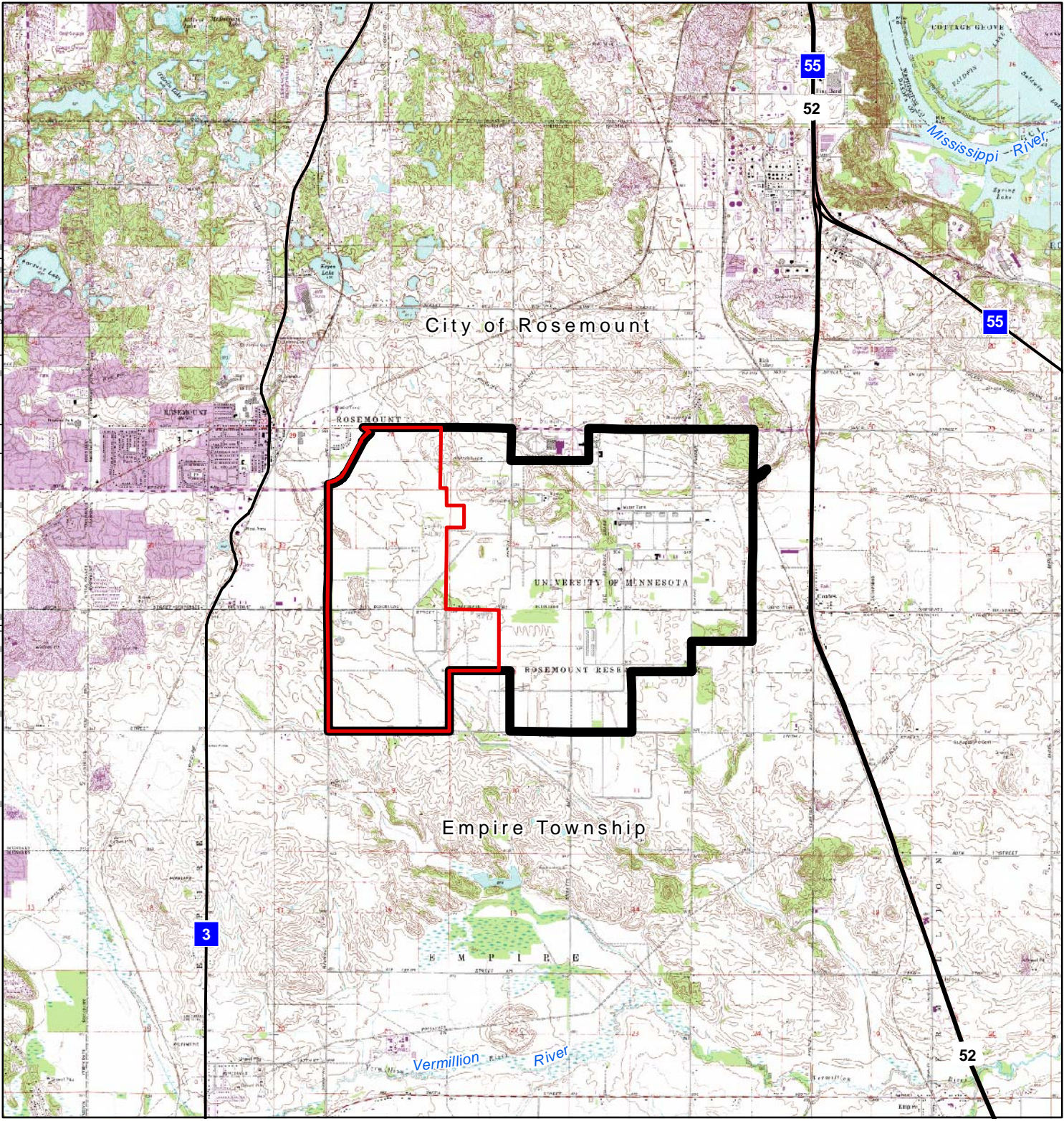




Figures



-  UMore Mining Area (UMA)
-  UMore Park Boundary

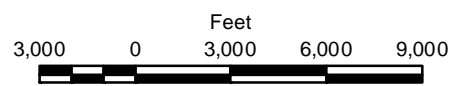
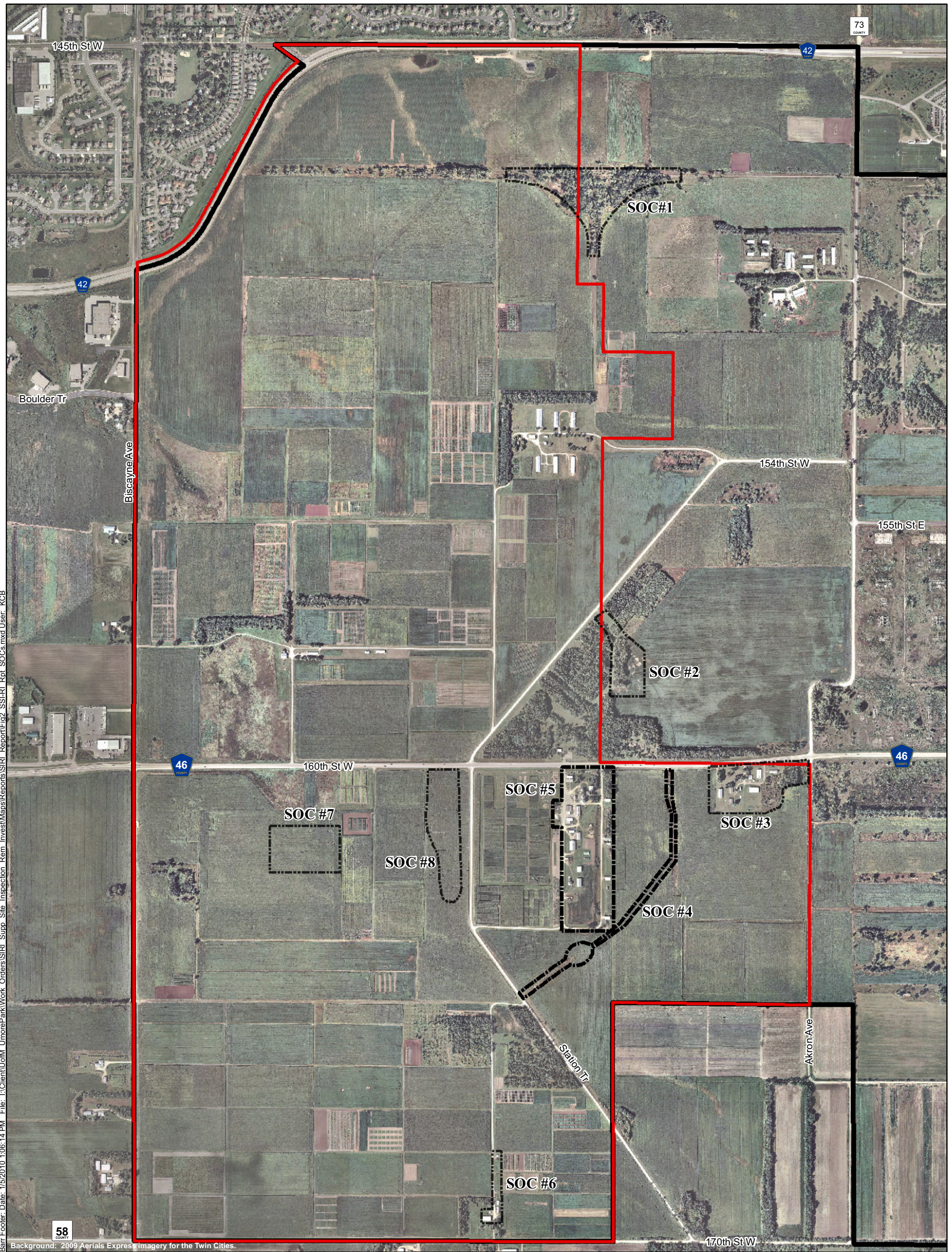


Figure 1

SITE LOCATION

SSIRI Report
UMore Mining Area
Dakota County, MN





- UMore Mining Area (UMA) Boundary
- UMore Park Boundary
- Site of Concern (SOC) Boundary

- SOC1 Former Railroad "Y"
- SOC2 Forestry Research/Former GOW Storage
- SOC3 Ag. Engineering/K Street Dump
- SOC4 Former DNT Platform and Drainage Ditch
- SOC5 Central Services/Former DNT Bunkers (AOC 5)
- SOC6 Southern Complex Storage Buildings and Wash Pads
- SOC7 Susp. Disposal Area
- SOC8 Undet. Use Area

Source: Dakota County, Barr, James R. Hill, HKGi.

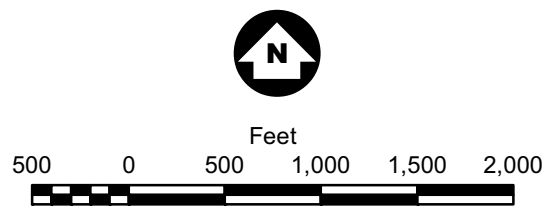
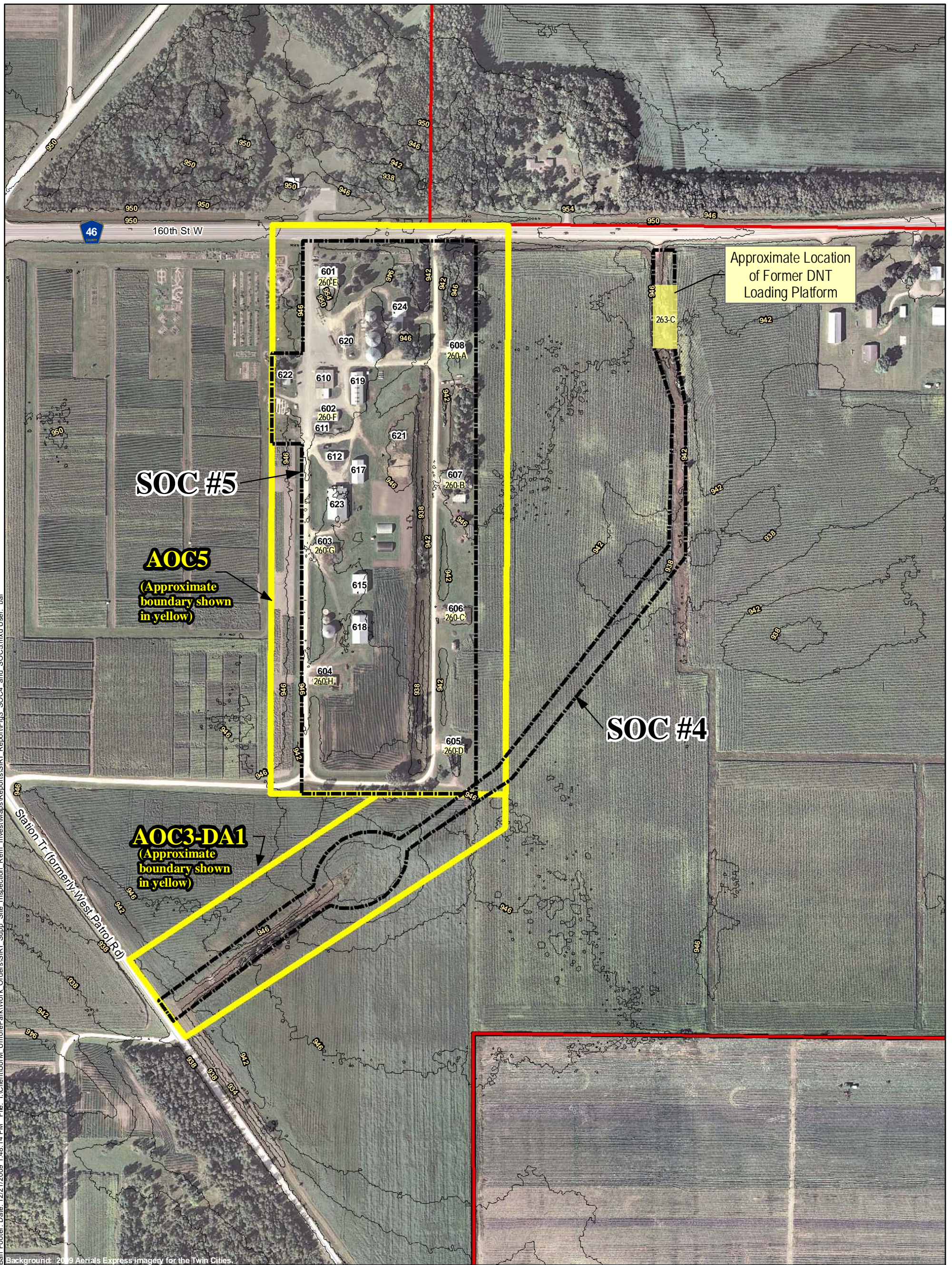


Figure 2

SOC LOCATIONS

SSI/RI Report
 Sites of Concern 4 and 5
 UMore Mining Area
 Dakota County, MN





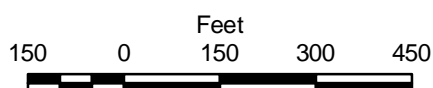
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Figure 3

SOC 4 AND SOC 5

SSI/RI Report
 Sites of Concern 4 and 5
 Umore Mining Area
 Dakota County, MN

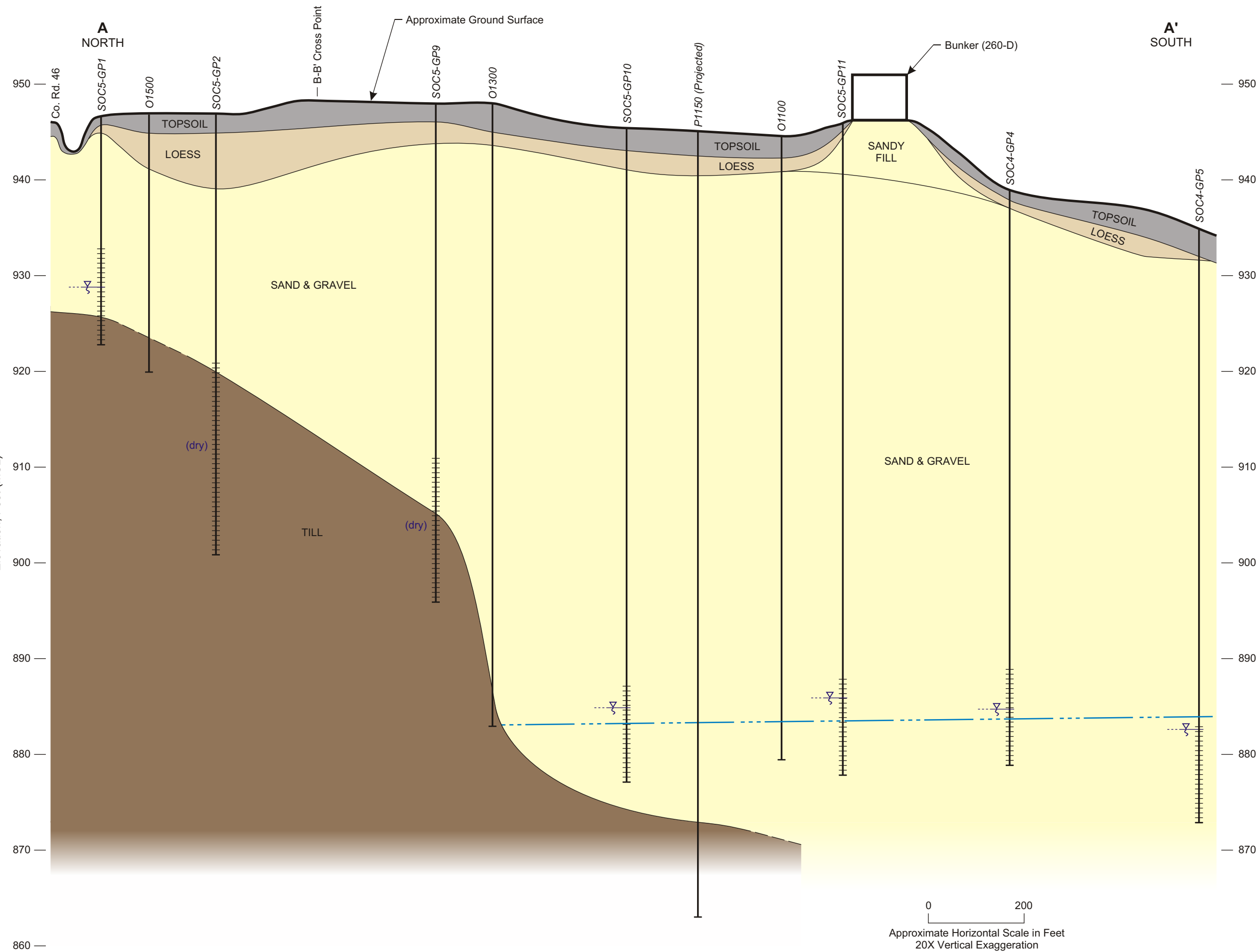
- Cross Section Location
- Umore Park Boundary
- Umore Mining Area (UMA)
- Site of Concern (SOC) Boundary
- USACE AOC Boundaries (based on Baywest 2008)
- Ground Surface Contour (4-foot interval) ft, msl
- 260-H GOW-Era Building Number
- 604 University Building Number



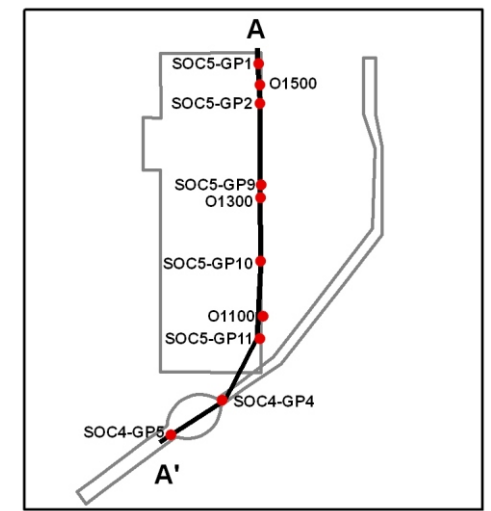
Source: Dakota County, Barr, SEH, HKGi, Bay West (2008).



P:\Mpls23\MN19\2319B05\WorkFiles\Phase II Investigation\WO#1 and #6\Figures_Graphics\SOC Cross Section A-A'_2.CDR RLG 01-12-10



SOC 4&5 Cross Section A-A' Location Map



Legend

- Approximate Ground Surface
- Boring and Temporary Well Screen Interval
- Approximate Water Table in Outwash. Based on 07/01/09 Data
- Approximate Water Level in Temporary Monitoring Wells

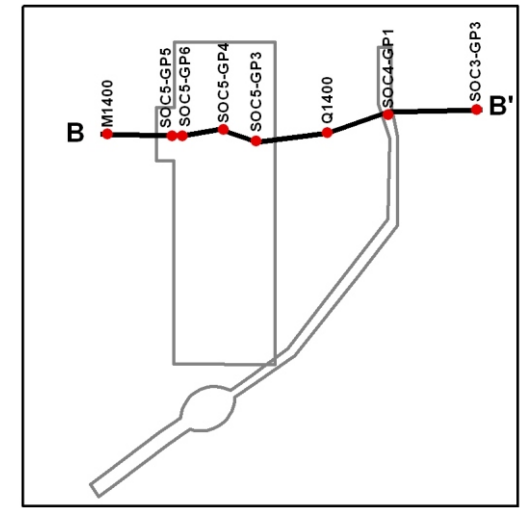
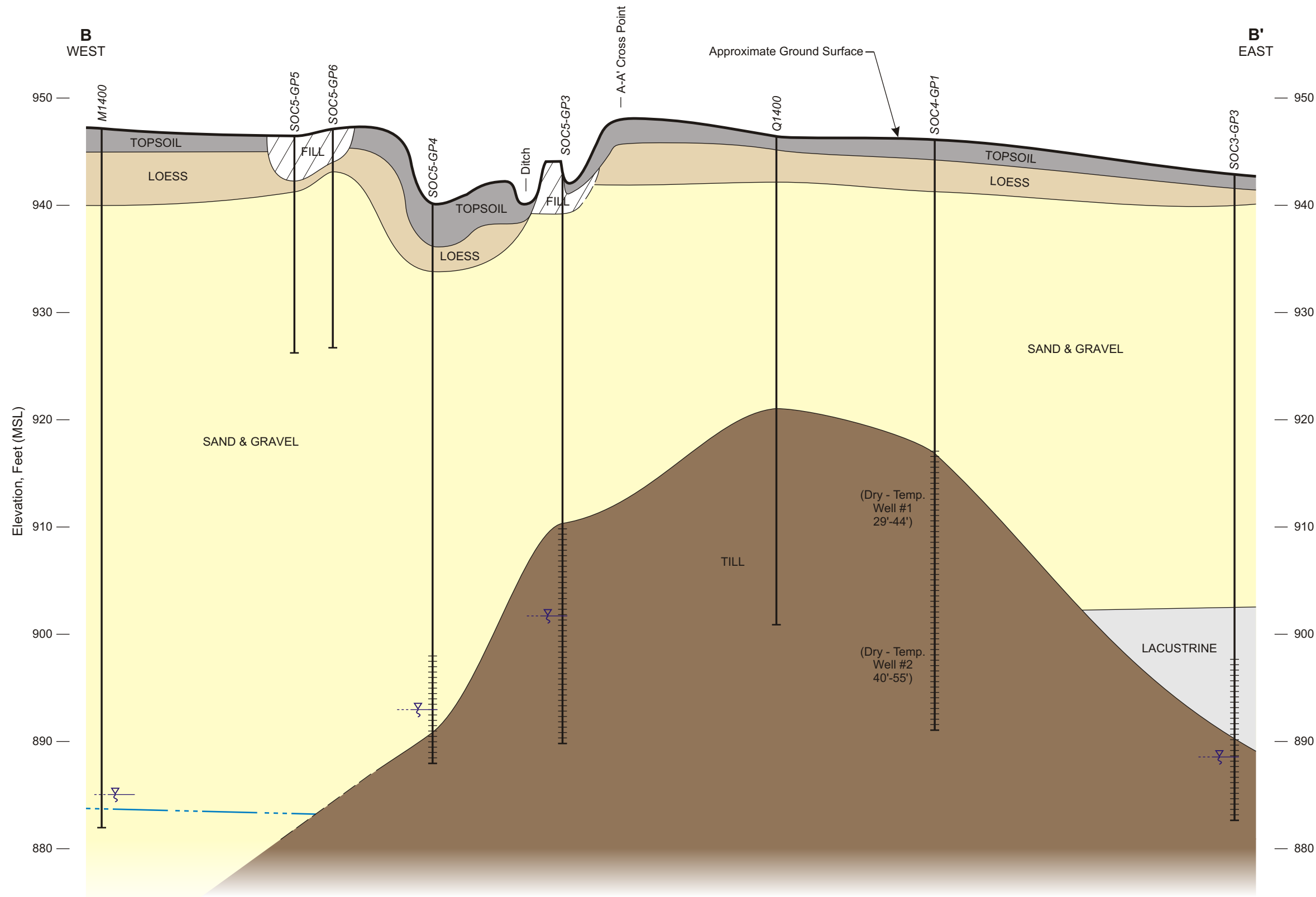
Notes

1. Geology for O-series borings from ProSource, 2008
2. Water samples collected from temporary wells on 9/2/09, 9/8/09, and 9/16/09
3. Groundwater elevation in temporary wells do not represent static water level elevations.

- Topsoil and Organic Silt
- Loess - Silt
- Sand & Gravel
- Glacial Till Diamicton

Figure 4

CROSS SECTION A-A'
SSI/RI Report
SOCs 4 and 5
UMore Mining Area
Dakota County, Minnesota



Legend

- Approximate Ground Surface
- Boring and Temporary Well Screen Interval
- Approximate Water Table in Outwash. Based on 07/01/09 Data
- Approximate Water Level in Temporary Monitoring Wells
- Topsoil and Organic Silt
- Loess - Silt
- Sand & Gravel
- Glacial Till Diamicton
- Lacustrine - Silt/Clay

Notes

1. Geology for O-series borings from ProSource, 2008
2. Water samples collected from temporary wells on 9/2/09, 9/8/09, and 9/16/09
3. Groundwater elevation in temporary wells do not represent static water level elevations.

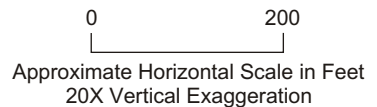
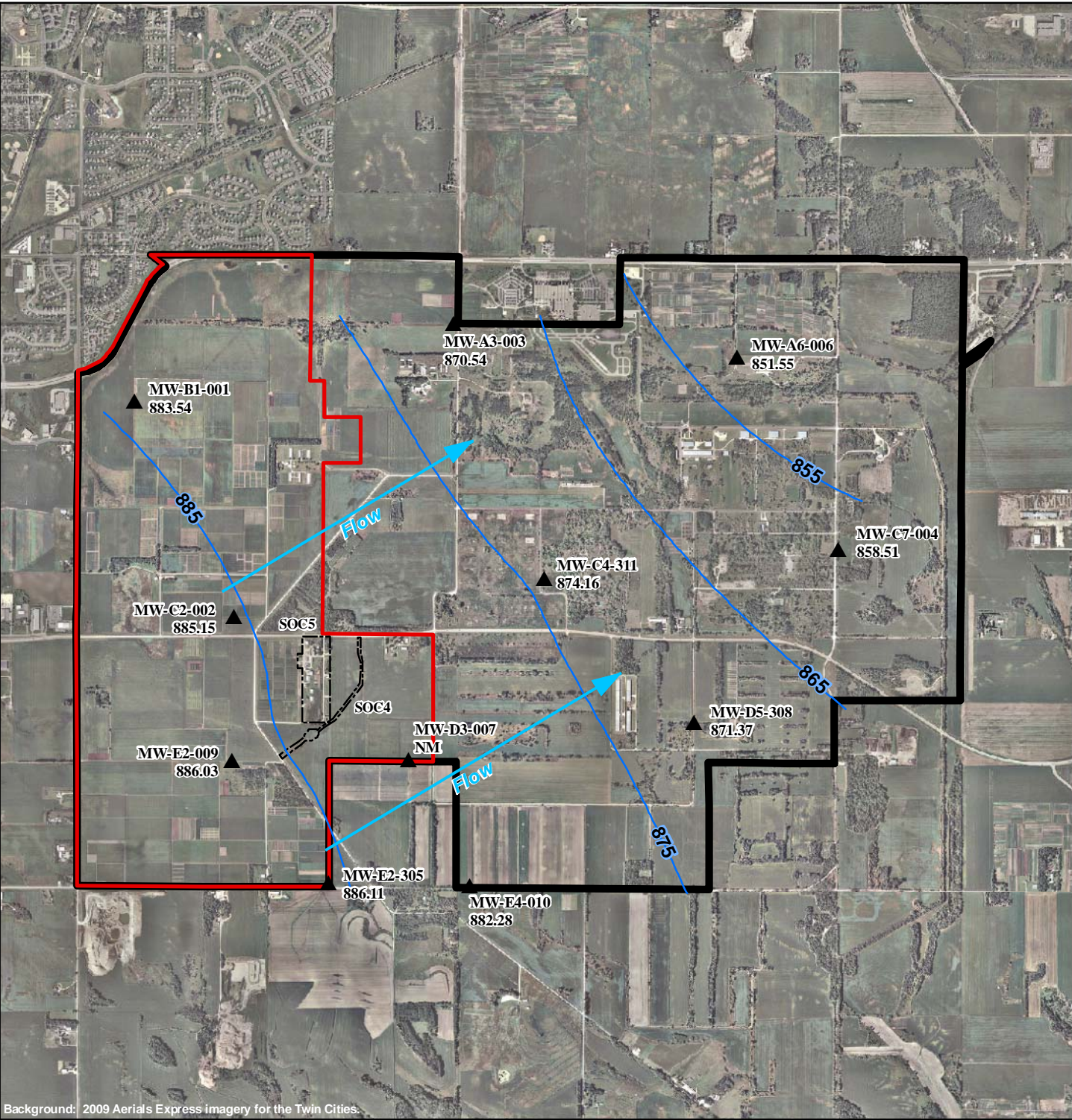


Figure 5
CROSS SECTION B-B'
SSI/RI Report
SOCs 4 and 5
UMore Mining Area
Dakota County, Minnesota

<u>Formation Name and Graphic</u>	<u>Description</u>	<u>Site Nomenclature</u>	<u>Hydrogeologic Role</u>
Unconsolidated Glacial Deposits	Unconsolidated sand and gravel containing fine grained diamicton and lacustrine deposits.	Outwash (sand & gravel deposit)	Surficial Aquifer
		Diamicton or Till	Leaky Confining Unit
		Lacustrine - Lake bed silts & clays	Leaky Confining Unit
St. Peter	Fine to medium grained sandstone (Not present in SOCs 4 and 5)	St. Peter Formation Sandstone	Aquifer (where saturated)
Shakopee and Oneota	Thin to medium-bedded crystalline dolomite	Prairie Du Chien Group	Aquifer
Jordan	Fine to coarse sandstone	Jordan Formation Sandstone	Aquifer
St. Lawrence	Dolomitic shale and siltstone	St. Lawrence Formation	Regional Confining Unit

Figure 6

GENERALIZED STRATIGRAPHIC COLUMN
 SSI/RI Report
 SOCs 4 and 5
 UMore Mining Area
 Dakota County, Minnesota



- 874.67 Groundwater Elevation ft, msl
July 1, 2009
- ▲ Monitoring Wells
- ~ Groundwater Elevation Contour
- Site of Concern (SOC) Boundary
- ▭ UMore Mining Area (UMA)
- ▭ UMore Park Boundary

Source: Metropolitan Council, MnDOT, Dakota County, Barr, ProSource, James R. Hill, HKGI.

Water levels used for this map are from wells completed in the uppermost saturated unit and within 25 feet of the water table. Well MW-C4-311 completed in St. Peter Sandstone confined by glacial till.

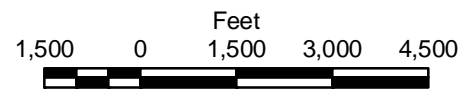
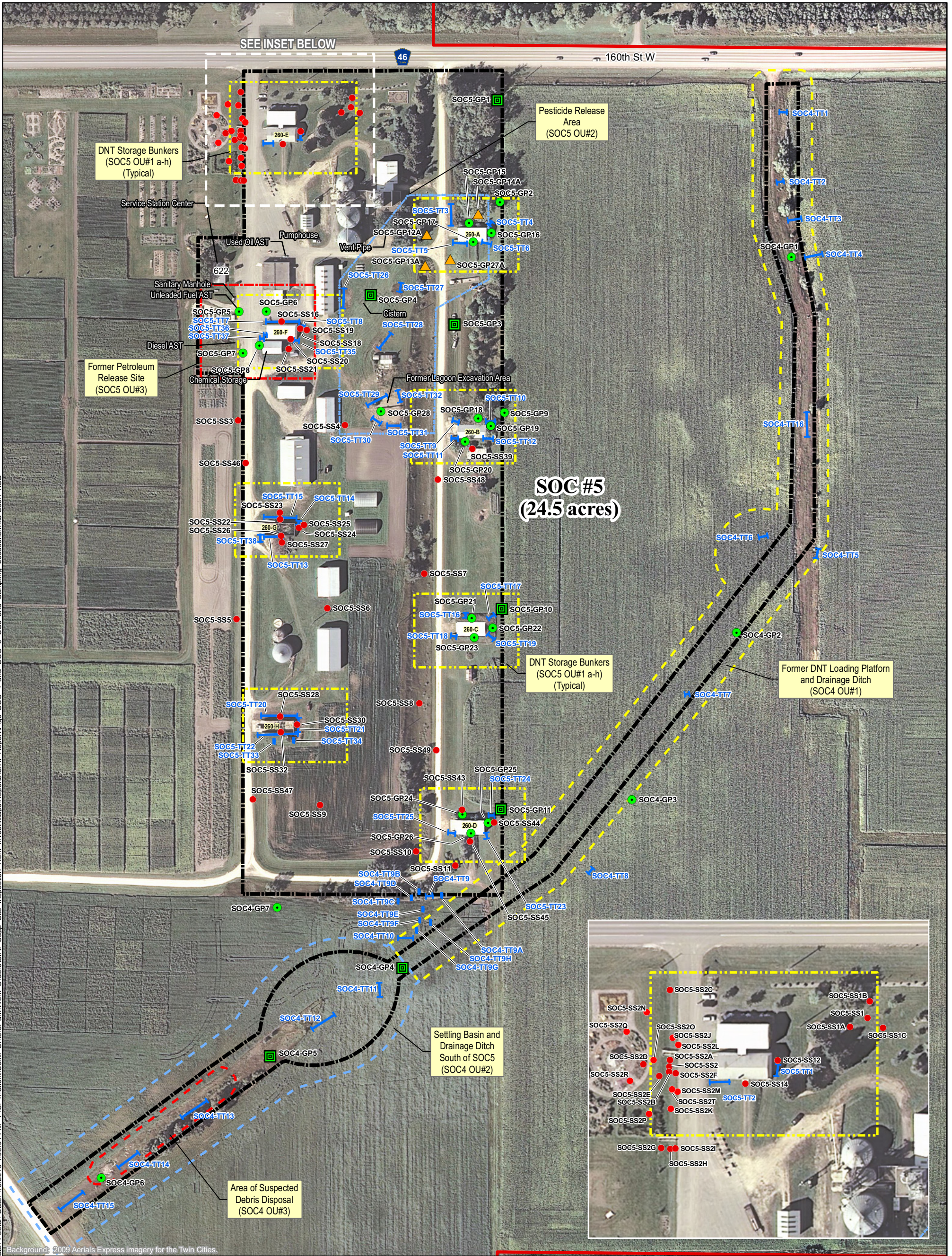


Figure 7
GROUNDWATER FLOW MAP
(UPPERMOST SATURATED UNIT)

SSI/RI Report
Sites of Concern 4 and 5
UMore Mining Area
Dakota County, MN





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- ▲ Direct Push Boring for Ag. Chem. Soil Sampling
 - Direct Push Boring for Soil Sampling
 - Direct Push Boring for Soil and/or Groundwater Sampling
 - Surface Soil Sample
 - Test Trench
 - ▭ UMore Mining Area (UMA)
 - ▭ Site of Concern (SOC) Boundary
 - ▭ OU1 Operable Unit Boundary
 - ▭ OU2 Operable Unit Boundary
 - ▭ OU3 Operable Unit Boundary
- Notes:
1. Based on field observation, test trenches may consist of discontinuous test pits excavated throughout the planned trench limits.
 2. Sample locations are approximate and may vary depending on site conditions.
- Source: Dakota County, Barr, SEH, HKGi, Bay West (2008).

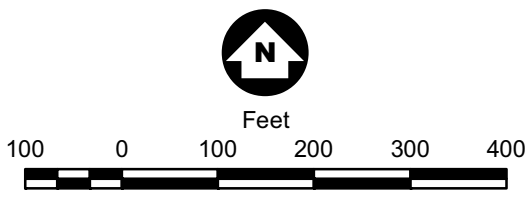


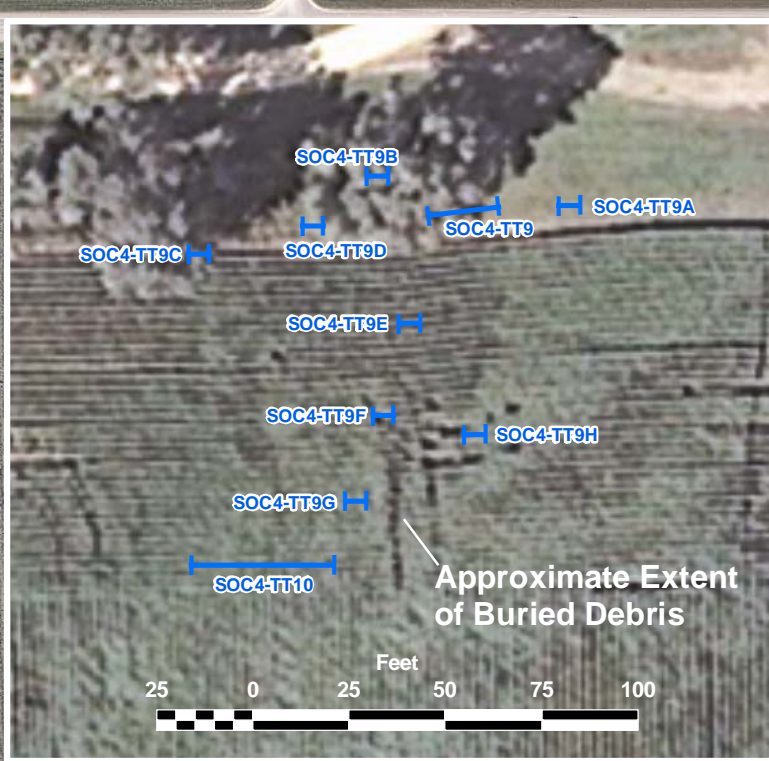
Figure 8

SOC 4 AND SOC 5 OPERABLE UNITS AND SAMPLING LOCATIONS

SSI/RI Report
 Sites of Concern 4 and 5
 UMore Mining Area
 Dakota County, MN



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AOC3-DA1-GP1 (0-0.5)					
Parameters	Sample Analyzed	Non-Detect	Results		Parameter & Concentration >Regulatory Criteria
			Detected < Regulatory Criteria	Detected > Regulatory Criteria	
Nitrocellulose	X		X		NC = 8.2 mg/kg
DNT	X	X			
DPA	X	X			

AOC3-DA1-GP1 (2-4)					
Parameters	Sample Analyzed	Non-Detect	Results		Parameter & Concentration >Regulatory Criteria
			Detected < Regulatory Criteria	Detected > Regulatory Criteria	
Nitrocellulose	X		X		NC = 1.2 mg/kg
DNT	X	X			
DPA	X	X			

AOC3-DA1-GP1 (8-10)					
Parameters	Sample Analyzed	Non-Detect	Results		Parameter & Concentration >Regulatory Criteria
			Detected < Regulatory Criteria	Detected > Regulatory Criteria	
Nitrocellulose	X	X			
DNT	X	X			
DPA	X	X			

SOC4-TT12 (0.5)					
Parameters	Sample Analyzed	Non-Detect	Results		Parameter & Concentration >Regulatory Criteria
			Detected < Regulatory Criteria	Detected > Regulatory Criteria	
SVOCs	X	X			
Metals	X		X		
Nitrocellulose	X	X			
PCBs	X	X			
Pesticides	X	X			

SOC4-GP6 (1-2)					
Parameters	Sample Analyzed	Non-Detect	Results		Parameter & Concentration >Regulatory Criteria
			Detected < Regulatory Criteria	Detected > Regulatory Criteria	
SVOCs	X	X			
Metals	X		X		
Nitrocellulose	X	X			

SOC4-GP5 (1-3)					
Parameters	Sample Analyzed	Non-Detect	Results		Parameter & Concentration >Regulatory Criteria
			Detected < Regulatory Criteria	Detected > Regulatory Criteria	
SVOCs	X	X			
Metals	X		X		
Nitrocellulose	X	X			

SOC4-GP7 (1-2)					
Parameters	Sample Analyzed	Non-Detect	Results		Parameter & Concentration >Regulatory Criteria
			Detected < Regulatory Criteria	Detected > Regulatory Criteria	
SVOCs	X	X			
Nitrocellulose	X	X			

SOC4-GP1 (0.5-2)					
Parameters	Sample Analyzed	Non-Detect	Results		Parameter & Concentration >Regulatory Criteria
			Detected < Regulatory Criteria	Detected > Regulatory Criteria	
SVOCs	X	X			
Metals	X		X		
Nitrocellulose	X	X			

SOC4-TT6 (0.5)					
Parameters	Sample Analyzed	Non-Detect	Results		Parameter & Concentration >Regulatory Criteria
			Detected < Regulatory Criteria	Detected > Regulatory Criteria	
SVOCs	X	X			
Metals	X		X		
Nitrocellulose	X	X			
Pesticides	X	X			

SOC4-GP2 (1-3)					
Parameters	Sample Analyzed	Non-Detect	Results		Parameter & Concentration >Regulatory Criteria
			Detected < Regulatory Criteria	Detected > Regulatory Criteria	
SVOCs	X	X			
Nitrocellulose	X	X			

SOC4-GP3 (1-3)					
Parameters	Sample Analyzed	Non-Detect	Results		Parameter & Concentration >Regulatory Criteria
			Detected < Regulatory Criteria	Detected > Regulatory Criteria	
SVOCs	X	X			
Nitrocellulose	X	X			

SOC4-TT9 (6)					
Parameters	Sample Analyzed	Non-Detect	Results		Parameter & Concentration >Regulatory Criteria
			Detected < Regulatory Criteria	Detected > Regulatory Criteria	
SVOCs	X	X			
Metals	X		X		
Nitrocellulose	X	X			
Pesticides	X	X			

SOC4-GP4 (1-2)					
Parameters	Sample Analyzed	Non-Detect	Results		Parameter & Concentration >Regulatory Criteria
			Detected < Regulatory Criteria	Detected > Regulatory Criteria	
SVOCs	X	X			
VOCs	X	X			
Metals	X		X		
Nitrocellulose	X	X			
Pesticides	X	X			

AOC3-DA1-SS1 (0-0.5)					
Parameters	Sample Analyzed	Non-Detect	Results		Parameter & Concentration >Regulatory Criteria
			Detected < Regulatory Criteria	Detected > Regulatory Criteria	
Nitrocellulose	X		X		NC = 1.0 mg/kg
DNT	X	X			
DPA	X	X			

- Direct Push Boring for Soil Sampling
- Direct Push Boring for Soil and/or Groundwater Sampling
- Test Trench
- USACE Surface Soil Sample (Approximate Location from Bay West, June 2008)
- USACE Geoprobe (Approximate Location from Bay West, 2009)
- Site of Concern (SOC) Boundary
- UMore Mining Area (UMA)

Source: Dakota County, Barr, James R. Hill, HKGI, ProSource.

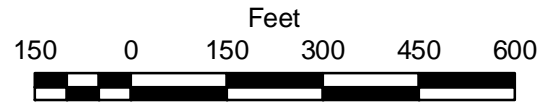
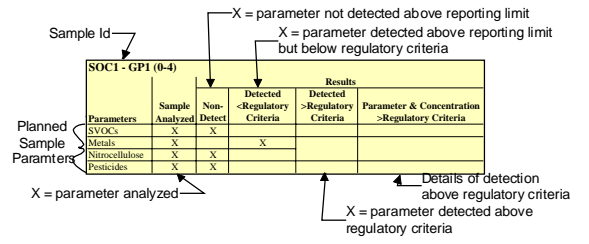
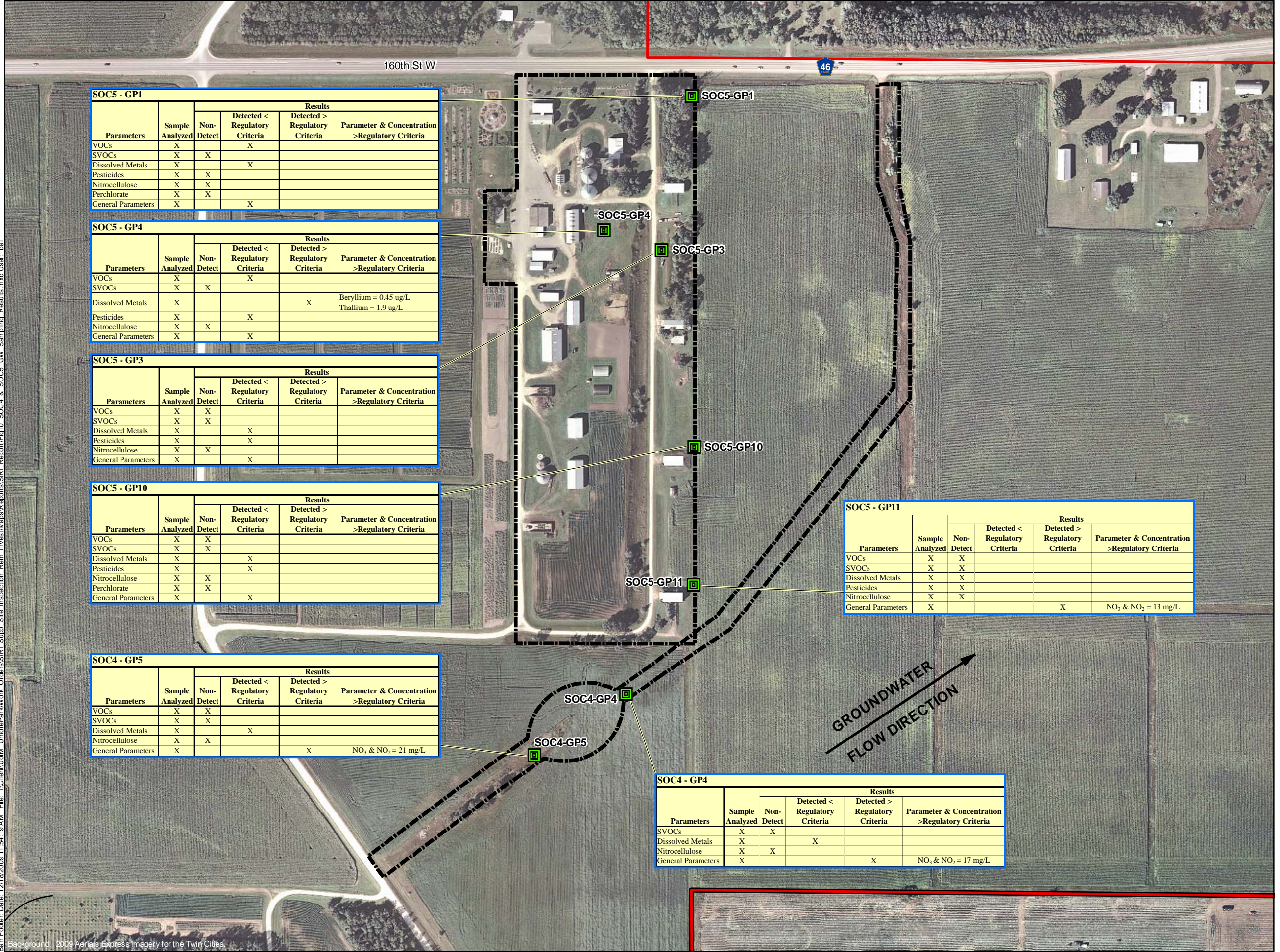


Figure 9
SOC 4 SOIL SAMPLING RESULTS

SSI/RI Report
Sites of Concern 4 and 5
UMore Mining Area
Dakota County, MN

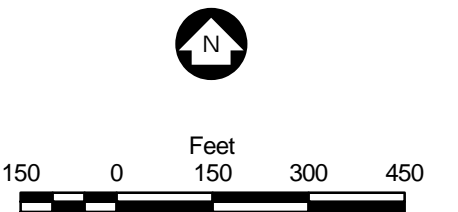


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- Direct Push Boring For Soil and/or Groundwater Sampling
- UMore Mining Area (UMA)
- Site of Concern (SOC) Boundary
- UMore Park Boundary

Source: Metropolitan Council, MnDOT, Dakota County, Barr, ProSource, James R. Hill, HKGI.



SOC5 - GP1					
Parameters	Sample Analyzed	Non-Detect	Results		
			Detected < Regulatory Criteria	Detected > Regulatory Criteria	Parameter & Concentration >Regulatory Criteria
VOCs	X		X		
SVOCs	X	X			
Dissolved Metals	X		X		
Pesticides	X	X			
Nitrocellulose	X	X			
Perchlorate	X	X			
General Parameters	X		X		

SOC5 - GP4					
Parameters	Sample Analyzed	Non-Detect	Results		
			Detected < Regulatory Criteria	Detected > Regulatory Criteria	Parameter & Concentration >Regulatory Criteria
VOCs	X		X		
SVOCs	X	X			
Dissolved Metals	X			X	Beryllium = 0.45 ug/L Thallium = 1.9 ug/L
Pesticides	X		X		
Nitrocellulose	X	X			
General Parameters	X		X		

SOC5 - GP3					
Parameters	Sample Analyzed	Non-Detect	Results		
			Detected < Regulatory Criteria	Detected > Regulatory Criteria	Parameter & Concentration >Regulatory Criteria
VOCs	X	X			
SVOCs	X	X			
Dissolved Metals	X		X		
Pesticides	X		X		
Nitrocellulose	X	X			
General Parameters	X		X		

SOC5 - GP10					
Parameters	Sample Analyzed	Non-Detect	Results		
			Detected < Regulatory Criteria	Detected > Regulatory Criteria	Parameter & Concentration >Regulatory Criteria
VOCs	X	X			
SVOCs	X	X			
Dissolved Metals	X		X		
Pesticides	X		X		
Nitrocellulose	X	X			
Perchlorate	X	X			
General Parameters	X		X		

SOC5 - GP11					
Parameters	Sample Analyzed	Non-Detect	Results		
			Detected < Regulatory Criteria	Detected > Regulatory Criteria	Parameter & Concentration >Regulatory Criteria
VOCs	X	X			
SVOCs	X	X			
Dissolved Metals	X	X			
Pesticides	X	X			
Nitrocellulose	X	X			
General Parameters	X			X	NO ₃ & NO ₂ = 13 mg/L

SOC4 - GP5					
Parameters	Sample Analyzed	Non-Detect	Results		
			Detected < Regulatory Criteria	Detected > Regulatory Criteria	Parameter & Concentration >Regulatory Criteria
VOCs	X	X			
SVOCs	X	X			
Dissolved Metals	X		X		
Nitrocellulose	X	X			
General Parameters	X			X	NO ₃ & NO ₂ = 21 mg/L

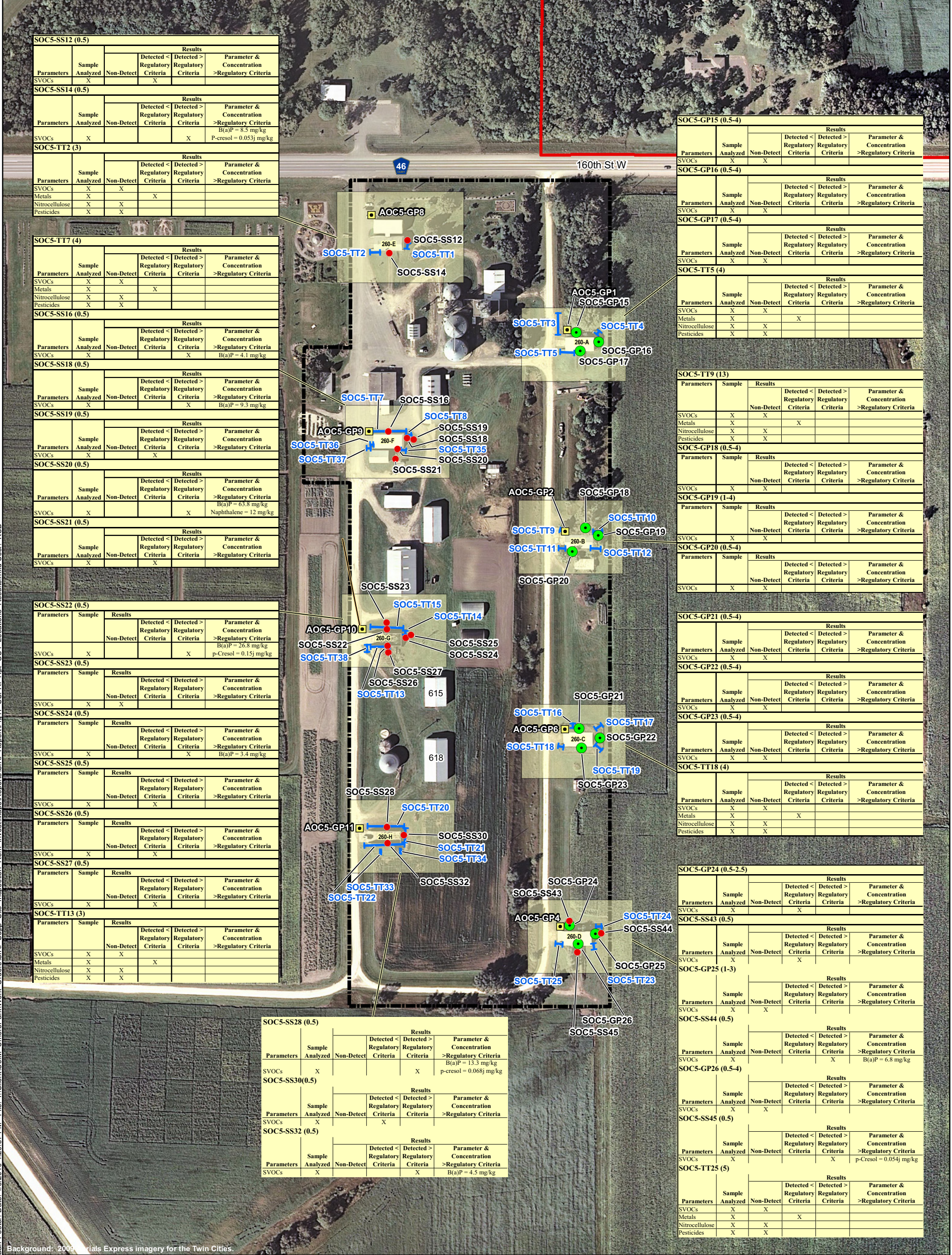
SOC4 - GP4					
Parameters	Sample Analyzed	Non-Detect	Results		
			Detected < Regulatory Criteria	Detected > Regulatory Criteria	Parameter & Concentration >Regulatory Criteria
SVOCs	X	X			
Dissolved Metals	X		X		
Nitrocellulose	X	X			
General Parameters	X			X	NO ₃ & NO ₂ = 17 mg/L

Figure 10
SOC 4 AND SOC 5
GROUNDWATER SAMPLING RESULTS

SSI/RI Report
Sites of Concern 4 and 5
UMore Mining Area
Dakota County, MN



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Background: 2009 Aerials Express Imagery for the Twin Cities.

- Direct Push Boring for Soil Sampling
- Surface Soil Sample
- USACE Geoprobe (Approximate Location from Bay West, 2009)
- Test Trench
- UMore Mining Area (UMA)
- Site of Concern (SOC) Boundary

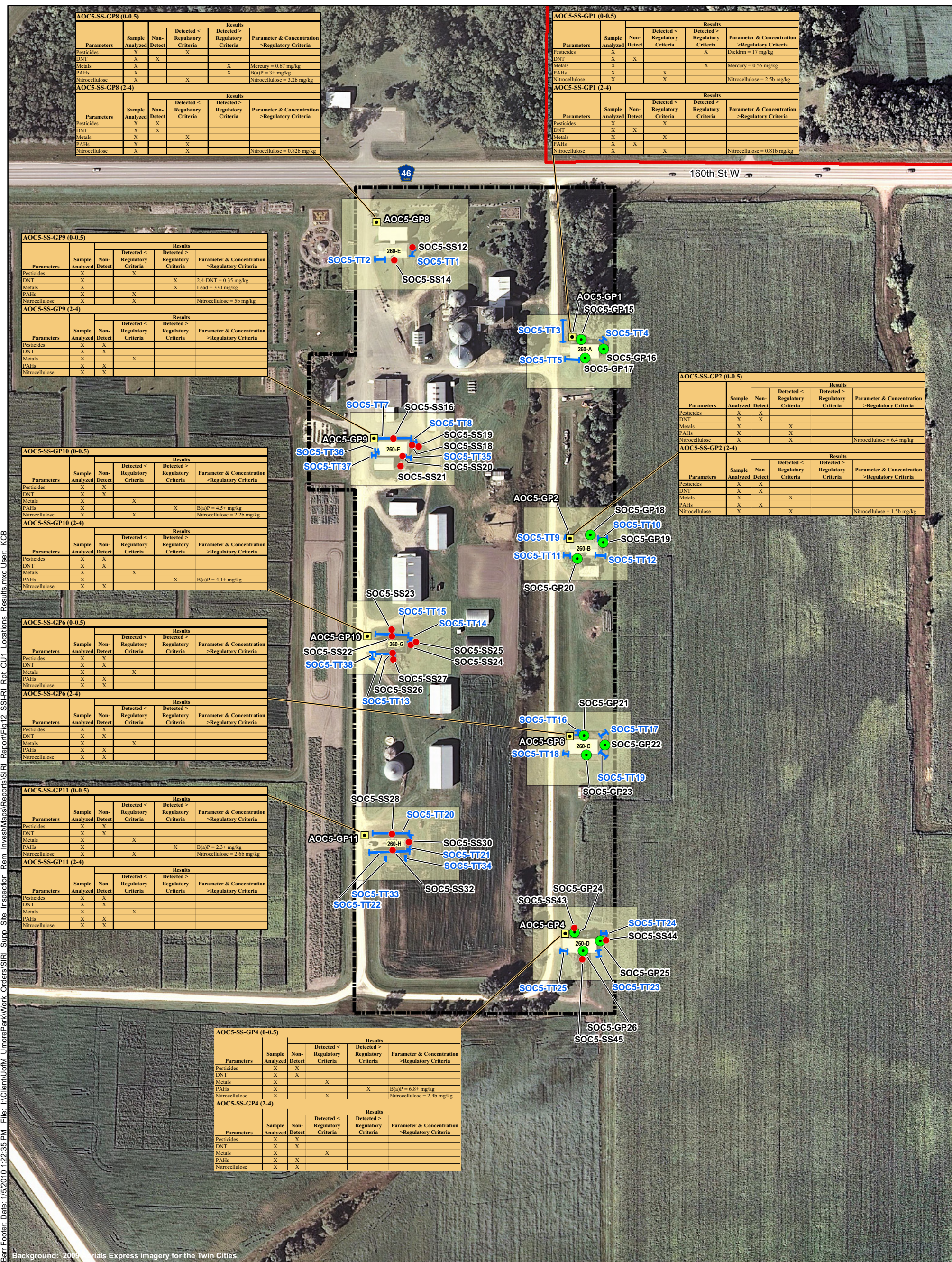
Source: Dakota County, Barr, SEH, HKGi, Bay West (2008).

Sample Id	Parameters	Sample Analyzed	Results		Parameter & Concentration
			Detected < Regulatory Criteria	Detected > Regulatory Criteria	
SOC1 - GP1 (0-4)	SVOCs	X			
	Metals	X			
	Nitrocellulose	X			
	Pesticides	X			

X = parameter analyzed
 X = parameter not detected above reporting limit
 X = parameter detected above reporting limit but below regulatory criteria
 X = parameter detected above regulatory criteria

Figure 11
 DNT STORAGE BUNKERS (SOC 5 OU #1)
 SAMPLING RESULTS
 SSI/RI Report
 Sites of Concern 4 and 5
 UMore Mining Area
 Dakota County, MN





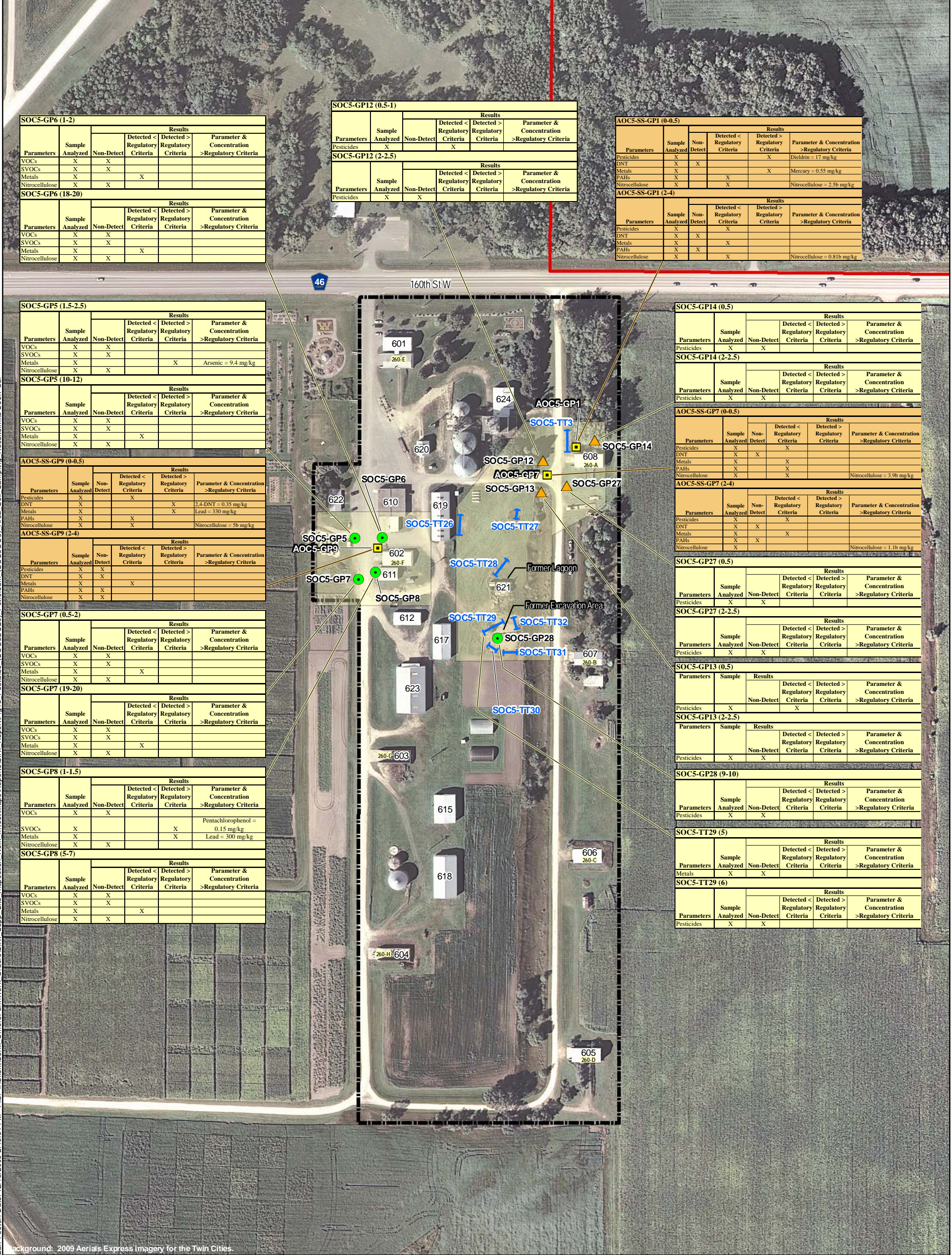
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Figure 12

DNT STORAGE BUNKERS (SOC 5 OU #1) SAMPLING RESULTS

SSI/RI Report
Sites of Concern 4 and 5
UMore Mining Area
Dakota County, MN





- ▲ Direct Push Boring for Ag. Chem. Soil Sampling
- Direct Push Boring for Soil Sampling
- Direct Push Boring for Soil and/or Groundwater Sampling
- Surface Soil Sample
- USACE Geoprobe (Approximate Location from Bay West, 2009)
- Test Trench
- UMore Mining Area (UMA)
- Site of Concern (SOC) Boundary

Sample Id → X = parameter not detected above reporting limit
 X = parameter detected above reporting limit but below regulatory criteria

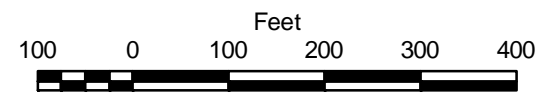
Parameters	Sample Analyzed	Non-Detect	Results		Parameter & Concentration > Regulatory Criteria
			Detected < Regulatory Criteria	Detected > Regulatory Criteria	
SVOCs	X	X			
Metals	X	X	X		
Nitrocellulose	X	X	X		
Pesticides	X	X			

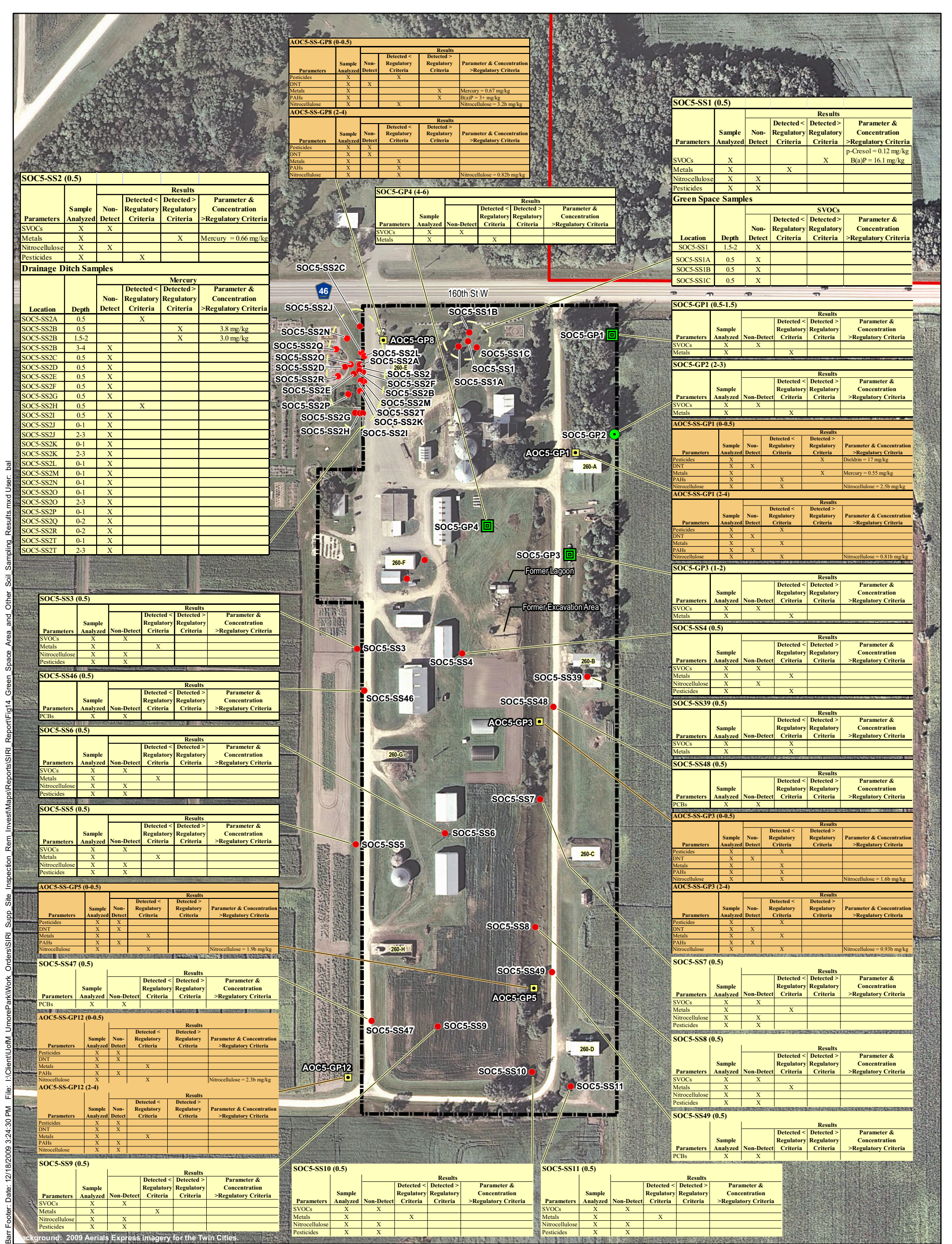
X = parameter analyzed
 X = parameter detected above regulatory criteria

Figure 13
**PESTICIDE (SOC 5 OU 2),
 AND PETROLEUM (SOC 5 OU 3)
 RELEASE AREA
 SOIL SAMPLING RESULTS**

SSI/RI Report
 Sites of Concern 4 and 5
 UMore Mining Area
 Dakota County, MN

Notes:
 1. Based on field observation, test trenches may consist of discontinuous test pits excavated throughout the planned trench limits.
 2. Sample locations are approximate and may vary depending on site conditions.
 Source: Dakota County, Barr, SEH, HKGi, Bay West (2008).





Barr Footer: Date: 12/18/2009 3:24:30 PM File: I:\Client\UofM_UmoreParkWork_Orders\SI\RI_Supp_Site_Inspection_Rem_Invest\Maps\Reports\SI\RI_Report\Fig14_Green_Space_Area_and_Other_Soil_Sampling_Results.mxd User: bal

Background: 2009 Aerials Express imagery for the Twin Cities.

- ▲ Direct Push Boring for Ag. Chem. Soil Sampling
- Direct Push Boring for Soil Sampling
- Direct Push Boring for Soil and/or Groundwater Sampling
- Surface Soil Sample
- USACE Geoprobe (Approximate Location from Bay West, 2009)
- Test Trench
- UMore Mining Area (UMA)
- Site of Concern (SOC) Boundary

Notes:

1. Based on field observation, test trenches may consist of discontinuous test pits excavated throughout the planned trench limits.
2. Sample locations are approximate and may vary depending on site conditions.

Source: Dakota County, Barr, SEH, HKGi, Bay West (2008).

Legend:

- X = parameter not detected above reporting limit
- X = parameter detected above reporting limit but below regulatory criteria
- X = parameter analyzed
- X = parameter detected above regulatory criteria

SOC1 - GP1 (0-4)					
Parameters	Sample Analyzed	Non-Detect	Detected < Regulatory Criteria	Detected > Regulatory Criteria	Parameter & Concentration > Regulatory Criteria
SVOCs	X	X	X		
Metals	X	X	X		
Nitrocellulose	X	X	X		
Pesticides	X	X	X		

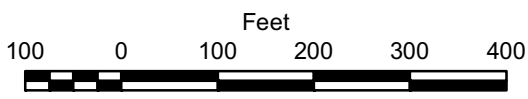
Planned Sample Parameters

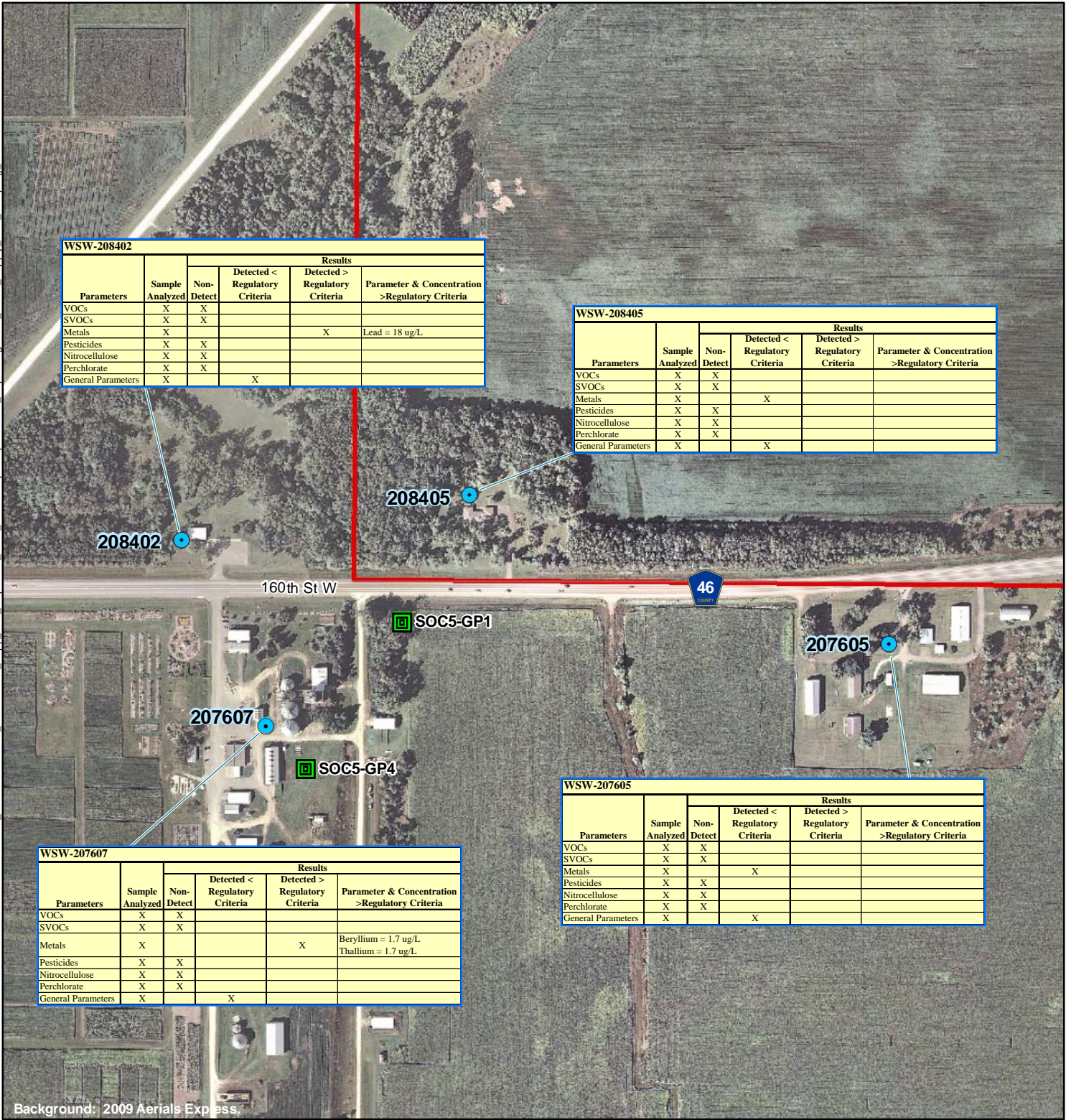
Details of detection above regulatory criteria

Details of detection above regulatory criteria

Figure 14
GREEN SPACE AREA AND OTHER SOIL SAMPLING RESULTS

SSI/RI Report
Sites of Concern 4 and 5
UMore Mining Area
Dakota County, MN





WSW-208402					
Parameters	Sample Analyzed	Non-Detect	Results		
			Detected < Regulatory Criteria	Detected > Regulatory Criteria	Parameter & Concentration >Regulatory Criteria
VOCs	X	X			
SVOCs	X	X			
Metals	X	X		X	Lead = 18 ug/L
Pesticides	X	X			
Nitrocellulose	X	X			
Perchlorate	X	X			
General Parameters	X		X		

WSW-208405					
Parameters	Sample Analyzed	Non-Detect	Results		
			Detected < Regulatory Criteria	Detected > Regulatory Criteria	Parameter & Concentration >Regulatory Criteria
VOCs	X	X			
SVOCs	X	X			
Metals	X		X		
Pesticides	X	X			
Nitrocellulose	X	X			
Perchlorate	X	X			
General Parameters	X		X		

WSW-207607					
Parameters	Sample Analyzed	Non-Detect	Results		
			Detected < Regulatory Criteria	Detected > Regulatory Criteria	Parameter & Concentration >Regulatory Criteria
VOCs	X	X			
SVOCs	X	X			
Metals	X			X	Beryllium = 1.7 ug/L Thallium = 1.7 ug/L
Pesticides	X	X			
Nitrocellulose	X	X			
Perchlorate	X	X			
General Parameters	X		X		





WSW-207605					
Parameters	Sample Analyzed	Non-Detect	Results		
			Detected < Regulatory Criteria	Detected > Regulatory Criteria	Parameter & Concentration >Regulatory Criteria
VOCs	X	X			
SVOCs	X	X			
Metals	X		X		
Pesticides	X	X			
Nitrocellulose	X	X			
Perchlorate	X	X			
General Parameters	X		X		

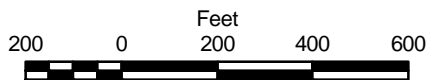
Background: 2009 Aerials Express.

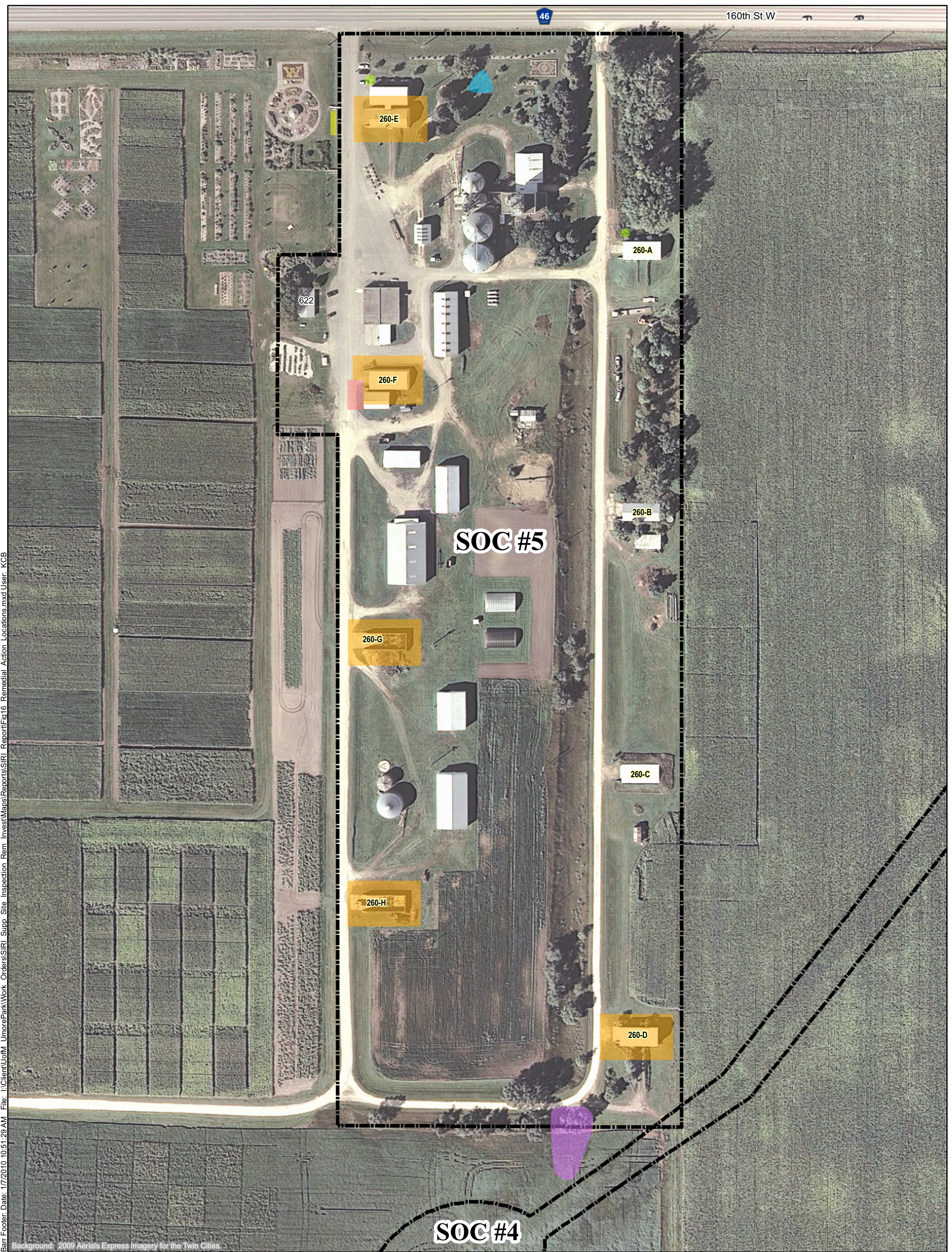
Figure 15

WATER SUPPLY WELL SAMPLING RESULTS

SSI/RI Report
Sites of Concern 4 and 5
UMore Mining Area
Dakota County, MN

-  Water Supply Well
-  Sampling Location
-  Direct Push Boring for Soil and/or Groundwater Sampling
-  UMore Mining Area (UMA)





Barr Footer: Date: 1/7/2010 10:51:29 AM File: I:\Client\UoM_UmorePark\Work_Orders\SIRI_Supp_Site_Inspection_Rem_Invest\Maps\Reports\SIRI_Report\Fig16_Remedial_Action_Locations.mxd User: KCB

Remediation Proposal

- DNT Storage Bunker Surface Soils
- Buried Debris
- Surface Soil PAH

- Site of Concern (SOC) Boundary
- UMore Mining Area (UMA)

Notes:
 1. Based on field observation, test trenches may consist of discontinuous test pits excavated throughout the planned trench limits.
 2. Sample locations are approximate and may vary depending on site conditions.
 Source: Dakota County, Barr, SEH, HKGi, Bay West (2008).

Additional Investigation Needed

- Petroleum Release Area (Estimated)
- Green Space

Interim Corrective Action

- NW Drainage Ditch

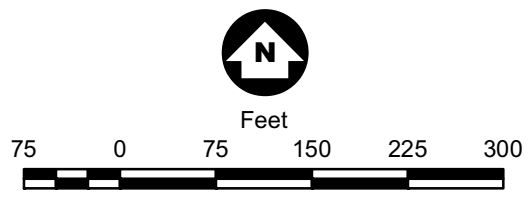


Figure 16

REMEDIAL ACTION LOCATIONS

SSI/RI Report
 Sites of Concern 4 and 5
 UMore Mining Area
 Dakota County, MN

