

Crow Wing County Pressure Bed/Trench with Pump Design

Property Owner: _____ Date: _____

Mailing Address: _____

City: _____ State: _____ Zip: _____

Home Phone Number: _____ Cell: _____

Site Address: _____

City: _____ State: _____ Zip: _____

Driving directions if no address issued: _____

Legal Description: _____

Sec: _____ Twp: _____ Range: _____ Twp Name: _____

Parcel Number: _____

Lake/ River: _____

Lake/River Classification: _____

Flow Data

Number of Bedrooms: _____

Dwelling Classification: _____

System Type: _____

GPD: _____

Wells

Deep Well: _____

Shallow Well: _____

Wells to be sealed (if applicable)? _____

Estimated Flow in Gallons per Day (GPD)			
Bedrooms	Class I	Class II	Class III
2	300	225	180
3	450	300	218
4	600	375	256
5	750	450	294
6	900	525	332
7	1050	600	370
8	1200	675	408

Setbacks

Tank(s) to: Well _____ Drainfield to: Well _____ Sewer Line to well: _____
House _____ House _____ Air Test:
Property Line _____ Property Line _____

Additional System Notes and Information: _____

Designer Name: _____ License Number: _____

Address: _____

City: _____ State: _____ Zip: _____

Home Phone Number: _____ Cell: _____

E-Mail Address: _____

Designer Signature: _____ Date: _____

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Parcel Number: _____ Property Owner: _____ Date: _____

Designer's Initials: _____

Tank Sizing

A. Septic Tank Capacity: _____ Gallons
 Tank Type: _____ Filter: _____
 Garbage Disposal/Basement Lift Station: _____
 B. Pump Tank Capacity: _____ Gallons (7080.2100)
 a. Alarm Type: _____

Septic Tank Capacity		
Bedrooms	Minimum	GD/BL
5 or less	1,500	2,250
6 or 7	2,000	3,000
8 or 9	2,500	3,750

Soils

C. Depth to Restricting Layer: _____ ft.
 D. Native SSF: _____
 (Perc. Rate [Optional] _____ MPI)

Absorption Width Ratio Table		
Texture	SSF	AWR
Sand	0.83	1.00
Fine Sand	1.67	2.00
Sandy Loam	1.27	1.52
Loam	1.67	2.00
Silt Loam	2.00	2.40
Clay Loam	2.20	2.67

****Enter GPD next to the type of system****

Rock Trenches

E. 6 in. Trench Depth _____ GPD × D = _____ sq. ft.
 F. 12 in. Trench Depth _____ GPD × D × .8 = _____ sq. ft.
 G. 18 in. Trench Depth _____ GPD × D × .66 = _____ sq. ft.
 H. 24 in. Trench Depth _____ GPD × D × .6 = _____ sq. ft.
 I. Divide (E-H) by Trench Width for lineal feet: _____ ÷ _____ = _____

Cubic Yards of Rock: _____ yds³
 Cubic Yards of Rock: _____ yds³
 Cubic Yards of Rock: _____ yds³
 Cubic Yards of Rock: _____ yds³

Chamber Trenches

J. Brand: _____ Dimensions of one chamber (L x W): _____ ft. × _____ ft.
 K. 6-11 in. Chamber Depth _____ GPD × D = _____ sq. ft.
 L. 12 in. Chamber Depth _____ GPD × D × .8 = _____ sq. ft.
 M. Select from (K-L) if installing Chamber Trenches: _____
 N. Divide (M) by Trench Width for lineal feet: _____ ÷ _____ = _____ Lineal Feet
 O. Total Chambers Needed (**Round Up**): _____ Chambers

Pressure Beds

P. Pressure Bed _____ GPD × D = _____ sq. ft.
 a. Bed Dimensions _____ ft. × _____ ft.
 b. Cubic Yards of Rock Bed Length × Bed Width × Rock Depth _____ ft. ÷ 27 = _____ yds³

Additional System Notes and Information: _____

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Determine Pump Capacity

1) Gravity Distribution Pump Capacity Range: 10 - 45 GPM

*Skip to Pump Head Requirements if pumping to gravity

2) Pressure Distribution:

a) Number of laterals: _____

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b) Lateral Size: _____ in.

c) Perforation spacing: _____ ft.

d) Check Table 4 to see the maximum number of perforations per lateral.

3) Lateral Length (choose):

a) End manifold: rock bed length: _____ - 2 ft. = _____ ft.

b) Center manifold: rock bed length /2: _____ - 1 ft. = _____ ft.

c) Choose 3a or 3b: _____ ft.

4) Total Perforation Determination:

a) Length (3c) ÷ Spacing (2c): _____ + 1 = _____ Perforations / Lateral

b) (4a): _____ × (2a): _____ = _____ Total Number of Perforations

c) Select perforation discharge from Table 1 = _____ GPM/Perf.

d) (4b): _____ × (4c): _____ GPM/Perf. = _____ GPM

PUMP HEAD REQUIREMENTS

5) Elevation difference:

a) Elevation difference between pump and point of discharge _____ ft.

b) If pumping to a pressure distribution system, (5a) _____ + 5 = _____ ft.

c) Choose 5a if pumping to gravity or 5b for pressure: _____ ft.

6) Friction loss:

a) Select a value from Table 2: _____ ft. / 100 ft. of pipe

b) Pipe length to drainfield: _____ ft. × 1.25 = _____ ft.

c) (6a): _____ × (6b): _____ ÷ 100 = _____ Total Friction Loss

7) Drainback:

a) Actual Pipe length _____ ft. × _____ gal/ft. (Table 3) = _____ gal

8) (5c): _____ ft. + (6c): _____ ft. = _____ Total Head Required

9) Minimum Pump Size _____ GPM (4d) & _____ ft. of dynamic head (8)

Designer's Initials: _____

Table 1

Perforation Discharge (GPM/perf.)

Ft. of Head	7/32 Perf Diameter	1/4 Perf Diameter
1.0	0.56 in.	0.74 in.
2.0	0.80 in.	1.04 in.

Table 2

Friction Loss in Plastic Pipe

Flow (GPM)	1.5"	2"	3"
20	2.47	0.73	0.11
25	3.73	1.11	0.16
30	5.23	1.55	0.23
35	6.96	2.06	0.30
40	8.91	2.64	0.39
45	11.07	3.28	0.48
50	13.46	3.99	0.58
55		4.76	0.70
60		5.60	0.82
65		6.48	0.95
70		7.44	1.09

Use 1.0 for single homes, 2.0 for everything else

Table 3

Volume of Liquid in Pipe

Pipe Diameter	Gal/Ft.
1.25 in.	0.078
1.5 in.	0.11
2.0 in.	0.17

Table 4

Max Perforations/Lateral

Perf. Spacing	1.25" Pipe	1.5" Pipe	2" Pipe
2.5 ft.	14	18	28
3 ft.	13	17	26
3.3 ft.	12	16	25
4 ft.	11	15	23
5 ft.	10	14	22

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Designer's Initials: _____

Proposed Site Boring #1

Depth (in)	Texture	Coarse Frag. %	Color	Structure	Redox

Proposed Site Boring #2

Depth (in)	Texture	Coarse Frag. %	Color	Structure	Redox

Alternate Site Boring #1

Depth (in)	Texture	Coarse Frag. %	Color	Structure	Redox

Alternate Site Boring #2

Depth (in)	Texture	Coarse Frag. %	Color	Structure	Redox

Soil Sizing Factors/Hydraulic Loading Rates							
Perc. Rate	Texture	SSF	HLR	Perc. Rate	Texture	SSF	HLR
<0.1	Coarse Sand			16 to 30	Loam	1.67	0.60
0.1 to 5	Sand	0.83	1.20	31 to 45	Silt Loam	2.00	0.50
0.1 to 5	Fine Sand	1.67	0.60	46 to 60	Clay Loam	2.20	0.45
6 to 15	Sandy Loam	1.27	0.78	> 60	Clay Loam	****	0.24

Description of Soil Treatment Areas				
	Proposed Site		Alternate Site	
Disturbed Areas?				
Compacted Areas?				
Flooding Potential?				
Run-on Potential?				
Limiting Layer Depth	Proposed #1:	Proposed #2:	Alternate #1:	Alternate #2:
Slope % and Direction				
Landscape Position				
Vegetation Types				
Soil Texture				
Soil Sizing Factor				

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Please Draw to Scale with North Arrow to top or Left Side of Page



*Click in the sketch area below to import an existing sketch (PDF or JPG format).
Drawing tools are also available in the Comments Toolbar of Adobe Reader.*

Please show all that apply (Existing or Proposed):

Wells within 100 ft. of a Drainfield
Water lines within 10 ft. of a Drainfield
Drainfield Areas
Boring Locations

Disturbed/Compacted Areas
Component Location
OHW
Lot Easements

Access Route for Tank Maintenance
Property Lines
Structures
Setbacks

Elevations:

Benchmark Elevation: _____
Elevation of Sewer Line at House: _____
Tank Inlet Elevation: _____
Drainfield Elevation: _____

Pump Elevation: _____
Pump Discharge Elevation: _____
Restricting Layer Elevation: _____

Designer Signature: _____ Date: _____ License Number: _____

SSTS Management Plan required to be submitted with this design

Minnesota Pollution Control Agency Rules Sections 7082.0600 Subp. 1. A and B, and Section 7082.0100 Subpart 3. J