CONSTRUCTION OF SANITATION FACILITIES
FOR NEW OR RENOVATED HOMES
AT SCATTERED SITES ON THE
MILLE LACS INDIAN RESERVATION
MILLE LACS, KANEBEC, AITKIN, AND PINE COUNTIES, MINNESOTA

BE 18-L07

ROY GARBOW

BID SCHEDULE

Schedule A - Individual Wastewater Facilities

ITEM NO.	DESCRIPTION	EST QTY	UNIT	UNIT COST	TOTAL COST
1	2500 Gallon Septic Tank	1	EA		
2	1070 Gallon Pump Tank	1	EA		
3	4" Solid PVC Pipe	50	FT		
4	Two-way Cleanout	1	EA		
5	Effluent Pump With Controls	1	EA		
6	Electric Cable	660	FT		
7	2-inch Solid PVC Effluent Pipe	32	FT		
8	Mound System	1	LS		
9	ISTS Permit	1	EA		
				Subotal Schedule A	

Contractor's Authorized Signature

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Application for SSTS Permit

MILLE LACS COUNTY

INSTRUCTIONS

Before you apply for a SSTS Permit, all property taxes must be current. Please complete this application in full. Incomplete or incorrect applications will be returned to the applicant. The application and required submittal documents may be submitted in person or mailed to:

Mille Lacs County Environmental Resources
635 2nd Street SE
Milaca, MN 56353

APPLICANT INFORMATION

Name: ROY GARBOW/ MILLE LACS BAND OF OJIBWE Contact Phone: 320-630-2624

Mailing Address: _____

E-mail Address: _____

Are you purchasing the property on a Contract for Deed? ☐ Y ☐ N

If yes, please have the Contract Holder sign here: _____

Are you an agent acting on behalf of the landowner? ☐ Y ☐ N

If yes, please have the landowner sign here: _____

SSTS PROFESSIONAL INFORMATION

Installer Name: _____ Installer Phone: _____

Installer Email Address: _____ Installer License #: _____

Designer Name: E-Z EXCAVATING/KEVIN HERWIG Designer Phone: 320-241-7036

Designer Email Address: EZEXCAVATING@YAHOO.COM Designer License #: 1472

PROPERTY INFORMATION

Property Owner: ROY GARBOW/MILLE LACS BAND OF OJIBWE

Property Address: 40589 BEACH RD. ONAMIA MN Dwelling Type: HOME PROPOSED

Parcel ID Number: 17-414-0020 # Bedrooms: 6 Flow: 900

Is the property located within 1,000 feet of a lake or 300 feet of a river? ☑ Y ☐ N

Application for SSTS Permit

MILLE LACS COUNTY

SYSTEM INFORMATION

Installation Type:	☑ New ☐ Replacement ☐ Upgrade		
Septic Tank Capacity:	2500	Pump Tank Capacity:	1000
Sewage Pump:	☑ Yes ☐ No	Garbage Disposal:	☐ Yes ☑ No
Pressure Test:	☐ Yes ☐ No	Filter/Alarm:	☑ Yes ☐ No
Well Setback:	NONE	Well Type:	☐ Deep ☐ Shallow
Building Setback:	NONE	OHWM Setback:	
Property Line Setback:		Road Setback:	
System Type:	☐ Type I ☐ Type II ☑ Type III ☐ Type IV ☐ Type V		
Drainfield Type:	MOUND	Drainfield Size (sq ft):	750
Restrictive Layer (in):	10"	Sand Lift (in):	36"
Well Setback:		Well Type:	☐ Deep ☐ Shallow
Building Setback:		OHWM Setback:	NONE
Property Line Setback:		Road Setback:	

APPLICATION SUBMITTAL REQUIREMENTS

- ☐ Management Plan.
- ☐ Soil Verification Form(s).
  - Percolation test required if a soil pit is not utilized.
- ☐ Site Map:
  - Elevations of tanks and soil treatment system.
  - Setbacks to buildings, property lines, water bodies, and wells.
  - Soil borings and/or pits identified.
  - Distance between tank and soil treatment system.
- ☐ Type II Holding Tank Service Agreement, if applicable.
- ☐ Type IV and V Operating Permit, as applicable.
- ☐ Homeowner-Installed System Indemnification Agreement Form, as applicable.
- ☐ Permit fee, based on system and/or permit type, payable by cash, check, or credit card:
  - $250 Standard System
  - $100 Tank Only
  - $150 Holding Tank
  - $50 System Repair
  - $150 Soil Treatment System Only
  - $1,200 - $2,000 Performance System or MSTS (*Call for permit cost)*
- ☐ Plumbing Permit fee of $31.95 payable by cash, check, or credit card, if installing new tank.
- ☐ MPCA Compliance Inspection Form for Existing SSTS, if reusing existing tank.

Mille Lacs County Environmental Resources, 635 2nd Street SE, Milaca, MN 56353
320-983-8458 • www.millelacs.mn.gov

Application for SSTS Permit

MILLE LACS COUNTY

TERMS AND CONDITIONS

The information in this application and submitted materials are true and correct to the best of my knowledge. I agree that all work will comply with all applicable federal and state regulations, the documents contained herein, and the Mille Lacs County Subsurface Sewage Treatment System Ordinance. I also agree to allow Mille Lacs County staff to enter the property during normal business hours to conduct tests and inspections as may be needed to process the application.

Signature of Applicant/Owner _____ Date _____

I hereby certify that I am a currently licensed SSTS designer certified to design this system, that I have followed all requirements of state administrative rules and the Mille Lacs County Subsurface Sewage Treatment System Ordinance, and that the number of bedrooms identified is true and correct.

Signature of Designer _____ Date 7-15-2020

OFFICE USE ONLY

Date Application Received: _____ Taxes Verified as Current: ☐ Y ☐ N

Building Permit # (air test): _____ Any Violations on Property: ☐ Y ☐ N

Ownership Verified: ☐ Y ☐ N Submitted with Building Permit: ☐ Y ☐ N

Date Staff Approved Application as Complete: _____

☐ Ownership

☐ Setbacks Soil Verification Date: _____

☐ Floodplain Permit Approved Date: _____

☐ Wetlands Permit Number: _____

☐ Public Waters LSO Notification Date: _____

☐ Soils Verified Reviewer Initials: _____

Notes:

_____

_____

_____

_____

Mille Lacs County Environmental Resources, 635 2nd Street SE, Milaca, MN 56353
320-983-8458 • www.millelacs.mn.gov

E-Z EXCAVATING LLC.

2358 HWY# 23
MORA MN. 55051
Ph. 320-679-4031
Cell 320-241-7036

DESIGN

LOCATION: 40589 BEACH RD. ONAMIA MN.
PID# 17-414-0020

OWNER: ROY GARBOW/MILLE LACS BAND OF OJIBWE
SYSTEM TYPE: TYPE III NOUND

DESIGN FLOW: 5 BEDROOM DESIGNED @ 900 GPD
TREATMENT AREA: **750** SQ.FT.
MOUND SIZE: 41.6 X 105
SLOPE: 2 %

SEPTIC TANK: 2500 SPLIT
FILTER: POLYLOK PL122

PUMP TANK: 1070 GAL

PUMP: GOULDS WE0511H

FLOW METER: SJE-RHOMBUS AB DUO W/EVENT COUNTER

KEVIN HERWIG M.P.C.A. 1472

CONSTRUCTION NOTES

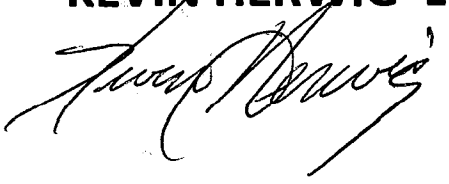
PRODUCT BRAND & MODEL LISTED IN DESIGN MUST BE USED. (CEMSTONE TANKS –1 SEPTIC 2500 GAL. COMBO(#9552501) W/ POLYLOK PL-122 FILTER WITH ALARM, 1-PUMP TANK 1070 GAL.(# 9551001) PUMP – GOULDS WE0511H) PUMP CHAMBER AND PUMP SETTINGS WILL NOT BE CORRECT IF OTHER PRODUCTS ARE USED.**

SJE RHOMBUS AB DUO CONTROL WITH EVENT COUNTER(POLYLOC FILTER PL-122 WITH ALARM)

IT IS THE DESIGNERS DISCRETION TO APPROVE OR DISAPPROVE SUBSTITUTIONS.THE INSTALLER WILL BE RESPONSIBLE FOR DESIGN CHANGE FEE.

ALL PRODUCTS AND CONSTRUCTION PRACTICES ARE TO MEET M.P.C.A. 7080 RULE AND MILLE LACS BAND SPECIFICATION FOR SEWAGE TREATMENT SYSTEMS

KEVIN HERWIG LIC # 1472



University of Minnesota Onsite Sewage Treatment Program

Preliminary Evaluation Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

1. Contact Information

v 04.01.2020

Property Owner/Client: ROY GARBOW / MILLE LACS BAND OF OJIBWE | Date Completed: 7/15/2020

Site Address: 40589 BEACH RD. ONAMIA MN. 56359 | Project ID:

Email: | Phone: 320-630-2624

Mailing Address:

Legal Description:

Parcel ID: 17-414-0020 | SEC: | TWP: | RNG:

2. Flow and General System Information

A. Client-Provided Information

Project Type: ☑ New Construction ☐ Replacement ☐ Expansion ☐ Repair

Project Use: ☐ Residential ☐ Other Establishment:

Residential use: # Bedrooms: 6 | Dwelling Sq.ft.: | Unfinished Sq. Ft.:

Adults: | # Children: | # Teenagers:

In-home business (Y/N): | If yes, describe:

Water-using devices: *(check all that apply)*

☐ Garbage Disposal/Grinder ☐ Dishwasher ☐ Hot Tub*
☐ Sewage pump in basement ☐ Water Softener* ☐ Sump Pump*
☐ Large Bathtub >40 gallons ☐ Iron Filter* ☐ Self-Cleaning Humidifier*
☐ Clothes Washing Machine ☐ High Eff. Furnace* ☐ Other:

* Clear water source - should not go into system

Additional current or future uses:

Anticipated non-domestic waste:

The above is complete & accurate: *Client signature & date*

B. Designer-determined flow Information

Attach additional information as necessary.

Design Flow: 900 GPD | Anticipated Waste Type: Residential

BOD: <170 mg/L | TSS <60 mg/L | Oil & Grease <25 mg/L

3. Preliminary Site Information

A. Water Supply Wells

#	Description	Mn. ID#	Well Depth (ft.)	Casing Depth (ft.)	Confining Layer	STA Setback	Source
1	NONE						
2							
3							
4							

Additional Well Information:

ONSITE SEWAGE TREATMENT PROGRAM

Preliminary Evaluation Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

Site within 200' of noncommunity transient well (Y/N)	No	Yes, source:	
Site within a drinking water supply management area (Y/N)	No	Yes, source:	
Site in Well Head Protection inner wellhead management zone (Y/N)	No	Yes, source:	
Buried water supply pipes within 50 ft of proposed system (Y/N)	No		
B. Site located in a shoreland district/area?		Yes, name:	
Elevation of ordinary high water level:	ft	Source:	
Classification:	Tank Setback: ft.	STA Setbk: ft.	
C. Site located in a floodplain?	No	Yes, Type(s):	N/A
Floodplain designation/elevation (10 Year):	N/A ft	Source:	N/A
Floodplain designation/elevation (100 Year):	N/A ft	Source:	N/A

D. Property Line Id / Source: ☐ Owner ☐ Survey ☑ County GIS ☐ Plat Map ☐ Other:

E. ID distance of relevant setbacks on map: ☐ Water ☐ Easements ☐ Well(s) ☐ Building(s) ☑ Property Lines ☐ OHWL ☐ Other:

4. Preliminary Soil Profile Information From Web Soil Survey (attach map & description)

Map Units: C10B Slope Range: 0-6 %

List landforms: GROUND AND END MORAINES

Landform position(s): SHOULDER

Parent materials: Lacustrine

Depth to Bedrock/Restrictive Feature: 10 in Depth to Watertable: in

Map Unit Ratings

Septic Tank Absorption Field- At-grade:	
Septic Tank Absorption Field- Mound:	Slightly Limited
Septic Tank Absorption Field- Trench:	

5. Local Government Unit Information

Name of LGU: MILLE LACS COUNTY

LGU Contact:

LGU-specific setbacks:

LGU-specific design requirements:

LGU-specific installation requirements:

Notes:

ONSITE SEWAGE TREATMENT PROGRAM

Field Evaluation Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

1. Project Information

v 04.01.2020

Property Owner/Client: ROY GARBOW / MILLE LACS BAND OF OJIBWE | Project ID:

Site Address: 40589 BEACH RD. ONAMIA MN. 56359 | Date Completed: 7/16/2020

2. Utility and Structure Information

Utility Locations Identified ☐ Gopher State One Call # ☐ Any Private Utilities:

Locate and Verify (*see Site Evaluation map*) ☐ Existing Buildings ☑ Improvements ☐ Easements ☐ Setbacks

3. Site Information

Vegetation type(s): Grass | Landscape position: Shoulder

Percent slope: 2 % | Slope shape: Linear, Linear | Slope direction: southwest

Describe the flooding or run-on potential of site: SAFE

Describe the need for Type III or Type IV system: REDOX @ 10"

Note:

Proposed soil treatment area protected? (Y/N): Yes | If yes, describe: ROPED OFF

4. General Soils Information

Filled, Compacted, Disturbed areas (Y/N): No

If yes, describe:

Soil observations were conducted in the proposed system location (Y/N): Yes

A soil observation in the most limiting area of the proposed system (Y/N): Yes

Number of soil observations: 7 | Soil observation logs attached (Y/N): Yes

Percolation tests performed & attached (Y/N): No

5. Phase I. Reporting Information

	Depth		Elevation		
Limiting Condition*:	11	in		ft	**Most Restrictive Depth Identified from List Below*
Periodically saturated soil:	10	in		ft	Soil Texture: silt loam
Standing water:		in		ft	Percolation Rate: min/inch
Bedrock:		in		ft	Soil Hyd Loading Rate: 0.5 gpd/ft^2
Benchmark Elevation:	NE CORNER	ft			Elevations and Benchmark on map? (Y/N):

Benchmark Elevation Location: STAKE W/NAIL NE CORNER OF MOUND

Differences between soil survey and field evaluation:

Site evaluation issues / comments:

Anticipated construction issues:

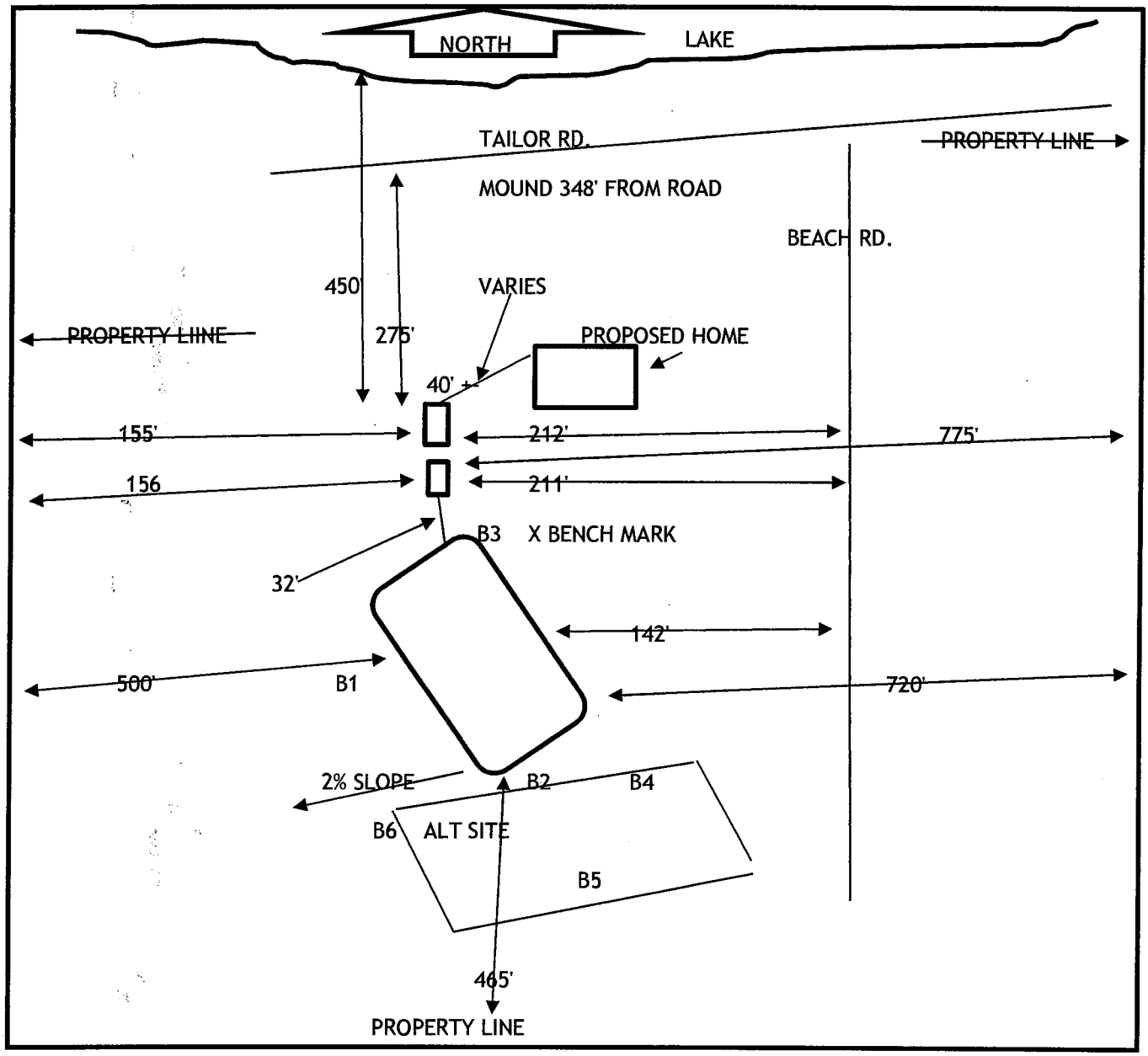
University of Minnesota Onsite Sewage Treatment Program

Proposed Design Map

Minnesota Pollution Control Agency

Project ID: v 04.01.2020

Property Owner/Client: ROY GARBOW / MILLE LACS BAND OF OJIBWE



Map scale: NONE ☑ Indicated north ☐ Show slope/contours

Elevations in feet

System Corners:			Soil Borings:			Tank Outlet:	
NW:	99.1	ft	#1:	98.3	ft	95.5	ft
NE:	99.4	ft	#2:	98.5	ft		
SW:	99.25	ft	#3:	99.6	ft		
SE:	99.45	ft					

University of Minnesota Onsite Sewage Treatment Program

Proposed Design Map

MINNESOTA POLLUTION CONTROL AGENCY

	Project ID:	v 04.01.2020
Property Owner/Client:	ROY GARBOW / MILLE LACS BAND OF OJIBWE	

Mapping Checklist

Locate

- [x] Lot Dimensions/Property Lines
- [x] Dwellings and Other Improvements
- [ ] Existing or Proposed System(s)
- [ ] Replacement Area
- [ ] Unsuitable Area(s)
- [ ] Public Water Supply Wells
- [ ] Pumping Access
- [ ] Inner Wellhead Zone

Easements

- [ ] Phone
- [ ] Electric
- [ ] Gas

Elevations

- [x] Benchmark
- [x] Borings
- [ ] Perc Tests
- [ ] Horizontal and Vertical Reference Points

Setbacks

- [ ] Building
- [x] All water wells within 100 feet
- [ ] Pressure Pipe
- [ ] Water Suction
- [x] Streams, Lakes
- [ ] Floodway and Fringe

Comments:

University of Minnesota
Onsite Sewage Treatment Program

Soil Observation Log

Project ID:

v 04.01.2020

Client:	ROY GARBOW / MILLE LACS BAND OF OJIBWE	Location / Address:	40589 BEACH RD. ONAMIA MN. 56359

Soil parent material(s): (Check all that apply) ☐ Outwash ☑ Lacustrine ☐ Loess ☐ Till ☐ Alluvium ☐ Bedrock ☐ Organic Matter

Landscape Position: (select one)	Shoulder	Slope %:	2.0	Slope shape	Linear, Linear
Elevation-relative to benchmark:	98.3				
Vegetation:	Lawn	Soil survey map units:	C10B	Limiting Layer Elevation:	97.47
Weather Conditions/Time of Day:	9AM PL.CLOUDY			Date	07/10/20
Observation #/Location:	1	NE		Observation Type:	Pit

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure		
							Shape	Grade	Consistence
0-8	Silt Loam	<35%	10YR 3/2				Blocky	Weak	Friable
8-12	Silt Loam	<35%	10YR 5/3	2.5YR 5/6	Concentrations	S1	Blocky	Weak	Friable
12-20	Silt Loam	<35%	10YR 4/3	2.5YR 5/6	Concentrations	S1	Blocky	Weak	Friable

Comments

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

KEVIN HERWIG		1472	7/10/2020
(Designer/Inspector)	(Signature)	(License #)	(Date)

University of Minnesota
Onsite Sewage Treatment Program

Soil Observation Log

Project ID:

v 04.01.2020

Client:	ROY GARBOW / MILLE LACS BAND OF OJIBWE	Location / Address:	40589 BEACH RD. ONAMIA MN. 56359

Soil parent material(s): (Check all that apply) ☐ Outwash ☑ Lacustrine ☐ Loess ☐ Till ☐ Alluvium ☐ Bedrock ☐ Organic Matter

Landscape Position: (select one)	Shoulder	Slope %: 2.0	Slope shape	Linear, Linear	Elevation-relative to benchmark: 98.5
Vegetation:	Lawn	Soil survey map units:	C10B		Limiting Layer Elevation: 97.66
Weather Conditions/Time of Day:	9AM PL.CLOUDY			Date	07/10/20
Observation #/Location:	2	S.CENTER		Observation Type:	Pit

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure		
							Shape	Grade	Consistence
0-8	Silt Loam	<35%	10YR 3/2				Blocky	Weak	Friable
8-14	Silt Loam	<35%	10YR 5/3	2.5YR 5/6	Concentrations	S1	Blocky	Weak	Friable
14-22	Silt Loam	<35%	10YR 4/3	2.5YR 5/6	Concentrations	S1	Blocky	Weak	Friable

Comments

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

KEVIN HERWIG		1472	7/10/2020
(Designer/Inspector)	(Signature)	(License #)	(Date)

University of Minnesota
Onsite Sewage Treatment Program

Soil Observation Log

Project ID:

v 04.01.2020

Client:	ROY GARBOW / MILLE LACS BAND OF OJIBWE	Location / Address:	40589 BEACH RD. ONAMIA MN. 56359

Soil parent material(s): (Check all that apply) ☐ Outwash ☑ Lacustrine ☐ Loess ☐ Till ☐ Alluvium ☐ Bedrock ☐ Organic Matter

Landscape Position: (select one)	Shoulder	Slope %:	2.0	Slope shape	Linear, Linear
Elevation-relative to benchmark:	99.6				
Vegetation:	Lawn	Soil survey map units:	C10B	Limiting Layer Elevation:	98.73
Weather Conditions/Time of Day:	9AM PL.CLOUDY			Date	07/10/20
Observation #/Location:	3	N.END CENTER		Observation Type:	Pit

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure		
							Shape	Grade	Consistence
0-8	Silt Loam	<35%	10YR 3/2				Blocky	Weak	Friable
8-16	Silt Loam	<35%	10YR 5/3	2.5YR 5/6	Concentrations	S1	Blocky	Weak	Friable
16-20	Silt Loam	<35%	10YR 4/3	2.5YR 5/6	Concentrations	S1	Blocky	Weak	Friable

Comments

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

KEVIN HERWIG		1472	7/10/2020
(Designer/Inspector)	(Signature)	(License #)	(Date)

University of Minnesota
ONSITE SEWAGE TREATMENT PROGRAM

Soil Observation Log

Project ID:

v 04.01.2020

Client:	ROY GARBOW / MILLE LACS BAND OF OJIBWE	Location / Address:	40589 BEACH RD. ONAMIA MN. 56359

Soil parent material(s): (Check all that apply) ☐ Outwash ☑ Lacustrine ☐ Loess ☐ Till ☐ Alluvium ☐ Bedrock ☐ Organic Matter

Landscape Position: (select one)	Shoulder	Slope %: 2.0	Slope shape	Linear, Linear	Elevation-relative to benchmark: 98.1
Vegetation:	Grass	Soil survey map units:	C10B		Limiting Layer Elevation: 97.3
Weather Conditions/Time of Day:	9AM PL.CLOUDY			Date	07/10/20
Observation #/Location:	ALT 1	N.END CENTER		Observation Type:	Pit

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure		
							Shape	Grade	Consistence
0-10	Silt Loam	<35%	10YR 3/2				Blocky	Weak	Friable
10-20	Silt Loam	<35%	10YR 5/3	2.5YR 5/6	Concentrations	S1	Blocky	Weak	Friable
20-24	Silt Loam	<35%	10YR 4/3	2.5YR 5/6	Concentrations	S1	Blocky	Weak	Friable

Comments

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

KEVIN HERWIG		1472	7/10/2020
(Designer/Inspector)	(Signature)	(License #)	(Date)

University of Minnesota
Onsite Sewage Treatment Program

Soil Observation Log

Project ID:

v 04.01.2020

Client:	ROY GARBOW / MILLE LACS BAND OF OJIBWE	Location / Address:	40589 BEACH RD. ONAMIA MN. 56359

Soil parent material(s): (Check all that apply) ☐ Outwash ☑ Lacustrine ☐ Loess ☐ Till ☐ Alluvium ☐ Bedrock ☐ Organic Matter

Landscape Position: (select one)	Shoulder	Slope %: 2.0	Slope shape	Linear, Linear	Elevation-relative to benchmark: 97.8
Vegetation:	Grass	Soil survey map units:	C10B		Limiting Layer Elevation: 97
Weather Conditions/Time of Day:	9AM PL.CLOUDY			Date	07/10/20
Observation #/Location:	ALT 2	S. CENTER		Observation Type:	Pit

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Structure: Grade	Structure: Consistence
0-10	Silt Loam	<35%	10YR 3/2				Blocky	Weak	Friable
10-18	Silt Loam	<35%	10YR 5/3	2.5YR 5/6	Concentrations	S1	Blocky	Weak	Friable
18-24	Silt Loam	<35%	10YR 4/3	2.5YR 5/6	Concentrations	S1	Blocky	Weak	Friable

Comments

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

KEVIN HERWIG		1472	7/10/2020
(Designer/Inspector)	(Signature)	(License #)	(Date)

University of Minnesota
Onsite Sewage Treatment Program

Soil Observation Log

Project ID:

v 04.01.2020

Client:	ROY GARBOW / MILLE LACS BAND OF OJIBWE	Location / Address:	40589 BEACH RD. ONAMIA MN. 56359

Soil parent material(s): (Check all that apply) ☐ Outwash ☑ Lacustrine ☐ Loess ☐ Till ☐ Alluvium ☐ Bedrock ☐ Organic Matter

Landscape Position: (select one)	Shoulder	Slope %:	2.0	Slope shape	Linear, Linear
Elevation-relative to benchmark:	97.4				
Vegetation:	Grass	Soil survey map units:	C10B	Limiting Layer Elevation:	96.6
Weather Conditions/Time of Day:	9AM PL.CLOUDY			Date	07/10/20
Observation #/Location:	ALT 3	WEST		Observation Type:	Pit

Depth (in)	Texture	Rock Frag. %	Matrix Color(s)	Mottle Color(s)	Redox Kind(s)	Indicator(s)	Structure: Shape	Structure: Grade	Structure: Consistence
0-10	Silt Loam	<35%	10YR 3/2				Blocky	Weak	Friable
10-18	Silt Loam	<35%	10YR 5/3	2.5YR 5/6	Concentrations	S1	Blocky	Weak	Friable
18-24	Silt Loam	<35%	10YR 4/3	2.5YR 5/6	Concentrations	S1	Blocky	Weak	Friable

Comments

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

KEVIN HERWIG		1472	7/10/2020
(Designer/Inspector)	(Signature)	(License #)	(Date)

LOCATION BRENNYVILLE MN+WI

Established Series
Rev. KDS-JFG-AGG
10/2006

BRENNYVILLE SERIES

The Brennyville series consists of very deep, somewhat poorly drained soils that formed in a silty mantle of loess or lacustrine deposits and dense loamy glacial till on ground and end moraines. A densic contact occurs at depths of 40 to 60 inches. Slopes range from 0 to 6 percent. Mean annual precipitation is about 28 inches. Mean annual air temperature is about 43 degrees F.

TAXONOMIC CLASS: Coarse-loamy, mixed, superactive, frigid Aquic Glossudalfs

TYPICAL PEDON: Brennyville silt loam on a slightly convex slope of 1 percent in a cultivated field. (Colors are for moist soil unless otherwise stated.)

Ap--0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine and medium subangular blocky structure; friable; about 1 percent gravel; strongly acid; abrupt smooth boundary. (1 to 10 inches thick)

B/E--8 to 11 inches; 75 percent brown (10YR 5/3) silt loam (Bt); with about 25 percent tongues of grayish brown (10YR 5/2) silt loam (E); weak fine and medium subangular blocky structure; common fine distinct light olive brown (2.5Y 5/6) Fe concentrations; friable; about 1 percent gravel; strongly acid; gradual wavy boundary. (3 to 10 inches thick)

Btl--11 to 21 inches; brown (10YR 4/3) silt loam; moderate fine and medium subangular blocky structure; common fine distinct light olive brown (2.5Y 5/6) Fe concentrations and fine faint grayish brown (2.5Y 5/2) Fe depletions; friable; common distinct discontinuous dark olive brown (2.5Y 3/3) clay films on faces of peds; about 1 percent gravel; strongly acid; clear wavy boundary. (0 to 10 inches thick)

2Bt2--21 to 28 inches; brown (7.5YR 4/3) loam; moderate medium platy structure parting to thin platy; few medium faint grayish brown (10YR 5/2) Fe depletions and common medium distinct dark yellowish brown (10YR 4/6) Fe concentrations; friable; few distinct discontinuous dark brown (7.5YR 3/3) clay films on bottoms of plates; about 3 percent gravel; strongly acid; gradual wavy boundary.

2Bt3--28 to 38 inches; brown (7.5YR 4/4) fine sandy loam; moderate medium platy structure parting to thin platy; few medium distinct brown (7.5YR 5/3) Fe depletions and common fine distinct dark strong brown (7.5YR 4/6) Fe concentrations; friable; few distinct discontinuous dark brown (7.5YR 3/4) clay films on bottoms of plates; about 3 percent gravel; strongly acid; gradual wavy boundary. (Combined thickness of the 2Bt horizons is 6 to 20 inches)

2BC--38 to 45 inches; dark reddish brown (5YR 3/4) fine sandy loam; moderate thick platy structure; firm; few fine and medium faint reddish brown (5YR 5/3) Fe depletions and few medium distinct yellowish red (5YR 4/6) Fe concentrations; few thin distinct brown and dark brown (7.5YR 3/4) clay films on bottoms of plates; about 5 percent gravel and 2 percent cobbles; slightly acid; gradual wavy boundary. (0 to 12 inches thick)

2BCd--45 to 80 inches; dark reddish brown (5YR 3/4) fine sandy loam; moderate very coarse and extremely coarse prismatic structure parting to moderate fine and medium platy, few 2 to 3 millimeter oblique fractures 0.5 to 3.0 feet apart; very firm; few faint reddish brown (5YR 5/3) Fe depletions and yellowish red (5YR 4/6) Fe concentrations on fracture faces; about 5 percent gravel and 2 percent cobbles; slightly acid.

TYPE LOCATION: Mille Lacs County, Minnesota; about 3.5 miles south and 1 mile west of Foreston; about 1,400 feet east and 100 feet south of the northwest corner of Sec. 32, T. 37N., R. 27 W; USGS

Foreston SW quadrangle; Lat. 45 degrees 39 minutes 46 seconds N., Long. 93 degrees 44 minutes 00 seconds W. NAD83.

RANGE IN CHARACTERISTICS: Thickness of the silty mantle ranges from 15 to 30 inches. Depth to dense till (densic contact) ranges from 40 to 60 inches. Rock fragments range from 0 to 5 percent in the silty mantle and 1 to 15 percent in the 2B and 2BC horizons. All parts of the argillic horizon have a base status of more than 60 percent. Stony or very stony phases are recognized in some places.

Where present, an Oe or Oa horizon with hue of 10YR, value of 2 or 3, and chroma of 1 or 2, is comprised of litter of leaves, needles and mosses.

The Ap or A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 to 3. The higher value and chroma are typical of the Ap horizon. The A horizon is silt loam or very fine sandy loam. It is very strongly acid to moderately acid.

Where present, the E horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2. It is silt loam or very fine sandy loam. It is strongly acid to slightly acid. Redoximorphic features of high chroma are usually present.

Some pedons have a Bw horizon with hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4. Texture is silt loam or very fine sandy loam.

The B/E or E/B horizons have colors and textures of the E and Bt horizons. Textures are similar to the E or Bt horizons. The E material ranges from 15 to 85 percent and the Bt material ranges from 85 percent to 15 percent. It is strongly acid or slightly acid.

The Bt horizon has hue of 10YR or 7.5YR, value of 4, and chroma of 3 or 4. Texture is silt loam or very fine sandy loam. It is strongly acid or slightly acid.

The 2Bt horizon has hue of 10YR, 7.5YR or 5YR, value and chroma of 3 to 5. It is fine sandy loam, sandy loam or loam. It is strongly acid to neutral. Clay films are faint or distinct and patchy. Clay content ranges from 10 to 18 percent. Bulk density ranges from 1.55 to 1.75 gm/cc.

The 2BC horizon has hue of 2.5YR, 5YR or 7.5YR, value and chroma of 3 to 5. It is sandy loam or fine sandy loam. Clay content averages more than 7 percent. This horizon is restrictive to root penetration due to the platy soil structure, which is a property of the dense till, but is not as restrictive as the BCd horizon. Roots are concentrated along the vertical ped faces. It is moderately acid to neutral. Moist bulk density ranges from 1.65 to 1.80 gm/cc.

The 2BCd horizon has hue of 2.5YR, 5YR or 7.5YR, value and chroma of 3 to 5. It is sandy loam or fine sandy loam. It is moderately acid to slightly alkaline. Calcium carbonate equivalent ranges from 0 to 5 percent in the dense till. This is considered to be a densic contact. Moist bulk density ranges from 1.80 to 2.0 gm/cc.

COMPETING SERIES: These are in the Bemidji, Fallcreek, Glendenning, Hatley, Magnor, Magroc, Mora, Oesterlie, Plover, Rosy and Stinnett soils. Bemidji soils have calcareous, friable glacial till in the lower third of the series control section. Fallcreek soils do not have a lithologic discontinuity in the series control section.Glendenning, Hatley, Oesterlie, Plover and Rosy soils do not have a densic contact within a depth of 60 inches. Magnor soils have base saturation (by sum of cations) of less than 60 percent in some part of the argillic horizon. Magroc soils have sola terminated by bedrock at depths of 40 to 60 inches. Mora soils do not have an upper silty mantle. Stinnett soils average less than 7 percent clay in the lower third of the series control section.

GEOGRAPHIC SETTING: These soils are on nearly level to gently sloping ground and end moraines. Slope range from 0 to 6 percent. Brennyville soils formed in loess or silty lacustrine deposits and the underlying dense loamy glacial till of the Late Wisconsinan Age. Mean annual air temperature ranges from 37 to 45 degrees F. Mean annual precipitation ranges from 24 to 33 inches. Frost-free days range from 90 to 145. Elevation above sea level ranges from 1000 to 1400 feet.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Adolph, Freer, Milaca, Mora, and Ronneby soils. Adolph is very poorly drained and are on lower lying areas or depressions. Freer soils have more clay in the control section and are lower on the landscape. Milaca soils are well drained and are on terrain that is higher lying and are more sloping. Mora and Ronneby soils lack the silty mantle.

DRAINAGE AND SATURATED HYDRAULIC CONDUCTIVITY: Somewhat poorly drained. Surface runoff is medium or low. Saturated hydraulic conductivity, measured in inches per hour, is .6 to 2.0 in the silty mantle, .06 to .6 in the lower part and .01 to .06 in the underlying dense till. A perched zone of saturation occurs as high as .5 foot during the months of April to May in years of normal rainfall.

USE AND VEGETATION: About half of this soil is cleared and used for pasture or cropped to corn and hay. The remainder is in woodland or wooded pasture. Native vegetation is deciduous forest or mixed deciduous and coniferous forest.

DISTRIBUTION AND EXTENT: MLRA-90A and MLRA-90B. East Central Minnesota and Northwestern Wisconsin. This soil is moderately extensive.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: St. Paul, Minnesota

SERIES ESTABLISHED: Aitkin County, Minnesota 1995.

REMARKS: Diagnostic horizons and features recognized in this pedon are: Ochric epipedon - the zone from the surface of the soil to a depth of 8 inches (Ap horizon); Glossic horizon - the zone from 8 to 11 inches (B/E horizon); Argillic horizon - the zone from 11 to 38 inches (Bt and 2Bt horizons); Other features are frigid temperature regime and aquic subgroup based upon low chroma redox within 10 inches of the top of the argillic horzion. The 2BCd horizon is considered to be a densic contact.

This soil was formerly correlated as Paget (inactive). It also includes much of what was correlated as Freeon series in Minnesota.

The type location was moved from Benton County, Minnesota to Mille Lacs County Minnesota to better represent the series concept.

ADDITIONAL DATA: Refer to MAES Central File Code No. 3939, 3752 and 736 for results of laboratory data on similar pedons.

National Cooperative Soil Survey
U.S.A.

University of Minnesota Onsite Sewage Treatment Program

Design Summary Page

MINNESOTA POLLUTION CONTROL AGENCY

1. PROJECT INFORMATION

v 04.01.2020

Property Owner/Client:	ROY GARBOW / MILLE LACS BAND OF OJIBWE	Project ID:	
Site Address:	40589 BEACH RD. ONAMIA MN. 56359	Date:	07/16/20
Email Address:		Phone:	320-630-2624

2. DESIGN FLOW & WASTE STRENGTH

Attach data / estimate basis for Other Establishments

Design Flow: 900 GPD Anticipated Waste Type: Residential

BOD: <170 mg/L TSS: <60 mg/L Oil & Grease: <25 mg/L

Treatment Level: C *Select Treatment Level C for residential septic tank effluent*

3. HOLDING TANK SIZING

Minimum Capacity: Residential =400 gal/bedroom, Other Establishment = Design Flow x 5.0, Minimum size 1000 gallons

Code Minimum **Holding Tank** Capacity: _____ Gallons in _____ Tanks or Compartments

Recommended **Holding Tank** Capacity: _____ Gallons in _____ Tanks or Compartments

Type of High Level Alarm: _____ (Set @ 75% tank capacity)

Comments: _____

4. SEPTIC TANK SIZING

A. Residential dwellings:

Number of Bedrooms (Residential): 6

Code Minimum **Septic Tank** Capacity: 2000 Gallons in 1 Tanks or Compartments

Recommended **Septic Tank** Capacity: 2500 Gallons in 2 Tanks or Compartments

Effluent Screen & Alarm (Y/N): Yes Model/Type: POLYLOK PL122

B. Other Establishments:

Waste received by: _____ _____ GPD x _____ Days Hyd. Retention Time

Code Minimum **Septic Tank** Capacity: _____ Gallons In _____ Tanks or Compartments

Recommended **Septic Tank** Capacity: _____ Gallons In _____ Tanks or Compartments

Effluent Screen & Alarm (Y/N): _____ Model/Type: _____

5. PUMP TANK SIZING

Pump Tank 1 Capacity (Minimum):	900 Gal	Pump Tank 2 Capacity (Minimum):	Gal
Pump Tank 1 Capacity (Recommended):	1000 Gal	Pump Tank 2 Capacity (Recommended):	Gal
Pump 1	56.0 GPM	Pump 2	GPM
Total Head	21.0 ft	Total Head	ft
Supply Pipe Dia.	2.00 in	Supply Pipe Dia.	
Dose Vol:	224.0 gal	Dose Vol:	Gal

University of Minnesota Onsite Sewage Treatment Program

Design Summary Page

MINNESOTA POLLUTION CONTROL AGENCY

6. SYSTEM AND DISTRIBUTION TYPE

Project ID:

Soil Treatment Type:	Mound	Distribution Type:	
Elevation Benchmark:	NE CORNER ft	Benchmark Location:	STAKE W/NAIL NE CORNER OF MO
MPCA System Type:	Type III	Distribution Media:	Rock
Type III/IV Details:	REDOX@10"		

7. SITE EVALUATION SUMMARY:

Describe Limiting Condition: SILT LOAM REDOX @ 10"

Layers with >35% Rock Fragments? (yes/no) No If yes, describe below: % rock and layer thickness, amount of soil credit and any additional information for addressing the rock fragments in this design.

Note:

	Depth		Depth		Elevation of Limiting Condition	
Limiting Condition:	0	inches	0.0	ft	99.45	ft
Minimum Req'd Separation:	36	inches	3.0	ft		*Critical for system compliance*
					Elevation	
Code Max System Depth:	Mound	inches	-3.0	ft	102.45	ft

This is the maximimum depth to the bottom of the distribution media for required separation. Negative Depth (ft) means it must be a mound.

Soil Texture:	Silt Loam		
Soil Hyd. Loading Rate:	GPD/ft^2	Percolation Rate:	MPI
Contour Loading Rate:	3	Note:	
Measured Land Slope:	2.0 %	Note:	
Comments:			

8. SOIL TREATMENT AREA DESIGN SUMMARY

Trench:

Dispersal Area	ft^2	Sidewall Depth	in	Trench Width	ft
Total Lineal Feet	ft	No. of Trenches		Code Max. Trench Depth	in
Contour Loading Rate	ft	Length	ft	Designed Trench Depth	in

Bed:

Dispersal Area	ft^2	Sidewall Depth	in	Maximum Bed Depth	in
Bed Width	ft	Bed Length	ft	Designed Bed Depth	in

Mound:

Dispersal Area	750.0 ft^2	Bed Length	75.0 ft	Bed Width	10.0 ft
Absorption Width	24.0 ft	Clean Sand Lift	3.0 ft	Berm Width (0-1%)	ft
Upslope Berm Width	13.6 ft	Downslope Berm	18.0 ft	Endslope Berm Width	15.0 ft
Total System Length	105.0 ft	System Width	41.6 ft	Contour Loading Rate	12.0 gal/ft

University of Minnesota Onsite Sewage Treatment Program

Design Summary Page

MINNESOTA POLLUTION CONTROL AGENCY

Project ID:

At-Grade:

Bed Width	ft	Bed Length	ft	Finished Height	ft
Contour Loading Rate	gal/ft	Upslope Berm	ft	Downslope Berm	ft
Endslope Berm	ft	System Length	ft	System Width	ft

Level & Equal Pressure Distribution

No. of Laterals		Perforation Spacing	ft	Perforation Diameter	in
Lateral Diameter	in	Min Dose Volume	gal	Max Dose Volume	gal

Non-Level and Unequal Pressure Distribution

	Elevation (ft)	Pipe Size (in)	Pipe Volume (gal/ft)	Pipe Length (ft)	Perf Size (in)	Spacing (ft)	Spacing (in)
Lateral 1							
Lateral 2							
Lateral 3							
Lateral 4							
Lateral 5							
Lateral 6							

Minimum Dose Volume _____ gal

Maximum Dose Volume _____ gal

9. Additional Info for At-Risk, HSW or Type IV Design

A. Starting BOD Concentration = Design Flow X Starting BOD (mg/L) X 8.35 ÷ 1,000,000

_____ gpd X _____ mg/L X 8.35 ÷ 1,000,00 = _____ lbs. BOD/day

B. Target BOD Concentration = Design Flow X Target BOD (mg/L) X 8.35 ÷ 1,000,000

_____ gpd X _____ mg/L X 8.35 ÷ 1,000,00 = _____ lbs. BOD/day

Lbs. BOD To Be Removed: _____

PreTreatment Technology: _____ *Must Meet or Exceed Target

Disinfection Technology: _____ *Required for Levels A & B

C. Organic Loading to Soil Treatment Area:

_____ mg/L X _____ gpd x 8.35 ÷ 1,000,000 ÷ _____ ft^2 = _____ $lbs./day/ft^2$

10. Comments/Special Design Considerations:

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

(Designer)	(Signature)	(License #)	(Date)

University of Minnesota Onsite Sewage Treatment Program

Mound Design Worksheet
≥1% Slope

MINNESOTA POLLUTION CONTROL AGENCY

1. SYSTEM SIZING: Project ID: v 04.01.2020

A. Design Flow:	900	GPD
B. Soil Loading Rate:	0.00	GPD/ft^2
C. Depth to Limiting Condition	0.0	ft
D. Percent Land Slope:	2.0	%
E. Design Media Loading Rate:	1.2	GPD/ft^2
F. Mound Absorption Ratio:	2.40	

Table I
MOUND CONTOUR LOADING RATES:

Measured Perc Rate	← OR →	Texture - derived mound absorption ratio		Contour Loading Rate:
≤ 60mpi		1.0, 1.3, 2.0, 2.4, 2.6	→	≤12
61-120 mpi	← OR →	5.0	→	≤12
≥ 120 mpi*		>5.0*	→	≤6*

TABLE IXa
LOADING RATES FOR DETERMINING BOTTOM ABSORPTION AREA AND ABSORPTION RATIOS USING PERCOLATION TESTS

Percolation Rate (MPI)	Treatment Level C		Treatment Level A, A-2, B,	
	Absorption Area Loading Rate (gpd/ft^2)	Mound Absorption Ratio	Absorption Area Loading Rate (gpd/ft^2)	Mound Absorption Ratio
<0.1	-	1	-	1
0.1 to 5	1.2	1	1.6	1
0.1 to 5 (fine sand and loamy fine sand)	0.6	2	1	1.6
6 to 15	0.78	1.5	1	1.6
16 to 30	0.6	2	0.78	2
31 to 45	0.5	2.4	0.78	2
46 to 60	0.45	2.6	0.6	2.6
61 to 120	-	5	0.3	5.3
>120	-	-	-	-

*Systems with these values are not Type I systems. Contour Loading Rate (linear loading rate) is a recommended value.

2. DISPERSAL MEDIA SIZING

A. Calculate Dispersal Bed Area: Design Flow ÷ Design Media Loading Rate

900 GPD ÷ 1.2 GPD/ft^2 = 750 ft^2

If a larger dispersal media area is desired, enter size: _____ ft^2

B. Enter Dispersal Bed Width: 10.0 ft *Can not exceed 10 feet*

C. Calculate Contour Loading Rate: Bed Width X Design Media Loading Rate

10 ft^2 X 1.2 GPD/ft^2 = 12.0 gal/ft *Can not exceed Table 1*

D. Calculate Minimum Dispersal Bed Length: Dispersal Bed Area ÷ Bed Width

750 ft^2 ÷ 10.0 ft = 75.0 ft

3. ABSORPTION AREA SIZING

A. Calculate Absorption Width: Bed Width X Mound Absorption Ratio

10.0 ft X 2.4 = 24.0 ft

B. For slopes >1%, the Absorption Width is measured downhill from the upslope edge of the Bed.

Calculate Downslope Absorption Width: Absorption Width - Bed Width

24.0 ft - 10.0 ft = 14.0 ft

4. DISTRIBUTION MEDIA: ROCK Project ID:

A. Rock Depth Below Distribution Pipe

6 in 0.50 ft

5. DISTRIBUTION MEDIA: REGISTERED TREATMENT PRODUCTS: CHAMBERS AND EZFLOW

A. Enter Dispersal Media: _____

B. Enter the Component: Length: _____ ft Width: _____ ft Depth: _____ ft

C. Number of Components per Row = Bed Length divided by Component Length (Round up)

_____ ft ÷ _____ ft = _____ components/row

Check registered product information for specific application details and design

D. Actual Bed Length = Number of Components/row X Component Length:

_____ components X _____ ft = _____

E. Number of Rows = Bed Width divided by Component Width (Round up)

_____ ft ÷ _____ ft = _____ rows *Adjust width so this is a whole number.*

F. Total Number of Components = Number of Components per Row X Number of Rows

_____ X _____ = _____ components

6. MOUND SIZING

A. Clean Sand Lift: Required Separation - Depth to Limiting Condition = Clean Sand Lift (1 ft minimum)

3.0 ft - _____ ft = 3.0 ft Design Sand Lift (optional): _____ ft

B. Upslope Height: Clean Sand Lift + Depth of Media +Depth to Cover Pipe+ Depth of Cover (1 ft)

3.0 ft + 0.50 ft + 0.3 ft + 1.0 ft = 4.8 ft

Land Slope %		0	1	2	3	4	5	6	7	8	9	10	11	12
Upslope Berm Ratio	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

C. Select Upslope Berm Multiplier (based on land slope): 2.83

D. Calculate Upslope Berm Width: Multiplier X Upslope Mound Height

2.83 ft X 4.8 ft = 13.6 ft

E. Calculate Drop in Elevation Under Bed: Bed Width X Land Slope ÷ 100 = Drop (ft)

10.0 ft X 2.0 % ÷ 100 = 0.20 ft

F. Calculate Downslope Mound Height: Upslope Height + Drop in Elevation

4.8 ft + 0.20 ft = 5.0 ft

Land Slope %		0	1	2	3	4	5	6	7	8	9	10	11	12
Downslope Berm Ratio	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

G. Select Downslope Berm Multiplier (based on land slope): 3.19

H. Calculate Downslope Berm Width: Downslope Multiplier X Downslope Height

3.19 x 5.0 ft = 16.0 ft

I. Calculate Minimum Berm to Cover Absorption Area: Downslope Absorption Width + 4 feet

14.0 ft + 4 ft = 18.0 ft

J. Design Downslope Berm = greater of 4H and 4I: 18.0 ft

K. Select Endslope Berm Multiplier: 3.00 *(usually 3.0 or 4.0)*

L. Calculate Endslope Berm X Downslope Mound Height = Endslope Berm Width

3.00 ft X 5.0 ft = 15.0 ft

M. Calculate Mound Width: Upslope Berm Width + Bed Width + Downslope Berm Width

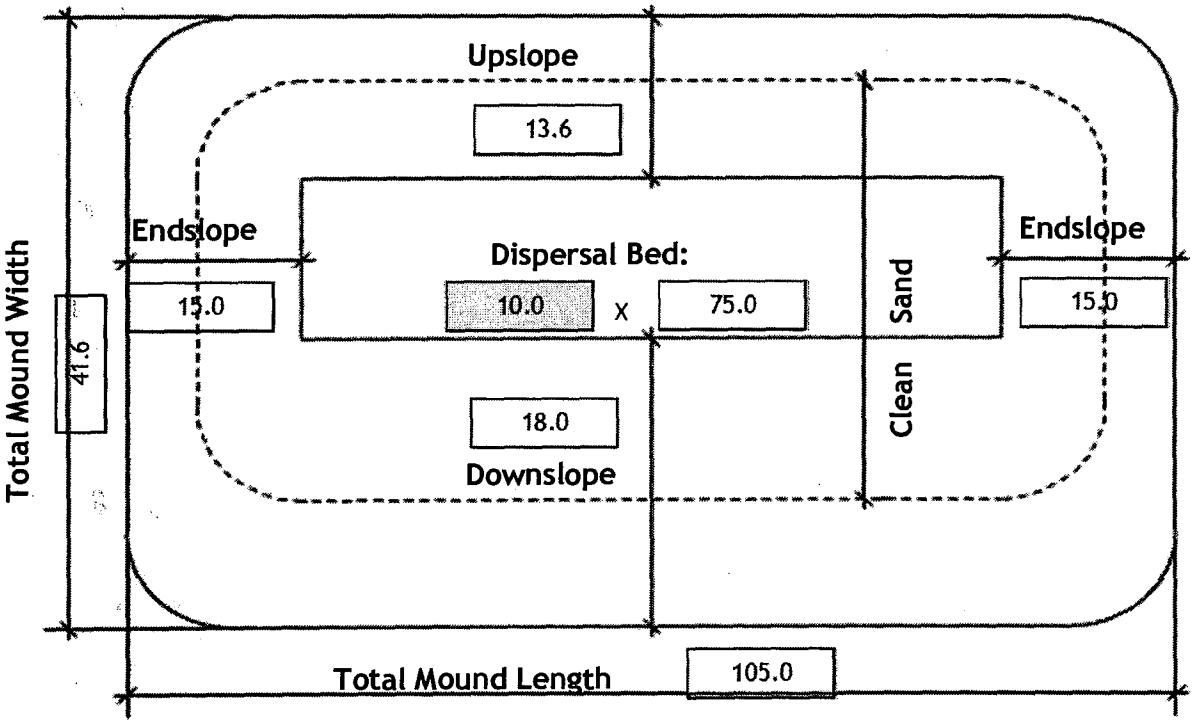
13.6 ft + 10.0 ft + 18.0 ft = 41.6 ft

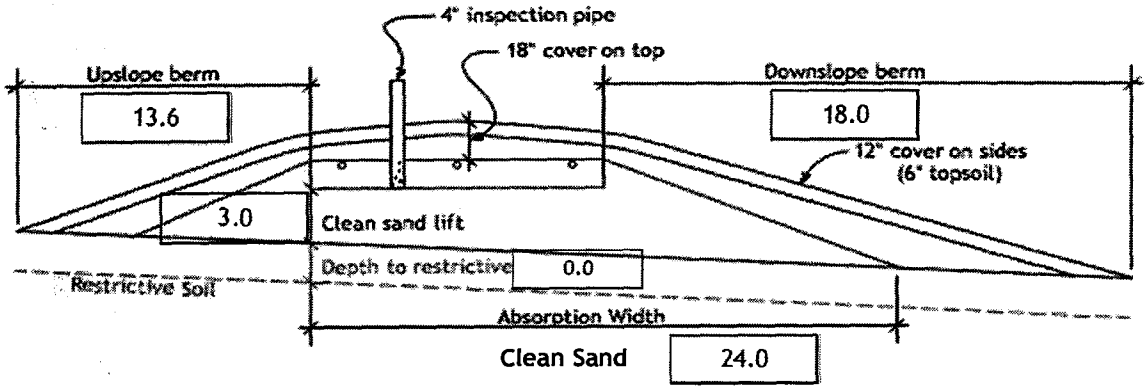
N. Calculate Mound Length: Endslope Berm Width + Bed Length + Endslope Berm Width

15.0 ft + 75.0 ft + 15.0 ft = 105.0 ft

7. MOUND DIMENSIONS

Project ID:





Comments:

University of Minnesota Onsite Sewage Treatment Program

Mound Materials Worksheet

Minnesota Pollution Control Agency

Project ID: v 04.01.2020

A. Rock *Volume*: (Rock Below Pipe + Rock to cover pipe (*pipe outside dia + ~2 inch*)) X *Bed Length* X *Bed Width* = *Volume*

(6 in + [ ] in) ÷ 12 X 75.0 ft X 10.0 ft = 375.0 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 375.0 ft^3 ÷ 27 = 13.9 yd^3

Add 30% for constructability: 13.9 yd^3 X 1.3 = 18.1 yd^3

B. Calculate *Clean Sand Volume:*

Volume Under Rock bed: *Average Sand Depth* x *Media Width* x *Media Length* = cubic feet

2.9 ft X 10.0 ft X 75.0 ft = 2175.0 ft^3

For a Mound on a slope from 0-1%

Volume from Length = ((Upslope Mound Height - 1) X Absorption Width Beyond Bed X Media Bed Length)

[ ] ft - 1) X [ ] X [ ] ft = [ ]

Volume from Width = ((Upslope Mound Height - 1) X Absorption Width Beyond Bed X Media Bed Width)

[ ] ft - 1) X [ ] X [ ] ft = [ ]

Total Clean Sand Volume: *Volume from Length* + *Volume from Width* + *Volume Under Media*

[ ] ft^3 + [ ] ft^3 + [ ] ft^3 = [ ] ft^3

For a Mound on a slope greater than 1%

Upslope Volume: ((*Upslope Mound Height - 1*) x 3 x *Bed Length*) ÷ 2 = cubic feet

((4.8 ft - 1) X 3.0 ft X 75.0) ÷ 2 = 427.5 ft^3

Downslope Volume: ((*Downslope Height - 1*) x Downslope Absorption Width x *Media Length*) ÷ 2 = cubic feet

((5.0 ft - 1) X 14.0 ft X 75.0) ÷ 2 = 2100.0 ft^3

Endslope Volume: (*Downslope Mound Height - 1*) x 3 x *Media Width* = cubic feet

(5.0 ft - 1) X 3.0 ft X 10.0 ft = 120.0 ft^3

Total Clean Sand Volume: *Upslope Volume* + *Downslope Volume* + *Endslope Volume* + *Volume Under Media*

427.5 ft^3 + 2100.0 ft^3 + 120.0 ft^3 + 2175.0 ft^3 = 4822.5 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 4822.5 ft^3 ÷ 27 = 178.6 yd^3

Add 30% for constructability: 178.6 yd^3 X 1.3 = 232.2 yd^3

C. Calculate *Sandy Berm Volume:*

Total Berm Volume (approx): ((Avg. Mound Height - 0.5 ft topsoil) x Mound Width x Mound Length) ÷ 2

(4.9 - 0.5)ft X 41.6 ft X 105.0) ÷ 2 = 9605.9 ft^3

Total Mound Volume - Clean Sand volume -Rock Volume = cubic feet

9605.9 ft^3 - 4822.5 ft^3 - 375.0 ft^3 = 4408.4 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 4408.4 ft^3 ÷ 27 = 163.3 yd^3

Add 30% for constructability: 163.3 yd^3 x 1.3 = 212.3 yd^3

D. Calculate *Topsoil Material Volume: Total Mound Width X Total Mound Length X .5 ft*

41.6 ft X 105.0 ft X 0.5 ft = 2183.2 ft^3

Divide ft^3 by 27 ft^3/yd^3 to calculate cubic yards: 2183.2 ft^3 ÷ 27 = 80.9 yd^3

Add 30% for constructability: 80.9 yd^3 x 1.3 = 105.1 yd^3

Pressure Distribution Design Worksheet

ONSITE SEWAGE TREATMENT PROGRAM — MINNESOTA POLLUTION CONTROL AGENCY

Project ID: v 04.01.2020

1. Media Bed Width: 10 ft
2. Minimum Number of Laterals in system/zone = Rounded up number of [(Media Bed Width - 4) ÷ 3] + 1.

   [(10 - 4) ÷ 3] + 1 = 3 laterals *Does not apply to at-grades*
3. Designer Selected *Number of Laterals*: 3 laterals
   Cannot be less than line 2 (Except in at-grades)
4. Select *Perforation Spacing*: 3.00 ft
5. Select *Perforation Diameter Size:* 1/4 in
6. *Length of Laterals* = Media Bed Length - 2 Feet.

   75.0 - 2ft = 73.0 ft *Perforation can not be closer then 1 foot from edge.*
7. Determine the *Number of Perforation Spaces*. Divide the *Length of Laterals* by the *Perforation Spacing* and round down to the nearest whole number.

   Number of Perforation Spaces = 73.0 ft ÷ 3.0 ft = 24 Spaces
8. *Number of Perforations per Lateral* is equal to 1.0 plus the *Number of Perforation Spaces*. Check table below to verify the number of perforations per lateral guarantees less than a 10% discharge variation. The value is double with a center manifold.

   Perforations Per Lateral = 24 Spaces + 1 = 25 Perfs. Per Lateral

Maximum Number of Perforations Per Lateral to Guarantee <10% Discharge Variation

1/4 Inch Perforations

Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1¼	1½	2	3
2	10	13	18	30	60
2½	8	12	16	28	54
3	8	12	16	25	52

7/32 Inch Perforations

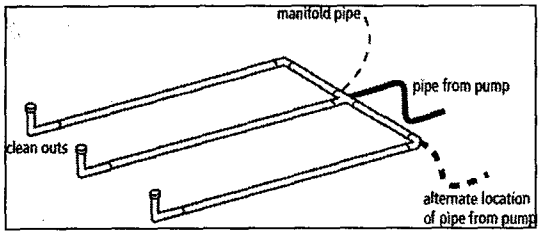
Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1¼	1½	2	3
2	11	16	21	34	68
2½	10	14	20	32	64
3	9	14	19	30	60

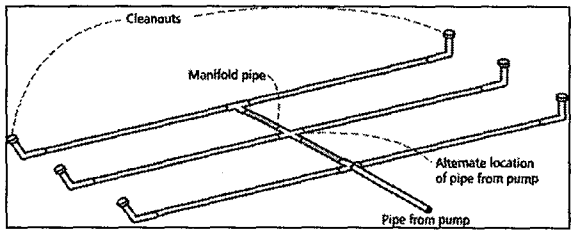
3/16 Inch Perforations

Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1¼	1½	2	3
2	12	18	26	46	87
2½	12	17	24	40	80
3	12	16	22	37	75

1/8 Inch Perforations

Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1¼	1½	2	3
2	21	33	44	74	149
2½	20	30	41	69	135
3	20	29	38	64	128





9. *Total Number of Perforations* equals the *Number of Perforations per Lateral* multiplied by the *Number of Perforated Laterals.*

   25 Perf. Per Lat. X 3 Number of Perf. Lat. = 75 Total Number of Perf.
10. Spacing of laterals; Must be greater than 1 foot and no more than 3 feet: 3.0 ft
11. Select *Type of Manifold Connection* (End or Center): End
12. *Select Lateral Diameter (See Table):* 2.00 in

University of Wisconsin Onsite Sewage Treatment Program

Pressure Distribution Design Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

13. Calculate the *Square Feet per Perforation.*

Recommended value is 4-11 ft2 per perforation, Does not apply to At-Grades

a. *Bed Area* = Bed Width (ft) X Bed Length (ft)

10	ft	X	75	ft =	750	ft^2

b. *Square Foot per Perforation = Bed Area* ÷ by the *Total Number of Perfs*

750	ft^2 ÷		75	perf =	10.0	ft^2/perf

14. Select *Minimum Average Head:* 1.0 ft

15. Select *Perforation Discharge* based on Table: 0.74 GPM per Perf

16. *Flow Rate = Total Number of Perfs X Perforation Discharge.*

75	Perfs	X	0.74	GPM per Perforation =	56	GPM

17. *Volume of Liquid Per Foot of Distribution Piping (Table II):* 0.170 Gallons/ft

18. *Volume of Distribution Piping* =

= [*Number of Perforated Laterals* X *Length of Laterals* X (Volume of Liquid Per Foot of Distribution Piping]

3	X		73	ft X	0.170	gal/ft =	37.2	Gallons

19. Minimum Delivered Volume = Volume of Distribution Piping X 4

37.2	gals	X	4	=	148.9	Gallons

Perforation Discharge (GPM)				
Head (ft)	Perforation Diameter			
	1/8	3/16	7/32	1/4
1.0*	0.18	0.41	0.56	0.74
1.5	0.22	0.51	0.69	0.9
2.0*	0.26	0.59	0.80	1.04
2.5	0.29	0.65	0.89	1.17
3.0	0.32	0.72	0.98	1.28
4.0	0.37	0.83	1.13	1.47
5.0*	0.41	0.93	1.26	1.65
1 foot	Dwellings with 3/16 inch to 1/4 inch perforations			
2 feet	Dwellings with 1/8 inch perforations			
	Other establishments and MSTS with 3/16 inch to 1/4 inch perforations			
5 feet	Other establishments and MSTS with 1/8 inch perforations			

Table II 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

Comments/Special Design Considerations:

ONSITE SEWAGE TREATMENT PROGRAM

Basic Pump Selection Design Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

1. PUMP CAPACITY Project ID: v 04.01.2020

Pumping to Gravity or Pressure Distribution: Pressure

A. If pumping to gravity enter the gallon per minute of the pump: _____ GPM *(10 - 45 gpm)*

B. If pumping to a pressurized distribution system: 56.0 GPM

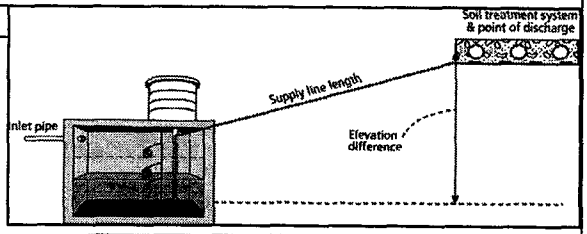
C. Enter pump description: Demand Dosing

2. HEAD REQUIREMENTS

A. Elevation Difference between pump and point of discharge: 13 ft

B. Distribution Head Loss: 5 ft

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



Distribution Head Loss	
Gravity Distribution = 0ft	
Pressure Distribution based on Minimum Average Head Value on Pressure Distribution Worksheet:	
Minimum Average Head	**Distribution Head Loss**
1ft	5ft
2ft	6ft
5ft	10ft

D. 1. Supply Pipe Diameter: 2.0 in

2. Supply Pipe Length: 32 ft

E. **Friction Loss in Plastic Pipe per 100ft** from Table I:

Friction Loss = 7.53 ft per 100ft of pipe

F. 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*

32 ft X 1.25 = 40.0 ft

Table I. Friction Loss in Plastic Pipe per 100ft

Flow Rate (GPM)	Pipe Diameter (inches)			
	1	1.25	1.5	2
10	9.1	3.1	1.3	0.3
12	12.8	4.3	1.8	0.4
14	17.0	5.7	2.4	0.6
16	21.8	7.3	3.0	0.7
18		9.1	3.8	0.9
20		11.1	4.6	1.1
25		16.8	6.9	1.7
30		23.5	9.7	2.4
35			12.9	3.2
40			16.5	4.1
45			20.5	5.0
50				6.1
55				7.3
60				8.6
65				10.0
70				11.4
75				13.0
85				16.4
95				20.1

G. Calculate *Supply Friction Loss* by multiplying *Friction Loss Per 100ft* by the *Equivalent Pipe Length* and divide by 100.

Supply Friction Loss =

7.53 ft per 100ft X 40.0 ft ÷ 100 = 3.0 ft

H. *Total Head* requirement is the sum of the *Elevation Difference* + Distribution Head Loss, + Additional Head Loss + Supply Friction Loss

13.0 ft + 5.0 ft + _____ ft + 3.0 ft = 21.0 ft

3. PUMP SELECTION

A pump must be selected to deliver at least **56.0** GPM with at least **21.0** feet of total head.

Comments:

Onsite Sewage Treatment Program

Pump Tank Design Worksheet (Demand Dose)

Minnesota Pollution Control Agency

DETERMINE TANK CAPACITY AND DIMENSIONS | Project ID: | v 04.01.2020

1. A. *Design Flow (Design Sum.1A)*: 900 GPD — C. Tank Use: Dosing
   B. Min. required pump tank capacity: 900 Gal — D. Recommended pump tank capacity: 1000 Gal

2. A. Tank Manufacturer: CEMSTONE — B. Tank Model: 9551001
   C. Capacity from manufacturer: 1070 Gallons
   D. Gallons per inch from manufacturer: 32.0 Gallons per inch
   E. Liquid depth of tank from manufacturer: 32.0 inches

Note: Design calculations are based on this specific tank. Substituting a different tank model will change the pump float or timer settings. Contact designer if changes are necessary.

DETERMINE DOSING VOLUME

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

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

(10 in + 2 inches) X 32.0 Gallons Per Inch = 384 Gallons

4 *Minimum Delivered Volume* = 4 X Volume of Distribution Piping:

-Item 18 of the Pressure Distribution or Item 11 of Non-level 149 **Gallons (Minimum dose)** 4.7 inches/dose

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

Design Flow: 900 GPD X 0.25 = 225 **Gallons (Maximum dose)** 7.0 inches/dose

6 *Select a pumpout volume that meets both Minimum and Maximum:* 224 Gallons

7 Calculate *Doses Per Day* = Design Flow ÷ *Delivered Volume*

900 gpd ÷ 224 gal = 4.02 *Doses*

8 Calculate Drainback:

A. *Diameter of Supply Pipe* = 2 inches

B. Length of Supply Pipe = 32 feet

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

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

32 ft X 0.170 gal/ft = 5.4 Gallons

9. *Total Dosing Volume = Delivered Volume* plus *Drainback*

224 gal + 5.4 gal = 229 Gallons

10. Minimum Alarm Volume = Depth of alarm (2 or 3 inches) X gallons per inch of tank

2 in X 32.0 gal/in = 64.0 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

DEMAND DOSE FLOAT SETTINGS

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

Total Dosing Volume /Gallons Per Inch

229 gal ÷ 32.0 gal/in = 7.2 Inches

12. Measuring from bottom of tank:

A. *Distance to set Pump Off Float* = Pump + block height + 2 inches

10 in + 2 in = 12 Inches

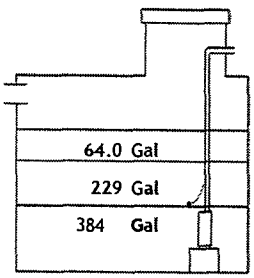
B. *Distance to set Pump On Float=Distance to Set Pump-Off Float + Float Separation Distance*

12 in + 7.2 in = 19 Inches

C. *Distance to set Alarm Float = Distance to set Pump-On Float + Alarm Depth* (2-3 inches)

19 in + 2.0 in = 21 Inches

Inches for Dose:	7.2	in
Alarm Depth	21.2	in
Pump On	19.2	in
Pump Off	12.0	in



MITIGATION ACTION PLAN

SEPTIC SYSTEM CLASSIFIED AS TYPE III

Should the system failed a new site for the septic system may be considered or the owner agrees to repair the septic system if it is possible If the septic system is not repairable the homeowner agrees to disconnect the septic tanks from the septic system and use and maintain the septic tanks as holding tanks.

Mille Lacs county and Kevin Herwig are to be notified as soon as possible about any operational problems. If a failure occurs the septic pump must be disconnected immediately and remain disconnected until any and all repairs are completed. A pumping contract will need to be set up with a septic maintenance contractor. A copy of all documents must be submitted to the county.

The system must be monitored for a minimum of three years. The mound system is to be inspected by the homeowner for leaks or saturated areas. Inspections are to be done every month for 36 months. Any leaks or failures in system must be reported to the county within 24 hours.

Type III systems are not warrantied by the Designer, Installer, or the Local Unit of Government

Any and all expenses for inspections, maintenance, repair, or replacement are the homeowner's responsibility.

I Roy Garbow, property owner of 40589 Beach Rd. Onamia Mn.

Hereby agree that as long as I am the owner of the property, to accept all legal and financial responsibility for future system repair and/or replacement expense in the event that failure of the system on the above referenced property occurs.

_____

Owner

_____

Date

Owners Septic System Management Plan

Date: 7/15/2020

Property Address: 40589 Beach Rd Onamia Mn.

Septic Systems can be an expensive investment, good maintenance will ensure they last a lifetime. The purpose of a septic system is to properly "decompose" the pollutants before the water is recycled back into the groundwater. If you're not taking this seriously, ask yourself where your well water comes from.

Your septic design lists all the components of your system and their location. Keep the design, this management plan and the UofM "Septic System Owners Guide" in a safe place for future reference. For a copy of the Owners guide call the University of MN at 1-800-876-8636.

Some of the following tasks you can do yourself, some require a professional, but is it YOUR responsibility to see that it gets done.

Homeowner Tasks

- Do your best to conserve water. Don't overload your septic with multiple large water uses at the same time or on the same day.
- Fix household leaks promptly (leaky toilet, dripping faucets).
- Limit bleach and anti-bacterial products. Use Biodegradable dishwasher detergent.
- Consider a lint filter on your clothes washer.
- Regularly check for wet or spongy soil around your drainfield.
- Have a septic professional check your tanks every 3 years to determine if they need pumping.
- If you have a septic tank filter (effluent filter) clean it on a regular basis (or have a professional do it).
- If a septic alarm goes off, call your septic professional to diagnose the problem.
- Notify the County/City/Township when this management plan is not being met.
- Be aware of and protect your secondary drainfield site.

Professional Tasks

- Disclose the location of the secondary drainfield (if applicable).
- Respond to alarms and diagnose problems as needed.
- Review water use with the owner, check for a "soggy" drainfield.
- Pump the septic tanks as needed and ensure they are in proper working order.
- Verify the pump, dose amount, HI Level Alarm & drainback are all working properly.

"As the owner, I understand it is my responsibility to properly operate and maintain this septic system".

Property Owner Signature: _____ **Date** _____

CONTRUCTION OF SANITATION FACILITIES
FOR

NEW OR RENOVATED HOMES
AT

SCATTERED SITES
ON THE

MILLE LACS INDIAN RESERVATION
MILLE LACS, KANEBEC, AITKIN, AND PINE COUNTIES, MINNESOTA

PROJECT BE-18-L07
ROY GARBOW

DRAWINGS AND SPECIFICATIONS

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
INDIAN HEALTH SERVICE
OFFICE OF ENVIRONMENTAL HEALTH
AND ENGINEERING
BEMIDJI AREA OFFICE

SPECIFICATION INDEX

SECTION 01100
SUMMARY OF WORK

PART 1 - GENERAL

1.01 SUMMARY

A. The work to be performed under this contract shall consist of furnishing the following to perform the work outlined in these specifications and as indicated by Project Drawings:

1. tools
2. equipment
3. materials
4. labor
5. supplies
6. manufactured articles
7. all transportation to complete the work
8. temporary facilities

B. Location of Work: Roy Garbow, 40589 Beach Road, Onamia, Mille Lacs County, Minnesota, for the Mille Lacs Band of Ojibwe

C. Incidentals Items: All work, materials, and services not expressly listed as being provided by others or not expressly called for in the contract but are necessary for the completion of the work in good faith, shall be furnished, installed, and performed by the contractor.

1.02 SUMMARY OF WORK TO BE DONE BY CONTRACTOR

A. Individual Wastewater Facilities

1. Install Septic Tanks, Pump Tank and Mound System.
2. Install per design, drawing and specifications.
3. Acquire ISTS Permit

1.03 ADDITIONAL INFORMATION

A. For information regarding the technical aspects of the project, contact the Engineer:

Anthony LaFontain
Indian Health Service
705 5th Street NW, Suite E
Bemidji, MN 56601
Telephone: (218)-444-0527

B. For information regarding contracting information, contact the Owner's Representative for this project:

Brian Scheinost
Public Works Administrator
Mille Lacs Public Works
43408 Oodena Drive
Onamia, MN 56359
Telephone: (320) 532-7437

C. Comply with all Tribal regulations related to the completion of the work including the acquisition of necessary permits and the payment of Tribal taxes.

1.04 WARRANTY

A. Provide a minimum one (1) year warranty for all materials and labor, covering defects in the materials or deficiencies resulting from Contractor installation and materials.

1.05 ADDITIONAL REQUIREMENTS

A. Contractor shall be licensed and insured.

END OF SECTION

SECTION 01270
PRICE AND PAYMENT

PART 1 - GENERAL

1.01 SUMMARY

A. Work covered by this section includes method of measurement and basis of payment for all divisions included.

B. Payment for the various items of the Bid Schedules, as further specified herein, shall include all compensation to be received by the Contractor for furnishing all tools, equipment, materials, labor, supplies, manufactured articles, transportation, and temporary facilities required to complete the work in accordance with contract documents including incidentals.

C. Respective prices and payment shall constitute full compensation for all work completed including incidentals.

D. All items not expressly listed as being provided by others that are necessary for the completion of work shall be furnished and installed by the Contractor.

E. No payment shall be made for mobilization and demobilization of equipment.

1.02 ESTIMATED QUANTITIES

A. All quantities stipulated in the bid schedule or other contract documents are approximate and are to be used: (1) as a basis for estimating the probable cost of the work and (2) for the purpose of comparing the bids submitted.

B. The Contractor shall be paid for actual quantities installed based on the quantities measured in the field. The actual amounts of work completed and materials furnished may differ from estimated quantities. The Contractor shall make no claim for damages, anticipated profits, or otherwise, on account of differences between the estimated amounts and the actual amount of work performed and materials furnished.

1.03 SURVEY AND MEASUREMENTS

A. All quantity measurements shall be the responsibility of the Contractor and will be verified by the Engineer.

B. All measurements and subsequent payments will be based on completed and accepted work performed in strict accordance with the drawings, specifications, and other contract documents.

PART 2 – BID SCHEDULE ITEMS

2.01 GENERAL

A. Payment shall be full compensation to complete the work items in good faith, including incidental work.

B. In addition to the those things listed under each item, the unit price bid shall be full compensation for all of the following:

1. General requirements in Division 01, but not limited to the following.

    a. Submittals
    b. Record drawings

2. Specific requirements in Division 02, including but not limited to the following (unless otherwise expressly defined as a line item in the bid schedule):

    a. Erosion control
    b. Clearing and grubbing
    c. Removal and replacement of obstructions
    d. Associated trenching, excavation and backfill including the removal of any nuisance water, bedding, haunching, and compaction.
    e. Disposal of any excess material
    f. Traffic control
    g. Rough grading
    h. Finish work, where called for, including finish grading, topsoiling, and landscaping

2.02 BID ITEMS

A. Individual Wastewater Facilities Design

1. 2500 Gallon Septic Tank
    a. Measurement: Per each tank installed.
    b. Basis for Payment: Payment shall be full compensation for septic tank, fittings, risers, connections, excavation, compaction, grading, and site restoration.

2. 1070 Gallon Pump Tank
    a. Measurement: Per each tank installed.
    b. Basis for Payment: Payment shall be full compensation for pump tank, fittings, risers, connections, excavation, compaction, grading, and site restoration.

3. 4-Inch Solid PVC Pipe:

a. Measurement: Per linear foot,
b. Basis for Payment: Includes pipe, fittings, connections, excavation, trenching, bedding, haunching, backfill, compaction, grading, and site restoration.

4. Two-way Cleanout:
   a. Measurement: By each unit installed.
   b. Basis for Payment: Includes pipe, fittings, covers, connections, excavation, trenching, bedding, haunching, backfill, compaction, grading, and site restoration.

5. Effluent Pump with Controls:
   a. Measurement: By each unit installed.
   b. Basis for Payment: Includes pump, control, alarm system, float switches, effluent filter, above ground electrical wiring, in-chamber piping, union, fittings and connections.

6. Electrical Cable:
   a. Measurement: Per linear foot.
   b. Basis for Payment: Payment shall be full compensation for cable, splices, conduit, excavation, trenching, bedding, backfill, compaction, grading, and site restoration.

7. 2-inch Solid PVC Effluent Pipe:
   a. Measurement: Per linear foot.
   b. Basis for Payment: Payment shall be full compensation for pipe, fittings, connections, excavation, trenching, bedding, haunching, backfill, compaction, grading, and site restoration.

8. Mound System
   a. Measurement: Lump Sum for the complete mound system.
   b. Basis for Payment: Payment shall be full compensation for a complete and operational mound system per the design and specifications. This includes clean sand material, loam fill, topsoil, gravel synthetic material and placement, scarification of the original topsoil, removing excessive vegetation, manifold piping, perforated pipe, seeding, protective cover for seeding, observation pipes and all other incidentals.

9. ISTS Permit:
   a. Measurement: Per each permit obtained.
   b. Basis for Payment: Payment includes site evaluation, permit application, and permit fee submitted to appropriate local authority.

PART 3 – EXECUTION (N/A)

END OF SECTION

SECTION 01300
ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes the administrative notes and requirements for this contract.

1.02 For all contracts:

A. The Indian Health Service (IHS) is the engineer for this project; however, this is not a federal contract. IHS reserves the right to inspect the work performed by the Contractor or any of its Subcontractors. IHS does not represent the Tribe and the Tribe does not represent IHS regarding any matter related to administration of this Contract.

B. IHS Indian preference requirements apply to the solicitation and award of this contract. If the tribe has enacted an Indian preference ordinance, it may apply in lieu of the IHS requirements.

C. SUSPENSION AND TERMINATION OF WORK

1. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any change proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

2. If the Contractor fails to perform the work in accordance with the Contract Documents, Owner may declare the Contractor to be in default and give Contractor notice that the Contract is terminated. The termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor.

3. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for completed and acceptable work executed in accordance with the Contract Documents prior to the effective date of termination. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

D. Contractor shall comply with 41 CFR 60-1.4(b) in accordance with Executive Order 11246, “Equal Employment Opportunity,” as amended by Executive Order 11375, “Amending Executive Order 11246 Relating to Equal Employment Opportunity.

E. Debarment and Suspension (Executive Orders 12549 and 12689)—A contract award (see 2 CFR 180.220) must not be made to parties listed on the government-wide exclusions in the System for Award Management (SAM), in accordance with the OMB guidelines at 2 CFR part 180 that implement Executive Orders 12549 (3 CFR part 1986 Comp., p. 189) and 12689 (3 CFR part 1989 Comp., p. 235), “Debarment and Suspension.” SAM Exclusions contains the names of parties debarred, suspended, or otherwise excluded by agencies, as well as parties declared ineligible under statutory or regulatory authority other than Executive Order 12549.

F. Contractor is required to perform thirty-three and one-third percent of the total amount of the Work using its own employees and equipment. Copies of subcontract agreements may be requested to verify the amount of Work performed.

1.03 For Contracts Exceeding $2,000:

A. The Contractor shall comply with wage and provisions of the Davis-Bacon Act (40 U.S.C. 3141-3148) as supplemented by Department of Labor regulations (29 CFR part 5). In accordance with the statute, Contractors must be required to pay wages to laborers and mechanics at a rate not less than the prevailing wages specified in a wage determination made by the Secretary of Labor.

B. The Contractor shall comply with the Copeland “Anti-Kickback” Act (40 U.S.C. 3145), as supplemented by Department of Labor regulations (29 CFR part 3). The Act provides that each Contractor or subrecipient must be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he or she is otherwise entitled.

1.04 For Contracts Exceeding $10,000:

A. Contractor shall comply with the requirements of 41 CFR 60-4 regarding required notices and procedures to be followed in soliciting for federally assisted construction contracts (including subcontracts). Compliance with Executive Order 11246 and 41 CFR part 60-4 shall be based on implementation of the Equal Opportunity Clause, specific affirmative active obligations required by the Standard Federal Equal Employment Opportunity Construction Contract Specifications, as set forth in 41 CFR Part 60-4.3(a) and efforts to meet the goals established for the geographical area where the Contract is to be performed.

1.05 For Contracts Exceeding $100,000:

A. The Contractor shall comply with the provisions of the Work Hours and Safety Standards Act (40 U.S.C. 3701-3708). Under 40 U.S.C. 3702 of the Act, each Contractor must be required to compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of 40 hours in the work week. The requirements of 40 U.S.C. 3704 are applicable to construction work and provide that no laborer or mechanic must be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous.

B. The Contractor shall comply with the provisions of the Byrd Anti-Lobbying Amendment (31 U.S.C. 1352), certifying that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award.

END OF SECTION

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SECTION 01310
PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes the preconstruction conference, construction scheduling and coordination requirements.

1.02 PRE-CONSTRUCTION CONFERENCE

A. Required after award of contract and prior to start of construction.

B. Representatives from the following shall attend.

1. Prime Contractor
2. Subcontractors
3. Engineer and Technical Representative
4. Owner’s Representative

C. Engineer will arrange a date that is mutually acceptable to all parties planning to attend.

D. Contractor shall notify subcontractors of time and date of meeting.

1.03 CONSTRUCTION SCHEDULE

A. Present Owner and Engineer with a written preliminary construction schedule containing start and completion dates of the major items at the preconstruction meeting.

B. Notify the Owner and Engineer seven (7) days in advance of any construction.

C. Communicate major changes to the schedule to the Owner and Engineer in writing.

1.04 WORKING HOURS/DAYS

A. Except as required for safety purposes, all work shall be performed during regularly scheduled working hours. The Contractor shall not work on Saturday, Sunday, or a Federal holiday without the Owner and Engineer’s consent.

1.05 COORDINATION WITH OTHER CONTRACTORS/UTILITIES

A. Coordinate work with other contractors (i.e. roads, building, etc) in the area as necessary to complete the work specified.

B. Coordinate work with local utilities (i.e. water and sewer, power, telephone). Note: all buried utilities may not be shown on the plans. Contractor's responsibility for having utilities marked prior to construction.

END OF SECTION

SECTION 01330
SUBMITTAL PROCEDURE

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes information on submittal procedures. Materials requiring submittal are listed in the appropriate specification section.

1.02 SUBMITTAL PROCEDURES

A. Submit copies of submittals to the Engineer, unless requested otherwise.

1. Contractor's option:
   a. Two (2) hard copies.
   b. An electronic copy in pdf format delivered to Engineer via email or other means as approved by the Engineer.

B. Identify each cut sheet or shop drawing with the following information:

1. Contract number.
2. Supplier.
3. Specification section to which the submittal pertains.

C. Submit the following information, as applicable:

1. Manufacturer's cut sheets indicating compliance with references (e.g. applicable ASTM, AWWA standards).
2. Laboratory results, as applicable.
3. Dimensional drawings or shop drawings, as applicable.
4. Other information necessary for the Engineer to determine compliance with the specifications.
5. Clearly identify brand, manufacturer, model number, sizes, and all other information on each cut sheet to identify the exact product being submitted for approval.

D. Identify variations from the contract documents and product or system limitations that may be detrimental to successful performance of the completed work.

E. Revise and resubmit submittals as required and identify all changes made since previous submittal.

F. Distribute copies of reviewed submittals to concerned parties, (i.e. suppliers, sub-contractors).

G. Submit written communication of any inability to comply with the Engineer's comments.

H. Submit information to the Engineer at least three weeks in advance of the work to be performed.

I. Approval of submittals must be provided by the Engineer prior to installation of materials.

END OF SECTION

SECTION 01420
REFERENCES

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes a list of common organizations, associations or appropriate agencies with jurisdiction that have references, standards, laws or regulations cited in these specifications. This list is not all-inclusive. Other agencies (county, local, tribal) with jurisdiction might not be listed here.

B. Use latest revision of all references, standards, laws or regulations.

1.02 LIST OF ORGANIZATIONS, ASSOCIATIONS & AGENCIES

A. National Standards Organizations & Associations

American Association of State Highway and Transportation Officials (AASHTO)
444 North Capital Street NW, Suite 249
Washington DC, 20001
(202) 624-5800
www.aashto.org

American Concrete Institute (ACI)
ACI International
PO Box 9094
Farmington Hills, Michigan 48333-9094
(810) 848-3700
www.aci-int.org

American Society for Testing and Materials (ASTM)
100 bar Harbor Drive
West Conshohocken, Pa 19428-2959
(610) 832-9585
www.astm.org

American Water Works Association AWWA
6666 West Quincy Avenue
Denver, CO 80235
(303) 794-7711
www.awwa.org

National Electric Code (NEC)
National Fire and Protection Association
1 Batterymarch Park
Quincy, MA 02269-9959
1 888 632-2633
www.nec.com

National Electrical Manufacturer's Association
NEMA
1300 North 17th Street
Rosslyn, VA 22209
(703) 841-3200
www.nema.org

Underwriters' Laboratories, Inc. UL
333 Pfingston Road
Northbrook, IL 60062
(847) 272-8800
www.ul.com

B. Federal Agencies

Environmental Protection Agency (EPA)
Region 5
77 West Jackson
Chicago, IL 60604-3507
http://www.epa.gov/r5water/

Occupational Health and Safety Administration
Region 5 (OSHA)
238 South Dearborn Street , Room 3244
Chicago, IL 60604
www.osha.gov

C. State Agencies

Minnesota Department of Transportation (MNDOT)
Transportation Building
395 John Ireland Boulevard
St. Paul, MN 55155
1 800 651-3774
www.dot.state.mn.us

Minnesota Pollution Control Agency (MPCA)
Individual Sewage Treatment System Standard
520 Lafayette Road
St Paul, MN 55155
1 800 657-3864
www.pca.state.mn.us

Minnesota Department of Health
717 Delaware Street South East
Minneapolis, MN 55440-9441
(651) 201-5000
www.health.state.mn.us

D. Local Agencies

1. Contractor shall review other local agency requirements to determine applicability with this project.

E. Tribal Organizations

1. See Section 01100 for appropriate tribal contact regarding tribal laws.

PART 2 – PRODUCTS (N/A)

PART 3 – EXECUTION (N/A)

END OF SECTION

SECTION 01430
QUALITY ASSURANCE

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes prerequisites and procedures to assure the quality of construction.

1.02 SUBMITTALS

A. Contractor Name and License Number

1.03 INSTALLER QUALIFICATIONS

A. Work shall be performed under the direction of personnel licensed in the state/reservation where the project is proposed and where licensing of the trade is regulated by the state/reservation including, but not limited to, plumbing, well drilling, septic system installation, HVAC, and electrical work.

1.04 CONTROL OF INSTALLATION

A. Review materials for acceptability when delivered to the site.

B. Store and handle materials to prevent damage.

C. Review materials, services, and workmanship to ensure that work is performed in accordance with the specifications.

D. Comply fully with manufacturers' instructions.

E. Should manufacturers' instructions conflict with contract documents, request clarification from Engineer before proceeding.

F. Correct defective work to the satisfaction of the Project Engineer.

1.05 MANUFACTURER'S FIELD SERVICES

A. Provide reports on observations and documentation of workmanship to the Engineer within 30 days of visit for review where manufacturers' field services are provided.

1.06 WARRANTY

A. Provide a minimum one (1) year warranty for all materials and labor, covering defects in the materials or deficiencies resulting from contractor installation.

B. Provide additional warranties as required under other sections.

END OF SECTION

SECTION 01500
TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 SUMMARY

A. The work covered by this section includes all temporary facilities and controls needed to complete work under the Contract in a manner that protects public safety and worker safety, that preserves both public and private property and that appropriately involves local governments, emergency and law enforcement.

1.02 RELATED WORK

A. Section 02315 – Excavation, Trenching and Backfill

B. Section 02705 – Road Restoration

1.03 REFERENCES

A. Manual on Uniform Traffic Control Devices

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.01 GENERAL

1. Provide temporary facilities and controls that are necessary to carry out the requirements of the Contract in a manner

    1. That protects public safety and worker safety

    2. That preserves both private and public property

    3. That communicates and cooperates with local authorities and governments.

3.02 TEMPORARY WATER (IF APPLICABLE)

A. If there is an existing building or hydrant on the site from which water can be taken, Contractor may use the available water if authorized by the Owner.

B. If the Owner has water supply mains, but no hydrant is available, Contractor may make a water main tap and create a service line if authorized by the Owner.

C. If the Owner does not have a water supply, make arrangements to obtain water and pay for it at no direct cost to the project.

D. Cross Connection Control: When connecting to the Owner's water supply, provide appropriate backflow prevention devices in accordance with State codes and the Owner's requirements.

3.03 TEMPORARY SANITARY FACILITIES

A. Provide and maintain a chemical toilet approved by the State Department of Health (MN) for the use of all workers of all trades.

B. Place temporary facilities in an inconspicuous place and keep clean.

C. Remove temporary sanitary facilities after completion of the project.

3.04 BARRICADES & WARNING DEVICES

A. Notify local police, fire departments and other emergency programs of any proposed barricading or detouring.

B. Erect and maintain barricades, guardrails, lights and signs as necessary for public convenience and safety.

C. Ensure that barricades remain in place during critical hours.

D. Comply with "Occupational Safety and Health Act" and local safety requirements, as they apply.

3.05 TRAFFIC CONTROL

A. Conduct all traffic control operations in accordance with the latest issues of the "Manual On Uniform Traffic Control Devices" (MUTCD).

B. Coordinate and obtain approval for all traffic control from local law enforcement.

C. Signs, Signals and Devices

1. Place warning signs in the region of the work.

2. Warn of types of conditions that may be encountered.
   a. Muddy Roads
   b. Slippery Roads
   c. Flagman
   d. Detour
   e. Slow Moving Traffic

f. Trucks Entering Roadway

3. Traffic Control Signals: Meet the needs of the local government authority.

4. Traffic Cones and Drums, Flares and Lights:
   a. Meet the needs of the local jurisdictions.
   b. Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.
   c. Ensure that flares, lights, etc. remain in position throughout the night.

5. Flagman:
   a. Meet the needs of the local jurisdictions.
   b. Provide trained and equipped flagmen to regulate traffic when construction operations or traffic encroach on public traffic lanes.

C. Haul Routes:

1. Consult with authority having jurisdiction in establishing public thoroughfares to be used for haul routes and site access.

2. Confine construction traffic to designated haul routes.

3. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.

D. Removal of Traffic Control:

1. Remove equipment and devices when no longer required.

2. Repair damage caused by installation.

3.06 ACCESS ROADS

A. Construct and maintain temporary roads accessing public thoroughfares to serve construction area.

B. Provide detours necessary for unimpeded traffic flow.

C. Provide and maintain access to fire hydrants, free of obstructions.

D. Permanent access roads and parking areas, if applicable, will be covered in Division 2, Site Work.

3.07 PARKING

A. If the site is large enough, the Contractor may park their own and employees' vehicles on the site without charge after obtaining permission from the Owner.

B. If the site is not large enough, the Contractor shall make parking arrangements.

C. Prevent interference with the flow of local traffic.

D. Prevent interference with emergency vehicle functions.

3.08 ROAD SURFACE MAINTENANCE

A. Remove mud and excavated spoils from the affected roadway at the end of each workday in order to preserve the roadways and maintain safe driving conditions.

B. Contractor is responsible for any costs associated with repairing the roadways that are damaged due to construction equipment.

3.09 WATER CONTROL

A. Grade site to drain.

B. Protect site from puddling or running water.

C. Provide water barriers as required to protect site from soil erosion.

3.10 DUST CONTROL

A. Use measures to minimize dust caused by the project.

B. Avoid dust-creating activities during dry, windy conditions.

3.11 SECURITY

A. The Owner will **not** be responsible for security on the site of work.

B. Each Contractor will be held responsible for loss or injury to persons or property where their work is involved.

C. Provide (if deemed necessary) such watchmen and take such other precautionary measures as deemed necessary to protect facilities during the contract period.

3.12 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris and rubbish. Maintain site in a clean and orderly condition.

B. Remove waste materials, debris, and rubbish from site weekly and dispose off-site.

3.13 REMOVAL OF UTILITIES, FACILITIES & CONTROLS

A. Remove temporary above grade or buried utilities, equipment, facilities, materials, prior to inspection.

B. Clean and repair damage caused by installation or use of temporary work.

C. Restore existing facilities used during construction to original condition.

3.14 TEMPORARY FIRST AID FACILITIES

A. Provide temporary first aid facilities for employees in sufficient quantity for the number of workers.

3.15 TEMPORARY FIRE PROTECTION

A. Post fire department telephone numbers at the jobsite.

B. Keep fire extinguishers on the job that are appropriate for the type of work being performed.

END OF SECTION

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SECTION 01770
CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes information on closeout procedures and final cleaning.

1.02 RELATED WORK

A. Section 01780 – Closeout Submittals

1.03 CLOSEOUT PROCEDURES

A. Submit written certification that work is complete in accordance with contract documents and ready for final inspection at least three (3) working days prior to final inspection.

B. Provide warranties and record documents (e.g. as-built drawings) to the Engineer that are required within ten (10) days after date of first beneficial use. Refer to Section 01780.

1.04 FINAL CLEANING

A. Complete final clean-up prior to final inspection.

B. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.05 FINAL INSPECTION

A. A final inspection of the facilities shall be conducted in the presence of the Owner, the Engineer, and the Contractor, at a minimum.

B. Final inspection shall include inspection of all facilities installed under the project.

1.06 PUNCH LIST

A. Any deficiencies noted at the Final Inspection will be communicated to the Contractor through a letter from the Engineer.

B. All deficiencies will need to be completed before full payment is made.

C. Retainage for punch list items shall be based on the estimated cost to retain another contractor to finish the deficient work items.

END OF SECTION

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SECTION 01780
CLOSEOUT SUBMITTALS

PART 1 - GENERAL

1.01 SUMMARY

A. This section describes the requirements for closeout submittals including, record drawings, warranty information and general operation and maintenance information.

1.02 RELATED WORK

A. Section 01430 – Quality Assurance
B. Section 01770 – Closeout Procedures
C. Section 01785 – Operation and Maintenance Manuals (If applicable)

1.03 DELIVERY

A. Provide all closeout submittals meeting these requirements and any specific requirements of each section.

B. Closeout submittals must be received before payment is requested for the work that the drawings describe or illustrate.

C. All closeout submittals must be received in a correct and complete manner before final payment can be made. If material is deficient, the deficiencies will be indicated in punch lists (Section 01770).

1.04 DEFINITIONS

A. Record Drawing: A drawing showing the actual installation of facilities, showing changes from the plans, and showing detail enough that future persons can readily locate all objects.

B. Ties: Measurements from permanent easily located objects to an installed object.

PART 2 – PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.01 RECORD DRAWINGS

A. Provide record data in one of the following manners:

1. On a set of project drawings, neatly draw tie measurements and changes.
2. On separate 8½ X 11 sheets (see 01780D – Closeout Submittal Drawings), neatly draw site sketches, structure sketches, etc., indicating the necessary information.

B. Provide three (3) swing tie measurements to all buried utility objects that may need to be located in the future, including, but not limited to:

1. Gate valves
2. Corporation stops
3. Curb stops
4. Water main fittings
5. Couplings to existing water systems.
6. Cleanouts
7. Sewer wyes.
8. Utility crossings.
9. Septic tank manholes and access covers.
10. Corners of drainfields
11. Tracer Wire Boxes

C. Provide offset measurements for buried utilities (e.g. water main) installed parallel to roads.

D. Provide revised elevation data for all items that have elevations shown on the plan drawings, including, but not limited to, the following:

1. Manhole inverts (inlet and outlet)
2. Manhole rims
3. Lift station invert
4. Lift station top
5. Lift station pipe penetrations
6. Float elevations
7. Septic tank elevations
8. Elevations of pipe entering and leaving structures
9. Elevation of sewer service line stub (if terminated at right of way)
10. Other elevations indicated on profiles.

E. Provide installed bid schedule items quantities for individual facilities on 8½ X 11 sheets.

1. Engineer may supply standard forms for use by the Contractor.

3.02 WARRANTIES

A. Submit all warranty information regarding the materials installed.

B. Minimum warranty information is listed in Section 01430.

3.03 OPERATION AND MAINTENANCE INFORMATION

A. Submit all operation and maintenance information as included in the packaging from the manufacturer regarding the materials installed.

B. Additional project specific operation and maintenance requirements are listed in Section 01785.

END OF SECTION

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AS-BUILT DRAWING

NORTH ARROW

HOMEOWNER:
PROJECT NO:
RESERVATION:
ADDRESS:
LEGAL DESCRIPTION:

ITEM DESCRIPTION	SYMBOLS	MATERIALS SIZE	MAT'L	QUANT.	HOUSE CORNER TIES (FT.) A	B	C	D
CURB STOP	⊙	"						
WELL	Ⓦ	"						
SEPTIC TANK	▭	GAL						
COMBINATION SEPTIC/PUMP TANK	▭ ▭	GAL						
TWO WAY CLEANOUT	●●	"						
ONE WAY CLEANOUT	●	"						
FREEZELESS RISER	Ⓕ	'						
WATER SERVICE LINE	—— W ——	"						
SEWER SERVICE LINE	—— S ——	"						
DRAIN FIELD	▭▭▭▭▭	"						
PERFORATED PIPE	——	"						
SEWER FORCE MAIN	—— SFM ——							
INSULATION	▨							
BURIED ELECTRICAL LINE	—— E ——							
WATER MAIN	—— W/M ——	"						
SEWER MAIN	—— S/M ——	"						

DISPOSAL SYSTEM

TYPE: ☐ CONVENTIONAL
☐ IN-GROUND
☐ AT-GRADE
☐ MOUND

MATERIAL:
DIMENSIONS:

DRAWN BY:
DATE:
COMPANY:
REMARKS:

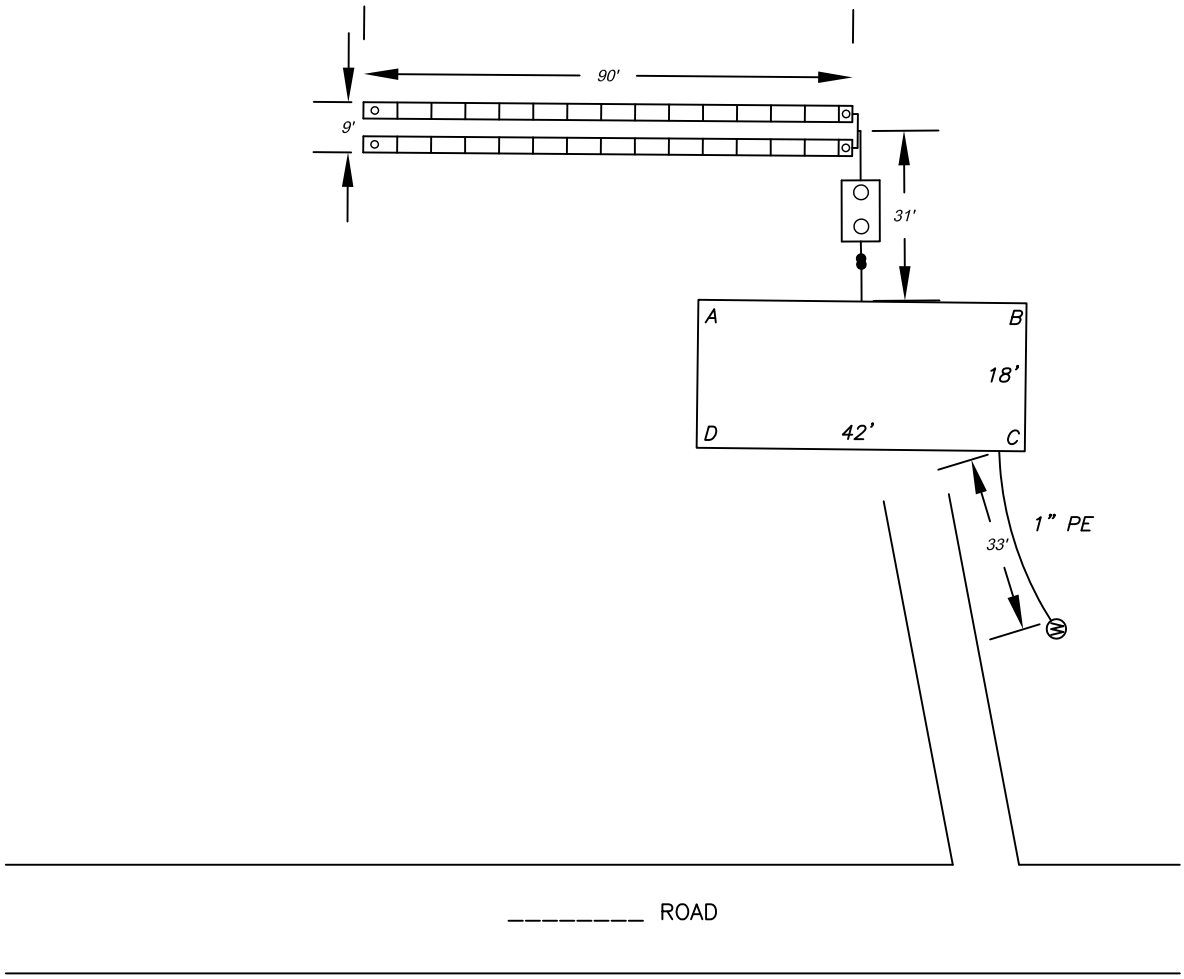
DRAWING NO.
01780-1

USER: jzierden FILE: I:\STANDARD DETAILS\CSI-SPECS\2012\01780-1.dwg 12/14/2012 - 9:20am

AS-BUILT DRAWING

NORTH ARROW

HOMEOWNER: [NAME]
PROJECT NO: [IHS PROJECT NO.]
RESERVATION:
ADDRESS:
LEGAL DESCRIPTION:



ITEM DESCRIPTION	SYMBOLS	MATERIALS SIZE	MAT'L	QUANT.	HOUSE CORNER TIES (FT.) A	B	C	D
CURB STOP	⊙							
WELL	Ⓦ	6"	STEEL	1			33.2'	74.1'
SEPTIC TANK	▭	1000 GAL	CONCRETE	1	35.0'	35.0'		
					52.0'	52.0'		
COMBINATION SEPTIC/PUMP TANK	▭	GAL						
TWO WAY CLEANOUT	●●	4"	PVC	1	30.7'	30.9'		
					31.2'	31.5'		
ONE WAY CLEANOUT	●							
FREEZELESS RISER	Ⓕ							
WATER SERVICE LINE	—— W ——							
SEWER SERVICE LINE	—— S ——							
DRAIN FIELD	▭▭▭▭▭		HDPE	42				
PERFORATED PIPE	——							
SEWER FORCE MAIN	—— SFM ——							
INSULATION	▨							
BURIED ELECTRICAL LINE	—— E ——							
WATER MAIN	—— W/M ——							
SEWER MAIN	—— S/M ——							

DISPOSAL SYSTEM

TYPE: ☒ CONVENTIONAL
☐ IN-GROUND
☐ AT-GRADE
☐ MOUND

MATERIAL: INFILTRATOR CHAMBERS
DIMENSIONS: 9' x 90'

DRAWN BY: TLR
DATE: 02-16-06
COMPANY:
ABC COMPANY

REMARKS:
DRAINFIELD IS
DESIGNED FOR A
4 BEDROOM HOME

INSTALLED QUICK4
STANDARD CHAMBERS

FACILITIES INSTALLED
IN FEBRUARY 2006

DRAWING NO.
01780-2 (EXAMPLE)

USER: jzierden FILE: I:\STANDARD DETAILS\CSI-SPECS\2012\01780-1.dwg 12/14/2012 - 9:19am

SECTION 02310
GRADING

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes rough and finished site grading of all areas disturbed during construction.

1.02 RELATED WORK

A. Section 02315 – Excavation, Trenching and Backfill
B. Section 02370 – Temporary Erosion and Sediment Control
C. Section 02920 – Topsoiling, Seeding, Fertilizing and Mulching

PART 2 – PRODUCTS (Not applicable)

PART 3 - EXECUTION

3.01 ROUGH GRADING

A. Grade the area in the vicinity of the excavation to prevent surface water from flowing into the excavation.

B. Maintain existing drainage.

3.02 FINISH GRADING

A. Grade site to true grades as specified on the plans after all structures and piping have been installed.

B. Grade sites for effective drainage away from structures.

C. Dress and trim all slopes.

END OF SECTION

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SECTION 02315
EXCAVATION, TRENCHING, AND BACKFILL

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes excavation, trenching and backfill necessary for the construction of the facilities as indicated on the plans including, but not limited to: water mains and service lines, sewer mains and service lines, concrete manholes, septic tanks, and other structures.

1.02 RELATED WORK (as applicable)

A. Section 01780 – Closeout Submittals
B. Section 02310 – Grading
C. Section 02370 – Temporary Erosion And Sediment Control
D. Section 02512 – Individual Water Systems
E. Section 02920 – Topsoiling, Seeding, Fertilization and Mulching

1.03 REFERENCES

A. Manual on Uniform Traffic Control Devices.

B. ASTM D698 – Test Methods for Moisture Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5 lb. Rammer and 12-in. Drop [Standard Proctor Test].

C. ASTM D2321 – Underground installation of Flexible Thermoplastic Sewer Pipe.

D. ASTM D2487 – Classification of Soils for Engineering Purposes [Unified Soil Classification System].

E. OSHA – Occupational Safety and Health Standards 1910 and 1926.

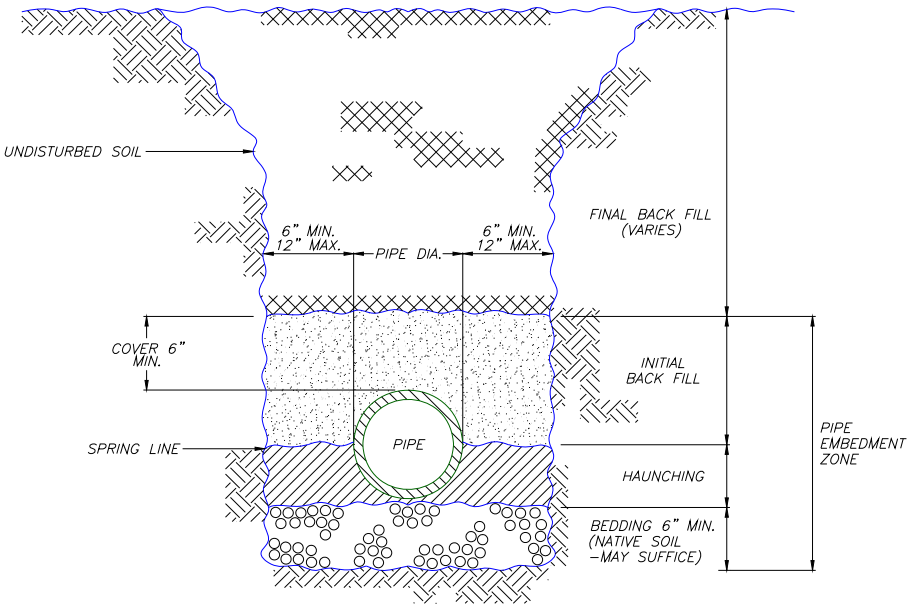
1.04 SUBMITTALS

A. Polystyrene Insulation

B. Polyethylene Encasement (as applicable)

1.05 DEFINITIONS

A. Bedding, Haunching and Initial Backfill zones as defined herein and on the standard pipe trench detailed drawing below:



PIPE TRENCH DETAIL

B. Soil Materials as summarized in the table below and defined in ASTM D2321 and ASTM D2487

Description and Comparison of Soil Material Classifications

ASTM D2321		*ASTM D2487*	
Class	*Type*	*USCS Group Symbol*	*Description*
IA	Manufactured aggregates: ¼ to 1 ½ inch open graded, clean.	* *None*	Closest to "Poorly graded gravel (GP)"
IB	Manufactured aggregates: ¼ to 1 ½ inch dense graded, clean.	* *None*	Closest to "Poorly graded gravel with sand (GP)"
II	Coarse sands and gravels with maximum particle size of 1 ½ inch, clean.	GW	Well-graded gravels and gravel-sand mixtures; little or no fines.
		GP	Poorly graded gravels and gravel sand mixtures; little or no fines.
		SW	Well-graded sands and gravelly sands; little or no fines.
		SP	Poorly graded sands and gravelly sands; little or no fines
	Coarse sands and gravels with maximum particle size of 1 ½ inch, borderline clean.	GW-GC SP-SM Etc.	Sands and gravels which are borderline between clean and with fines
III	Fine sand and clayey gravels.	GM	Silty gravels, gravel-sand-silt mixtures.
		GC	Clayey gravels, gravel-sand-clay mixtures
		SM	Silty sands, sand-silt mixtures

		SC	Clayey sands, sand-clay mixtures
IV	Fine grained soils (inorganic)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, silts with slight plasticity.
		CL	Inorganic clays of low to medium plasticity, gravely clays, sandy clays, silty clays, lean clays.
		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
		CH	Inorganic clays of high plasticity, fat clays.
V	Organic soils	OL	Organic silts and organic silty clays of low plasticity.
		OH	Organic clays of medium to high plasticity, organic silts.
		PT	Peat and other high organic soils.

* USCS system is limited to naturally occurring soils. Manufactured aggregates not covered.

PART 2 – PRODUCTS

2.01 BEDDING, HAUNCHING AND INITIAL BACKFILL MATERIAL

A. Class I, Class II or Class III, utilized in accordance with restrictions described in Part 3 - Execution.

2.02 INSULATION

A. Rigid extruded polystyrene insulation board, having a minimum compressive strength of 25 psi.

B. Width:

1. 4-foot for mains 6-inch (nominal diameter) and larger.

2. 2-foot for mains and service lines less than 6-inches (nominal diameter).

C. Thickness: As stipulated on the bid schedule.

2.03 POLYETHYLENE ENCASEMENT

D. Minimum 8 mils thickness.

PART 3 - EXECUTION

3.01 GENERAL

A. Trenching and excavation work shall be done in accordance with proper emphasis on safety as determined by the Contractor to conform to recommended safety standards such as OSHA 1910 and 1926.

B. Obtain all permits from appropriate road agency for construction within road right of way.

C. Repair damage resulting from settlement, slides, cave-ins, water pressure, and other causes.

D. Provide adequate signs, barricades, fences and amber lights and take all necessary precautions to protect the work and the safety of the public in all construction areas.

1. Placement of construction signs and barricades shall conform to the "Manual on Uniform Traffic Control Devices."

2. Protect barricades and obstructions at night by amber signal lights that burn from sunset to sunrise. Barricades shall also be of substantial construction, painted white or with reflective paint to increase their visibility at night.

3. Perform work without obstruction to traffic or inconvenience to the general public and the residents in the vicinity of the work.

E. Road Crossing

1. Comply with all construction and material requirements of roadway authorities having jurisdiction.

2. Maintain one lane of traffic open at all times.

3. Refer to Section 02705 – Road Restoration for backfill and restoration requirements.

3.02 EXCAVATION

A. Remove trees and stumps from excavation and site.

B. Remove and stockpile existing topsoil.

C. Install facilities as staked unless otherwise approved by Engineer.

D. Maintain surface drainage away from trenching or excavation.

E. Remove unsuitable foundation materials from excavation as shown on the plans or as authorized by the Engineer.

F. Maintain a minimum 1-foot clearance between outer surface of structure being installed and wall of excavation.

G. Rock encountered shall be classified, excavated and measured in accordance with Section 02316 – Rock Excavation

3.03 TRENCHING

A. Bottom width: No less than 12 inches or more than 36 inches wider than the outside diameter of the pipe.

B. Depth: Provide minimum cover as specified, or depths shown on plans.

3.04 BEDDING

A. If existing soil cannot provide uniform, stable bearing support, over-excavate 6 inches below bottom of pipe or structure and provide bedding material.

B. Utilize Class I, II or III materials as appropriate for bedding as listed in Table below.

Use of Soils and Aggregate for Bedding

	Class IA	*Class IB*	*Class II*	*Class III*
General	Excellent pipe support. Excellent drainage.	Excellent pipe support. Good drainage. Minimizes migration of adjacent material.	Good pipe support. Fair drainage.	Reasonable pipe support. Poor drainage
Compaction	Not required	Not required	Required 90% of Standard Proctor.	Required 90% of Standard Proctor.
Wet Conditions (below current or future water table). Rock Cuts	Acceptable. Must use same material for Haunching.	Acceptable. Must use same material for Haunching.	Acceptable. Clean groups only suitable for drainage blanket.	Not- Acceptable
Dry Conditions	Acceptable	Acceptable	Acceptable	Acceptable

3.05 HAUNCHING AND INITIAL BACKFILL

A. General

1. Provide complete and uniform bearing and support for the pipe, including allowance for bell holes, or structure.

2. Work material under and around the pipe to ensure full pipe support.

3. Prevent movement of the pipe during placement of material.

4. Avoid contact between the pipe and mechanical compaction equipment.

B. Utilize Class I, II or III materials as appropriate for haunching and initial backfill as listed in Table below. No frozen materials or frozen clods.

Use of Soils and Aggregate for Haunching and Initial Backfill

	Class IA	*Class IB*	*Class II*	*Class III*
General	Excellent pipe support. Excellent drainage. Install to a minimum of 6" above the pipe crown.	Excellent pipe support. Good drainage. Minimizes migration of adjacent material. Install to a minimum of 6" above the pipe crown.	Good pipe support. Fair drainage. Install and compact to a minimum of 6" above the pipe crown.	Reasonable pipe support. Poor drainage. Install and compact to a minimum of 6" above the pipe crown.
Compaction	Not required	Not required	Required 85% of Standard Proctor. 6 inch maximum lifts.	Required 90% of Standard Proctor. 6 inch maximum lifts.
Wet Conditions (below current or future water table). Rock Cuts	Acceptable. Must use same material for Bedding. Extend Haunching to the top crown of the pipe.	Acceptable. Must use same material for Bedding. Extend Haunching to the top crown of the pipe.	Acceptable. Clean groups only suitable for drainage.	Not- Acceptable
Dry Conditions	Acceptable	Acceptable	Acceptable	Acceptable

3.06 FINAL BACKFILL

A. Backfill remainder of excavation with native material, free from large clods, large stones, organic material or frost chunks unless otherwise specified below.

B. Backfill within roadways, driveways, and shoulders.

1. Conform to Section 02705 – Road Restoration for backfill requirements under roadways, driveways, and shoulders.

C. Backfill around structures.

1. Backfill and compact around manholes, valve boxes, and other appurtenances in 12-inch lifts.

   a. Compact with a mechanical tamper to a density not less than 90% of the maximum dry density, determined by ASTM D 698.
   b. Compaction around structures in roadways, driveways, and shoulders shall conform to Section 02705.

2. Backfill around septic tanks in 18-inch lifts.

   a. Compact in a manner that will not produce undue strain on the tank.

b. Compaction may be accomplished with the use of water, provided the material is thoroughly wetted from the bottom up, and the tank is filled with water to prevent floating.

D. Backfill of trenches and other locations not listed above.

1. Compact in 18-inch lifts to a density not less than the density of the surrounding undisturbed soil.

2. Provide 3 feet minimum of backfill over the pipe before wheel loading the trench.

3. Provide 4 feet minimum cover over the top of the pipe before utilization of hydrohammer compaction equipment.

4. Compact in smaller lifts if the required compaction cannot be obtained.

5. Lifts may be increased at the discretion of the Project Engineer if required compaction can be obtained.

E. Repair any trenches improperly backfilled or where settlement occurs, then refill and compact.

F. Restore surface to the required grade and compaction. Conform to Section 02310 – Grading for rough grading, finish grading and site surface drainage.

G. Remove all surplus backfill materials to a location approved by the Engineer.

3.07 FROST PROTECTION

A. Place insulation in areas where water main, sewer service lines or water service lines cross a road, driveway, traveled path, as indicated on the plans or as directed by the Engineer.

B. Center insulation over the main with no more than 6 inches of compacted fill between the pipe and the insulation. Grade fill so insulation lays flat.

C. Maintain a straight alignment of insulation.

D. Extend insulation a minimum of 5 feet on each side of the crossing.

E. Lap insulation by 6 inches or stagger by 6 inches if composed of two layers.

F. Minimum thickness for the first lift of backfill over the insulation is 8 inches.

1. Do not operate construction equipment directly on insulation. Do not compact first lift with backhoe-mounted compactor, or any other large compaction equipment.

2. Compact remaining backfill using normal construction practices.

3.08 POLYETHYLENE ENCASEMENT

A. All metallic mainline pipe, fittings, and appurtenances installed in aggressive soils shall be wrapped with polyethylene in accordance with ANSI/AWWA C105/A21.5.

B. The wrap shall extend 2-feet beyond all metallic fittings/appurtenances and cover the entire length of metallic pipe. All rips or punctures shall be repaired with tape or by rewrapping that area with polyethylene film.

C. After assembling the pipe joint, the polyethylene shall be overlapped approximately 1-foot and at all joints sealed with approved adhesive tape. Additional taping shall be used at 3-foot intervals along the pipe. All copper service connections shall be wrapped for a distance of 3-feet from the center line of the main. Before installing the polyethylene wrap, the exterior of the pipe shall be free of foreign material.

3.09 REMOVAL OF NUISANCE WATER

A. Remove nuisance water entering the trenches. Nuisance water that can be removed through the use of sump or trash pumps is not considered dewatering.

B. Keep trenches free from water until the facilities are in place, sealed against the entrance of water, and backfill has been placed and compacted above the water level.

3.10 LOCATE EXISTING UTILITIES

A. Field locate all existing underground utilities.

1. Utilize state “dig-safe” or “one-call” hotlines.

2. Contact all other utility owners not covered by the state “dig safe” hotlines.

3.11 UTILITY CONFLICTS

A. Protect existing utilities from damage during excavation and backfilling operations.

B. Provide temporary support for existing water, gas, telephone, power, or other utility services that cross the trench until backfilling of trench is complete

1. Compact backfill to 95% of Standard Proctor Density under disturbed utilities.

2. Repair or replace any damaged existing utilities, at no additional cost to the project.

C. Water and sewer main crossing and parallel installation

1. Maintain a 10 foot horizontal separation (O.D. to O.D.) for parallel mains.

2. Upon approval by the Engineer, water and sewer mains may be installed closer than 10 feet, provided all of the following conditions;

   a. Vertical separation is 18 inches (O.D. to O.D.)
   b. Water main is above the sewer main.
   c. Separate trenches are maintained.

3. Maintain a minimum 18-inch vertical separation (O.D. to O.D.) for crossing mains.

   a. Lay pipe with joints equidistant from the point of crossing.

4. If it is impossible to meet any of the above separation distances and deviations, one of the following methods shall be adhered to.

   a. Sewer main shall be constructed to water main pressure pipe standards, and successfully pass a 150-psi pressure test prior to backfilling.
   b. Either the water main or the sewer main may be encased in a watertight carrier pipe that extends 10 feet on both sides of the crossing. The carrier pipe shall be of materials approved by the regulatory agency for use in water main construction.

D. Water and sewer service crossing and parallel installation.

1. Maintain a 30-inch horizontal separation from water and sewer services.

2. Maintain a 12-inch vertical separation for crossing water and sewer services.

3. Water service line splices or joints will not be permitted within 10 feet of a sewer line crossing.

3.12 MOVING FENCES AND MINOR STRUCTURES

A. Remove and reset culverts, drainage pipes or other minor structures that fall within the alignment of the new construction, to their original location and grade.

B. Visit the project site and determine actual conditions with regard to the existence of old car bodies, abandoned houses, fences, driveways, trees, stumps, brush, sidewalks, approaches, and other miscellaneous obstacles to construction.

    1. Unless specifically referenced in a bid item, no separate payment will be made for the removal or replacement of these items.

3.13 RECORDS

A. Conform to as-built requirements in Section 01780 – Closeout Submittals.

END OF SECTION

SECTION 02370
TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes temporary erosion and siltation control measures accomplished through the use of silt fences, hay bales, erosion mats and other erosion control devices or methods.

1.02 RELATED WORK (as applicable)

A. Section 02310 – Grading
B. Section 02315 – Excavation, Trenching and Backfill
C. Section 02920 – Topsoiling, Seeding, Fertilizing and Mulching

1.03 REFERENCES

A. Minnesota Pollution Control Agency – Best Management Practices Handbook

B. Environmental Protection Agency - 1987 Congressional Amendments, Clean Water Act, Section 402.

1.04 SUBMITTALS

A. Method of Erosion Control
B. Silt Fence and Appurtenances
C. Erosion Mats and Appurtenances
D. Erosion Control Plan (If requested by the Engineer)

1.05 QUALITY ASSURANCE

A. Erosion control materials, methods and practices shall conform to the applicable state agency handbooks of Best Management Practices, or tribal laws established for the purpose of erosion control on construction sites.

B. Obtain and pay for permits and inspections in accordance with the provisions of all local government agencies having jurisdiction. No additional claim for compensation will be allowed because of the Contractor's failure to obtain or pay for such permits and inspections.

PART 2 - PRODUCTS

2.01 SILT FENCING

A. Applicability

1. Heavy Duty: General use during site grading to protect critical areas and bodies of water.

2. Standard: Light-duty applications to protect temporary construction or to supplement the other types of silt fence.

3. Machine-slice: For most applications.

B. Geotextile properties:

Description	Heavy Duty	Standard	Machine Slice
Type	Woven	Woven	Monofilament
Width	48 inches	36 inches	36 inches
Grab Tensile Strength (ASTM D 4632)	100 lb Min	100 lb Min	130 lb Min
Apparent Opening Size (ASTM D 4751)	20-70 Sieve	20-70 Sieve	30-40 Sieve
UV Stability (ASTM D 4355 500 hr)	70% Min	70% Min	70% Min
Top-fastening Component	Overlap around woven wire backing	Sewn-In cord	

* From Minnesota BMP

C. Net Backing

Description	Heavy Duty	Standard	Machine Slice
Material	Woven wire	N/A	N/A
Min. Weight	14-1/2 gauge		
Min. Mesh Opening	2 inches		
Max Mesh Opening	6 inches		
Min. Width	30 inches		
Tensile Strength (ASTM D 4595)	100 lb/ft		
UV Stability (ASTM D 4355 500 hr)	70% Min		

* From Minnesota BMP

D. Post properties:

Description	Heavy Duty	Standard	Machine Slice
Material	Metal	Wood	Metal
Min. Size	1.25 lb/ft	1.5 inch x 1.5 inch	1.25 lb/ft
Min. Length	5 feet	4 feet	5 feet
Min. Embedment	2 feet	1.5 feet	2 feet
Max. Spacing	8 feet	8 feet	6 feet
Type of Post Fasteners	U-shaped clips. No. 16 gauge wire	Gun staples 0.5 inch long	Plastic zip ties (50lb tensile strength)
Min. Fasteners per Post	3	5	3

* From Minnesota BMP

E. All seams shall be heat sealed or sewn

2.02 EROSION BALES

A. Applicability: Can be used in locations where silt fencing is used.

B. Rectangular clean hay bales or straw bale.

C. Posts: Wood or steel, 2” x 2” x 54” minimum.

2.03 EROSION CONTROL MATS

A. Biodegradable or photodegradable erosion control mat equal to American Excelsior Curlex II with a minimum 4-foot mat width.

2.04 OTHER

A. Other materials proposed by the Contractor shall conform to standards published by the applicable state agency handbooks of Best Management Practices (BMP’s).

PART 3 – EXECUTION

3.01 GENERAL

A. Coordinate temporary and permanent erosion control measures to assure economical, effective and continuous erosion control.

B. Keep construction areas small.

C. Divert drainage away from construction areas.

D. Perform construction in and adjacent to rivers, streams, lakes or other waterways in such a manner as to avoid washing, sloughing or deposition of material into waterways which will result in undue or avoidable contamination, pollution or siltation of such waterways.

E. Inspect and maintain erosion control materials to ensure its continued effectiveness.

1. Remove sediment material captured by erosion control systems before systems fails.

2. Inspect and repair erosion control systems within 48 hours of rain event.

F. Remove erosion control only after the area has stabilized and vegetation has developed to the extent that further erosion is unlikely.

G. Submit a plan for erosion control measures that are in compliance with State BMPs and/or Federal EPA requirements, if the area to be disturbed is greater than one (1) acre total.

3.02 TEMPORARY EROSION CONTROL

A. Use temporary erosion control measures to protect ditches and drainage ways as shown on the detailed drawings and as directed by the Engineer.

B. Silt fencing (in lieu of or in combination with erosion bales)

1. Install silt fence in accordance with manufacturer's recommendations.

2. Construct the silt fence as shown on the plans and/or install on the contour of the slope.

3. Place silt fences in an arc or horseshoe shape with the ends pointing up towards the slope.

4. Maximum drainage area = ¼ acre per 100 feet of fence

5. Installation limitations:

Slope Steepness	Maximum Slope Length
2:1 (50%)	15 feet
3:1 (33%)	15 feet
4:1 (25%)	15 feet
5:1 (20%)	25 feet
10:1 (10%)	50 feet
20:1 (5%)	75 feet

6. Compact the soil immediately next to the silt fence fabric.

7. Clean silt fence when sediment reaches 1/3 height of the silt fence.

C. Erosion Bales

1. Install hay bales as shown on the plans and/or install on the contour of the slope.

2. Installation limitations:

Slope Steepness	Maximum Slope Length
2:1 (50%)	15 feet
3:1 (33%)	15 feet
4:1 (25%)	15 feet
5:1 (20%)	25 feet
10:1 (10%)	50 feet
20:1 (5%)	75 feet

3. Install hay bales in 4-inch deep trench.

4. Place bales at right angles to the direction of flow.

5. Securely anchor each bale with stakes as shown on the plans.

6. Compact soil on the upslope side of the hay bales.

7. Fill gaps between bales with straw.

8. Clean sediment away from bale when sediment reaches 1/2 height of the hay bale.

9. Replace damaged, destroyed or rotted bales immediately.

10. Bales may be used for mulching material if they meet the specifications of Section 02920.

D. Erosion Control Mats

1. Where indicated on the plans, by the Project Engineer, or on slopes greater than 5%, use a wood fiber mat in lieu of mulch.

2. Install in accordance with manufacturer's recommendations

3. Roll matting strips in the direction of the flow.

4. Spread mat evenly, smoothly, and in a natural position without stretching and with all parts touching the soil.

END OF SECTION

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SECTION 02541
PRESSURE DOSED MOUND SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes construction of a pressurized, above-ground wastewater disposal system from the pump tank to the soil treatment area.

1.02 RELATED WORK (as applicable)

A. Section 01780 – Closeout Submittals
B. Section 02315 – Excavation, Trenching and Backfill
C. Section 02545 – Concrete Septic Tank and Piping
D. Section 02920 – Topsoiling, Seeding, Fertilizing, and Mulching

1.03 REFERENCES

A. ASTM C 33 – Standard Specification for Concrete Aggregates

B. ASTM D1785 – Polyvinyl Chloride (PVC) Plastic Pipe Schedule 40, 80, and 120

C. ASTM D1785 - Polyvinyl Chloride (PVC) Plastic Pipe Schedule 40 Insulated Pipe

D. ASTM D2241 – Polyvinyl Chloride (PVC) Pressure-Rated Pipe (SDR Series)

E. Minnesota Pollution Control Agency, Minnesota Rules Chapter 7080 – Subsurface Sewage Treatment Systems Program

F. National Electric Code (NEC)

1.04 SUBMITTALS

A. Pump tank, riser, cover, and safety screen
B. Effluent pump, controls, and alarm system
C. Force Main, manifold, and lateral piping and fittings
D. Source and gradation of drainfield gravel
E. Source and sieve analysis for clean sand
F. Geotextile fabric
G. Gravel-less drainfield distribution media (if required)

1.05 QUALITY ASSURANCE

A. Mound materials and construction practices shall meet Minnesota Rules Chapter 7080 requirements if not otherwise specified in this Section.

PART 2 - PRODUCTS

2.01 CONCRETE PUMP TANK

A. Material: Watertight, reinforced concrete

B. Size: Volume of container shall be listed in the design or bid schedule.

C. Must comply with applicable state requirements. Refer to Section 02545 for appropriate state references.

D. Combination septic /pump tanks that meet applicable state requirements are acceptable.

E. Manhole risers and covers

1. Provide at least one manhole opening, no less than 24 inches in diameter, situated over the pump.

2. Manhole riser shall be cast in place polyethylene with gasketed connections or other approved water-tight material.

3. Covers shall be of the same material as the riser with a warning label printed with information regarding the hazards present when entering a septic tank affixed or supplied by the manufacturer.

4. Cover shall be secured to the riser with locking screws or approved equal.

F. Manhole Safety ScreenSafety screen shall be a Polylok 24 inch safety screen #3008-SS or approved equal.

1. Made of yellow ABS plastic with built in handle, to fit 24 inch Polylok manhole riser sections.

2. Unit to be rated and tested for 250 pounds per square foot.

3. Screen shall be installed per manufacturer instructions inside the top riser section that connects to cover dome facing up.

2.02 PUMPS AND CONTROLS

A. Effluent Pump

1. Size: Total dynamic head and flow requirements shall be listed in the design by the Engineer.

2. Equal to Peabody Barnes Model EH522, Myers Model ME 50, Goulds Model 3885 or Zoeller 270.

3. The pump motor shall have a built-in thermal overload protection with automatic reset.

B. Power Supply

1. 120/240 volt, single phase, three-wire service from one/two pole breaker off lighting panel in the residence on a separate/dedicated circuit.

2. Use wire sized in accordance with NEC.

C. Pump Controls

1. Furnish and install controls to operate the pump based on on-off level control floats.

2. Option #1: A control panel compatible with the pump supplied.

   a. Enclosure: Weatherproof NEMA 4X fiberglass

   b. Pump Control: Hand-Off-Auto switch

   c. Circuit breakers for pump and alarm

   d. Provide terminal blocks for connection of on-off level control floats.

   e. Equal to Rhombus Model 112 Control Panel or Rhombus EZ Series Single Phase Simplex

3. Option #2: Pump Switch with Piggy-Back Plug and outlet rated for exterior use

   a. Enclosure: Weatherproof NEMA 4X fiberglass

   b. Size pump switch to be compatible with selected pump.

   c. Enclosure area shall be a minimum of 1.5 times the area of the piggyback switch, outlet, and folded cables.

   d. Equal to Rhombus Double Float pump switch.

D. Floats

1. Install two mechanical float switches to detect on-off control levels for the pump.

2. Use SJE Rhombus Signal Master Control Switch or equal.

E. Alarm

1. Provide an alarm system on a separate circuit from the pump.

2. Visual warning: Red beacon

3. Audible warning: Horn at 80-90 decibel rating

4. Switch: Alarm test and horn silence

2.03 ELECTRICAL CABLE

A. Electrical cable shall be type UF for direct burial.

B. Use two separate wires for the effluent pump and for the float switches.

C. Size underground cable to limit voltage drop from power source to pump motor in accordance with pump manufacturer's recommendations.

2.04 FORCE MAIN AND LATERAL PIPING

A. Force Main Pipe

1. Material: Schedule 40 PVC must conform to ASTM D 1785.

2. Material: 160 psi SDR 26 PVC must conform to ASTM D 2241.

3. Size: Diameter shall be indicated on design drawings.

4. Insulated pipe may be used if approved by the Engineer:

a. Material: Insulated Schedule 40 PVC with 6-mil polyethylene protective sleeve. Must conform to ASTM D 1785.

b. Insulation: R-value of 13 and 6-inch diameter of urethane foam.

c. Other: Belled ends and solvent joints.

B. Manifold Pipe

1. Material: Schedule 40 PVC must conform to ASTM D 1785.

2. Material: 160 psi SDR 26 PVC must conform to ASTM D 2241.

3. Size: 2 inch diameter unless otherwise indicated in design drawings.

C. Lateral Pipe

1. Material: Schedule 40 PVC must conform to ASTM D 1785.

2. Material: 160 psi SDR 26 PVC must conform to ASTM D 2241.

3. Size: Diameter shall be indicated on design drawings.

4. The pipe shall be field perforated.

5. Lateral cleanouts shall be Schedule 40 PVC or SDR 26 PVC.

6. Lateral cleanout caps shall be Schedule 40 PVC with PVC adapter and screw type plug or a female threaded cap.

7. Lateral cleanouts shall be installed with an insulated access box or 4 inch PVC cover pipe with cap.

2.05 MOUND MATERIALS AND DISTRIBUTION MEDIA

A. Clean sand shall meet the following requirements for fine aggregate (ASTM C33):

Sieve No.	Percent Finer by Weight
3/8 inch	100%
No. 4	95-100%
No. 8	80-100%
No. 16	50-85%
No. 30	25-60%
No. 50	10-30%
No. 100	2-10%
No. 200	0-3%

B. Distribution Media Options: Shall be determined by Engineer and indicated on design drawings and bid schedule.

1. Drainfield Gravel: Gravel shall be clean and may vary in size from 3/4-inch to 1-1/2 inches not to exceed 5 percent fines.

2. Infiltrators Systems Inc., Quick 4 Standard Chambers

3. Infiltrators Systems Inc., Quick 4 Plus Standard Low Profile (LP) Chambers

4. Infiltrators Systems Inc., Quick 4 High Capacity (HC) Chambers

5. Infiltrators Systems Inc., EZ Flow Systems

C. Fill material may be subsoil if it is not heavy clay or glacial till with stones and boulders. Sandy loam is the preferred material.

2.06 GEOTEXTILE FABRIC

A. Material: Synthetic, nonwoven material shall be TYPAR Style 3151 or approved equal.

2.07 OBSERVATION PIPE

A. Material: Schedule 40 PVC

B. Size: 4-inch diameter

C. Observation pipe caps shall be 4-inch Schedule 40 PVC with PVC adapter and screw type plug or female threaded cap.

D. Cap shall be non-vented plastic.

PART 3 - EXECUTION

3.01 GENERAL

A. Construct mound in accordance with Minnesota Rules 7080 and Engineer's design.

B. If changes to mound are found to be necessary at the time of construction, notify Engineer immediately for approval or redesign.

3.02 CONCRETE PUMP TANK AND PUMP

A. Install 4-inch Schedule 40 PVC from the septic tank to pump chamber.

B. Seal all joints between inlet piping, vent pipe, riser, etc. to eliminate ground water infiltration.

C. Extend risers 3 to 6 inches above finished grade.

3.03 CONTROL PANEL AND ALARM SYSTEM

A. Install all wiring in accordance with the NEC.

B. Install all buried electrical cable (1 pump wire and 3 float switch wires) in one trench.

C. Mount control panel in a location specified by the Engineer.

D. Seal all conduit openings entering the control panel and pump chamber with silicone caulk or other appropriate material.

E. Install outdoor alarm system with control panel. If indoor alarm system is specified, then install in a location selected by the Engineer and homeowner.

1. Install the alarm system on a separate circuit from the pump.

2. High level warning shall activate audible and visual alarm.

3. Provide a silence switch that will silence the audible alarm and allow the visual alarm to remain energized.

4. The high alarm sensor shall continue to show an alarm condition until the operating condition has returned to normal and the silencing switch has been returned to its “normal” position.

3.04 FORCE MAIN, MANIFOLD, AND LATERAL PIPING

A. Install force main piping and union in the pump chamber as shown in the detail drawings to allow the removal of the pump through the riser by only disconnecting the union.

1. Union shall be a maximum of 24 inches below top of tank riser.

B. Alternative discharge piping layout: exit through the pump tank opening.

1. Discharge piping shall be brought up into the riser so that the union is within 24 inches of the top of the tank riser.

2. Drill a 1/4-inch weep hole in the bottom elbow of the outlet pipe.

C. Slope force main continuously up to the mound manifold unless otherwise directed by the Engineer. Slope shall be a 1/8 inch per foot or minimum of 6 inches to ensure drainback of force main to the pump tank.

D. Trench force main pipe up to the mound area and slope into the mound from the upslope side or the end of the mound per the design drawings.

E. Pressurized Lateral Piping:

1. Install piping per design and as shown in the drawings.

2. Field perforate laterals using sharp drill bit. Perforation diameters and spacing shall be indicated in design drawings.

3. Remove all burrs and filings from the interior of the pipe.

F. Lateral cleanouts:

1. Located at the terminal end of each lateral.

2. Accessible from final grade

3. Large enough to allow access to caps or plugs with hands, tools, etc.

G. Refer to Section 02315 for excavation and backfilling procedures.

3.05 MOUND SURFACE PREPARATION

A. Remove excessive vegetation from the mound area by clearing and mowing.

B. If tree removal is required, cut trees flush with the ground and remove from site. Leave stumps in the ground.

C. Mound absorption area shall be roughened to a depth of 8 inches and perpendicular to the slope with backhoe teeth or plow.

1. Do not compact or mix soil.

2. Never use a rototiller.

3.06 MOUND CONSTRUCTION

A. Application of clean mound sand must be completed immediately after surface roughening has been accomplished.

B. Place a minimum of 12 inches of clean sand below drainfield gravel.

C. Place sand by dumping from the upslope side and ends of the roughened area.

D. Use tracked equipment to spread the sand and keep at least 6 inches of sand under the tracks at all times.

E. Distribution Media Construction:

1. Gravel:

a. Place gravel the full width of the trench and lay perforated pipe level.

b. Gravel shall be 2 inches above the pipe and 6 inches below the pipe unless otherwise indicated by Engineer.

c. Cover the top of the gravel bed with geotextile fabric.

2. Gravel-less Distribution Media: Install media approved by the Engineer as shown on the detail drawings and according to manufacturer specifications.

a. Install observation pipe on each gravel-less drainfield lateral end.

i. Chambers: Insert observation pipe through 4-inch punch-out hole on top of the end drainfield chamber.

ii. EZ Flow: Install observation pipe in accordance with 3.07.

F. Refer to 3.04 for manifold and lateral piping installation requirements.

G. Place fill material above the drainfield gravel as shown on the detail drawings.

1. The fill material layer shall be a minimum of 12 inches deep at the center of the mound and a minimum of 6 inches deep at the sides.

H. Cover the entire mound with a minimum of 6 inches of topsoil.

D. Seed and mulch entire mound area to provide immediate erosion control. Refer to Section 02920 for Topsoiling, Seeding, Fertilizing, and Mulching requirements.

I. Repair erosion damage and re-seed the mound area as required until a complete vegetation cover is achieved.

3.07 OBSERVATION PIPE

A. Install an observation pipe on the downslope side. Install a second observation pipe in between the 2 laterals on the upslope side and opposite end from the downslope observation pipe.

B. Drill a minimum of 2 holes in observation pipe located within the distribution media zone. Holes shall be a minimum of 3/8” in diameter and no more than 6 inches apart vertically.

C. Install a piece of 1/4” to 3/8” diameter rebar through bottom of observation pipe to anchor pipe in distribution media.

D. The observation pipe shall extend from the bottom of the trench to a height of 12 to 24 inches above grade.

3.08 FIELD QUALITY CONTROL

A. No roughening shall take place when the moisture content of the soil is such that rolling a sample between the hands forms a roll 1/8 inch in diameter.

B. The Engineer reserves the right to conduct a field test of mound sand and reject the aforesaid sand should it fail to meet the gradation requirements.

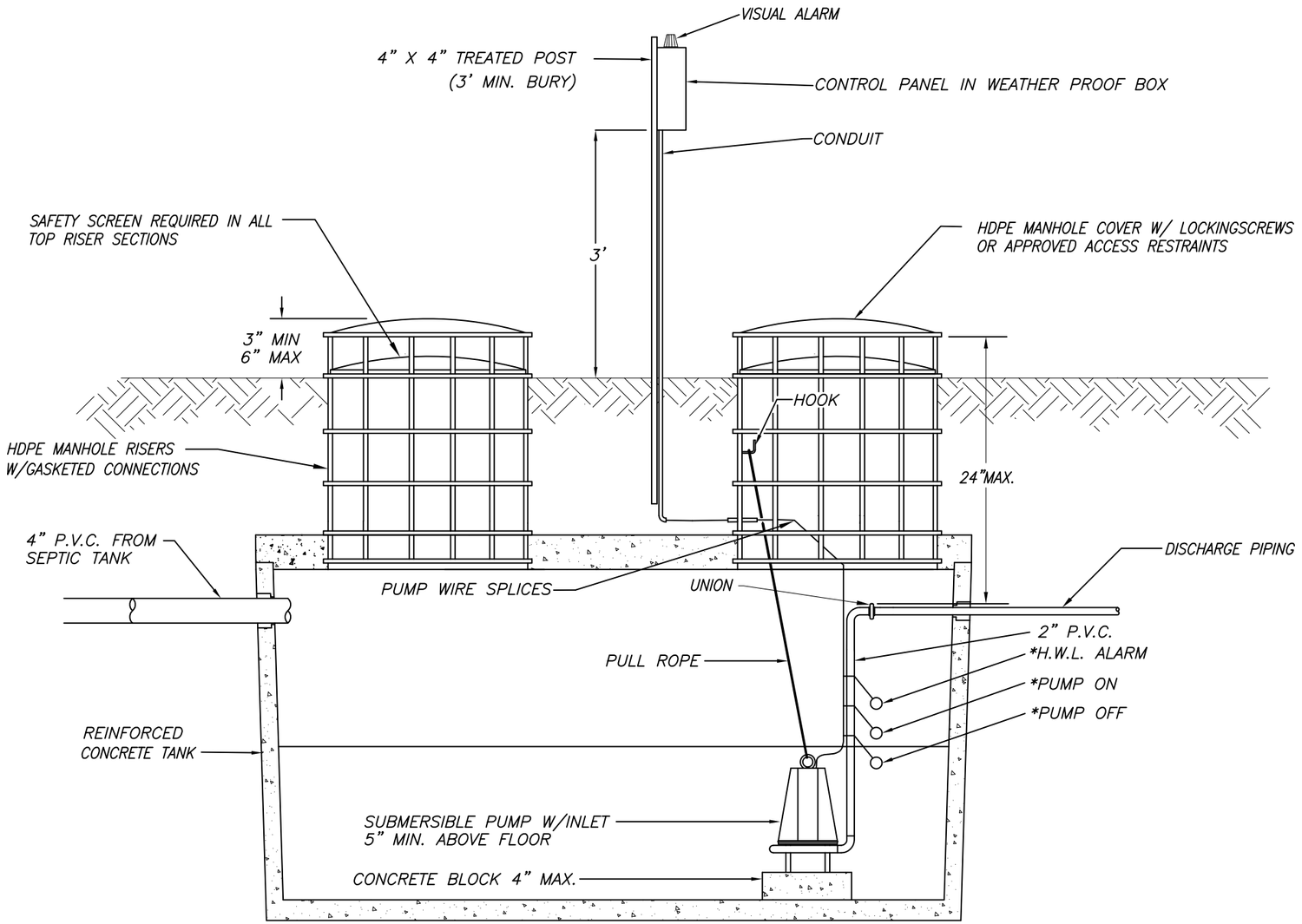
C. No rubber tired or wheeled equipment or material stockpiles will be allowed on the mound soil treatment area and the designated down-slope area.

D. Draw-down test may be requested by the Engineer.

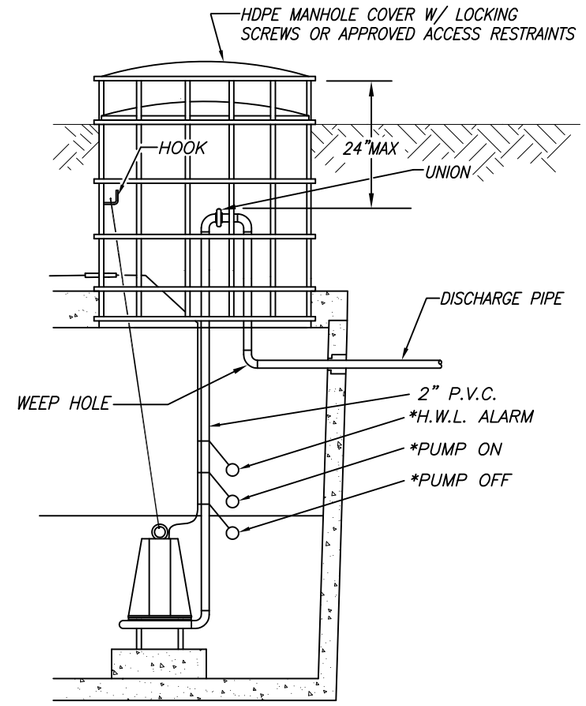
3.07 AS-BUILTS

A. Provide as-built information on each system in accordance with Section 01780.

END OF SECTION



STANDARD DISCHARGE PIPING
N.T.S.



ALTERNATE DISCHARGE PIPING
N.T.S.

NOTES:

1.) FLOAT SETTINGS TO BE SPECIFIED BY THE PROJECT ENGINEER.

2.) DISTANCE FROM ELBOW TO THE TOP OF THE RISER IS A MAX. OF 24" OR OPTIONAL PIPING SHALL BE USED.

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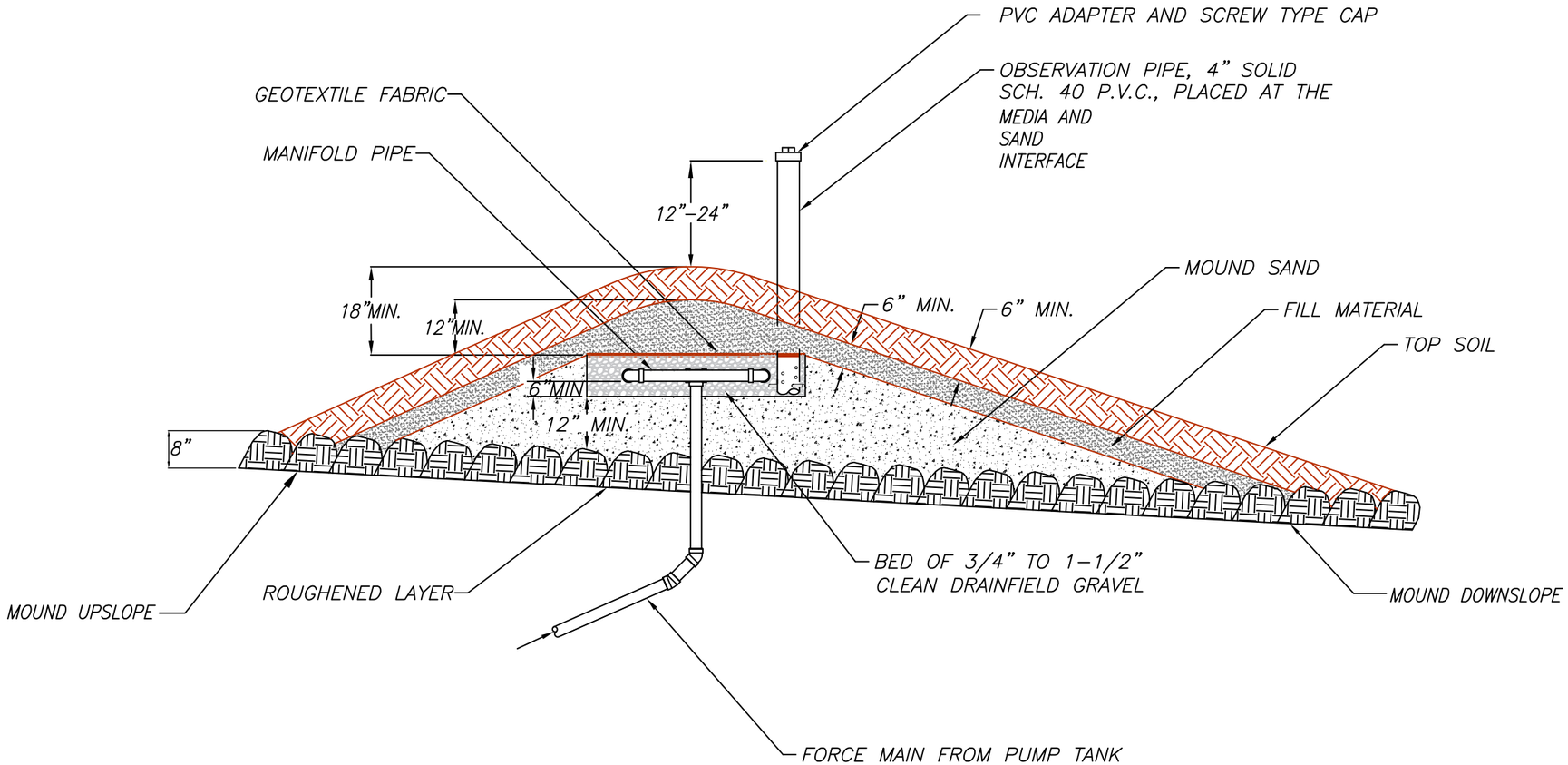
U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES
PUBLIC HEALTH SERVICE
INDIAN HEALTH SERVICE
OFFICE OF ENVIRONMENTAL HEALTH
BEMIDJI AREA OFFICE BEMIDJI, MINNESOTA

TITLE:

TYPICAL CONCRETE PUMP TANK

FOR SANITARY FACILITIES CONSTRUCTION
UNDER PUBLIC LAW 86-121

DRAWN BY: R.A.M.	CHK'D BY: B.A.R.	DRAWING NO. 02541-D
REV. DATE: 02/10/16	REV. DATE: 02/10/16	1 OF 4



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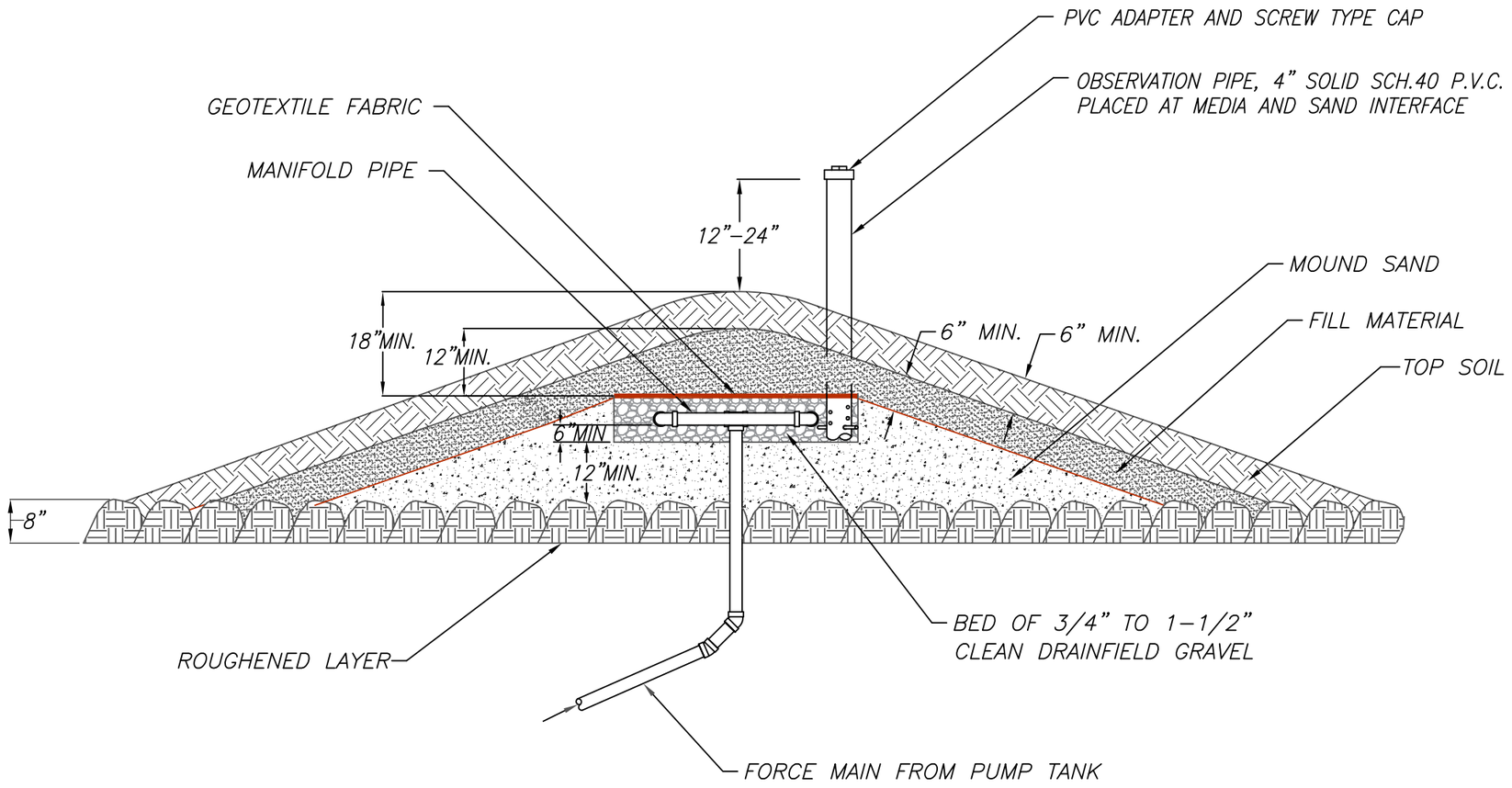
U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES
PUBLIC HEALTH SERVICE
INDIAN HEALTH SERVICE
OFFICE OF ENVIRONMENTAL HEALTH
BEMIDJI AREA OFFICE BEMIDJI, MINNESOTA

TITLE:

TYPICAL MOUND CROSS SECTION ON SLOPE>1%

FOR SANITARY FACILITIES CONSTRUCTION
UNDER PUBLIC LAW 86–121

DRAWN BY: R.A.M.	CHK'D BY: B.A.R.	DRAWING NO. 02541-D
REV. DATE: 02/09/16	REV. DATE: 02/09/16	2 OF 4



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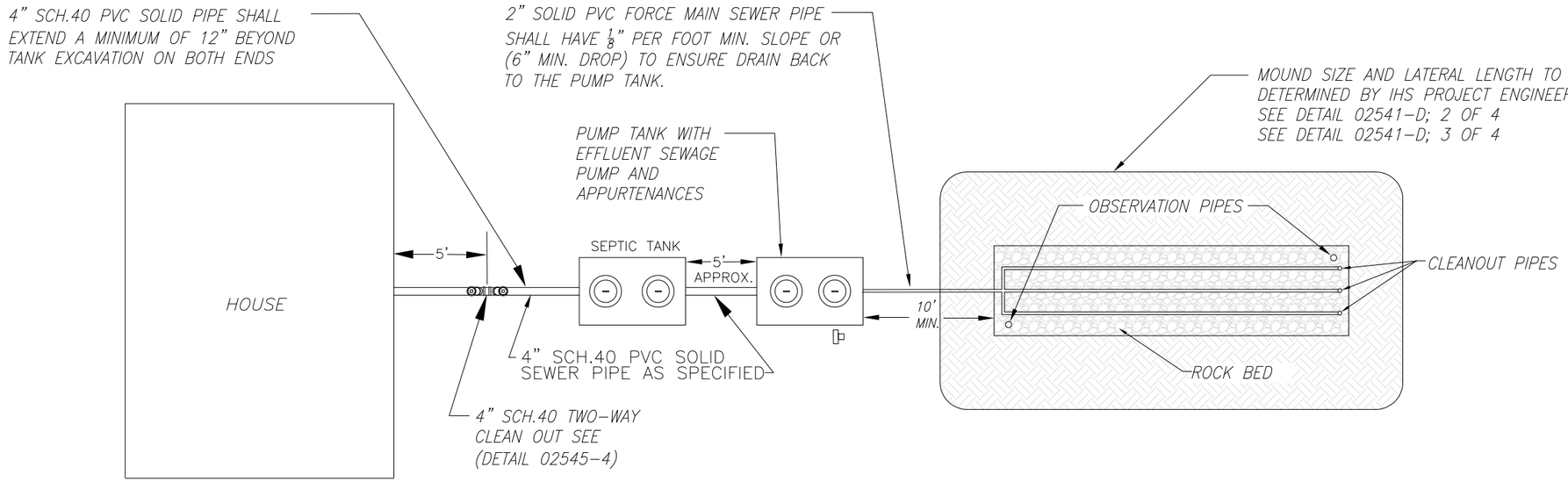
PUBLIC HEALTH SERVICE
INDIAN HEALTH SERVICE
OFFICE OF ENVIRONMENTAL HEALTH
BEMIDJI AREA OFFICE BEMIDJI, MINNESOTA

TITLE:

TYPICAL MOUND CROSS SECTION ON SLOPE<1%

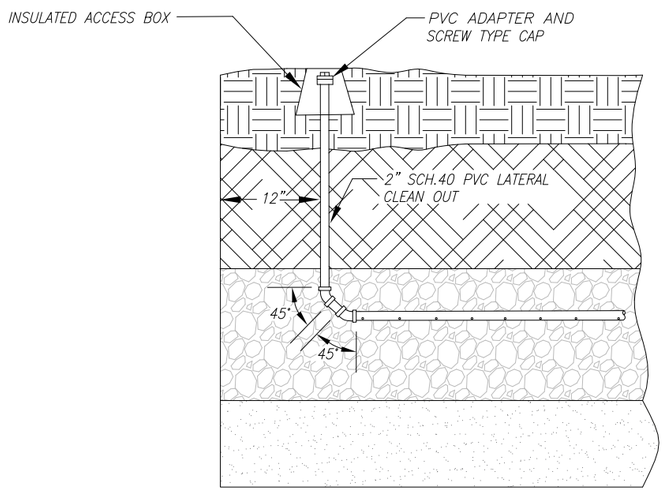
FOR SANITARY FACILITIES CONSTRUCTION
UNDER PUBLIC LAW 86–121

DRAWN BY: R.A.M.	CHK'D BY: B.A.R.	DRAWING NO. 02541-D
REV. DATE: 02/09/16	REV. DATE: 02/09/16	3 OF 4

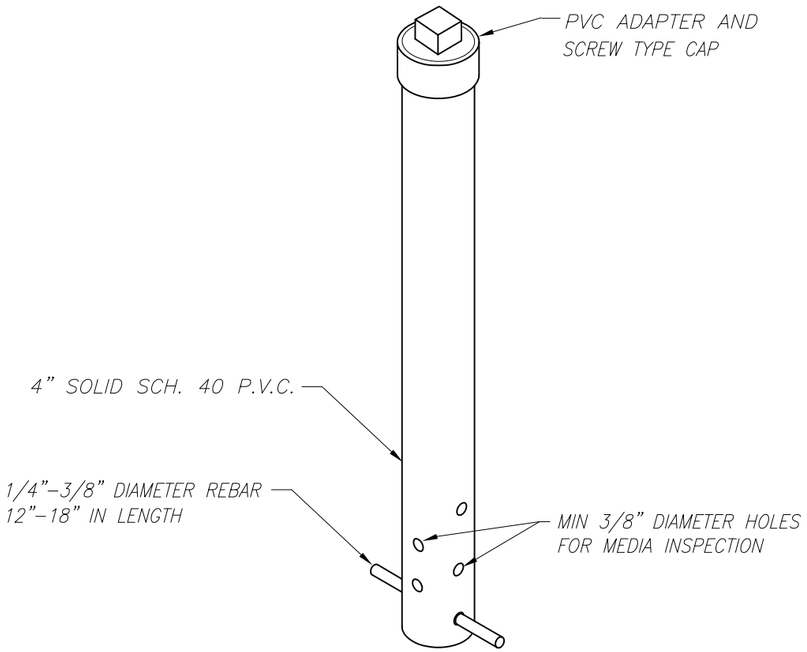


PLAN VIEW MOUND DETAIL
N.T.S.

NOTE:
*SEE ENGINEER DESIGN FOR TYPE OF MANIFOLD CONNECTION (END FEED IS SHOWN IN TYPICAL DRAWINGS)



LATERAL CLEAN OUT DETAIL
N.T.S.



OBSERVATION PIPE DETAIL
N.T.S.

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U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES
PUBLIC HEALTH SERVICE
INDIAN HEALTH SERVICE
OFFICE OF ENVIRONMENTAL HEALTH
BEMIDJI AREA OFFICE BEMIDJI, MINNESOTA

TITLE:

TYPICAL MOUND LAYOUT

FOR SANITARY FACILITIES CONSTRUCTION
UNDER PUBLIC LAW 86-121

DRAWN BY: R.A.M.	CHK'D BY: B.A.R.	DRAWING NO. 02541-D
REV. DATE: 02/10/16	REV. DATE: 02/10/16	4 OF 4

SECTION 02545
CONCRETE SEPTIC TANK AND PIPING

PART 1 - GENERAL

1.01 SUMMARY

A. This section covers single and multi-compartment precast septic tanks. Also included is the piping from the home to the septic tanks, two-way cleanouts, and septic tank abandonment.

1.02 RELATED WORK (as applicable)

A. Section 01119 – Revisions to Standard Specifications
B. Section 01780 – Closeout Submittals
C. Section 02315 – Excavation, Trenching and Backfill
D. Section 02540 – Drainfields
E. Section 02541 – Pressure Dosed Mound Systems
F. Section 02542 – Pressure Dosed Trenches and Beds

1.03 REFERENCES

A. ASTM D 1785 – Polyvinyl Chloride (PVC) Plastic Pipe Schedule 40, 80 and 120.

B. ASTM D 3034 – Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings.

C. Minnesota Pollution Control Agency, Minnesota Rules Chapter 7080 – Subsurface Sewage Treatment Systems

1.04 SUBMITTALS

A. Septic tank
B. Septic tank riser and cover
C. Safety screen.
D. Effluent filter and alarm
E. Solid sewer pipe

1.05 QUALITY ASSURANCE

A. Septic tanks and other materials shall meet Minnesota Rules Chapter 7080 requirements if not otherwise specified in this Section.

PART 2 - PRODUCTS

2.01 SEPTIC TANKS

A. Concrete tanks that meet Chapter 7080.

1.	Minimum. reinforced concrete wall thickness	2 inches
2.	Minimum liquid depth	2 1/2 feet
3.	Maximum liquid depth	5 1/2 feet
4.	Concrete compressive strength	3,000 psi

B. Rectangular tanks shall have a minimum width of 36 inches and be constructed with the longest dimension parallel to the direction of flow.

C. Reinforce throughout with 6-inch x 6-inch – 10/10 wire mesh or fiber mesh.

D. Joints below the liquid level shall be of monolithic construction or have interlocking V-notch, shiplap or tongue and grove joints.

E. Inlet and Outlet

1. Connections: 4-inch Schedule 40 PVC, rubber boots.

2. Baffles: Open-end coated sanitary tees or other Chapter 7080 approved materials at the inlet and outlet. Extend at least 6 inches above and 9 inches below the liquid level.

3. The bottom of the outlet opening shall be at least 2 inches lower than the bottom of the inlet.

F. Manhole Risers and Covers

1. Provide at least two manhole openings no less than 24 inches in diameter with each single or multiple compartment tanks situated over the inlet pipe, baffle, outlet pipe, and effluent filter.

2. Manhole riser shall be cast in place polyethylene with gasketed connections or other approved water-tight material.

3. Covers shall be of the same material as the riser, with a warning label, printed with information regarding the hazards present when entering a septic tank affixed or supplied by the manufacturer.

G. Manhole Safety ScreenSafety screen shall be a Polylok 24 inch safety screen #3008-SS or approved equal.

1. Made of yellow ABS plastic with built in handle, to fit 24 inch Polylok manhole riser sections.

2. Unit to be rated and tested for 250 pounds per square foot.

3. Screen shall be installed, per manufacturer instructions, inside the top riser section that connects to cover dome facing up.

2.02 SOLID SEWER PIPE, CLEANOUT AND FITTINGS

A. Schedule 40 PVC fittings and caps shall conform to ASTM D 1785.

B. SDR 35 PVC pipe and fittings shall conform to ASTM D 3034.

C. Cleanout piping and cap shall be PVC and threaded.

2.03 EFFLUENT FILTER

A. Rated for 3,000 gpd flow rate.

B. Maximum filter opening: 1/16 inch.

C. Equal to Polylok PL-525 or Zabel A100 (12 x 20 inches).

2.04 PIPE HANGERS

A. Shall be made of a material compatible with piping material.

B. Shall be of sufficient strength to support the pipe at full capacity.

C. Shall not affect pipe integrity by either abrading, cutting or bending of pipe.

PART 3 - EXECUTION

3.01 SOLID SEWER PIPE and CLEANOUTS

A. Install solid sewer pipe from the house to the septic tank as indicated in design.

B. Solvent weld all joint connections.

C. Minimum cover over solid sewer pipe is 12-inches.

D. Minimum slope between the house and the septic tank is 1/8-inch per foot or 6 inches, whichever is greater.

E. There shall be no 90-degree bends in the pipe between the house and the septic tank.

F. Install two-way cleanout approximately 5 feet from the outside wall of home.

1. Cleanout shall allow rodding the sewer line both towards the home and towards the septic tank.

2. Fit cleanout with a threaded plug.

3. Install cleanout so the top is flush with the ground or as specified by the Engineer.

G. Insert inlet piping to be at least 6 inches but no more than 12-inches from baffle.

H. Inlet and outlet schedule 40 PVC pipe shall extend from the septic tank at least 12 inches past the tank excavation before transitioning if SDR 35 pipe is being used.

I. Properly seal pipe connections to tanks to prevent groundwater infiltration.

J. Install insulation in traveled areas as specified by the Engineer in accordance with Section 02315 – Excavation, Trenching and Backfill.

3.02 TANK INSTALLATION

A. Place tank in excavations at the locations and elevations designated on the plans or by the Engineer.

B. Refer to Section 02315 for excavation, backfill, and grading requirements.

C. Place tank level.

D. Install tanks in accordance with manufacturer’s recommendations.

E. Seal joints when the tank is set with an epoxy based sealing compound or Rub-R-Nek flexible gasket or equal.

F. Seal inlet and outlet with temporary plugs until connections are made to the inlet and outlet lines.

G. Set the top of the tank a minimum of 6-inches below finished grade. Do not exceed 24-inch cover depth unless tank is designed for deeper bury depth and Engineer approves.

1. Install tank lid insulation when tank lid is less than 24 inches deep with insulation with a minimum R-value of 10.

2. Install manhole risers and terminate access cover 3-6-inches above finished grade. Provide suitable locking screws or locking device that meets with Engineer's approval.

H. Do not drive over the tank during and after construction.

3.03 EFFLUENT FILTER

A. Center filter under the outlet manhole opening.

B. Solvent weld to 4-inch PVC Schedule 40 outlet pipe.

C. Install filter handle and extend handle to within 6-inches of the top of the access riser for easy access.

D. Conform to manufacturer's installation instructions.

3.04 EXISTING SEPTIC TANK ABANDONMENT

A. Abandon existing septic tanks where directed by the Engineer.

B. Pump tanks prior to abandonment, and dispose of contents in accordance with state and federal requirements.

C. Remove and dispose of any interior pipes, plumbing, or pumps.

E. Remove and dispose of concrete tank cover, risers, and inspection pipes.

F. Break or open bottom of tank.

E. Backfill interior of the tank with suitable, compactable soil material.

F. Conform to section 02310 – Grading, and section 02920 – Topsoiling, Seeding, Fertilizing and Mulching.

G. Locate abandoned septic tanks on the as-built drawing.

H. Other methods of abandonment are subject to prior approval by Engineer.

3.05 AS–BUILTS

A. Provide as-built information on each system in accordance with Section 01780.

END OF SECTION

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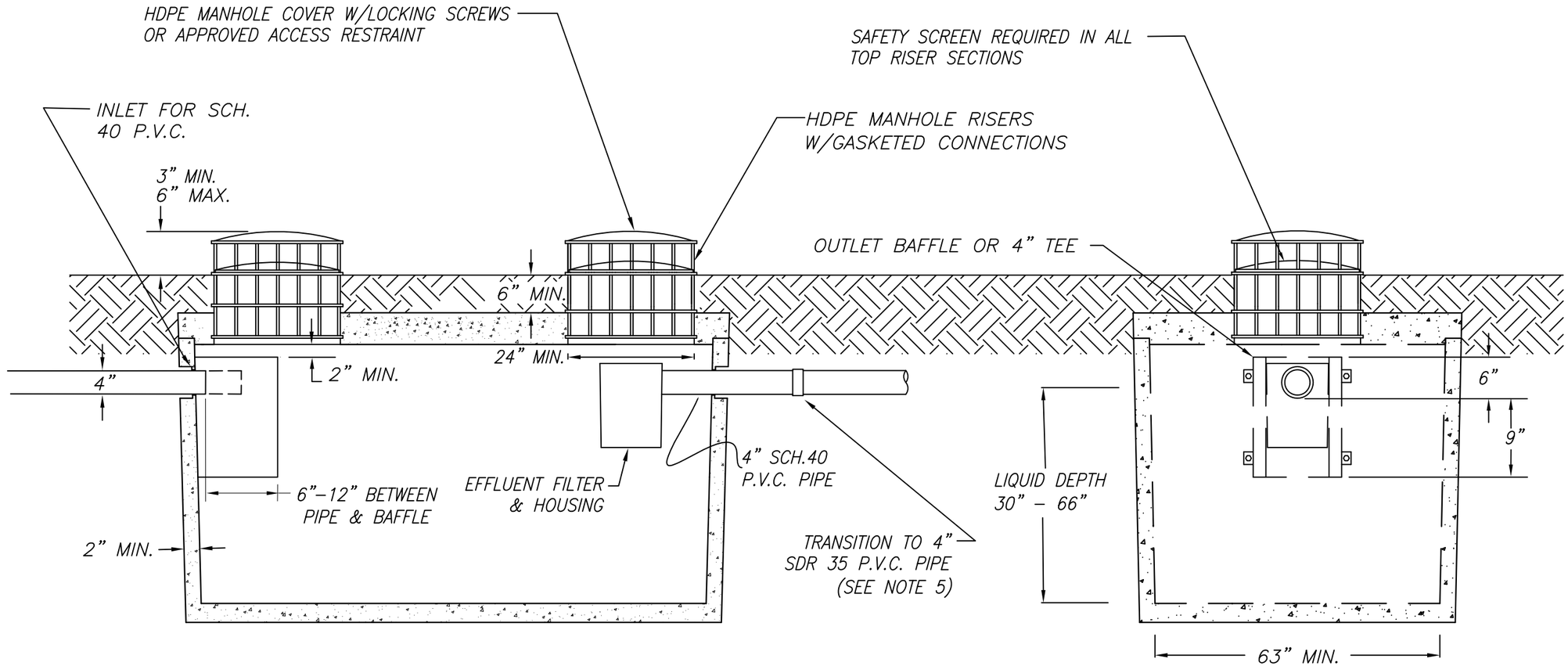


NOTE:

1. TANK TO BE REINFORCED THROUGHOUT WITH 6" X 6"–10/10 WIRE MESH OR FIBER MESH AS PER SPEC.
2. INLET BAFFLE OR TEE REQUIRED PER SPEC'S.
3. OUTLET IS 2"–3" BELOW INLET.
4. 1000 GALLON MINIMUM CAPACITY, OR AS SPECIFIED ON THE BID SCHEDULE.
5. SCH. 40 PVC PIPE SHALL EXTEND OUTWARD FROM THE SEPTIC TANK INLET AND OUTLET A MINIMUM OF 12–INCHES PAST THE EDGES OF THE TANK EXCAVATION.
6. INSTALL R10 VALUE INSULATION ON TANK LID IF LESS THAN 24" COVER

THIS DRAWING IS NOT TO SCALE

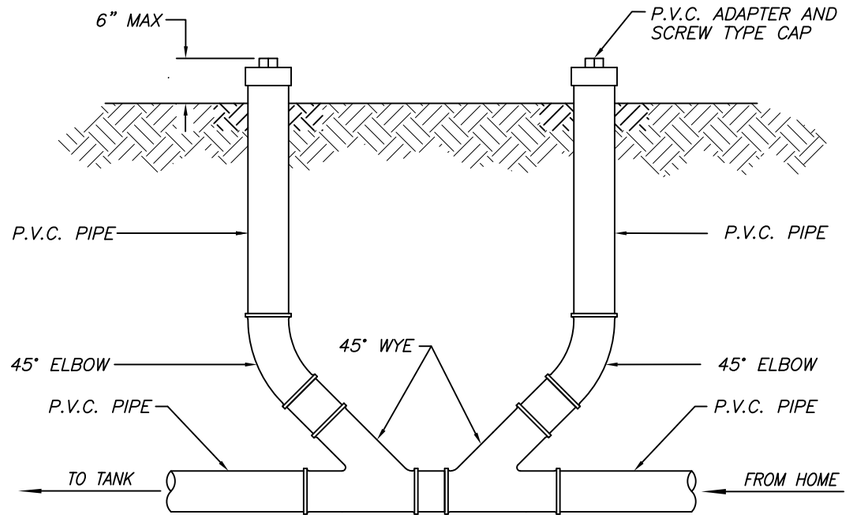
U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES
PUBLIC HEALTH SERVICE
INDIAN HEALTH SERVICE
OFFICE OF ENVIRONMENTAL HEALTH
BEMIDJI AREA OFFICE BEMIDJI, MINNESOTA

TITLE:

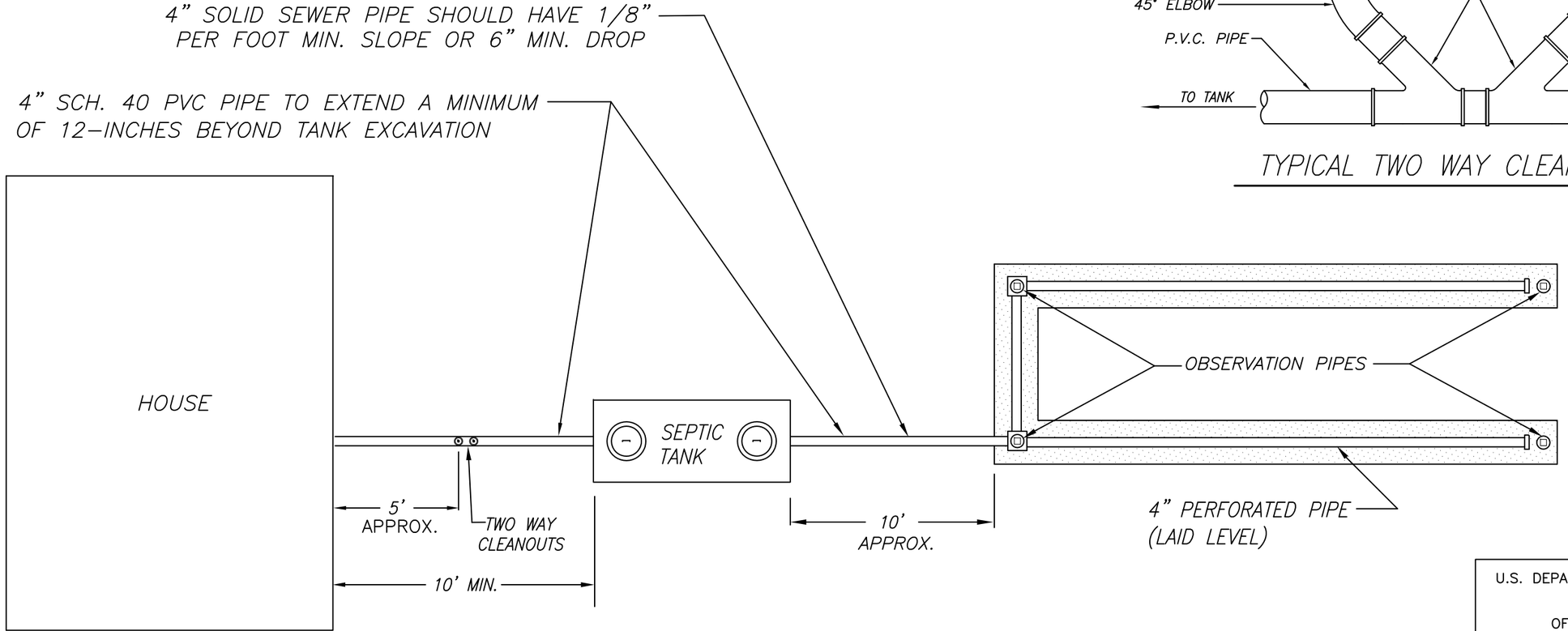
TYPICAL DETAIL 1000 GAL. SEPTIC TANK

FOR SANITARY FACILITIES CONSTRUCTION
UNDER PUBLIC LAW 86–121

DRAWN BY: R.A.M.	CHK'D BY: B.A.R.	DRAWING NO. 02545-D
REV. DATE: 02/16/16	REV. DATE: 02/16/16	1 OF 2



TYPICAL TWO WAY CLEANOUT DETAIL



NOTE: DESIGN OF DRAINFIELD TO BE DETERMINED BY I.H.S. ENGINEER

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PUBLIC HEALTH SERVICE
INDIAN HEALTH SERVICE
OFFICE OF ENVIRONMENTAL HEALTH
BEMIDJI AREA OFFICE BEMIDJI, MINNESOTA

TITLE:

TYPICAL SEPTIC TANK LAYOUT

FOR SANITARY FACILITIES CONSTRUCTION
UNDER PUBLIC LAW 86-121

DRAWN BY: R.A.M.	CHK'D BY: B.A.R.	DRAWING NO. 02545-D
REV. DATE: 02/17/16	REV. DATE: 02/17/16	2 OF 2

SECTION 02920
TOPSOILING, SEEDING, FERTILIZING, AND MULCHING

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes topsoiling, seeding, fertilizing, and mulching areas disturbed by construction activities.

1.02 RELATED WORK (as applicable)

A. Section 02310 – Grading
B. Section 02370 – Temporary Erosion and Sediment Control

1.03 REFERENCES

A. Minnesota Department of Transportation – Seeding Manual 2007 Edition.

1.04 SUBMITTALS

A. Topsoil
B. Seed Mixture and Application Rate Data
C. Mulching Material

PART 2 - PRODUCTS

2.01 TOPSOIL

A. Natural loam, sandy loam, silt loam, silty clay loam, or clay loam humus-bearing soils adapted to the sustenance of plant life.

B. Neither excessively acid nor excessively alkaline.

2.02 FERTILIZER

A. Use a 20-10-10 mixture of 20% Nitrogen, 10% Phosphorous, and 10% Pot Ash.

2.03 SEED MIXTURE

A. Use Minnesota DOT seed mixture #240 or other Engineer accepted seed mixture for well drained sandy soils:

Minnesota DOT Seed Mixture #240

13%	Smooth Brome Grass
27%	Kentucky Bluegrass
13%	Canadian Bluegrass
2.5%	Switch Grass
4.0%	Slender Wheat-grass
7.0%	“Reliant II” Hard Fescue
20%	Perennial Rye-grass
2.5%	Sand Dropseed
3.5%	Little Bluestem
7.0%	Red Clover
0.5%	Purple Prairie Clover

B. Use Minnesota DOT seed mixture #250 or other Engineer accepted seed mixture for average loam, heavy clay or predominately moist soils:

Minnesota DOT Seed Mixture #250

14%	Smooth Brome Grass
29%	Kentucky Bluegrass
14%	Canadian Bluegrass
3.0%	Switch Grass
21%	Perennial Rye-grass
3.0%	Timothy
3.0%	Redtop
6.0%	Creeping Alfalfa
3.0%	White Clover

2.04 MULCHING MATERIAL

A. Straw or hay

PART 3 - EXECUTION

3.01 TOPSOIL

A. After grading is completed, spread stockpiled topsoil over all disturbed areas, excluding those where another type of finished surface is being provided.

3.02 FERTILIZING

A. Work soil to be seeded until soil is reasonably even and loose.

B. Fertilize all topsoiled areas using 20-10-10 fertilizer at an application rate of 400-600 pounds per acre.

3.03 SEEDING

A. Sow seed using either equipment suited to that purpose or scatter seed uniformly over area with hand seeders when the weather is sufficiently quiet to prevent seeds from blowing away. Use an appropriate method and rate as directed by the Mn/DOT Seeding Manual.

B. Lightly rake soil to cover the seed with approximately ¼ inch of soil.

3.04 MULCHING

A. Place hay or straw mulching on seeded area loose enough to allow some sunlight to penetrate and air to circulate but thick enough to shade the ground, conserve soil moisture, and prevent/reduce erosion.

B. Do not perform mulching activities during periods of excessively high winds, which would preclude the proper placing of the mulch.

C. Apply straw or hay uniformly over the disturbed area to a loose depth of ½ to 1½ inches using 1½ to 3 tons of mulch per acre.

D. Immediately after spreading, anchor mulch using a mulch tiller consisting of a series of dull flat discs with notched edges or other approved equipment.

E. Anchor mulch to a depth of approximately 1½ to 2½ inches in the soil.

3.05 QUALITY CONTROL

A. All work necessary for topsoiling, fertilizing, seeding and mulching shall be completed to insure adequate re-establishment of vegetation.

B. The Contractor is responsible for re-establishing vegetation.

END OF SECTION

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