EXISTING FLOAT TREE SETUP:

	SWITCH "ON" POSITIONS
LOW WATER ALARM	18"
QUANTITY RELAY SENSOR	57" 51
HIGH WATER ALARM	74" 68
OVERFLOW PREVENTION	110"

5400 GALLON PUMP TANK INSIDE HEIGHT: 124"

43.5 GALLONS PER INCH

720 GALLONS PER DOSE

DRAWDOWN CALCULATIONS:

① PRESSURE MANIFOLD SERVING DRAINFIELDS #1 & #2 (25" WORKING HEAD):

2.25 INCHES PER MINUTE
× 43.5 GALLONS PER INCH
= 97.88 GALLONS PER MINUTE
÷ 16 TAPS (½" SCH 80)
= 6.12 GALLONS PER MINUTE/TAP

② PRESSURE MANIFOLD SERVING DRAINFIELD #3 (25" WORKING HEAD):

1.12 INCHES PER MINUTE
× 43.5 GALLONS PER INCH
48.72 GALLONS PER MINUTE
÷ 8 TAPS (½" SCH 80)
= 6.09 GALLONS PER MINUTE/TAP

③ PRESSURE MANIFOLD SERVING DRAINFIELD #4 (18" WORKING HEAD):

1.20 INCHES PER MINUTE
× 43.5 GALLONS PER INCH
= 52.2 GALLONS PER MINUTE
÷ 20 TAPS (½" BRASS NIPPLE)
2.61 GALLONS PER MINUTE/TAP

Design Flow = 2,884 GPD

LTAR = 0.25 GPD/SF

Nitrification Lines

$\frac{2884}{0.25} = 11,536$ SF $\quad \frac{11536}{3} = 3,845$ LF

Min drainfield area = 11,536 sf

Required septic tank size

$V = 0.75\,Q + 1125 = (0.75)(2884) + 1125 = 3288$ gal

USE existing 3,000gal septic tank

BLUE RIDGE ENGINEERING
529 MAIN STREET
N. WILKESBORO, NC 28659
(336) 838-2500
(336) 838-4179 Fax
brepllc@earthlink.net

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Field #4 flow

use $h = 1.5'$

use $\frac{3}{8}$" ID brass nipples $d = 0.375"$

orifice flow $= 13(0.375)^2(1.5)^{\frac{1}{2}} = 2.24$ gpm

$Q = 20 @ 2.24 = 44.8$ gpm $\rightarrow$ 45 gpm

Flow to #1 or #2 or #3

$Q = 45$ gpm use $\frac{1}{2}$" sch 80 taps $d = 0.546"$

Each field has 8 taps.

$45 = 8(13)(.546)^2(h)^{\frac{1}{2}}$

$\sqrt{h} = 1.45$

$h = 2.1'$

$h = 25" \pm$

$Q = 45$ gpm

USE

Field	#1	#2	#3	#4 (ex)
Q (gpm)	45	45	45	45
h	25"	25"	25"	18"
material	sch80	sch 80	sch80	brass nipple
d	0.546"	0.546"	0.546"	0.375"

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Elevation Head

Top of ground @ tank = 965' ±

Pump elev = 959' ±

Manifold elev = 956' ±

$h = -3'$ or less

USE $h = 6'$ (to exit tank)

Friction Head

Assume 3" PVC to #1 and #2

$Q = 90$ gpm

Length of pipe = 655' + 25% for fittings = 818' → 850'

$$H_f = \frac{0.00113 L Q^{1.85}}{d^{4.87}} = \frac{(0.00113)(850')(90)^{1.85}}{(3")^{4.87}} = 18.8' \Rightarrow \underline{19'}$$

$$\frac{90}{7.48(60)} = 0.20 \text{ CFS} \qquad V = \frac{Q}{A} = \frac{(0.20)}{\pi (0.125)^2} = 4.1 \text{ fps} > 2 \Rightarrow \text{OK}$$

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check velocity in branch lines:

$$Q = 45\,gpm = \frac{45}{(7.48)(60)} = .10\,cfs$$

$$V = \frac{Q}{A} = \frac{0.1}{\pi (0.125)^2} = 2.05\,fps > 2\,fps \Rightarrow OK$$

Pump requirements

Elev. head = 6'

Friction head = 19'

Pressure head = 2'

TDH = 27'

92 GPM @ 27' TDH

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Dosing

Each field has ~1000LF conventional trench

1000LF @ 0.653 gal/LF = 653 gal

$\frac{66+75}{2} = 70\frac{1}{2}\%$ 653gal (.705) = 460gal

Assume each field gets $\frac{1}{4}$ of 2884 GPD

$\frac{2884}{4} = 721$ GPD/field

Assume 2 doses/field/day

$\frac{721}{2} = 360$ gal/dose

pump run time = $\frac{360}{45} = \underline{8.0 \text{ min}}$

USE

Each field gets 360gal dose 2 times per day.

(4 fields)(360gal)(2 times) = 2880 GPD

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Pump tank sizing

Emergency storage = 2884gal
(above alarm level)

Pump submerged = height of pump

Dose = 720gal

Extra Dose = 720 gal

Capacity = 4,324gal
+ pump depth

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Actual application rates

Field #1

8 lines × 125' = 1000 LF

Area = 1000 (3) = 3000 SF

$$LTAR = \frac{(360)(2)}{3000} = 0.24 \text{ GPD/SF}$$

Field #2

LTAR = 0.24 GPD/SF

Field #3

8 lines × 150' = 1200 LF

Area = 1200(3) = 3600 SF

$$LTAR = \frac{360(2)}{3600} = 0.20 \text{ GPD/SF}$$

Field #4

20 lines = 1500 LF

Area = 1500(3) = 4500 SF

$$LTAR = \frac{360(2)}{4500} = 0.16 \text{ GPD/SF}$$

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Summary

- Construct 3 new drainfields. Rework
- Existing drain field by installing 3/8" brass nipples at each orifice.
- Use existing grease trap & septic tank.
- Remove existing pump tank & replace with larger pump tank per sheet 6.
- Install new control panel which sends timed dose to each field 2 times per day

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