SPECIFICATIONS, CALCULATIONS, SOILS REPORT AND MANUFACTURER'S CUT SHEETS FOR A SUBSURFACE DRIP IRRIGATION SEWAGE EFFLUENT DISPOSAL SYSTEM

TO SERVE

3-BEDROOM SINGLE FAMILY RESIDENCE

135 COVENTRY HILLS LANE
TROUTMAN, IREDELL COUNTY, NC

January 27, 2009
Revised March 30, 2009

As Built 1/20/2010

Approved By
ON-SITE WASTEWATER SECTION
Division of Environmental Health, DENR
File No.: 2009-10
Date: 1/13/09
By: Tricia F

PREPARED FOR:
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NORTH CAROLINA PROFESSIONAL SEAL 17327 ENGINEER DONALD L. MUNDAY

On-site Water Protection Section DENR/DEH RECEIVED APR 02 2009

OPERATOR:
SID GASKINS
WATER MANAGEMENT
828-244-9765

SECTION I - GENERAL

Jim Day is proposing to construct an addition to his existing residence at 135 Coventry Hills Lane in Troutman, Iredell County North Carolina. The addition to the residence will consist of adding another bedroom to an existing 2-bedroom home. Due to limited available space, soil conditions and limiting topography, a pre-treatment system and subsurface drip effluent disposal system is proposed. The design flow has been set at 360 GPD.

Directions to the property: From Perth Road in Mooresville, turn left on State Park Road. Go approximately 3 miles and turn left on Morrison Farm Road before entrance to State Park. Go approximately 2 miles and Turn right on Abington. Turn left on Coventry Hills Lane. Existing house is on left hand side of road near end. The residence is to be served by an on site water well located more than 50 feet from any septic system component. There is an existing well on site that will need to be abandoned before system can be put into use. (See site plan on Plan Sheet U-1 for new well and existing well location). Existing and proposed wells, both on site and off site, shall be located more than 50 feet from any septic system component.

Paul Penninger, LSS, with S&ME has evaluated the area for the proposed disposal area. An application rate of 0.2 G/D/SF has been recommended for this system and has been approved by the Iredell County Health Department. The effluent will be pretreated using a septic tank and recirculation tank with an Orenco Advantex AX20 packed bed media filter.

These specifications and design plans have been prepared for an on-site subsurface effluent drip disposal system using a septic tank, recirculation tank, textile packed bed media filter, drip field dosing tank, and a dual zone drip system.

The system is designed to accept and treat domestic waste only. No other discharge is allowed, including condensate water from HVAC systems, etc.

The Engineer has designed a textile filter and drip irrigation system that dispenses treated effluent through subsurface drip irrigation using design criteria intended to comply with NC DEM Administrative Code 15A NCAC 2H.0200 and 15A NCAC 18A .1969, and NC DEH Onsite Section Innovative Waste Water System IWWS–2000-2 (Geoflow Sub-Surface Drip System) and IWWS–2004-3R (Orenco Advantex Textile Filter).

Until plan acceptance and construction, the drip field site shall be maintained undisturbed. This shall include placement of signs, ribbons and barricades to avoid traffic, storage, or parking in the area. Encroachment by any utility or others is not permitted.

The Contractor shall be prohibited from working while the site is wet. The Contractor shall contact the Engineer prior to commencement of work after rainfall.

The Engineer or the Soil Scientist has the right to suspend work until soil moisture conditions are favorable to optimal installation.

The installer shall be knowledgeable of the type of system to be installed, and shall have prior instruction on the installation of the various components of the system, and shall have the prior approval of the component manufacturers, (Orenco) and (Geoflow), and the approval of the design engineer.

Orenco and Geoflow's Field Representative and designer shall provide written acceptance of the system installation prior to issuance of operation permit.

Scope of the Project: The scope of this project is to construct a system to collect the domestic waste from the residence through a gravity collection system. The waste will flow to a properly sized two-compartment septic tank. The outlet at the second compartment of the tank will have a slotted wastewater effluent filter. From the septic tank the effluent flows to a textile packed bed media filter, which treats and recirculates the effluent. Effluent then flows from the packed bed media filter to a trap for UV disinfection (for future use) and on to the dosing tank for dosing of the drip field. A timer controlled pump will pump treated effluent to the drip field.

The drip dosing system will have solenoid valves, spin clean filter, flow meter, air release valves and other apparatus and controls to allow the automatic dosing and maintenance of the system.

The pump controls will have a 24-hour clock, programmable as determined by the operator. Controls shall also have elapsed run time clock and cycle counter for the pump. The controls shall also have manual operating capabilities and alarms. The controls are to be located at a readily accessible location at the residence.

SECTION III - BASIS OF DESIGN

DEVELOPMENT DESCRIPTION Location	3 Bedroom Residence 135 Coventry Hills Lane Troutman, Iredell County, NC
Water Supply Sewage Disposal	On-Site Water Supply Well On-Site Septic System with One Recirculating Textile Filter, and Drip Irrigation
Application Rate	0.2 G/D/SF

PROJECTED WASTEWATER FLOWS

Proposed Use	3 Bedroom Residence
Base Design Flow	360 G/D

DESIGN BASIS - TREATMENT SYSTEM

Septic Tank	1,000 gal pre-cast concrete w/ OSI 4" Biotube Filter at outlet (Top Seam Tank Only)
Effluent Filter	(1) Orenco Model FTPS0436-28-NC
Pretreatment	(1) Orenco Advantex AX20 Textile packed bed media filter module
Pretreatment Control Panel	VCOM-AX20B2/~~PTHTUVSA~~ PTUVR6
Recirculation Tank	1,000 gal precast concrete pump tank (Top Seam Tank Only)

DESIGN BASIS - DRIP SYSTEM

Design Flow	360 G/D
Application Rate	0.2 G/D/SF
Area	1,800 SF (Repair area is available and shall remain undisturbed)
Drip Dosing Tank	1,000 gal pre-cast concrete tank (Top Seam Tank Only)
Force Mains	~~(2)~~ 1 +/-110 LF 1" Diameter SCH 40 PVC
Scour Return Main	(1) +/-110 LF 3/4" Diameter SCH 40 PVC
Drip Lines	~~Two~~ ONE zones with a total of ~~900~~ 961 LF of Geoflow wasteflow PC; Drip Line with constant flow rate pressure compensating emitters at 2' centers; Drip Lines at 2' centers
Emitters	Zone 1 – ~~200~~ 480 emitters @ 0.53 G/H = ~~1.77~~ 4.24 G/M ~~Zone 2 – 250 emitters @ 0.53 G/H = 2.21 G/M~~
Operating Pressure Range	10 – 60 PSI
Drip Field Pump	~~Zoeller 10 G/M Model 5030-0008 1/2~~ OSI MODEL PF200512 1 HP/230 V/1 Ph ~~(6.4 G/M @ 148' TDH)~~ 13.1 G/M @ 151.7' TDH
Drip Field Dosing Pump Controller	VCOM AX20B2/PTUV R6 • ~~GEOTS-08-SIM programmable controller~~ Simplex: • Pump run timer • Pump run contacts • Elapsed pump run clock • Pump cycle counter • Zone valve contacts • Filter flush valve contacts • Alarm Features

SECTION IV - COMPONENTS OF SYSTEM

- Three Bedroom residence collection system
- 1,000 gallon septic tank with slotted filter and access port
- Pretreatment – One Advantex Textile filter containing module with cover
- 1,000 gallon recirculation tank
- PVC UV Housing (UV Light not to be installed at this time, trap is for future usage)
- 1,000 gallon dosing tank
- Drip system (force mains, pump, control w/ audiovisual alarm, spin clean filter, meter, valves, shelter, drip lines and apparatus.)

A. TREATMENT SYSTEM

1. General Requirements - The Contractor shall furnish, install, test, and place into service and warrant the complete system. The major system components including septic tank, slotted filter, textile filter (pretreatment), dosing tank with pump, headworks, drip fields and controls. Accessories shall be supplied by a single operating entity and shall be equal to that as specified.

2. Five sets of submittal documents and shop drawings for all mechanical equipment and major materials including piping, tanks, and all other accessories shall be furnished to the Engineer for approval. No equipment shall be installed prior to approval by the Engineer.

3. Precast Structures - General: This section shall apply to the septic tank, recirculation tank and drip dosing tank as shown on the Contract Drawings.

4. Approvals: The tank designs shall have been approved by the Division of Environmental Health of NC DENR and shall have the approval number imprinted on the delivered tank. The tank shall be State Approved and equal to that manufactured by Dellinger Precast Tank Company, Inc. Openings or inserts shall be cast in during manufacture. Concrete shall have a minimum compressive strength of 4,000 PSI @ 28 days. Shop drawings shall be submitted to the Engineer for approval. If tanks are to be located in traffic area, then tanks shall be constructed to meet H-20 highway loadings. All tanks shall be top seam only.

Precast Tank Installation: Installer shall excavate for and install all precast concrete tanks as per plans. Installer shall ensure that the tank remains level and true to grade after placement and filling with water. All precast tanks shall be tested for water tightness by an approved method such as 24-hour water tightness test with maximum allowable leakage not to exceed a maximum of 1/2-inch rise or fall in 24 hours or vacuum test. Contractor shall use clean, potable water free of any sediment for testing. Test shall be run with risers/and inlet/outlet pipes in place. Testing shall begin after the water level in the tank has stabilized. Each tank shall be installed in the location and to the elevations shown on the plans. A 6" undercut shall be made to allow for washed stone leveling course for the tank to rest on.

Once testing of the tank has been completed, the tanks shall be backfilled in lifts with well compacted, debris free earth to a level, which directs surface water away from the tanks. Tank access holes in the yard shall be installed and grouted watertight and the earth raked smooth for grassing. All tank lids shall be lockable or constructed to prevent easy removal. Tank access in traffic area shall be 24" cast iron manhole frame and lid. Tanks shall not be pumped during extremely wet conditions.

5. Septic tank shall consist of a 1,000-gallon capacity, reinforced, precast concrete tank with full baffle and shall have easy access to each chamber from ground level for checking and pumping. The first chamber of the septic tank shall consist 2/3 to 3/4 of the volume of the total tank and the baffle shall contain a horizontal opening across the tank at about midway its height. The PVC outlet tee shall extend one-fourth depth of liquid level and contain an effluent filter. Locate the septic tank at such height as to provide approximately 8" of cover soil over top of the tank or as necessary to receive gravity flow from the collection system. Provide access at each end of the tank. All metal installed in tank shall be stainless steel.

8. Slotted Effluent Filter: An Orenco 4" Biotube effluent filter shall be installed in the PVC outlet tee of the septic tank. The filter shall be manufactured by Orenco System Incorporated. Filter shall be OSI model # FTPS0436-28-NC.

9. Recirculation Tank shall be a 1,000-gallon capacity. The tank shall be reinforced, precast concrete tank without baffle. Provide access for entry into the tank directly over the inlet and outlet using OSI lid, risers, and tank adapters, and extending 6" above final grade. Provide access for entry into the tank directly over the pump location. In yard areas, the riser shall extend 6" above final grade. Use an OSI tank access system including lid, risers and tank adapter or approved alternate. Riser shall be made watertight at the tank. Locate the tank at such height as to provide approximately 8" of cover soil over top of the tank or as necessary to receive gravity flow from the septic tank. All metal installed in tank shall be stainless steel.

10. Advantex Textile Bio-Filter: One textile-containing packed bed media filter module with cover shall be used, one module for four bedrooms or 480 gallons per module per day. The module shall be as described in manufacturer's literature attached herein.

The module shall be pressure dosed with effluent filtered from the septic tank. Discharge from the module shall be collected

4. Pressure Regulating Valve: Pressure reducing valve shall be nylon 1" diameter. Model shall be Geoflow PMR-50-HFPRV and shall be installed prior to the ball valve and union in the field-dosing tank. Valve shall be set to not allow pressure at the start of any of the zones of the drip field exceed 50 PSI. The valve shall have a reducing pilot added to the valve in lieu of the common port and shall be manufactured by Geoflow, Inc. and distributed by BB Hobbs Company 843-495-0465.

5. Spring Check Valves: Spring check valves shall be flow control PVC spring check valves with rubber flapper and PVC cap as manufactured by Geoflow Model CV-S-15 as supplied by BB Hobbs Company at (843) 307-2090.

6. Air Vacuum Relief Valve: The air vacuum relief valve provides instant and continuous vacuum relief and non-continuous air relief. Both the body and the removable dirt cover shall be constructed of molded plastic. The body and the dirt cover shall be connected with a 1-inch pipe thread. The ball shall be constructed of a low density plastic and the internal seal shall be constructed of vinyl. The air vacuum relief valve shall seal at 5 PSI. Inlet size shall be 1-inch male pipe thread. The air vent shall be Geoflow Item Number APVBKV-1 with attached Schrader valve as supplied by BB Hobbs Company at (843) 307-2090.

7. Drip System Dosing Pump: For the drip field, a ~~Zoeller 10 GPM Model Zoeller Model 5030-0008 1/2~~ ORENCO SYSTEMS, INC MODEL PF200512 HP/230 V/1 Ph, capable of pumping ~~6.4~~ 13.1 GPM @ ~~148'~~ 151.7' TDH for the drip irrigation. Details of pump installation are shown on the plan. Product shall be as supplied by BB Hobbs Company at (843) 307-2090.

8. Drip System Controller shall be mounted 30" or more above grade and readily accessible. The unit shall be as manufactured by Automated Control Systems (1-845-278-7367) for Geoflow or Engineer approved equal. Irrigation control panel shall be model GEOTS-08-SIM. The control panel shall be provided factory pre-wired and tested in a NEMA 4X lockable fiberglass enclosure which shall contain the following: Components shall include motor contactors and circuit breakers for use with 208V AC 1 Ph current using a max 1½ HP motor. Programmable logic unit shall include time functions, motor function, valve controls and float input function. Unit shall include fused transformer for valves. An audiovisual alarm condition light and siren shall be mounted on the top of the panel and include a separately fused transformer. The unit shall have a hand-off-auto (H-O-A) switch. Product shall be as supplied by BB Hobbs Company at (843) 307-2090.

The controller shall be able to perform the following functions: receive input for floats and rain sensors, provide operator set timer controlled pump operation, timer controlled contacts for zone valves, scour valves and flush valves. The controller shall have an event counter, which shall count the number of moisture sensor overrides. The controller shall have an elapsed pump run clock and pump cycle counter.

Unless alternately provided with the Advanced Pretreatment System, the drip system control panel shall enable the daily, 7-day and 30-day monitoring requirements of Rule .1970 to be met, such as by data logging the field dosing times or field flow meter readings.

Floats, pump and control circuits, and the control panel shall meet the requirements of Rule .1952(c). Panel and control equipment shall include lightning protection, be protected from unauthorized access, and remain accessible at all times to the system operator.

The activation of any alarm shall result in the activation of a dry and a 120 V powered alarm contacts. These contacts may be used to activate externally mounted alarm devices and telemetry systems. The alarm contacts will automatically reset when the R/O-N Switch for the activated alarm is placed in the reset / off position.

Panel Operation:

- High Level Alarm Float: When lifted this float will activate the audible alarm and the illuminated pushbutton. *Note: This function can be combined with the Override Timer On & Off Function.*
- Override Timer & Off Float: When lifted this float will activate the normal timer function. This timer is capable of cycling at a faster rate to accommodate high flow conditions. This float being enabled will force the pump to dose at twice the operating cycle until the effluent is at normal levels in the pump tank again.
- Timer On & Off Float: When lifted this float will activate the normal timer function. This timer will begin with its 'off' cycle.
- Redundant Off & Low Level Alarm Float: When lowered this float will activate the audible alarm and illuminated pushbutton. This float will also deactivate the pump in both auto and manual.
- Pump & Valve Operation: The pump dosing cycles will be controlled by the timer. During high flow conditions, the pump dosing cycles will be controlled by the override timer. Zone valves will open as programmed and the pump comes on. The spin filter valve will open for 1 minute (field adjustable) to allow for drainage of the return line. After an operator defined number of cycles (field adjustable prime numbers), the field flush valve and the zone valve will open for one cycle. At the end of the dose, the field flush valve closes and normal operation resumes. Since the flush cycle is to be set at an odd interval (prime number), the next flush cycle will fall on the opposite zone.

Components Include:

- Motor contractor & circuit breaker rated for use with 208VAC, 1Ph and 1 Ph max
- Programmable logic unit
- Timer Functions

recirculation and dosing tank will contain a pump and a pump enabling float switch, a pump disabling float switch and a high water alarm float switch. The drip-dosing tank will be set at elevation to receive gravity from the filter. All components shall be checked and proper flow verified.

6. Perform leak test on tanks as called for herein. Provide riser access as called for
7. Carefully backfill tanks and trenches to finish grade with clean debris free earth (no stone).
8. Install pumps, filters, fittings and floats.
9. Install control system and wire per NC Building Code and NEC. Contractor shall verify available electrical power before ordering components. Provide and connect to properly sized and number of breakers in the main panel board.
10. Seed all disturbed areas. Follow seeding specifications.

Final Landscaping: After the system is installed, the following should be checked to ensure that the system will not be overloaded with excess rainwater and run-off.

(a) The drip field is shared to shed rainwater and is free of low area.
(b) Curtain drains, grassy swales or ditches for diverting ground and surface water are properly installed.
(c) Gutter and downspout drains are directed away from the system.

Any problems should be corrected before approving the system.

Finally, all disturbed area should be planted with grass according to specifications.

Seeding: After completion of the drip fields, the site shall be stabilized with tall fescue grass. This should be seeded at the rate of 25 lbs. per acre each for a total of 50 lbs. per acre. Before seeding, lime should be added at the rate of 1.5 tons per acre. Fertilizer should be added at the rate of 100 units of Nitrogen, 120 lbs. of P_2O_5 and 120 lbs. of K_2O. Both the lime and fertilizer should be lightly incorporated into the soil before adding seed. After seeding, the area should be mulched until stand is established. Due to the erosion potential of this soil, this is an important part of the system.

SECTION VI - OPERATING CHECKS AND ADJUSTMENTS (START-UP)

The system shall consist of one 1,000-gallon septic tank with slotted filter, OSI Advantex textile containing module with cover and 1,000 gallon recirculation tank, 1,000-gallon drip field dosing chamber and drip field with pump, headworks, controls and other apparatus.

All components of the system shall be checked and taken through a complete test cycle in the presence of the Owner's Engineer and to his satisfaction. If the test fails, adjustments shall be made and the test repeated until the system is determined to operate properly.

Septic Tank: Check water level, inlet pipe, outlet pipe and slotted filter. Verify that the filter can be removed for service and handle is within 12" from top of riser.

Textile Filter: Using manufacturer's instruction, become familiar with filter components and operation.

Drip System Dosing Tank Pump control - Sequence of Operation: Effluent fills tank to level that will activate the "Pump Enabling" float. Pump can now operate. The control panel will be set to allow the prescribed pump cycles per day based on customer setting of the programmable timer. When a pump is called for service, and the level in the dosing tank permits, the zone valve and filter flush valve will open. After an adjustable time, the filter flush valve will close, and the system will continue to dose the active drip zone for the operator selectable time. If the timer override float is activated, the pump will be allowed to dose for ~~22.60~~ 10.62 minutes and disable for one hour. Then the pump will activate again until the water level in thank reaches normal again.

Dosing Cycle: If the system is equipped with multiple zones, all zones are dosed individually on an alternating basis so that each field is dosed once every other dosing cycle. The appropriate zone valve opens, the pump doses the field for ~~22.60~~ 10.62 minutes and then the zone valve closes and the pump stops.

After an operator defined number of cycles (field adjustable prime numbers), the field flush valve and one zone valve will open for one cycle. At the end of the dose, the pump stops and the field flush and zone valves close. Since the flush cycle is to be set at an odd interval (prime number), the next flush cycle will fall on the opposite zone.

The pump shall operate delivering a timer controlled predetermined dose to the designated drip field. The pump shall also shut off when the low water level "pump off" switch is activated.

If the "high water alarm" float switch is activated, the controller shall activate audible and flashing alarm systems. Once energized, the flashing and audible alarm unit must be shut-off manually. After installation, each field shall be independently pressurized and the function and operating pressure checked to verify compliance with the specifications and required wetted area shown on the Plans. System pressure is to be obtained at the Schrader Valves located at the ends of the manifolds as shown on the plans. **The pressure and flow reading shall be recorded for comparison with future readings. The owner/operator cannot tell if the system is operating properly unless he has this info.**

Project: Jim Day Subsurface Drip
Project#: 09-01-06-EC

Original Date: January 27, 2009
Revised Date: January 27, 2009

DESIGN FLOW

360 gpd

SEPTIC TANK: **Use 1,000 Gallon Septic Tank**
Use Orenco #FTPS 0436-28MA-NC Series Biotube Effluent Filter
- See Filter Cut Sheet for Exact Specifications

RECIRICULATION TANK: **Use 1,000 Gallon Pump Tank**
- Top Seam Tank Only

DRIP FIELD DOSE TANK: **Use 1,000 Gallon Pump Tank**

TANK ANTIFLOATATION

1,000 Gallon Septic Tank — *Based on Dellinger Precast Company* — *STB-524*

Outer Length	9.00	FT
Inner Length	8.50	FT
Outer Width	4.50	FT
Inner Width	4.00	FT
Outer Height	5.83	FT
Inner Height	5.17	FT

Wt of Water Displaced	14,742.00	LBS		Outer Length x Outer Width x Outer Length x 62.4 Lb/CF (Wt of Water)
Wt of Tank	4,009.50	LBS	Top & Bottom	Outer Length x Outer Width x 150 Lb/CF x 2 (Top & Bottom) x Slab Thickness
	1,743.75	LBS	Ends	Inner Width x Inner Height x 150 Lb/CF x 2 (Ends) x Wall Thickness
	3,293.75	LBS	Sides	Outer Height x Outer Length x 150 Lb/CF x 2 (Sides) x Wall Thickness
	737.50	LBS	Baffle	Inner Width x (Inner Height-3 Inches) x 150 Lb/CF x x Wall Thickness
	9,784.50	LBS	Total Tank Wt.	Sum Above four
Wt of Overburden	5,100.00	LBS		Outer Length x Outer Width x 120 Lb/CF (Saturated Soil Wt) x Soil Thickness
Total	14,884.50	LBS		Sum of Total Tank Wt. & Soil Overburden

WATER	14,742.00	<	14,884.50	TANK

**Buoyancy Calculations Account for Fluid in Tank, Do Not Pump When Ground is Saturated or During Extremely Wet Conditions.*

1,000 Gallon Pump Tank — *Based on Dellinger Precast Company* — *PT-283*

Outer Length	8.08	FT
Inner Length	7.58	FT
Outer Width	5.04	FT
Inner Width	4.54	FT
Outer Height	4.79	FT
Inner Height	4.13	FT

Wt of Water Displaced	12,185.29	LBS		Outer Length x Outer Width x Outer Length x 62.4 Lb/CF (Wt of Water)
Wt of Tank	4,034.59	LBS	Top & Bottom	Outer Length x Outer Width x 150 Lb/CF x 2 (Top & Bottom) x Slab Thickness
	1,559.77	LBS	Ends	Inner Width x Inner Height x 150 Lb/CF x 2 (Ends) x Wall Thickness
	2,346.09	LBS	Sides	Outer Height x Outer Length x 150 Lb/CF x 2 (Sides) x Wall Thickness
	7,940.45	LBS	Total Tank Wt.	Sum Above three
Wt of Overburden	6,113.02	LBS		Outer Length x Outer Width x 120 Lb/CF (Saturated Soil Wt) x Soil Thickness
Total	14,053.47	LBS		Sum of Total Tank Wt. & Soil Overburden

WATER	12,185.29	<	14,053.47	TANK

**Buoyancy Calculations Account for Fluid in Tank, Do Not Pump When Ground is Saturated or During Extremely Wet Conditions.*

Project: Jim Day Subsurface Drip Original Date: January 30, 2008
Project#: 09-01-06-EC Revised Date: January 27, 2009

135 Coventry Hills Lane Recirculation Tank Float Settings

ADVANTEX Dosing Regime (Normal & Override)

Recirculation Tank Inside Dimensions

Length	7.58	Ft
Width	4.54	Ft
Height	4.13	Ft
Invert	3.75	Ft from Tank Bottom
Tank Volume =	257.62	Gallons per Foot
Volume to Invert =	966.07	Gallons

Inlet Holes on Filtered Effluent

40% Tank Volume (See RSV Application Sheet)

1.500 Feet from Bottom of Tank

Redundant Off Float Elevation

<50% Tank Volume (See RSV Application Sheet)

2.06 Feet from Bottom of Tank

RSV Setting

60% Tank Volume to Stinger Seat (See RSV Application Sheet)

2.48 Feet from Bottom of Tank

High Water Pump Float Setting

3" or more above normal operating level or Stinger seat level
(This depth should allow sufficient surge capacity to accommodate peak inflows between recirc doses)

RSV Stinger Seat level	2.48	Feet
Add 3" for Float Setting	2.73	Feet from Tank Bottom

High Water Alarm Elevation

10% Tank Depth or Below Inlet Invert Elevation (See RSV Application Sheet)

3.38 Feet from Bottom of Tank

Enter Yellow Fields Only

Recirculation Ratio	4		360	Total Dosed over AdvanTex/day	1440
Single Pump Delivery Rate (GPM)	30	Gal/Dose	30	Doses Per Day Required	48.0
Rest Time (Minutes)	29.5			Override Doses Per Calculated	94
Run Time (Minutes)	0.5	*Prefer 30 Secs. No more than 1 min*			
Override Rest (Minutes)	14.8				
Override Run (Minutes)	0.5	*Prefer 30 Secs. No more than 1 min*			

GEOFLOW SUBSURFACE DRIP

Field Flow

Job Description:	*1356 Coventry Hills Lane*
Contact:	*David DeCaron - PDAPA*
Prepared by:	*Donald Munday, PE - PDAPA*
Date:	*27-Jan-09*

Please fill in the shaded areas and drop down menus:
This spreadsheet serves as a guide, and is not a complete hydraulic design.

Worksheet 1- Field Flow

Total field

Total Quantity of effluent to be disposed per day	360	gallons / day
Hydraulic loading rate	0.2	gallons / sq.ft. / day
Minimum Dispersal Field Area	1,800	square ft.
Total Dispersal Field Area	1,800	square ft.

Flow per zone

Number of Zones	1 ~~2~~	zone(s)
Dispersal area per zone	1800 ~~900~~	square ft.
Choose line spacing between WASTEFLOW lines	2	ft.
Choose emitter spacing between WASTEFLOW emitters	2	ft.
Total linear ft.per zone (minimum required)	961 ~~450~~	ft. per zone
Total number of emitters per zone	480 ~~225~~	emitters per zone
Select Wasteflow dripline (16mm)	Wasteflow PC - 1/2gph	dripline
Pressure at the beginning of the dripfield	45	psi
Feet of Head at the beginning of the dripfield	103.95	ft.
What is the flow rate per emitter in gph?	0.53	gph
Dose flow per zone	**1.99**	**gpm**

Note: A few States or Counties require additional flow for flushing. Please check your local regulatio
Flush velocity in this spreadsheet below is for PC dripline only. Classic dripline usually requires less
Please refer to Geoflow's spreadsheet called "Design Flow and Flush Curves" at www.geoflow.com or

If required, choose flush velocity	2	ft/sec
How many lines of WASTEFLOW per zone?	6 ~~3~~	lines
Fill in the *actual* length of longest dripline lateral	206 ~~188~~	ft.
Max. *allowable* length of a single WASTEFLOW line	651	ft.
Flush flow required at the end of each dripline	1.48	gpm
Total Flow required to achieve flushing velocity	8.88 ~~4.44~~	gpm
Total Flow per zone- worst case scenario	13.12 ~~6.43~~	**gpm**

Select Filters and zone valves

Select Filter Type	Vortex Screen Filter	
Recommended Filter (item no.)	AP46-1F ~~AP4E-75F~~	
Select Zone Valve Type	Electric Solenoid	-
Recommended Zone Valve (item no.)	~~SVLVB-100~~ ~~1-in. Solenoid valve~~	N/A

Dosing

Number of doses per day / zone:	8 ~~4~~	doses
Timer ON. Pump run time per dose/zone:	10.62 ~~22.38~~	mins:secs
Timer OFF. Pump off time between doses	2.49 ~~5.37~~	hrs:mins
Per Zone - Pump run time per day/zone:	1.24 ~~1.30~~	hrs:mins
All Zones - Number of doses per day / all zones	8	doses / day

GEOFLOW — Pump Size

Job Description:	1356 Coventry Hills Lane
Contact:	David DeCaron - PDAPA
Prepared by:	Donald Munday, PE - PDAPA
Date:	1/27/2009

Please fill in the shaded areas and drop down menus:

This spreadsheet serves as a guide, and is not a complete hydraulic design.
Pressure losses may be grossly overstated, particularly if designing with WASTEFLOW Classic
The letters on the diagram(right) match the letters in section 2 below.

Worksheet - Pump Sizing

Section 1 - Summary from Worksheet 1		
Flow required to dose field	4.24 ~~1.99~~	gpm
Flow required to flush field	8.88 ~~4.44~~	gpm
Flow required to dose & flush field	13.12 ~~6.43~~	gpm
Filter	AP46-16 ~~AP4E-.75I~~	
No. of Zones	1 ~~2~~	zones
Zone valve	~~SVLVB-100~~	
Dripline	Wasteflow PC - 1/2gph	
Dripline longest lateral	206.00 ~~188.00~~	ft.

Section 2	Ft of head	Pressure
A. Flush line - Losses through return line		
Size of flush line in inches	1 ~~.75~~ inch	
Length of return line	115 ft.	
Equivalent length of fittings	138 ft.	
Elevation change. (if downhill enter 0)	-15 ft.	
Pressure loss in 100 ft of pipe	6.38 ~~2.76~~ ft.	3.10 psi
Total pressure loss from end of dripline to return tank	1.1 ~~3.1~~ *ft.*	1.35 psi
B. Dripline - Losses through Wasteflow dripline		
Fill in the length of longest dripline lateral	206 ~~188~~ ft.	
Minimum pressure required at end of dripline	16.17 ft.	7.00 psi
Loss through dripline during flushing	4.97 ~~2.59~~ ft.	1.12 psi
Total minimum required dripline pressure	21.14 ~~18.76~~ *ft.*	8.12 *psi*
A+B. Minimum Pressure required at beginning of dripfield		
CALCULATED pressure required at beginning of dripfield	22.27 ~~21.88~~ *ft.*	9.47 *psi*
SPECIFIED pressure at beginning of dripfield (from worksht 1)	104.0 ft.	45.00 *psi*
Great! SPECIFIED Pressure is greater than CALCULATED Pressure requirement. Go to next step		
C. Drip components - Losses through headworks		
Filter	11.6 ~~9.5~~ ft.	4.10 psi
Zone valve pressure loss (not in diagram)	~~0.69~~ ft.	0.30 psi
Flow meter pressure loss (not in diagram)	5.00 ft.	2.16 psi
Other pressure losses	ft.	- psi
Total loss through drip components	16.6 ~~15.16~~ ft.	6.56 psi
D. Supply line - Minimum Pressure head required to get from pump tank to top of dripfield		
Size of supply line in inches	1.25 ~~2~~ inch	
Length of supply line	115 ft.	
Equivalent length of fittings	138 ft.	
Height from pump to tank outlet	5 ft.	
Elevation change. (if downhill enter 0)	15 ft.	
Pressure loss/gain in 100 ft. of pipe	3.50 ft.	1.52 psi
Total gain or loss from pump to field	*28.9 ft.*	12.50 psi
Total dynamic head	61.7 ~~148.0~~ ft.	64.06 *psi*
Pump capacity *	13.1 ~~6.4~~ gpm	
Pump Model Number	Zoeller 10 G/M Model 5030-0008	
Volts / Hp / phase	230V - 1/2 HP - 1 PH	

OR MODEL PF200512
230 V - 1HP - 1PH

* Note: Pump capacity flow assumes flow in dripline does not change during a dose cycle. With Wasteflow C
For more accurate flows please see Geoflow's **Flushing worksheet**.

If you need assistance designing for this additional flow, please

a. See Geoflow flushing worksheet or

b. Contact Geoflow at 800-828-3388

DRIPFIELD, JIM DAY, 135 COVENTRY HILLS LANE, TROUTMAN, IREDELL COUNTY, NC

DRIP RUN (FROM TOP)	LENGTH
1	47
2	49
3	70
4	72
5	91
6	91
7	102
8	104
9	91
10	81
11	84
12	79
TOTAL:	**961**
EMITTERS:	**480**
DOSE FLOW:	**4.24**
LATERALS:	**6**
FLUSH FLOW:	**8.88**
DOSE + FLUSH:	**13.12**