

## Crow Wing County Mound 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: Select One

### Flow Data

Number of Bedrooms:

Dwelling Classification: Select One

System Type: Select One

GPD:

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

### Wells

Deep Well: Select One

Shallow Well: Select One

Wells to be sealed (if applicable)?

### Setbacks

Tank(s) to: Well

House

Property Line

Drainfield to: Well

House

Property Line

Sewer Line to well:

Air Test: Select One

### Additional System Notes and Information:

Designer Name:

License Number:

Address:

City:

State:

Zip:

Home Phone Number:

Cell:

E-Mail Address:

I hereby certify that I have completed this work in accordance with all applicable requirements.

Designer Signature: \_\_\_\_\_

Date:

# Crow Wing County Mound Design

Property Owner:

Date:

Designer's Initials:

## Tank Sizing

A. Septic Tank ☐ \*Existing New

Capacity: Gallons Tank Type: Filter:

Garbage Disposal/Basement Lift Station:

B. Pump Tank \* Existing New Capacity: Gallons (7080.2100)

a. Alarm Type:

\*Sewage Tank Integrity Assessment form must be attached

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. Depth of Clean Sand at Upslope Edge: ft.

E. Native SSF: (Perc. Rate [Optional] MPI)

F. Land Slope: %

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

## Rock Bed Dimensions

G.  $\times$  = sq. ft.

H. Rock Bed Width: ft.

I. Rock Bed Length: ft.

J. Cubic Yards of Rock  $\times$   $\times$  Rock Depth 1ft.  $\div$  27 = yds<sup>3</sup>

## Mound Size Calculations

K. AWR (from table):  $\times$  Rock Bed Width (H): = ft. (Absorption Width)

L. Absorption Width (K): - Rock Bed Width (H): ft. = ft. (Downslope Minimum)

M. Depth of washed sand (D): + 1 ft. of rock + 1 ft. of cover = ft. (Upslope Height)

N. Enter upslope berm value from Berm Multiplier Table:

O. Upslope berm multiplier (N):  $\times$  upslope height (M): = ft. (Upslope Width)

P. Rock bed width (H): ft.  $\times$  land slope (F):  $\times$  0.01 = ft. (Drop in Elevation)

Q. Upslope height (M): ft. + drop in elevation (P): ft. = ft. (Downslope Height)

R. Enter downslope berm value from Berm Multiplier Table:

S. Downslope height (Q):  $\times$  Downslope berm multiplier (R): = ft. (Downslope Width)

T. Select the larger number of Step (L) and Step (S): ft.

U. Upslope width (O): + rock bed width (H): + downslope width (T): = ft. (Mound Width)

V. Upslope width (O): + rock bed length (I): + Upslope width (O): = ft. (Mound Length)

W. Final Mound Dimensions Are: Width (U): ft. by Length (V): ft.

Berm Multiplier Table													
Land Slope→	0%	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%
Upslope Berm ↓ 3/1	3.00	2.91	2.83	2.75	2.68	2.61	2.54	2.48	2.42	2.36	2.31	2.26	2.21
4/1	4.00	3.85	3.70	3.57	3.45	3.33	3.23	3.12	3.03	2.94	2.86	2.78	2.70
5/1	5.00	4.76	4.54	4.35	4.17	4.00	3.85	3.70	3.57	3.45	3.33	3.23	3.12
6/1	6.00	5.66	5.36	5.08	4.84	4.62	4.41	4.23	4.05	3.90	3.75	3.61	3.49
7/1	7.00	6.54	6.14	5.79	5.46	5.19	4.93	4.70	4.49	4.30	4.12	3.95	3.80
Downslope Berm ↓ 3/1	3.00	3.09	3.19	3.30	3.41	3.53	3.66	3.80	3.95	4.11	4.29	4.48	4.69
4/1	4.00	4.17	4.35	4.54	4.76	5.00	5.26	5.56	5.88	6.25	6.67	7.14	7.69
5/1	5.00	5.26	5.56	5.88	6.25	6.67	7.14	7.69	8.33	9.09	10.00	11.11	12.50
6/1	6.00	6.38	6.82	7.32	7.89	8.57	9.38	10.34	11.54	13.04	15.00	17.65	21.43
7/1	7.00	7.53	8.14	8.86	9.72	10.77	12.07	13.73	15.91	18.92	23.33	30.43	43.75

# Crow Wing County Mound Design

Property Owner:

Date:

Designer's Initials:

## 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:

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) (3c):        ft. ÷ (2c):        ft. + 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:

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

Table 1		
Perforation Discharge (GPM/perf.)		
Ft. of Head	7/32" Perf	1/4" Perf
1.0	0.56	0.74
2.0	0.80	1.04

Use 1.0 for single homes, 2.0 for everything else

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

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

Page:        of

Et qy 'Y lpi 'Eqwpv{ 'O qwpf 'F guki p''

Rtqr gtv{ 'Qy pgt<''

F cvg<''

F guki pgt{ 'Kpklcn<''

%'Rtqr qugf 'Ukg

)	u	#7	#	o	k

%'Rtqr qugf 'Ukg

)	u	#7	#	o	k

%'Cngtpcvg'Ukg

)	u	#7	#	o	k

%'Cngtpcvg'Ukg

)	u	#7	#	o	k

UqklUk lpi 'HcevtuU { f t cwle'Nqcf lpi 'Tcvgu'							
Rgte0Tcvg"	Vgzwtg"	UUH'	J NT"	Rgte0Tcvg"	Vgzwtg"	UUH'	J NT"
>208"	Eqctug'Ucpf "			38"q"52"	Nqco "	3089"	2082"
208"q"7"	Ucpf "	20 5"	3042"	53"q"67"	Ukn'Nqco "	4022"	2072"
208"q"7"	Hpg'Ucpf "	3089"	2082"	68"q"82"	En{ 'Nqco "	4042"	2067"
8"q"37"	Ucpf { 'Nqco "	3049"	200;"	@82	En{ 'Nqco "	,, ,,,"	2046"

) o u				
	h o	h o	o	o
)				
#				
7 h				
k h				
O O )				
o )				
O h				
t u				
o u				
o o 7				

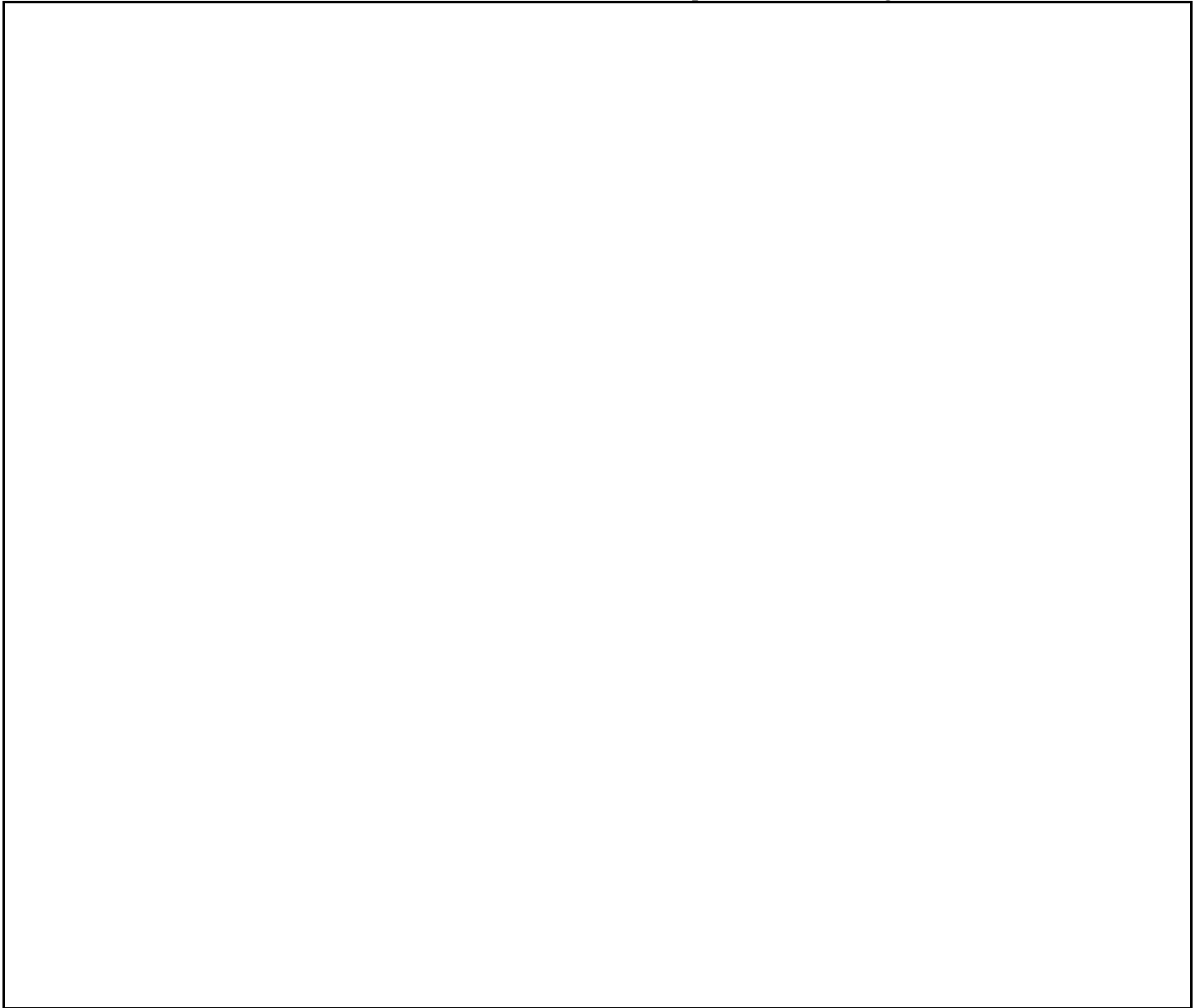
# Crow Wing County Mound Design

Page:    of 0

Property Owner:

Date:

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



**Please show all that apply (Existing or Proposed):**

- |  |  |   |
|--|--|---|
| <input type="checkbox"/> Wells within 100 ft. of a Drainfield      | <input type="checkbox"/> Disturbed/Compacted Areas         | <input type="checkbox"/> Lot Easements  |
| <input type="checkbox"/> Water lines within 10 ft. of a Drainfield | <input type="checkbox"/> Component Location                | <input type="checkbox"/> OHW            |
| <input type="checkbox"/> Drainfield Areas                          | <input type="checkbox"/> Access Route for Tank Maintenance | <input type="checkbox"/> Property Lines |
| <input type="checkbox"/> Boring Locations                          | <input type="checkbox"/> Structures                        | <input type="checkbox"/> Setbacks       |

**Elevations:**

Benchmark Elevation:

Elevation of Sewer Line at House:

Restricting Layer Elevation:

Tank Inlet Elevation:

Drainfield Elevation:

Pump Elevation:

Pump Discharge Elevation:

Designer Signature: \_\_\_\_\_ Date:

License Number:

# Crow Wing County Mound Design

~~SSTS Management Plan required to be submitted with this design~~

Page:     of 0

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