University of Minnesota Site Evaluation Form Trench / Bed

Property Owner(s) _____ Phone Number _____

Address _____

P.I.D. _____ Section __ Township _____ N Range _____

Date _____ Time _____ Weather conditions _____

Location Information *(check all that apply)*
__shoreland __dwelling __replacement system
__protection area __other establishment __new home construction

Homeowner Information

No. of bedrooms *(if applicable)* _____ bedrooms (includes possible additions)

No. of residents in home __adults __children

Estimated flow _____ gpd

Well casing depth _____ feet

Water using devices *(check)* — Discharge location if checked
__Garbage disposal __Water softener _____
__Dishwasher __Sump pump _____
__Large bathtub __High eff. furnace _____
__Laundry/large tub on 2nd floor __Jucuzzi/hottub _____

Water use concerns *(check)*
__Toilet/faucet leaks __Max load laundry/day __Long term prescription medications
__Home business __Lint screen __Antibact. soap __Frequent parties or out of town guests

Soil Data

Soil texture classification: _____

Unnatural soil *(check)* __Yes __No

Type of observation *(check)* __Probe __Pit __Boring

Parent material *(check)* __Till __Outwash __Loess __Bedrock __Alluvium

Vegetation type *(check)* __Wet __Dry __Unknown

Slope form *(check)* __Summit __Shoulder __Back __Foot __Toe

Drainage *(check)* __Good __Fair __Poor __Ponding __Flooding

Located in floodplain *(check)* __Yes __No

Site Summary Data

Standing water: _____ inches

Bedrock: _____ inches

Saturated soil: _____ inches

Maximum depth of system: _____ inches

Max elevation at system bottom: _____ feet

Soil sizing factor (SSF): _____ gpd/ft^2

Linear loading rate (LLR): _____ gpd/ft

Was a perc test done ? __Yes _____ mpi
__No

Soil Survey Data	Soil #1	Soil #2
Map unit sym & name		
Landscape position		
Flooding		
Slope		
Watertable depth		
Bedrock depth		
Possible system depth		
Texture at depth		
Permeability (P)		
Perc(MPI) = 60 / P		
NRCS onsite suitability		

Soil Boring Data

Boring # _____ Elevation _____ Location _____

Soil Horizons Depth (inches)	Texture	Color	Structure	Consistence

Boring # _____ Elevation _____ Location _____

Soil Horizons Depth (inches)	Texture	Color	Structure	Consistence

Site Evaluation Map

List any construction issues: _____

_____

Mapping Checklist

Map scale: _____ ___ indicate north ___ show slope _____ % direction _____

Locate

___ lot dimensions/property lines
___ dwellings and other improvements
___ existing and/or proposed system(s)
___ replacement area
___ unsuitable area(s)
___ public water supply wells
___ pumping access
___ inner wellhead zone

Easements

___ phone
___ electric
___ gas

Elevations

___ borings
___ benchmark
___ perc tests
___ horiz&vert reference pts

Setbacks

___ building
___ all water wells within 100ft
___ pressure pipe
___ water suction pipe
___ streams, lakes, rivers
___ floodway and fringe

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

_____ (signature) _____ (date)

_____ (license #) _____ (phone number)

University of Minnesota Trench and Bed Worksheet

All boxed rectangles must be entered, the rest will be calculated.

1. **Flow**

A. Estimated Flow [ ] gpd *(Fig. A-1)*

A-1 Estimated Sewage Flows in GPD				
Number of Bedrooms	Class I	II	III	IV
2	300	225	180	60% of the values in the Class I, II or II columns
3	450	300	218	
4	600	375	256	
5	750	450	294	
6	900	525	332	
7	1050	600	370	
8	1200	675	408	

Pump Tank Minimum Sizing
500 gallons or 100% of Average Design Flow (A-1) or dual alternating pump system

2. **Minimum Septic Tank Capacity**

B. Septic tank capacity *(Fig C-1)* [ ] gallons Number of tanks/compartments [ ]

C. Effluent filter (yes/no) [ ]

C-1 Minimum Septic Tank Capacity in Gallons			
Number of Bedrooms	Minimum Capacity	Capacity with GD*	Capacity with GD and pump in basement **
2 or less	750	1125	1500
3 or 4	1000	1500	2000
5 or 6	1500	2250	3000
7, 8 or 9	2000	3000	4000

* GD = garbage disposal, Must have multiple tanks or compartments

** Must have multiple tanks, compartments or effluent screen

3. **Pump Tank Specifications**

D. Pump tank needed (yes/no) [ ] Minimum size if needed [ ] gallons

4. **SOILS** *(Site evaluation data)*

E. Depth to restricting layer = [ ] ft

F. Maximum depth of system Item E - 3 ft = _____ - 3 = _____ ft

G. Texture [ ] Percolation Rate [ ] mpi *if available*

H. SSF [ ] ft^2/gpd (see figure D-15)

I. % Slope [ ] %

D-15 Soil Characteristics & SSF		
Perc Rate mpi	Soil Texture	Soil Sizing Factors ft^2/gpd
< 0.1 *	Coarse sand	0.83
0.1- 5	Medium sand Loamy sand	0.83
0.1- 5**	Fine sand	1.67
6 - 15	Sandy loam	1.27
16 - 30	Loam	1.67
31 - 45	Silt loam, silt	2.00
46 - 60	Clay loam, sandy clay or silty clay	2.20
61 - 120***	Clay, sandy or silty clay	4.20
>120****		

* No trench >25% of total system

** Soil with >50% fine sand particles

*** A mound must be used

**** An other or performance system

5. **System Type**

☐	Pressure Bed *(<6% slope)*
☐	Gravity Bed (<6% slope)
☐	Trenches

Distribution Media Type

☐	Rock
☐	Chamber
☐	Gravelless
☐	Other: _____

Method of Distribution

☐	Pressure
☐	Drop Boxes
☐	Dist. Box *(<3% slope)*
☐	Other: _____

6. **TRENCH OR BED BOTTOM AREA**

J. For trenches with 6 inches of wide wall beneath the pipe or 10" diameter gravelless pipe:
A x H = _____ gpd x _____ ft/gpd = _____ ft^2

K. For trenches with 12 inches of sidewall:
A x H x 0.8= _____ gpd x _____ ft/gpd x 0.8 = _____ ft^2

L. For trenches with 18 inches of sidewall:
A x H x 0.66= _____ gpd x _____ ft/gpd x 0.66 = _____ ft^2

M. For trenches with 24 inches of sidewall:
A x H x 0.6= _____ gpd x _____ ft/gpd x 0.6 = _____ ft^2

N. For gravity beds with 6 or 12 inches of rock below the pipe;
1.5 x A x H = 1.5 x _____ gpd x _____ ft/gpd = _____ ft^2

O. For pressure beds with 6 or 12 inches of rock below the pipe;
A x H = _____ gpd x _____ ft/gpd = _____ ft^2

7. **Trench and Bed Dimensions**

P. Select required square feet of bottom area required based on depth of rock/gravelless pipe or height of chamber slats
☐ ft^2
(must use 6" of rock square footage for beds)

Q Select width of trench or bed ☐ ft
(use 3' for gravelless pipe, width of chamber or width of excavation for rock in trenches & beds can not be wider the 25')

R. For trenches or pressure beds the lineal feet required = required square footage / width of bottom of trench or bed
_____ ft^2 / _____ ft = _____ lineal feet

S. For gravity beds the lineal feet required = required square footage / width of bed
_____ ft^2 / _____ ft = _____ lineal feet

8. **Rock Sizing and Volume**

T. Depth of media below pipe ☐ ft
Cubic feet of rock needed = Rock depth below distribution pipe plus 0.5 foot times bottom area:
(Rock depth + 0.5 foot) x Area (J, K, L, M)
(_____ ft + 0.5 ft) x _____ ft^2 = _____ ft^3
Volume in cubic yards = volume in cubic feet divided by 27
_____ / 27= _____ yd^3
Weight of rock in tons = cubic yards times 1.4
_____ x 1.4= _____ tons
Add in 10% extra for constructability = 1.1 X _____ = _____ tons

9. **Layout**
Select an appropriate scale; one inch = ☐ ft
Show pertinent property boundaries, rights-of-way, easements.
Show location of house, garage, driveway, and all other improvements, existing or proposed.
Show location and layout of sewage treatment system, well and dimensions of all elevations

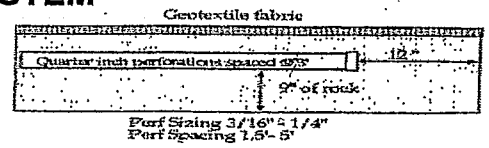
I hereby certify that I have completed this work in accordance with all applicable ordinances, rules and laws.

_____ (signature) _____ (license #) _____ (date)

Local Unit of Government Approval

_____ (signature) _____ (registration #) _____ (date)

PRESSURE DISTRIBUTION SYSTEM



All boxed rectangles must be entered, the rest will be calculated.

1. Select number of perforated laterals: [ ]

2. Select perforation spacing = [ ] ft

3. Since perforations should not be placed closer that 1 foot to the edge of the rock layer (see diagram), subtract 2 feet from the rock layer length
   [ ] - 2 ft = _____ ft
   rock layer length

E-4: Maximum allowable number of 1/4-inch perforations per lateral to guarantee <10% discharge variation

perforation spacing (feet)	1 inch	1.25 inch	1.5 inch	2.0 inch
2.5	8	14	18	28
3.0	8	13	17	26
3.5	7	12	16	25
4.0	7	11	15	23
5.0	6	10	14	22

4 Determine the number of spaces between perforations.
Divide the length (3) by perforation spacing (2) and round down to nearest whole number.
Perforation spacing = _____ ft / _____ ft = _____ spaces

5. Number of perforations is equal to one plus the number of perforation spaces (4).
   ** Check figure E-4 to assure the number of perforations per lateral guarantees < 10% discharge variation.*
   _____ spaces + 1 = _____ perforations/lateral

6. A. Total number of perforations = perforations per lateral (5) times number of laterals (1).
   _____ perfs/ lat x _____ laterals = _____ perforations

   B. Calculate the square footage per perforation.
   Recommended value is 6-10 sqft/perf. Does not apply to at-grades.
   1. Rock bed area = rock width (ft) x rock length (ft)
   [ ] ft x _____ ft = _____ ft^2
   2. Square foot per perforation=Rock Bed Area/number of perfs(6)
   _____ ft^2 / _____ perfs = _____ ft^2/ perf

E-6 Perforation Discharge in GPM

Head (feet)	Perforations diameter (inches)		
	3/16	7/32	1/4
1[a]	0.42	0.56	0.74
2[b]	0.59	0.80	1.04
5	0.94	1.26	1.65

a. Use 1.0 foot for single-family homes.
b. Use 2.0 feet for anything else

7. Determine required flow rate by multiplying the total number of perforations(6A) by flow per perforations (see figure E-6)
   _____ perfs x [ ] gpm / perfs = _____ gpm

8. If laterals are connected to header pipe as shown in Figure E-1, to select minimum required lateral diameter; enter figure E-4 with perforation spacing (2) and number of perforations per lateral (5).

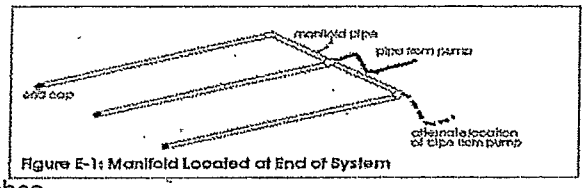
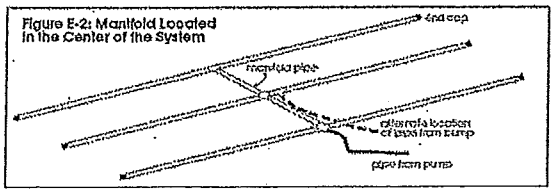
   

   Figure E-1: Manifold Located at End of System

   Select minimum diameter for perforated laterals = [ ] inches

9. If perforated lateral system is attached to manifold pipe near the center, like Figure E-2, perforated lateral length (3) and number of perforations per lateral (5) will be approximately one half of that in step 8. Using these values, select minimum diameter for perforated lateral = [ ] inches.

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

_____ (signature) _____ (license #) _____ (date)

PUMP SELECTION PROCEDURE

All boxed rectangles must be entered, the rest will be calculated.

1. Determine pump capacity:

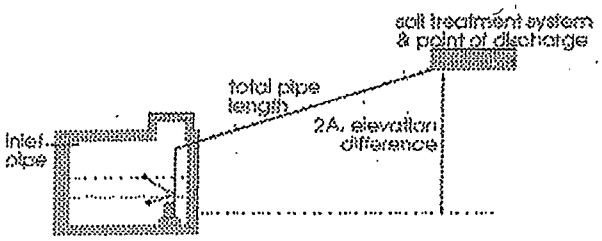
A. Gravity Distribution

1. Minimum required discharge is 10 gpm
2. Maximum suggested discharge is 45 gpm

For other establishments at least 10% greater than the water supply rate, but no faster than the rate at which effluent will flow out of the distribution device.

B. Pressure Distribution - *see pressure design worksheet*

Selected Pump Capacity: [ ] gpm



2. Determine head requirements:

A. Elevation difference between pump and point of discharge.
[ ] feet

B. Special head requirement? *(See Figure - Special Head Requirements)*
[ ] feet

Special Head Requirements	
Gravity Distribution	0ft
Pressure Distribution	5ft

C. Friction loss

1. Select pipe diameter [ ] in
2. Enter Figure E-9 with gpm (1A or B) and pipe diameter (C1)
   Read friction loss in feet per 100 feet from Figure E-9
   Friction loss= [ ] ft/ 100 ft of pipe

E-9: Friction Loss in Plastic Pipe Per 100 feet

flow rate gpm	nominal pipe diameter 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		6.49	0.95
70		7.44	1.09

3. Determine total pipe length from pump discharge to soil system discharge point
   Estimate by adding 25 percent to pipe length for fitting loss.
   Equivalent pipe length times 1.25 = total pipe length
   [ ] ft x 1.25 = _____ feet

4. Calculate total friction loss by multiplying friction loss (C2) by the equivalent pipe length (C3) and divide by 100.
   FL= _____ ft/100ft X _____ ft / 100= _____ feet

D. Total head requirement is the sum of elevation difference (A), special head requirements (B), and total friction loss (C4).
_____ ft + _____ ft + _____ ft

Total Head: _____ **feet**

3. Pump Selection

1. A pump must be selected to deliver at least _____ gpm (1A or B) with at least _____ feet of total head (2D).

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

_____ (signature) _____ (license #) _____ (date)

PERCOLATION TEST DATA

-TWO TESTS ARE REQUIRED-

	Perc test #1	Perc test #2
Diameter of hole		
Depth to bottom of hole		
Did the hole require presoaking?		

PERC TEST #1

Time	Interval (minutes)	Water Depth	Water Drop	Perc Rate
	START			÷ = TIME DROP PERC
Time	Interval (minutes)	Water Depth	Water Drop	Perc Rate
	START			÷ = TIME DROP PERC
Time	Interval (minutes)	Water Depth	Water Drop	Perc Rate
	START			÷ = TIME DROP PERC
Time	Interval (minutes)	Water Depth	Water Drop	Perc Rate
	START			÷ = TIME DROP PERC
Time	Interval (minutes)	Water Depth	Water Drop	Perc Rate
	START			÷ = TIME DROP PERC
Time	Interval (minutes)	Water Depth	Water Drop	Perc Rate
	START			÷ = TIME DROP PERC
Time	Interval (minutes)	Water Depth	Water Drop	Perc Rate
	START			÷ = TIME DROP PERC
Time	Interval (minutes)	Water Depth	Water Drop	Perc Rate
	START			÷ = TIME DROP PERC

PERCOLATION RATE________________ SSF____________

PERC TEST #2

Time	Interval (minutes)	Water Depth	Water Drop	Perc Rate
	START			÷ = TIME DROP PERC
Time	Interval (minutes)	Water Depth	Water Drop	Perc Rate
	START			÷ = TIME DROP PERC
Time	Interval (minutes)	Water Depth	Water Drop	Perc Rate
	START			÷ = TIME DROP PERC
Time	Interval (minutes)	Water Depth	Water Drop	Perc Rate
	START			÷ = TIME DROP PERC
Time	Interval (minutes)	Water Depth	Water Drop	Perc Rate
	START			÷ = TIME DROP PERC
Time	Interval (minutes)	Water Depth	Water Drop	Perc Rate
	START			÷ = TIME DROP PERC
Time	Interval (minutes)	Water Depth	Water Drop	Perc Rate
	START			÷ = TIME DROP PERC
Time	Interval (minutes)	Water Depth	Water Drop	Perc Rate
	START			÷ = TIME DROP PERC

PERCOLATION RATE________________ SSF____________

Anticipated construction related concerns:____

____

____

Todd County
Septic System Management Plan Agreement

Property Owner _____ Phone: _____ Date: _____

Site Address _____ Parcel # _____

System Designer _____ Company Name _____ License # _____

This management plan agreement will identify the operating and management activities necessary to ensure the long-term performance of the septic system. This agreement must determine the responsibilities of the system owner and those of the system designer in conducting regular maintenance and monitoring of the septic system.

Identify the service intervals recommended by the system designer and Todd County Planning and Zoning. The tank assessment for the system must be the **shortest interval of these three intervals.**
Pumping and cleaning of tanks must be done by a licensed professional.

System Designer: check every _____ months
Todd County P&Z: check every 36 months
State Requirement: check every 36 months

My tank needs to be checked every _____ months

Tank pumping and tank maintenance is contracted with _____

Management Tasks required seasonally or several times per year:

- ☐ *Leaks.* Check (listen, look) for leaks in toilets and dripping faucets. Repair leaks promptly.
- ☐ *Surfacing sewage.* Regularly check for wet or spongy soil around your treatment area. If surfacing sewage or strong odors are not corrected by pumping the tank or fixing broken caps, call your service professional. Untreated sewage may make humans and animals sick.
- ☐ *Alarms.* Alarms signal when there is a problem; contact your maintainer any time the alarm signals.
- ☐ *Lint filters.* If there is a lint filter, check for buildup and clean when necessary.
- ☐ *Effluent screen.* If there is an effluent screen, inspect and clean it twice a year or per manufacturer recommendations.

Management Tasks required annually and/or scheduled maintenance:

- ☐ *Inspection Caps.* Check to make sure they are properly capped. Replace caps that are damaged.
- ☐ *Pumps and controls.* Check to make sure the pump and controls are operating correctly and inspect wiring for corrosion and function.
- ☐ *Event counter or water meter.* Monitor the average daily water use (if applicable).
- ☐ *Septic tank integrity.* **Scheduling** of pumping and cleaning of tanks at the recommended interval is very important. This maintenance **must** be conducted through the manhole openings and include verification that tank and tank components are watertight and in good operating condition.

These management tasks are the responsibility of **the septic system owner/septic designer (Circle one)**

Property Owner Signature _____ Date: _____
Designer Signature _____ Date: _____
Todd County P&Z Signature _____ Date: _____

"I understand it is task manager's responsibility to properly operate and maintain the sewage treatment system on this property, utilizing the Management Plan. If requirements of the Management Plan are not met, I will promptly notify Todd County Planning & Zoning and take necessary corrective actions. If I have a new system, I agree to adequately protect the reserve area for future use as a soil treatment system."

Todd County Planning & Zoning will not accept sewer designs unless accompanied by a signed Septic System Management Plan Agreement.