

# Design Spec's for 7429 Mink Hollow Rd.

4 Bedrooms

Design Flow  $\Rightarrow$  600 gpd

\* Use Existing S.T. and 4" gravity Sewer

Ex. Septic Tank: Outlet Inv of S.T. = 44" below grade (133")

New Pump Tank: (1500g)  
Elev. Pump OFF = 14.5 ft  
Pump Chamber size = 1500g

Pump  
Liberty 1/2 HP  
FL 50

Trenches:  
T1 (Highest) = 2ft wide Inlet 2ft below grade  
T2 Bottom 7ft w/  
T3 (lowest) 1' sand mound sand.

Force Main and manifold:

50ft of 3" F.M. + manifold.  
5x 90° bends  
2x "Tees"  
1x Union (quick-Disconnect)

Laterals:

Lateral 1 Elev = 2.46 ft  
Lateral 2 Elev = 3.83 ft  
Lateral 3 Elev = 4.25 ft

	<u>Lateral 1</u>	<u>Lateral 2</u>	<u>Lateral 3</u>
Lateral Length =	36.00 ft	52.50 ft	61.75 ft
Lateral Diameter =	1.5 in	1.5 in	1.5 in
# of Holes =	5	8	10
Hole Diameter =	5/16 in	5/16 in	5/16 in
Hole Spacing =	8.0 ft	7.0 ft	6.5 ft

Pump Design:

TDH = 17.983 ft

Flow = 61 gpm

Static Head = 12.1 ft

Dose = 104.2g

Friction = .883 ft

for 5ft of Distal Head @ highest lateral Elev.

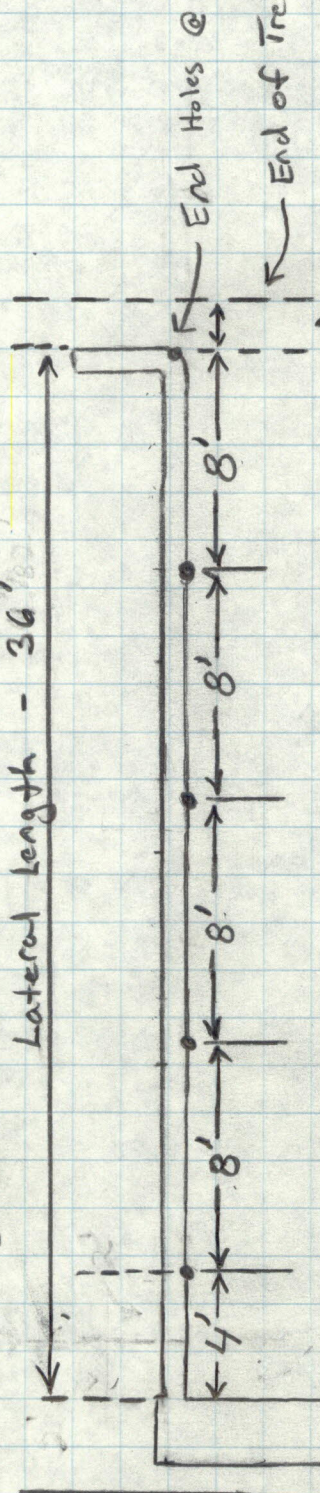
Note: Ball valve will probably need to be used.

Q = 2.6 gpm  
for 5/16" holes

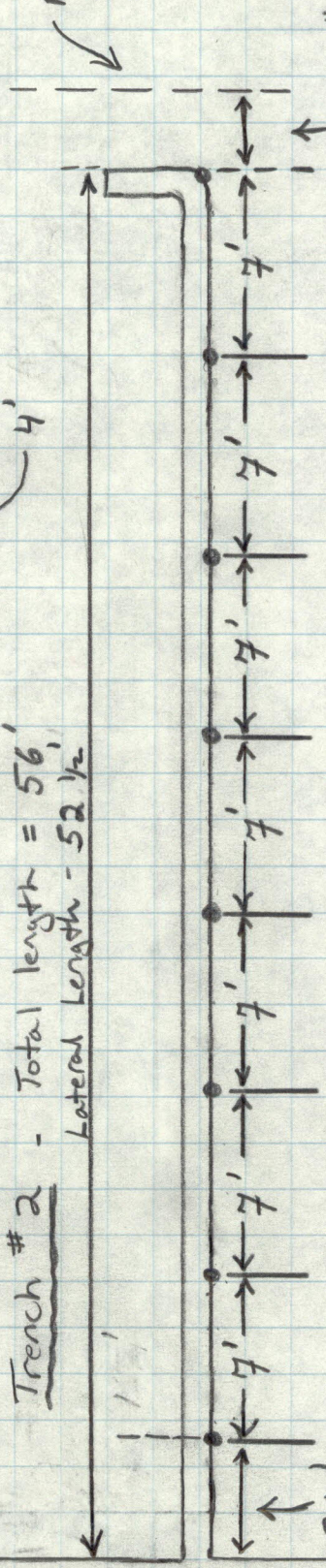
7429 Mink Hollow Rd

(Highest Elevation)

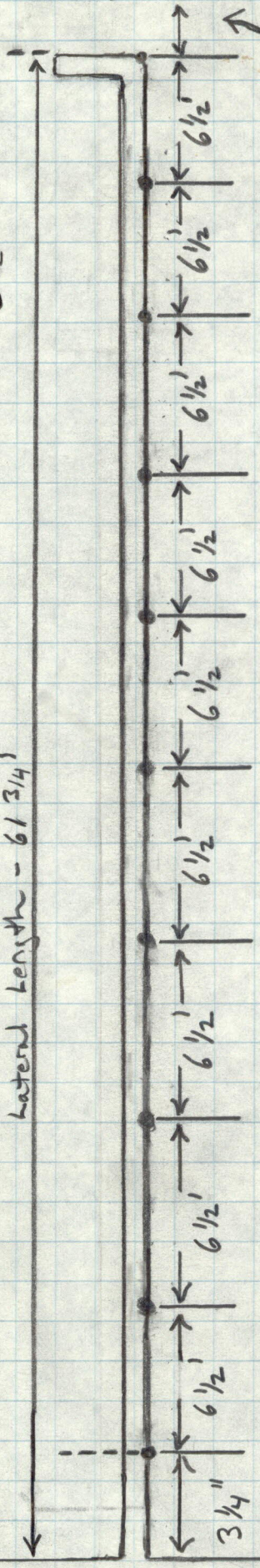
Trench # 1 - Total length = 40'  
Lateral length - 36'



Trench # 2 - Total length = 56'  
Lateral length - 52 1/2'



Lateral length - 61 3/4'



Trench # 3 - Total length = 65'

(lowest Elevation)

5/16" Diameter Holes

100' well Radius

3" F.M.



DESIGN FLOW (in gallons/day)?  
 Elevation of the PUMP OFF SWITCH, in feet?  
 Elevation of the upper LATERAL, in feet?  
 DELIVERY PIPE distance, from pump to manifold, in feet?  
 DELIVERY PIPE diameter, in inches (if not 2"--use 2" min)?  
 Design DISTAL PRESSURE, in feet (if not 2.5)? (hd)  
 IS MANIFOLD CENTER-FED & SYMMETRICAL (yes or no)?  
 How many orifices in the MANIFOLD?  
 MANIFOLD ORIFICE diameter, in inches (if not 5/16")  
 MANIFOLD DIAMETER (if not 2"--use 2" min)?  
 TOTAL LENGTH OF MANIFOLD  
 Does MANIFOLD drain to FIELD after dose (yes or no)?  
 How many LATERALS?  
 Pumping chamber weep hole size (usually .25")  
 PROGRAM WILL CALCULATE UP TO 26 LATERALS AND UP TO 50 ORIFICES PER LATERAL

600	
14.5	Yellow cells inputs
2.46	
45	
3	(Inside Diameter)
5	
no	GO TO MANIFOLD DESIGN <50 feet up to 75 usually END FEED
0	(Ignore)
0	0.3125 (Ignore)
3	3 (Inside Diameter)
24	
no	( Are you pumping downhill)
3	
0.25	USE 0 IF FORCE MAIN DOES NOT DRAIN Back to Pump Chamber
40	56 65

Your HIGHEST elevation lateral MUST be LATERAL 1:  
 (first orifice from lateral 1/2 of orifice spacing)

Length of each LATERAL, in feet?  
 Diameter of each LATERAL, in inches (1.5" min)?  
 Elevation of each LATERAL, in feet?  
 Number of ORIFICES per lateral  
 Distance from Manifold to closest Orifice, in feet  
 ORIFICE SPACING, in feet (2-6 ft ok 3-6 preferred)  
 Diameter of ORIFICES, in inches? (D)  
 Square feet of leachfield per laterals (can ignore)

Lateral 1:	Lateral 2:	Lateral 3:			
36.00	52.50	61.75			
1.5	1.5	1.5	0	0	0
2.46	3.8	4.25	0	0	0
5	8	10	0	0	0
4.00	3.50	3.25			
8.00	7.00	6.50			
0.3125	0.3125	0.3125	0	0	0
120	168	195	0	0	0

Maximum number of orifices in any one lateral 0  
 Minimum lateral diameter

**RESULTS**

FRICITION CALCULATIONS (using Hazen Williams friction  $f_t = Ld((3.55Qm/Ch(Dd^{2.63})))^{1.85}$ )  
 PRESSURE CALCULATIONS (using orifice discharge equation  $Q=11.79 D^{2.5} hd^{0.5}$ )

	Lateral 1:	Lateral 2:	Lateral 3:			
LATERAL DISCHARGE (first approximation)	12.87	20.60	25.75			
MANIFOLD ORIFICE DISCHARGE	0.00					
TOTAL SYSTEM DISCHARGE (first approximation)	59.21					
TOTAL DISCHARGE PER LATERAL	12.91	17.76	20.86			
DISCHARGE PER SQUARE FOOT OF LEACHFIELD	0.10761234	0.105694593	0.10698314			
ORIFICE MAXIMUM DISCHARGE BY LATERAL	2.60	2.25	2.13			
ORIFICE MINIMUM DISCHARGE BY LATERAL	2.57	2.20	2.06			
ORIFICE % DIFFERENCE DISCHARGE within LATERAL	0.8%	2.0%	3.0%	0.0%	0.0%	0.0%
MAXIMUM DISCHARGE LATERAL	20.86					
MINIMUM DISCHARGE LATERAL	12.91					
MAXIMUM DISCHARGE PER SQUARE FOOT	0.11					
MINIMUM DISCHARGE PER SQUARE FOOT	0.11					
% DIFFERENCE DISCHARGE for SYSTEM by orifice	20.5% as percent of maximum orifice in system					
% DIFFERENCE DISCHARGE for SYSTEM by laterals	38.1% as percent of maximum lateral in system					
% DIFFERENCE DISCHARGE for SYSTEM by square feet	1.8% as percent of maximum square foot in system					

WEEP HOLE DISCHARGE (usually a 1/4" weep hole) #NUM! weep hole= 0.25 inch

WARNING: THERE IS GREATER THAN A 15% DIFFERENCE IN ORIFICE DISCHARGE RATES  
 WARNING: THERE IS GREATER THAN A 15% DIFFERENCE IN LATERAL DISCHARGE RATES

VOID VOLUME IN DELIVERY PIPE	16.52					
VOID VOLUME IN MANIFOLD	6.28	Volume from Manifold Design				
VOID VOLUME IN EACH LATERAL	3.30	4.82	5.67	0.00	0.00	0.00
TOTAL LATERAL VOID VOLUME	13.79					

MINIMUM DOSE VOLUME (based on void volume) 68.96 to 137.92 MIN  
 ACTUAL MINIMUM IS BASED ON DAILY DESIGN FLOW  
 (weep hole, usually 1/4", not counted for dose, effluent is repumped during process and not counted for friction, except as fitting headloss)  
 TOTAL HEAD LOSS IN EACH LATERAL 0.35 0.75 1.10

MAXIMUM TOTAL LATERAL HEADLOSS IN SYSTEM	1.10					
MANIFOLD HEADLOSS (center-fed unless manifold design)	0.90					
DELIVERY PIPE HEADLOSS	0.31	w/ delivery	3 inch diameter			
FITTING LOSS (headloss *.15)	0.75	add extra head if fittings are more than absolute minimum				
DISTAL PRESSURE HEAD	5.00					
STATIC HEAD (OFF-SWITCH TO HIGH LATERAL/MANIFOLD)	-12.04					
HEADLOSS PUMP TO WEEPHOLE (assume 3' run)	#NUM!					
PUMP MUST BE ABLE TO PASS SOLIDS AT	#NUM!	G.P.M.	#NUM!	FEET OF HEAD		
or						
After OTIS (network losses =1.3*distal head)	#NUM!	G.P.M.	#NUM!	FEET OF HEAD		

# 7429 Mink Hollow Rd. Design Spec's - LPD

Trenches:

Inlet → 2' [clean #2 stone 2'-6"]  
Bottom → 7'

w/ 1" sand mand  
sand @ bottom

2' of head  
Q = 5/16" @ 1.63 gpm

5' of head (Distal)  
Q 5/16" @

- manifold length = 24'
- 3 laterals
- 5/16" holes

(Highest) T1 = 29.5" → (2,46")  
T2 = 46" → (3,83")  
T3 = 51" → (4,25")

Pump Tank: 64" bottom of tank to outlet insert (lowest)

\* Pump tank must be reversed.  
Use Inlet as outlet.

Liberty Pump 1/2 HP  
model FL50

sewer outlet from Ex. S.T. : { 44" below grade  
Elevation shot in field: 133" (11.1')

TDH = Static head + Friction Head + Distal Head (5')  
5x90° bends  
2x Tees

Static Head = (29.5") - 174" = 145.0" (12.1')

Friction Head = \* @ 60.2 gpm per 100' of 3" pipe = 0.81 friction loss \*

- 50' of 3" pipe = 50'
- 5x90° bends @ 10' of pipe per 90° = 50'
- 2x Tee @ 3' of pipe per Tee = 6'
- 1 "union" @ 3' of pipe per union = 3'

11.09' x .81 = .8829 ft friction loss

Distal Head = 5' =

@ 109' = .883' ft friction loss

Dose: length of F.M + manifold = 50' of 3" sch 40  
length 50' x 38.4 ÷ 100 = 19.2 gallons

length of laterals = 161' of 1.5" sch 40  
161' x 10.6 ÷ 100 = 17.0 gallons

→ (5 x 17.0 g) + 19.2g = 104.2g (min Dose)

1/6 x 600g = 100g

Dose → 104.2g

Flow: 5/16" holes  
Q = 2.66 gpm

T1 has 5 perforations  
T2 has 8 perf.  
T3 has 10 perf.

Total Perf. = 23

23 x 2.66 = 61.0 gpm

Flow = 61.0 gpm

Design Head = (12.1' (static) + 0.883' (friction) + 25' (distal))

TDH = 17.983'

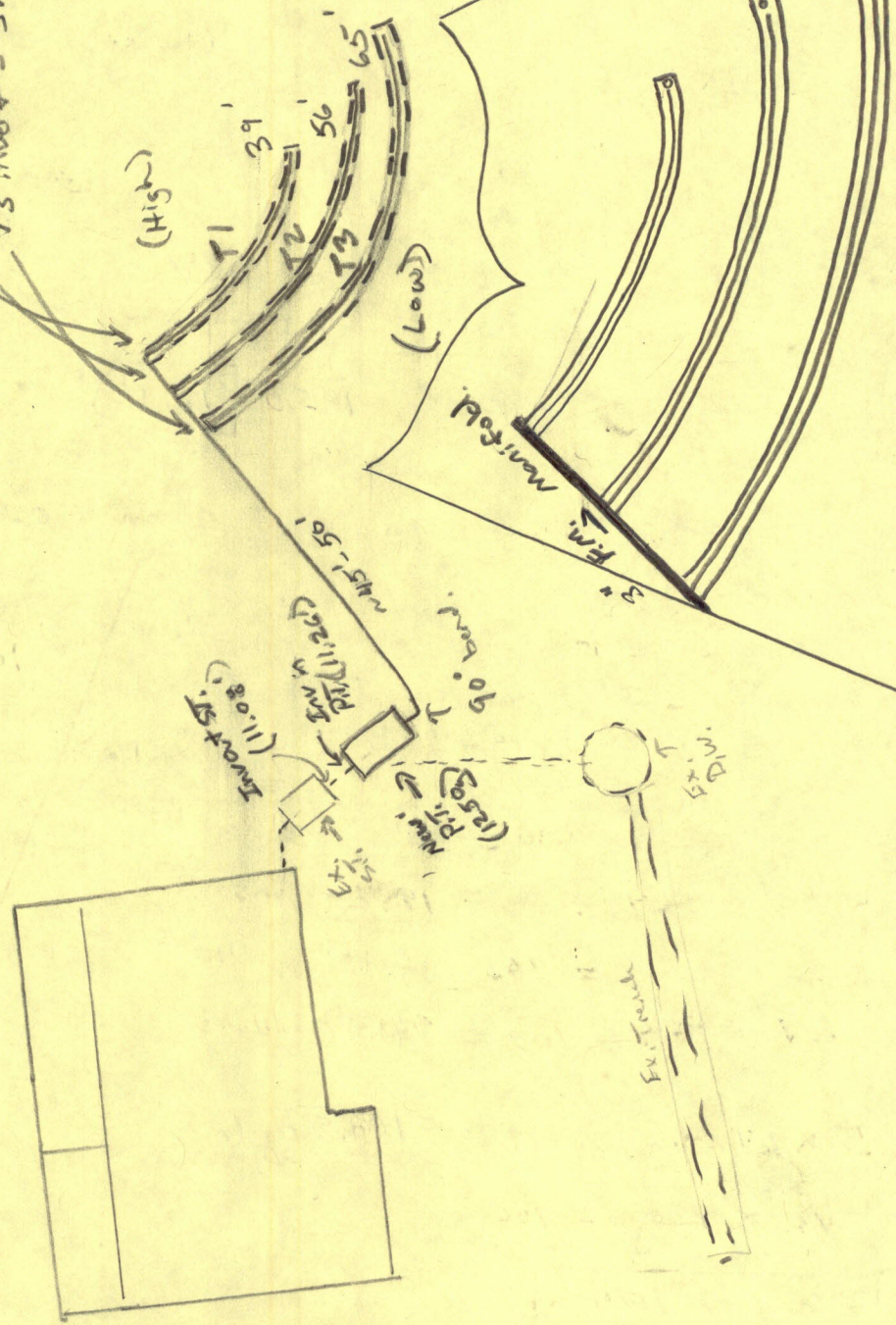
Q = 11.82 x d<sup>2</sup> x √h  
d = Diameter of hole  
h = Distal head.  
11.82 x (.1004687) √5 = 2.66 gpm

Laterals

- Lateral Diameter : 2"
- Force main Dia. : 3"
- Lateral lengths :

- Trenches : 2' wide
- Inlet @ 2'
- Bottom @ 7'

T1 invert = 29.5" = 2.46'  
T2 invert = 46" = 3.83'  
T3 invert = 51" = 4.25'

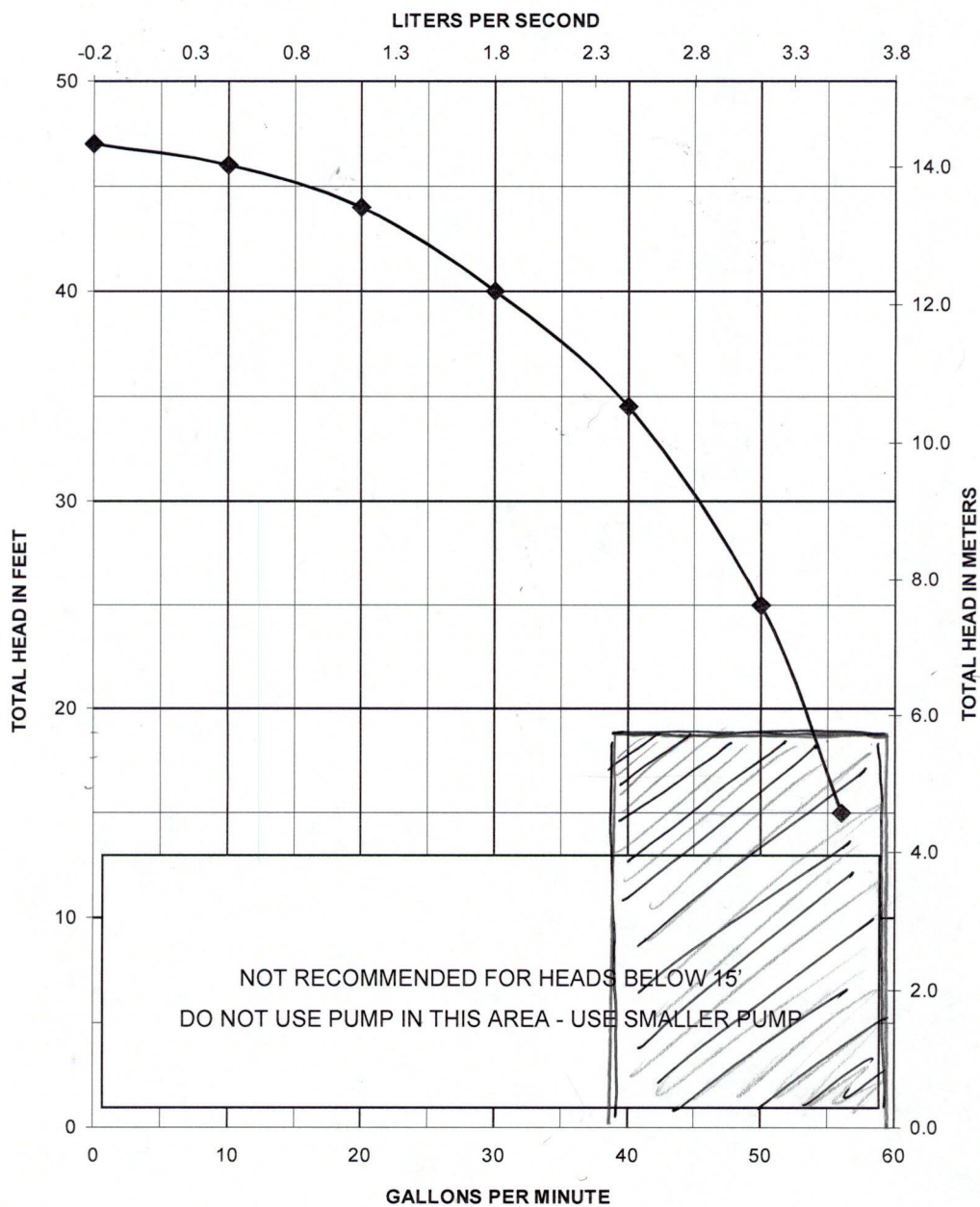
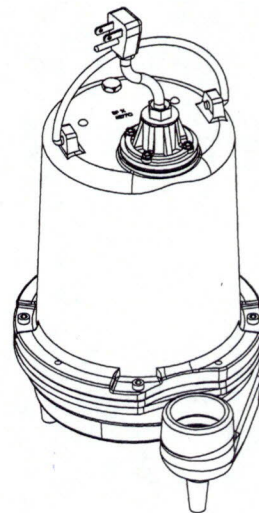


1439 Mark Nelson Rd  
Dustin - Spent - 2000

# Liberty Pumps®

## Pump Specifications

### FL50 Series 1/2 hp Submersible Effluent Pump



-76°59'57"



39°10'9."



39°10'9."

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-76°59'57"



By:  
 Office:  
 Map Width: 273.00 ft.  
 Print Date: 11/1/2010  
 Scale: 1 in. = 30 ft.