



HOW TO IMPROVE AN ONSITE SYSTEM DESIGN

RANDY ROSBACH, SOIL SERVICES COMPANY / MOUNTAIN WASTEWATER MANAGEMENT

CHARLIE BARKMAN, PENNSYLVANIASEPTIC.COM



INTRODUCTION

• **RANDY ROSBACH – SOIL SERVICES CO / MOUNTAIN WASTEWATER MANAGEMENT FORKSVILLE, PA**


- SEO #03610
- SERVICE PROVIDER FOR JET, NORWECO, ECOFLO, PURAFLO, ADVANTEX, PERC-RITE DRIP SYSTEMS
- PSMA CERTIFIED WASTEWATER TREATMENT INSPECTOR
- NAWT CERTIFIED O&M PROVIDER
- ACTIVE MEMBER OF PASEO, PSMA AND POWRA

• **CHARLIE BARKMAN – PENNSYLVANIASEPTIC.COM HUNTINGDON, PA**

- FORMER WASTEWATER TREATMENT PLANT OPERATOR
- FORMER DISTRIBUTOR FOR ECOFLO, ADVANTEX, ELJEN, JNM DRIP AND INFILTRATOR
- SERVICE PROVIDER FOR ECOFLO, JET AND ADVANTEX
- ACTIVE IN PASEO AND PSMA TRAINING & CONFERENCE COMMITTEE
- CONSULT / DESIGN



OBJECTIVE

- IMPROVE OVERALL SYSTEM PERFORMANCE THROUGH BETTER DESIGN
 - KNOW YOUR DEMOGRAPHIC
 - WHAT IS REQUIRED?
 - BETTER PLACEMENT OF SYSTEM COMPONENTS
 - TOOLS, TOOLS AND A FEW MORE TOOLS
 - ANTICIPATING FUTURE DEMAND
- 

...A LOOK BACK

128)

**PENNSYLVANIA SEWAGE FACILITIES PROGRAM
APPLICATION FOR SEWAGE DISPOSAL SYSTEM**

H 23377

Before completing this application read carefully all instructions listed on the reverse side of this page. Print clearly or type all information.

| GENERAL INFORMATION | | | PART II TREATMENT | | |
|---|--|----------------------|---|--|---|
| Applicant | Telephone No. | | PRIMARY TREATMENT | | |
| Clair, Russel/ Phyllis Glazman | 658-3788 | | <input checked="" type="checkbox"/> Septic Tank <input type="checkbox"/> Aerobic Tank | | |
| Address of Applicant | Zip Code | | SECONDARY TREATMENT | | |
| RD# 3, Box 71-A Huntingdon, PA | 16652 | | <input type="checkbox"/> Standard Trench <input type="checkbox"/> Elev. Sand Trench <input type="checkbox"/> Seepage Bed <input checked="" type="checkbox"/> Elev. Sand Bed <input type="checkbox"/> Subsurf. Sand <input type="checkbox"/> Holding Tank <input checked="" type="checkbox"/> Pressure Dose <input type="checkbox"/> Retaining tank <input checked="" type="checkbox"/> Alternate <u>long bed</u> <input type="checkbox"/> Experimental | | |
| Site Address or Directions to Site | Municipality | | Total Tank Capacity | Total Absorption Area | |
| <u>same</u> | <u>Walker</u> | | 2/900 ¹⁰⁰ gal. | 841 ⁸⁰⁰ Sq. Ft. | |
| County | Subdivision | | PART IV FOR ENFORCEMENT OFFICER USE ONLY | | |
| Huntingdon | NA | | SITE SUITABILITY ANALYSIS | | |
| Type of Establishment | No. Bedrooms | | Soil Series | <input type="checkbox"/> Approved Plan <input checked="" type="checkbox"/> Area Not Planned <input type="checkbox"/> Limitations in Effect | |
| <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Non-Residential | 2 mobile homes 500 gal./day | | Slope | | |
| | | | 10 % | | |
| Lot Size | Nearest Private Water Supply | Nearest Public Sewer | Percolation Rate | FEES PAID | |
| 2 ac. Sq. Ft. | 100+ Ft. | 1/2 mile | 37 min/in. | Application | 80.00 |
| | | prop. m. c. 1/2 | Depth to Rock Formation | Testing | 10.00 |
| Type Water Supply | Type Sewage System | | 23 in. | Final Inspection | |
| <input type="checkbox"/> Private <input type="checkbox"/> Public <input type="checkbox"/> Other | <input checked="" type="checkbox"/> Individual <input type="checkbox"/> Community | | Depth to Shallowest indication of water table. | Total \$ | 90.00 |
| | | | 23 in. | APPLICATION ACTION | DATE |
| | | | Site | Permit Issued | <input checked="" type="checkbox"/> 6/14/89 |
| | | | <input checked="" type="checkbox"/> Suitable <input type="checkbox"/> Unsuitable | Permit Denied | <input type="checkbox"/> |
| | | | Attach Form ER-BWQ-290 Appendix A | Final Inspection | 11/14/89 |
| | | | | <input checked="" type="checkbox"/> Approved <input type="checkbox"/> Denied | initials <u>aff</u> |
| PART III PLOT PLAN | | | NOTE: It is unlawful to submit false information in this application | | |

existing m. c. 1/2 prop. m. c. 1/2 systems



UNI-TEC, INC.

2041 CATO AVENUE
STATE COLLEGE, PENNSYLVANIA 16801

CONSULTING ENGINEERS
AND TECHNICIANS

■ 814-238-8223

Date: 5-26-89
File No.: 589107

DESIGN OF ELEVATED SAND MOUND BED ON-LOT SEWAGE DISPOSAL SYSTEM

Permittee: PHYLLIS J. GLANZMAN
Application No.: _____
Subdivision/Location: BLAIR
Township: WALKER
County: HUNTINGDON

Design Criteria:

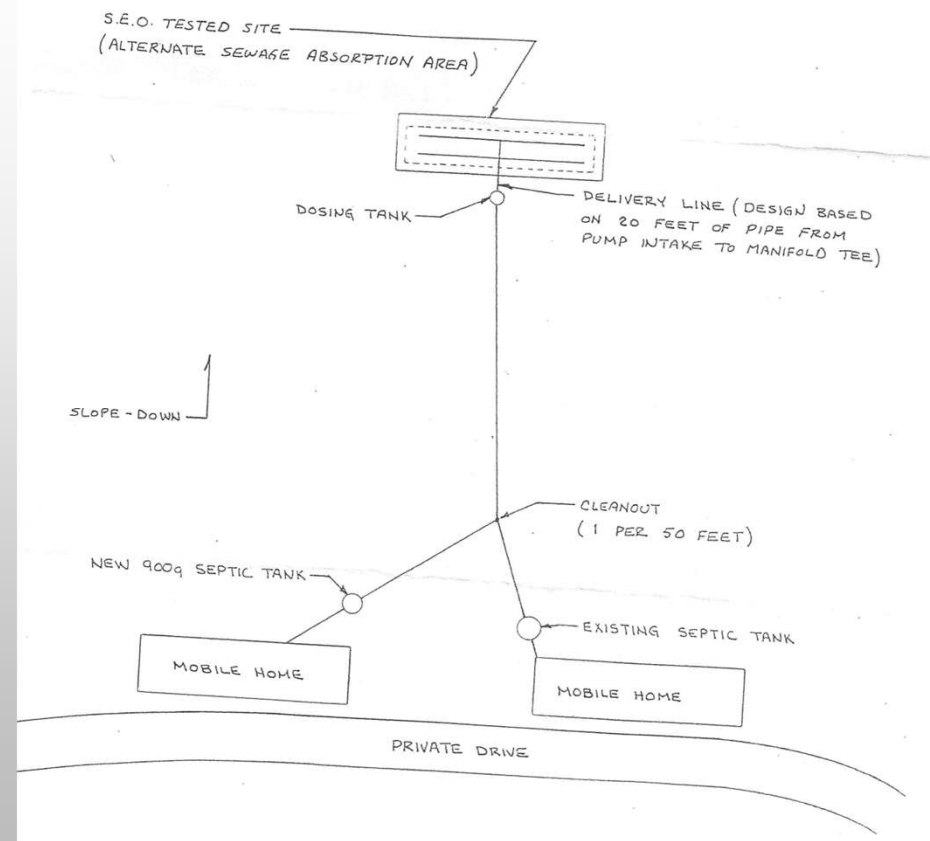
Slope: 10 %
Percolation Rate: 37 Minutes per inch
No. of Bedrooms: 2MH @ 250gpd ea. (500 gpd Flow)
Limiting Zone Depth: 23 (Inches)

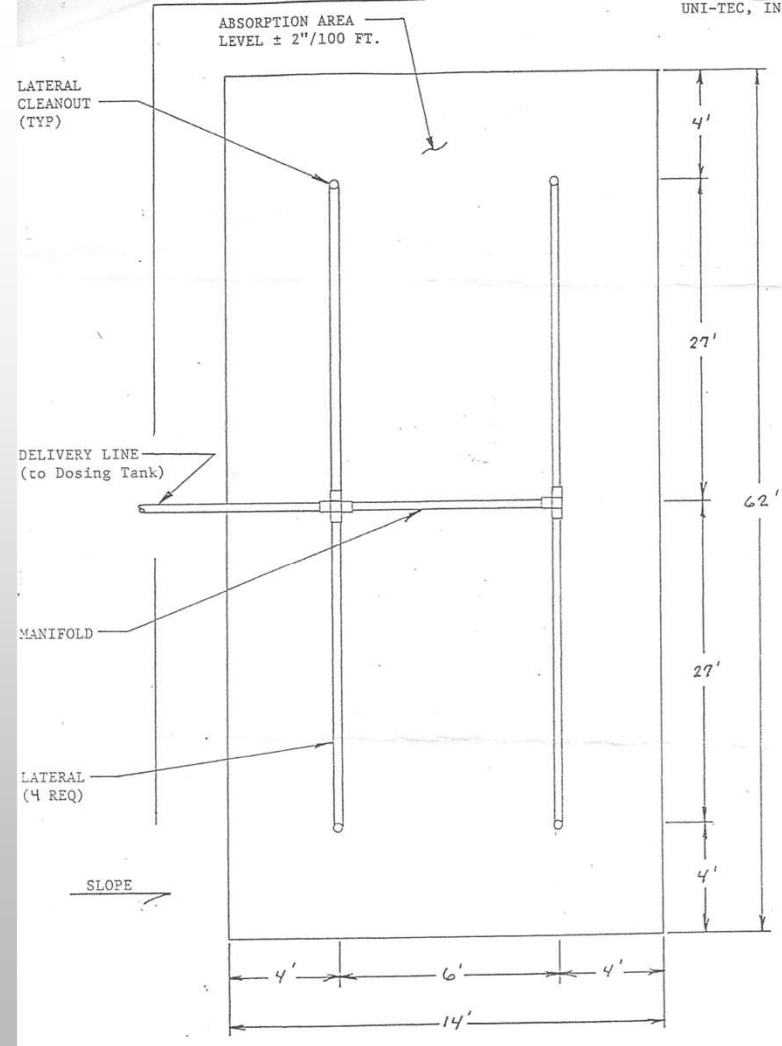
Required Seepage Bed Area: 868 SQ. FT.

NOTES: System Design - Elevated sand mound bed on 10% slope as an alternate system to elevated sand mound trenches due to ease of construction on the undisturbed soils about the

This design was based on information pertaining to slope, elevation data, soils, and percolation rate as shown on the site investigation report which is attached as Exhibit "A". The Owner and/or Contractor must verify the elevation information prior to construction.

DESIGNED BY: CHARLES F. HERR JR





NOTES:1. ABSORPTION AREA (14 x 62 feet)25 inches of approved sand on upslope side.

Sand to be level to tolerance of + or -2 inches per 100 feet.

Berm side slope not to exceed 50%.

6 inches of aggregate on top of sand.

1 1/2 inch pipe for both manifold and laterals.1 1/2 inch pipe for delivery line.

Additional 4 inches of aggregate.

Approved covering. (i.e. untreated building paper or 2 inches of straw)

12 inches of topsoil, seeded.

NOT to be covered until final inspection by S.E.O.

2. PREPARATION:

To prepare existing area for placement of sand;

Cut off all trees and brush at ground level, rake and remove all loose vegetation and sticks from absorption area.

Rough or plow parallel to contour to a maximum depth of 6 inches, using a chisel plow, small moldboard plow, or similar implement attached to light-weight equipment.

DO NOT ROTO-TILL.

Sand to be placed from the upslope side of absorption area using light-weight equipment.

3. BERM: (3 feet wide complete distance around and level with highest point of aggregate)

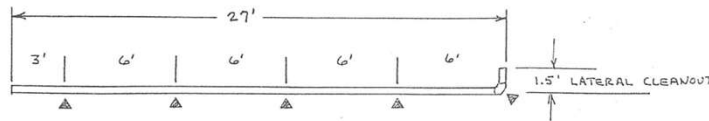
To consist of mineral soil containing less than 20% coarse fragments with no coarse fragments greater than 4 inches in diameter.

To be more stable and less permeable than the sand to contain and protect the mound interior.

Outside berm slope not to exceed 50%. Unless absorption area site slope is 9% or more, in which the down-slope berm slope not to exceed 30%.

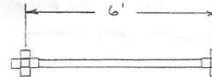
4. LATERAL DESIGN (typical)

TYPE "D"



▲ DENOTES 3/16 INCH HOLE

5. MANIFOLD DESIGN



6. DELIVERY LINE

To be below frost line outside of berm area.

Becoming upward at edge of sand and gradual upward slope through sand to manifold.

Delivery line to be sloped between dosing tank and absorption area that would allow drainage back to dosing tank to prevent freezing.

7. 4-INCH DIAMETER PIPE (non-perforated).

Gradual slope of minimum 1/4 inch per foot on the 4-inch non-perforated pipe from the structure to the septic tank, and likewise on the 4-inch non-perforated pipe from the septic tank to the dosing tank. Max slope for last 10' pre-inlet to be 1/4 inch per foot.

CALCULATIONS:

HEAD: Elevation change

| | |
|--|-------------|
| depth to bottom of dosing tank..... | 5.00 feet |
| from dosing tank to absorption area..... | - 1.30 feet |
| Subtotal..... | 3.70 feet |
| required sand..... | 2.10 feet |
| aggregate below manifold..... | .50 feet |
| Subtotal..... | 6.30 feet |
| pump above bottom of tank..... | -.50 feet |
| Head loss due elevation..... | 5.80 feet |

Calculations (Cont'd.)

FRICION:

| | |
|--|------------|
| Straight pipe (<u>1 1/2</u> inch)..... | 26.00 feet |
| (<u> </u>)45 degree elbow (<u> </u> inch) @ <u> </u> feet per..... | feet |
| (<u>3</u>)90 degree elbow (<u>1 1/2</u> inch) @ <u>4.73</u> feet per..... | 14.19 feet |
| (<u> </u>)coupling (<u> </u> inch) @ <u> </u> feet per..... | feet |
| (<u>1</u>)disconnect (<u>1 1/2</u> inch) @ <u>1.05</u> feet per..... | 1.05 feet |
| (<u>1</u>)manifold tee (<u>1 1/2</u> inch) @ <u>8.62</u> feet per..... | 8.62 feet |
| Total pipe friction in feet..... | 49.86 feet |

Loss factor is 1.41 per 100 feet. (Based on pump requirements below.)

1.41 X 49.86 equals .70 feet head loss due to friction in pipe.

TOTALS:

| | |
|--------------------------------|-----------|
| Elevation head loss..... | 5.80 feet |
| Friction head loss..... | .70 feet |
| Required head at manifold..... | 3.00 feet |
| | 9.50 |

PUMP REQUIREMENTS:

Distribution area has 20 - 3/16 inch holes in 1 1/2 inch pipe.
Factor is .75 gpm per hole.
20 X .75 equals 15 gpm minimum pump capacity at determined head.

DOSE REQUIREMENTS:

140 feet of 1 1/2 inch pipe times factor of .09 equals 12.6 gallons of internal capacity.
Minimum dose equals 5 times internal capacity (63 gal) or 100 gallons, whichever is greater, plus 100% (100 gal) excess capacity, plus area required for electrical connections.

Dosing tank requirements..... 500 gallons.

ADDITIONAL:

- a. Pump requirements, 15 gpm at 9.50 feet of head.
Pump curve required for final inspection.
- b. Dosing tank requirements, 500 gallons.
ON-OFF switch to be calculated when tank placed. (S.E.O.)
- c. Sand certification required for final inspection.

SEPTIC TANK DETAILS

"A septic tank is a horizontal, continuous-flow, one-story sedimentation tank, through which the sewage is allowed to flow slowly to permit the settleable suspended matter to settle to the bottom where it is retained until anaerobic decomposition is established, resulting in the change of some of the organic matter into liquid and gaseous substances and of consequent reduction in the quantity of the sludge to be disposed of" (Babbit and Baumann, 1958). The liquid which is discharged from a septic tank should be essentially free of "settleable" suspended solids, but will retain most of its non-settleable suspended and soluble organic matter. The septic tank does not purify the sewage, eliminate odors, or destroy all the solids.

FUNCTIONS:

The following describes the three basic functions that septic tanks are designed to perform:

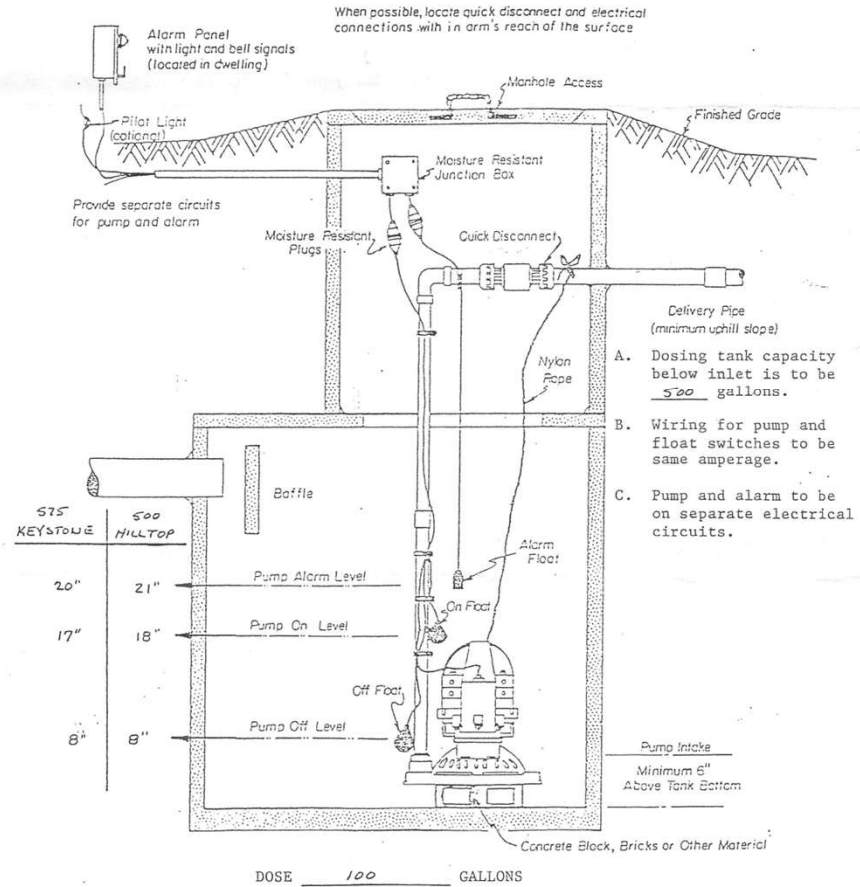
1. The primary purpose of the septic tank is to remove solids suspended in the wastewater. It is designed to provide quiescent conditions for a sufficient period of time to allow the settleable solids to fall to the bottom, and the floatable solids to rise to the top. Inlet and outlet baffles prevent short-circuiting of wastewater through the tank and retain the sludge and scum blankets that form.

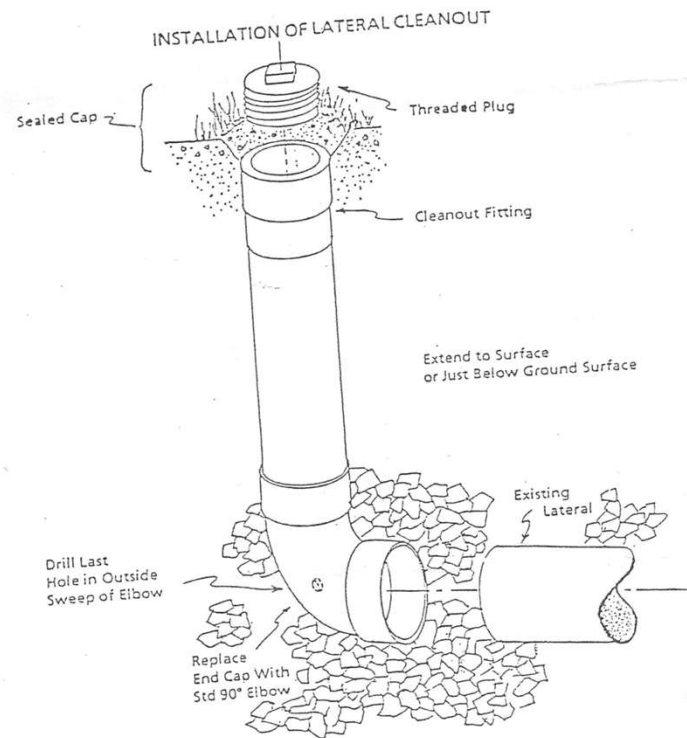
2. Storage

To avoid frequent removal of the accumulated solids, the tank is designed with ample volume so that sludge and scum can be stored in the tank for a year or more without disturbing the sedimentation function.

3. Digestion

Anaerobic biological reduction of the sludge is a beneficial result of prolonged storage of the solids in the tank. The bacteria in the tank depletes any oxygen that may be dissolved in the waste while feeding on the concentrated organics. In the anaerobic environment, facultative and anaerobic bacteria attack the organic molecules reducing them to soluble compounds and gases.

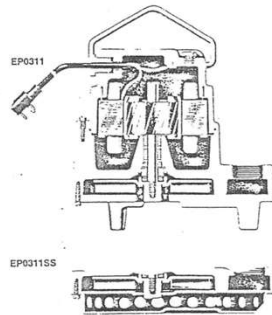
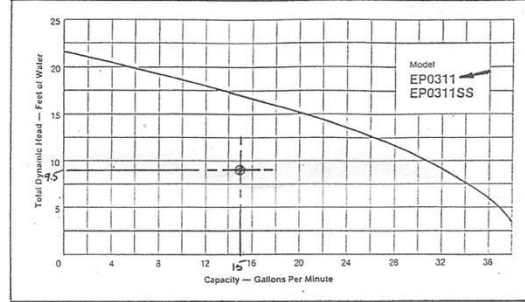




... pump other than Goulds is used...
 S.E.O. must ensure pump curve
 meets or exceeds 15 gpm at
9.5 ft. of head.

FILE NO. 389107

GOULDS Model EP0311 & EP0311SS Submersible Effluent Pump



Specifications

Discharge: 1 1/2" NPT. Will accept adapter for 1" discharge pipe.

Motor: Full 1/2 H.P., 115 volt, 60 Hz, single phase, thermally protected (auto reset), completely sealed in high grade turbine oil, 13 Amps maximum, 1725 RPM.

Motor Housing, Casing & Top Cover: Heavy wall cast iron construction with stainless steel fasteners. Model EP0311SS has a stainless steel base.

Power Cord: Heavy duty 3-wire 16/3 SJT-W-A with NEMA 3-15P Cap., 15' long, UL-listed wire and plug.

Impeller & Handle: Stainless steel

Solids Handling Capability: 1/2"

Temperature: 140° F max.

Weight: EP0311 — 34 lbs., EP0311SS — 32 lbs.

Note: Pump can be controlled by a timer or external switch.

**GOULDS
 Model 3885**

(Supersedes Model 3870)

**Submersible
 Effluent Pumps**

Pump Specifications

Solids Handling Capability to 1/2".

Discharge Size
 2" NPT.

Semi-Open Impeller
 3 vane design, threaded on shaft. Three phase units use impeller locknut to prevent accidental back-off. Pump out vanes on backside of impeller for protection of mechanical seal.

Casing
 Volute type for maximum efficiency.

Stainless Steel Fasteners
 Series 300 stainless steel for corrosion resistance.

Mechanical Seal
 Ceramic vs. Carbon sealing faces, stainless steel spring and Buna N elastomers.

Maximum Temperature
 160° F.

Capable of Running Dry
 without damage to components.

Motor Specifications

Motor Fully Submerged
 in high grade turbine oil for permanent lubrication of bearings and mechanical seal and efficient heat dissipation. Motor sealed from environment by rugged cast iron enclosure.

Bearings
 Heavy-duty all ball bearing construction.

Stainless Steel Shaft
 Series 300 stainless steel for corrosion resistance. Threaded shaft.

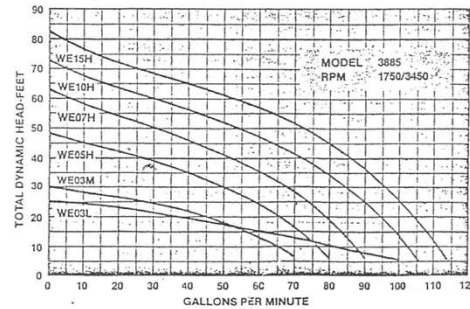
Single Phase Units
 All single phase units have built-in thermal overload protection with automatic reset.

Three Phase Units
 Overload protection in starter unit. 208-230 or 460 volts. Threaded shaft 60 Hz operation.

Power Cord
 Water and oil resistant. Epoxy seal on motor end acts as a secondary moisture barrier in case of damage to outer jacketing. Corrosion resistant gland nut.

Single Phase Units
 1/2 H.P. models equipped with 15' of 16/3 SJT-O with 3-prong grounding plug. 1, 1 1/2 H.P. models equipped with 15' of 14/3 STO power cord.

SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.



DF-47

CHEET 11 OF 12



Septic System Pumps

Home / All Services / ... / Septic System Pumps

Septic System Pumps

Rosenberry's Superior Septic Services offers several quality pump brands for your septic system needs including Goulds and Liberty. In addition, we offer specialty pumps required for your farm and commercial applications.

Goulds Liberty Champion



Sewage Pumps



3886 - WS Series

DOWNLOAD

Effluent Pumps



3885 - WE Series

DOWNLOAD



SITE INVESTIGATION AND PERCOLATION TEST REPORT FOR ON-LOT DISPOSAL OF SEWAGE

Applicant R. Blair Telephone _____ Application No. _____ Date 3-2-39
 Property Address _____ Municipality Walker County Huntingdon
 Soil Type Berks Slope _____ Person conducting test Gmelch/Farks/Blair

Percolation Data:

| Hole No. | Water Remaining in inches | 30 min | | 60 min | | 90 min | | 120 min | | 150 min | | 180 min | | 210 min | | 240 min | |
|----------|---------------------------|--------|------|--------|------|--------|------|---------|------|---------|------|---------|------|---------|------|---------|------|
| | | in | drop | in | drop | in | drop | in | drop | in | drop | in | drop | in | drop | in | drop |
| 1 | | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 |
| 2 | | | 3/4 | | 1/2 | | 1/2 | | 1/2 | | 1/2 | | 1/2 | | 1/2 | | 1/2 |
| 3 | | | 1/2 | | 1/2 | | 1/2 | | 1/2 | | 1/2 | | 3/4 | | 1/2 | | 3/4 |
| 4 | | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 |
| 5 | | | 3/4 | | 1/2 | | 1/2 | | 1/2 | | 1 | | 1/2 | | 1/2 | | 1 |
| 6 | | | 1 | | 1/4 | | 1 | | 1 | | 1 | | 1 | | 1 | | 1 |

Calculation:

| Hole No. | Drop in inches for final 30 minute reading | Perc. Rate for each hole | Depth of hole |
|----------|--|--------------------------|----------------------------------|
| 1 | 1 | 30 min/in | 20 in. |
| 2 | 1/2 | 60 min/in | in. |
| 3 | 3/4 | 40 min/in | in. |
| 4 | 1 | 30 min/in | in. |
| 5 | 1 | 30 min/in | in. |
| 6 | 1 | 30 min/in | in. |
| | | 220 min/in total | 6 test holes = min/in perc. rate |

Follow Chapter 73, 107, etc. procedures on conducting and calculating percolation tests.

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Soil Description:

Provide soil profile description by horizons from each pit dug for evaluation. Include the following items in describing each soil horizon: depth in inches, soil texture (USDA), mottling (if present), percentage of coarse fragments (by volume), depth to noticeable water seepage (if present), depth to water level in excavation (if present), any other pertinent data.

| Inches | Description of Horizon |
|----------|---|
| 0 To 8 | Top soil |
| 8 To 16 | 10 yr 4/4 Dark Yel Brown Silty Clay Loam |
| 16 To 23 | 10 yr 3/3 " Brown silty clay loam slightly shaley |
| 2 To 23 | Layer of Shale |
| To | |
| To | |
| To | |

The above information is the true and correct results of tests conducted by me or under my personal observation

By J. Gmelch
 SEWAGE ENFORCEMENT OFFICER

LOCAL AGENCY

EXHIBIT "A"
 SHEET 12 OF 12

#KYD... KNOW YOUR DEMOGRAPHIC!

- **WHO ARE YOU SUBMITTING DESIGN TO?**

- WHAT DO THEY WANT?
- WHAT FORMAT DO THEY LIKE?
- HOW MANY COPIES?
- COUNTY HEALTH DEPT / AGENCY ?
- MINIMUM REQUIREMENTS ABOVE AND BEYOND REGS?
- PA DEP REVIEW?
- QUICK REVIEW = QUICK PERMIT

#KYD... KNOW YOUR DEMOGRAPHIC!

- **WHO IS INSTALLING THE SYSTEM?**

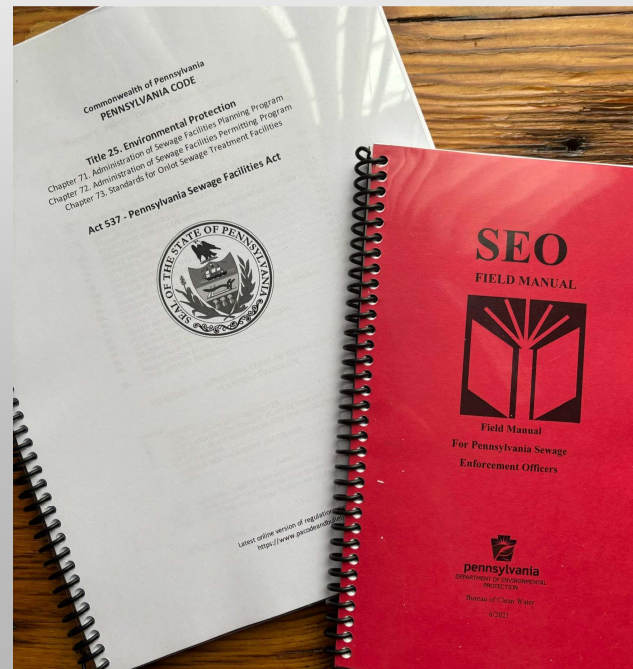
- IS IT GOING OUT FOR BID?
- HOW WELL DO YOU KNOW THEM?
- ARE YOU COMFORTABLE WITH THEIR WORK?
- DO THEY HAVE EXPERIENCE WITH SPECIFIC SYSTEM?
- SEO'S INVOLVEMENT ? INSPECTION SCHEDULE?
- STAKE OUT ? PRECONSTRUCTION MEETING?
- COORDINATE WITH OTHER CONTRACTORS ON-SITE?

WHAT IS REQUIRED?

DISCLAIMER: Most of these points are opinions and may not necessary be required as per the regulations!

WHAT IS REQUIRED:

DEP central office stated there are no regulations detailing what is required for a proper design. DEP pointed out to refer to planning module instructions section for site plan, chapter 73, and the SEO Field Manual (aka Red Book).



WHAT IS REQUIRED?

PART III

When the site is found to be suitable for installation of an onlot sewage disposal system, the appropriate system classification and components should be determined and entered in PART III. These components are to be determined by taking into consideration the quality of soil, the specific lot conditions and the design standards of Title 25 Pa. Code, Chapter 73.

After the component parts of the Sewage Disposal System have been determined, the property owner must provide a system design to the SEO for completion of this section. Many people obtain the services of a specialist to prepare this design. The plot plan sketch must locate the system with reference to various site characteristics (see items below). Attach detailed plans and cross sections, profiles, slopes, installation specifications, etc. as necessary to show the required details. **Design, plot plan and locations must be specific enough to provide the installer all the information necessary to install the system without reference to other documents.** Any change in a system design or location must be approved by the SEO and the application properly modified prior to installation.

Attach copies of *Site Investigation and Percolation Test Report for Onlot Disposal of Sewage*, *Verification of Prior Testing* and any required soil morphological evaluation reports.

The plot plan and design must include:

1. property lines and adjacent streets
2. dimensions and distance in feet
3. location of:
 - a. buildings and driveways
 - b. treatment and dosing tanks
 - c. all wells, springs and surface waters
 - d. sewage disposal system (use fixed reference points which can be located in the field)
 - e. all percolation holes and test pits on the property
 - f. existing sewage disposal systems
4. plans and cross section:
 - a. depth - inches
 - b. length - feet
 - c. width - feet
5. reference to north
6. direction of slope
7. distance to nearest stream (if any)
8. isolation distances as set forth in Title 25 Pa. Code §73.13
9. specifications and instructions for installing the system

If the plot plan or design is incomplete, the SEO may return the application for additional information.

Attach additional sheets for "Comments" or any special conditions which you may wish to describe.

PART IV

The applicant (the property owner or his authorized agent) must sign and date this application after completing Part I. The SEO signs and dates this application when the permit is issued or denied.

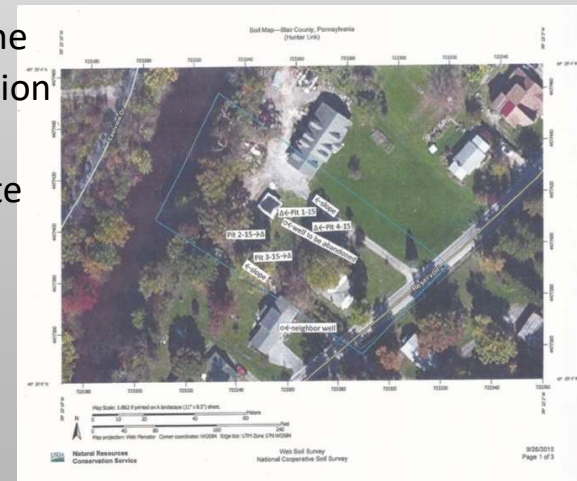
Source: Instructions for Completing Component 1

1. Plot Plan

The plot plan should be of a sufficiently large scale to show the development area and adjacent areas so that the plotted items can be easily identified. Preliminary lot lines can be used when soils testing is completed prior to lots being established, but the plot plan must be prepared by a registered surveyor before submission to the approving agency. The plan is required to show the following:

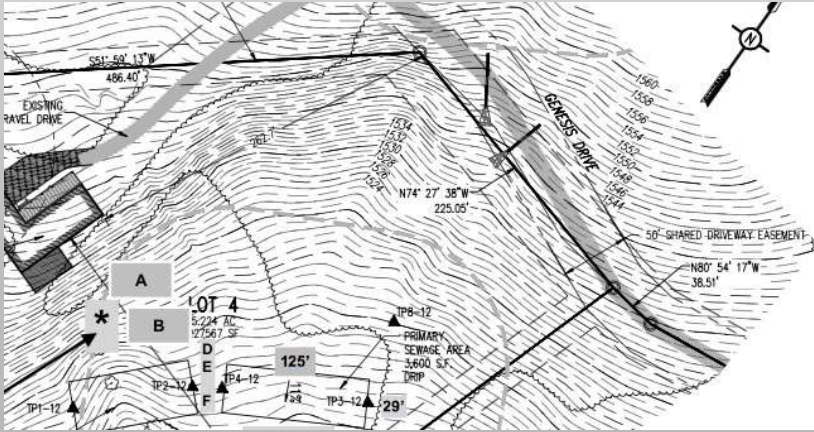
- a. Locations of ALL soil profile examinations and percolation tests (both suitable and unsuitable).

The location of all soil profile excavations and percolation test sites, including those which documented unsuitable conditions for the use of onlot sewage disposal, must be shown on the plot plan. Excavations are to be shown by the symbol ▲ and percolation tests by the symbol ●. When the scale of the plot plan makes it impossible to show each percolation test hole, the area of the test may be shown using a rectangular box labeled with the percolation test symbol. Each test must be referenced by number to the appropriate “Site Investigation and Percolation Test Report”.



b. The slope at each test area.

Slopes must be taken from in-field measurements recorded on "Site Investigation and Percolation Test Report" forms (3800-FM-BPNPSM0290A (formerly known as "Appendix A" or that are available from the Municipal SEO)) or from a registered surveyor's in-field slope measurements. The slopes should be shown on the plan with a slope arrow identifying measured percentage of grade and the source of the measurement ("Test Report" or surveyor). When slopes are measured, they must be taken across the soil profile/percolation test area from the down-grade extent to the up-grade extent of the proposed absorption area or spray field. This includes the berm area when elevated sand mound use is proposed in the subdivision. The Sewage Enforcement Officer should estimate the size of the absorption area from the percolation test data and Table A in Chapter 73, Section 73.16(e)), or the size of the spray field (from Table B in Chapter 73, Section 73.16(e)). Before a surveyor measures the slope, the sewage enforcement officer must place a labeled marker at each end of the area to be measured to assure that the tested area is being assessed. Any landscape feature, such as a bench, which may impact the general suitability of the site must be identified on the plan.



- Locations of existing and proposed adjacent streets, roadways and access roads.
- Existing and proposed rights-of-way.
- Existing and proposed water supplies (wells, reservoirs, etc.) and surface water (ponds, lakes, streams
- The SEO must identify existing water supplies and surface waters on adjacent properties which may impact site suitability related to isolation distances. If the sewage enforcement officer determines that the identified water supplies and surface waters are far enough away from the proposed development that they will have no impact on site suitability, the locations do not have to be plotted. If the identified water supplies or surface waters may have an affect on isolation distances, they must be shown on the plan. The SEO will provide access to the property for any required surveying activities.
- Location of existing buildings.
- Surface waters, including ponds, streams, lakes and impoundments.
- Flood plains and flood ways. As with wetlands, these areas should be plotted on the plan as they are shown on Federal Emergency Management Agency flood plain mapping.
- Any existing on-lot or sewerage systems, pipelines, transmission lines, etc. which may impact the use of an onlot system.
- Orientation to north, usually shown by a directional arrow.

73.17 Sewage Flows:

(d) Establishments with food preparation facilities **are required** to install adequately designed pretreatment units and traps to reduce greases and biological oxygen demand (BOD) prior to discharge to an individual or community sewage system. *Most designers are not aware of this section*



73.21 Building Sewers Specifications:

(a) Building sewers shall be constructed of a durable material acceptable to the Department or the local agency. *What about foam core? DEP says per regulations it can be but they want to change the regs to not allow it.*

(c) 3" min for avg flows of 1,000 gpd or less; 6" for avg flows > 1,000 gpd; *most designers use 4" Why is that? Is 3" better than 4"?*

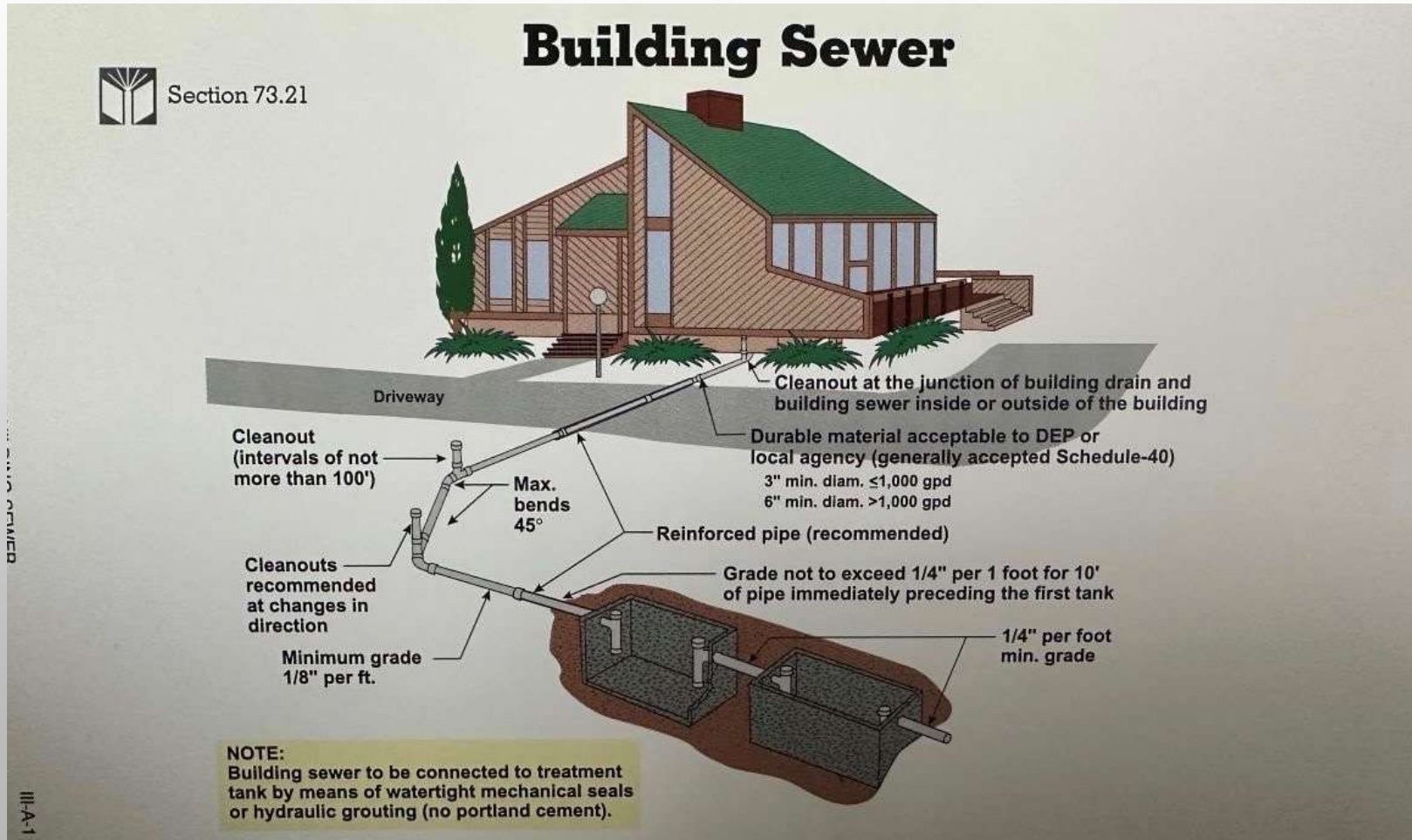
(e) clean out provided not more than every 100 feet. *Is this too far apart? Recommend 75'*



Where do you find the list of approved materials?

(h) Building sewers shall be constructed with watertight joints, shall be of sufficient strength to withstand imposed loads and installed on material suitable for preventing damage from settling.

How many specify for bedding of pipes? How many see the pipes directly outside of the tank settle?



SUPPORT PIPING

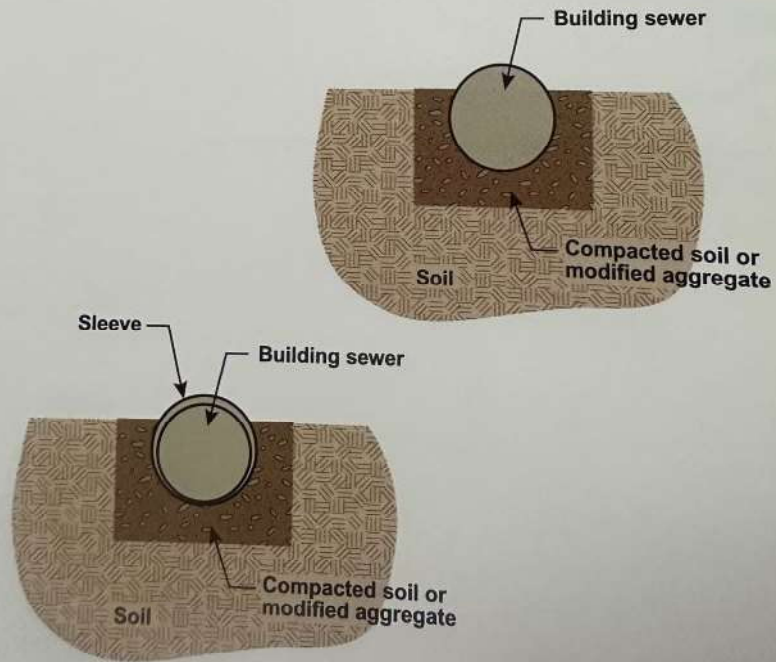


Section 73.21

- The entire length of the building sewer pipe must be supported with material suitable to prevent damage from settling. Use clean, hand-tamped backfill or modified aggregate. Modified aggregates are aggregates of different sizes that will compact.

Note: When the entire length of pipe is properly supported, it will be protected from damage.

The two illustrations below show a building sewer supported with compacted soil or modified aggregate. The bottom illustration also has a sleeve to provide extra support under driveways or other structures that could cause damage to the pipe.



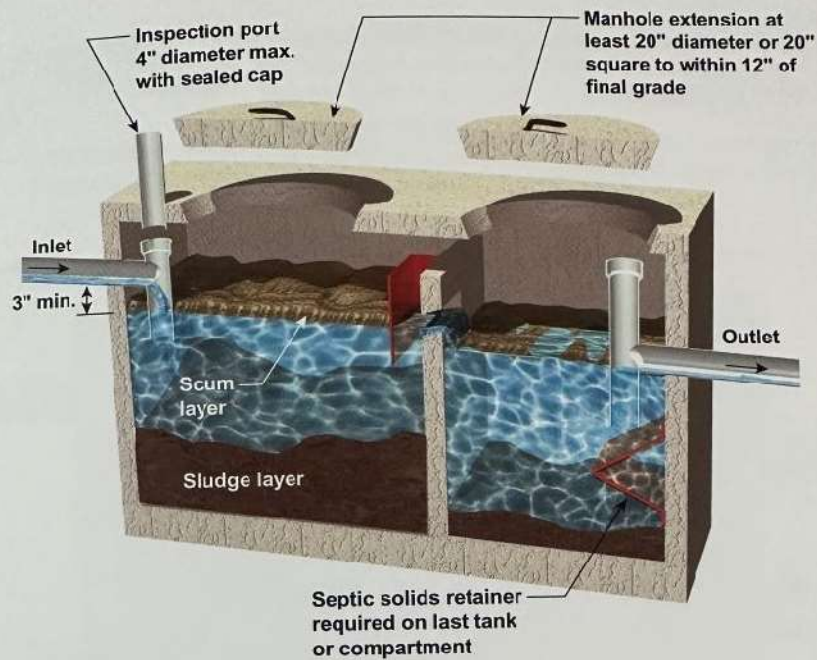
73.31 Standards for Septic Tanks

(a) (1) Min. liquid capacity for any installation is 900 gallons. Most use 1,000 gal. which is dependent on local supplier. *Is going larger better? Is it cost justified? Some local agencies have larger min. size tanks.*

(d) (1) Access to each tank or compartment of the tank shall be provided by a manhole with....The top of the tank containing the manhole or the top of a manhole extension may not be more than 12 inches below grade level. If access is extended to grade, the access cover shall be airtight. *If below grade, how does the lid remain watertight? If using a typical concrete lid to above grade, how is it airtight?*

(d) (2) The ground shall slope away from any access extended to grade level. *How many see surface waters going towards the tank/access?*

Regulations for a Multiple-Compartment Septic Tank



NOTES:

- If the manhole is extended to grade, it must be airtight and secured by bolts or locking mechanisms, or it must have sufficient weight to prevent unauthorized access.
- If the manhole is extended to grade, the ground must slope away from access.
- The first compartment must have at least the same capacity as the second but may not exceed twice the capacity of the second.

IV INSPECTIONS

V CONSTRUCTION

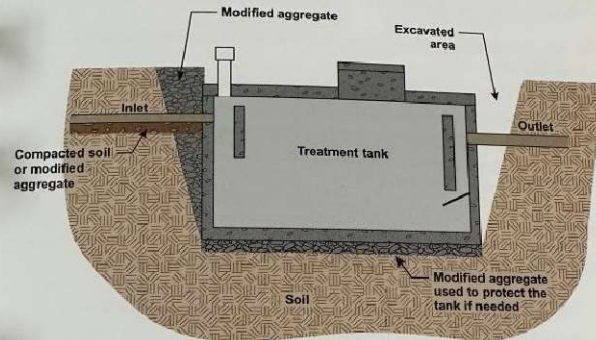
III-C Distribution Methods

III-D

Treatment Tank(s) or Dosing Tank

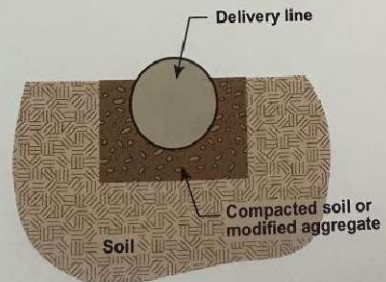
- The excavation for a tank must provide a level bottom.
- Clean or modified aggregate may be placed on the bottom of the excavation to support and protect the tank.

Note: Modified aggregates are aggregates consisting of different sizes that will compact.



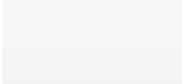
Distribution Method

- Pressure fittings must be used for pressure distribution or lift pump pipe.
- Rigid conduit may also be used to protect the wiring.
- The pipes from the treatment tank(s) to the distribution method must be supported with material suitable for preventing damage from settling. Use clean hand-tamped backfill or modified aggregate.

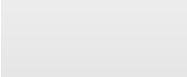


Eljen GSF Septic System Design

Client Information



Property Location



Lat: 41.850507
Long: -76/014660

Designer



Date
9/19/2023

Permit and Design Information

This on-lot septic system design will service new home which contains three bedrooms. The septic system shall be constructed as per the design specifications. No changes to the design are permitted without the written authorization of the designer and the approval of the local authority.

Permit and Design Information

| | |
|----------------------------|--------------------------------|
| Permit Type: | New |
| System Type: | Eljen Geotextile Sand Filter |
| Number of Bedrooms | 3 |
| Gallons Per Day | 400 |
| Depth to Limiting Zone | 20" |
| Percolation Rate | 15,40 min/inch |
| Type of Limiting Zone | Redoximorphic Features |
| Slope | 6% |
| Soil Classification | MIC2 |
| Type of Cover | Grassy |
| Required Absorption Area | 600 ft ² |
| Absorption Area Reduction | Yes |
| Absorption Area Dimensions | 8' x 49' = 392 ft ² |
| Distribution Method | Pump |

System Components

| | |
|-----------------|-------------------------------------|
| Septic Tank | 1 - 1000-Gallon Dual Compartment |
| Dose Tank | 1 - 1000-Gallon Single Compartment |
| Effluent Filter | 1 - Zabel 1800 |
| Pump | 1/2 HP Goulds WE 3885 or equivalent |
| B43 Modules | 24 |
| Control Panel | Aquaworx |

Eljen Sizing

| | |
|--|------|
| 100% Absorption Area ft ² | 600 |
| Minimum Absorption Area @ 40% | 360 |
| Min Number of Modules (ft ²) | 22.5 |
| Number of Rows | 2 |
| Modules Per Row | 12 |
| Bed Length | 49 |
| Bed Width | 8 |
| Total Absorption Area ft ² | 392 |
| Length in ft. | 49 |
| Width in ft. | 8 |
| Number of Modules | 24 |

Eljen GSF Pa Manual is available at <https://eljen.com/industry-professionals/>

Area Suppliers

| | | | | |
|---------------------------------|--------------------------------|-------------------------|-----------------|----------------|
| Concrete Tanks, Pumps & Filters | Centermoreland Concrete | 12 Creamery Road | Tunkhannock, PA | (570) 333-4944 |
| | Scranton Craftsmen | 930 Dunmore Street | Throop, PA | (570) 347-5125 |
| | William Elston Septic Tanks | 481 Cortez Road | Mount Cobb, PA | (570) 689-2203 |
| | Holbrook's Precast, Inc | 634 Jennings Creek Road | Kilavog, NY | (607) 849-3787 |
| Eljen Modules and Components | Mountain Wastewater Management | 5804 PA-87 | Forksville, PA | (570) 896-0262 |
| | Expert Septic - Mike Kaub | PO Box 410 | Newburg, PA | (570) 229-0286 |

The septic system design is in compliance with all applicable DEP rules and regulations in effect at the time the design was completed unless otherwise noted with a "BTG" designation.

The system installer shall verify all elevations and system component depths prior to setting and installing the system components. The designer or the company does not accept any liability or responsibility for the installation, construction, operation, or maintenance of the septic system.

There is no warranty, implied, or otherwise in effect.

MINIMUM HORIZONTAL ISOLATION DISTANCES
Title 25 Section 73.13

Minimum horizontal distance is shown in section 73.13 must be maintained between the on lot sewage system and the features itemized except as provided by section 73.33 (relating to the well isolation distance exemption). If conditions warrant greater isolation distances may be required.

- A. The minimum horizontal isolation distances between the features named and treatment tanks, dosing tanks, lift pumps tanks, filter tanks, and chlorine storage tanks must comply with the following:

| | |
|---|-----|
| Property line, easement, or right-of-way | 10' |
| Occupied buildings, swimming pools, and driveways | 10' |
| An individual water supply suction line | 50' |
| Water supply line under pressure | 10' |
| Streams, lakes, or other surface waters | 25' |
| A cistern used as a water supply | 25' |

- B. the following minimum horizontal distances must be maintained between the features named and the perimeter of the aggregate in the absorption area.

| | |
|---|------|
| Property line, easement, or right-of-way | 10' |
| Occupied buildings, swimming pools, and driveways | 10' |
| An individual water supply suction line | 100' |
| Water supply line under pressure | 10' |
| Streams, watercourses, lakes, ponds, or other surface waters. (Wetlands not included) | 50' |
| Other active onlot sewage disposal systems | 5' |
| Surface drainage | 10' |
| Mine subsidence areas, mine boreholes, or sinkholes | 100' |
| Rock outcrop or identified shallow pinnacle | 10' |
| Natural or manmade slope greater than 25% | 10' |
| A cistern used as a water supply | 25' |
| Detention basins, retention basins, and stormwater seepage beds | 10' |

General Specifications

Building Sewer

1. Building Sewer shall be 4" Schedule 40 PVC. The line between the septic tank and the dosing tank (if needed) shall be a minimum 3" Schedule 40 PVC.
2. A cleanout shall be provided at the junction of the building drain and the building sewer.
3. A Building Sewer cleanout shall be provided at intervals of no more than 100 feet. Cleanouts are recommended at changes in direction.
4. Bends ahead of the treatment tank shall be limited to 45 degrees where possible. If 90 degree bends cannot be avoided, they shall be made with two 45 degree elbows.
5. The grade of the building sewer shall be at least 1/8" per foot. The grade of the last 10 feet immediately preceding the tank inlet shall not exceed 1/4" per foot.
6. The building sewer shall be constructed with watertight joints.
7. The building sewer shall be constructed to allow continuous venting of the treatment tank through the main building stack vent.

Septic Tank

1. The septic tank must be watertight and constructed of sound and durable materials, certifiable to the specifications set forth in Pennsylvania Code Title 25 "Environmental Resources", Chapter 73.31 "Standard for Septic Tanks". The septic tanks must be a multiple compartment unit (or two septic tanks plumbed together in series) with a solids retaining device or effluent filter at its effluent exit.
2. Manhole access for each compartment must be extended to within 12" of grade or higher and must be at least 20" X 20" square or 20" in diameter with a removable cover. Any access at grade must be airtight and secured from access by children by the use of bolts, locking mechanisms or sufficient weight. The inlet must be viewable for inspection via a 4" maximum diameter inspection port with a sealed cover installed to grade level above the inlet tee.
3. All pipe and wire holes in concrete tanks shall be sealed with hydraulic cement.
4. All tanks shall be set on suitable compacted soil or fine aggregate material.
5. All tanks must be set level in every direction.
6. Tank backfill and cover shall be constructed in a manner that will divert surface and subsurface water away from the tank.

Absorption Area Construction

1. All vegetation shall be cut close to the ground throughout the area to be utilized for the absorption area and the berm. Brushes and trees shall be cut flush with the ground surface and roots shall be left in place. All cut vegetation or organic litter shall be raked and removed from the berm and the absorption area.
2. The proposed absorption area not obstructed by stumps or other obstacles shall be roughed or plowed parallel with the contour to a maximum six (6) inches using a chisel plow or similar implement attached to light weight equipment. Rotary equipment is prohibited. Under no circumstances shall equipment travel on the plowed soil surface.
3. Soil moisture level during construction of the absorption area shall be such that a sample of the natural mineral soil taken from the level of the proposed installation shall crumble when compressed into a ball.
4. The contractor is responsible for maintaining all isolation distances. (See the attached isolation distance sheet)

Pump Setup

- This system requires a dosing tank. Refer to the detail page for tank and pump size.
- A watertight manhole at least 20" square or 24" in diameter that extends to grade must be provided for access to the dosing tank.
- The manhole must be secured from access by children by the use of bolts, locking mechanisms or sufficient weight.
- If a manhole extension is required to reach grade level, the space in the manhole extension can be used to locate all necessary electrical connections.
- A quick disconnect is required. (See the detail page). The disconnect should be located in the horizontal part of the delivery pipe, inside the dosing tank, no more than 2 ft below the tank/riser lid.
- All electrical wires and control floats should be strapped to the discharge pipe between the pump and quick disconnect.
- This system uses an Aquaworx Control panel which may be located adjacent to the dose tank or in a location frequented by the homeowner or responsible individual. An alarm provides a warning of a malfunction while sufficient capacity is available in the dosing tank to provide time for repair before backup or overflow occurs. The alarm activation device must be set to a level not to exceed 75% capacity of the tank.
- The pump and alarm must always be on separate fuses or breakers.
- The intake of the pump must be elevated above the bottom of the dosing tank at least 6".
- As few as possible electrical connections and splices should be made within the dosing tank. All necessary connections in the tank should be made at the highest point of the tank or manhole extension in moisture resistant junction boxes, moisture resistant plugs, or moisture resistant splices. Under no circumstances are standard electrical receptacles, exposed splices, splices wrapped in electrical tape only, or an uninsulated plugs allowed within the dosing tank. The wiring used in the dosing tank should be marked moisture resistant (NMC) or direct burial (UF). The size of the wire required depends on the amperage demand of the pump and the length of wire required. If the wire will be buried less than 2 feet below the ground surface, it should be encased in conduit to prevent damage. If the wire is not protected by conduit, provide sufficient slack to allow for soil settling.

Maximum Copper Cable Lengths

| Motor Rating | | Copper Wire Size | | | | |
|--------------|-----|------------------|------|-------|-------|-------|
| Volts | HP | 14 | 12 | 10 | 8 | 6 |
| 115 | 1/3 | 130' | 210' | 340' | 540' | 840' |
| 115 | 1/2 | 100' | 160' | 250' | 390' | 620' |
| 230 | 1/3 | 550' | 880' | 1390' | 2190' | 3400' |
| 230 | 1/2 | 400' | 650' | 1020' | 1610' | 2510' |
| 230 | 3/4 | 300' | 480' | 760' | 1200' | 1870' |
| 230 | 1 | 250' | 400' | 630' | 990' | 1540' |

MINIMUM AGGREGATE ABSORPTION AREA REQUIREMENTS FOR TREATMENT TANK EFFLUENT

| | |
|---------|---|
| 15.4 | Perc Rate |
| 400 | Enter GPD Flow Bedrooms: 1-3 = 400, 100 gallons per day for each additional bedroom |
| KZ = 20 | Enter Depth to Seasonal High Water Table |
| None | Enter Depth to Rock |
| 6.0% | Enter Slope % |

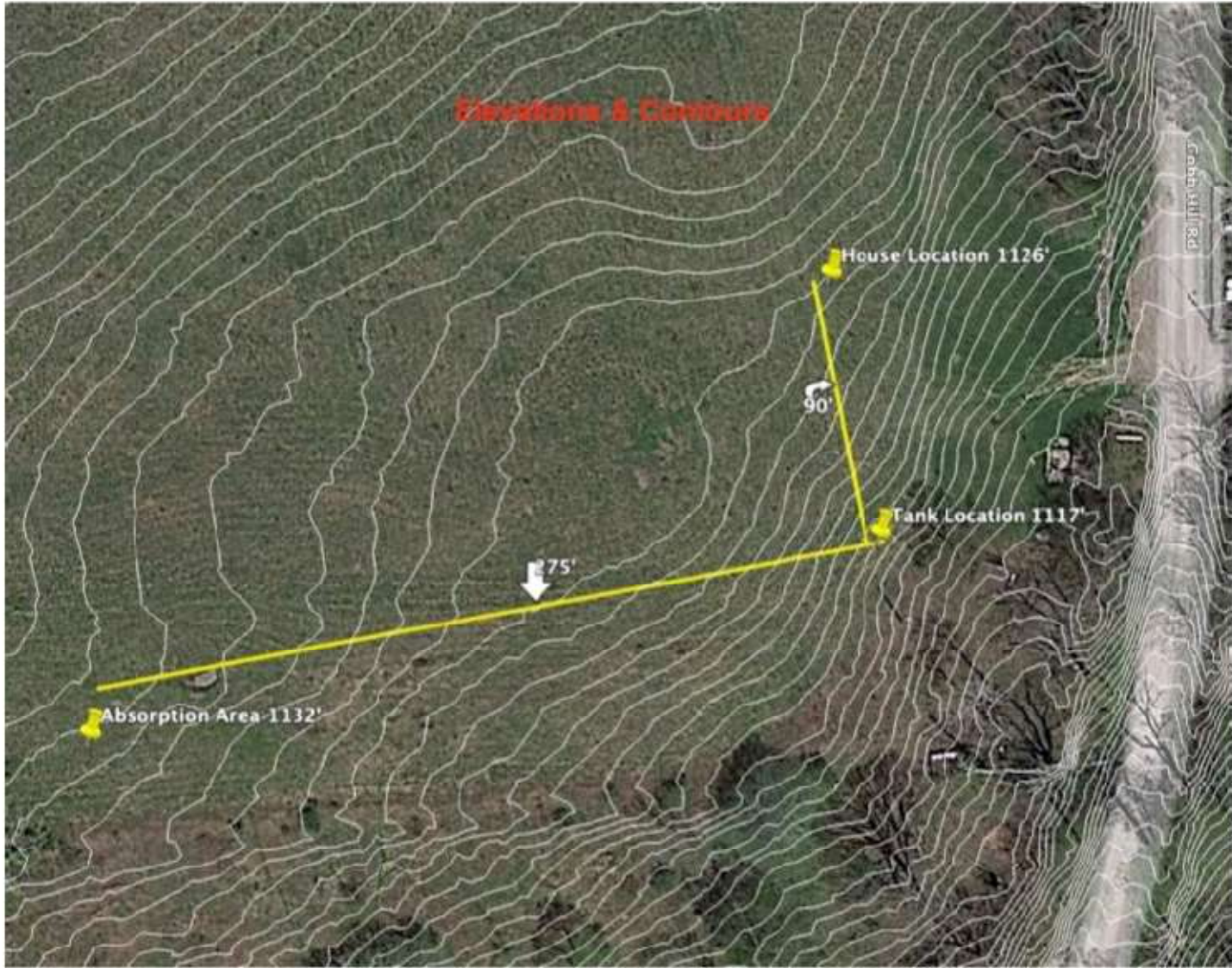
| Average Perc Rate Expressed as Minutes/Inch | | See Footnotes Below | All Systems Except Elevated Sand Mounds and Subsurface Sand Filters | Sq. Ft. of Aggregate Area/ Gallon/Day | 100% Traditional Absorption Area | | 33% Reduction of Absorption Area for Aerobic Tank - 'B' | | 33% Reduction of Absorption Area for Alternate Tech - 'C' | |
|---|------|---------------------|---|---------------------------------------|----------------------------------|---------|---|---------|---|---------|
| Low | High | | | | Acres | Sq. Ft. | Acres | Sq. Ft. | Acres | Sq. Ft. |
| < | 3 | | Unsuitable | | | | | | | |
| 3 | 5 | | Unsuitable | | | | | | | |
| 6 | 15 | | 1.19 | | | | | | | |
| → 16 | 30 | B C | (Avg. Perc Rate - 15) x (0.040) + 1.19 = | 1.21 | 0.01 | 482 | 0.01 | 323 | 0.01 | 289 |
| 31 | 45 | | (Avg. Perc Rate - 30) x (0.030) + 1.79 = | | | | | | | |
| 46 | 60 | | (Avg. Perc Rate - 45) x (0.028) + 2.24 = | | | | | | | |
| 61 | 90 | | (Avg. Perc Rate - 60) x (0.023) + 2.66 = | | | | | | | |
| 91 | 120 | | Unsuitable | | | | | | | |
| 121 | 150 | | Unsuitable | | | | | | | |
| 151 | 180 | | Unsuitable | | | | | | | |
| 181 + | | | Unsuitable | | | | | | | |

| Average Perc Rate Expressed as Minutes/Inch | | See Footnotes Below | Elevated Sand Mounds and Subsurface Sand Filters | Sq. Ft. of Aggregate Area/ Gallon/Day | 100% Traditional Absorption Area | | 33% Reduction of Absorption Area for Aerobic Tank - 'B' | | 40% Reduction of Absorption Area for Alternate Tech - 'C' | |
|---|------|---------------------|---|---------------------------------------|----------------------------------|---------|---|---------|---|---------|
| Low | High | | | | Acres | Sq. Ft. | Acres | Sq. Ft. | Acres | Sq. Ft. |
| < | 3 | | Unsuitable | | | | | | | |
| 3 | 5 | | 1.50 | | | | | | | |
| 6 | 15 | | 1.50 | | | | | | | |
| → 16 | 30 | A B C | 1.50 | 1.50 | 0.01 | 600 | 0.01 | 402 | 0.01 | 360 |
| 31 | 45 | | (Avg. Perc Rate - 30) x (0.026) + 1.50 = | | | | | | | |
| 46 | 60 | | (Avg. Perc Rate - 45) x (0.022) + 1.89 = | | | | | | | |
| 61 | 90 | | (Avg. Perc Rate - 60) x (0.020) + 2.22 = | | | | | | | |
| 91 | 120 | | (Avg. Perc Rate - 90) x (0.017) + 2.82 = | | | | | | | |
| 121 | 150 | | (Avg. Perc Rate - 120) x (0.015) + 3.33) x (1.05) = | | | | | | | |
| 151 | 180 | | (Avg. Perc Rate - 150) x (0.014) + 3.78) x (1.05) = | | | | | | | |
| 181 + | | | | | | | | | | |

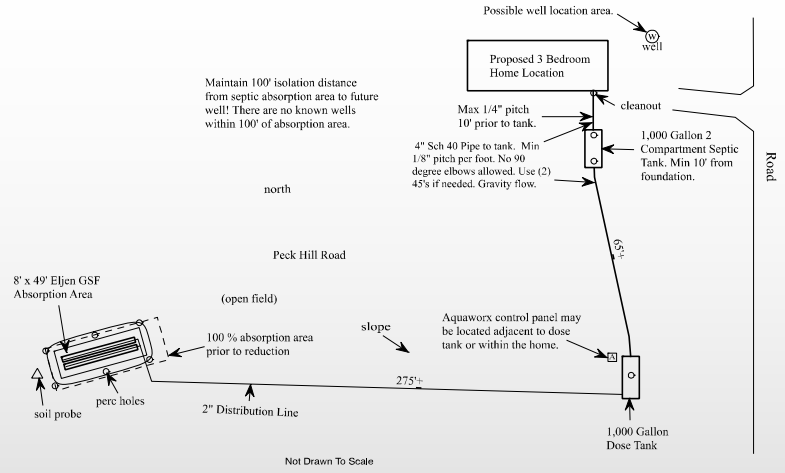
A Pressure dosing required.

B One third reduction may be permitted for use of an aerobic tank.

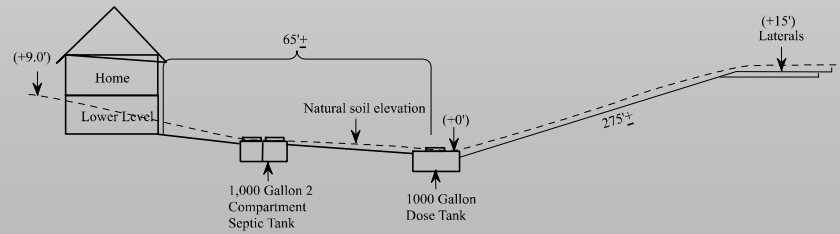
C May be considered for experimental or alternate proposals.



Plot Map

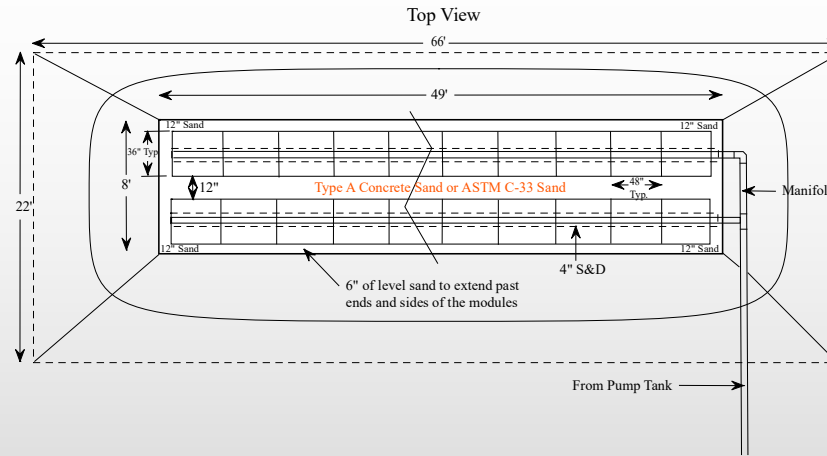


Elevations

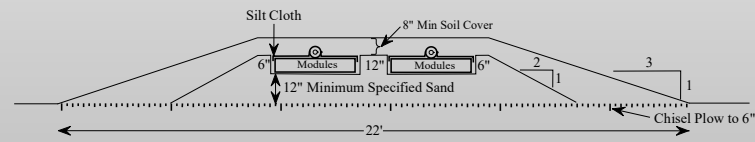


Note: The main components of the on-lot sewage disposal system have been field located and does not indicate surveyed locations. The location of components may be adjusted to accommodate proposed infrastructure with the prior approval of the municipality's sewage enforcement officer. Contractor must insure that all isolation distances are maintained and that a minimum gravity flow of 1/4" per foot is

Eljen GSF - 2 Row System
1.5" Manifold & 1.5" Laterals



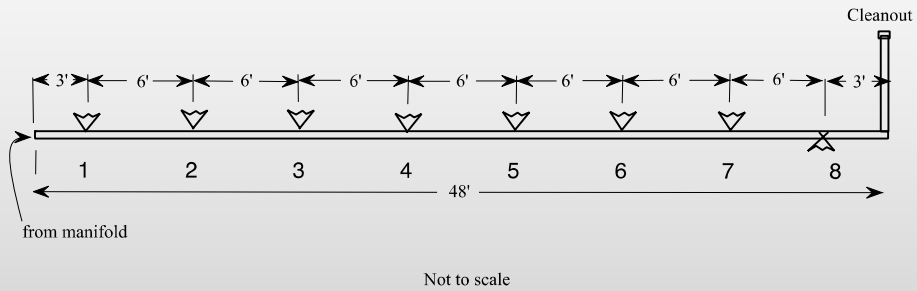
Level Bed Cross Section



Note: Sand and Berm dimensions are approximate and the actual site conditions and construction will determine actual overall dimensions. Dimensions shown are minimums.

Module and Hole Spacing in Lateral

8 - 1/4" Holes in each lateral

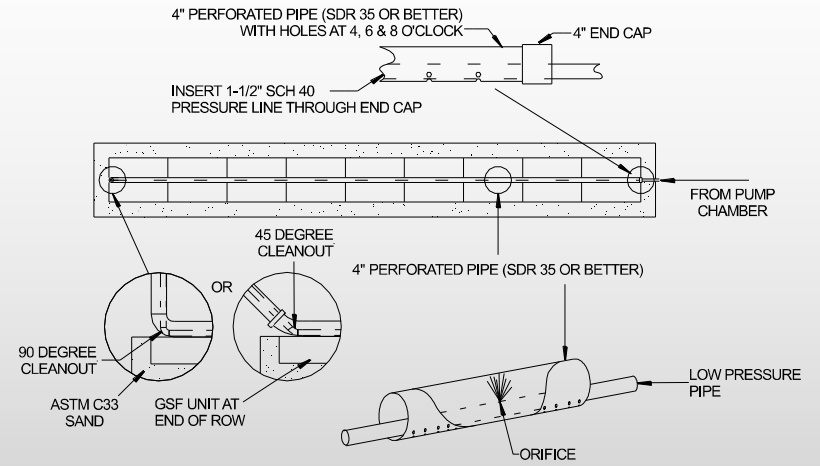


Drill 1/4" hole at each location at the 12 o'clock position except for the final hole which will be drilled at the 6 o'clock position to facilitate drainage.

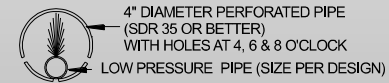
The 1.5" lateral will be sleeved inside a 4" Sewer & Drain pipe. Be sure drilled holes are free from the plastic drill windings.

5.0 Pressure Distribution Guidance

FIGURE 17: PRESSURE PIPE PLACEMENT

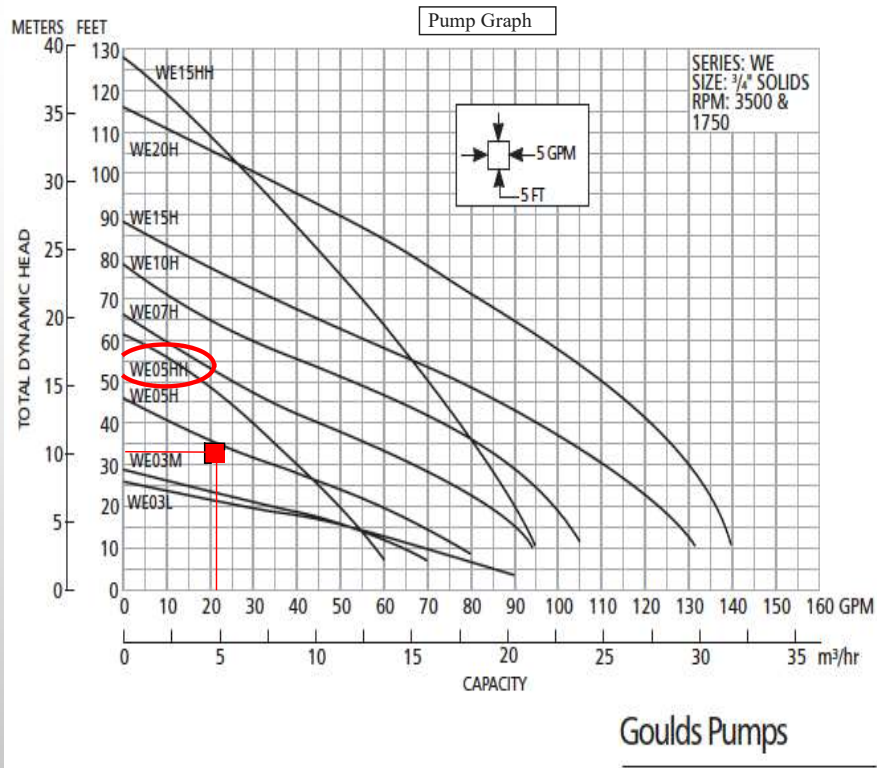


PRESSURE PIPE CROSS SECTION FOR ALL APPLICATIONS



2.0" DELIVERY LINE AND MANIFOLD WITH 1.5" LATERAL WORKSHEET

| Absorption Area Data | | Lateral Info | | Friction Loss | |
|-----------------------------------|-----|---------------|-------|---|--------|
| Bedrooms | 3 | Diameter (in) | 1.5 | 2" Del/Manifold/Fitting Equivalent Length | 349.57 |
| Gallons/Day | 400 | Number | 2 | 2" GPM Friction Loss | 0.015 |
| Min Square Feet | 360 | Length (ft) | 48 | 2" Loss (ft) | 5.24 |
| Length (ft) | 49 | Total length | 96 | 1.5" Fitting & Lateral Equivalent Length | 111.76 |
| Width (ft) | 8 | No. of holes | 16 | 1.5" GPM Friction Loss | 0.027 |
| Total Area (ft. ²) | 392 | Hole Dia (in) | 0.25 | 1.5" Loss (ft) | 3.02 |
| Distribution Data | | Gal/Min/Hole | 1.28 | Total Friction Loss (ft) | 8.26 |
| Delivery Line (in) | 2.0 | Total GPM | 20.48 | Minimum Head (ft) | 3 |
| Delivery Line (ft) | 275 | | | Total Required (ft) | 11.26 |
| Manifold Diameter (in) | 2.0 | | | Elevation Data (ft) | |
| Manifold Length (ft) | 4 | | | Elev. Change | 15 |
| Fitting Friction Loss 2.0" | | | | Depth of Sand | 1.5 |
| 90 Degree Elbow | 2 | 5.55 | 11.1 | Depth of Module | 0.75 |
| 45 Degree Elbow | 2 | 2.58 | 5.16 | Bottom of Tank (ft) | 5 |
| Standard Tee | 1 | 11.11 | 11.11 | Pump Elevation | -0.5 |
| Coupling | 31 | 1.35 | 41.85 | Total Elevation Difference | 21.75 |
| Quick Disconnect | 1 | 1.35 | 1.35 | Friction Loss | 11.26 |
| 4 Way | 0 | 4.30 | 0 | Total Dynamic Head | 33.01 |
| Total Equivalent | | | 70.57 | Dose Calculations | |
| Fitting Friction Loss 1.5" | | | | Pipe Diameter (in) | 2.0 |
| 90 Degree Elbow | 2 | 4.73 | 9.46 | Deliver Line Length (ft) | 275 |
| 45 Degree Elbow | 0 | 2.01 | 0 | Liquid Volume Per Foot | 0.16 |
| Standard Tee | 0 | 8.62 | 0 | Total Delivery Line Volume | 44 |
| Coupling | 6 | 1.05 | 6.3 | Manifold Length | 4 |
| Quick Disconnect | 0 | 1.05 | 0 | Manifold Liquid Volume Per Foot | 0.16 |
| 4 Way | 0 | 2.70 | 0 | Total Manifold Liquid Volume | 0.64 |
| Total Equivalent | | | 15.76 | Total Lateral Length | 96 |
| Min Dose Volume 149 | | | | Lateral Volume Per Foot | 0.09 |
| Total Dynamic 33.01 | | | | Total Lateral Volume | 8.64 |
| Gallons Per 20.48 | | | | Total Internal Volume | 53.28 |
| | | | | Internal Dose Vol + 4 Gal/Module (96) | 149 |
| | | | | Maximum Dose Volume | 149 |



ITT

B3885

Wastewater

Goulds Pumps

WE Series Model 3885

Submersible Effluent Pump

EXTENDED WARRANTY AVAILABLE FOR RESIDENTIAL APPLICATIONS.

FEATURES

- **Impeller:** Cast iron, semi-open, non-clog with pump-out vanes for mechanical seal protection. Balanced for smooth operation. Silicon bronze impeller available as an option.
- **Casing:** Cast iron volute type for maximum efficiency. 2" NPT discharge.
- **Mechanical Seal:** Silicon Carbide vs. Silicon Carbide sealing faces. Stainless steel metal parts, BUNA-N elastomers.
- **Shaft:** Corrosion-resistant, stainless steel. Threaded design. Locknut on all models to guard against component damage on accidental reverse rotation.
- **Fasteners:** 300 series stainless steel.
- Capable of running dry without damage to components.
- Designed for continuous operation when fully submerged.



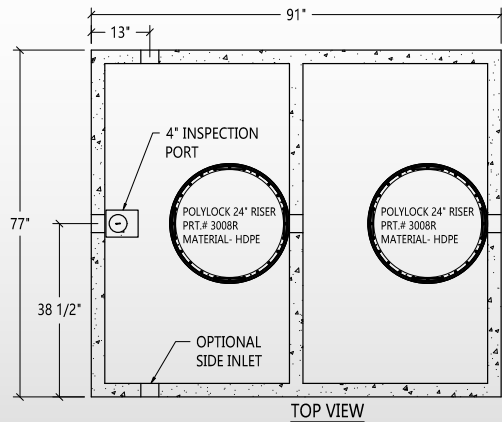
GOULDS PUMPS

Goulds Pumps is a brand of ITT Corporation.

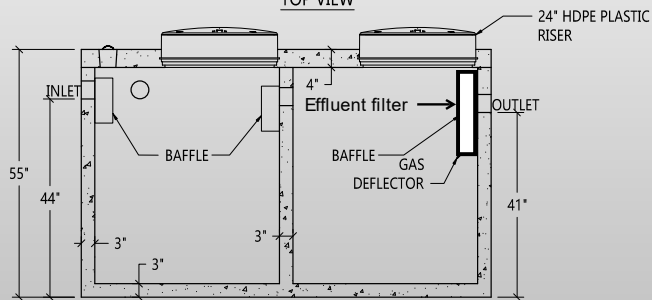
www.goulds.com

Engineered for life

1000 GAL. 2 COMP. SEPTIC TANK



TOP VIEW



SIDE VIEW

SPECIFICATIONS:

MINIMUM STRENGTH OF CONCRETE- 4,000 @ 28 DAYS
 AIR ENTRAINMENT- 5 1/2% ± 1 1/2%
 STEEL REINFORCEMENT- 6" X 6" - 6 GAUGE WIRE MESH IN SIDES, BOTTOM AND LID
 JOINT- SEALED WITH SYNTHETIC RESIN OR EQUIVALENT
 APPROXIMATE WEIGHT- 9,000 LBS.



Scranton Craftsmen, Inc

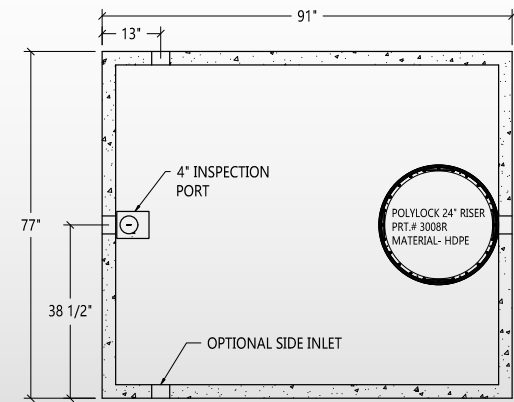


930 Dunmore Street
 Throop, PA 18512

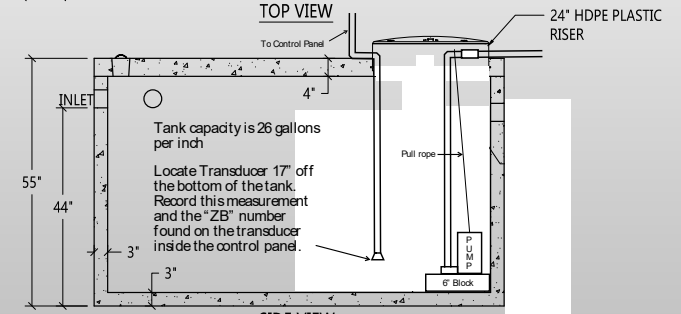
www.scrantoncraftsmen.com
 sales@scrantoncraftsmen.com

Toll Free: 1800-775-1479
 Phone: (570) 347-5125
 Fax: (570) 489-4212

1000 GAL. MONOLITHIC DOSING TANK



TOP VIEW



SIDE VIEW

SPECIFICATIONS:

MINIMUM STRENGTH OF CONCRETE- 4,000 @ 28 DAYS
 AIR ENTRAINMENT- 5 1/2% ± 1 1/2%
 STEEL REINFORCEMENT- 6" X 6" - 6 GAUGE WIRE MESH IN SIDES, BOTTOM AND LID
 JOINT- SEALED WITH SYNTHETIC RESIN OR EQUIVALENT
 APPROXIMATE WEIGHT- 7,500 LBS.



Scranton Craftsmen, Inc



930 Dunmore Street
 Throop, PA 18512

www.scrantoncraftsmen.com
 sales@scrantoncraftsmen.com

Toll Free: 1800-775-1479
 Phone: (570) 347-5125
 Fax: (570) 489-4212



A1800-4x18-B35 & B40



A1801-4x18

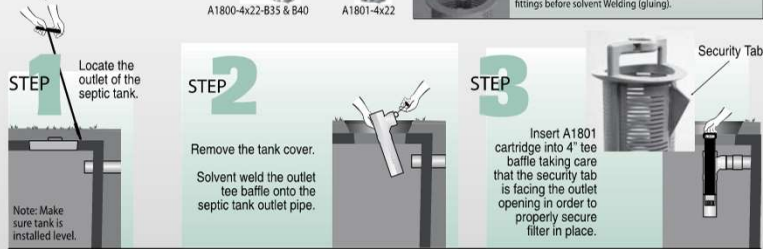


INSTALLATION A1800™ Series Filter

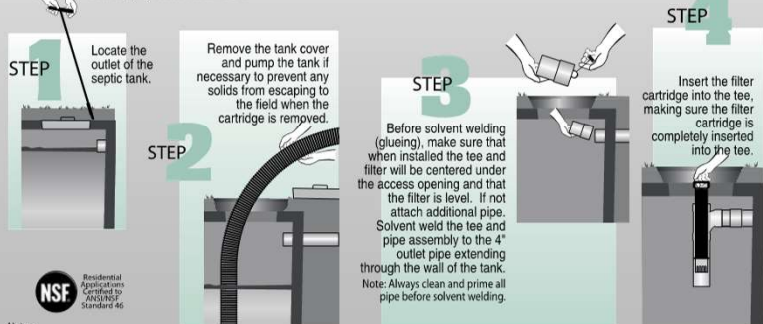
Optional Handle Installation Instructions

1. Place the 1/2" female threaded cap underneath the hole in the center of the filter handle. 2. Thread the male end of the 1/2" male adapter (MPT x SLIP) into the female threads of the cap. Tighten the fittings until they are snug around the filter handle. 3. Glue one end of the 1/2" sch40 pipe into the slip adapter on the top of the filter. (If the 1" pipe is not long enough, you will need to supply your own length of pipe. Also, the pipe may be cut to give a shorter handle.) 4. Glue the 1/2" tee to the top of the 1/2" sch40 pipe. 5. Install the Zabel filter following its installation instructions. Notes: Prime all fittings before solvent welding (gluing).

New System Installation:



Existing System Installation



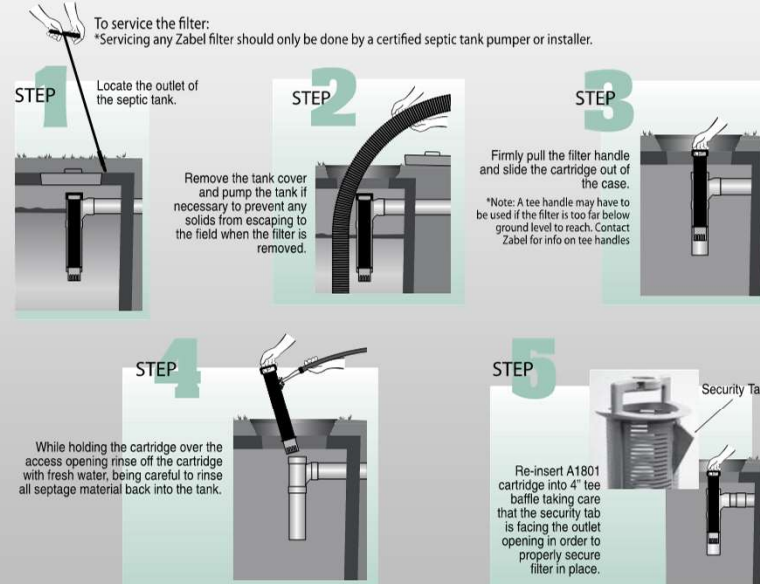
Notes:

- If 4" PVC pipe does not extend into the tank, a plumbing flange may be used.
- The A1801 and A1801-HIP cartridges may be inserted into SDR 33 or Schedule 40 outlet tee baffles.
- The bottom gasket on the cartridge must be contained within the outlet baffle pipe, in order to create a seal with the surrounding pipe.
- If you have purchased a Zabel Smartfilter, additional installation instructions can be found in the Smartfilter Alarm System box.
- A riser to grade over the outlet access opening is recommended and may be required in certain states.
- If the filter can not be installed in the existing tank, it can be installed using a Zeus Basin System. In this case, the New System Installation instructions will be used.
- Filter material: white or natural = PVC, gray = ABS
- Performance: Maximum daily flow = 800 GPD
Average reduction in TSS within 6 months of installation - 40% in typical residential wastewater.
- Minimum of 3" drop required in tank for proper SmartFilter operation



MAINTENANCE A1800™ Series Filter

The interval for servicing septic tanks is set by state and local code. Throughout the United States there is a wide difference of opinion on what this interval should be, but most regulatory agencies suggest two to five years. The Zabel™ filter, which does not increase the frequency of servicing for the tank, should be cleaned when the septic tank is normally inspected and pumped. However, our filter is virtually self-cleaning. The continued action of the anaerobic organisms on the Zabel filter causes lodged particles to disintegrate and fall to the bottom of the tank. If your filter contains a SmartFilter™ alarm, you will be notified by an alarm when the filter needs servicing.



Notes:

- If you have a Filtered Versa-Tee™ Model Filter, be sure and spray clean the outlet opening before replacing the Filter.



The product(s) shown are covered by the following patents:

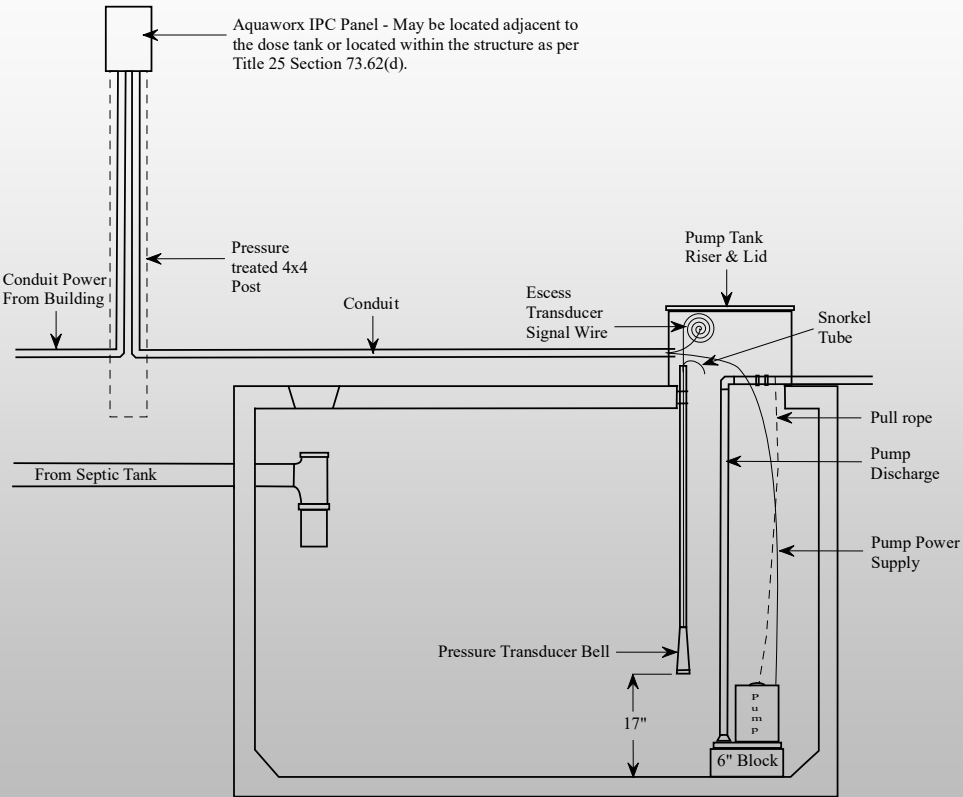
Copyright 2003, Zabel Industries International, Ltd. All rights reserved.

Product(s) covered by one or more U.S. and/or International patents. Other U.S. and International patents may be pending.

Call for a free ZABEL ZONE™ 1-800-221-5742 - Or Order Online: www.zabelzone.com

00303-000

Control Panel and Aquaworx Details



Notes:
 Locate the Transducer 17" off the bottom of the tank. Record this measurement and the "ZB" number, found on the Transducer, inside the control panel.

AQUAWORX IPC™ PANELS installation manual MAR-04



To download the complete manual visit
www.aquaworx.com

AQUAWORX™
by INFILTRATOR

AQUAWORX IPC PANEL INSTALLATION INSTRUCTIONS

The Aquaworx IPC (Intelligent Pump Control) Panel provides an innovative approach to pump control. Designed specifically for the onsite industry, the IPC Panel leverages simple pressure transducer technology for the enhancement of pump system performance, and ease of installation. Relying on an embedded microprocessor in the pump controller and a floatless pressure transducer in the pump chamber, the IPC Panel monitors liquid levels, controls pumping time intervals, and logs events in real time. Using the Mountable and Removable Controller (MARC) as the user interface, the IPC Panel offers a cost-effective solution with expanded capability.

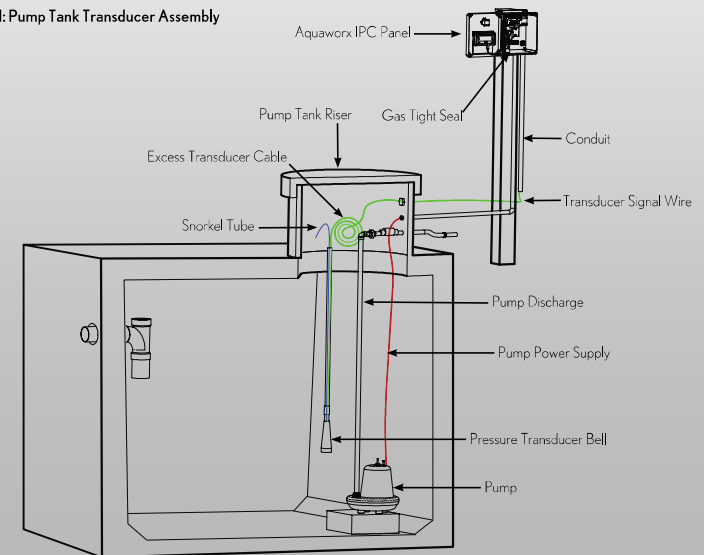
Aquaworx offers three models of the IPC Panel; Simplex, Duplex, and Sand Filter to meet a variety of system design requirements. The Simplex Panel has the ability to time control a single pump, while the Duplex Panel can control two pumps in an alternating design with independent timing. The Sand Filter Panel has the ability to time control two individual pumps having independent level sensors, allowing for a design which will simultaneously time dose a treatment system and drainfield. All three IPC Panel models have the option of including a built-in MARC 4.

I. General

Unpack the Aquaworx IPC Panel and check for any visible damage both external and internal. Also verify that there are no cracks or damage to the pressure transducer bell. Note: You will need to identify the number on the pressure transducer bell as it is needed during the MARC 4 setup. Notify Aquaworx immediately at 1-877-278-2979 if any damage has occurred.

ALL INSTALLATIONS MUST BE COMPLETED IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL CODE.

Figure 1: Pump Tank Transducer Assembly



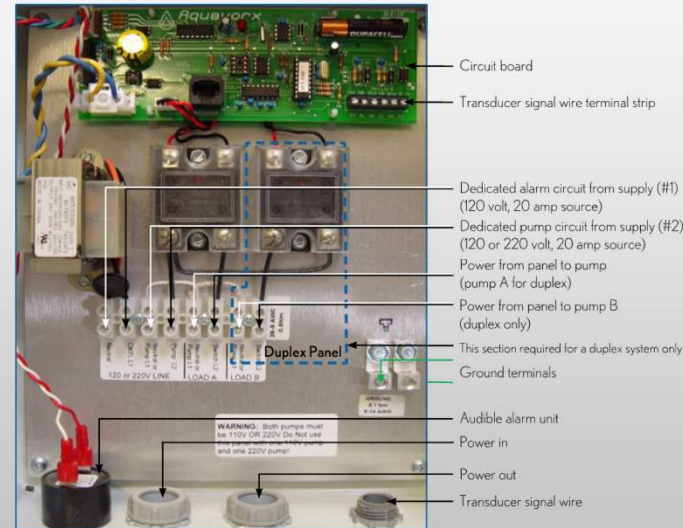
II. Installing the IPC Panel

Note: A qualified electrician must perform all wiring.

The following components and tools may be required for installation:

- Screwdriver (sm and med size flat head)
- Pipe cutter and tape measure
- Fish tape
- Wire strippers/cutters
- Electrical tester
- Drill
- 3/4" to 1" screws
- 1" PVC coupler
- Step bit
- Hole saw
- Electrical conduit
- Electrical tape
- Splice box for pump connection
- Waterproof wire connectors
- 1" PVC (for transducer handle, amount determined by tank depth (6' length typical)

Figure 2: IPC Panel Wiring Setup and Transducer 3-Wire Connection



1. Mount the IPC Panel to the wall or post. Position the IPC Panel so that the power supply enters the IPC Panel through the bottom approximately 1" to the right of the audible alarm unit.

2. On Simplex Panels drill two holes (3 holes for duplex) in the bottom of the enclosure spaced approximately 2" apart and in line with the audible alarm unit. When facing the panel, the order of conduit connections from left to right is shown below, as well as illustrated in **Figure 2**:

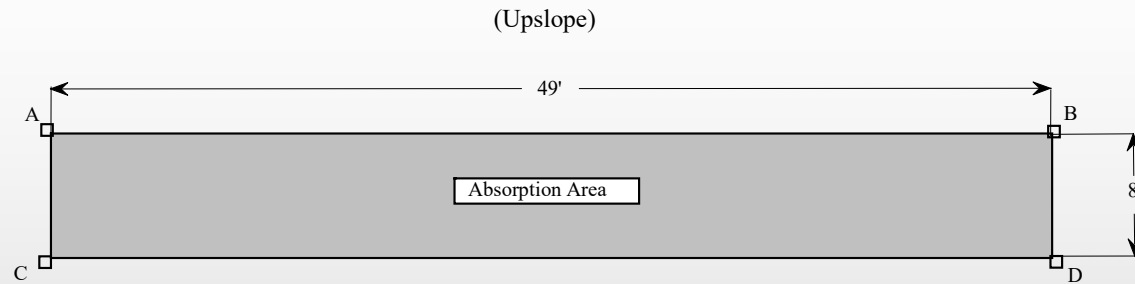
Power in - 2 dedicated 20 amp circuits from house to power the panel, 120V (1) and pump, 120V or 220V(2)

Power out - power supply from panel to pump

Transducer signal wire - signal transmission from panel to pump

NEMA 4X fittings must be installed in each field-drilled hole to retain the integrity of the enclosure's 4X rating.

LEVEL ABSORPTION AREA LAYOUT



1. Cut all vegetation close to the ground throughout the absorption area and the berm area. Bushes and trees shall be cut flush with the ground surfaces. Roots shall be left in place.
2. The proposed absorption area that is not obstructed by stumps or other obstacles shall be roughed or plowed parallel with the slope contour to a maximum of depth of 6", using a multiple share chisel plow or similar implement attached to light-weight equipment. ROTARY TILLING IS PROHIBITED.
3. Using a transit or laser level establish and drive a stake in the ground at "A". Location "B" shall be at the same elevation as stake "A". Place absorption area over perc holes as best possible.
4. Using "A" and "B" as reference points, place a stake in the ground at "D". (Adjust stake "C" location if necessary) Cross measure from A>D and B>C and square the rectangle.
5. Attach a string line from A>B making sure that the line is no less than 12" from the soil surface. This will establish the minimum sand fill elevation. More than 12" is acceptable if necessary.
6. Using a transit or laser level continue the same elevation as A & B to C & D. This will be the top of your level gravel bed elevation.



Innovative Environmental Products and Solutions Since 1970

To: ExpertSeptic, LLC
From: Eljen Corporation
Date: 5/20/2013
Re: Geotextile Sand Filter Revised Listing

Please be advised that the Pennsylvania Department of Environmental Protection has revised the Eljen's Geotextile Sand Filter product Listing. As a result of this revision, the 4 inch distribution pipe may utilize perforations at the 6:00 o'clock position with pressure distribution. Additionally, a Maintenance Agreement is no longer required for the Geotextile Sand Filter system rather; the Eljen Geotextile Sand Filter system should be maintained per the manufacturer's Septic System Owner's Manual at a frequency specified by Eljen Corp.

Please be advised that Eljen Corp. recommends that the maintenance frequency for Geotextile Sand Filter systems be equal to the maintenance frequency specified by the local agency for Elevated Sand mounds.

We would encourage you to inform homeowner's, clients and customers to review the revised details in the PADEP Geotextile Sand Filter listing.

The GSF septic system manual is provided for each customer/ homeowner per the listing. The Septic System Owner's Manual is also available on our website: www.eljen.com.





Managing Your On-Lot Septic System

About 25 percent of all housing units in Pennsylvania use on-lot septic systems for the treatment and disposal of household wastewater.

ARTICLES | UPDATED: SEPTEMBER 21, 2016



Homeowners should make a map showing the location of the components on their on-lot septic system. Photo: G. Hurd, Penn State Extension

An important factor in keeping on-lot septic systems operating properly and preventing system failure is homeowner maintenance. By properly managing your on-lot septic system, you are protecting your own drinking water and the health of your family. You are also protecting water resources in your community. Another important reason for

properly maintaining your septic system is money.

Malfunctioning septic systems are expensive to repair or replace. Improper maintenance by a property owner may cause septic system failure. It is far less expensive to maintain your on-lot septic system by having it inspected and pumped on a regular basis than it is to replace a malfunctioning system.

It's important to know the basic components of the system and how to keep them functioning properly. A few common sense precautions may help keep your septic system working well for a long period of time. Most on-lot septic systems have two basic parts. The first part is a septic tank that is designed to intercept, hold and partially treat solids contained in wastewater coming from the home. The second part is a soil absorption area such as a drainfield or a sandmound to facilitate treatment and dispersal of clarified wastewater after it leaves the septic tank.

The septic tank is a large container into which the wastewater flows. When you flush a toilet, wash a load of clothes or take a shower, the waste water flows into the septic tank. Bacteria in the septic tank help break down solids in the wastewater into liquids and gases. Not all solids break down, however. Those that don't will accumulate at the bottom of the septic tank and form sludge. The sludge must be pumped out periodically to keep the system functioning properly.

Liquids without the solids flow out of the septic tank to a distribution box or dosing tank, which is then directed to the soil absorption field. This effluent exits through pipes into a layer of gravel and then percolates through the soil for additional treatment to remove harmful, disease causing microorganisms, organics and nutrients. Bacteria in the soil neutralize many of the contaminants in the wastewater.

In some areas unsuitable for conventional septic tank-absorption field systems, sand mound systems have been installed. The major difference between the two systems is the use of a pumping station to deliver the wastewater at intervals to the mound absorption field.

Learn the location of your septic tank and drainfield. Have on hand a sketch or map showing the tank and field in relation to your house and private water well. Have the septic tank inspected regularly by a professional and pumped out when needed. Keep a record of inspection, pumping and other maintenance.

Water conservation is probably the most effective way to prevent septic system failures. Reducing water use in the home reduces the flow through the system, allowing more time for solids to settle and digest in the septic. It also

decreases the chances of overloading the soil absorption field. In addition, divert roof drains and surface water from driveways and hillsides away from the drainfield.

Be careful of what you dispose of in the toilet or in your drains. Never put plastics or any other nondegradable items into your septic tank. Household chemicals can destroy the bacteria in your septic tank. Garbage disposals can add unnecessary solids and grease to your system.

Do not plant trees or shrubbery in the drainfield because roots may wrap around the distribution lines and even puncture pipes. Do not cover this area with a hard surface, such as concrete, that would prevent soil contact with air. Do not allow heavy equipment to run over the drainfield and compact soil or damage distribution lines. Do not enter a septic tank. The gases contained in the tank can kill you.

Do not make or allow major repairs to your septic system without obtaining the required Pennsylvania Department of Environmental Protection permits. For information on regulations or required permits, contact your Local Sewage Enforcement Officer through your municipality.

Remember, homeowner maintenance is important! Take time to educate everyone in your household about the importance of practicing good on-lot septic system management habits.

Additional information and factsheets are available at the Penn State Extension website.

**Table 1
 Hydraulic Linear Loading Rate Table**

| Soil Characteristics | | | | Hydraulic Liner Loading Rate, gal/ft/d | | | | | |
|----------------------|-----------|---------|---|---|-------|-----------------------------|-------|-----------------------------|-------|
| | | | | Slope | | | | | |
| | | | | Infiltration Loading Rate, gal/ft ² /d | | 0-4% | | 5-9% | |
| Texture | Structure | | Infiltration Loading Rate, gal/ft ² /d | Infiltration Distance, Inch | | Infiltration Distance, Inch | | Infiltration Distance, Inch | |
| | Shape | Grade | | 10-12 | 12-20 | 10-12 | 12-20 | 10-12 | 12-20 |
| COS, S, LCOS, LS | -- | 0SG | 1.6 | 4.0 | 5.0 | 5.0 | 6.0 | 6.0 | 7.0 |
| FS, VFS, LFS, LVFS | -- | 0SG | 1.0 | 3.5 | 4.5 | 4.0 | 5.0 | 5.0 | 6.0 |
| CSL, SL | -- | 0M | 0.6 | 3.0 | 3.5 | 3.6 | 4.1 | 5.0 | 6.0 |
| | PL | 1 | 0.5 | 3.0 | 3.5 | 3.6 | 4.1 | 4.0 | 5.0 |
| | | 2, 3 | | | | | | | |
| | PR/BK /GR | 1 | 0.7 | 3.5 | 4.5 | 4.0 | 5.0 | 5.0 | 6.0 |
| 2, 3 | | 1.0 | 3.5 | 4.5 | 4.0 | 5.0 | 5.0 | 6.0 | |
| FSL, VFSL | -- | 0M | 0.5 | 2.0 | 2.3 | 2.4 | 2.7 | 2.7 | 3.2 |
| | PL | 1, 2, 3 | | | | | | | |
| | | 1 | 0.6 | 3.0 | 3.5 | 3.3 | 3.8 | 3.6 | 4.1 |
| | PR/BK /GR | 2, 3 | 0.8 | 3.3 | 3.8 | 3.6 | 4.1 | 3.9 | 4.4 |
| -- | | 0M | 0.5 | 2.0 | 2.3 | 2.4 | 2.7 | 2.7 | 3.2 |
| L | PL | 1, 2, 3 | | | | | | | |
| | | 1 | 0.6 | 3.0 | 3.5 | 3.3 | 3.8 | 3.6 | 4.1 |
| | PR/BK /GR | 2, 3 | 0.8 | 3.3 | 3.8 | 3.6 | 4.1 | 3.9 | 4.4 |
| | | -- | 0M | 0.5 | 2.0 | 2.3 | 2.4 | 2.7 | 2.7 |
| SIL | -- | 0M | 0.2 | 2.0 | 2.5 | 2.2 | 2.7 | 2.4 | 2.9 |
| | PL | 1, 2, 3 | | | | | | | |
| | | 1 | 0.6 | 2.4 | 2.7 | 2.7 | 3.0 | 3.0 | 3.5 |
| | PR/BK /GR | 2, 3 | 0.8 | 2.7 | 3.0 | 3.0 | 3.5 | 3.3 | 3.8 |
| SCL, CL, SICL | | -- | 0M | | | | | | |
| | PL | 1, 2, 3 | | | | | | | |
| | | 1 | 0.3 | 2.0 | 2.5 | 2.2 | 2.7 | 2.4 | 2.9 |
| | PR/BK /GR | 2, 3 | 0.6 | 2.4 | 2.9 | 2.7 | 3.0 | 3.0 | 3.5 |
| SC, C, SIC | | -- | 0M | | | | | | |
| | PL | 1, 2, 3 | | | | | | | |
| | | 1 | | | | | | | |
| | PR/BK /GR | 2, 3 | 0.3 | 2.0 | 2.5 | 2.2 | 2.7 | 2.4 | 2.9 |

Adapted from Tyler, 2000.
 Width of Infiltration Field = Hydraulic Linear Loading Rate divided by Infiltration Hydraulic Loading Rate
 Length of Infiltration Field = Wastewater Volume divided by Hydraulic Linear Loading Rate



ANY COMMENTS OR QUESTIONS?

- LET'S TAKE A QUICK LOOK AT ANOTHER
- 

ONE EXAMPLE

Eljen GSF
SEPTIC SYSTEM DESIGN
PennsylvaniaSeptic.com
814-641-1515

Cover page can be a huge help

Type of system

Designer / contact info

System is For
Mike Weyandt
1760 High Ridge Circle
State College, PA 16803

Property owner info

Property is located at 1501 Beaver Road, Julian, PA

Physical address

HUSTON TOWNSHIP, CENTRE COUNTY, PA

Township / County

SEO – Larron Horner
166 Cooper Street
Spring Mills, PA 16875
814-422-7688

SEO contact info

*Please note – slope is greater than 12% and perc rate is over 30 min / inch
Per DEP regs this site does not qualify for a steep slope sand mound*

PLEASE NOTE ?

Disclaimer:

this on-lot septic system design is intended to comply with the standards found in pa code title 25, chapter 73
this design is based on information provided by the property owners and others working for them
the designer provides no guarantee or warranty regarding proper functioning of the system
factors beyond the control of the designer are many and include (but are not limited to) the following
site evaluation, soil profile analysis, isolation distance verification, system construction inspections performed by
local agency's sewage enforcement officer or a soil scientist
potential disturbance of the test site, improper system installation and construction practices, improper system
maintenance or improper use by the system owner etc
the designer disclaims any warranty or guarantee either expressed or implied arising from this design

Disclaimer(s)

Pa 811 call before your dig



things everyone* needs to be aware of:

**property owner, homebuilder, installer and anyone else involved in the process!*

*Your brother-in-law may mean well but its unlikely he's installed an Eljen GSF system before!
same goes for your Uncle Ted, yes the walk out basement is a great idea but that may not line up with the
information that was provided back when this design was completed!*

*Be aware that changes to your house plans, landscaping, driveway, well placement etc
can create changes to your septic design layout!*

*Eljen GSF systems are not just a “normal” septic system!
they are used on sites with marginal (poor) soils and / or greater slope
they are not the system your grandparents installed in 1973!*

**Eljen GSF systems require Type A sand (ASTM C-33)
not limestone dust, repeat not limestone dust**

*They are going to cost more than a “normal” system!
typically a complete installation will be about the same as an elevated sand mound (they can be less!)
they will be more expensive than an traditional in – ground system (but you didn't qualify for that!)*

Proper installation is a must and is the key for long term success of any system!

Eljen GSF systems have been around since the mid-80's, they are slightly different than a sand mound please use an experienced installer or make sure installation oversight is being provided by those with the proper training and knowledge

do not disturb the site prior to installation !

can't stress enough that the absorption area can not be disturbed !

flag it, tape it off, fence around it... do something to keep folks / equipment off it!

please don't assume that folks wouldn't drive thru it !!!

tanks need to be watertight!

groundwater getting into tanks is not a good idea for any system and it really doesn't work with a timed dosed systems! Tanks, inlets, risers and lids need to be sealed properly!

System maintenance is a IMPORTANT

Effluent filter and regular tank pumping are GOOD things

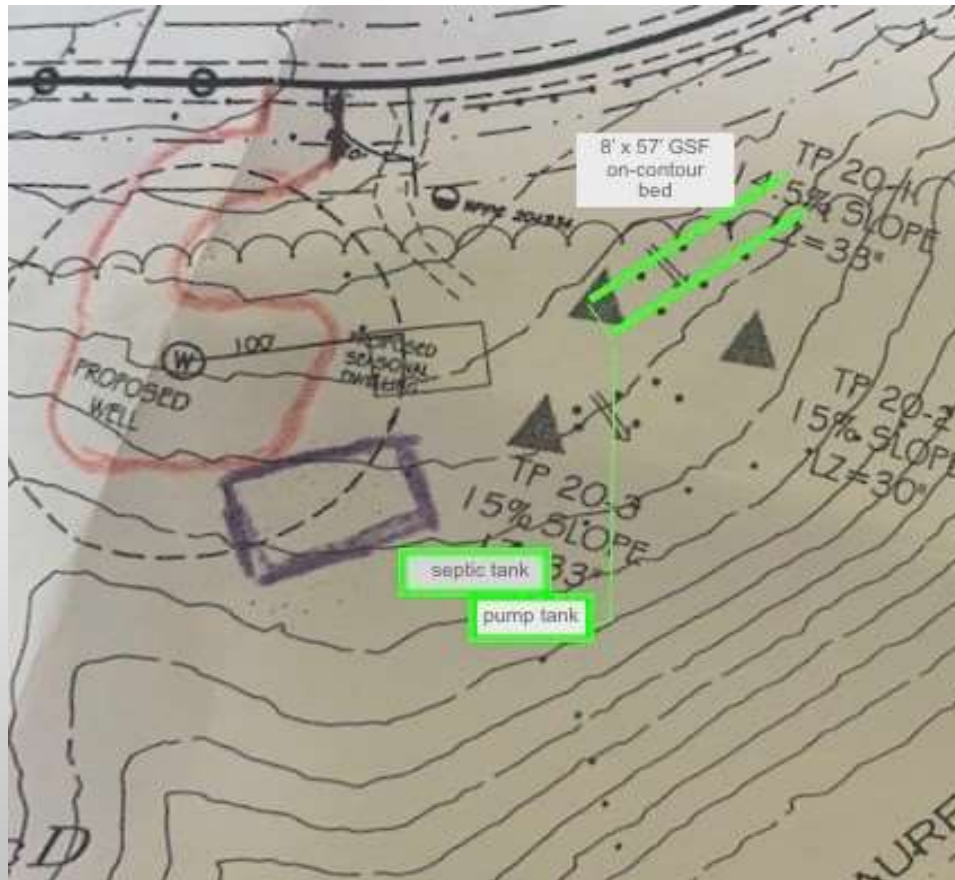
the next few pages of this design are **EXAMPLES**
they are meant to provide guidance and an overview of the system
they may not represent **EXACTLY** system layout or tank sizing
they are not step by step instructions! they are EXAMPLES ONLY!
specific system layout and tank sizing will be given on the final few pages

CALL BEFORE YOU DIG!

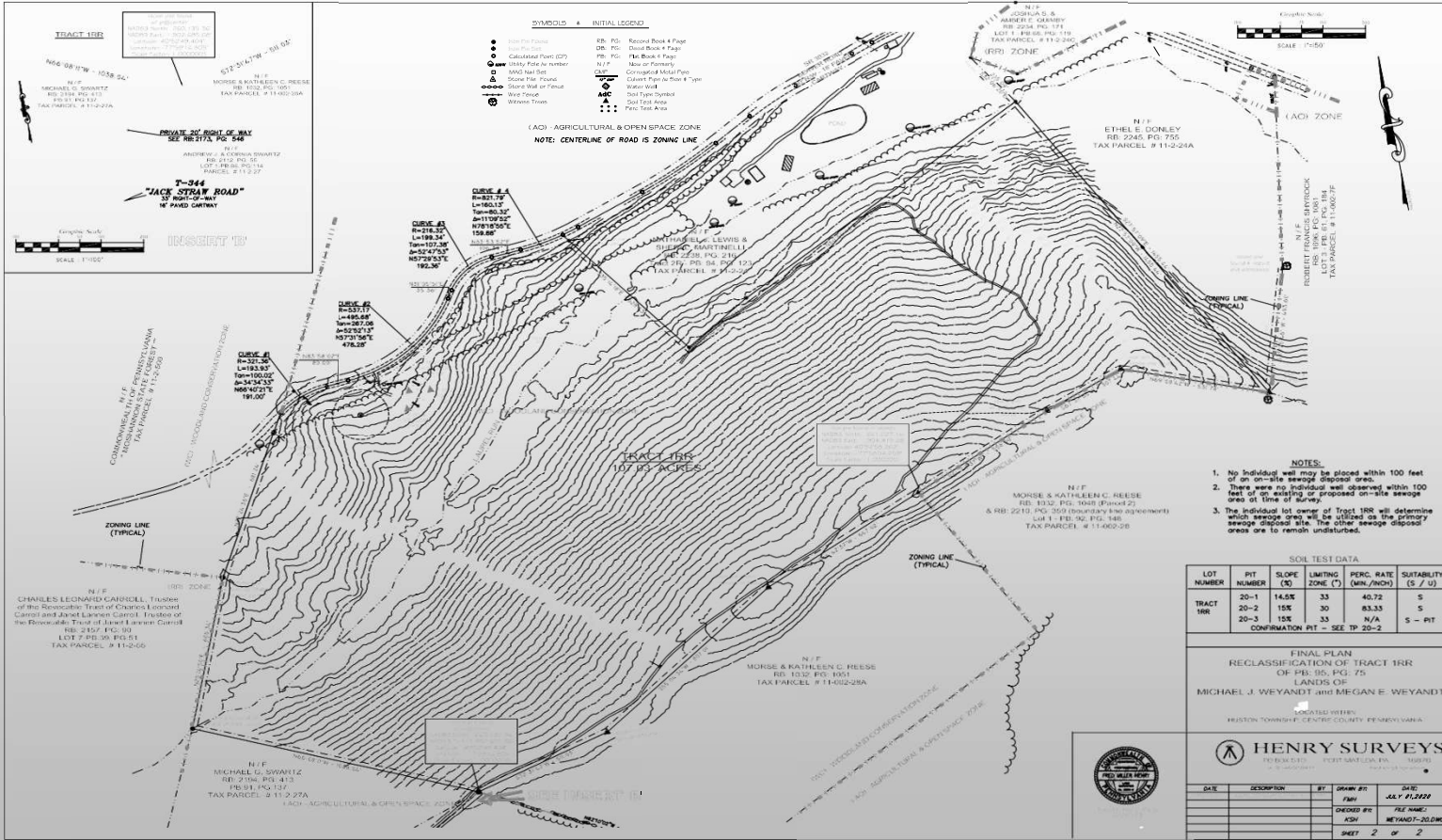
PENNSYLVANIA LAW REQUIRES
3 WORKING DAYS NOTICE FOR
CONSTRUCTION PHASE AND 10 WORKING
DAYS IN DESIGN STAGE - STOP CALL



PA 1 CALL
SYSTEM, INC.
1-800-242-1776



location of dwellings and tanks are approximate
pump sizing calculations have been made to allow for some
in field adjustments for tank placement



TRACT IRR
 107.85 ACRES
 N/F MICHAEL G. SWARTZ
 RB: 2106, PG: 413
 LOT 1, PRE-95, PG: 119
 TAX PARCEL # 11-2-27A

N/F MORSE & KATHLEEN C. REESE
 RB: 1332, PG: 106
 TAX PARCEL # 11-2-26A

N/F ANDREW J. GIBBONS SWARTZ
 RB: 2112, PG: 38
 LOT 1, PRE-95, PG: 114
 TAX PARCEL # 11-2-27

T-344
"JACK STRAY" ROAD
 1/2 PAVED DRIVEWAY

Graphic Scale
 1" = 100'

DISCREPANCY

SYMBOLS - INITIAL LEGEND

- Lot Foot Print
- Lot Foot Print
- Calculated Point (CP)
- Utility Pole or Marker
- MWD Nail Set
- Stone Wall or Fence
- Wet Trench
- Wetstone Trench
- RB: PG: Record Book # Page
- DR: PG: Record Book # Page
- FB: PG: File Book # Page
- N/F: Name or Name(s)
- CG: PG: Conventional Metal Pipe
- CG: PG: Culvert Pipe w/ Box "E" type
- W: Water Well
- : Soil Type Symbol
- : Dred Tail Area
- : Paved Tail Area

(AO) - AGRICULTURAL & OPEN SPACE ZONE
 NOTE: CENTERLINE OF ROAD IS ZONING LINE

- NOTES:**
- No individual well may be placed within 100 feet of an on-site sewage disposal area.
 - There are no individual well observed within 100 feet of an existing or proposed on-site sewage area or line of survey.
 - The individual lot owner of Tract IRR will determine which sewage area will be utilized as the primary sewage disposal site. The other sewage disposal areas are to remain undisturbed.

SOIL TEST DATA

| LOT NUMBER | PIT NUMBER | SLOPE (%) | LIMITING ZONE (') | PERC. RATE (MIN./INCH) | SUITABILITY (S / U) |
|------------|------------|-----------|-------------------|------------------------|---------------------|
| TRACT IRR | 20-1 | 14.6% | 33 | 40.72 | S |
| | 20-2 | 15% | 30 | 83.33 | S |
| | 20-3 | 15% | 33 | N/A | S - PIT |

CONFIRMATION PIT - SEE TP 20-2

FINAL PLAN
RECLASSIFICATION OF TRACT IRR
 OF PG: 95, PG: 75
LANDS OF
MICHAEL J. WEYANDT and MEGAN E. WEYANDT

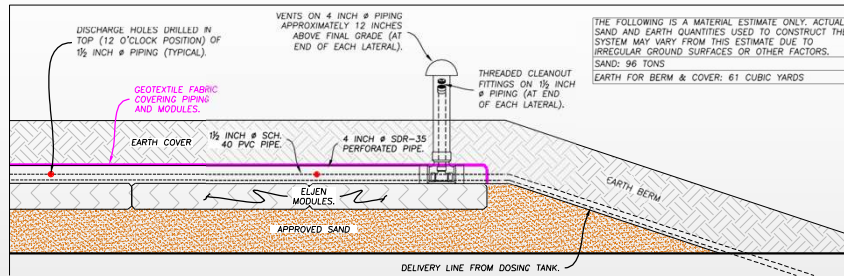
PREPARED BY:
 HENRY SURVEYS, INC.
 HUNTON TOWNSHIP, CENTRE COUNTY, PENNSYLVANIA



HENRY SURVEYS
 REGISTERED PROFESSIONAL SURVEYOR, INC.
 1000 W. MARKET STREET, SUITE 100
 HUNTON, PENNSYLVANIA 16832

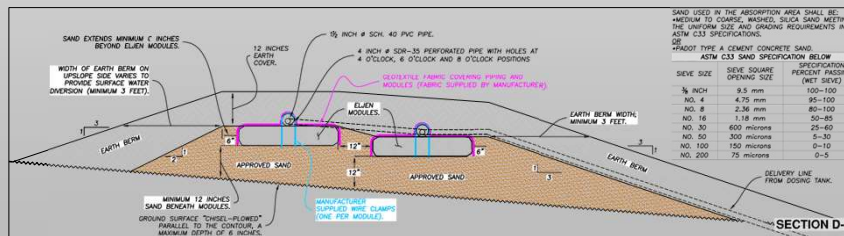
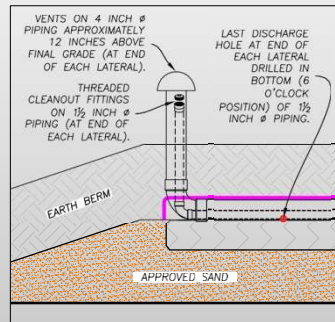
| DATE | DESCRIPTION | BY | DRAWN BY | DATE |
|------|-------------|----|----------|----------------|
| | PLAN | | | JULY 11, 2020 |
| | CHECKED BY: | | | FILE NAME: |
| | ASD | | | WEYANDT-2019MS |
| | SHEET | 2 | OF | 2 |

END AND SIDE VIEW OF BED (EXAMPLE ONLY)

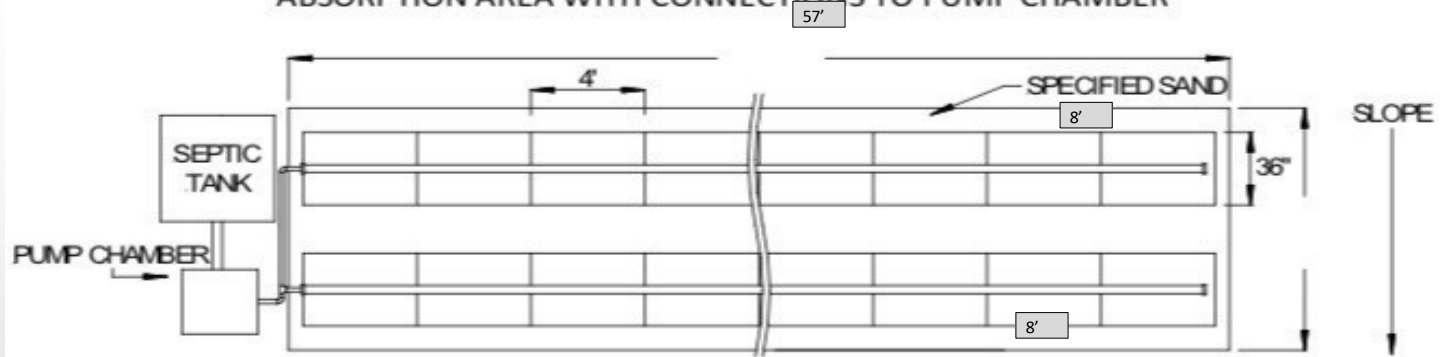


THE FOLLOWING IS A MATERIAL ESTIMATE ONLY. ACTUAL SAND AND EARTH QUANTITIES USED TO CONSTRUCT THE SYSTEM MAY VARY FROM THIS ESTIMATE DUE TO IRREGULAR GROUND SURFACES OR OTHER FACTORS.

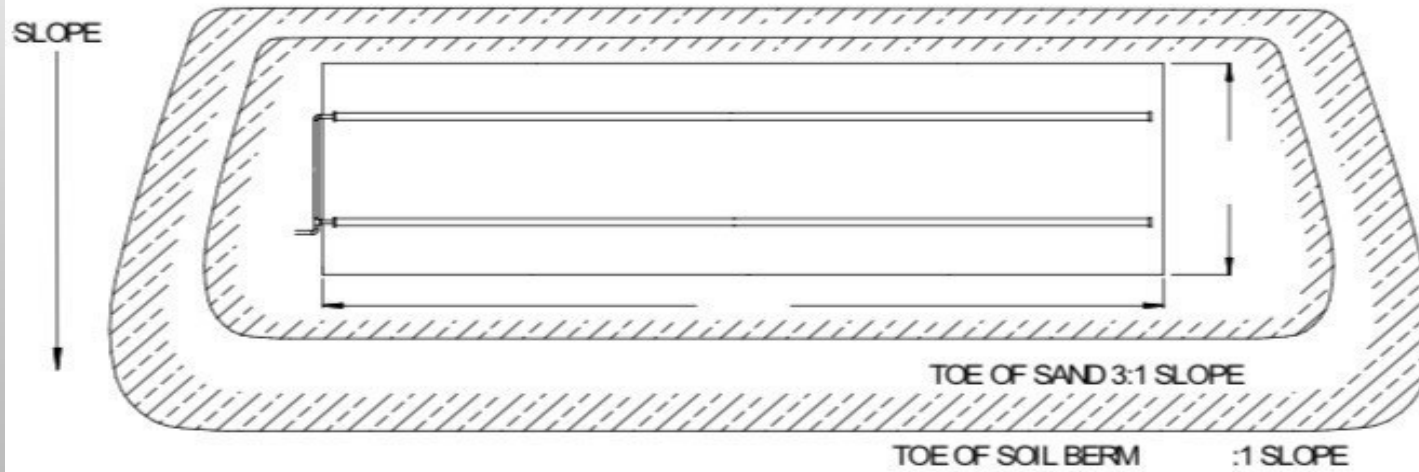
SAND: 96 TONS
EARTH FOR BERM & COVER: 61 CUBIC YARDS



ABSORPTION AREA WITH CONNECTIONS TO PUMP CHAMBER



PLAN VIEW

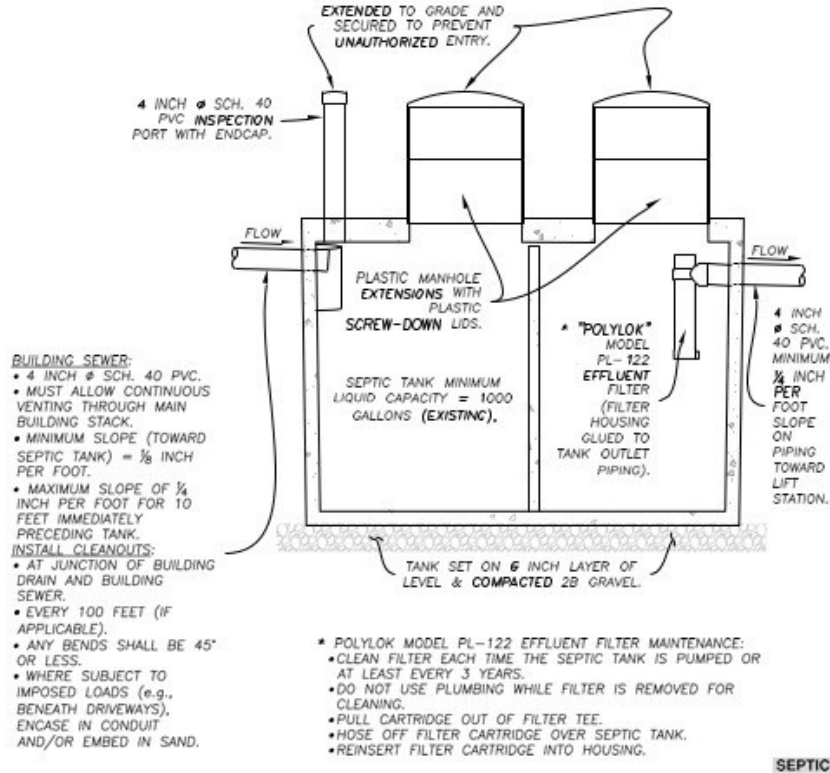


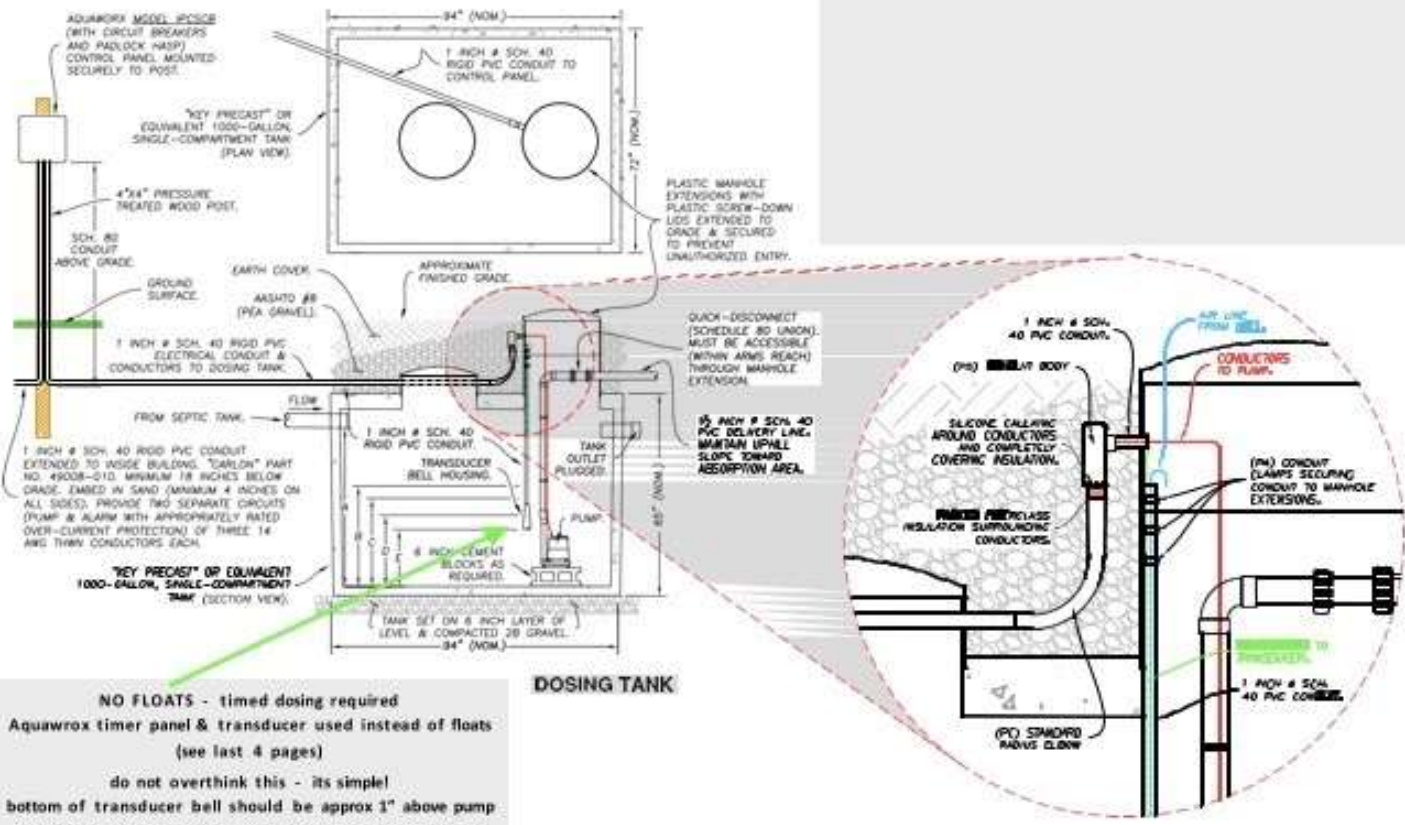
CROSS SECTION VIEW

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 they are meant to provide guidance and an overview of the system
 they may not represent **EXACTLY** system layout or tank sizing
they are EXAMPLES ONLY!

specific system layout and tank sizing will be given on the final few pages

- THIS SKETCH DEPICTS MINIMUM STANDARDS FOR SEPTIC TANKS.
- THE SEPTIC TANK MINIMUM LIQUID CAPACITY SHALL BE ACHIEVED USING A MULTIPLE COMPARTMENT TANK OR MULTIPLE TANKS CONNECTED IN SERIES.
- TANK CONSTRUCTION SHALL MEET THE STANDARDS OF PA. CODE, TITLE 25, CHAPTER 73(73.31b).
- ALL JOINTS BETWEEN LIDS & MANHOLE EXTENSIONS; INDIVIDUAL MANHOLE EXTENSION SECTIONS AND JOINTS WHERE PIPES ENTER OR EXIT TANK(S), SHALL BE WATERTIGHT MECHANICAL SEALS OR SEALS MADE WITH APPROPRIATE SEALANT. (USE OF PORTLAND CEMENT GROUTING IS NOT PERMITTED). ALL SYSTEM PIPING & FITTINGS SHALL BE WATERTIGHT.





DOSING TANK

NO FLOATS - timed dosing required
 Aquarox timer panel & transducer used instead of floats
 (see last 4 pages)

do not overthink this - its simple
 bottom of transducer bell should be approx 1" above pump
 panel to be programed by manufactures rep or trained
 installer / service provider

THIS ON-LOT SEWAGE SYSTEM DESIGN IS INTENDED TO COMPLY WITH THE STANDARDS AS SET FORTH IN PA. CODE, TITLE 25, CHAPTER 73, RELATING TO STANDARDS FOR SEWAGE DISPOSAL FACILITIES, INCLUDING REFERENCES TO "ALTERNATE" SEWAGE SYSTEMS. THIS DESIGN IS BASED ON INFORMATION PROVIDED BY THE PROPERTY OWNER (OR OTHERS ACTING ON THE PROPERTY OWNER'S BEHALF), AND/OR IN-FIELD INFORMATION COLLECTED BY THE DESIGNER. THE DESIGNER MAKES NO WARRANTY OR GUARANTEE REGARDING THE PROPER FUNCTIONING OF THE SYSTEM FOR ANY PERIOD OF TIME IN THE FUTURE. NUMEROUS FACTORS WHICH ARE BEYOND THE CONTROL OF THE DESIGNER, INCLUDING, BUT NOT LIMITED TO THE FOLLOWING: [SITE EVALUATION (SOIL PROFILE ANALYSIS, ISOLATION DISTANCE VERIFICATION, SYSTEM CONSTRUCTION INSPECTIONS, ETC.) PERFORMED BY THE LOCAL AGENCY'S SEWAGE ENFORCEMENT OFFICER OR A SOIL SCIENTIST, POTENTIAL SUBSEQUENT DISTURBANCE OF THE TEST SITE, IMPROPER SYSTEM INSTALLATION & CONSTRUCTION PROCEDURES, IMPROPER SYSTEM MAINTENANCE AND IMPROPER USE OF THE SYSTEM BY THE SYSTEM OWNER OR OTHERS], PROHIBIT THE DESIGNER FROM PROVIDING SUCH WARRANTIES OR GUARANTEES, AND THE DESIGNER DISCLAIMS ANY WARRANTY OR GUARANTEE, EITHER EXPRESSED OR IMPLIED, ARISING FROM THIS DESIGN.

CONSTRUCTION NOTES:

1. SOIL MOISTURE LEVELS DURING CONSTRUCTION OF THE ABSORPTION AREA SHALL BE SUCH THAT A SAMPLE OF NATURAL MINERAL SOIL TAKEN FROM THE LEVEL OF THE PROPOSED INSTALLATION WILL CRUMBLE IF COMPRESSED INTO A BALL.
2. AT ALL TIMES, BACKHOES, DELIVERY TRUCKS, AND SIMILAR HEAVY EQUIPMENT SHALL BE KEPT OFF OF THE PROPOSED ABSORPTION AREA, INCLUDING THE DOWNSLOPE AREA, TO PREVENT UNDUE COMPACTION OF THE SOIL.
3. CARE SHALL BE EXERCISED DURING CONSTRUCTION TO PREVENT UNDUE COMPACTION AND DAMAGE TO THE ABSORPTION AREA AND DOWNSLOPE AREA.
4. VEGETATION SHALL BE CUT CLOSE TO THE GROUND THROUGHOUT THE AREA TO BE UTILIZED FOR THE ABSORPTION AREA AND BERM. BUSHES AND TREES SHALL BE CUT FLUSH WITH THE GROUND SURFACE; ROOTS SHALL BE LEFT IN PLACE. CUT VEGETATION OR ORGANIC LITTER SHALL BE RAKED AND REMOVED FROM THE ABSORPTION AND BERM AREAS.
5. THE PROPOSED ABSORPTION AREA NOT OBSTRUCTED BY STUMPS OR OTHER OBSTACLES SHALL BE ROUGHED OR PLOWED PARALLEL WITH THE CONTOUR TO A MAXIMUM DEPTH OF 6 INCHES, USING A CHISEL PLOW OR SIMILAR IMPLEMENT ATTACHED TO LIGHTWEIGHT EQUIPMENT. ROTARY TILLING IS PROHIBITED.
6. IMMEDIATELY AFTER PLOWING, SAND SHALL BE PLACED OVER THE EXPOSED PLOWED SURFACE, USING LIGHTWEIGHT EQUIPMENT AND WORKING FROM THE UPSLOPE SIDE, PLACE SPECIFIED SAND IN TWO 6 INCH LIFTS, COMPACT EACH LIFT AT A TIME. THE COMPACTED HEIGHT BENEATH THE GSF MODULES MUST BE LEVEL AND AT A MINIMUM DEPTH OF 12 INCHES. A HAND TAMPING TOOL OR VIBRATING COMPACTOR ARE BOTH ACCEPTABLE.
7. PLACE THE GSF MODULES END TO END ON TOP OF THE SAND ALONG THEIR 4 FOOT LENGTH, PAINTED STRIPE FACING UP.
8. CENTER 4" SDR-35 PIPING ON MODULES WITH ORIFICES AT THE 4, 6 AND 8 O'CLOCK POSITIONS. SECURE THE 4" PIPING TO THE MODULES USING MANUFACTURER SUPPLIED WIRE CLAMPS (ONE CLAMP PER MODULE).
9. INSERT 1/2" PRESSURE PIPING INTO THE 4" PIPING. DISCHARGE HOLES SHALL BE DRILLED IN THE 1/2" PIPING AS FOLLOWS:
 - 9.1. THE LAST HOLE AT THE TERMINAL END OF EACH LATERAL IS DRILLED AND ORIENTED TO THE 6 O'CLOCK POSITION;
 - 9.2. ALL OTHER DISCHARGE HOLES ARE DRILLED AND ORIENTED TO THE 12 O'CLOCK POSITION.
10. SPREAD ELJEN GEOTEXTILE FABRIC LENGTHWISE OVER THE PIPE AND DRAPE OVER THE SIDES OF THE GSF MODULES. SECURE IN PLACE WITH SAND ALONG THE SIDES OF THE MODULES.
11. THE MOUND SHALL BE SURROUNDED BY A BERM CONSISTING OF MINERAL SOIL CONTAINING LESS THAN 20% COARSE FRAGMENTS WITH NO COARSE FRAGMENTS GREATER THAN FOUR INCHES IN DIAMETER, MORE STABLE AND LESS PERMEABLE THAN THE SAND, AND LIGHTLY COMPACTED DURING CONSTRUCTION TO CONTAIN AND PROTECT THE MOUND INTERIOR. THE WIDTH OF THIS BERM SHALL BE A MINIMUM OF 3 FEET AT THE TOP OF THE SAND (WITH NOTED EXCEPTIONS). UPON COMPLETION, THE OUTSIDE SLOPE OF THE BERM MAY BE NO GREATER THAN 33% AND SHALL BE SEDED TO ASSURE THE STABILITY OF THE BERM.
12. THE COVER OVER THE SAND SHALL BE A MINIMUM OF ONE FOOT OF SOIL SUITABLE FOR THE GROWTH OF VEGETATION.
13. NO EQUIPMENT MAY BE PERMITTED ON THE DOWNSLOPE SIDE OF THE MOUND WITH THE EXCEPTION OF LIGHTWEIGHT EQUIPMENT THAT IS USED TO FORM THE DOWNSLOPE BERM. TO THE GREATEST EXTENT POSSIBLE, MATERIALS SHALL BE PLACED FROM THE UPSLOPE SIDE OF THE MOUND.

MINIMUM HORIZONTAL ISOLATION DISTANCES (UNLESS MORE RESTRICTIVE BY LOCAL CODE OR ORDINANCE), MEASURED FROM TREATMENT TANK (SEPTIC TANK, DOSING TANK, ETC.)

- PROPERTY LINE, EASEMENT OR RIGHT-OF-WAY; 10 FEET
- OCCUPIED BUILDING, SWIMMING POOL OR DRIVEWAY; 10 FEET
- INDIVIDUAL WATER SUPPLY OR WATER SUPPLY SYSTEM SUCTION LINE; 50 FEET
- WATER SUPPLY LINE UNDER PRESSURE; 10 FEET
- STREAM, LAKE, POND OR OTHER SURFACE WATERS; 25 FEET
- CISTERN USED AS WATER SUPPLY; 25 FEET

MEASURED FROM THE PERIMETER OF THE AGGREGATE IN THE ABSORPTION AREA:

- PROPERTY LINE, EASEMENT OR RIGHT-OF-WAY; 10 FEET
- OCCUPIED BUILDING OR SWIMMING POOL; 10 FEET
- INDIVIDUAL WATER SUPPLY OR WATER SUPPLY SYSTEM SUCTION LINE; 100 FEET
- WATER SUPPLY LINE UNDER PRESSURE; 10 FEET
- STREAM, WATERCOURSE, LAKE, POND OR OTHER SURFACE WATERS; 50 FEET
- OTHER ACTIVE ON-LOT SYSTEM; 5 FEET
- SURFACE DRAINAGEWAY; 10 FEET
- MINE SUBSIDENCE AREA, MINE BORE HOLE OR SINK HOLE; 100 FEET
- ROCK OUTCROP OR IDENTIFIED SHALLOW PINNACLE; 10 FEET
- NATURAL OR MANMADE SLOPE GREATER THAN 25%; 10 FEET
- CISTERN USED AS A WATER SUPPLY; 25 FEET
- DETENTION BASIN, RETENTION BASIN OR STORMWATER SEEPAGE BED; 10 FEET

minimum isolation distances provided by PA DEP

if local codes or ordinances require them to be greater adhere to those

ALL ELECTRICAL WORK SHALL BE PERFORMED BY A QUALIFIED PERSON, BE INSPECTED IN ACCORDANCE WITH APPLICABLE CODE AND CONFORM TO NFPA 70, NATIONAL ELECTRICAL CODE (N.E.C.) (OR ADOPTED LOCAL CODES IF MORE STRINGENT THAN THE N.E.C.). PERTINENT SECTIONS OF THE N.E.C. INCLUDE, BUT ARE NOT NECESSARILY LIMITED TO THE FOLLOWING:

- ARTICLE 100 DEFINES "QUALIFIED PERSON" AS "ONE WHO HAS SKILLS AND KNOWLEDGE RELATED TO THE CONSTRUCTION AND OPERATION OF THE ELECTRICAL EQUIPMENT AND INSTALLATIONS AND HAS RECEIVED SAFETY TRAINING ON THE HAZARDS INVOLVED."
- 300.5 UNDERGROUND INSTALLATIONS;
- 300.5(A) (SEE CONDUIT INSTALLATION DEPTH SPECIFIED ON THIS DESIGN);
- 300.5(B) CABLES AND INSULATED CONDUCTORS INSTALLED IN ENCLOSURES OR RACEWAYS IN UNDERGROUND INSTALLATIONS SHALL BE LISTED FOR USE IN WET LOCATIONS;
- 300.5(C) UNDERGROUND CABLES INSTALLED UNDER A BUILDING SHALL BE IN A RACEWAY THAT IS EXTENDED BEYOND THE OUTSIDE WALLS OF THE BUILDING;
- 300.5(D)(1) DIRECT-BURIED CONDUCTORS AND ENCLOSURES EMERGING FROM GRADE SHALL BE PROTECTED BY ENCLOSURES OR RACEWAYS EXTENDING FROM THE MINIMUM COVER DISTANCE BELOW GRADE TO A POINT AT LEAST 8 FEET ABOVE FINISHED GRADE.
- 300.5(D)(2) CONDUCTORS ENTERING A BUILDING SHALL BE PROTECTED TO THE POINT OF ENTRANCE.
- 300.5(D)(4) WHERE THE ENCLOSURE OR RACEWAY IS SUBJECT TO PHYSICAL DAMAGE, THE CONDUCTORS SHALL BE INSTALLED IN SCHEDULE 80 RIGID NONMETALLIC CONDUIT.
- 110.14(B) CONDUCTORS SHALL BE SPLICED OR JOINED WITH SPLICING DEVICES IDENTIFIED FOR THE USE OR BY BRAZING, WELDING, OR SOLDERING WITH A FUSIBLE METAL OR ALLOY. SOLDERED SPLICES SHALL FIRST BE SPLICED OR JOINED SO AS TO BE MECHANICALLY AND ELECTRICALLY SECURE WITHOUT SOLDER AND THEN BE SOLDERED. ALL SPLICES AND JOINTS AND THE FREE ENDS OF CONDUCTORS SHALL BE COVERED WITH AN INSULATION EQUIVALENT TO THAT OF THE CONDUCTORS OR WITH AN INSULATING DEVICE IDENTIFIED FOR THE PURPOSE. WIRE CONNECTORS OR SPLICING MEANS INSTALLED ON CONDUCTORS FOR DIRECT BURIAL SHALL BE LISTED FOR SUCH USE.
- 300.5(F) (SEE SPECIFICATION FOR SAND BEDDING SURROUNDING CONDUIT ON THIS DESIGN).
- 300.5(G) CONDUITS OR RACEWAYS THROUGH WHICH MOISTURE MAY CONTACT LIVE PARTS SHALL BE SEALED OR PLUGGED AT EITHER OR BOTH ENDS.
- 300.5(H) A BUSHING, OR TERMINAL FITTING, WITH AN INTEGRAL BUSHED OPENING SHALL BE USED AT THE END OF A CONDUIT OR OTHER RACEWAY THAT TERMINATES UNDERGROUND WHERE THE CONDUCTORS OR CABLES EMERGE AS A DIRECT BURIAL WIRING METHOD. A SEAL INCORPORATING THE PHYSICAL PROTECTION CHARACTERISTICS OF A BUSHING SHALL BE PERMITTED TO BE USED IN LIEU OF A BUSHING.
- 300.5(I) ALL CONDUCTORS OF THE SAME CIRCUIT AND, WHERE USED, THE GROUNDED CONDUCTOR AND ALL EQUIPMENT GROUNDING CONDUCTORS SHALL BE INSTALLED IN THE SAME RACEWAY OR CABLE OR SHALL BE INSTALLED IN CLOSE PROXIMITY IN THE SAME TRENCH.
- 300.5(J) WHERE DIRECT-BURIED CONDUCTORS, RACEWAYS, OR CABLES ARE SUBJECT TO MOVEMENT BY SETTLEMENT OR FROST, DIRECT-BURIED CONDUCTORS, RACEWAYS, AND CABLES SHALL BE ARRANGED SO AS TO PREVENT DAMAGE TO THE ENCLOSED CONDUCTORS OR TO EQUIPMENT CONNECTED TO THE RACEWAYS.

MINIMUM MAINTENANCE STANDARDS

- A. THE MANUFACTURER'S REPRESENTATIVE MUST MEET WITH THE PROPERTY OWNER WITHIN ONE MONTH OF SYSTEM STARTUP AND/OR OCCUPANCY OF THE DWELLING AND WITH THE LOCAL AGENCY'S SED UPON REQUEST, TO EXPLAIN THE OPERATION AND MAINTENANCE OF THE SYSTEM AND PROVIDE WRITTEN INSTRUCTIONS TO THE PROPERTY OWNER THAT INCLUDES:
1. GSF SEPTIC SYSTEM OWNER'S MANUAL;
 2. HOMEOWNERS MANUAL SYSTEM CARE AND MAINTENANCE;
 3. INSTRUCTIONS ON THE OPERATION AND MAINTENANCE OF THE SYSTEM;
 4. THE LOCATIONS OF ALL PARTS OF THE SYSTEM;
 5. A STATEMENT REQUIRING THAT THE MANUFACTURER'S REPRESENTATIVE BE CONTACTED IF THE PUMP ALARM IS ACTIVATED;
 6. A COMMITMENT THAT THE MANUFACTURER'S SERVICE PROVIDER WILL INVESTIGATE AND TROUBLESHOOT SYSTEM PROBLEMS;
 7. CONTACT INFORMATION FOR THE MANUFACTURER, THE MANUFACTURERS' REPRESENTATIVES, AND MANUFACTURER'S SERVICE PROVIDER.
- B. WARRANTY: THE MANUFACTURER OF THE ELJEN GSF MUST PROVIDE A MINIMUM 2-YEAR WARRANTY ON ALL DEFECTS DUE TO MATERIALS OR WORKMANSHIP.

Materials Estimate

Manifold and Laterals (ABS or PVC schedule 40)

| | | | |
|--------|-----------------|----|-----------------------------|
| ft | 2.0 in dia pipe | 10 | 1. in pipe couplings |
| 112 ft | 1. in dia pipe | 1 | 1. x 2.0 x 1. standard tees |

Lateral Cleanouts (ABS or PVC schedule 40)

| | | | |
|----|--------------------------|---|-----------------------------|
| ft | 1. in dia pipe | 2 | 1. in dia cleanout fittings |
| 2 | 1. in dia threaded plugs | 2 | 1. in dia 1/2" elbows |

Distribution Pipes (SDR-35 or equivalent)

| | | | |
|--------|---------------------------|---|-----------------------------------|
| 112 ft | 1. in dia perforated pipe | 2 | 1. in dia 1/2" elbows |
| ft | 1. in dia solid pipe | 2 | 1. in dia mushroom type vent caps |
| 2 | 1. in dia end caps | 2 | 10 in tie wraps |

Delivery Line (ABS or PVC schedule 40)

| | | | |
|-------|-----------------------|---|--|
| 15 ft | 2.0 in dia pipe | 2 | 2.0 in dia 90° elbow (to exit dosing tank) |
| 1 | 2.0 in dia couplings | 1 | 2.0 in dia quick disconnect |
| 3 | 2.0 in dia 1/2" elbow | | |

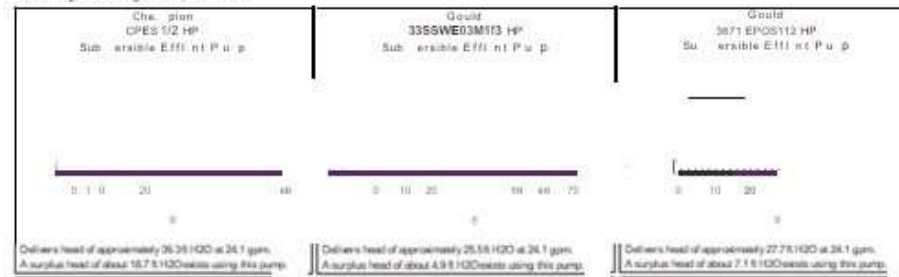
Geotextile Sand Filter

| | | | |
|----|-----------------------------|-----------------------------------|--|
| 28 | Ejen B-3 GSF modules | Geotextile fabric (Ejen supplied) | |
| 28 | Wire clamps (Ejen supplied) | | |

Discharge Area

1/4" AS 11C33 or Pa O type A Sand 118y x 13 Berming Material

Discharge Dosing Pump Curves



| | | | |
|--|-------------------------|---|---------------------------|
| Time of flow (total) 5.5805 | 26.2 gpm | Discharge accuracy | 200 min |
| Design flow rate | 21.0 sec | | |
| Discharge duration | | | |
| Discharge Lateral Flowrate Analysis | | | |
| Upper lateral hole size | 1.2 in | Lower lateral hole flowrate | 1.3 gpm |
| Upper lateral head | 3.00 ftH ₂ O | Lower lateral flow rate | 13.1 gpm |
| Upper lateral hole flowrate | 1.25 gpm | Lower lateral flowrate difference from Upper | 4.8% |
| Upper lateral flowrate | 12.50 gpm | Hole count | 20 |
| Lower lateral hole size | 1.2 in | Design flow rate | 26.2 gpm |
| Lower lateral head | 3.20 ftH ₂ O | | |
| Discharge Fitting Allowances | | | |
| Fitting | Qty | Effective Length | Quick disconnect |
| 90° Elbow (to exit dosing tank) | 2 | 3.35 | 1.35 |
| 45° Elbow | 3 | 2.50 | 1.35 |
| | | 7.74 | 5.01 |
| | | | 25.80 ft |
| Discharge Plumbing Friction Loss Calculations | | | |
| Design flow rate | 26.2 gpm | Total effective pipe length | 85.6 ft |
| Delivery line diameter | 2.0 in | Friction loss plastic pipe friction factor | 0.0120 ftH ₂ O |
| Delivery line cross-sectional area | 3.1 sq in | Total delivery line plumbing friction loss | 1.03 ftH ₂ O |
| Flat velocity | 2.7 ft/sec | Average delivery line friction (pipe & coupling only) | 0.014 ftH ₂ O |
| Delivery line length | 80.8 ft | Total manifold friction (w/ cross connection) | 0.01 ftH ₂ O |
| Discharge Dosing Pump Head Requirement | | | |
| Elevation difference dosing tank to bed | 16.0 ftH ₂ O | Delivery line plumbing friction loss | 1.03 ftH ₂ O |
| Elevation pump intake to top of dosing tank | 5.5 ftH ₂ O | Manifold plumbing friction loss | 0.01 ftH ₂ O |
| Required depth of sand | 1.0 ftH ₂ O | Required terminal head | 3.0 ftH ₂ O |

Design Improvements:

- Page numbering – Page 1 of X. This will make sure whoever is looking at the design knows they have the entire design copy
- Revision date and reason for revision
- Scaled plot plan with a North Arrow
- Staking out system and collecting proper elevations – How do you know you are on the property?
- Delegated agency's may require more detail. i.e. Bucks Co Dept of Health
- Detailed construction specs.
- Statement that reads "I am not liable for any mistakes" If getting paid you are responsible

Design Improvements:

- Consider tank placement to not interfere with pool, garage, near a future deck, etc.
- Also what about shallow rock? We should identify this upfront
- Having a signed written contract – limit your liability
- Use dimensions to identify between property lines and absorption area
- Providing dimensions for float settings
- Site Plan: Each pipe notation should be noted with size, type, and length so the contractor knows how much piping is needed.
- Day Light Drain
- Hydro / vacuum testing tanks?
- Using existing tanks ?

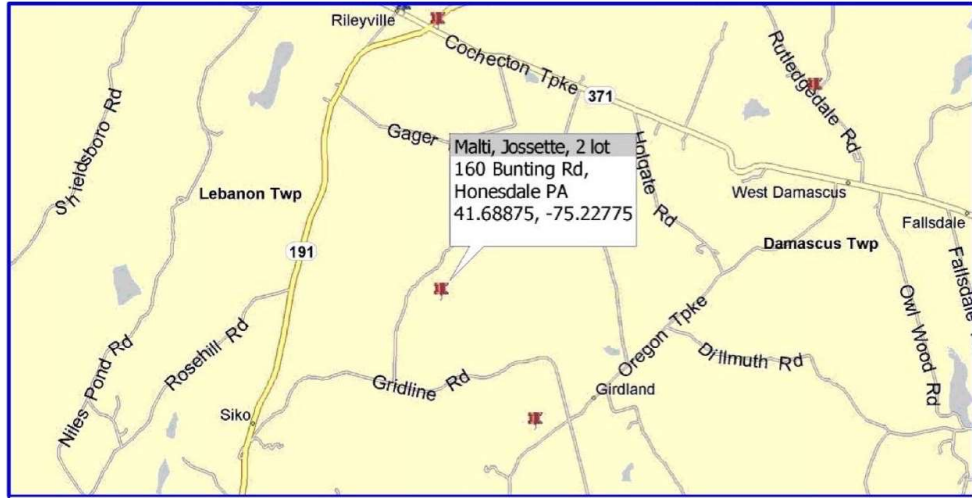
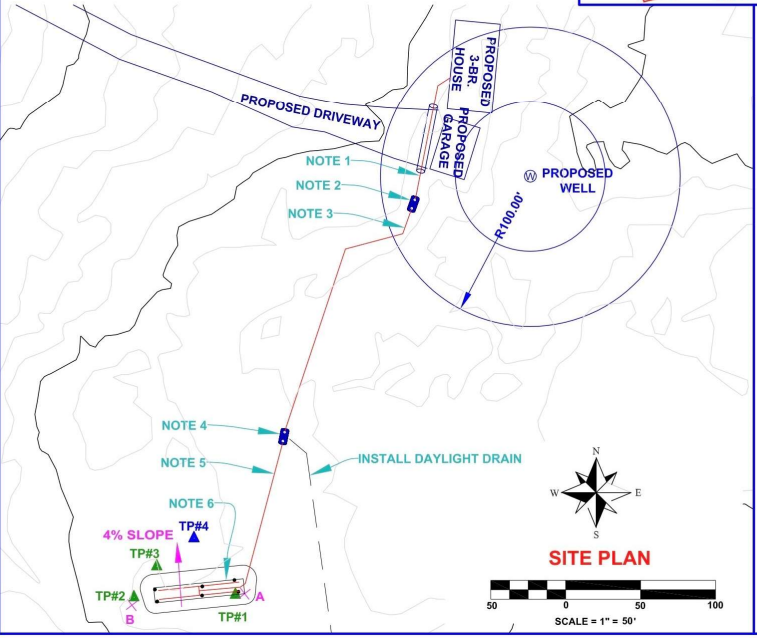
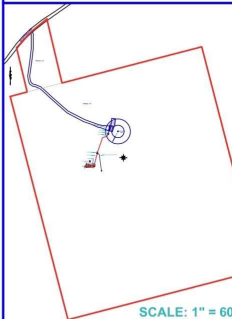
- NOTES:**
- APPROX. 90 L.F. OF 4 IN. DIAM. SCH. 40 PVC @ MIN. 1/4 IN./FT. FALL WITH MAX. 1/2 IN./FT. FALL IN FINAL 10 FT. INSTALL CLEAN-OUT DIRECTLY OUTSIDE OF BUILDING. SLEEVE UNDER DRIVEWAY USING LARGER PIPE FOR PROTECTION FROM TRAFFIC.
 - PROPOSED 1,000 GAL. 2-COMP. SEPTIC TANK. INSTALL POLYLOK MODEL # PL-122 (OR EQUAL) EFFLUENT FILTER AT OUTLET.
 - APPROX. 170 L.F. OF 4 IN. DIAM. SCH. 40 PVC @ 1/2 IN./FT. FALL.
 - PROPOSED 1,000 GAL. SINGLE COMP. PUMP TANK. USE GOULDS PUMP MODEL 3885 WE03M OR EQUAL AND SJE RHOMBUS DOUBLE FLOAT MASTER PUMP CONTROL FLOATS WITH TANK ALERT AB ALARM PANEL WITH FLOAT OR EQUAL.
 - APPROX. 135 L.F. OF 2 IN. DIAM. SCH. 48 PVC DELIVERY LINE. BACKSLOPED TO PUMP TANK TO ALLOW FOR DRAINING. INSTALL BENTONITE TRENCH PLUGS OR EQUAL AS NEEDED TO PREVENT GROUND WATER FOLLOWING PIPE BACK TO TANK.
 - 10 FT. X 60 FT. ELEVATED SAND MOUND BED.

CONTOUR LINES SHOWN ARE 2 FOOT LIDAR HILLSHADE DOWNLOADED FROM PASDA WEBSITE: <http://i146.186.163.133/imageryNavigator/>

SITE PLAN REFERENCE:
BOUNDARIES SHOWN IS DRAWN FROM A DEED DESCRIPTION DATED JUNE 2021 AND PLACED USING AERIAL IMAGING. STAKED ABSORPTION AREA LOCATED USING SUB-METER GPS EQUIPMENT.

STAKES:
A TO B - 75.0'


| TEST PIT DEPTH LOG FOR JOSSETTE MALTI | | | | | | | | | |
|--|-----------------|-----------|------------------|--------------------|------------|-----|-------|-----|-----|
| BUNTING ROAD, LEBANON TOWNSHIP, WAYNE COUNTY | | | | | | | | | |
| PIT NO. | SHT. REDOX (IN) | ROCK (IN) | SEEPS WATER (IN) | INSUFF. FINES (IN) | DATE | | | | |
| | | | | | | LSL | GREEN | BUN | RED |
| 1 | | > 35 | | | 05/07/2021 | | | | |
| 2 | | > 30 | | | 05/07/2021 | | | | |
| 3 | 25 | > 31 | | | 05/07/2121 | | | | |
| 4 | 12 | > 39 | 12 | | 05/07/2021 | | | | |



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| DATE | BY | REV. | REVISION DETAILS |
|------|----|------|------------------|
| | | | |

PA ACT 287 of 1974
As Amended by
ACT 187 of 1996
73 P.S. 176 et.seq.



Underground Utility Line Protection ACT

WHAT YOU DON'T KNOW CAN HURT YOU. PENNSYLVANIA ACT 187 (1996) REQUIRES NOTIFICATION BY EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN THE COMMONWEALTH.

EFFECTIVE DECEMBER 19, 1996

LEGEND


- EXISTING CONTOUR
- (W) - EXISTING WELL
- △ TP#1 - SOIL TEST PIT
- - IRON PIN
- ⊙ - IRON PIN FOUND
- ⊘ - UTILITY POLE

SEWAGE SYSTEM DESIGN, 400 GPD
PRESSURIZED ELEVATED SAND MOUND BED
PARCELS A & B, TMP #13-0-0214-0014.0002 & 13-0-0214-0004.0004

JOSSETTE MALTI
LEBANON TWP, WAYNE CO, PA

REVIEWED BY: _____ DATE: 10/12/2022

SCALE: AS NOTED SHEET 1 OF 1 DRAWING: RAR



SOIL SERVICES COMPANY

5804 ROUTE 87
FORKSVILLE, PA 18616
PHONE: 670-896-0055

WEB: www.SoilServicesCompany.com

REV.

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SEWAGE SYSTEM CONSTRUCTION AND MAINTENANCE SPECIFICATIONS FOR ELEVATED SAND MOUND BED

REGULATIONS: THE INSTALLATION OF THIS DESIGN SHALL BE IN CONFORMANCE WITH PENNSYLVANIA REGULATIONS, CHAPTER 73, "STANDARDS FOR SEWAGE DISPOSAL FACILITIES" AND ALL APPLICABLE MUNICIPAL ORDINANCES.

SEO NOTICE: CONTRACTOR SHALL NOTIFY THE APPROPRIATE SEWAGE ENFORCEMENT OFFICER (SEO) AT LEAST ONE WEEK PRIOR TO THE DESIRED TIME OF SYSTEM INSTALLATION TO ENABLE THE ARRANGEMENT OF AN INSPECTION SCHEDULE.

SITE CONDITIONS: IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ELEVATIONS, LOCATIONS, AND BOUNDARIES BEFORE COMMENCING CONSTRUCTION. SHOULD SITE CONDITIONS DIFFER FROM THOSE REPRESENTED ON THIS PLAN, THE CONTRACTOR SHALL NOTIFY SOIL SERVICES COMPANY, INC. REGARDING NECESSARY DESIGN REVISIONS.

STAKED SITE PROTECTION: THE SITE TO BE UTILIZED FOR INSTALLATION OF THE SEWAGE SYSTEM ABSORPTION AREA, SHALL BE STAKED AT ITS EXTREMES PRIOR TO ANY CONSTRUCTION ON THE PROPERTY. THE STAKED SITE SHALL BE AVOIDED BY CONSTRUCTION AND OTHER EQUIPMENT TO PREVENT UNNATURAL SOIL COMPACTION AND/OR REMOVAL.

SITE PREPARATION: VEGETATION SHALL BE CUT CLOSE TO THE GROUND THROUGHOUT THE AREA TO BE UTILIZED FOR THE ABSORPTION AREA AND BERM. BUSHES AND TREES SHALL BE CUT FLUSH WITH THE GROUND SURFACE; ROOTS SHALL BE LEFT IN PLACE. CUT VEGETATION OR ORGANIC LITTER SHALL BE RAKED AND REMOVED FROM THE ABSORPTION AND BERM AREAS. THE PROPOSED ABSORPTION AREA SHALL BE ROUGHED OR PLOWED PARALLEL WITH THE CONTOUR TO A MAXIMUM DEPTH OF 6 INCHES, USING MULTIPLE SHARE CHISEL PLOW OR SIMILAR IMPLEMENT ATTACHED TO LIGHTWEIGHT EQUIPMENT. ROTARY TILLING IS PROHIBITED.

BERM: THE BERM SHALL BE APPROPRIATELY COMPACTED DURING INSTALLATION TO PREVENT ANY LATERAL FLOW OR SURFACE DISCHARGE OF SEWAGE. BERM MATERIAL SHALL BE FREE OF LARGE ROCKS, SOD, STUMPS, ROOTS, AND OTHER DEBRIS. AGGREGATE SPILLED ON THE BERM AREA DURING INSTALLATION SHALL BE REMOVED.

SURFACE WATER DIVERSION: THE TERRAIN IMMEDIATELY SURROUNDING THE ABSORPTION AREA SHALL BE GRADED TO PROVIDE FOR DIVERSION OF SURFACE RUNOFF WATER AWAY FROM THE COMPLETED SYSTEM. UPSLOPE INTERCEPTOR DRAINS ARE STRONGLY RECOMMENDED. STATE AND FEDERAL ENCROACHMENT PERMITS MAY BE REQUIRED IF DIVERSIONS AND OUTFALLS ENTER STREAMS OR WETLANDS.

VEGETATIVE COVER: COVER SOIL SHALL BE PROPERLY PREPARED SO THAT GROUND COVER (GRASS, PACHYSANDRA SP., ETC.) SEED GERMINATION AND VEGETATIVE GROWTH ARE ENCOURAGED OVER THE ENTIRE SEWAGE SYSTEM AREA ONCE GRADING IS COMPLETED. IF GERMINATION IS LIMITED BY COLD WEATHER AND/OR POOR SITE CONDITIONS, SOD OR COMPOST PLACEMENT IS SUGGESTED AND MAY BE REQUIRED. MAINTENANCE SHALL INCLUDE REGULAR MOWING OF THE VEGETATIVE GROWTH OVER THE ABSORPTION AREA TO 4" IN HEIGHT TO PREVENT WOODY GROWTH.

WEATHER AND SOIL CONDITIONS: SHOULD WEATHER BECOME A FACTOR PROHIBITING SATISFACTORY COMPLETION OF ANY STAGE OF THE SYSTEM INSTALLATION, THE SEO MAY REQUIRE INSTALLATION TO CEASE UNTIL THE WEATHER BECOMES FAVORABLE.

MAINTENANCE: THE PROPERTY OWNER SHALL MAINTAIN THE SYSTEM COMPONENTS. PROPER MAINTENANCE SHALL INCLUDE REGULAR PUMPING OF THE TREATMENT TANK (SEPTIC OR AEROBIC) AND PROTECTION OF THE ABSORPTION AREA FROM EROSION, COMPACTION AND OTHER DAMAGE.

SAND: SAND TO BE USED IN THE ABSORPTION AREA SHALL MEET THE PENNSYLVANIA CODE, CHAPTER 73, SECTION 73.51 SPECIFICATIONS (QUARTZ SAND MEETING SAID SPECIFICATIONS SHALL BE USED). PROPER SAND ANALYSIS SHALL BE PROVIDED WITH EACH LOAD DELIVERED TO THE PROPERTY.

AGGREGATE: AGGREGATE SHALL MEET PENNDOT PUBLICATION #40B (1994) SECTION 703.3. 2 TABLE C. SIZE AND GRADING SHALL MEET AASHTO NO. 57 REQUIREMENTS. AGGREGATE SHALL BE FROM A PENNDOT CERTIFIED STOCKPILE AND SHALL BE OF TYPE B QUALITY.

DISCHARGE HOLES: DISCHARGE HOLES SHALL BE 1/4 INCH IN DIAMETER

DISCHARGE HOLES: DISCHARGE HOLES SHALL BE 1/4 INCH IN DIAMETER.

MANHOLES: ALL MANHOLES SHALL EXTEND TO ABOVE FINAL GRADE.

INSPECTION PORT: THE SEPTIC TANK SHALL HAVE A 4-INCH DIAMETER INSPECTION PORT, EXTENDING TO ABOVE FINAL GRADE.

BEDDING OF TANKS: ALL TANKS SHALL BE BEDDED WITH A MINIMUM OF 6 INCHES OF 2B MODIFIED AGGREGATE, SAND, SCREENINGS OR EQUAL.

INFILTRATOR TANKS: TANKS SHALL BE INSTALLED AS PER MANUFACTURES RECOMMENDATIONS. REFERENCE INFILTRATOR IM- AND TW- SERIES GENERAL INSTALLATION INSTRUCTIONS DATED MARCH 2014.

EFFLUENT FILTER: POLYLOK PL-122 EFFLUENT FILTER (OR EQUAL) SHALL BE PLACED AT OUTLET OF SEPTIC TANK.

PUMP TANK: GRAVITY DRAINAGE SHALL BE PROVIDED AROUND PUMP TANK TO PREVENT COMPLICATIONS FROM HIGH WATER TABLE, WHERE PRESENT.

SEPTIC/PUMP TANK: GRAVITY DRAINAGE (DAYLIGHT DRAIN) SHALL BE PROVIDED AROUND TANKS TO PREVENT COMPLICATIONS FROM HIGH WATER TABLE, WHERE PRESENT.

ALARMS: THE PUMP ALARMS SHALL BE AUDIBLE AND VISIBLE FOR THE OCCUPANT.

ELECTRICAL: THE PUMP AND ALARM CIRCUITS SHALL BE SEPARATE. ALL ELECTRICAL CONNECTIONS IN THE PUMP TANK SHALL BE WATERTIGHT. ELECTRICAL LINES FROM PUMP TANK TO CONTROL PANEL SHALL BE ENCLOSED IN CONDUIT.

PUMP AND ALARM CONTROLS: PUMP AND ALARM SHALL BE CONTROLLED USING SJE RHOMBUS CONTROLS OR EQUAL.

DELIVERY LINE: THE DELIVERY LINE SHALL SLOPE DOWNHILL TOWARD THE PUMP TANK TO ALLOW FOR DRAINING.

BENTONITE TRENCH PLUG: THE DELIVERY LINE SHALL HAVE BENTONITE TRENCH PLUGS TO PREVENT GROUND WATER FOLLOWING THE PIPE BACK TO THE PUMP TANK.

PUMP: THE PUMP SHALL BE PLACED ON A MIN. 6-INCH HIGH CONCRETE BLOCK WITHIN THE PUMP TANK. THE PUMP SPECIFICATIONS REFERENCED IN THIS PLAN ARE BASED ON THE LOCATIONS AND ELEVATIONS STATED. IF THE ACTUAL COMPONENT LOCATIONS OR ELEVATIONS CHANGE. A DIFFERENT PUMP MAY BE NECESSARY. THE CONTRACTOR SHALL VERIFY THE ADEQUACY OF THIS PUMP PRIOR TO ITS INSTALLATION.

MINIMUM ISOLATION DISTANCES:

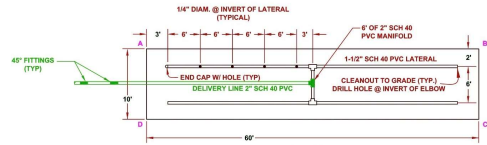
THE MINIMUM HORIZONTAL ISOLATION DISTANCES BETWEEN THE FEATURES NAMED AND TREATMENT TANKS, DOSING TANKS, LIFT PUMP TANKS, AND FILTER TANKS SHALL COMPLY WITH THE FOLLOWING:

- WATER SUPPLY LINE UNDER PRESSURE - 10 FEET.
- STREAMS, LAKES, CISTERNS, AND OTHER SURFACE WATERS - 25 FEET
- PROPERTY LINE, EASEMENT, OR RIGHT OF WAY - 10 FEET
- OCCUPIED BUILDING, SWIMMING POOLS, AND DRIVEWAYS - 10 FEET
- ANY INDIVIDUAL WATER SUPPLY OR WATER SUPPLY SUCTION LINE - 50 FEET

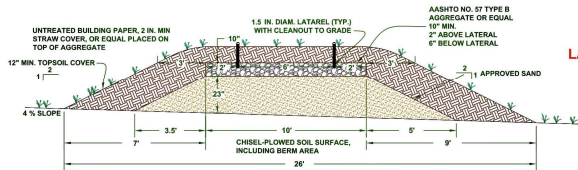
THE MINIMUM HORIZONTAL ISOLATION DISTANCES BETWEEN THE FEATURES NAMED AND THE PERIMETER OF THE AGGREGATE IN THE ABSORPTION AREA SHALL COMPLY WITH THE FOLLOWING:

- SURFACE DRAINAGE WAYS, DETENTION BASINS, RETENTION BASINS, AND STORM WATER SEEPAGE BEDS - 10 FEET
- OTHER ACTIVE ON-LOT SEWAGE SYSTEMS - 5 FEET
- STREAMS, LAKES, OR OTHER SURFACE WATERS - 50 FEET
- PROPERTY LINE, EASEMENT, OR RIGHT OF WAY - 10 FEET
- NATURAL OR MAN-MADE SLOPE GREATER THAN 25 PERCENT - 10 FEET
- ROCK OUTCROP OR IDENTIFIED SHALLOW PINNACLE - 10 FEET
- OCCUPIED BUILDINGS, SWIMMING POOLS, AND DRIVEWAYS - 10 FEET
- MINE SUBSIDENCE AREAS, MINE BORE HOLES OR SINKHOLES - 100 FEET
- ANY INDIVIDUAL WATER SUPPLY OR WATER SUPPLY SUCTION LINE - 100 FEET (CISTERNS - 25 FEET)

EXISTING WELLS: SOIL SERVICES COMPANY, INC. HAS VERIFIED THAT THERE ARE NO EXISTING WELLS WITHIN 100 FEET OF THE PROPOSED ABSORPTION AREA.



**TOP VIEW
ESMB ABSORPTION AREA
NOT TO SCALE**



**SECTION A-A
SIDE VIEW
ESMB ABSORPTION AREA
NOT TO SCALE**

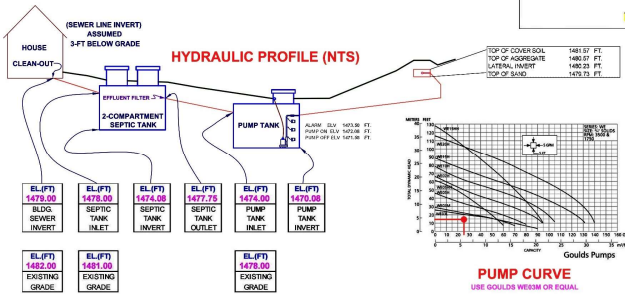


LATERAL END CLEAN-OUTS

| PRESSURE-DESIGNED ESMB BED | |
|--|-------------|
| Limiting Zone | 26 inches |
| Percolation Rate | 6.73 mps |
| Designed Capacity | 3 bathroom |
| Calculated Sewage Flow | 400 gal/day |
| Required Absorption Area | 600 sq ft |
| Absorption Area Size | 600 sq ft |
| Required Septic Volume | 800 gals. |
| Septic Tank Volume | 1000 gals. |
| Note: Pump Tank Volume | 485 gals. |
| Pump Tank Volume | 1000 gals. |
| Recommended Pump: Goulds Model WED3M or equal | |

| MAXIMUM TOTAL FRICTION LOSS: Flow = 0.250 gpm | |
|---|--|
| 2.67% Friction Loss from first manhole section to the last hole (Manhole = 10%) | |
| CORNER ELEVATIONS | |
| ABSORPTION AREA SLOPES | |
| A | 1477.40 FT. |
| B | 1477.40 FT. |
| C | 1477.00 FT. |
| D | 1477.00 FT. |
| BM | 1477.45 FT. BM LOCATION: Ground at A Stake |
| AD | 4.00 % |
| BC | 4.00 % |

| | | |
|------------------------|--|-----------------------|
| Pipe | 4 Laterals @ 27.00 ft. | 1.5 inch |
| | 8 ft of 2.0 inch PVC manifold | |
| | 135 ft of 2.0 inch PVC delivery line | |
| Minimum Cost | 135 ft of 2.0 in GELV provides | 21.60 gals. |
| | 8 ft of 2.0 in MANP provides | 0.96 gals. |
| | 108 ft of 1.5 in LAT provides | 8.22 gals. |
| | | 32.78 gals. |
| Min. Pump Tank Size | 191.40 gals. X TWO | 322.80 gals. |
| Volume below the block | 322.80 gals. (87back) | 645.60 gals. |
| Close Pump On Elev. | 1472.08 ft. | 1000 Gallon Pump Tank |
| Pump Off Elev. | 1471.50 ft. | 324 Gallon Per Foot |
| Flow Rate | 0.250 ft. | 182 Clean-Up Gals. |
| Static Head | Lateral Invert Elevation | 1480.23 ft. |
| | Pump Off Elevation | 1471.50 ft. |
| | Total | 8.73 ft. |
| Equl. Length | 4 - 45 Degree @ 2.58 ft. = | 10.32 ft. |
| | 1 - 90 Degree @ 5.00 ft. = | 5.00 ft. |
| | 1 - Elbow @ 11.10 ft. = | 11.10 ft. |
| | 10 - Coupling @ 1.35 ft. = | 13.50 ft. |
| | 0 - 1/4 Way Cross @ 3.50 ft. = | 0.00 ft. |
| | 1 - Clean Out @ 1.35 ft. = | 1.35 ft. |
| | | 48.27 ft. |
| Total Length | 135.00 ft. of Delivery Line | |
| | 6.00 ft. of Manhole Section | |
| | 8.27 ft. Exposure Length | |
| | 149.27 ft. | |
| Flow | 20 0.250 inch @ 3.0 ft. = | 26.58 GPM |
| Friction Loss | 198.97 ft. of 2.00" PVC @ 26.58 GPM => | 2.56 ft. |
| Total Dynamic Head | 8.65 ft. Static Head | |
| | 2.56 ft. Friction Loss | |
| | 3.00 ft. Operating Head | |
| | 14.21 ft. TDH | |



PA ACT 287 of 1974
As Amended by
ACT 187 of 1996
73 P.S. 176 et seq.

DAVID J. BERMAN, P.E.
1112
STATE OF PENNSYLVANIA
PROFESSIONAL ENGINEER
LICENSE NO. 1112
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TOOLS & EQUIPMENT

Bare Minimum



TOOLS & EQUIPMENT

- 100' – 300' TAPE MEASURE'
- LASER LEVEL (OR EQUAL)
- WOODEN STAKES



- MAGNETIC LOCATOR FOR FINDING PROPERTY PINS



- GPS HANDHELD UNIT (WE USE SUB-METER ACCURACY MADE BY JUNIPER SYSTEMS)



- DESIGN:
- COMPUTER & PRINTER
- DRAWING SOFTWARE (AUTOCAD) OR PDF CREATOR LIKE BLUEBEAM, ADOBE
- GOOGLE MAPS IS A GOOD RESOURCE AND PROVIDES SCALING.
- DOWNLOAD 2 FT CONTOURS FROM PASDA WEBSITE IS VERY USEFUL
[HTTPS://MAPS.PSIEE.PSU.EDU/IMAGERYNAVIGATOR/](https://maps.psiee.psu.edu/imagerynavigator/)
- TO OBTAIN TAX MAP INFO, MOST COUNTIES HAVE FREE TAX MAP VIEWERS ONLINE



PENNSYLVANIA IMAGERY NAVIGATOR

View and Download Imagery for Pennsylvania

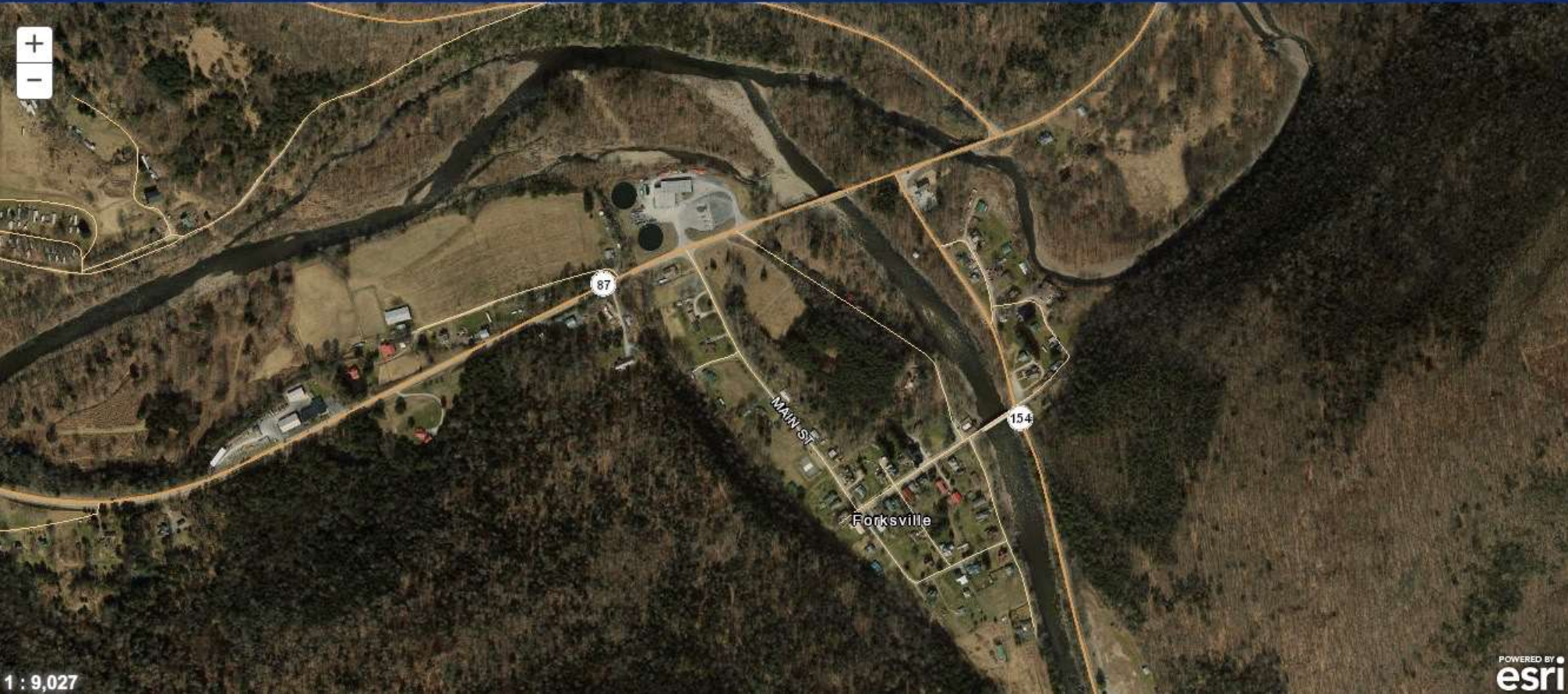
Display Imagery:
Statewide 2018 - 2020

Display Tile Index:
None

Display Overlays:
 Roads, Places, etc

Find a County:
Sullivan

Find an Address: (Street, Zip)
Forksville, PA





PENNSYLVANIA IMAGERY NAVIGATOR

View and Download Imagery for Pennsylvania

[Help](#) | [About](#)

Display Imagery:

Statewide 2018 - 2020

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None

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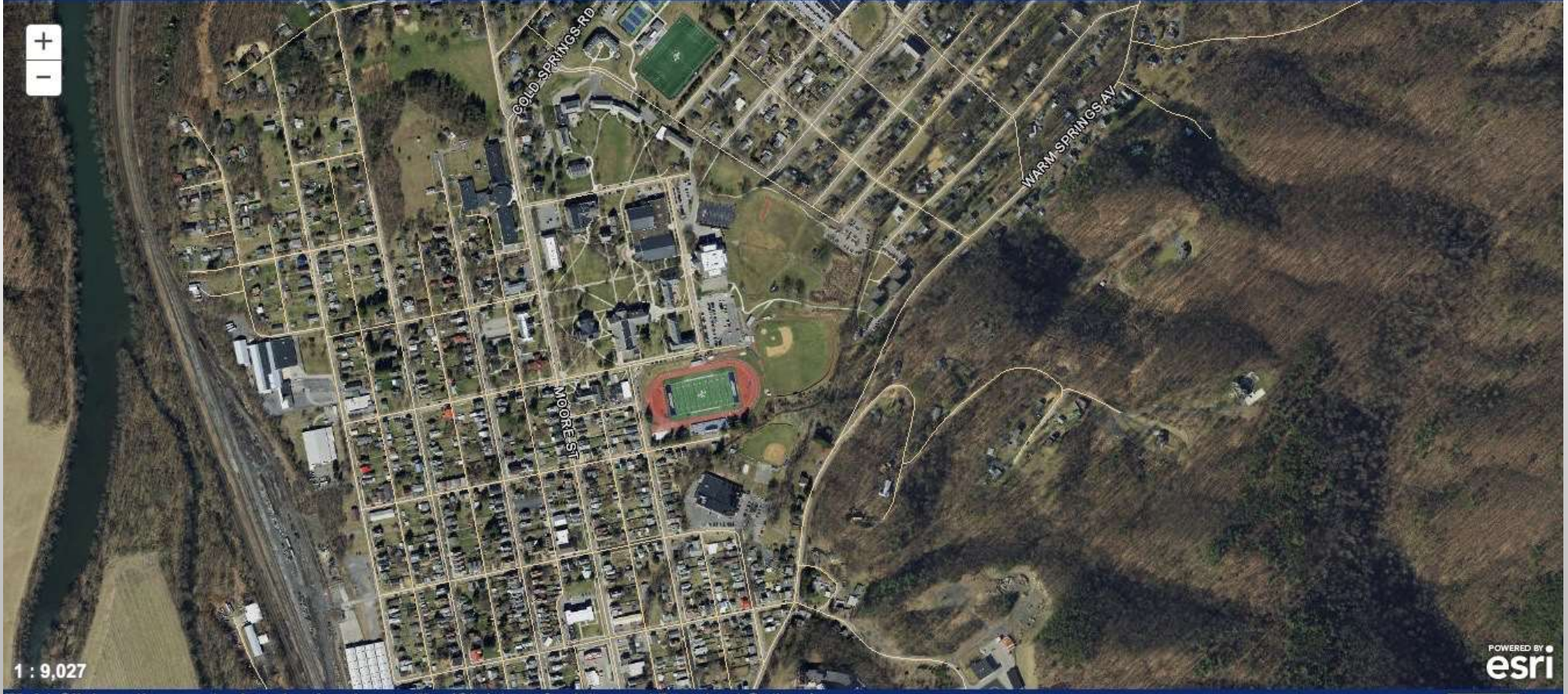
Roads, Places, etc

Find a County:

Huntingdon

Find an Address: (Street, Zip)

932 Selina Drive, Huntingdon, PA



1 : 9,027

POWERED BY esri

Right-click on the map to download imagery tiles. (Click here for Advanced Download Options)

FUTURE NEEDS... ASK WHAT IF QUESTIONS

- DETACHED GARAGE
- BASEMENT
- POOL
- DECK / PATIO
- ANYTHING BESIDES SINGLE FAMILY HOME

CONTRACTS?



THIS IS A CONTRACT!
April 12, 2023
E-mailed to:
& Mail via USPS

RE: Stakeout and Design for a Sewage System Permit (Potential Alternate System)
Norton Rd, TMP #06-102-0032; 38.68 acre lot
Elkland Township, Sullivan County, PA

Dear :

Thank you for requesting the following proposal/contract to have our firm accomplish the steps required toward obtaining an individual on-site sewage disposal system permit for the parcel referenced above. In that the soil testing and report are complete, our role is to stake and plot the absorption area and to provide design services to complete the permit process. It will be our objective to educate you on all design options.

For your information, there are many new options for sewage systems, most of which are considered "alternate," and which were adopted for use in Pennsylvania by being specified in the "Onlot Alternate Technology System" (OATS) listings available online at:
<http://www.dep.pa.gov/Business/Water/CleanWater/WastewaterMgmt/Act537/OnlotDisposal/Pages/OnlotAlternateTechnologyListings.aspx>

In submitting this proposal/contract to you, it is assumed that no subdivision is intended, and that you will provide us with a deed or a copy of a scaled plot plan of the property which indicates the project's surveyed boundaries, easements, rights-of-way, utility lines, and other restrictions affecting the property. We will also need a copy of the 290a, soil description form which you should have received from the local SEO. The boundaries shall be well marked in the field. In the absence of marked boundaries, surveying may be required for us to complete our work.


The following proposal/contract is offered for a period of 30 days. If it meets with your approval, kindly indicate your acceptance by signing both copies, keeping the original, and returning the copy to us with your retainer check for \$. If you wish, we can generate an invoice for this amount so that you can make an on-line payment. Scheduled dates are subject to postponement due to weather and soil conditions, and due to available dates for other involved parties. The permit can be issued after the design is prepared, submitted with the application, and reviewed by the SEO. Installation can only begin when the soil is not saturated, snow-covered, or frozen.

Upon design delivery, our division called "Mountain Wastewater Management" may offer equipment sales, construction oversight, a start-up meeting, and a maintenance service contract for your entire sewage disposal system.

PAGE 1

Rosbach Holdings Inc DBA Soil Services Company
5804 Route 87, Forksville, PA 18616
P: 570-896-0055
SoilServicesCompany.com

CONTRACTS?

| | |
|---|--|
|  <p>SOIL SERVICES COMPANY</p> | <p>PHONE: 570-896-0055 5804 Route 87, Forksville, PA 18616</p> |
| <p>SoilServicesCompany.com</p> | |

BILLING RATES, PAYMENT TERMS, AND CONDITIONS

BILLING RATES

| | |
|--|-------------------|
| Certified Professional Soil Scientist / Owner/ Principal | \$185.00 per hour |
| Staff Soil Scientist | \$150.00 per hour |
| Soil Science Technician / Designer / GPS support/ Project Management | \$125.00 per hour |
| Clerical / copying / shipping / errands | \$90.00 per hour |
| Expert Witness Testimony | \$200.00 per hour |

We do not charge for mileage, lodging, anticipated copies and prints, or postage.

PAYMENT TERMS

Invoicing: Soil Services Company ("Soil Services") invoices for time, subcontracts and materials as progress is made.

Retainer: Non-refundable retainer may be requested prior to scheduling work, and will be applied to the final invoice.

Payment is due upon receipt of invoice. Payments that exceed 15 days from date of invoice will be charged 1 1/2 percent interest monthly on the balance due. Unless Soil Services is notified otherwise within 15 days of the date of invoice, the invoice is deemed acceptable to you. If we incur collection costs to obtain payment, you will be liable for such costs.

Scheduling Priority is not given to jobs for which payments exceed 30 days.

Cease Work: We reserve the right to cease work under this contract if payment (or other) terms are not met and may apply the retainer to any balance due. Soil Services is not responsible for delays resulting from your failure to comply with our terms, caused by others, or by weather complications, or by our backlog.

Estimates: Estimates are based upon typical conditions, under current regulations and requirements by the appropriate governmental agencies. While Soil Services makes every effort to meet its provided estimates, all time spent on your project to complete the scope of work, shall be invoiced per our billing rates.

Not Included: Unless itemized as "Included," Soil Services fees do not include agency or municipal testing and review fees, permit application fees, chemical analyses, geotechnical, species habitat investigations, excavator expenses, drilling costs, testimony under subpoena, or excessive copying, reprographics, printing, or postage. Specially required engineering or surveying costs may add to the estimated cost of the project. If Soil Services schedules an excavator, you shall provide a check for payment-in-full for the operator's fee on the day of the excavation.

CONDITIONS

No Guarantee: Soils Services offers no guarantee that any permit(s) will, or will not be, issued as a result of the services rendered. Soil Services offers no guarantee that we will meet your deadline.

Authorization: You hereby authorize Soil Services to act in your behalf to carry out the steps necessary to perform soils and/or geological investigations. This may include: 1) entering the property to inventory soils and geology, performing required tests, withdrawing water or earth material samples, and documenting site features, 2) directing an excavator or driller, 3) scheduling agency officials to enter the property to perform required site inspections and to witness testing, and 4) submitting findings, reports, and/or applications to officials or other parties, as directed by you, 5) signing documents as your agent.

Cooperation: You agree to cooperate fully with Soil Services so as to facilitate the rendering of the foregoing services.

Records retention: You agree that Soil Services may dispose of files and records older than 8 years.


Exhibit "A" (please see other side)

2022

Rosbach Holdings Inc. DBA Soil Services Company and Mountain Wastewater Management



WHAT DID WE LEARN?

- THERE IS NO OFFICIAL REQUIREMENTS FROM PA DEP
 - LOTS OF THINGS ONE “SHOULD” INCLUDE
 - COVER PAGE SHOULD PROVIDE “ALL THE ANSWERS”
 - KNOW YOUR DEMOGRAPHIC
 - LESS IS MORE?
 - TOOLS >>
- 

THANK YOU!

