**University of Minnesota Site Evaluation Form**

**Property Owner(s)**
- Address
- P.I.D.
- Date

**Location Information**
- 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:
- Well casing depth: feet
- Water using devices (check):
  - Garbage disposal
  - Water softener
  - Dishwasher
  - Sump pump
  - Large bathtub
  - High eff. furnace
  - Laundry/large tub on 2nd floor
  - Jacuzzi/hot tub
- Water use concerns (check):
  - Toilet/faucet leaks
  - Max load laundry/day
  - Home business
  - Lint screen
  - Antibot. soap
  - Frequent parties or out of town guests

**Soil Data**
- Soil texture classification:
  - Yes
  - No
- Unnatural soil (check):
- Type of observation (check):
- Parent material (check):
- Vegetation type (check):
- Slope form (check):
- Drainage (check):
- Located in floodplain (check):

**Site Summary Data**
- Standing water:
- Bedrock:
- Saturated soil:
- Maximum depth of system:
- Max elevation at system bottom:
- Soil sizing factor (SSF):
- Linear loading rate (L LR):
- Was a perc test done?:
  - Yes
  - No

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

**Soil Boring Data**

<table>
<thead>
<tr>
<th>Soil Horizons Depth (inches)</th>
<th>Texture</th>
<th>Color</th>
<th>Structure</th>
<th>Consistence</th>
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<tbody>
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</table>
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

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

Elevations
- borings
- benchmark
- per tests
- horizon/vertical reference points

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 Mound Design Worksheet
Greater than 1% Slopes

A. FLOW
Estimated or measured gpd (see figure A-1) x 1.5 (safety factor) = 0 gpd

B. SEPTIC TANK LIQUID VOLUMES
Septic tank capacity gallons (see figure C-1)
Number of tanks/compartment
Effluent Filter (yes/no)

C-1 Septic Tank Capacity in Gallons

<table>
<thead>
<tr>
<th>Number of Bedrooms</th>
<th>Minimum Capacity</th>
<th>Capacity with Garb. Disp.</th>
<th>Capacity with Disp. and Lift</th>
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<td>2 or less</td>
<td>750</td>
<td>1125</td>
<td>1500</td>
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<td>1000</td>
<td>1500</td>
<td>2000</td>
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<td>5 or 6</td>
<td>1500</td>
<td>2250</td>
<td>3000</td>
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<tr>
<td>7, 8, or 9</td>
<td>2000</td>
<td>3000</td>
<td>4000</td>
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</table>

C. SOILS (Site evaluation data)
1. Depth to restricting layer=
2. Depth of percolation tests =
3. Texture
4. Soil loading rate (see Figure D-33) gpd/ft^2
   Percolation rate
5. % Land Slope

D. ROCK LAYER DIMENSIONS
1. Multiply average design flow (A) by 0.83 to obtain required area of rock layer: Item A x 0.83=
   gpd x 0.83 ft^2/gpd = __________ ft^2
2. Determine rock layer width = 0.83 ft^2/gpd x Linear Loading Rate (LLR) (see LLR chart)
   0.83 ft^2/gpd x __________ = __________ ft

   LLR Chart
   Perk Rate | LLR
   <120 MPI  | <=12
   >=120 MPI | <=6

3. Length of rock layer = area divided by width =
   __________ ft^2 / __________ feet = __________ ft

E. ROCK VOLUME
1. Multiply rock area by rock depth to get cubic feet of rock
   __________ X __________ ft = __________ ft^3
2. Divide ft^3 by 27 ft^3/yd^3 to get cubic yards
   __________ ft^3 / 27 = __________ yd^3
3. Multiply cubic yards by 1.4 to get weight of rock in tons;
   __________ yd^3 X 1.4 ton/yd^3 = __________ tons
F. ABSORPTION WIDTH  
1. Absorption width equals absorption ratio times rock layer width
   \[ \text{Absorption width} = \frac{\text{Absorption ratio}}{\text{Rock layer width}} \] 

G. MOUND SLOPE WIDTH & LENGTH (Greater than 1%)
1. Downslope absorption width = absorption width minus rock layer width
   \[ \text{DOWNSLOPE} \]

2. Calculate mound size
   UPSLOPE
   a. Depth of clean sand at upslope edge of rock layer = 3 feet minus distance to restricting layer(C1)
      \[ \text{Depth} = 3 \text{ft} - \frac{\text{Distance}}{\text{Rock layer width}} \] 
   b. Mound height at the upslope edge of rock layer = depth of clean sand for separation (G2a)
      at upslope edge plus depth of rock layer (1 foot) to depth of cover (1 foot)
      \[ 0 \text{ ft} + 1\text{ ft} + 1 \text{ ft} = \frac{\text{Mound height}}{\text{Rock layer width}} \] 
   c. Upslope berm multiplier based on land slope (see figure D-34)
      Selected berm multiplier:
   d. Upslope width = berm multiplier(G2c) times upslope mound height(G2b):
      \[ \frac{\text{Mound height}}{\text{Rock layer width}} \times \frac{\text{Berm multiplier}}{\text{Rock layer width}} = \] 
   DOWNSLOPE
   e. Drop in elevation = rock layer width (D2) times percent landscape(C5) / 100
      \[ \frac{\text{Rock layer width}}{\text{Rock layer width}} \times \frac{\text{Percent}}{100} = \] 
   f. Downslope mound height = depth of clean sand for slope difference (G2a)
      at downslope rock edge plus the mound height at the upslope edge of rock layer (2b)
      \[ \frac{\text{Downslope width}}{\text{Rock layer width}} + \frac{\text{Mound height}}{\text{Rock layer width}} = \] 
   g. Downslope berm multiplier based on percent land slope (see Figure D-34)
      Selected berm multiplier:
   h. Downslope width = downslope multiplier(G2d) times downslope mound height(G2f)
      \[ \frac{\text{Mound height}}{\text{Rock layer width}} \times \frac{\text{Berm multiplier}}{\text{Rock layer width}} = \] 
   i. Select greater of G1 and G2h as the downslope width
      \[ \text{Downslope width} \] 
   j. Total mound width is the sum of upslope (G2d) width plus rock layer width (D2) plus downslope width (G2)
      \[ \frac{\text{Upslope width}}{\text{Rock layer width}} + \frac{\text{Rock layer width}}{\text{Rock layer width}} + \frac{\text{Downslope width}}{\text{Rock layer width}} = \] 
   k. Total mound length is the sum of upslope width (G2d) plus rock layer length (D3) plus upslope width (G2d)
      \[ \frac{\text{Upslope width}}{\text{Rock layer width}} + \frac{\text{Rock layer width}}{\text{Rock layer width}} + \frac{\text{Upslope width}}{\text{Rock layer width}} = \] 

| Final Dimensions (slope >1%) | 0.0 ft | x | 0.0 ft |

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

  (signature)  (license #)  (date)
H. SAND VOLUME

1. Upslope Volume + Volume under rockbed + Downslope Volume
   a. Upslope Volume: (depth of clean sand + 1) x (upslope berm) x (mound length) / 2 = ft³
      \[ \frac{\text{ft} \times \frac{\text{ft}}{2}}{\text{ft}^3} \]
   b. Volume under rockbed: (average depth of sand under rock) x (rockbed width) x (mound length) = ft³
      \[ \frac{\text{ft} \times \frac{\text{ft}}{2}}{\text{ft}^3} \]
   c. Downslope Volume: (depth of clean sand + 1) x (downslope berm) x (mound length) / 2 = ft³
      \[ \frac{\text{ft} \times \frac{\text{ft}}{2}}{\text{ft}^3} \]

   Total cubic feet: \[ \frac{\text{ft} \times \frac{\text{ft}}{2}}{\text{ft}^3} \]

2. Divide ft³ by 27 ft³/yd³ to get cubic yards
   \[ \frac{\text{yt}^3}{\text{yd}^3} \]

3. Multiply cubic yards by 1.4 to get weight of sand in tons
   \[ \frac{\text{yd}^3 \times 1.4}{\text{tons}} \]

4. Add 10% for Constructability
   \[ \frac{\text{tons} \times 1.1}{\text{tons}} \]

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**A-1 Estimated Sewage Flows in GPD**

<table>
<thead>
<tr>
<th>No. of Bdrms</th>
<th>Class I</th>
<th>Class II</th>
<th>Class III</th>
<th>Class IV</th>
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<td>225</td>
<td>180</td>
<td>60% of</td>
</tr>
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<td>450</td>
<td>300</td>
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<td>the</td>
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**D-33 Absorption Width Sizing Table**

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<th>Perc Rate</th>
<th>Soil Texture</th>
<th>Loading Rate</th>
<th>Absorption Ratio</th>
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<td>Coarse sand, Loamy sand, Med., Fine sand</td>
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<td>Sandy loam</td>
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<td>Loam</td>
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<td>Silt loam, Silt</td>
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<td>46-60</td>
<td>Clay loam, Silty or Sandy Clay Loam</td>
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<td>61-120</td>
<td>Silty or Sandy Clay or Clay</td>
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*Must be other or performance.
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<td>5.76</td>
<td>9.71</td>
<td>14.25</td>
<td>14.06</td>
</tr>
</tbody>
</table>
Mound Detail: Land slope > 1%

Notes:
Divert surface water away from mound.
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 than 1 foot to the edge of the rock layer (see diagram), subtract 2 feet from the rock layer length

   \[
   \frac{\text{rock layer length}}{2} = \text{___ ft}
   \]

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

   \[
   \text{Perforation spacing} = \frac{\text{___ ft}}{\text{___ ft}} = \text{___ spaces}
   \]

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.

   \[
   \text{___ spaces} + 1 = \text{___ perforations/lateral}
   \]

6. A. Total number of perforations = perforations per lateral (5) times number of laterals (1).

   \[
   \text{___ perforations/lat} \times \text{___ laterals} = \text{___ perforations}
   \]

   B. Calculate the square footage per perforation.

   Recommended value is 6-10 sqft/perf. Does not apply to all-grades.

   1. Rock bed area = rock width (ft) x rock length (ft)

   \[
   \text{___ ft} \times \text{___ ft} = \text{___ ft}^2
   \]

   2. Square foot per perforation = Rock Bed Area/number of perforations (6)

   \[
   \text{___ ft}^2 \div \text{___ perforations} = \text{___ ft}^2/\text{perf}
   \]

7. Determine required flow rate by multiplying the total number of perforations (6A) by flow per perforation (see figure E-8)

   \[
   \text{___ perforations x ___ gpm/ perf} = \text{___ gpm}
   \]

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

   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 figure E-4. 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

   C. Friction loss
      1. Select pipe diameter ______ in
      2. Enter Figure E-9 with gpm (A or B) and pipe diameter (G1)
      Read friction loss in feet per 100 feet from Figure E-9
      Friction loss = ______ ft / 100 ft of pipe

      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 (G2) by the equivalent pipe length (G3) and divide by 100.
      FL = ______ ft/100 ft 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 (A 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 -

<table>
<thead>
<tr>
<th>Diameter of hole</th>
<th>Perc test #1</th>
<th>Perc test #2</th>
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<table>
<thead>
<tr>
<th>Depth to bottom of hole</th>
<th>Perc test #1</th>
<th>Perc test #2</th>
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<tr>
<th>Did the hole require presoaking?</th>
<th>Perc test #1</th>
<th>Perc test #2</th>
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## PERC TEST #1

<table>
<thead>
<tr>
<th>Time</th>
<th>Interval (minutes)</th>
<th>Water Depth</th>
<th>Water Drop</th>
<th>Perc Rate</th>
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<tr>
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<td>START</td>
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<td>TIME DROP PERC</td>
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## PERC TEST #2

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PERCOLATION RATE ____________ SSF ____________

Anticipated construction related concerns:
Todd County
Septic System Management Plan Agreement

Property Owner                                  Phone:                                Date:

Site Address                                    Company                                Parcel #

System Designer                                  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.

☐ Surfac ing 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.

Management Plan Agreement Form

Revised 1/1/2014