



Brunswick County Environmental Health Services
Onsite Wastewater

BCHS File Number: 2005066879A

Tax Parcel: 201MA009

[X] New [] Revision [] Repair

Owner's Name: DS & EM INVESTMENTS LLC

Property Address: 2656 MILL POND CT SE 28422

Subdivision: CYPRESS LAKES Lot: 9 Block: Section:

Water Supply: [] Public Water or [X] Private Water Project Type: [X] Residential or [] Commercial Design Flow (GPD): 360

Authorization to Construct Permit

The following conditions must be met prior to the issuance of the Operation Permit:

- The location and identification of all property lines, easements, and utilities shall be the responsibility of the installer and/or owner.
An Operation Permit shall be issued by Brunswick County Environmental Health Services (BCHS) prior to placing the system into use or making any connections to the system.
Maintain 10 feet minimum to any waterline.
The septic system shall be installed in a timely manner and staged to avoid unnecessary exposure to weather.
Maintain the following setback to any well: [X] 50 feet or [] 100 feet
Final landscaping shall be constructed to divert water and establish vegetative cover.
The system shall be installed in accordance with the approved set of plans and specifications. Failure to do so may result in delay or refusal of final approval of the system and may render the permit null and void.
Prior to the installation of the wastewater system, a conference shall be held onsite with the following representatives present:
Wastewater Installer [] Owner [] Applicant [] Engineer [] Other:
Barriers shall be installed, in accordance with BCHS Barrier Policy.
The contractor is responsible for notification of BCHS and the engineer for system inspection in stages, prior to backfilling any portion of the system. No portion of the system shall be backfilled or placed into use without prior approval of BCHS.
The forcemain(s) shall maintain an 18" separation below the existing water line(s) or be sleeved in ductile iron for 10' on each side of the crossing.
Forcemain(s) shall be installed at least 30" below the soil surface.
25% reduction taken. Installer shall utilize an approved trench product that allows a 25% reduction in linear feet.
The existing septic tank(s) and/or pump tank(s) shall be properly abandoned.
Shallow Placement: The final 6 inches of soil cover shall be installed in accordance with the soil cover plan, inspected by BCHS, and approved by BCHS.
Fill System: The final 6 inches of soil cover, seed, and straw shall be inspected and approved by BCHS.
[X] Drainlines shall be installed on contour.
Low flow technology: Neither the State nor local health department shall be liable for any damages caused by an engineered system approved or permitted pursuant to Session Law 2014-120 Section 53.
The engineer shall submit in writing to BCHS that the system construction is complete and in accordance with the approved plans.
The owner and a Public Management Entity/Subsurface System Certified Operator shall execute a contract which addresses all of the requirements for maintenance, monitoring, schedule and operation, and reporting in Section .1961. This information will be a part of the Operation Permit for the facility. Provisions of said contract shall be in effect for as long as the system is in use. Management of the wastewater system should be provided at all times.
Other:
Other:
Changes in the location, design flow, or wastewater strength of the wastewater system may result in permit action.
The issuance of all BCHS permits do not preclude the permittee from complying with any and all statutes, regulations, and ordinances which may be imposed by other government agencies which have jurisdiction, or other permits issued by BCHS.
BCHS permits may become invalid if the information submitted in the application was falsified, changed, and/or inaccurate.

Authorization to Construct Issuance Date: 4/19/23 Authorization to Construct Expiration Date: 4/19/28

REHS Signature: [Signature] REHS Registration Number: 2617

See Authorization to Construct Permit Site Plan and Conditions for Septic System Location and Further Detail



Brunswick County Environmental Health Services
Onsite Wastewater

BCHS File Number: 2025066879A

Tax Parcel: 201MA009

Site Plan For (Check One):

- Improvement Permit
- Well Permit
- Well Abandonment Permit
- Fill Plan
- Proposal
- Other: _____
- Authorization to Construct Permit
- Existing System Reuse

SITE PLAN ONLY. THIS IS NOT A PERMIT

See attached site plan SL 2022-11

*1/29/24 -- changed to pump -> PPOPS (VERT)
4, 19' lines*

Onsite Wastewater System Design Criteria

Type of Initial Wastewater System: 2-A ILB-E (PPOPS) Vertical Number of Occupants/Employees (Max): 6

Number of Bedrooms (Max.): 3 LTAR (gpd/ft²): 10-8

Design Flow (GPD): 360 Length of Lines (Feet): 40' 19'

Number of Lines: 3 Width of Lines (Feet): 3/2'

Trench Bottom Depth From Top of Final Cover (Max. Inches): 20" 24" Drainfield Square Feet: 360 225

Min. Size of Septic Tank (Gal.): 900/1000 33"-36" Bed Dimensions (Feet x Feet): _____

Min. Size of Pump Tank (Gal.): 900/1000 Other Information: _____

Min. Size of Grease Trap (Gal.): _____ Other Information: _____

JM

4/19/23

Wastewater System Pump Design Details

Location: 2656 Mill Pond Ct, Cypress Lakes Lot 9

Tax Parcel: 201MA009

Manual

Number of bedrooms 3
Flow Rate (gpd) 360

Septic Tank Size (gal) 1000
Pump Tank Size (gal) 1000
Pump Size Futrell ST
Futrell PT
Zoeller N53

System Type T&J Panel Block (PPBPS)
Linear Footage (sqft) 75
Number of Lines 4
Line Length (ft) 19
Line Spacing (ft on center) 8
Instal depth (in) 33-36

Pressure Manifold PVC (in) 3
Number of Taps 4
Tap Diameter (in) 0.5
Pump rate (gpm) 21.92
Pressure Head (ft) 2
Dose Rate*
Pump Rate* (gpm)
Purpose Sch. 80 taps
in manifold
5.46 per tap 0.5 inch
at 2 feet Pressure

Number of Panels 4
Panel Spacing (in) 6
Field Area 26' x 19'

Panel Dose Rate (gal per panel) 3.47
Lateral Line Dose Rate (gal) 15
Gallons per dose 60
Dose number per day 6
Horizontal Panels
7.2 gal/panel MAX
Verticle Panels
3.6 gal/panel MAX

Gate valves and cleanouts to be located in standard plastic valve box covers at grade for easy access all valve boxes will be back filled with gravel for drainage.

All plumbing is Sch. 40
Manifold Box from Shallotte Electric is Schd 80 fittings
Supply Line Sch 40, 2 Inch to maintain Scour Velocity > 2ft/sec

Calculations

Pump System Components:

(Number)

Horizontal pumping distance (total length of supply plus tank piping)		74
90 degree elbows at 7 equivalent feet per elbow (3 in tank)	4	28
quick disconnect at 2 equivalent feet	1	2
check valves at 19 equivalent feet	1	19
gate valves at 1.3 equivalent feet (1 in tank)	2	2.6

Total Equivalent length

126

All fittings and pipe are 2" PVC

From engineering tables for friction loss 2 inch Sch 40:

Friction loss (ft per 100 ft)	1.2	14.22 = 0.40	3 Feet pressure
Total Equivalent length (ft)	126	21.53 = 1.10	2" PVC Friction Loss
Friction Head (ft)	1.51	28.44 = 1.40	Flow Rate

Pressure Head (ft) 2 43.55 = 3.27

Pump Off elevation below grade (ft) 6.5

Pressure manifold above grade of tanks (ft) 3.5

Total elevation head from tanks to manifold (ft) 10

Total dynamic head = Friction head + pressure head + elevation head

Total dynamic head (ft) 13.51

Therefore, a pump that delivers these specifications is required:

Gallons per Minute (GPM)

21.92

Total Dynamic Head (TDH) (ft)

13.51

Recommended Pump:

Zoeller N53, 0.3 HP effluent pump

Pump Settings:

Gallons per dose

60

Doses per day

6

Draw down at 21 gal/in (in)

2.86

Pump run time (min)

2.74

* 3 min minimum

DRAWDOWN*	
21gal/inch Futrell Tanks	
18/gal per inch Garner Tanks	

Calculations by :

Scour Velocity

Scour Velocity must exceed 2 feet per second

$$SV = Q/A$$

$$Q = \text{Flow through pipes (gpm)} / 7.48052 \text{ g/ft}^3$$

A = Area of Pipe, Area = πr^2

Pipe Diameter (in)	2	or	1.5
actual diameter (in)	2.067	or	1.61
radius (ft)	0.086		0.067

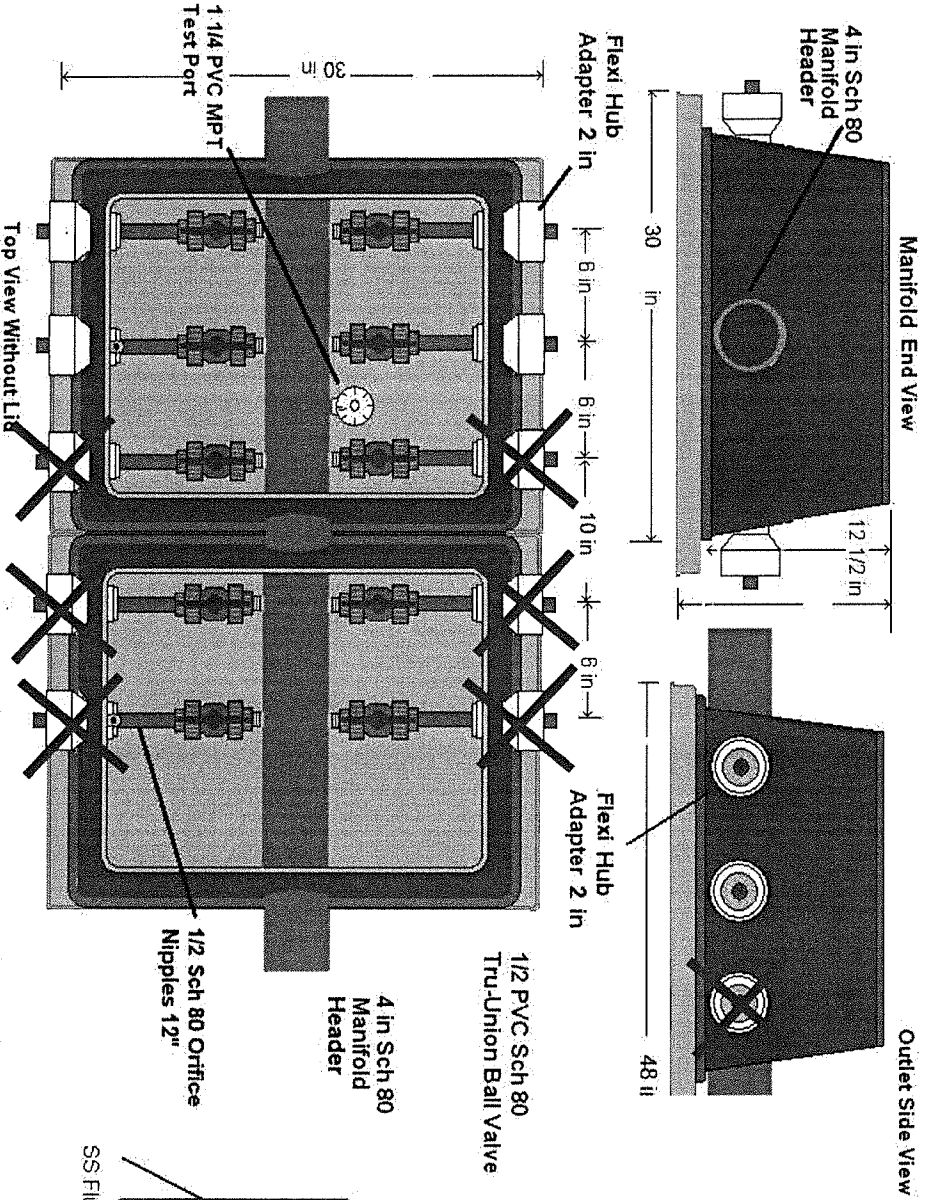
Q=	2.930	ft3/m
A=	0.023	ft2
SV=	<input type="text" value="2.096"/>	ft/sec

Scour Velocity is met



Davey Resource Group
3805 Wrightsville Ave, Suite 15
Wilmington, NC 28403

2656 Mill Pond Court Site Plan Proposal January 29, 2024 Parcel #: 201MA009

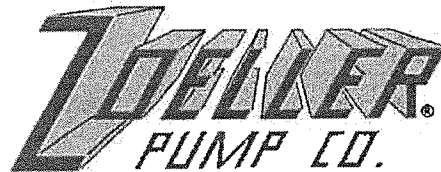


4 Taps

Head Pressure	2.0 ft	2.5 ft	3.0 ft	
1/2 Sch 80 Orifice Nipples	5.46	6.13	6.71	gpm
Total	21.92	24.52	26.84	gpm

Southwest Sewer Fabrication
NCSWRMANIX OS Outlet Enclosed
Septic Manifold
Outlets on Opposite Sides
1/2 Schedule 80 Taps Standard,
1/2 Schedule 40, 3/4 Schedule 40 and 80 Available
3/8 Schedule 80, Special Order

"QUALITY PUMPS SINCE 1939"



SECTION: 2.20.010

FM0493

1103

Supersedes

0403

Product information presented here reflects conditions at time of publication. Consult factory regarding discrepancies or inconsistencies.

MAIL TO: P.O. BOX 16347 • Louisville, KY 40256-0347
SHIP TO: 3649 Cane Run Road • Louisville, KY 40211-1961
(502) 778-2731 • 1 (800) 928-PUMP • FAX (502) 774-3624

visit our web site:
http://www.zoeller.com

COMPARE THESE FEATURES

- Non-Clogging vortex impeller.
• Float operated, submersible (NEMA 6) 2-pole mechanical switch & variable level long cycle systems available.
• UL Listed 3-wire cord plug; 9 ft. standard for automatic, 15 ft. standard for nonautomatic.
• Corrosion resistant powder coated epoxy finish.
• No sheet metal parts to rust or corrode.
• Stainless steel screws, switch arm, guard and handle.
• No screens to clog.
• Watertight neoprene "O" ring between motor and pump housing.
• Solid buoyant polypropylene float.
• Motor - 60 Hz, 1550 RPM, oil-filled, hermetically sealed, automatic reset thermal overload protected.
• Upper and lower sleeve bearings running in bath of oil.
• Entire unit pressure tested after assembly.
• Carbon and ceramic shaft seal.
• Maximum temperature for effluent or dewatering—130°F (54°C).
• Passes 1/2" inch spherical solids.
• 1 1/2" NPT Discharge.
• On point—7 1/4" • Off point—3".
• Major width—10 3/32" • Height—10 1/16".

SPECIAL MODEL FEATURES:

MODEL 53

- Cast iron switch case, motor & pump housing.
• Glass-filled polypropylene base.
• Engineered, glass-filled, plastic impeller with metal insert.
• Stainless steel guard & handle.
• Bearing - lower & upper oil fed cast iron.

MODEL 55

- Bronze switch case, motor & pump housing.
• Glass-filled polypropylene base.
• Engineered, glass-filled, plastic impeller with metal insert.
• Stainless steel guard & handle.
• Bearing - lower & upper oil fed bronze.

MODEL 57

- All cast iron construction.
• Stainless steel guard & handle.
• Bearing - lower & upper oil fed cast iron.

MODEL 59

- All bronze construction.
• Stainless steel guard & handle.
• Bearing - lower & upper oil fed bronze.

ALL MODELS ARE COMPLETELY SUBMERSIBLE HERMETICALLY SEALED

Watertight - dust tight. Permanently oiled bearings

VARIABLE LEVEL CONTROL SYSTEMS AVAILABLE

Note: The sizing of effluent systems normally requires variable level float(s) controls and properly sized basins to achieve required pumping cycles or dosing timers with nonautomatic pumps.

53 - 57 Cast Iron Series
55 - 59 Bronze Series

(For Pump Prefix Identification see News & Views 0052)

"MIGHTY-MATE" SUBMERSIBLE PUMP

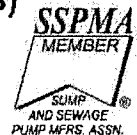
FOR DEWATERING (SUMP) OR EFFLUENT (SEPTIC TANK SYSTEMS)



Tested to UL Standard UL778.

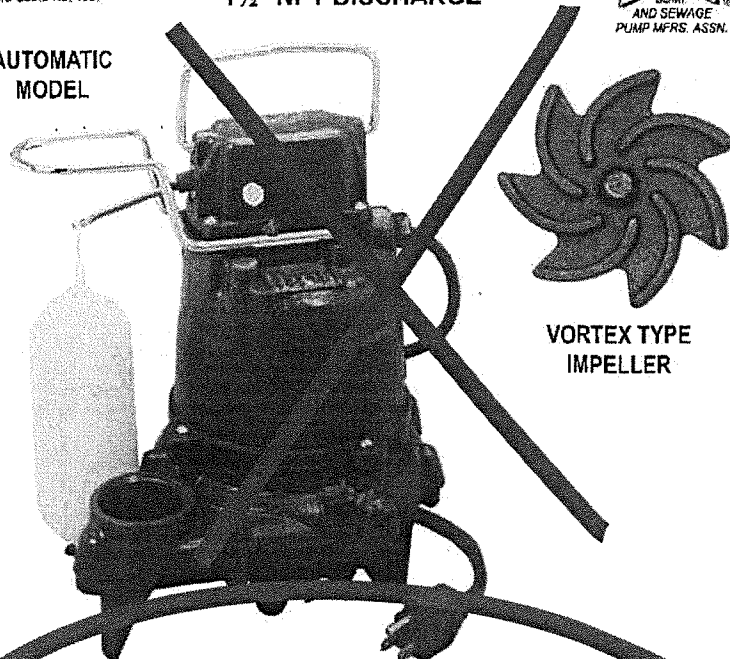


Certified to CSA Standard C22.2 No. 105.



PASSES 1/2" SOLIDS
1 1/2" NPT DISCHARGE

AUTOMATIC MODEL



VORTEX TYPE IMPELLER

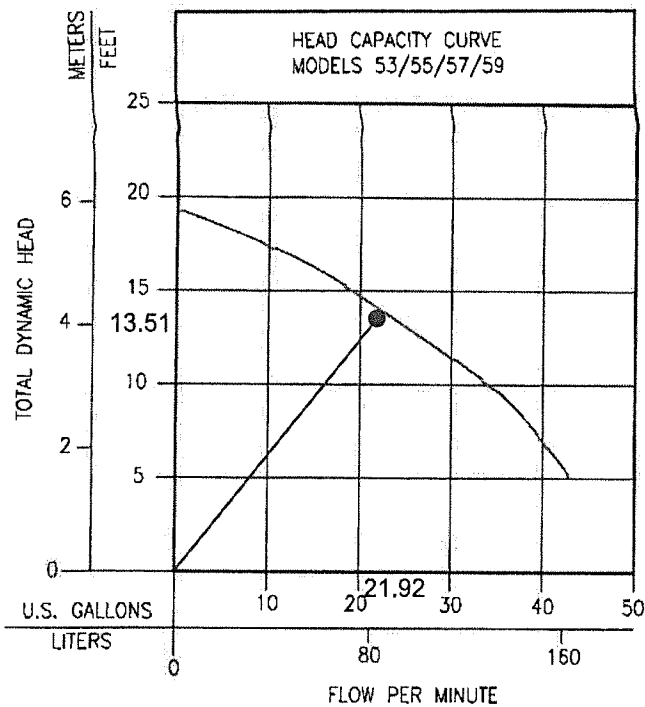


BN MODEL

MODELS AVAILABLE

- Automatic or Nonautomatic
• "53 - 57" - .3 HP, 115V or 230V
• "55 - 59" - .3 HP, 115V or 230V
• BE53/BE57 & BN53/BN57 available packaged with Piggyback Variable Level Float Switch

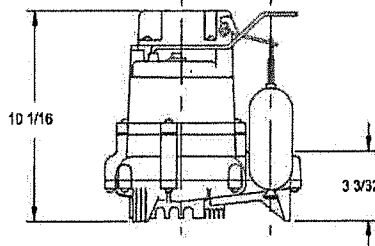
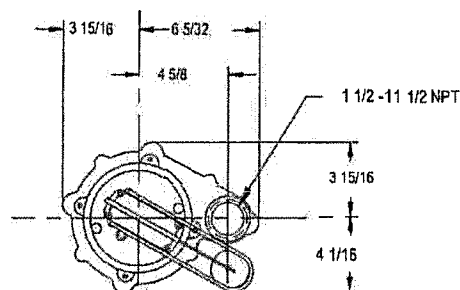




TOTAL DYNAMIC HEAD/FLOW PER MINUTE EFFLUENT AND DEWATERING

MODEL		53/55/57/59	
Feet	Meters	Gal.	Liters
5	1.5	43	163
10	3.0	34	129
15	4.6	19	72
Shut-off Head:		19.25 ft.(5.9m)	

009597



SK858

CONSULT FACTORY FOR SPECIAL APPLICATIONS

- Variable level float switches available.
- Variable level long cycle systems available.
- Available with special cord lengths of 15', 25', 35' and 50'.
- Alarm systems available.
- Duplex systems available.

Single Seal	Control Selection						Listings	
Model	Volts	Phase	Mode	Amps	Simplex	Duplex	CSA	UL
M53/55 & M57/59	115	1	Auto	9.7	1	---	Y	Y
N53/55 & N57/59	115	1	Non	9.7	2	3 or 4 & 5	Y	Y
* BN53	115	1	Auto	9.7	*	---	Y	Y
* BN57	115	1	Auto	9.7	*	---	N	Y
* BE53/57	230	1	Auto	4.8	*	---	Y	Y
D53/55 & D57/59	230	1	Auto	4.8	1	---	Y	Y
E53/55 & E57/59	230	1	Non	4.8	2	3 or 4 & 5	Y	Y

* Single piggyback switch included.

SELECTION GUIDE

1. Integral float operated mechanical switch, no external control required.
2. Single piggyback variable level float switch or double piggyback variable level float switch. Refer to FM0477.
3. Mechanical alternator "M-Pak" 10-0072 or 10-0075.
4. See FM0712 for correct model of Electrical Alternator.
5. Variable level control switch 10-0225 used as a control activator, with Electrical Alternator (3) or (4) float system.

For information on additional Zoeller products refer to catalog on Piggyback Variable Level Float Switches, FM0477; Electrical Alternator, FM0486; Mechanical Alternator, FM0495; Sump/Sewage Basins, FM0487; and Single Phase Simplex Pump Control/Alarm Systems, FM0732.

CAUTION

All installation of controls, protection devices and wiring should be done by a qualified licensed electrician. All electrical and safety codes should be followed including the most recent National Electric Code (NEC) and the Occupational Safety and Health Act (OSHA).

RESERVE POWERED DESIGN

For unusual conditions a reserve safety factor is engineered into the design of every Zoeller pump.



<http://www.zoeller.com>

ZOELLER
PUMP CO.

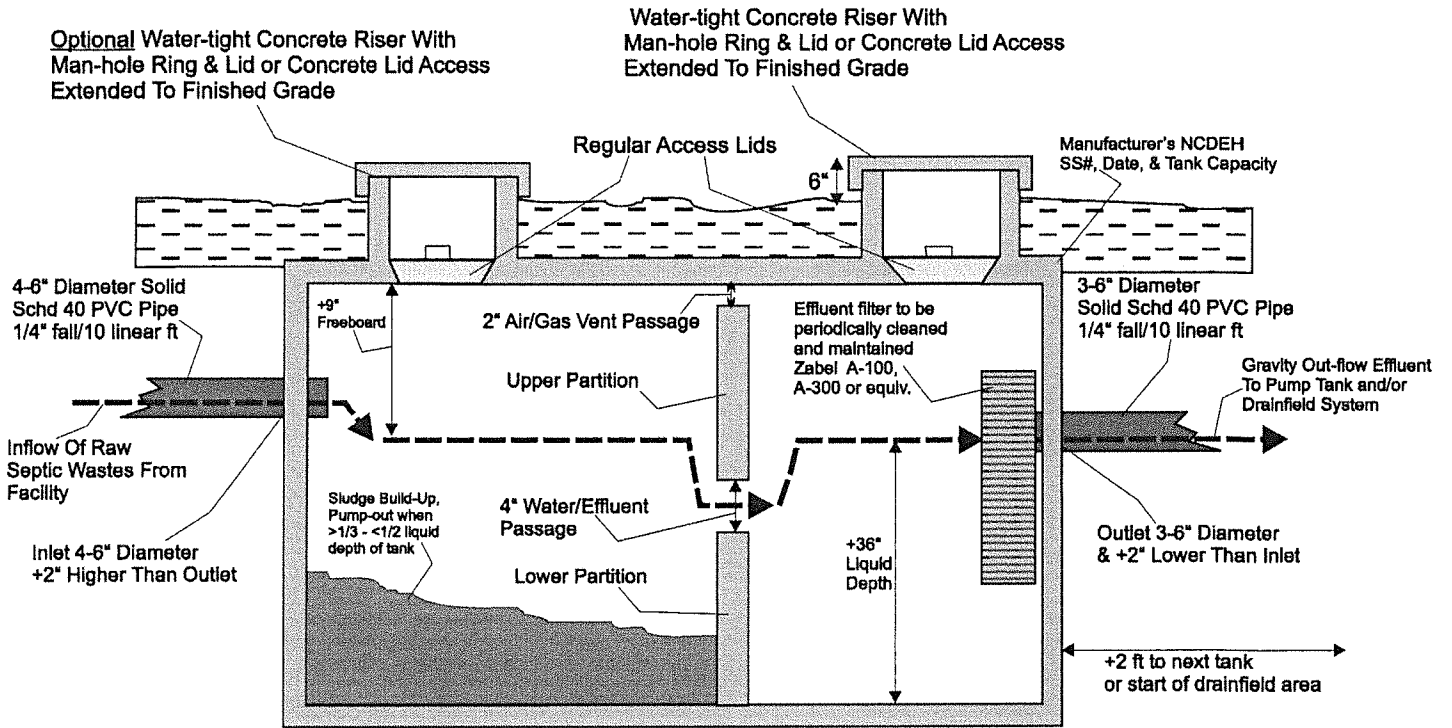
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Louisville, KY 40211-1961
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Manufacturers of...

"QUALITY PUMPS SINCE 1939"

CROSS-SECTION OF NCDEH APPROVED SEPTIC TANK

WITH ABOVE or BELOW GROUND ACCESS



Capacity: 1,000 Gallons

[Infiltrator IM 1060 or equivalent NCDEH septic tank]

[Not To Scale]
2023
NPH.



2. Simplex Control Panel System

- a. This system generally consists of the pump controller and high water alarm in a common enclosure. However, these functions can be provided separately. The pump controller shall consist of a means of manually operating the pump, such as a hand-off automatic (H-O-A) switch. Pump run light and alarm test switch should also be provided.
- b. The panel shall be listed by Underwriter's Laboratory or equivalent third party electrical testing and listing agency.
- c. The panel as designed and installed shall be rated NEMA 4X or equivalent and shall be securely mounted adjacent to the pump tank, or on the side of the facility readily visible from the tank. If not installed directly adjacent to the pump tank, a junction box rated NEMA 4X, or equivalent, shall be securely mounted adjacent to the pump tank at least 12 inches above finished grade.
- d. The panel shall be located above the 100-year storm elevation, unless designed and installed in accordance with NEMA 6P criteria, which provides for watertight conditions during periods of up to six feet of submersion.
- e. All power circuits to the panel must be provided with adjacent, external disconnects, such as are commonly required for outdoor heating and air conditioning units, unless the following conditions are met:
 - i. The enclosure door shall be easy to open without special tools by the system user and maintenance personnel, such as with thumb screws or quick release latches.
 - ii. Internal panel components are behind a dead front (inner door) with main disconnect (s) clearly labeled and accessible through the inner door.
 - iii. Panel is confirmed to be in accordance with the National Electrical Code disconnect requirements by the local electrical inspector. It is our understanding that such panels are now available from major control equipment manufacturers.
- f. The high water alarm shall be supplied ahead of any pump overload and short circuit protective devices. Generally, an independent circuit shall be provided from the facility electrical panel separate from the circuit supplying power to the pump.

However, if the pump overload and short circuit protection device is provided in the control panel, the alarm circuit can be supplied by the same power supply ahead of the pump protection device, provided it is properly protected by a separate breaker or fuse. The amperage rating of the circuit breaker serving the system in the facility electrical panel must be adequate for both the pump and alarm circuits and the acceptability of all components must be specifically confirmed by the local electrical inspector.