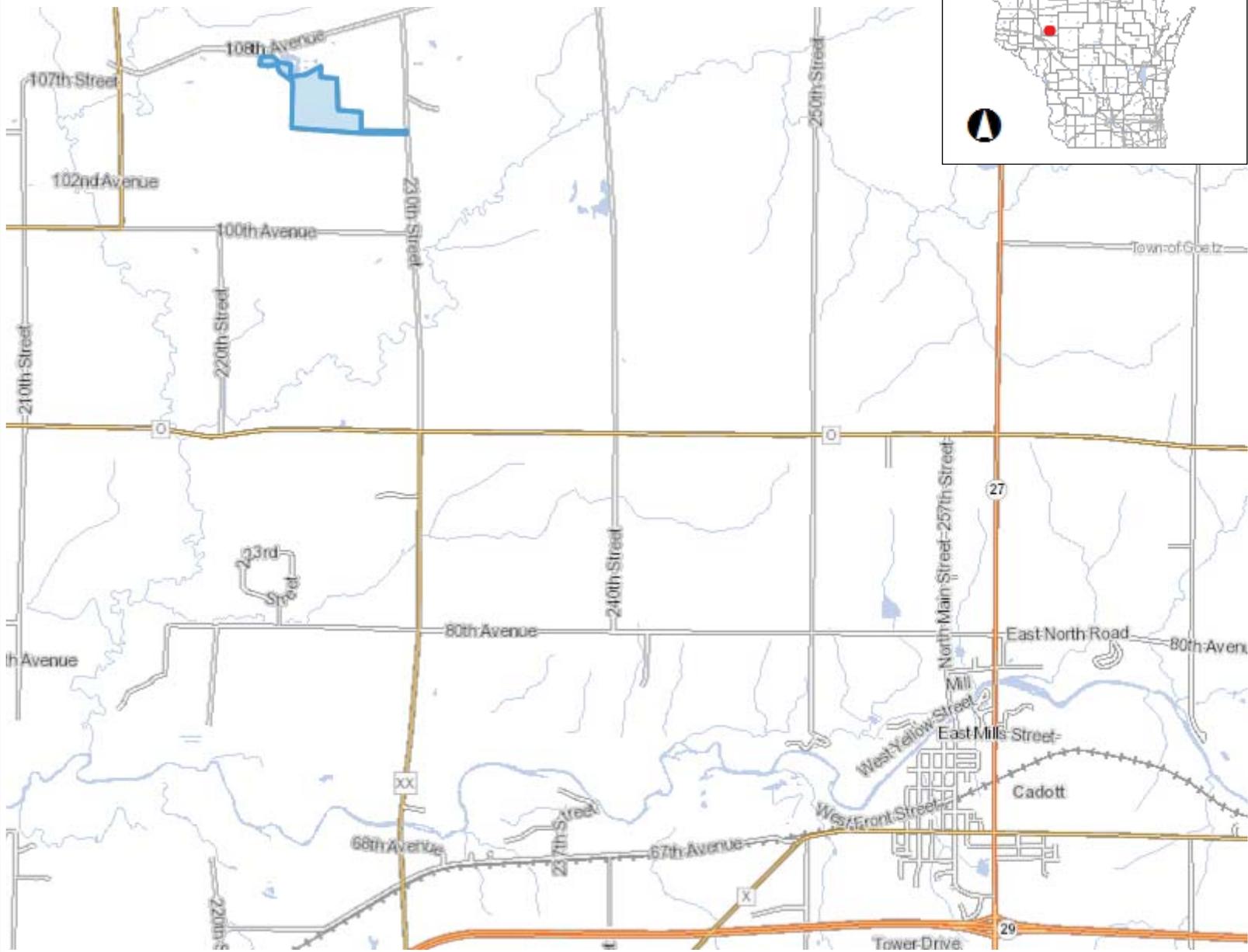




# Moats Location map



- Legend**
- Municipality
  - State Boundaries
  - County Boundaries
  - Major Roads**
  - Interstate Highway
  - State Highway
  - US Highway
  - County and Local Roads**
  - County HWY
  - Local Road
  - Railroads
  - Tribal Lands
  - Rivers and Streams
  - Intermittent Streams
  - Lakes and Open water



NAD\_1983\_HARN\_Wisconsin\_TM

1: 47,520

DISCLAIMER: The information shown on these maps has been obtained from various sources, and are of varying age, reliability and resolution. These maps are not intended to be used for navigation, nor are these maps an authoritative source of information about legal land ownership or public access. No warranty, expressed or implied, is made regarding accuracy, applicability for a particular use, completeness, or legality of the information depicted on this map. For more information, see the DNR Legal Notices web page: <http://dnr.wi.gov/legal/>

## Notes

# Moats pit

# Initial Site Map

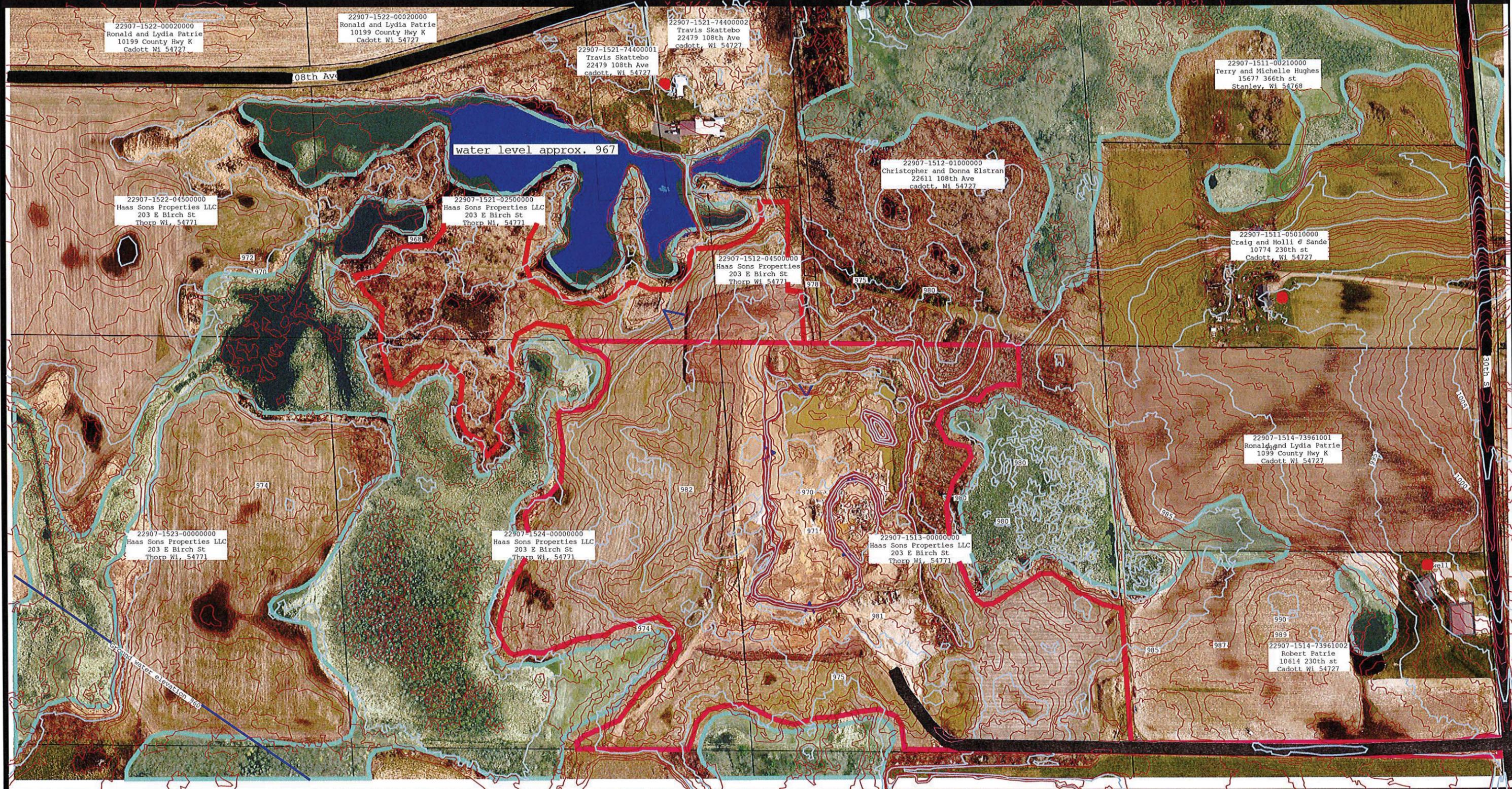


## Legend

- 1' Contours
- 5' Contours
- Wetlands
- Roads
- Expansion area
- Existing Pit area
- > Direction of concentrated flow
- Ground water contours
- Wells

Printed 12/12/2018

Scale = 1:300'



500 ft

Disclaimer: This map is a compilation of records as they appear in the Chippewa County Offices affecting the area shown and is to be used only for reference purposes.

# Moats pit Operations Site Map

## Legend

- 1' Contours
- 5' Contours
- Wetlands
- Roads
- Expansion area
- Existing Pit area
- Topsoil piles
- Silt Fence



Printed 12/12/2018

Scale = 1:300'



Disclaimer: This map is a compilation of records as they appear in the Chippewa County Offices affecting the area shown and is to be used only for reference purposes.

# Moats pit

# Final Site Map

## Legend

- 1' Contours
- 5' Contours
- Wetlands
- Roads
- Expansion area
- Existing Pit area



Printed 12/12/2018

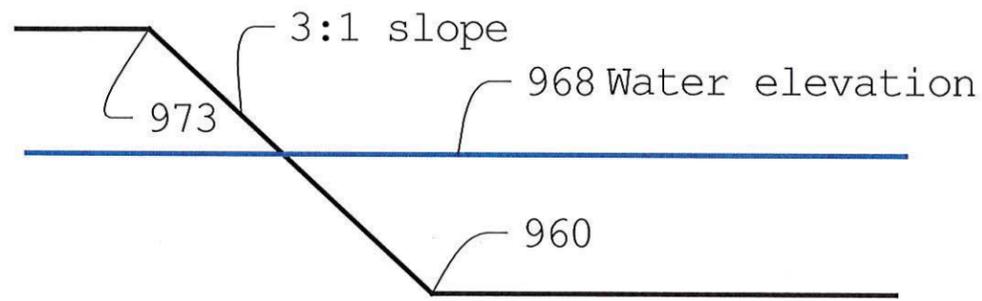
Scale = 1:300'



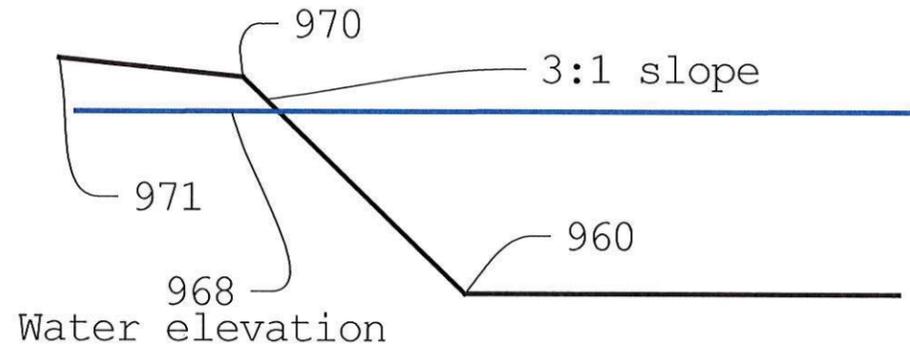
Disclaimer: This map is a compilation of records as they appear in the Chippewa County Offices affecting the area shown and is to be used only for reference purposes.

# Cross Sections

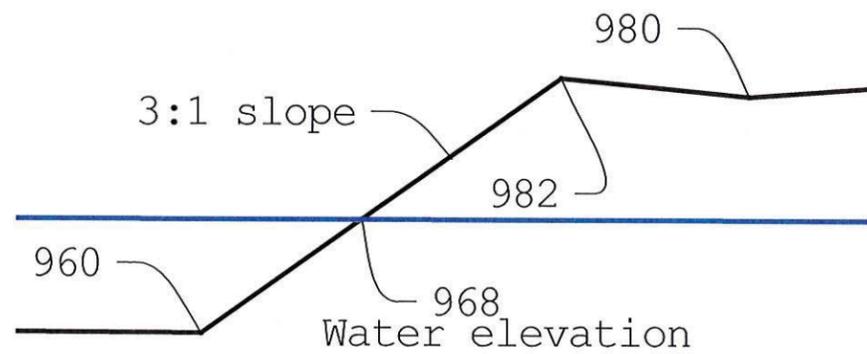
Cross Section A



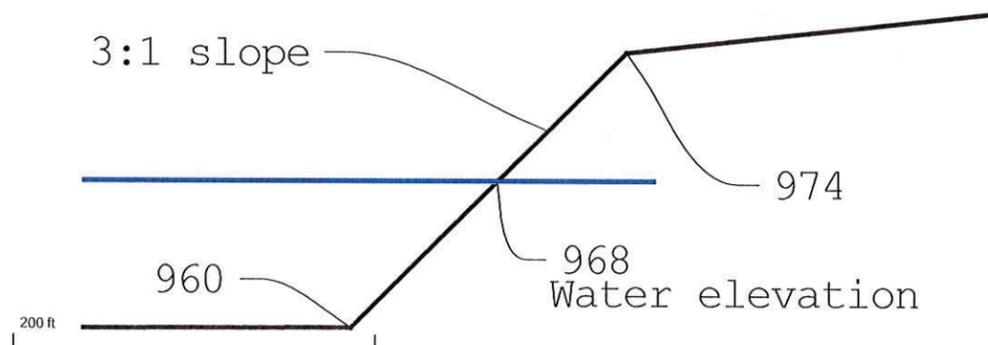
Cross Section B



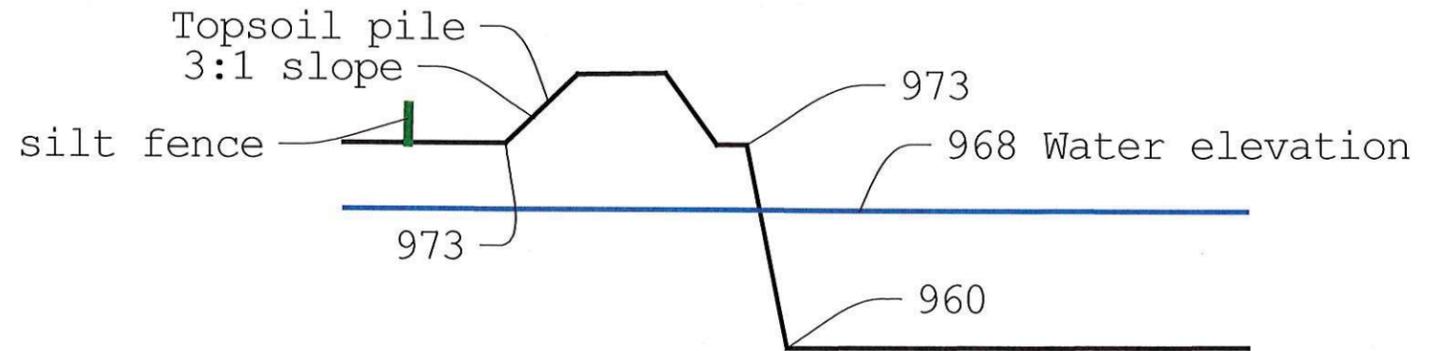
Cross Section C



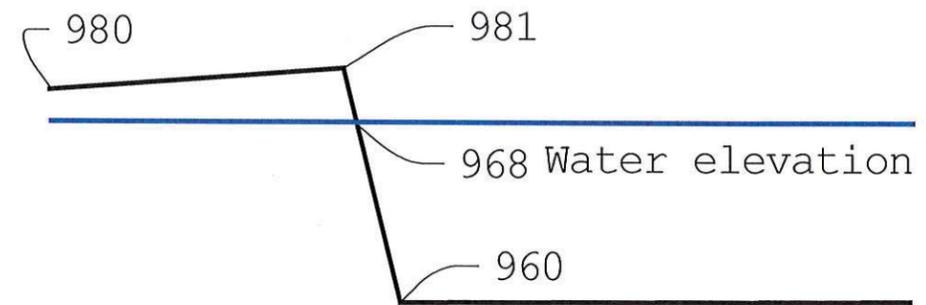
Cross Section D



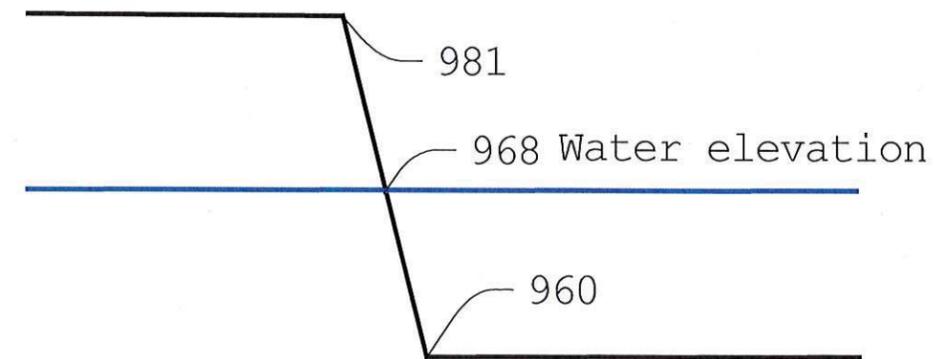
Cross Section AA



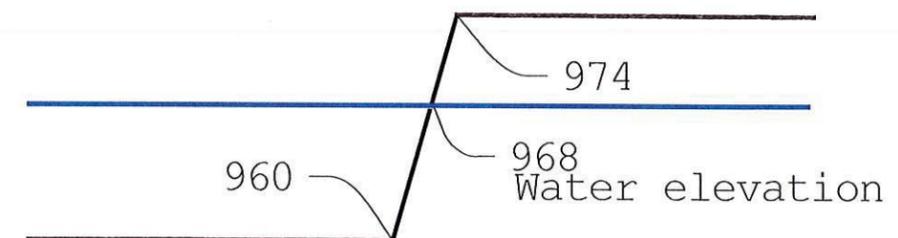
Cross Section BB



Cross Section CC



Cross Section DD

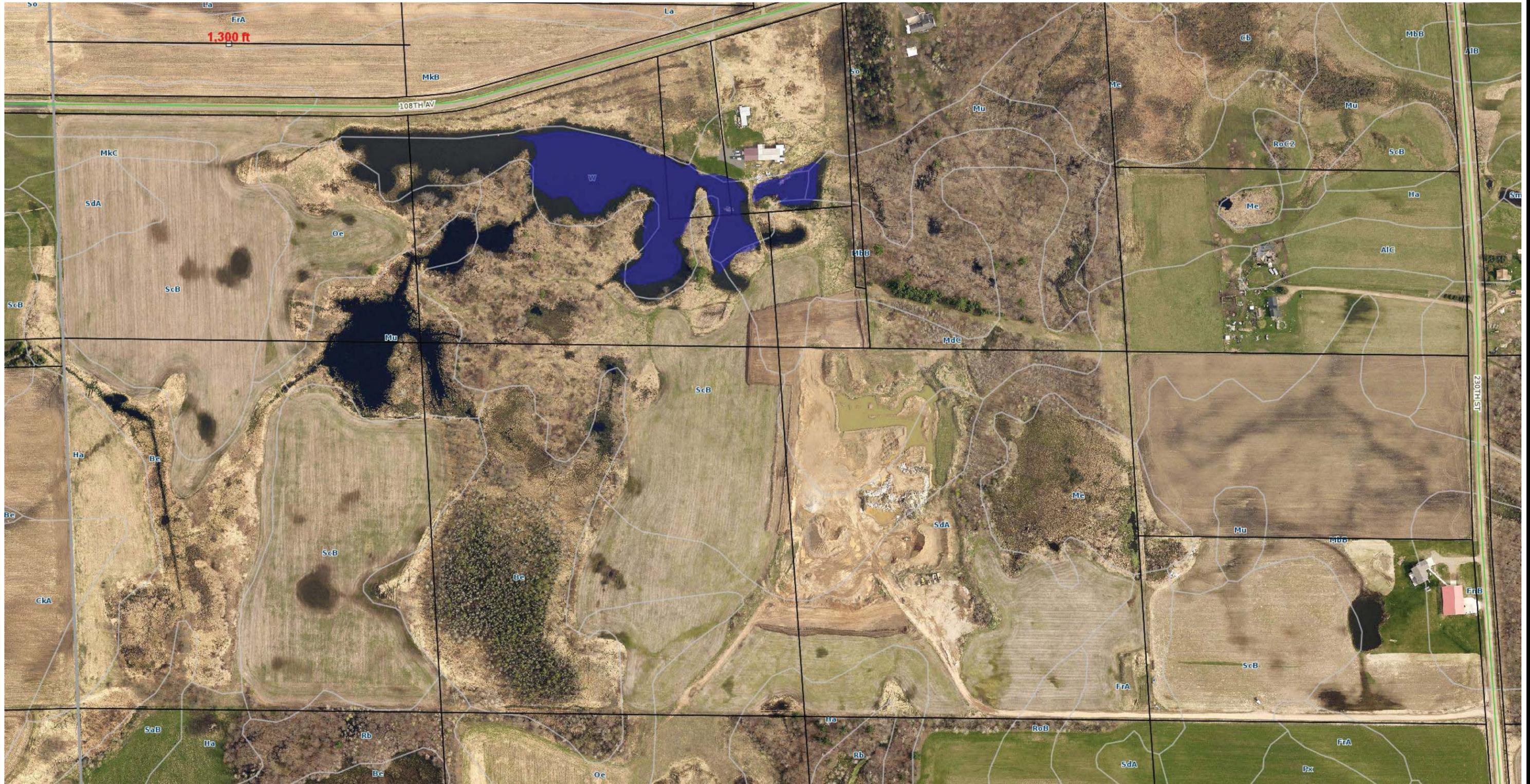


# soils map- Moats pit



Printed 03/18/2019

Scale = 1:334'



Disclaimer: This map is a compilation of records as they appear in the Chippewa County Offices affecting the area shown and is to be used only for reference purposes.

WORKING DRAFT - NON-METALLIC MINE RECLAMATION - POST MINING LAND USE

CATEGORY OF POST MINING LAND USE	SUB-CATEGORY	LAND COVER	DEVELOPMENT DENSITY/INTENSITY	PUBLIC ACCESS/USE
Wildlife Habitat/Conservancy	Terrestrial	Grassland/Prairie	No Residential, Commercial, or Industrial Development	No Public Use -vs- Defined Public Use
	Mixed	Grassland/Prairie/Forest Savannah		
	Aquatic	Wet/Sedge Meadow		
Agricultural	Ag Production	Shallow ponded/Deep Ponded	No Development =Non-Irrigated =Irrigated	No Public Use -vs- Defined Public Use
		Cultivated cropland; Row Crop		
		Cultivated Cropland; Forage Based		
		Pasture		
Forest	Forest Production	Other	No Development	No Public Use -vs- Defined Public Use
		Even aged species		
Residential	Ag/Forest Residential	Mixed aged species	Low Density	Defined Dev. Plan
Commercial	Light		Med. Density	Defined Dev. Plan
		Heavy		
Industrial	Light		High Density	Defined Dev. Plan
		Heavy		
Institutional	Public Inst.		Low Intensity	Defined Dev. Plan
		Private Inst.		
Any other land use category that may currently or potentially apply to the subject mine site, as defined in an approved comprehensive plan or zoning ordinance.				

### MIX 1 - PASTURE

Common Name	Scientific Name	Lb./Ac.*	Price/Lb.	Price
Timothy	<i>Phleum pratense</i>	4	\$ 1.50	\$ 6.00
Tall Fescue	<i>Festuca arundinaceae</i>	5	\$ 1.50	\$ 7.50
Canada Wild Rye	<i>Elymus canadensis</i>	3	\$ 12.00	\$ 36.00
Agricultural Rye	<i>Secale cereale</i>	4.5	\$ 1.00	\$ 9.00
Alfalfa**	<i>Medicago sativa</i>	10	\$ 4.00	\$ 40.00
Alsike Clover**	<i>Trifolium hybridum</i>	4.5	\$ 2.00	\$ 9.00
<b>Total</b>		<b>31 lbs.</b>	<b>Total</b>	<b>\$ 107.50</b>

### MIX 2 - STABILIZATION/WILDLIFE/GRAZING (Mix 3 would be suitable too)

Common Name	Scientific Name	Lb./Ac.*	Price/Lb.	Price
Agricultural Rye	<i>Secale cereale</i>	4	\$ 1.00	\$ 4.00
Timothy	<i>Phleum pratense</i>	2	\$ 1.50	\$ 3.00
Tall Fescue	<i>Festuca arundinaceae</i>	3	\$ 1.50	\$ 4.50
Switchgrass	<i>Panicum virgatum</i>	1	\$ 13.50	\$ 13.50
Big Bluestem	<i>Andropogon gerardi</i>	1	\$ 10.50	\$ 10.50
Canada Wild Rye	<i>Elymus canadensis</i>	3	\$ 12.00	\$ 36.00
Alsike Clover**	<i>Trifolium hybridum</i>	4	\$ 2.00	\$ 8.00
Red Clover**	<i>Trifolium repens</i>	4	\$ 2.00	\$ 8.00
Alfalfa**	<i>Medicago sativa</i>	5	\$ 4.00	\$ 20.00
<b>Total</b>		<b>27 lbs.</b>	<b>Total</b>	<b>\$ 107.50</b>

### MIX 3 - NATIVE MIX FOR WILDLIFE/PASSIVE RECREATION

Common Name	Scientific Name	Unit	Unit/Ac.*	Price/Unit	Price
Big Bluestem	<i>Andropogon gerardi</i>	lb.	1	\$ 10.50	\$ 10.50
Canada Wild Rye	<i>Elymus canadensis</i>	lb.	3	\$ 12.00	\$ 36.00
Switchgrass	<i>Panicum virgatum</i>	lb.	1	\$ 13.50	\$ 13.50
Indiangrass	<i>Sorghastrum nutans</i>	lb.	3	\$ 16.00	\$ 48.00
Purple Prairie Clover**	<i>Dalea purpurea</i>	oz.	2	\$ 4.50	\$ 9.00
Canada Tick Trefoil**	<i>Desmodium canadensis</i>	oz.	5	\$ 20.75	\$ 103.75
New England Aster	<i>Aster novae angliae</i>	oz.	0.2	\$ 48.75	\$ 9.75
Purple Cone Flower	<i>Echinacea purpurea</i>	oz.	4	\$ 4.50	\$ 18.00
Dotted Mint**	<i>Monarda punctata</i>	oz.	4	\$ 51.25	\$ 205.00
Bergamot**	<i>Monarda fistulosa</i>	oz.	5	\$ 25.75	\$ 128.75
Yellow Coneflower	<i>Ratibida pinnata</i>	oz.	3	\$ 4.50	\$ 13.50
Blackeyed Susan	<i>Rudbeckia hirta</i>	oz.	0.5	\$ 3.00	\$ 1.50
Blue Vervain	<i>Verbena hastada</i>	oz.	1	\$ 6.75	\$ 6.75
<b>Total</b>			<b>~9.5 lbs.</b>	<b>Total</b>	<b>\$ 604.00</b>

# MIX 4 - WET SOILS/POND EDGE/WEDLAND AREA

Common Name	Scientific Name	Unit	Unit/Ac.*	Price/Unit	Price
Canada Wild Rye	<i>Elymus canadensis</i>	lb.	3	\$ 12.00	\$ 36.00
Switchgrass	<i>Panicum virgatum</i>	lb.	1	\$ 13.50	\$ 13.50
Timothy	<i>Phleum pratense</i>	lb.	2	\$ 1.50	\$ 3.00
Blue Joint Grass	<i>Calamagrotis canadensis</i>	oz.	3.2	\$ 56.25	\$ 180.00
Annual Oats	<i>Avena sativa</i>	lb.	8	\$ 2.00	\$ 16.00
Alsike Clover**	<i>Trifolium hybridum</i>	lb.	1	\$ 2.00	\$ 2.00
Red Clover**	<i>Trifolium repens</i>	lb.	1	\$ 2.00	\$ 2.00
Culver's Root	<i>Veronicastrum virginicum</i>	oz.	2	\$ 77.00	\$ 154.00
Canada Tick Trefoil**	<i>Desmodium canadensis</i>	oz.	5	\$ 20.75	\$ 103.75
Blackeyed Susan	<i>Rudbeckia hirta</i>	oz.	0.2	\$ 3.00	\$ 0.60
Smooth Aster	<i>Aster laevis</i>	oz.	2	\$ 48.75	\$ 97.50
New England Aster	<i>Aster novae angliae</i>	oz.	0.6	\$ 30.75	\$ 18.45
Joe Pye Weed	<i>Eupatorium maculatum</i>	oz.	1	\$ 36.00	\$ 36.00
		<b>Total</b>	<b>~17 lbs.</b>		<b>Total \$ 662.80</b>

\* Seeding rates assume broadcast seeding and may be multiplied by 0.5 to approximate rates if drilled.

\*\* Denotes legumes, which must be inoculated according to the seed provider's instructions prior to seeding.

Pricing for native species found at Agrecol in 2012.

<http://www.agrecol.com>

## PAL Erosion control Matrices

# CHANNEL EROSION CONTROL MATRIX

(Concentrated Flow Application)

TYPE OF EROSION CONTROL DEVICE	PERMISSIBLE SHEAR (LBS./FT.)	DITCH GRADE												REMARKS
		< 2%		2% - 4%		4% - 6%		6% - 9% *		9% - 12% *				
		Max. Length (ft.)												
Seed with properly anchored mulch	0.6	300	600	1200	300	600	1200	300	600	1200	300	600	1200	Anchor mulch per specifications.
Sod ditch checks with seed and mulch	N/A	300	600	1200	300	600	1200	300	600	1200	300	600	1200	Install one ditch check for every 1 foot of drop. Sod stakes required.
Temporary ditch checks (hay bales or approved manufactured alternatives listed in the WisDOT PAL)	N/A	300	600	1200	300	600	1200	300	600	1200	300	600	1200	Install one ditch check for every 2 feet of drop. Maximum 200' spacing. Not recommended for slopes less than 1%.
Sod ditch liner	1.0	300	600	1200	300	600	1200	300	600	1200	300	600	1200	Upstream end must be buried. Additional sod stakes required.
Double netted light duty (WisDOT Class I Type B) erosion mat	1.5	300	600	1200	300	600	1200	300	600	1200	300	600	1200	Only mat type products allowed.
Sod reinforced with a double netted jute (WisDOT Class II Type A) erosion mat	1.5	300	600	1200	300	600	1200	300	600	1200	300	600	1200	Upstream end must be buried. Additional sod stakes required. Two bid items needed.
Stone or rock ditch checks, or Rock-Filled Filter Bags	N/A	300	600	1200	300	600	1200	300	600	1200	300	600	1200	Use No. 2 coarse aggregate, railroad ballast, or breaker run. Install one ditch check for every 2 feet of drop. Use in conjunction with a channel lining.
Medium duty coconut erosion mat (WisDOT Class II Type B or C)	2.0	300	600	1200	300	600	1200	300	600	1200	300	600	1200	Germination may be a problem with Class III Type A mats. An ECRM is required for initial erosion protection for Class III Type B mats.
Heavy duty synthetic (WisDOT Class III Type A) erosion mat or turf reinforcement mat (WisDOT Class III Type B)	2.0	300	600	1200	300	600	1200	300	600	1200	300	600	1200	An ECRM is required for initial erosion protection. Contact manufacturer if higher shears are needed.
Heavy duty synthetic turf reinforcement (WisDOT Class III Type C) mat	3.5	300	600	1200	300	600	1200	300	600	1200	300	600	1200	Place top of downstream ditch check level with bottom of upstream ditch check. Use in conjunction with a channel lining.
Riprap ditch checks	N/A	300	600	1200	300	600	1200	300	600	1200	300	600	1200	An ECRM is required for initial erosion protection. Contact manufacturer if higher shears are needed.
Heavy duty synthetic turf reinforcement (Class III Type D) mat	5	300	600	1200	300	600	1200	300	600	1200	300	600	1200	Outfalling, overtopping and scour need to be addressed. Use 2' minimum ditch depth.
Light riprap	4	300	600	1200	300	600	1200	300	600	1200	300	600	1200	
Medium riprap	5	300	600	1200	300	600	1200	300	600	1200	300	600	1200	
Heavy riprap	8	300	600	1200	300	600	1200	300	600	1200	300	600	1200	

Riprap measures apply to all ditch types. Use of these measure requires engineering judgement and design.

# CHANNEL EROSION CONTROL MATRIX

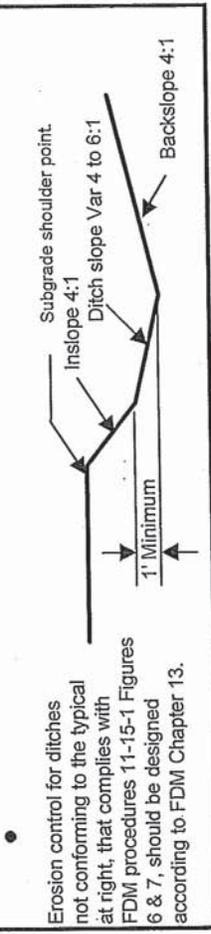
(Concentrated Flow Application)

TYPE OF EROSION CONTROL DEVICE	PERMISSIBLE SHEAR LB/S.F.	DITCH GRADE										REMARKS				
		< 2%		2% - 4%		4% - 6%		6% - 9%*		9% - 12%*						
		Max. Length (ft.)	300	600	1200	300	600	1200	300	600	1200		300	600	1200	
Grouted rip rap	N/A	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	Address outfalling, overtopping and scour. Line with Grotex fabric Type "HR", (see Chap. 10, Const. Detail and special provision). Use 2' minimum ditch depth.
Articulated Concrete Block Type A	5	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	ACBs apply to all ditch types. Use of these measures requires engineering judgement and design.
Articulated Concrete Block Type B	10	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	
Articulated Concrete Block Type C	15	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	
Articulated Concrete Block Type D	20	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	
Articulated Concrete Block Type E	30	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	

**NOTES**

- 1) Ditch flow rates used to develop bar chart are based on a 60 ft. right of way from pavement centerline and a 2-Yr. rainfall event for temporary liners or a 25-Yr. rainfall event for permanent (Class III mat or riprap) liners. If the drainage area extends outside the 60 foot right of way or unusual flows are expected, use the shear stress column values to determine the suitability of a liner. See FDM procedures in Chapter 10 and in Section 13-30-10.
- 2) Erosion mats shall extend upslope 1.0 ft. min. vertically from the ditch bottom or 6" higher than the design flow depth. There shall be no joints within 18" of the low point.
- 3) Cost shall be a consideration in the selection of these devices.
- 4) Add sediment traps at the bottom of channel slopes.
- 5) Refer to FDM Chapter 10 for any channels exceeding the limits shown.
- 6) Approved materials for erosion products are referenced from the Wisconsin Department of Transportation Erosion Control Product Acceptability Lists (PAL), found at the web site: <http://www.dot.wisconsin.gov/business/engrsrv/pal.htm>
- 7) On long or steep channels that require a higher class mat, use the appropriate lower class mat for the first 300 ft to 600 ft of the channel.
- 8) Effective erosion control involves minimizing the amount of time soil is exposed and the selection of a combination of practices, and not reliance on just one practice.

**Standard Ditch Section**



**KEY**

- Effective range of device for Sandy or Clayey Soil: ●●●●●●●●●●
- Device applicable, may not be cost effective: ●●●●●●●●●●
- "C" effective for clayey soil only: ●●●●●●●●●●
- Not applicable. Use in conjunction with other BMPs: (X) (X) (X)
- ECRM - Erosion control revegetation mat. All Class I and II mats are ECRMs.
- TRM - Turf reinforcement mat.
- FDM - WisDOT Facilities Development Manual
- BMP - Best Management Practice
- PAL - See Note 6

\* For ditch grades over 9% special design considerations may be required.  
 \*\* Soils that are not sandy should be treated as clay soils.

Figure 1



# SLOPE EROSION CONTROL MATRIX

Benches	Consider benches when cuts exceed 20', bench at approximately 15' vertical intervals to collect and drain water. Treat benches as channels (ditches). Adjust elevations to provide drainage. Consider flumes at transitions.
Intercepting embankments	Used to intercept runoff from abutting lands. Flumes may be necessary to direct runoff.
Silt fence	Used at toe of slopes to intercept and detain small amounts of sediment. Use only WisDOT approved silt fence as listed in the PAL.
Temporary ditch checks or Erosion bales	Used at toe of slopes to intercept and detain small amounts of sediment.
Slope drains/flumes	May be necessary on slopes (see channel matrix for design guidance).
Sediment traps	Used to trap sediment laden runoff. Could be used at the inlet or outlet end of slope drain.
KEY:	<p>Not applicable. Use in conjunction with other BMPs: </p> <p>Effective range of device for Sandy or Clayey Soil: </p> <p>Device applicable, may not be cost effective: </p> <p>* Soils that are not sandy should be treated as clay soils.</p> <p>ECRM - Erosion control revegetation mat. All Class I and II mats are ECRMs.</p> <p>TRM - Turf reinforcement mat.</p> <p>FDM - WisDOT Facilities Development Manual</p> <p>PAL - See Note 5</p>
NOTES	<ol style="list-style-type: none"> <li>1) Cost shall be a consideration in the selection of these devices.</li> <li>2) Designers should review FDM Chapter 10 prior to selection of erosion mats.</li> <li>3) Install intercepting ditches to limit slope lengths to 15' vertical intervals. (See FDM Chapter 10)</li> <li>4) Refer to FDM Chapter 10 for any slopes exceeding the limits shown.</li> <li>5) Approved materials for erosion products are referenced from the Wisconsin Department of Transportation Erosion Control Product Acceptability Lists (PAL), found at the web site: <a href="http://www.dot.wisconsin.gov/business/engserv/pal.htm">http://www.dot.wisconsin.gov/business/engserv/pal.htm</a></li> <li>6) On steeper slopes that require a higher class mat, use the appropriate lower class mat or seed and mulch for the first 30 ft to 60 ft of the slope.</li> <li>7) Unless project conditions require otherwise, seed and mulch all slopes that are flatter than a 5% grade, regardless of length. If practicable, bench the slopes.</li> <li>8) Effective erosion control involves minimizing the amount of time soil is exposed and the selection of a combination of practices, and not reliance on just one practice.</li> </ol>