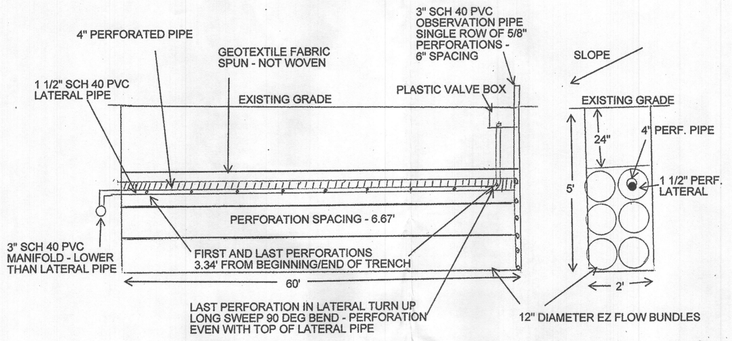
TRENCH 1 CROSS SECTIONS

PLAN NTS

SIDE VIEW

END VIEW



NOTE: ALL PERFORATIONS (WITH EXCEPTION OF LAST PERFORATION IN LATERAL TURN UP) WILL BE FACING UP

TRENCH 2 CROSS SECTIONS

PLAN NTS

SIDE VIEW

END VIEW

NOTE: ALL PERFORATIONS (WITH EXCEPTION OF LAST PERFORATION IN LATERAL TURN UP WILL BE FACING UP

TRENCH 3 CROSS SECTIONS

PLAN NTS

SIDE VIEW

END VIEW

NOTE: ALL PERFORATIONS (WITH EXCEPTION OF LAST PERFORATION IN LATERAL TURN UP) WILL BE FACING UP

VARIABLE HEAD LPD and TRENCH SPECIFICATIONS

- TRENCH 1 – UPPER TRENCH - total trench length – 60'
  - Perforation diameter – 5/16""
  - 9 perforations, end feed
  - Perforation spacing – 6.67' (6' 8")
  - Lateral diameter – 1 1/2", Sch. 40 pvc pipe
  - Distance from start of trench to first perforation – 3.34' (3' 4")
  - Distance from the last perforation (at lateral turn-up) to end of trench – 3.34' (3' 4")
  - Length of lateral pipe in trench – 56.66' (56' 8")
- TRENCH 2 – total trench length – 60'
  - Perforation diameter – 5/16""
  - 8 perforations, end feed
  - Perforation spacing – 7.5' (7' 6")
  - Lateral diameter – 1 1/2", Sch. 40 pvc pipe
  - Distance from start of trench to first perforation – 3.75' (3' 9")
  - Distance from the last perforation (at lateral turn-up) to end of trench – 3.75' (3' 9")
  - Length of lateral pipe in stone trench – 56.25' (56' 3")
- TRENCH 3 – total trench length – 60'
  - Perforation diameter – 1/4
  - 9 perforations, end feed
  - Perforation spacing – 6.67' (6' 9")
  - Lateral diameter – 1 1/2", Sch. 40 pvc pipe
  - Distance from start of trench to first perforation – 3.34' (3' 4")
  - Distance from the last perforation (at lateral turn-up) to end of trench – 3.34' (3' 4")
  - Length of lateral pipe in stone trench – 56.66' (56' 8")

PRESSURE DISTRIBUTION ON SLOPING SITES

TRENCH	LATERAL PIPE ELEV. AT INLET	GROUND SURFACE ELEV. AT INLET	COVER ON LATERAL PIPE AT INLET	HEAD PRESSURE	PERF. DIAMETER	GPM PER PERF.	PERF. SPACING	# OF PERF.	FLOW PER TRENCH
Trench 1	509.53	512.2	2.67'	2.00'	5/16"	1.63	6.67'	9	14.67
Trench 2	508.7	510.37	1.67'	2.83'	5/16"	1.94	7.5'	8	15.52
Trench 3	507.17	508.84	1.67'	4.36'	1/4"	1.54	6.67'	9	13.86
								TOTAL	44.05

TRENCH LAYOUT - PLAN VIEW

SCALE 1" = 10'

LOW PRESSURE DOSING - DEEP TRENCH
SEWAGE DISPOSAL SYSTEM REPAIR

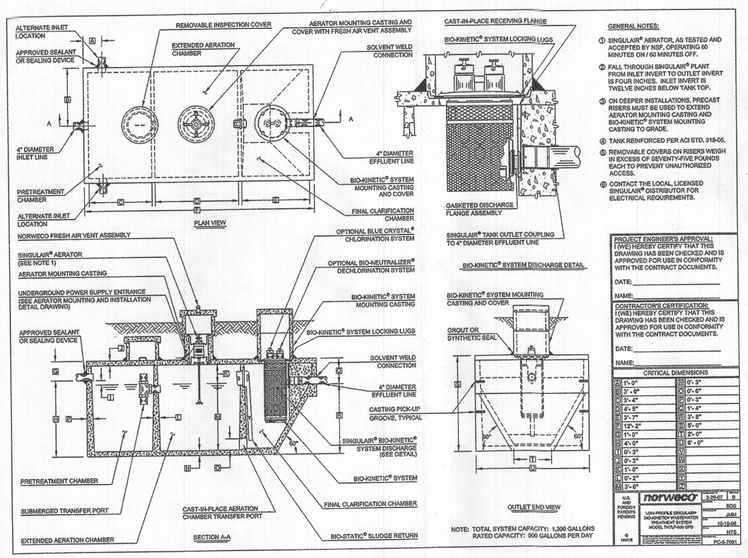
1425 MARRIOTTSVILLE ROAD
MARRIOTTSVILLE, MARYLAND 21104
TAX MAP 0010 PARCEL 0130

TAX ACCOUNT # 03 - 280829

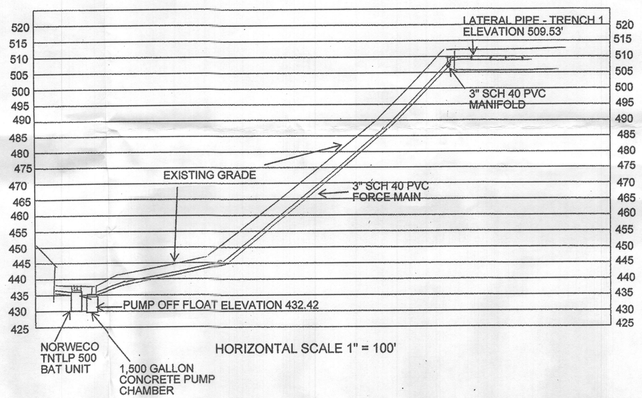
OWNERS – CHRISTA CAREY, MICHAEL SACK
1425 MARRIOTTSVILLE ROAD
MARRIOTTSVILLE, MARYLAND 21104

DESIGN CONSULTANT – JAMES R. POWELL
421 ROCKWAY ROAD
CATONSVILLE, MARYLAND 21228
ROBPOWELL781@VERIZON,NET
443-900-3169

PLAN DATE – SEPTEMBER 12, 2023

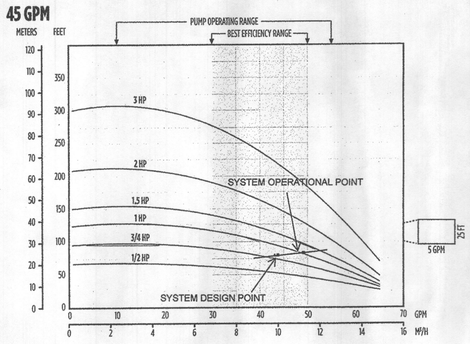


HYDRAULIC PROFILE



PUMP PERFORMANCE CURVE

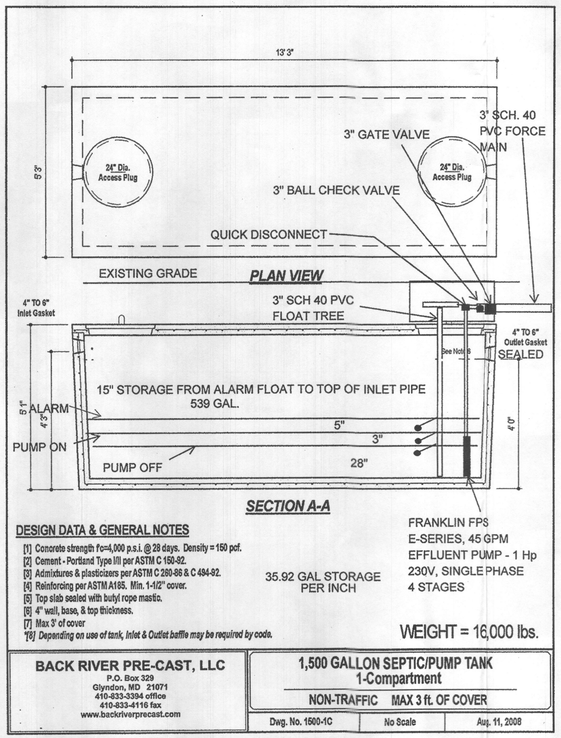
FRANKLIN FPS, E SERIES - 45 GPM
SUBMERSIBLE EFFLUENT PUMP
1 Hp, 230 V, SINGLE PHASE



CONTROL PANEL INFORMATION

AND DOSE CALCULATIONS

- Control panel will be a Simplex Non-Clog, single phase, demand dose control panel manufactured by Franklin Electric. The panel will include the options for an event counter and an elapsed time meter for the pump run. The panel must be compatible with a Franklin FPS E-Series submersible effluent pump 45 gpm Model 1 Hp, single phase, 230 volts.
- A high-water alarm will be required and must be on a separate electrical circuit.
- Hydraulic profile is also attached.
- Dose
  - Dose = volume of 3" force main (520') + volume of 3" manifold (24') + 5x volume of laterals (1 1/2" diam.)
  - Given the length of the force main and static head (77.11'), the force main will be equipped with a ball check valve, to be located in the pump chamber manhole riser
  - (24' ÷ 100') x 38.4 gal/100' + 5 x (169.57'÷100) x (10.6 gal/100') =
  - 9.22 + 89.88 = 99.1 gal. minimum dose
  - Peak flows from three-bedroom dwelling – 450 gpd
  - 1/6 of peak flow = 75 gal.
  - Elect to use a dose flow of 108 gal.
- Storage capacity above high-water alarm float in pump chamber
  - PUMP CHAMBER
    - Inside measurements in pump chamber = 12.58' wide x 4.58' long = 57.62 sq. ft.
    - 57.62 sq. ft. x 7.48 gal./cubic ft. = 431 gal./cu. Ft. // 431 gal. cu. Ft. ÷ 12" /ft. = 35.92 gal./inch.
    - Set the Pump On/Off float to deliver a 3" dose, which equals 108 gallons.
    - Set the High Water Alarm Float to be 5" above the Pump On Float. This setting leaves 11" between the High Water Alarm float and inlet invert = 395 gal. storage capacity
    - Additional four inches to top of inlet pipe yields an additional 144 gal. storage
  - Total storage capacity above high-water alarm float in pump chamber is 359 gal. + 144 gal. = 539 gal. This allows for additional storage capacity in the pump chamber in the event that the check valve fails (200 gallon capacity in force main)



TOTAL DYNAMIC HEAD CALCULATIONS

- Inlet invert elevation at proposed Norweco Singulair TNTLP – 500 will be 435.13'. Existing grade at that location is 437.63'. It is anticipated that the soil cover on top of the proposed unit will be 1.5'. Outlet elevation will be 434.8'.
- Existing grade at the pump chamber inlet is 437.42' and 435.13' at the outlet. The inlet invert into the pump chamber will be 434.00'. It is anticipated that the soil cover on top of the proposed pump chamber at the inlet will be 2.59' and 0.3' at the outlet. 12" of soil will be added at the outlet end of the tank to provide adequate soil cover.
- The Pump Off float will be 28" above the bottom of the pump chamber and 19" below the inlet invert. Consequently, the pump off float elevation is 432.42'.
- Existing grade at the highest trench (Trench 1) is 512.2' (as measured at the end of the trench). The lateral pipe for Trench 1 will be 2.67' below grade; consequently, the distribution lateral will be at elevation 509.53'.
- Consequently, the static head is 77.11'.
- Design head at the distal end of Lateral 1 will be 2'.
- Friction loss
  - Length of force main is 520' and is 3" diameter Sch. 40 pvc pipe.
  - Equivalent length of fittings (3" Sch. 40 pvc pipe)
    - 2 ea. 90° ells –10' ea. – 20' (3" Sch. 40 pvc)
    - 6 ea. . 45° ells – 6' ea. – 36' (3" Sch. 40 pvc)
    - 1 tee – 15' – (3" Sch. 40 pvc)
    - 2 gate valves – 2' ea. – 4' (3" Sch. 40 pvc)
    - 1 ea. 3" Sch. 40 pvc ball check valve – 100'
  - Total Equivalent pipe length – 175'
  - Total length of pipe – 695'
  - Friction loss for 3" schedule 40 plastic pipe with a flow of 44.05 gpm is 0.48'/100' length of pipe. Consequently, friction loss is 3.34'
- Total Dynamic Head is therefore 3.34' + 2' + 77.11' = 82.45'
- Pump must be able to deliver a minimum of 44.05 gpm at a TDH of 82.45'
- Selected Franklin FPS - E Series, 1 Hp, 230 V, Single Phase, 45 gpm submersible effluent pump.
- System operational curve
  - At 3' operating head at distal end of top lateral (Lateral 1) – 49.77 gpm @ 84.28' TDH
  - System operational point is approximately 48.5 gpm @ 84' TDH

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