City of RAMSEY

7550 Sunwood Drive NW • Ramsey, Minnesota 55303
City Hall: 763-427-1410 • Fax: 763-427-5543
www.ci.ramsey.mn.us

October 11, 2011

Jason and Ruth Obermaier
5220 156th Lane NW
Ramsey, MN 55303

Re: Letter of Understanding - Septic Replacement

Dear Mr. and Mrs. Obermaier,

As previously discussed with you, this letter outlines our agreement related to the relocation of the sanitary septic system on your property located at 5220 156th Lane NW. The City of Ramsey will be preparing the final design and construction documents for you so that you may administer the project and contract directly with a contractor of your choice. This project entails the following:

- Relocation of the existing septic drain field.
- Tree removal as necessary to complete the project.
- Relocation of existing shrubs, as shown on the design, to the west property line to provide screening.
- Grading work to fill the depression at the rear of your property to alleviate the drainage concerns in that area.
- Relocation and/or repair of your existing irrigation system to facilitate this project.
- Final turf establishment in all areas disturbed by the construction activities.

The City will be responsible for the technical inspections and oversight during installation of the septic facilities, and will bear the cost of all these improvements. You will be required to administer the items related to final grading and turf establishment directly with the contractor, such that it meets your satisfaction. Following completion and acceptance the City will have no further obligation related to this matter.

Attached to this letter is the septic design, which has been prepared by Landform Engineering and is the basis for the work related to this project. By signing this letter you acknowledge the facts and obligations stated above, and agree that there will be no further recourse against the City as it relates to this work. Please feel free to contact me directly if you have any questions or concerns related to this matter, and thank you for your patience and cooperation through this process.

Sincerely,

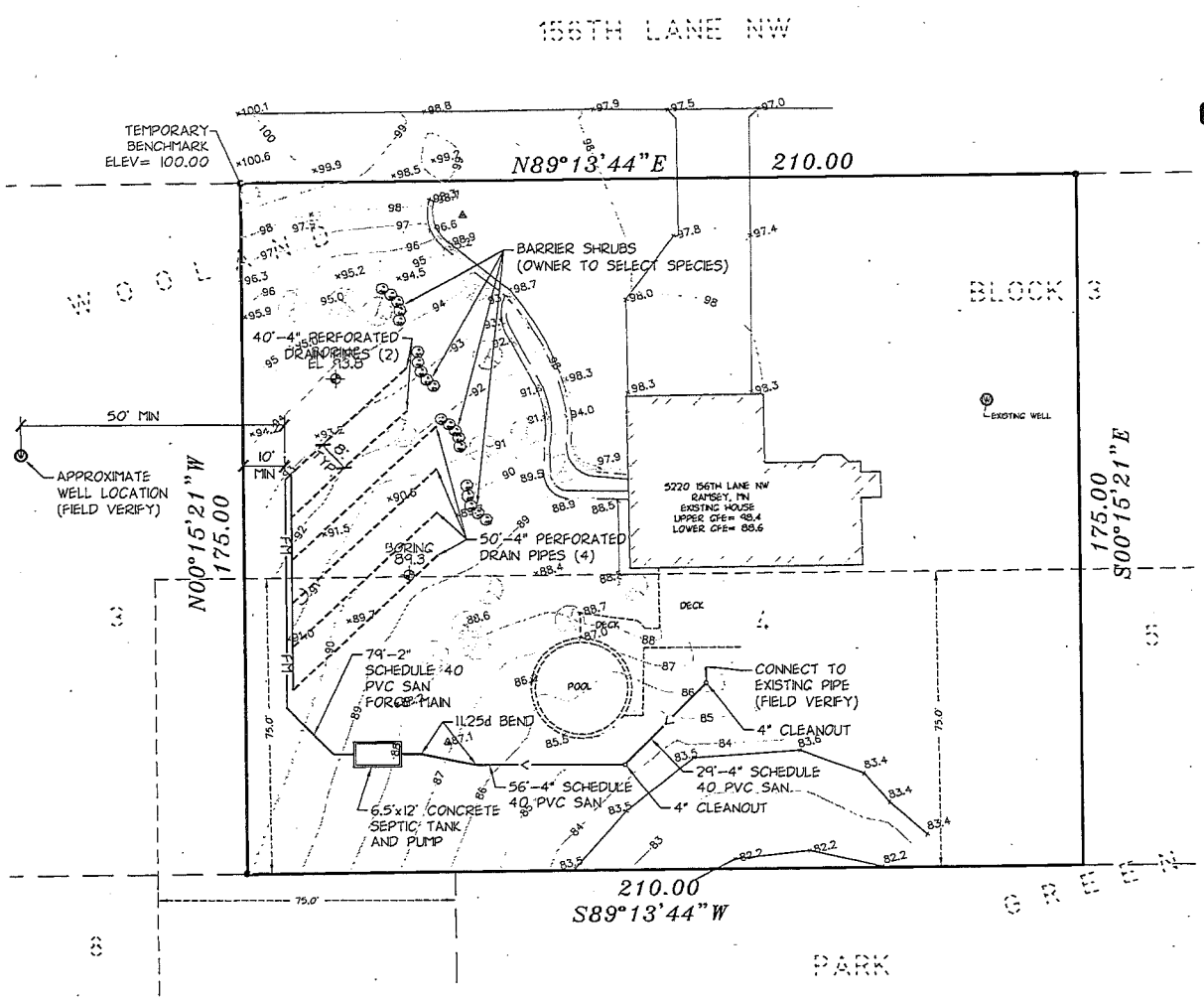
Brian Olson, PE
Public Works Director/Principal City Engineer

Jason Obermaier

Ruth Obermaier

SEPTIC LAYOUT

FOR: LOT 4, BLOCK 3, WOODLAND GREEN, ANOKA COUNTY, MN



NORTH

0 30

SCALE IN FEET

NOTES

1. BACKGROUND INFORMATION SHOWN PER FIELD SURVEY PERFORMED BY LANDFORM ON SEPTEMBER 30, 2011 EXPRESSLY FOR THIS PROJECT.
2. FOR THE PURPOSES OF THIS SURVEY THE NORTH LINE OF LOT 4, BLOCK 3, WOODLAND GREEN IS ASSUMED TO BEAR SOUTH 89 DEGREES 13 MINUTES 44 SECONDS EAST, ACCORDING TO THE RECORDED PLAT THEREOF.
3. THE NORTHWEST CORNER OF SAID LOT IS ASSUMED TO HAVE AN ELEVATION OF 100.00.
4. THIS SURVEY HAS BEEN PERFORMED WITHOUT THE BENEFIT OF A DEED OR TITLE COMMITMENT. EASEMENTS OF RECORD HAVE NOT BEEN RESEARCHED.

SITE SYMBOLS

EXISTING	DESCRIPTION
	BUILDING CANOPY / OVERHANG
123	CONTOUR
x123.4	SPOT ELEVATION
NUMBER & ELEVATION	SOIL BORING
	TREES
W	WELL

LANDFORM
From Site to Finish
105 South Fifth Avenue
Suite 513
Minneapolis, MN 55401
Web: landform.net

Job No. RAM11010 Drawing: CNPRAM1010 By: MJ

City of Ramsey

5220 156th Lane NW

Ramsey, MN

SEPTIC DESIGN

10/3/11

LANDFORM

From Site to Finish

L A N D F O R M
From Site to Finish

105 South Fifth Avenue
Suite 513
Minneapolis, MN 55401

Tel: 612-252-9070
Fax: 612-252-9077
www.landform.net

10/4311

5220 156th Lane NW
Ramsey,Mn,

Thank you for asking us to provide a septic design for your project in Ramsey. We have successfully completed projects of similar nature in the past and have the expertise to meet and exceed your expectations for this project.

We have estimated/designed a new, standard septic system (Type 1) for a 4-bedroom house. The details of this system are outlined within the project scope as follows.

- Design is to replace flooded trenches in rear lower yard.

  Existing system is non compliant due to lack of vertical separation.

- Pump and reuse existing compliant 1250 gallon septic tank..

- Install 1500 gallon reverse flow tank use 1000 gallon end for lift tank with pump and indoor alarm. Install in lower west end of yard below pool elevation. This may require a water proofed tank and dewatering.

- Use dropbox distribution of effluent. Pump to highest dropbox.

- Use schedule 40 piping throughout pressure distribution system.

  Verify all well and property line setbacks.

- . As part of the scope of this project and to ensure quality control, we will divert water from system's surroundings on final grade, rope off the new septic site, keep all construction traffic off of the site before and after construction.

Sincerely,
Landform

Michael Jungbauer, The Septic Doctor™
MPCA License No. L3227

Soil Boring Log

University of Minnesota Onsite Sewage Treatment Program

Date: 9/30/2011

Time: 4:30pm

Client/ Address: 5220 156th Lane NW

Legal Description/ GPS: Boring 1

Landscape position: Back/ Side Slope

Vegetation: lawn grasses

Soil parent materials (Check all that apply): ☐ Outwash ☐ Lacustrine ☐ Loess ☐ Till ☐ Alluvium ☐ Bedrock ☐ Organic

Soil survery map units: NyC

Slope %: 6

Slope shape: Convex, Concave

						Structure		
Depth (in)	Texture	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Shape	Grade	Consistence
0-6"	fine loamy sand	10yr2/2				Granular	Structureless	Loose
6-12"	medium loamy sand	10yr3/2				Single grain	Structureless	Loose
12-36"	medium loamy sand	10yr3/3				Single grain	Structureless	Loose
36-72"	medium loamy sand	10yr4/4				Single grain	Structureless	Loose
72-84"	medium loamy sand	10yr5/4				Single grain	Structureless	Loose

Comments:

Textures:

c-clay
sic-silty clay
sc-sandy clay
cl-clay loam
sicl-silty clay loam
scl-sandy clay loam
si-silt
sil-silt loam
l-loam
sl-sandy loam*
ls-loamy sand*
s-sand*

*Sand Modifiers
co-coarse
m-medium
f-fine
vf-very fine

Subsoil Indicator(s) of Saturation:

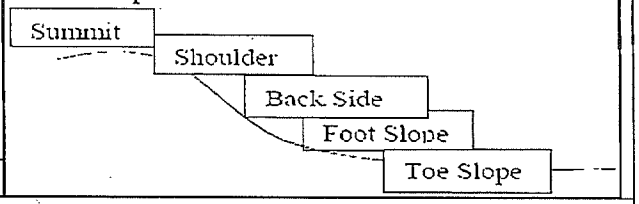
S1. Distinct gray or red redox features
S2. Depleted matrix (value >/=4 and chroma </=2)
S3. 5Y chroma </= 3
S4. 7.5 YR or redder faint redox concentrations or redox depletions

If yes to one of the above indicators then:

Topsoil Indicator(s) of Saturation:

T1. Wetland Vegetation
T2. Depressional Landscape
T3. Organic texture or organic modifiers
T4. N 2.5/ 0 color
T5. Redox features in topsoil
T6. Hydrolic indicators

Landscape Position:



Consistence:

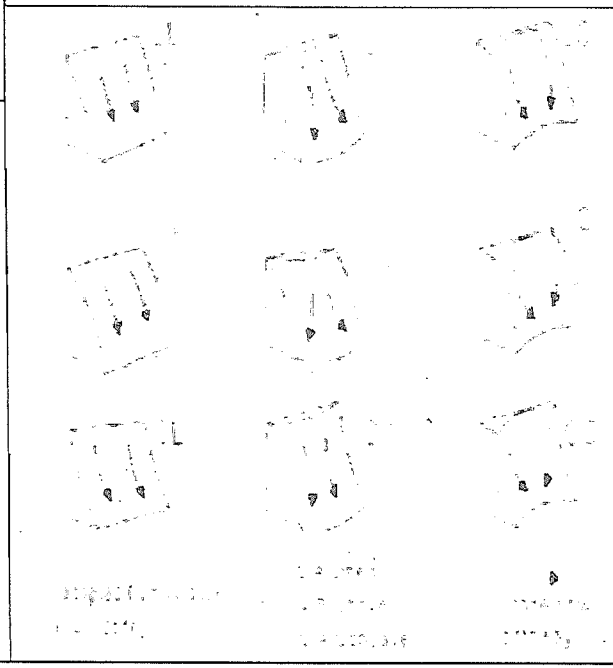
Loose-	Intact specimen not available
Friable-	Slight force between fingers
Firm-	Moderate force between fingers
Extremely firm-	Moderate force between hands or slight foot pressure
Rigid-	Foot pressure

Soil Structure Grade:

Weak-	Poorly formed, indistinct peds, barely observable in place
Moderate-	Well formed, distinct peds, moderately durable and evident, but not distinct in undisturbed soil
Strong-	Durable peds that are quite evident in un-displaced soil, adhere weakly to one another, withstand displacement, and become separated when soil is disturbed
Loose-	No peds, sandy soil

Slope Shape:

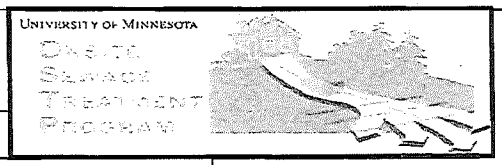
Slope shape is described in two directions: up and down slope (perpendicular to the contour), and across slope (along the horizontal contour); e.g. Linear, Convex or LV.



Soil Structure Shape:

Granular-	The peds are approximately spherical or polyhedral and are commonly found in topsoil. These are the small, rounded peds that hang onto roots when soil is turned over.
Platy-	Platy structure is commonly found in forested areas just below the leaf litter or shallow topsoil.
Blocky-	The peds are block-like or polyhedral, and are bounded by flat or slightly rounded surface that are casting of the faces of surrounding peds. Blocky structure is commonly found in the lower topsoil and subsoil.
Prismatic-	Flat or slightly rounded vertical faces bound the individual peds. Peds are distinctly longer vertically, and faces are typically cast or molds of adjoining peds. Prismatic structure is commonly found in the lower subsoil.
Single Grain-	The structure found in a sandy soil. The individual particles are not held together.
Massive-	No observable aggregates, or no orderly arrangement of natural lines of weakness.

Soil Boring Log



Date 9/30/2011

Time 4:30pm

Client/ Address: 5220 156th Lane NW

Landscape position: Back/ Side Slope

Legal Description/ GPS: Boring 2

Vegetation: lawn grasses

Soil parent materials (Check all that apply): ☐ Outwash ☐ Lacustrine ☐ Loess ☐ Till ☐ Alluvium ☐ Bedrock ☐ Organic

Soil survery map units: NyC

Slope %: 6

Slope shape: Convex, Concave

						Structure		
Depth (in)	Texture	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Shape	Grade	Consistence
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14-48"	medium loamy sand	10yr3/2				Single grain	Structureless	Loose
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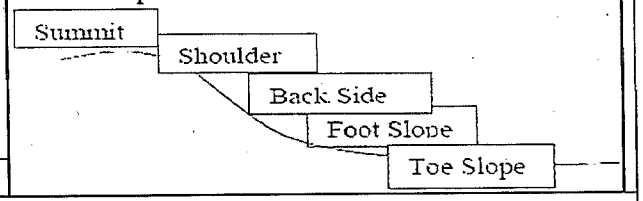

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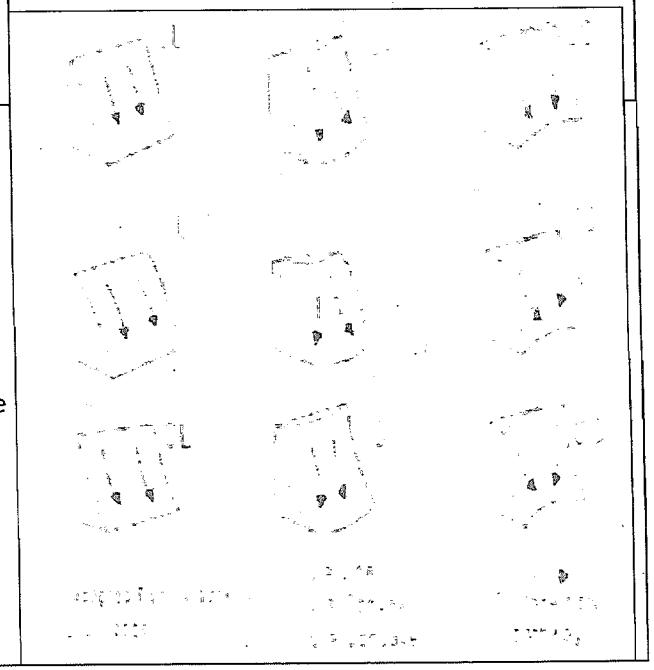

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Design Flow and Soil Worksheet

1. AVERAGE DESIGN FLOW:

A. Estimated Flow *(GPD)*: 600

or *Measured Flow (GPD)*: flow times safety factor ____ gpd X ____ = ____ gpd

Design Flow: 600 Gallons Per Day (GPD)

B. *Septic Tank* capacity: 1500 Gallons

Number of *Septic Tanks* or *Compartments*: 2

Effluent Screen & Alarm? No

* Note: If a garbage disposal unit or other appliance with garbage grinding abilities (i.e. dishwashers) is anticipated or installed, or if sewage is pumped to the septic tank, the septic tank capacity must be increased by 50% and multiple tanks or compartments must be used, plus an effluent screen with an alarm.

Table I - Design Flow (Gallons Per Day)

Number of Bedrooms	Classification of Dwelling			
	I	II	III	IV
2 or less	300	225	180	*
3	450	300	218	*
4	600	375	256	*
5	750	450	294	*
6	900	525	332	*

* Flows for Classification IV dwellings are 60 percent of the values as determined for Classification I, II or III systems.

Table II - Septic Tank Capacity

Number of Bedrooms	Septic Tank Liquid Minimum Capacities (Gallons)	Capacity with Garbage Disposal and/or Sewage Pumped to Tank*
3 or less	1,000	1,500
4 or 5	1,500	2,250
6 or 7	2,000	3,000
8 or 9	2,500	3,750

2. SITE EVALUATION:

A. *Depth to Limiting Layer*: 72 inches 6.0 ft

B. *Maximum Depth* of system: 36 inches 3.0 ft

(a negative number means a mound system is required)

C. *Type of Soil Treatment and Dispersal Area*: Trenches

D. Type of *Distribution*: Gravity Distribution

E. *Landscape Position*: Sidehill

F. *Soil Texture Group Number*: 3

G. *Percent Land Slope*: 6.0 % *Slope* = *Rise* ____ ÷ *Run* ____ x 100 = ____

Table III

Treatment Levels of BOD	BOD (mg/L)
Level C	125
Level B	25
Level A	15

3. SOIL LOADING RATES: Use either A. or B. below

A.

7080 Table IX DETAILED SOIL DESCRIPTIONS (SOIL PIT REQUIRED)	
Texture	Fine Sand
Texture Group	3
Structure	Granular
Grade	Weak
Consistence	Loose
Select Soil Loading Rate:	0.60

C. Design Loading Rate: 0.60

B.

7080 Table IXa	
PERCOLATION TEST SIZING	LOADING RATE (GPD/ft²)
Faster than 0.1*	0.00
0.1 to 5*	1.20
0.1 to 5 (soil texture groups 3 & 5)	0.60
6 to 15	0.78
16 to 30	0.60
31 to 45	0.50
46 to 60	0.45
61-120	0.24
Slower than 120	0.00

*Rapidly permeable soils: see 7080.2260

Slowest measured percolation rate: ____

Select Soil Loading Rate: 0.60

Texture Group	
Soil Texture	Group #
Coarse Sand	1
Medium Sand	2
Fine Sand	3
Coarse Loamy Sand	4
Medium Loamy Sand	4
Fine Loamy Sand	5
Very Fine Loamy Sand	5
Coarse Sandy Loam	6
Medium Sandy Loam	6
Fine Sandy Loam	7
Very Fine Sandy Loam	7
Loam	8
Silt Loam	9
Clay Loam	10
Silty Clay Loam	10
Sandy Clay Loam	10
Silty Clay	11
Sandy Clay	11
Clay	11

4. ORGANIC LOADING (if pretreatment is being used)

Organic Loading = *Design Flow* X *Estimated BOD* in mg/L in the effluent X 8.35 ÷ 1,000,000 (See Table III)

____ gpd X ____ mg/L X 8.35 ÷ 1,000,000 = ____ lbs BOD

I hereby certify that I have completed this work in accordance with all applicable ordinances, rules and laws.

Michael J Jungbauer	(Signature)	L3227	10/3/2011
(Designer)		(License #)	(Date)

Trench & Bed Design Worksheet

University of Minnesota Onsite Sewage Treatment Program

1. SYSTEM SIZING:

A. *Design Flow*: 600 GPD

B. *Maximum Depth*: 24 inches

C. *Loading Rate*: 0.60 ft^2/GPD

D. *Required Bottom Area: Design Flow (1.A) ÷ Loading Rate (1.C) = Required Bottom Area*

600 ÷ 0.60 = 1000 ft^2

E. Select *Dispersal Media*: ☐ Rock ☐ Chambers ☐ Gravelless Pipe ☐ Other Approved Media — **rock or geo covered chambers**

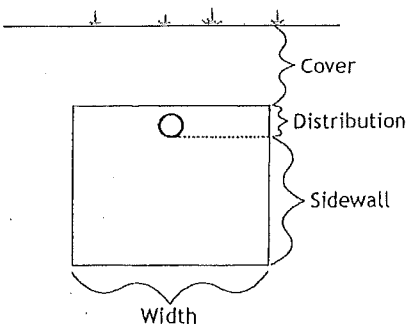
F. Select *Distribution Method*: ☐ Pressure (required for rapidly permeable soils) ☐ Gravity-Drop Box ☐ Gravity-Other — **gravity - drop box**

G. Select *Dispersal Type*: ☐ Trench ☐ Bed (<6% Slope)

2. TRENCH CONFIGURATION:

A.

Required trench bottom area (ft^2): (from 4A)	Sidewall Absorption (inches)	Bottom Area Reduction	Bottom Area Multiplier	Reduced trench bottom area
1000	6 to 11	0%	1	1000
	12 to 17	20%	0.8	800
	18 to 23	34%	0.66	660
	24	40%	0.6	600



B. Select *Sidewall Height*: 12 inches = 1.00 ft

C. Required *Bottom Area*: 800 ft^2

D. Select *Trench Width*: 3.0 ft

E. Total *Required Trench Length: Bottom Area* (2.C) ÷ *Trench Width* (2.D) = *Total Required Trench Length*

800.0 ft^2 ÷ 3.0 = 266.7 ft

F. Select *Trench Spacing*: 8 ft *(typically 5 - 12 ft)*

G. Calculate Lawn Area: *Trench Length* (2.E) X *Trench Spacing* (2.F) = ft^2 lawn area

266.7 X 8.0 = 2133.3 ft^2 lawn area

H. If using rock or subsitutue, select *Depth Required to Cover Distribution Pipe*:

0.5 ft (0.33 for pressure, 0.5 for gravity)

I. Calculate *Rock Volume*: (*Sidewall Height* (2.B) + Depth to Cover Pipe (2.H)) X *Bottom Area (2.C)* = cubic feet

(1.00 + 0.50) X 800.0 = 1200 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards:

1200 ft ÷ 27 = 44 yd^3

3. BED CONFIGURATION:(less than 6% slope)

A. Required *Bottom Area*: _____ ft^2

B. Select size *Multiplier*: _____ 1.0 = pressurized; 1.5 = gravity (not allowed in rapidly permeable soils)

Designed Bottom Area: _____ ft^2

C. Select *Bed Width*: _____ ft Maximum width = 25 ft. (pressurized); Maximum width = 12 ft. (gravity)

D. Calculate *Bed Length: Designed Bottom Area* (3.B) ÷ *Bed Width* (3.C) = *Length*

_____ ft^2 ÷ _____ ft = _____ ft

E. Select *Sidewall Absorption*: _____ inches below the pipe = _____ ft

F. Calculate *Rock Volume*: (*Rock Depth (3.E)* + 0.5 foot) X *Adjusted Bottom Area (3.B)* = ft^3

(_____ ft + 0.5) X _____ = _____ ft^3

Calculate *Volume in cubic yards*: Rock volume in cubic feet (3.F) ÷ 27 = cubic yards

_____ ÷ 27 = _____ yd^3

4. ORGANIC LOADING: (if pretreatment is being used)

A. *Organic Loading* = *Design Flow* X *Estimated BOD* in mg/L in the effluent X 8.35 ÷ 1,000,000 (See Table III)

_____ X _____ mg/L X 8.35 ÷ 1,000,000 = _____ lbs BOD

B. Calculate *System Organic Loading: lbs. BOD* (4.A) ÷ *Bottom Area* (2.C) *or* (3.B) = $lbs/day/ft^2$

_____ ft ÷ _____ = _____ $lbs/day/ft^2$

Table III (7083.4030)	
BOD Treatment	BOD (mg/L)
Level A	15
Level B	25
Level C	125

Comments:

I hereby certify that I have completed this work in accordance with all applicable ordinances, rules and laws.

Michael Jungbauer		L3227	10/3/2011
(Designer)	(Signature)	(License #)	(Date)

Pump Selection Design Worksheet

1. PUMP CAPACITY

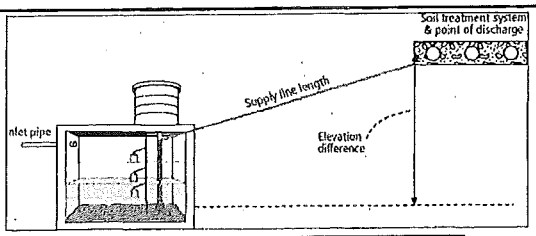
1. **Pumping to Gravity Distribution**
   - A. Minimum discharge is 10 GPM (15 GPM recommended) — 15 GPM
   - B. Maximum discharge is 45 GPM.

2. **Pressure Distribution** - See Pressure Distribution Worksheet

   Required *Flow Rate* (Line 20 of Pressure Distribution Worksheet) — 15 GPM

2. HEAD REQUIREMENTS

3. Elevation Difference between pump and point of discharge: 12 ft



4. Distribution Head Loss: 0 ft

Distribution Head Loss
Gravity Distribution = 0ft
Pressure Distribution based on Minimum Average Head Value on Pressure Distribution Worksheet:

1 ft	=	5ft
2ft	=	6ft
5ft	=	10ft

Additional Head Loss: 0 ft
(due to special equipment, etc.)

Friction Loss

5. Supply Pipe Diameter: 2.00 Inches

6. Based on **Friction Loss in Plastic Pipe per 100ft** from Table I:

   Friction Loss = 0.48 ft per 100ft of pipe

7. Determine *Equivalent Pipe Length* from pump discharge to soil dispersal area discharge point. Estimate by adding 25% to supply pipe length for fitting loss.
   Supply Pipe Length X 1.25 = *Equivalent Pipe Length*

   Supply Pipe Length: 105 ft X 1.25 = 131.25 ft

8. Calculate *Supply Friction Loss* by multiplying *Friction Loss Per 100ft* (Line 6) by the *Equivalent Pipe Length* (Line 7) and divide by 100.

   Supply Friction Loss =

   0.48 ft per 100ft X 131.25 ft + 100 = 0.63 ft

10. *Total Head* requirement is the sum of the *Elevation Difference* (Line 3), the Distribution Head Loss (Line 4), and the Supply Friction Loss (Line 8)

    12 ft + 0 ft + 1 ft

    Total Head Required: 13 ft

Table I
Friction Loss in Plastic Pipe per 100ft

Flow Rate (GPM)	Nominal Pipe Diameter 1	1¼	1½	2	3
10	5.51	1.45	0.69	0.20	-
12	7.72	2.03	0.96	0.28	-
14	10.27	2.70	1.28	0.38	-
16	13.14	3.46	1.63	0.48	-
18	-	4.30	2.03	0.60	-
20	-	5.23	2.47	0.73	0.11
25	-	7.90	3.73	1.11	0.16
30	-	11.07	5.23	1.55	0.23
35	-	14.73	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

3. PUMP SELECTION

A pump must be selected to deliver at least 15 GPM (Line 1 or Line 2) with at least 13 feet of total head.

I hereby certify that I have completed this work in accordance with all applicable ordinances, rules and laws.

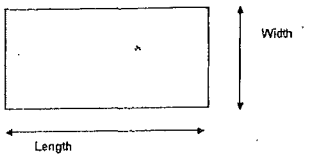
Michael J Jungbauer		L3227	October 3, 2011
(Designer)	(Signature)	(License #)	(Date)

Pump Tank Sizing, Dosing and Float and Timer Setting Design Worksheet

1. DETERMINE AREA AND GALLONS PER INCH

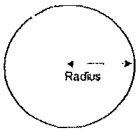
1. A. Rectangle area = Length (L) X Width (W)

6.0 ft X 8.0 ft = 48.0 ft²



B. Circle area = πr^2 (3.14159) X radius X radius)

3.14 X [ ]² ft = [ ] ft²



C. Get area from manufacturer [ ] ft²

2. Calculate *Gallons Per Inch*:

There are 7.48 gallons per cubic foot. Therefore, multiply the area from 1.A, 1.B, or 1.C by 7.48 to determine how many gallons the tank holds. Then divide that number by 12 to calculate the gallons per inch.

(Area X 7.48 gallons/ft³)/(12 in/ft) = 48.0 ft² X 7.5 ÷ 12 in/ft = 29.9 *Gallons Per Inch*

2. TANK CAPACITY

3. Select the required *Minimum Tank Capacity* based on the table to the right: 600 Gallons

Design Flow (Gallons Per Day)	Minimum Pump Tank Capacity (Gallons)	
0-600	500	or Alternating Dual Pumps
601-4,999	100% of the Design Flow	or Alternating Dual Pumps
5,000-9,999	50% of the Design Flow	and Alternating Dual Pumps

4. Calculate *Total Tank Volume*

A. *Depth from bottom of inlet pipe to tank bottom*: 48 in

B. *Total Tank Volume = Depth from bottom of inlet pipe* (Line 4.A) X *Gallons/Inch* (Line 2)

48 in X 29.9 Gallons Per Inch = 1436.16 Gallons

Volume of Liquid in Pipe	
Pipe Diameter (inches)	Liquid Per Foot (Gallons)
1	0.045
1.25	0.078
1.5	0.110
2	0.170
3	0.380
4	0.661

5. Calculate *Volume to Cover Pump* (The inlet of the pump must be at least 4-inches from the bottom of the pump tank & 2-3 inches of water covering the pump is recommended)

(Pump and block height + 2 inches) X *Gallons Per Inch* (Line 2)

(4 + 2 inches) 29.9 Gallons Per Inch = 179.52 Gallons

3. DOSING VOLUME

7. Calculate *Minimum Pumpout Volume* (5 times Volume of Supply and Distribution Pipes)

Volume of Distribution Piping - Line 17 of the Pressure Distribution Worksheet: [ ] Gallons

Minimum Pumpout Volume = Volume of Distribution Piping X 5: [ ] X 5 = 125 Gallons

8. Calculate *Maximum Pumpout Volume* (25% of Design Flow)

Design Flow: 600 GPD X 0.25 = 150 Gallons

9. *Dosing Volume = Select a volume for 4-5 doses per day and is between the minimum (Line 7) and maximum (Line 8) pumpout volume:* 125 Gallons

10. Calculate *Doses Per Day* = Design Flow / *Dosing Volume*: 600 ÷ 125 = 4.8 *Doses Per Day*

11. Calculate Drainback:

A. *Diameter of Supply Pipe* = 2 inches

B. Length of Supply Pipe = 105 feet

C. *Volume of Liquid Per Lineal Foot of Pipe* = 0.170 Gallons

D. *Drainback = Length of Supply Pipe X Volume of Liquid Per Lineal Foot of Pipe*

105 X 0.170 = 17.9 Gallons

12. *Total Dosing Volume = Dosing Volume* (Line 9) minus *Drainback* (Line 11.D)

125 + 17.9 = 142.9 Gallons

4. FLOAT AND TIMER SETTINGS

Pump Tank Sizing, Dosing and Float and Timer Setting Design Worksheet

A. DEMAND DOSE FLOAT SETTINGS

13. Calculate *Float Separation Distance* using *Dosing Volume*.

Dosing Volume (Line 12)/Gallons Per Inch (Line 2)

125 ÷ 29.9 = 4.2 Inches

14. Calculate *Gallons for Alarm* (typically 2-3 inches)

Alarm Depth (Inch) x *Gallons Per Inch* (Line 2)

2 X 29.9 = 59.8 Gallons

15. Calculate *Total Gallons = Gallons Over Pump* (Line 5) + *Dosing Volume* (Line 9) + *Gallons for Alarm* (Line 14)

180 + 125.0 + 60 = 364 Gallons

16. *Minimum Tank Depth = Total Gallons* (Line 15)*/Gallons Per Inch* (Line 2)

364 ÷ 29.9 = 12 Inches

17. Measuring from bottom of tank:

A. *Distance to set Pump Off Float = Pump Height + Block Height* (Line 5) + 2 Inches

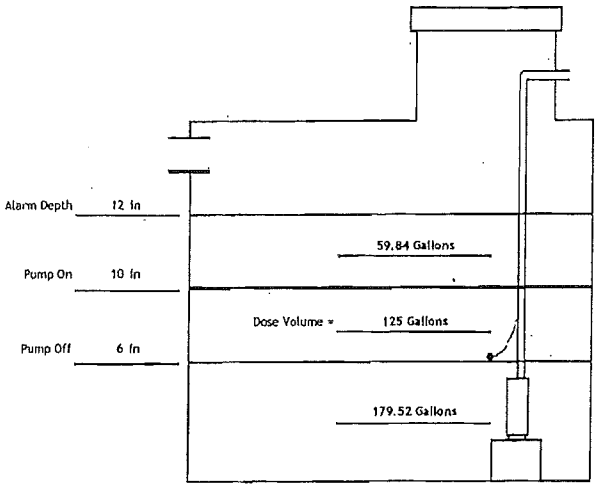
4 + 2 = 6 Inches

B. *Distance to set Pump On Float=Distance to Set Pump-Off Float (Line 17.A) + Float Separation Distance (Line 13)*

6 + 4.2 = 10 Inches

C. *Distance to set Alarm Float = Distance to set Pump-On Float* (17.B) + *Alarm Depth* (Line 14)

10 + 2.0 = 12 Inches



B. TIME/DOSING SETTINGS

18. Required *Flow Rate*:

A. From Design (Line 20 of Pressure Distribution Worksheet): GPM

B. Or calculated: GPM = Change in Depth (in) x Gallons Per Inch (Line 2) / Time Interval in Minutes

X 29.9 ÷ = GPM

19. Choose a Flow Rate from Line 18.A or 18.B above. GPM

20. Calculate TIMER ON setting:

Dosing Volume (Line 9)/GPM(Line 18)

125 ÷ = Minutes ON

21. Calculate TIMER OFF setting:

Minutes Per Day (1440)/*Doses Per Day (Line 10)* - Minutes On (Line 17)

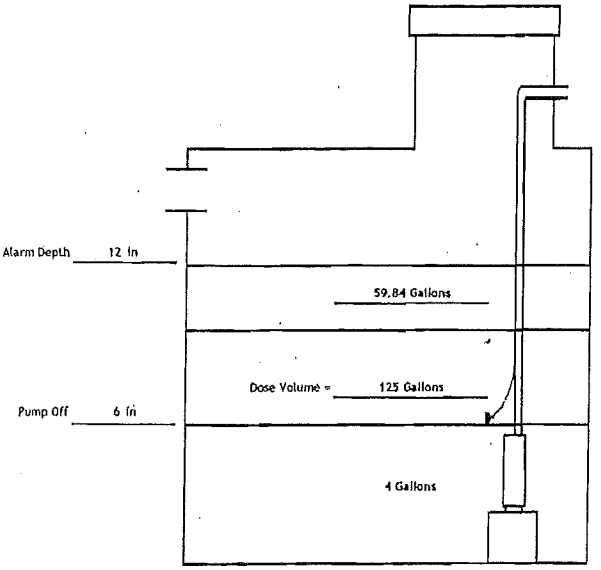
1440 ÷ 4.8 - = Minutes OFF

22. Measuring from bottom of tank:

Distance to set Pump Off Float=Gallons to Cover Pump (Line 5) / Gallons Per Inch (Line 2):

179.52 ÷ 29.9 = 6 Inches

Note: Installer, designer or service provider needs to verify actual GPM of pump installed based on pump calibration measurements to ensure that the timer settings established here are accurate or need to be adjusted.



I hereby certify that I have completed this work in accordance with all applicable ordinances, rules and laws.

Michael J Jungbauer		L3227	10/3/2011
(Designer)	(Signature)	(License #)	(Date)


93° 24' 4"
93° 23' 51"
45° 15' 22"
45° 15' 10"
468560
468600
468640
468680
468720
468760
468800
5011480
5011440
5011400
5011360
5011320
5011280
5011240
5011200
5011160
ZmB
NyB
NyB
NyB
156th Ln
Yakima St
Map Scale: 1:1,830 if printed on A size (8.5" x 11") sheet.
N
Meters
0 15 30 60 90
Feet
0 50 100 200 300

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:1,830 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:15,840.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 15N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Anoka County, Minnesota
Survey Area Data: Version 8, Dec 14, 2009

Date(s) aerial images were photographed: 7/18/2003

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Anoka County, Minnesota (MN003)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
NyB	Nymore loamy sand, 2 to 6 percent slopes	1.6	10.8%
NyC	Nymore loamy sand, 6 to 12 percent slopes	11.2	76.3%
ZmB	Zimmerman fine sand, 2 to 6 percent slopes	1.9	12.9%
Totals for Area of Interest		**14.7**	**100.0%**