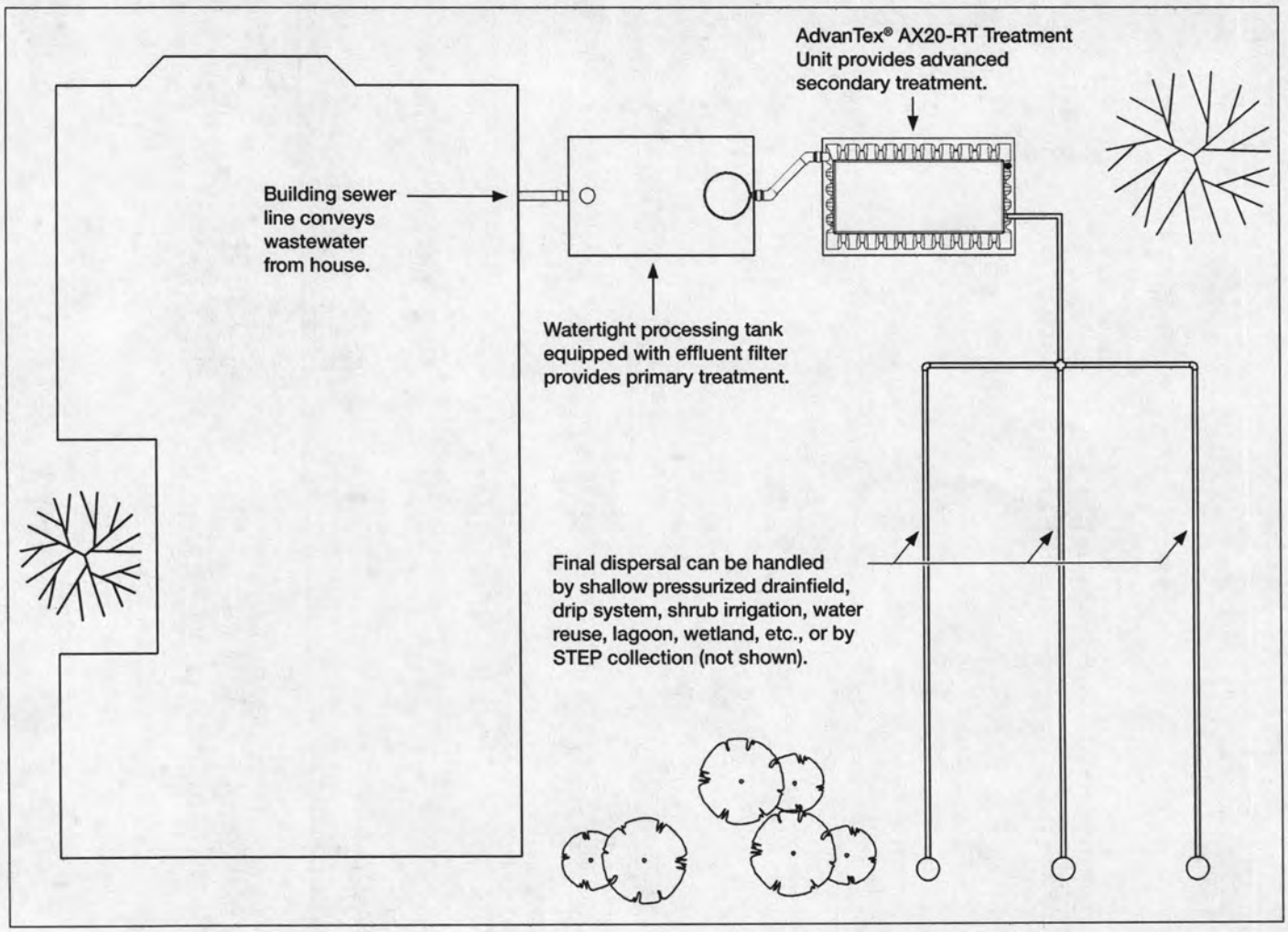
Typical Site Plan for an AdvanTex AX20-RT Treatment Unit



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AdvanTex® O&M MANUAL

SUPPLEMENTAL INFORMATION, AX20-RT

AdvanTex O&M Manual: Changes Specific to the AX20-RT

The following shows AX20-RT-specific information not found in Parts 1 and 2 of the *AdvanTex® O&M Manual* that are relevant to operating and maintaining the AdvanTex AX20-RT Treatment Unit. Use the general information found in the *O&M Manual* along with this information to start up and properly service AX20-RT systems.

Start-Up Checklist Changes

Primary Treatment

Note: *All pumping equipment is contained in the AX20-RT unit. Substitute the checklist item below for the checklist items in the "Process Tank Pumping Equipment" and "Process Tank Pumping System" sections.*

Septic Tank

☐ Biotube® filter installed correctly on the septic tank outlet.

Secondary Treatment

Note: *There is no recirculating splitter valve (RSV) or separate discharge basin in an AX20-RT system. Floats in the Biotube® Pump Vault Unit (PVU) are set at the factory for correct performance. Do not adjust the floats in the PVU. Substitute the checklist items below for the checklist items in the "Secondary Treatment" section.*

AX20-RT Unit

☐ AX20-RT unit installed level.

☐ All piping properly covered and compacted.

Ventilation System

☐ Passive air vent on AX20-RT unit properly installed.

Biotube® Pump Vault Unit

☐ Floats operate properly.

☐ Pump plumbing connected correctly to manifold.

Biotube Pump Vault Operation

☐ Pump operates in "Manual."

☐ Pump operates in "Automatic."

☐ Pump run amps:_____

☐ Pump rest volts:_____ run volts:_____

AX20-RT Filter Operation

☐ Squirt height verified.

AX20-RT Discharge Unit (pump discharge only)

☐ Floats operate properly.

☐ Pump discharge plumbing connected correctly.

☐ "Off" float adjusted for correct discharge dose to dispersal.

Setting Discharge Flow Volume

The AX20-RT is pre-set at the factory for a discharge flow volume of 42.5 gal/dose (161 L/dose). If necessary, use the discharge pump "Off" float to make adjustments to the discharge flow volume. Each 1-in. (12.7 mm) increase or decrease in "Off" float height is equal to approximately 4 gal. (15 L) change in volume.

Do not adjust the settings of the "High-Level Alarm" and "On" floats.

Table 1. Dose Volume Information

Pump gal./min (L/sec)	10 (0.6)	20 (1.3)	30 (1.9)	50 (3.2)
Factory float setting*, in. (mm)	25 (635)	25 (635)	25 (635)	25 (635)
Lowest "Off" setting, in. (mm)	16 (406)	18 (457)	20 (508)	24 (610)
Max dose volume, gal. (L)	76 (288)	68 (257)	64 (242)	56 (212)

**Settings are measured from the bottom of the discharge side of the AX20-RT unit.*

Perform Field Sampling

When you arrive at the site, remove the lid from the AX20-RT and take your sample from the discharge side of the AX20-RT unit before doing anything else, so that the sample won't be contaminated by material that you stir up while working.

When you collect effluent samples, be careful not to touch the textile sheets, unit walls, or other components. Disturbing the sheets, walls, or other components could contaminate the samples. Also, be sure to thoroughly clean and dry your sampling device between uses to avoid cross-contamination.

Measure Sludge and Scum

Measure sludge and scum in the process tank AND on the recirc side of the AX20RT. Follow the instructions for pumpouts found in the *AdvanTex O&M Manual* for the process tank.

NOTE: *A light buildup of solids is expected to form in the AX20-RT unit over time. After the second year that the system is in use, we recommend measuring solids accumulation in the AX20-RT whenever you perform regularly scheduled maintenance.*

If more than trace amounts of scum or solids are found in the recirc side of the AX20-RT unit, check the distribution side of the unit for solids and scum, schedule a pumpout, and begin troubleshooting the system. The *Advanced Service Tips and Troubleshooting Guide* can help you determine the cause. You may need to change timer settings or discuss household habits with the system users.

Notes

 •

IMPORTANT FACTORS TO CONSIDER WHEN INSTALLING AND MAINTAINING SEPTIC TANK DRAINFIELD SYSTEMS

DRAINFIELD DISTURBANCE: The designated drainfield area (primary and reserve), must remain undisturbed until installation. The client is responsible for all parties that are involved in the home construction process and any destruction to the restricted area. The drainfield area is not to be driven on, parked on, or disturbed in anyway (i.e. soil compaction). Vehicles (trucks, tractors, and heavy equipment) especially should avoid this area. Our design package is final and cannot be deviated from without permission from our department. If the area is disturbed to a point where the area is no longer feasible as a drainfield site, the additional costs will fall on the client for our company or another AOSE to find another appropriate drainfield area.

LOGGING AND CLEARING: The clearing of a drainfield area is sometimes necessary, but must be followed according to the AOSE's specifications. The area must be hand-cleared when an engineered or alternative system has been specified with an install depth of 24 inches or less. Logging on or around the drainfield area is prohibited without permission from the AOSE. Heavy logging traffic and logging decks must be kept at least 50' feet away from the designated area (primary and reserve). If the area is disturbed to a point where the area is no longer feasible as a drainfield site, the additional costs will fall on the client for our company or another AOSE to find another appropriate drainfield area.

MULCH / IRRIGATION: We do not recommend the use of bark, sawdust, or plastic sheeting on drainfield sites. The purpose of these mulch beds is to prevent evaporation and retain water, while the primary function of a drainfield is to percolate water through the soil system with evapo-transpiration being an integral part of that process. Mulch can lead to an early failing of your septic system. Yard irrigation systems are not recommended for use on or within 25 feet of the drainfield trenches. Additional water added to the drainfield area can increase the likelihood of premature drainfield failure. The drainfield should be graded and seeded and maintained as a lawn for optimal performance. Consult your local Extension Service office for seed, lime, and fertilizer recommendations.

GARBAGE DISPOSERS AND KITCHEN WASTE: If a garbage disposal unit is installed within a home, the kitchen plumbing should be plumbed to a separate outlet and a 1250/1500-gallon septic tank/grease trap installed to receive only kitchen effluent. This effluent can then flow to the primary or a separate drainfield site. We do not recommend garbage disposal units with conventional drainfields that do not have a dedicated septic tank/grease trap. Grease/kitchen waste build-up can lead to premature failure of your septic system.

The client is responsible for maintaining the drainfield site and minimizing the disturbance on or around our designated area. It is also the responsibility of the client to ensure that the installer is supplied with the most updated version of all drawings and specifications, including a current Health Department approval letter. It is also your responsibility to pass care and maintenance information on to the eventual homeowner. We assume no liability outside of our specifications and design package. If any questions arise, do not hesitate to call for any advice or consultation.

[redacted]

Rev: 9/07