BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

In the Matter of:	)	
	)	
SIERRA CLUB, ENVIRONMENTAL LAW AND POLICY CENTER, PRAIRIE RIVERS NETWORK, and CITIZENS AGAINST RUINING THE ENVIRONMENT	)	
	)	**PCB 2013-015**
Complainants,	)	**(Enforcement – Water)**
	)	
v.	)	
	)	
MIDWEST GENERATION, LLC,	)	
	)	
Respondent.	)	

NOTICE OF FILING

TO: Don Brown, Assistant Clerk
Illinois Pollution Control Board
James R. Thompson Center
100 West Randolph Street, Suite 11-500
Chicago, IL 60601

Attached Service List

PLEASE TAKE NOTICE that I have filed today with the Illinois Pollution Control Board Respondent, Midwest Generation, LLC's Additional Demonstrative Exhibits, copies of which are hereby served upon you.

MIDWEST GENERATION, LLC

By: /s/ Jennifer T. Nijman

Dated: January 30, 2018

Jennifer T. Nijman
Susan M. Franzetti
Kristen L. Gale
NIJMAN FRANZETTI LLP
10 South LaSalle Street, Suite 3600
Chicago, IL 60603
(312) 251-5255

SERVICE LIST

Bradley P. Halloran, Hearing Officer
Illinois Pollution Control Board
100 West Randolph Street
Suite 11-500
Chicago, IL 60601

Lindsay P. Dubin
Eric DeBellis and Jessica Dexter, also for Prairie Rivers Network and Sierra Club
Environmental Law & Policy Center
35 East Wacker Drive, Suite 1600
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Keith Harley
Chicago Legal Clinic, Inc.
211 West Wacker Drive, Suite 750
Chicago, IL 60606

Abel Russ
For Prairie Rivers Network
Environmental Integrity Project
1000 Vermont Avenue, Suite 1100
Washington, DC 20005

Faith E. Bugel
Attorney at Law
Sierra Club
1004 Mohawk
Wilmette, IL 60091

Greg Wannier, Associate Attorney
Sierra Club
2101 Webster Street, Suite 1300
Oakland, CA 94612

CERTIFICATE OF SERVICE

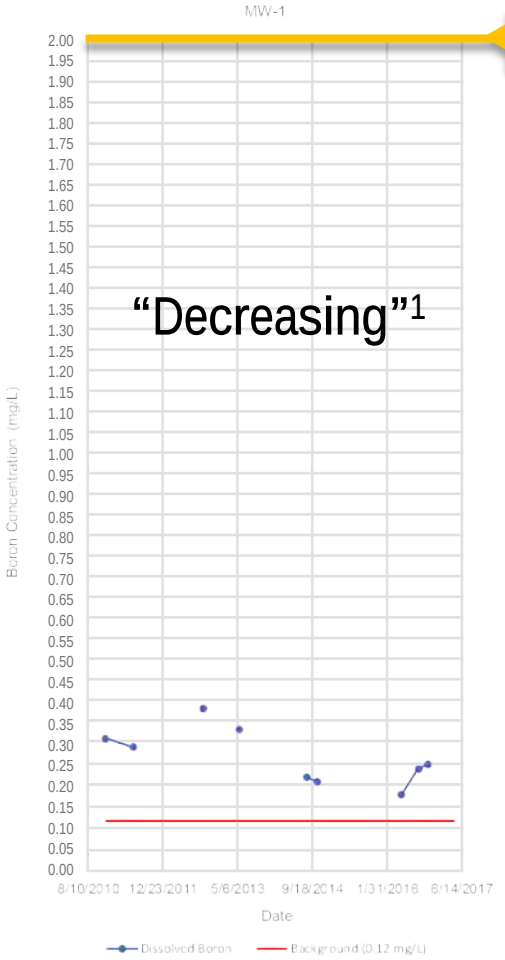
The undersigned, an attorney, certifies that a true copy of the foregoing Notice of Filing, Certificate of Service and Respondent, Midwest Generation, LLC's Additional Demonstrative Exhibits were filed electronically on January 30, 2018 with the following:

Don Brown, Assistant Clerk
Illinois Pollution Control Board
James R. Thompson Center
100 West Randolph Street, Suite 11-500
Chicago, IL 60601

and that true copies were emailed on January 30, 2018 to the parties listed on the foregoing Service List.

/s/ Jennifer T. Nijman

Joliet #29 Monitoring Well-1 Boron Concentration



Standard Boron Levels: 2.00

"Decreasing"[1]

Class I Standard
(Not applicable in GMZ)

[1] J. Kunkel description (visual)
Oct 20, 2017 Complainant's Notice of Filing at 7

Joliet #29 Monitoring Well-2 Boron Concentration

Class I Standard
(Not applicable in GMZ)

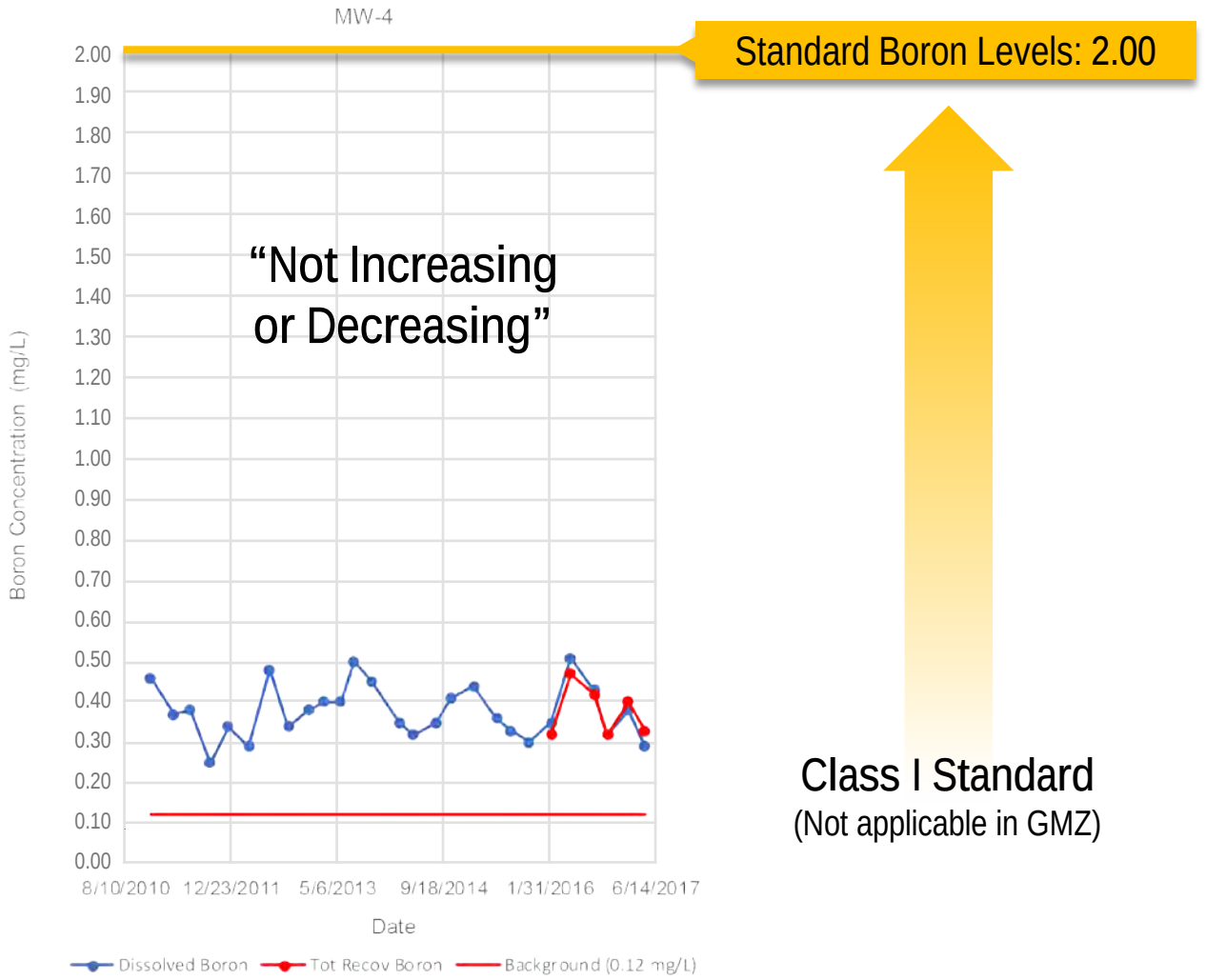
Oct 20, 2017 Complainant's Notice of Filing at 7

Joliet #29 Monitoring Well-3 Boron Concentration

Class I Standard
(Not applicable in GMZ)

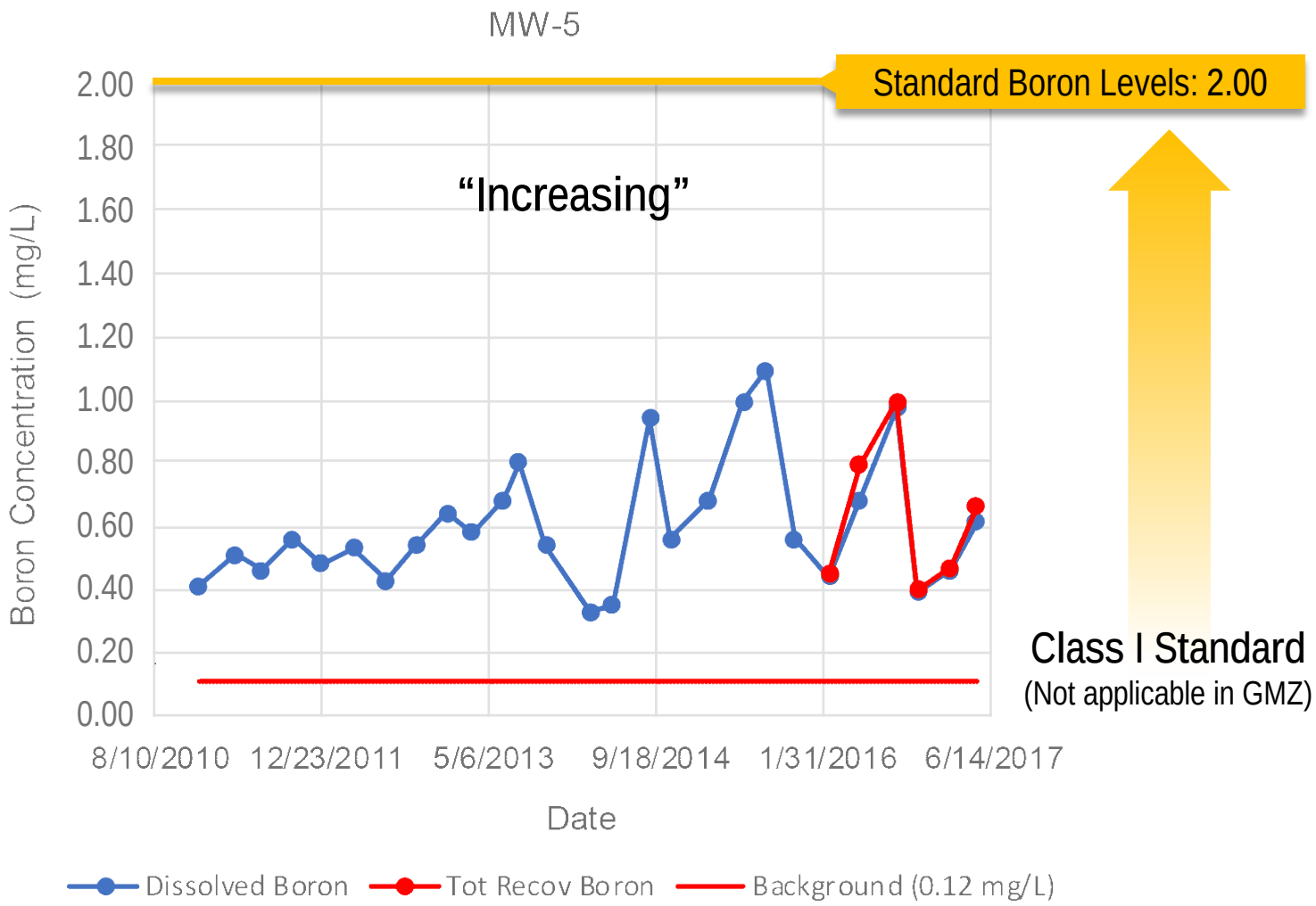
Oct 20, 2017 Complainant's Notice of Filing at 7

Joliet #29 Monitoring Well-4 Boron Concentration



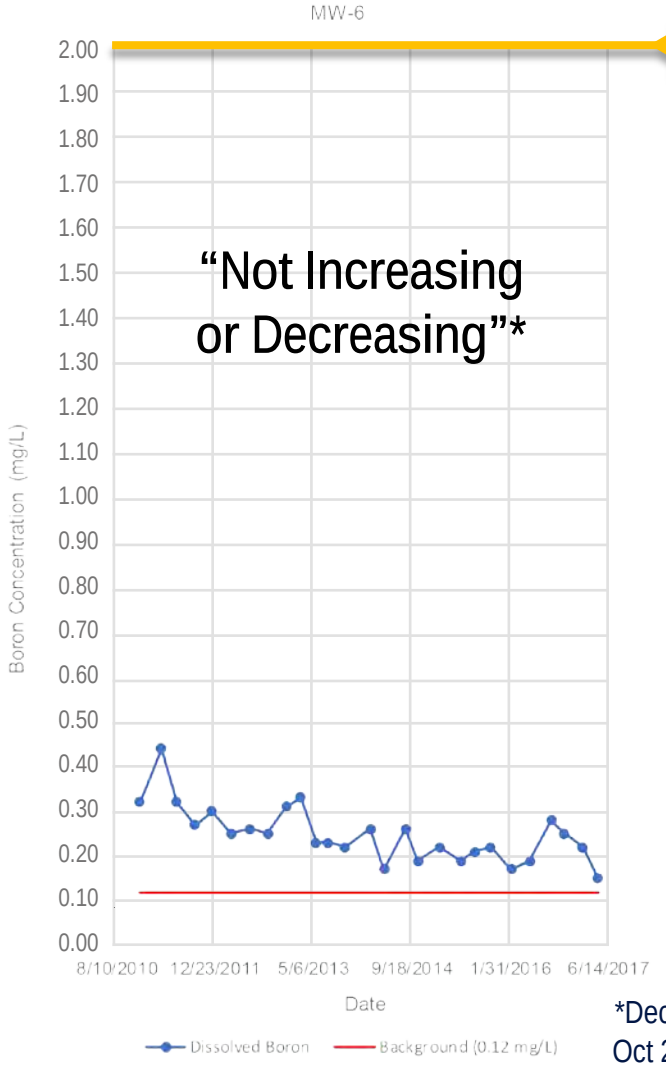
Oct 20, 2017 Complainant's Notice of Filing at 8

Joliet #29 Monitoring Well-5 Boron Concentration



Oct 20, 2017 Complainant's Notice of Filing at 8

Joliet #29 Monitoring Well-6 Boron Concentration



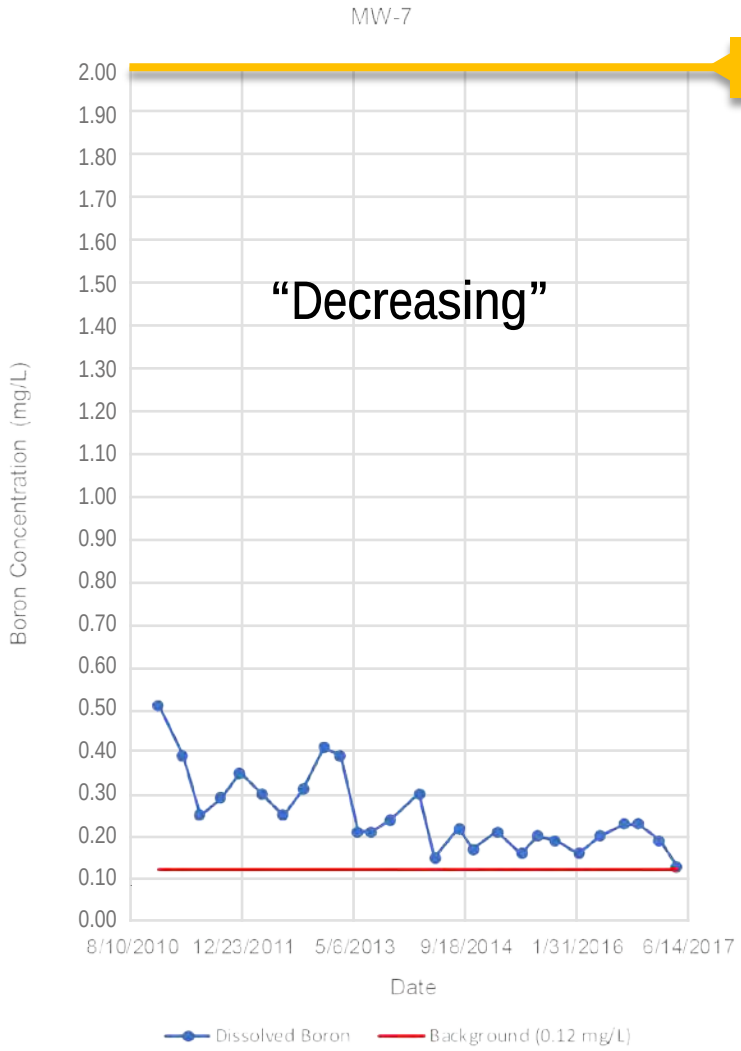
Standard Boron Levels: 2.00

"Not Increasing or Decreasing"*

Class I Standard
(Not applicable in GMZ)

*Decreasing (based on Seymour Trend Testing)
Oct 20, 2017 Complainant's Notice of Filing at 8

Joliet #29 Monitoring Well-7 Boron Concentration



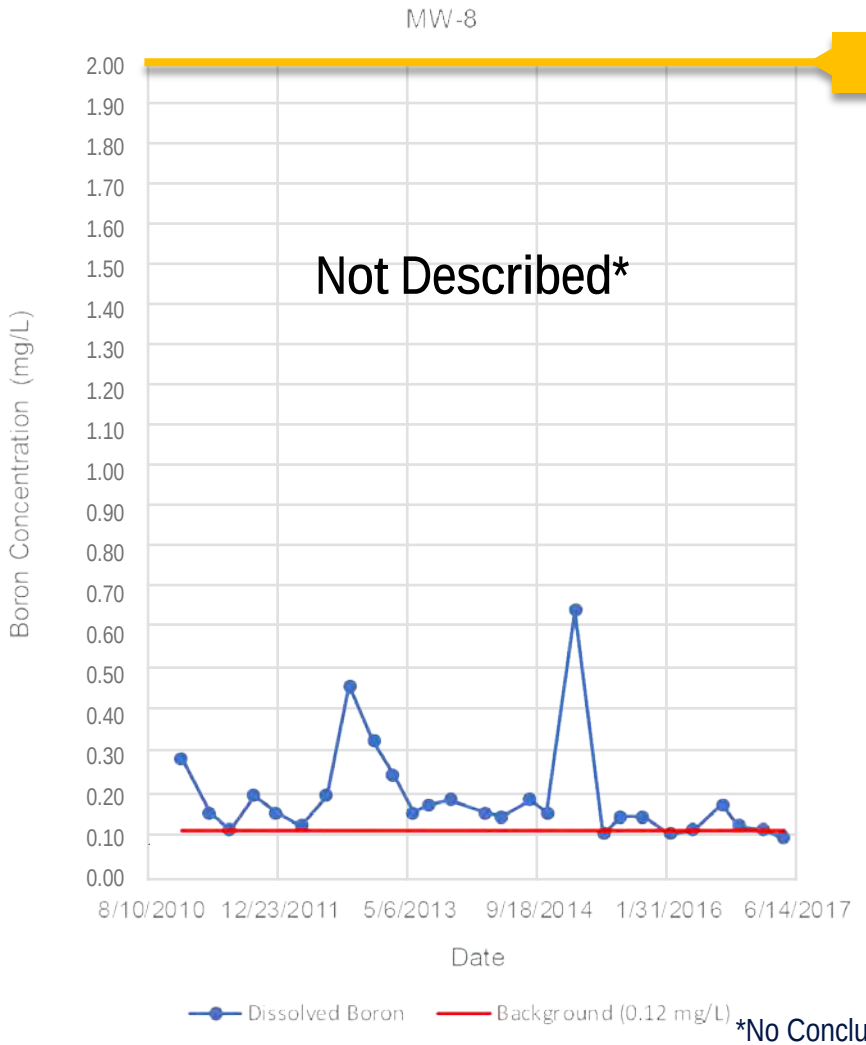
Standard Boron Levels: 2.00

"Decreasing"

Class I Standard
(Not applicable in GMZ)

Oct 20, 2017 Complainant's Notice of Filing at 9

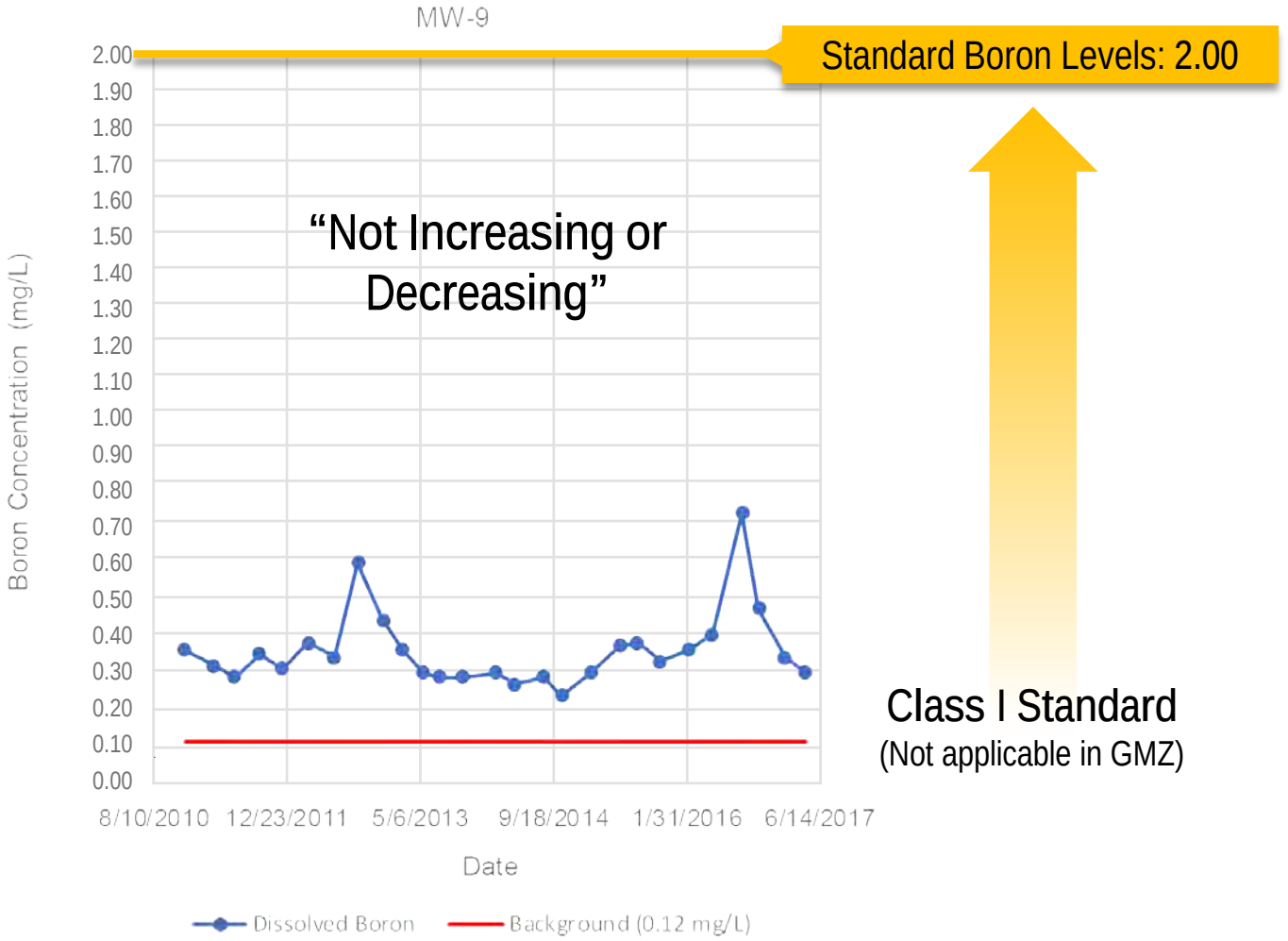
Joliet #29 Monitoring Well-8 Boron Concentration



Class I Standard
(Not applicable in GMZ)

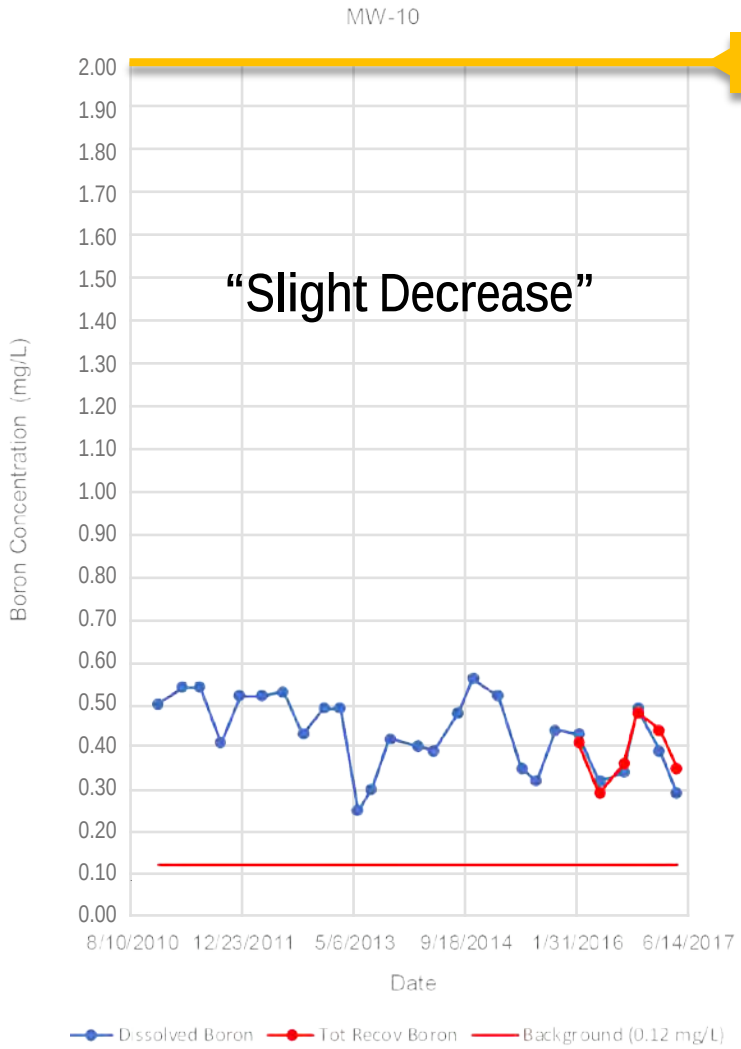
*No Conclusion (based on Seymour Trend Testing)
Oct 20, 2017 Complainant's Notice of Filing at 9

Joliet #29 Monitoring Well-9 Boron Concentration



Oct 20, 2017 Complainant's Notice of Filing at 9

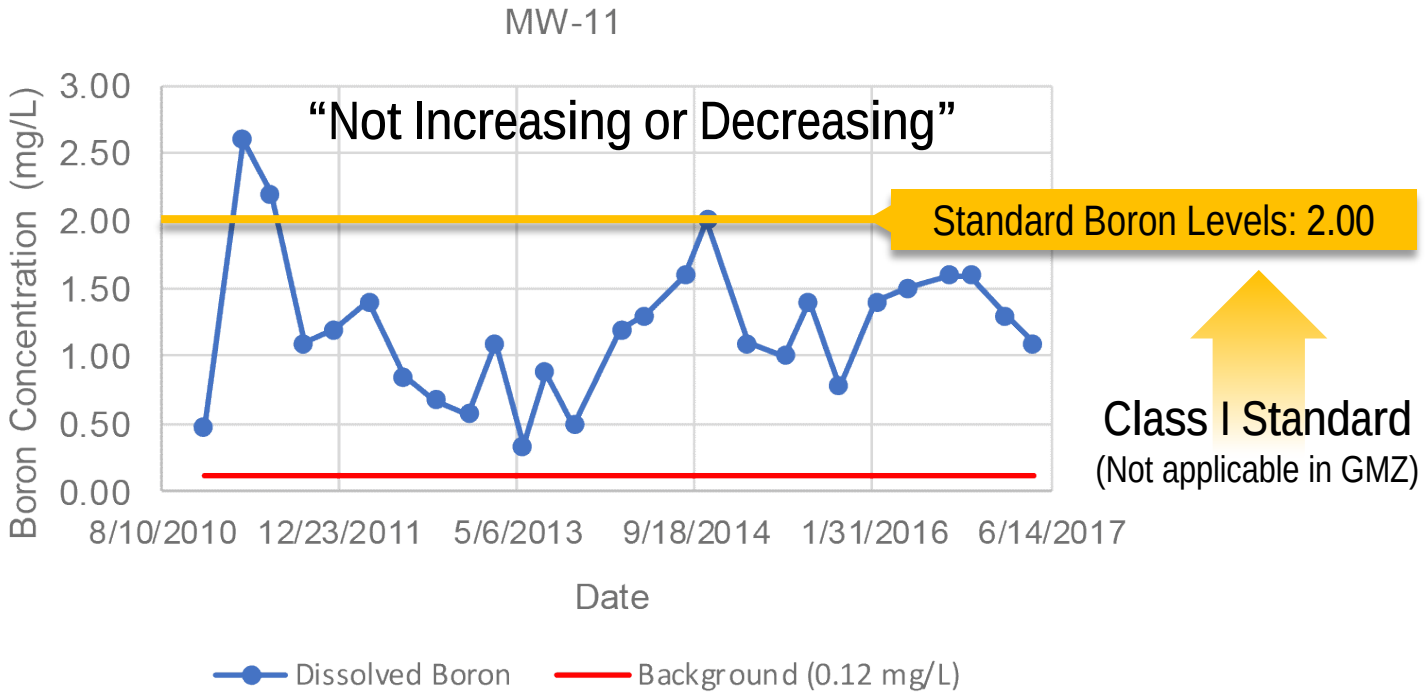
Joliet #29 Monitoring Well-10 Boron Concentration



Class I Standard
(Not applicable in GMZ)

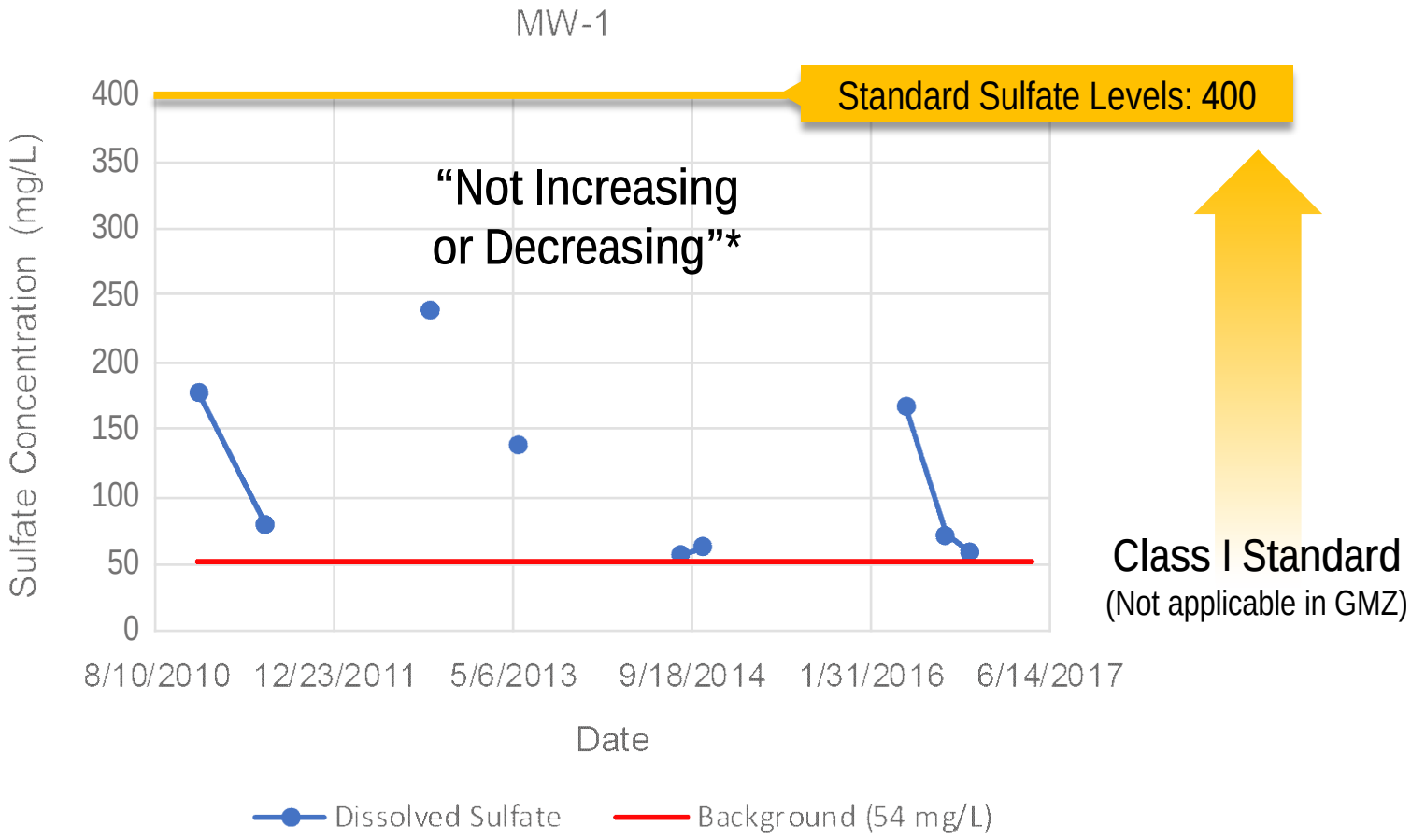
Oct 20, 2017 Complainant's Notice of Filing at 10

Joliet #29 Monitoring Well-11 Boron Concentration



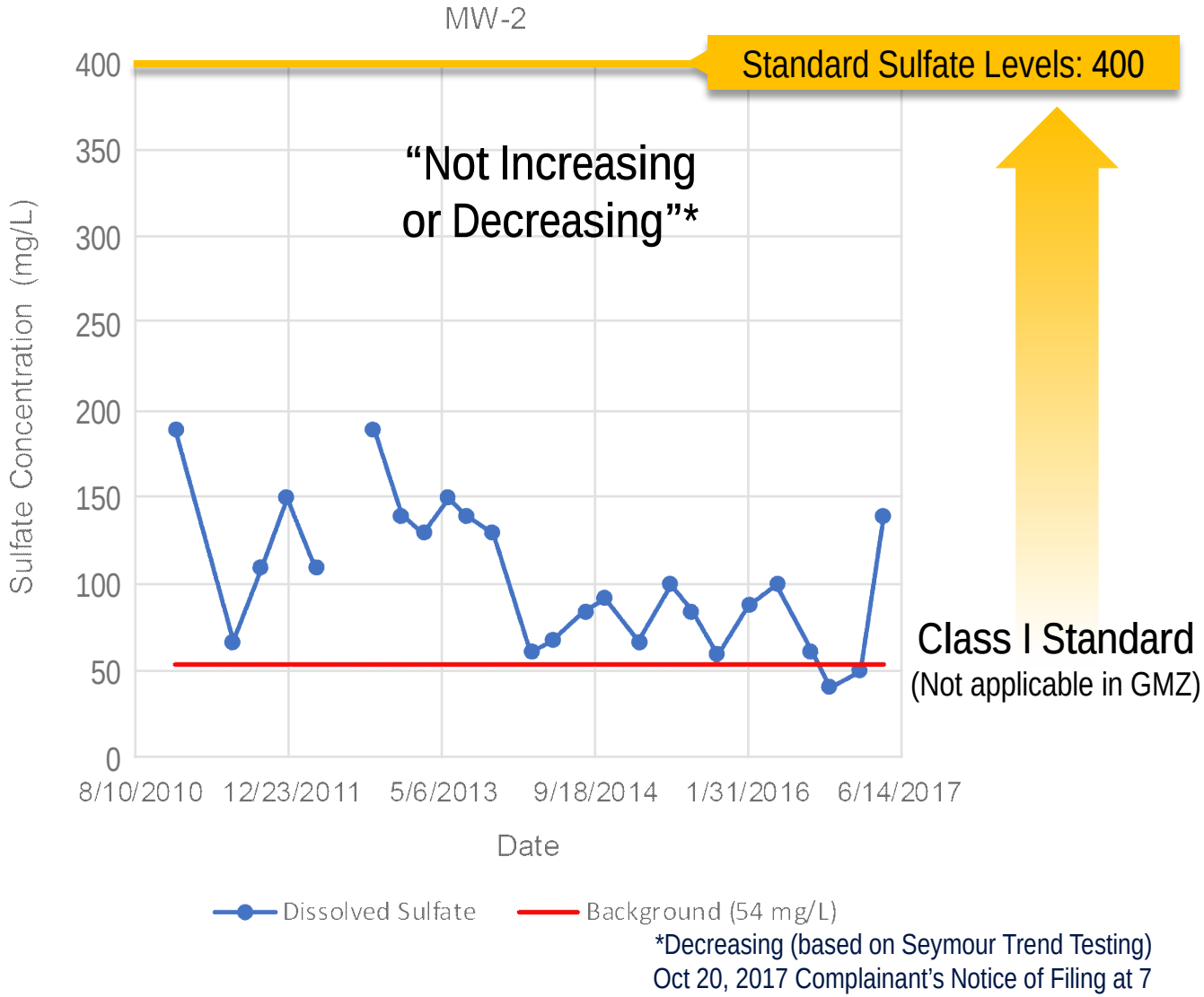
Oct 20, 2017 Complainant's Notice of Filing at 10

Joliet #29 Monitoring Well-1 Sulfate Concentration



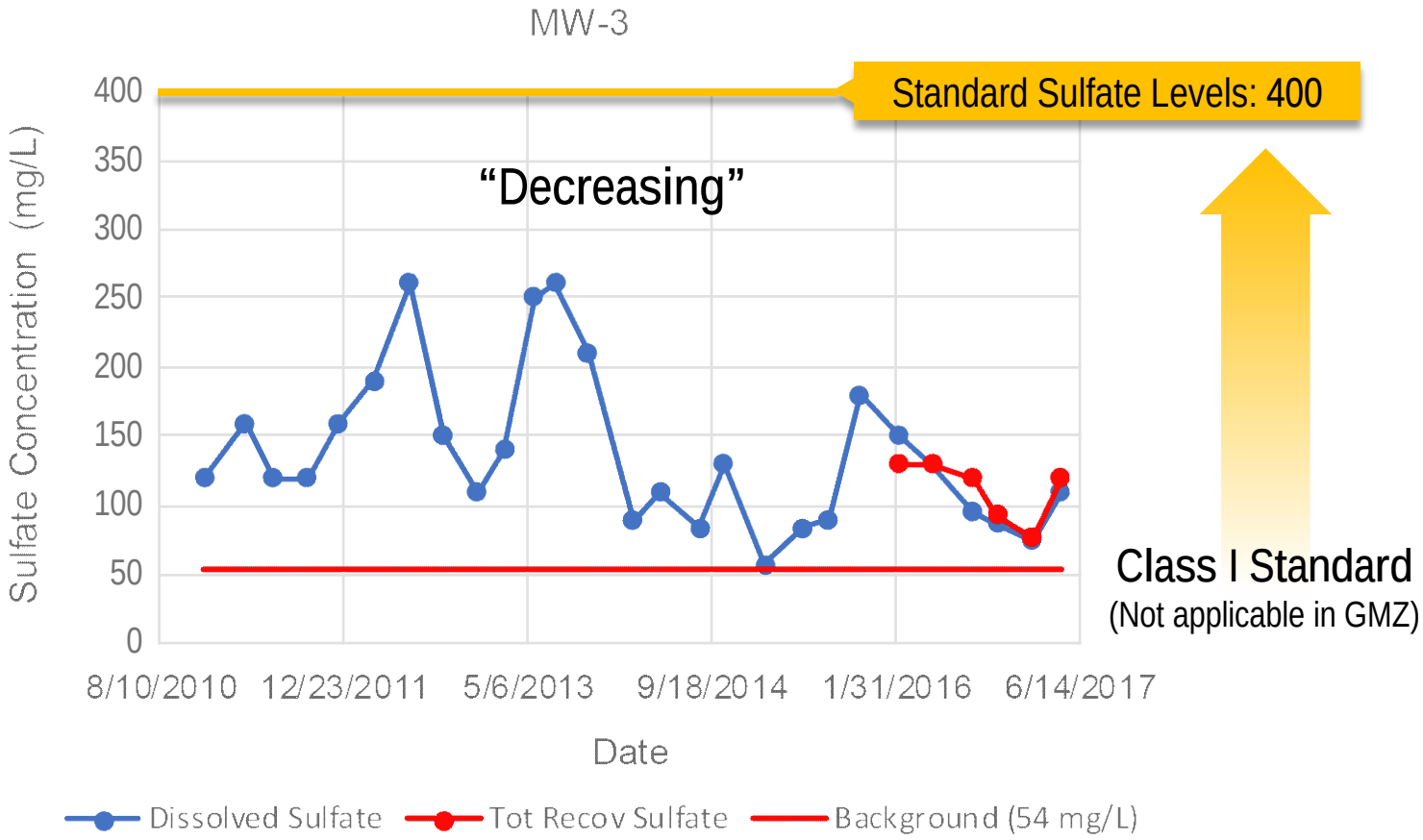
*Decreasing (based on Seymour Trend Testing)
Oct 20, 2017 Complainant's Notice of Filing at 7

Joliet #29 Monitoring Well-2 Sulfate Concentration



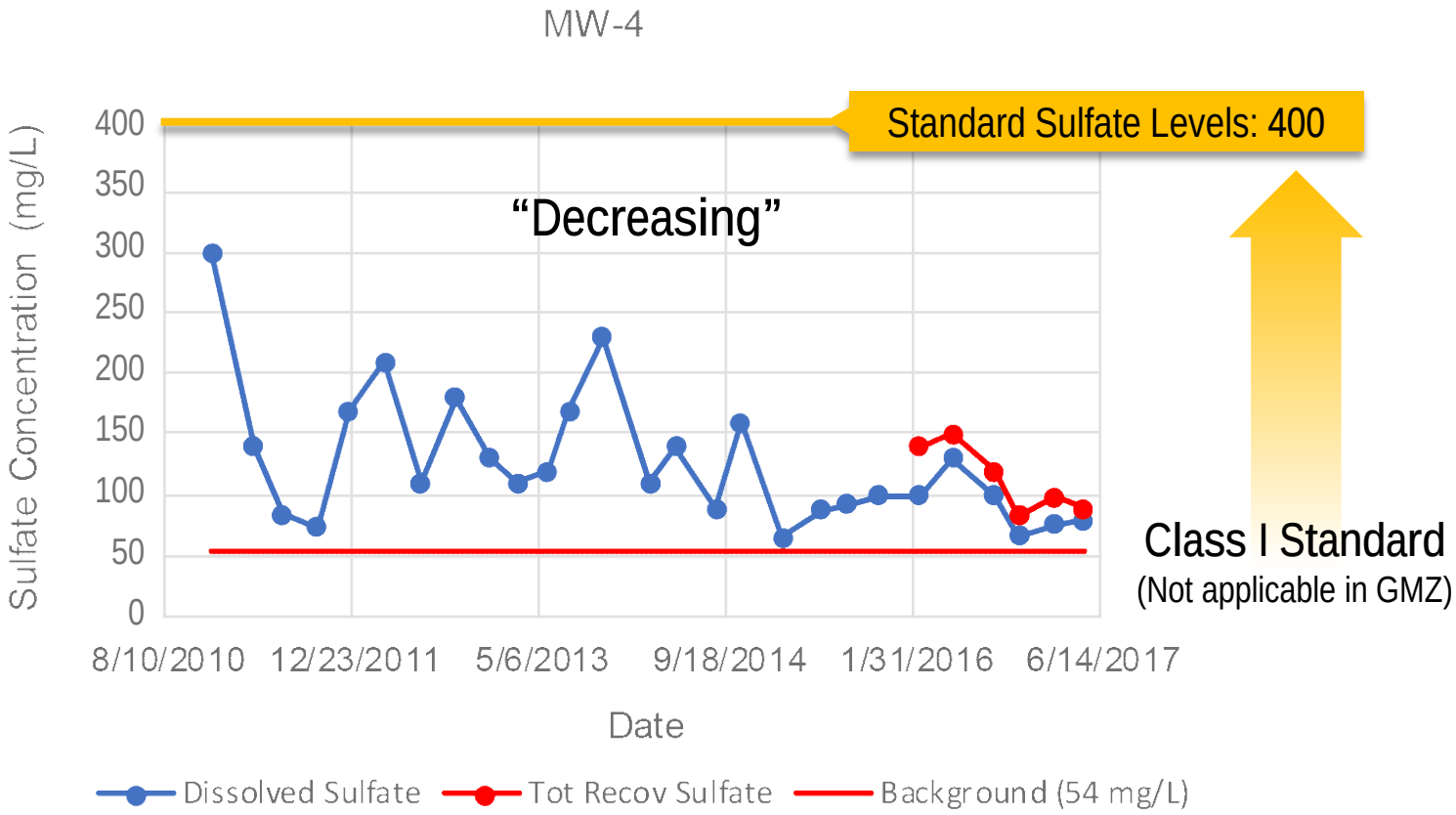
*Decreasing (based on Seymour Trend Testing)
Oct 20, 2017 Complainant's Notice of Filing at 7

Joliet #29 Monitoring Well-3 Sulfate Concentration



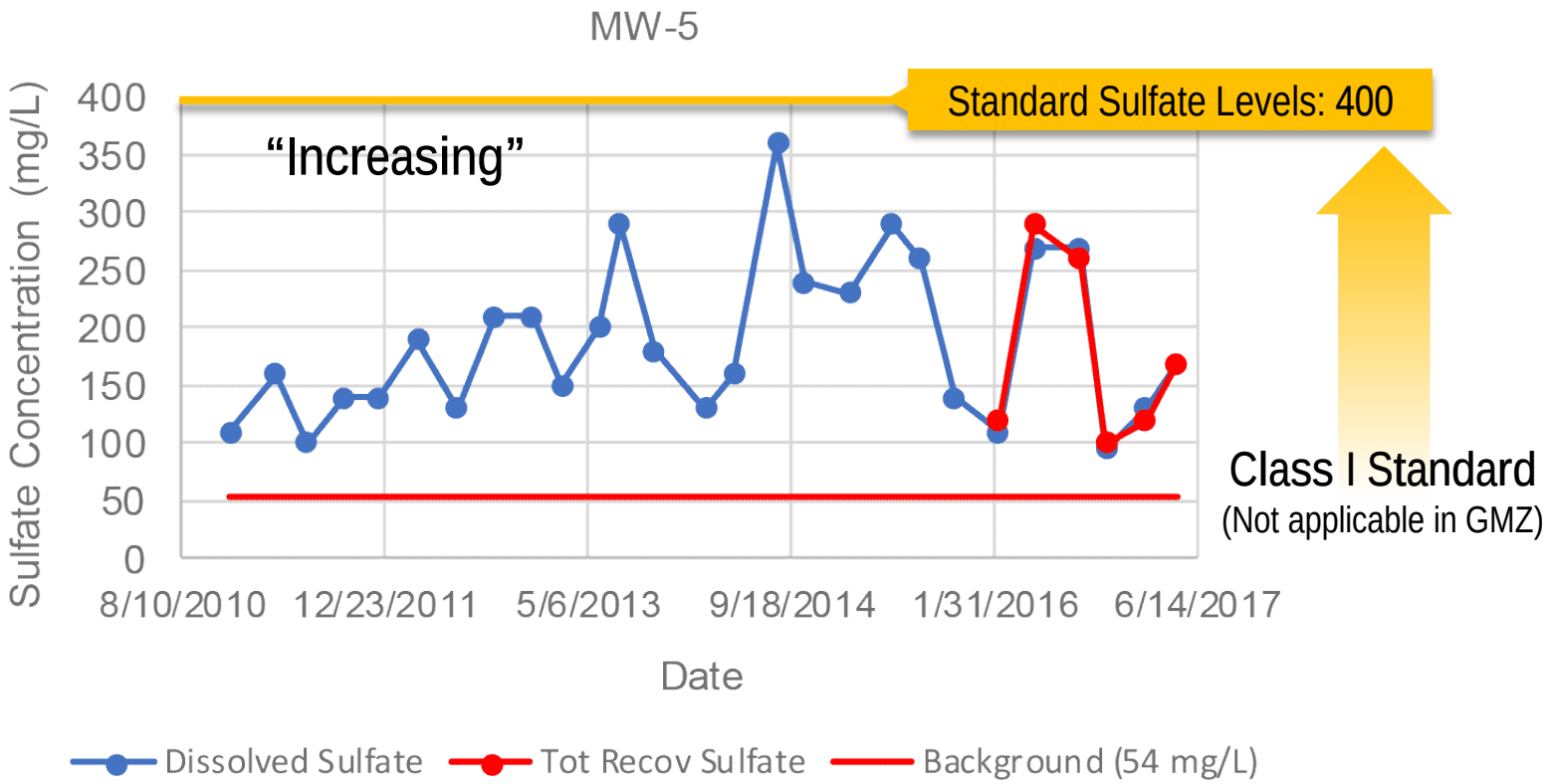
Oct 20, 2017 Complainant's Notice of Filing at 7

Joliet #29 Monitoring Well-4 Sulfate Concentration



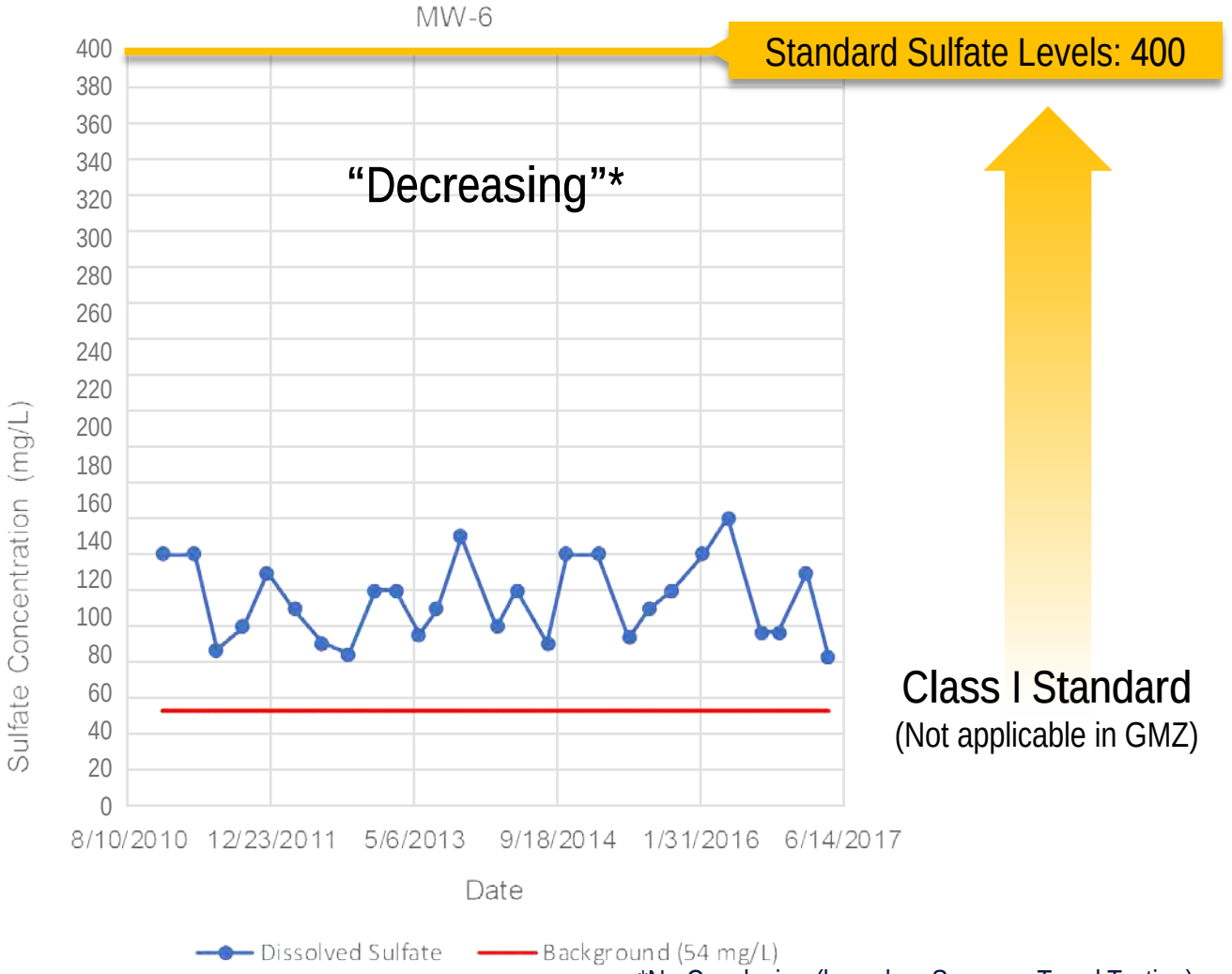
Oct 20, 2017 Complainant's Notice of Filing at 8

Joliet #29 Monitoring Well-5 Sulfate Concentration



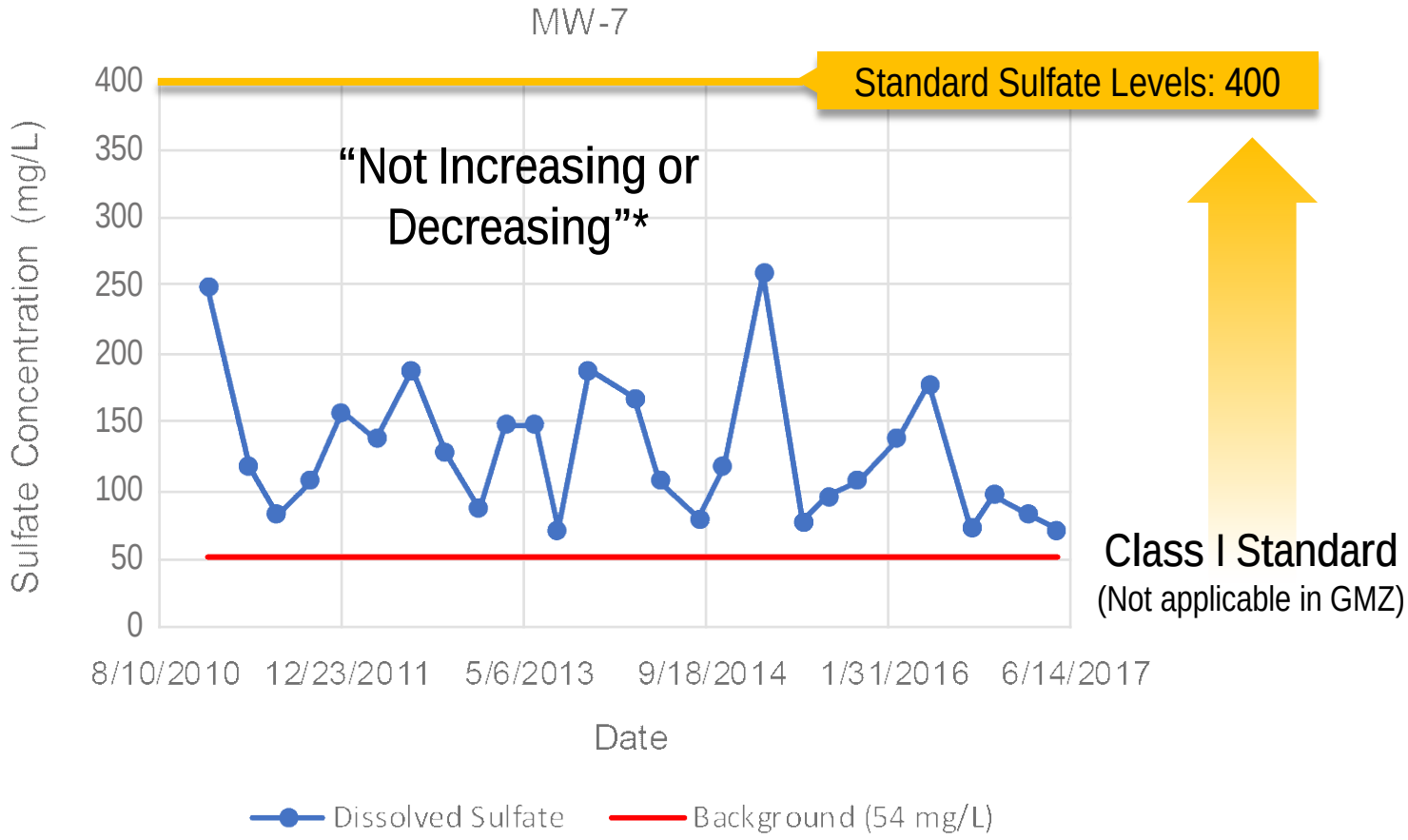
Oct 20, 2017 Complainant's Notice of Filing at 8

Joliet #29 Monitoring Well-6 Sulfate Concentration



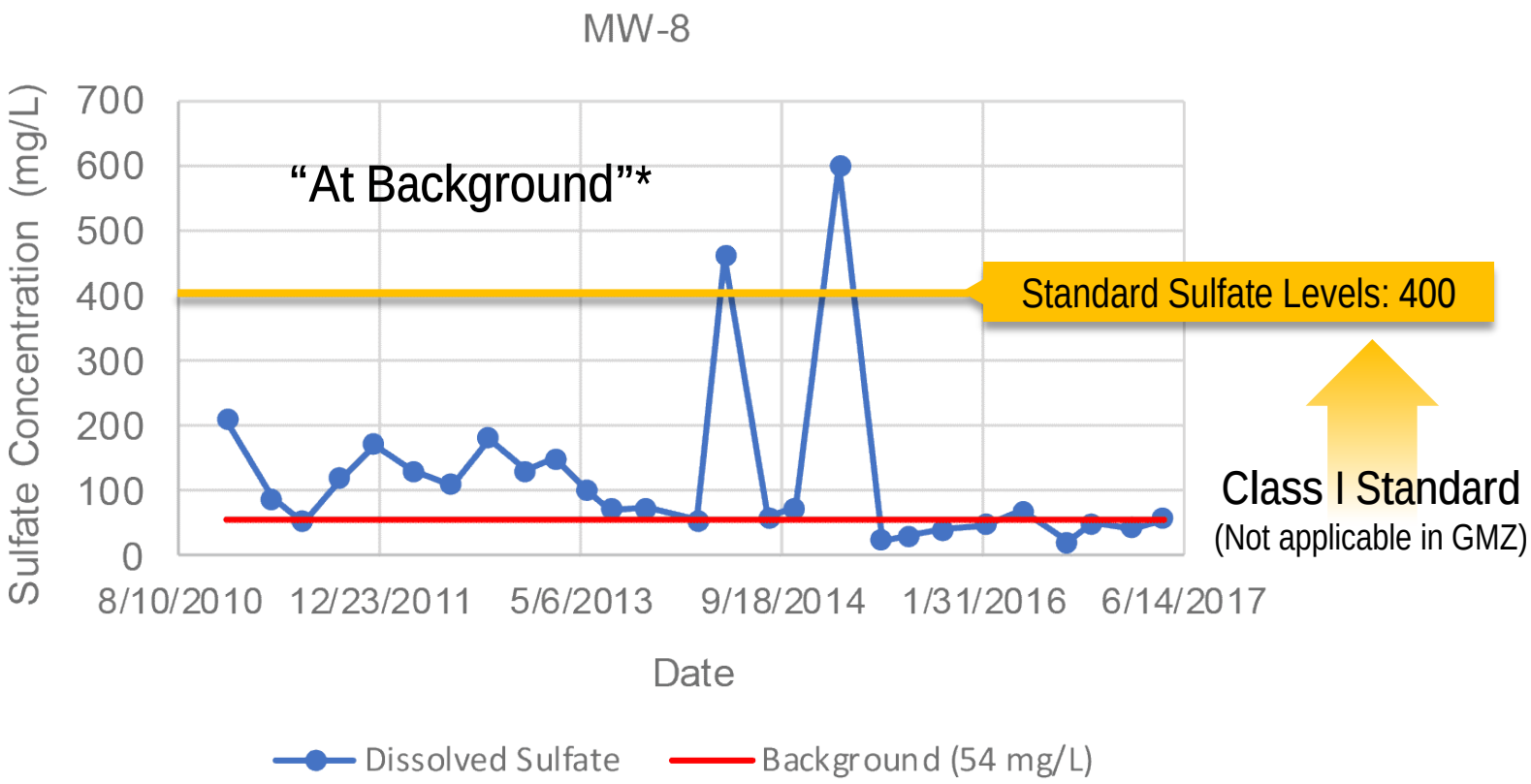
*No Conclusion (based on Seymour Trend Testing)
Oct 20, 2017 Complainant's Notice of Filing at 8

Joliet #29 Monitoring Well-7 Sulfate Concentration



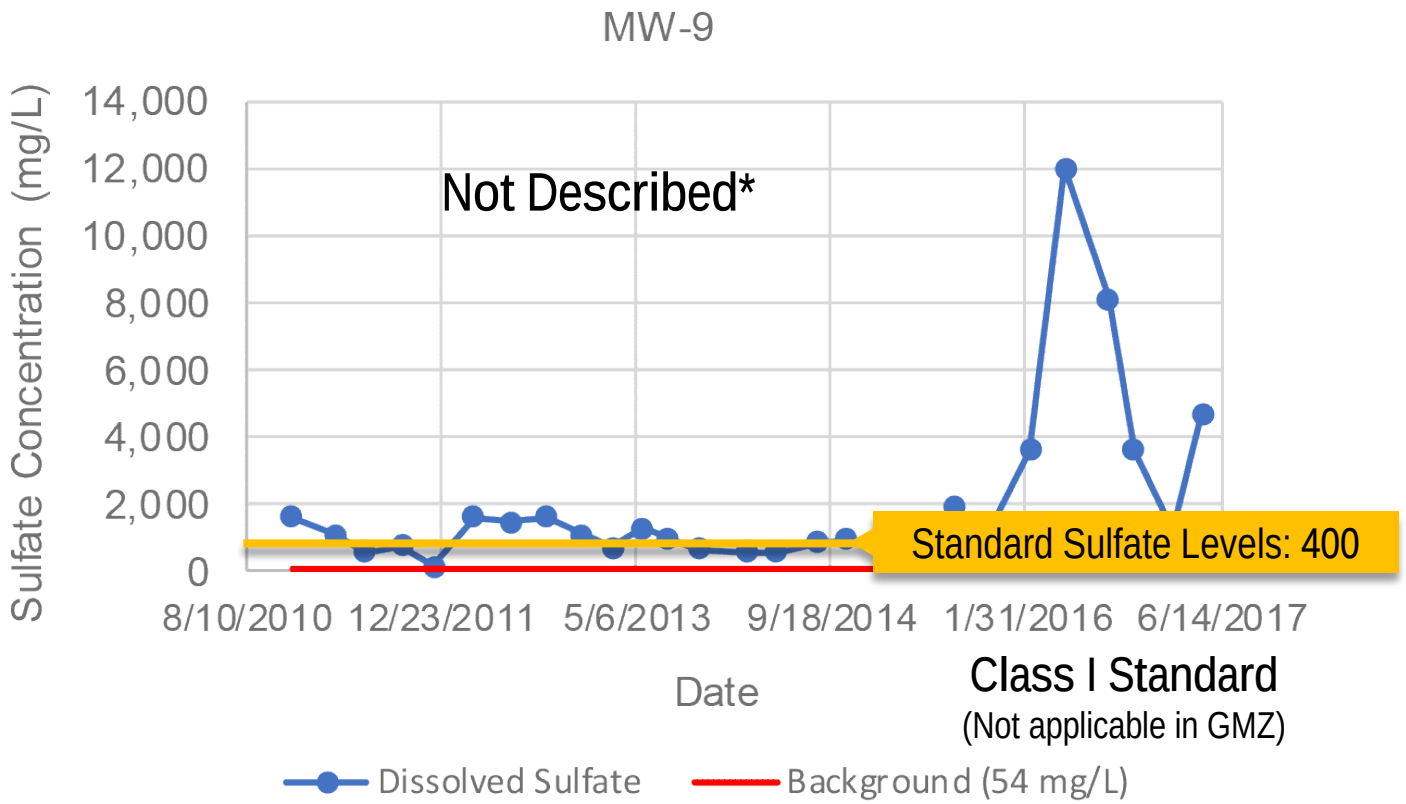
*Decreasing (based on Seymour Trend Testing)
Oct 20, 2017 Complainant's Notice of Filing at 9

Joliet #29 Monitoring Well-8 Sulfate Concentration



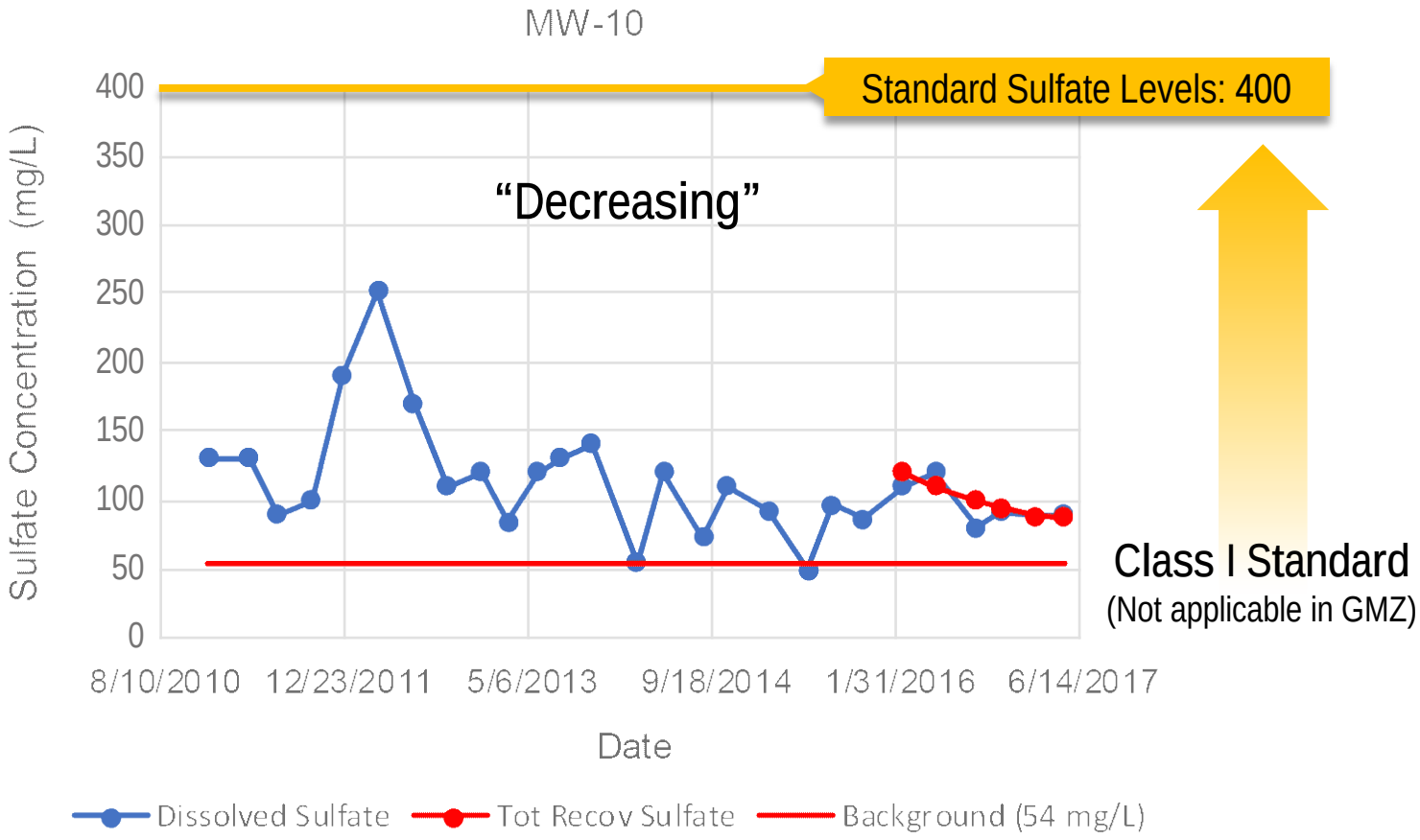
*No Conclusion (based on Seymour Trend Testing)
Oct 20, 2017 Complainant's Notice of Filing at 9

Joliet #29 Monitoring Well-9 Sulfate Concentration



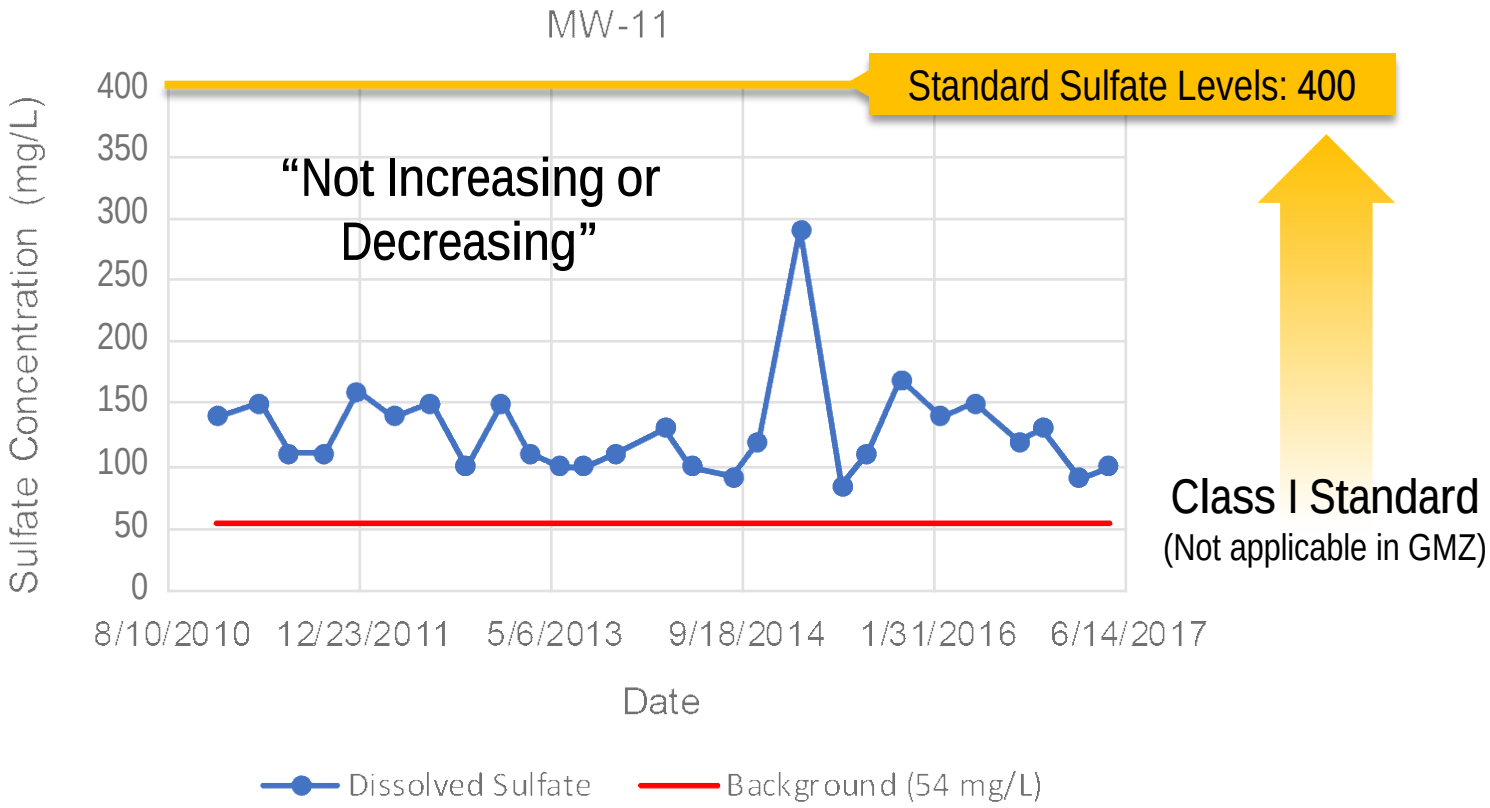
*Increasing (based on Seymour Trend Testing)
Oct 20, 2017 Complainant's Notice of Filing at 9

Joliet #29 Monitoring Well-10 Sulfate Concentration



Oct 20, 2017 Complainant's Notice of Filing at 10

Joliet #29 Monitoring Well-11 Sulfate Concentration



Class I Standard
(Not applicable in GMZ)

Oct 20, 2017 Complainant's Notice of Filing at 10

Sierra Club Environmental, et al. v. Midwest Generation, LLC.

Defense Expert John Seymour

Monday, February 5, 2018

John Seymour

Geosyntec consultants

engineers | scientists | innovators

- Geosyntec Consultants, Chicago, IL
- M.S. Civil (Geotechnical) Engineering
- B.S. Civil (Soils and Construction) Engineering
- Professional Engineer licensed in four states
- 40 years of experience
- 14+ years experience with CCRs
- Experience at dozens of CCR Ponds and Landfills
  - Siting
  - Site Investigations
  - Design
  - Construction
  - Closure
  - Remediation
- Qualified Professional Engineer under the CCR Rule

Resume 2018 Updates

- **CCR Surface Impoundment Closure Plan, Illinois:**
  Engineer and project manager to develop closure plan of CCR pond complex for submittal to Illinois EPA
- **CCR Surface Impoundment Closure Design, Illinois:**
  Engineer and leader for design of CCR pond complex including new closure concept
- **Groundwater monitoring system CCR Assessment, Ohio and Kentucky:**
  Assessing eight CCR units for compliance with US EPA CCR rule (40 CFR 257)
- **CCR sites, Ohio, West Virginia, Michigan:**
  Project manager to investigate various CCR landfilled areas
- **Site Remediation Program, Illinois:**
  Project manager for investigation of brownfield property under Illinois' SRP
- **Landfill site, Illinois:**
  Project manager to prepare application for groundwater management zone

Overview

- Common Factors
- Assessed site conditions for each facility
  - Site history and surroundings; ponds and how ash was handled
  - Groundwater elevations -> groundwater flow
  - Groundwater conditions and other ash data
  - Updated with additional data to 2017
- Compared bottom ash to groundwater conditions for each facility
- Risk Analysis

Overview

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  - Updated with additional data to 2017
- Compared bottom ash to groundwater conditions for each facility
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Common Factors

- Old sites = from 1920s/"youngest" is 1965
- 1978 Poz-o-Pac or other liners
- **MWG's actions 1999**-2013
  - Pond relining project
  - CCAs (GMZs, ELUCs)
- Wyoming Coal
- On Site Data/MWG coal ash constituents
  - Samples of bottom ash from ponds
  - Samples of historic ash areas
- No risk to potential receptors

Common Factors – MWG Actions 1999-2013

- Pond Relinings
  - Reviewed construction documents
    - Subgrade
    - Liner installation/60 M HDPE
    - Leak detection
  - Contractor dredging procedures
- 2013 CCAs
  - GMZs
  - ELUCs

Analyses of Bottom Ash From MWG Ponds

Generating Station:	Powerton		Waukegan		Will County
Sample Date:	May 2004	March 2007	July 2004	July 2004	December 2010
Sample ID:	Bottom Ash	Bottom Ash	Bottom Ash-1	Bottom Ash-2	3 South Bottom Ash
Methods 6010B/6020/7041A/7470A/7841 (mg/L)					
Antimony	<0.003	<0.0060	<0.0060	<0.0060	<0.0060
Arsenic	<0.010	<0.050	<0.050	<0.050	<0.050
Barium	0.39	0.27	0.19	0.12	<0.50
Beryllium	<0.004	<0.0040	<0.004	<0.004	<0.0040
Boron	0.087	<0.10	1.1	2	1.3
Cadmium	<0.002	<0.0050	<0.005	<0.005	<0.0050
Chromium	<0.010	<0.025	<0.050	<0.050	<0.025
Cobalt	<0.005	<0.025	<0.050	<0.050	<0.025
Copper	<0.010	<0.025	<0.050	<0.050	<0.025
Iron	<0.050	<0.10	<0.10	<0.10	<0.10
Lead	<0.005	<0.0075	<0.0075	<0.0075	<0.0075
Manganese	<0.010	<0.025	<0.050	<0.050	<0.025
Mercury	<0.0002	<0.0020	<0.0020	<0.0020	<0.0020
Nickel	<0.010	<0.025	<0.050	<0.050	<0.050
Selenium	<0.010	<0.050	Not Analyzed	Not Analyzed	<0.050
Silver	<0.005	<0.025	<0.050	<0.050	<0.025
Thallium	<0.002	<0.0020	<0.0020	<0.0020	<0.0020
Zinc	0.044	<0.10	<0.10	<0.10	<0.10
Method 9056 (mg/L)					
Sulfate	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	49
SM 2540C (mg/L)					
Total Dissolved Solid	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed	200
Sources:	MWG13-15_11356	MWG13-15_10951	MWG13-15_12814	MWG13-15_12815	MWG13-15_14712-13

Potential Leaching Characteristics of Historical Ash in Fill Materials

Generating station: Sample Date:	Joliet #29 July 2005 KPRG	Powerton May 2004 Andrews Engineering	Will County June/August 2015 KPRG
Sample location:	15 soil borings from former ash placement area	8 ash samples from test pits in the Limestone Runoff Basin	20 soil borings at the Will County site
Findings:	-high degree of statistical certainty that the criteria established in 415 ILCS 5/3.135 (formerly 415 ILCS 5/3.94) a-5(B) are met and that the material may be considered CCB for engineering/ beneficial reuse	Metals were less than the IEPA Class I groundwater standards except selenium and chromium (2 wells); no impacts of selenium or chromium above groundwater standards	High degree of statistical certainty that the criteria established in 415 ILCS 5/3.135 (formerly 415 ILCS 5/3.94) a-5(B) are met and that the material may be considered CCB for engineering/ beneficial reuse
Sources:	MWG13-15_19486-668	MWG13-15_11302-492	MWG13-15_49565-649

No Risk to Potential Receptors

- No potable water receptors
- The potential surface water risks were evaluated using a screening level approach that compared concentrations in groundwater to Illinois Water Quality Standards (WQS) or Water Quality Criteria (WQC).
- “An assessment of human and ecological receptors in surface water indicates that there is no risk to the surface water environment at each site based on regulatory risk standards and standards of practice for risk assessments.”

Seymour Report, Pg. 5

Overview

- Common Factors
- Assessed site conditions for each facility
  - Site history and surroundings; ponds and how ash was handled
  - Groundwater elevations -> groundwater flow
  - Groundwater conditions and other ash data
  - Updated with additional data to 2017
- **Compared bottom ash to groundwater conditions for each facility**
- Risk Analysis

Comparison With Groundwater Conditions

- Conducted a comparison of the occurrence of groundwater constituents detected in 2014 [and updated to 2017] compared to sets of indicators of leachate from ash stored in ponds and from EPRI research.
- The profiles of the constituents in the groundwater do not match the profiles of leachate constituent indicators in the ponds at the plant sites.
- Groundwater impacts are not the result of ash stored in the ponds at sites

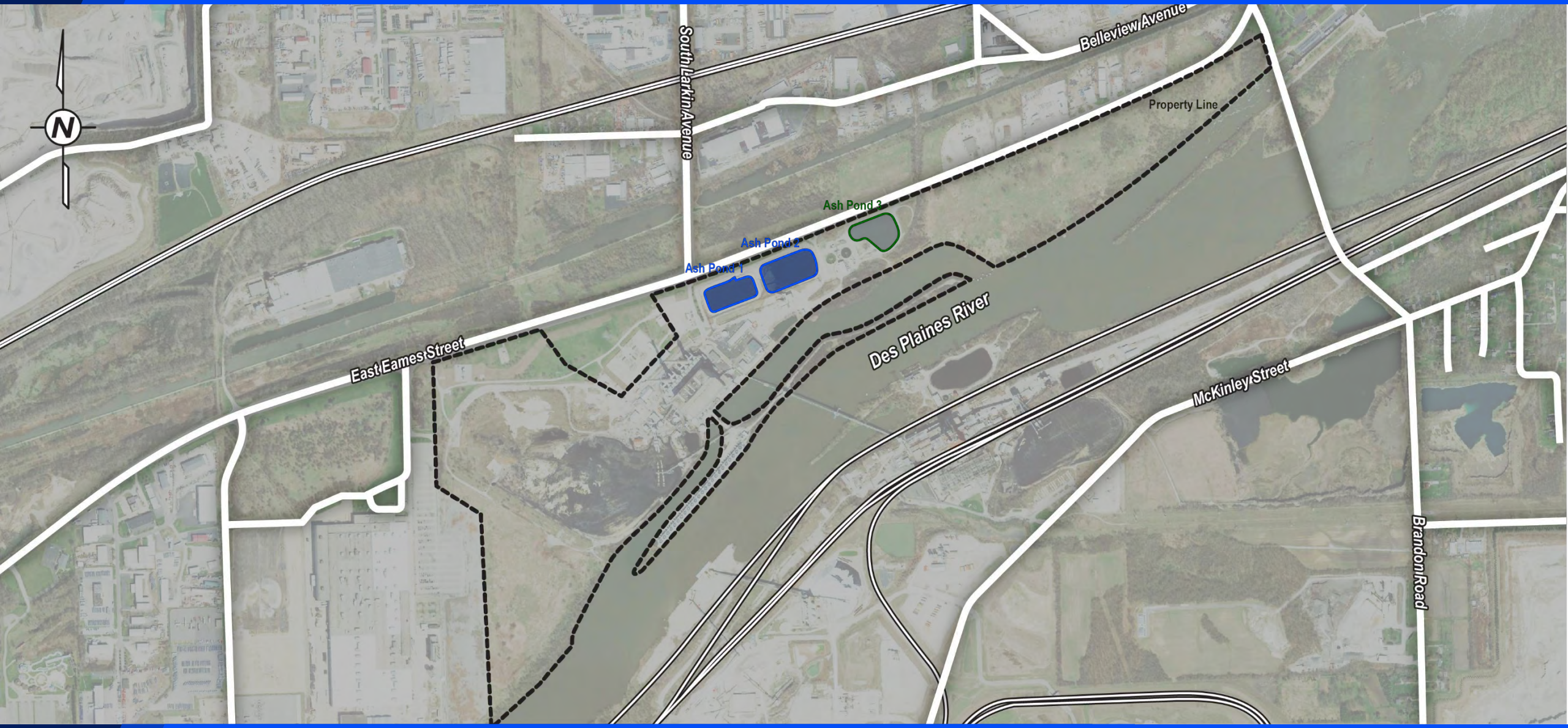
Overview

- Common Factors
- Assessed site conditions for each facility
  - Site history and surroundings; ponds and how ash was handled
  - Groundwater elevations -> groundwater flow
  - Groundwater conditions and other ash data
  - Updated with additional data to 2017
- Compared bottom ash to groundwater conditions for each facility
- Risk Analysis

Joliet #29 – Site History and Surroundings

- Operating for 30 years before MWG (1965)
- 2016 converted to natural gas – no ash
- When operating, most ash went off site - did not go to ponds
- **Review of Impoundments** (pre-2016)
  - Ponds 1 and 2 were used consecutively; Pond 3 was “finishing” – de minimis ash
  - Ponds lined and relined
- Historic ash / samples
- Administrative Controls/ GMZ and ELUC
- No potable water wells/no risk to receptors

Joliet #29

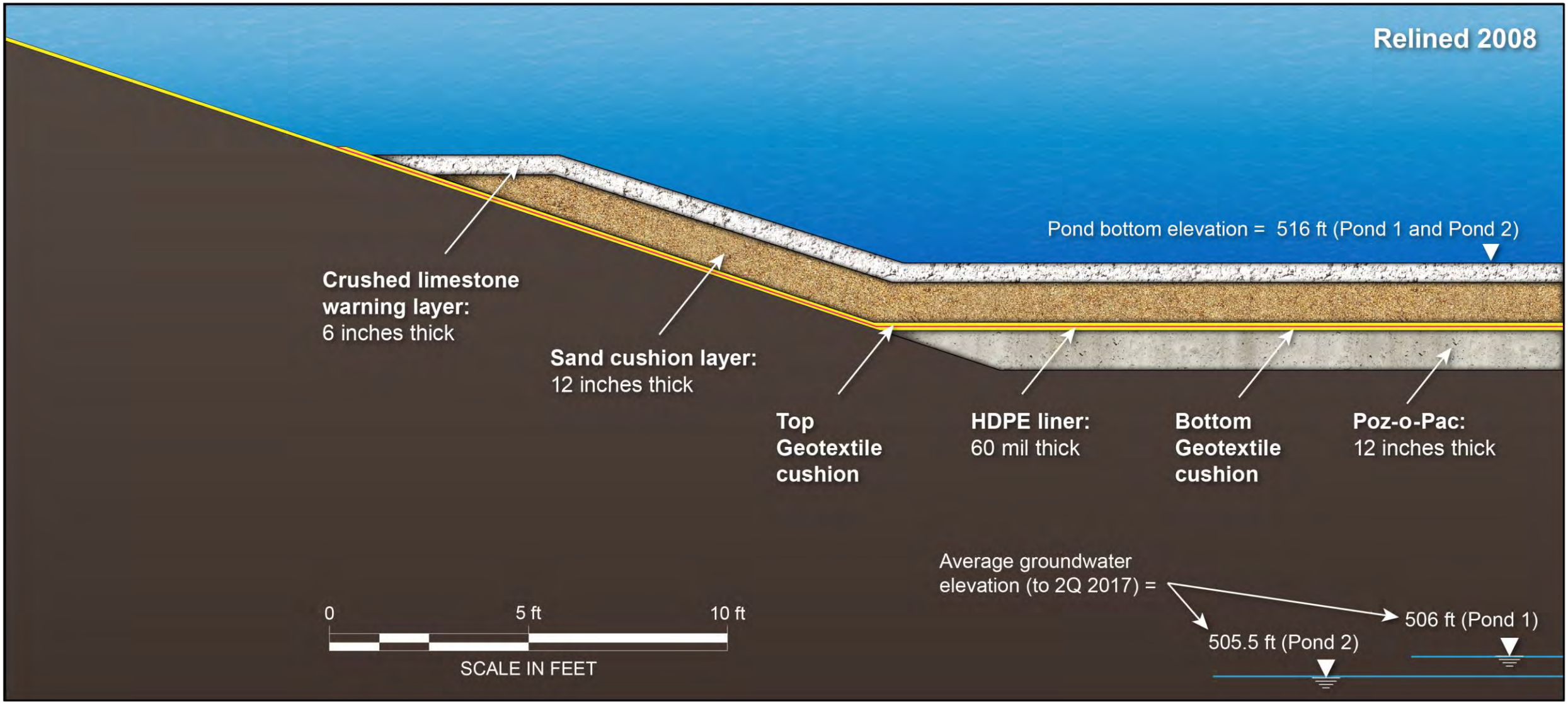

N
South Larkin Avenue
Belleview Avenue
Property Line
Ash Pond 3
Ash Pond 2
Ash Pond 1
East Eames Street
Des Plaines River
McKinley Street
Brandon Road

Joliet #29 – Impoundments

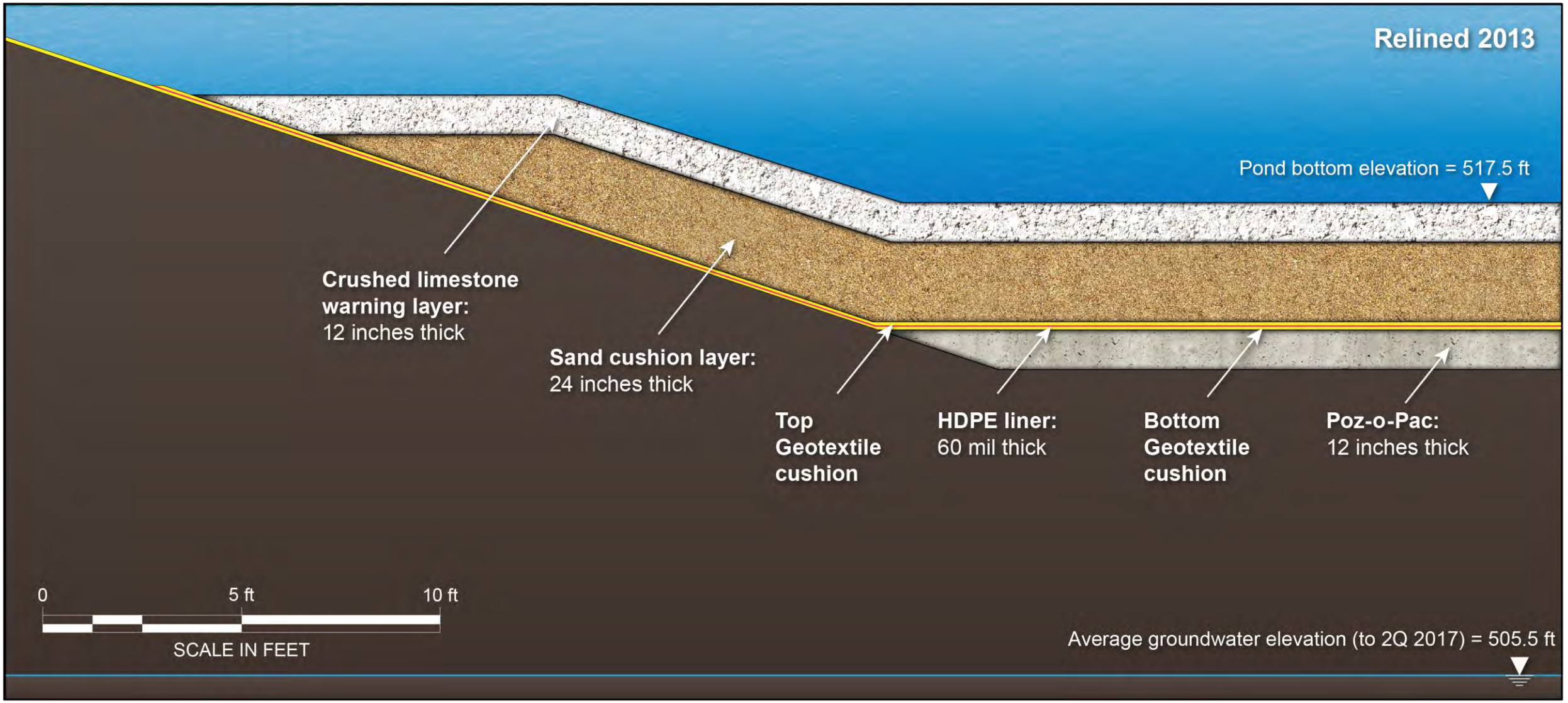
Station	Ash pond	Date Constructed/Liners	Date Relined With HDPE	Scheduled Ash Removal
Joliet #29 1964-65 Facility Operation Converted to gas in 2016	Ash Pond 1 Before 2015, used intermittently when the conveyer was not operating	1978 • Bituminous seal coat • Poz-o-Pac—12 inches thick • Compacted granular material—12 inches thick	2008 12” Poz-o-Pac; geotextile; HDPE; geotextile; sand; warning layer	No ash as of 2015 Previously emptied every 2-4 years*
	Ash Pond 2 Used intermittently used when the conveyer is not operating	1978 • Bituminous seal coat • Poz-o-Pac—12 inches thick • Compacted granular material—12 inches thick	2008 12” Poz-o-Pac; geotextile; HDPE; geotextile; sand; warning layer	No new ash; to be emptied of ash in 2018. Previously emptied every 2-4 years
	Ash Pond 3 Finishing pond	1978 • Bituminous seal coat • Poz-o-Pac —12 inches thick • Compacted granular material—12 inches thick	2013 12” Poz-o-Pac; geotextile; HDPE; geotextile; sand; warning layer	No ash Emptied for relining

*Per DiCola testimony/ponds emptied in succession

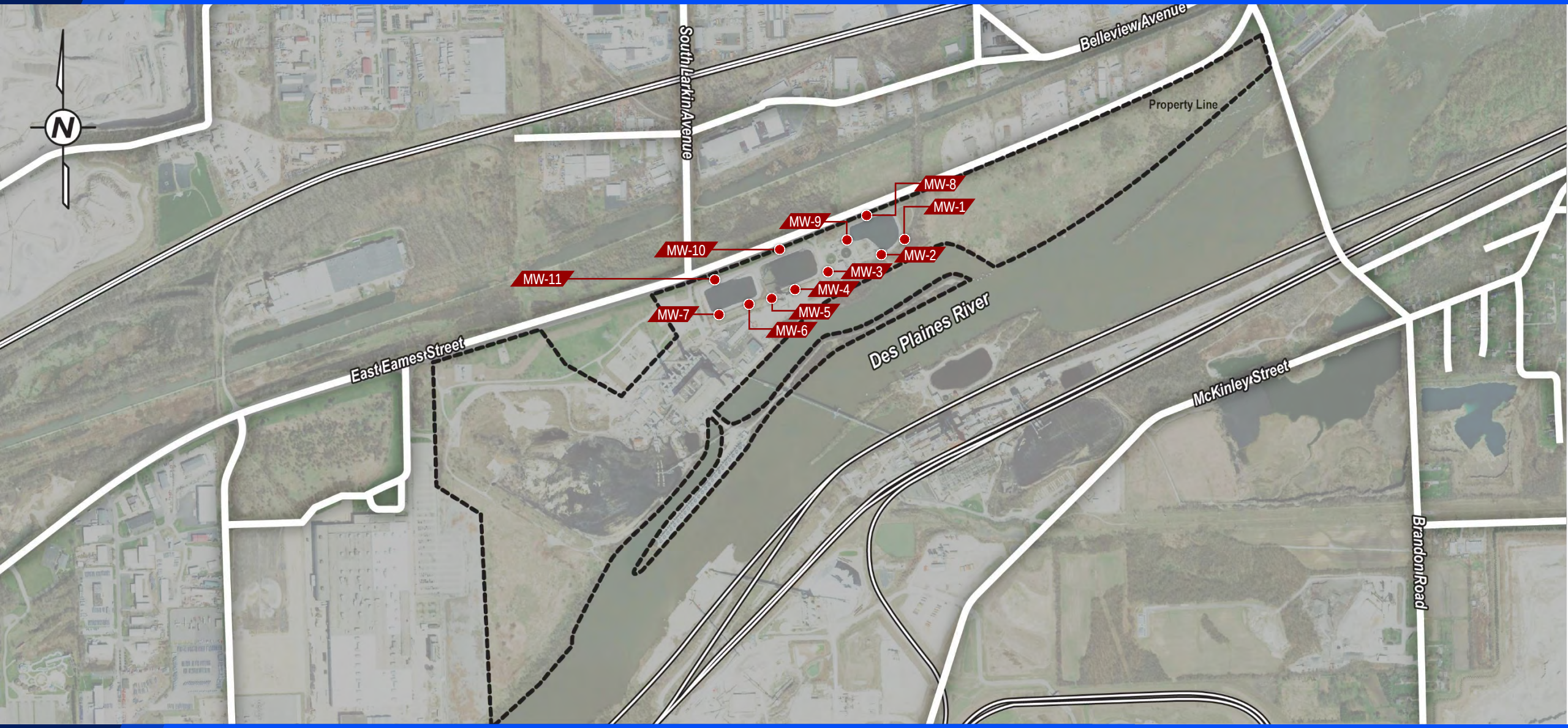
Joliet #29 – Ash Ponds 1 and 2

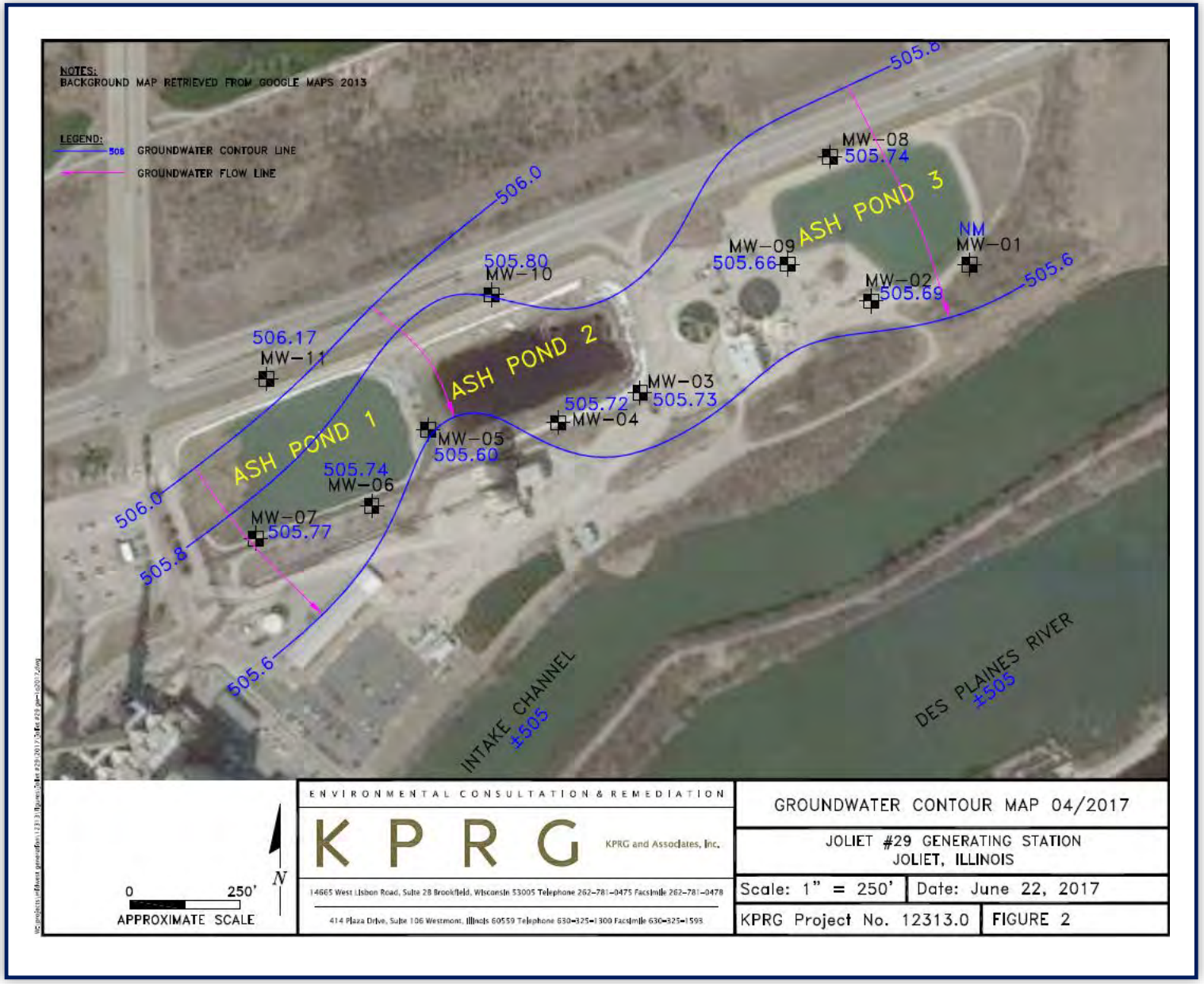


Joliet #29 – Ash Pond 3



Joliet #29




NOTES:
BACKGROUND MAP RETRIEVED FROM GOOGLE MAPS 2013
LEGEND:
505 GROUNDWATER CONTOUR LINE
GROUNDWATER FLOW LINE
506.0
505.80
MW-10
506.17
MW-11
ASH POND 1
ASH POND 2
ASH POND 3
505.74
MW-06
MW-07
505.77
MW-05
505.60
505.72
MW-04
MW-03
505.73
MW-08
505.74
MW-09
505.66
NM
MW-01
MW-02
505.69
505.6
506.0
505.8
505.6
INTAKE CHANNEL
±505
DES PLAINES RIVER
±505
0
250'
APPROXIMATE SCALE
N
ENVIRONMENTAL CONSULTATION & REMEDIATION
KPRG
KPRG and Associates, Inc.
14665 West Lisbon Road, Suite 28 Brookfield, Wisconsin 53005 Telephone 262-781-0475 Facsimile 262-781-0478
414 Plaza Drive, Suite 106 Westmont, Illinois 60559 Telephone 630-325-1300 Facsimile 630-325-1593
GROUNDWATER CONTOUR MAP 04/2017
JOLIET #29 GENERATING STATION
JOLIET, ILLINOIS
Scale: 1" = 250'
Date: June 22, 2017
KPRG Project No. 12313.0
FIGURE 2

Joliet #29 – Updated Table 5-5

Quarterly Groundwater Monitoring (2016-Q3 to 2017-Q2) Compared to Indicators in Impoundments/ponds (MWG site specific analyses)

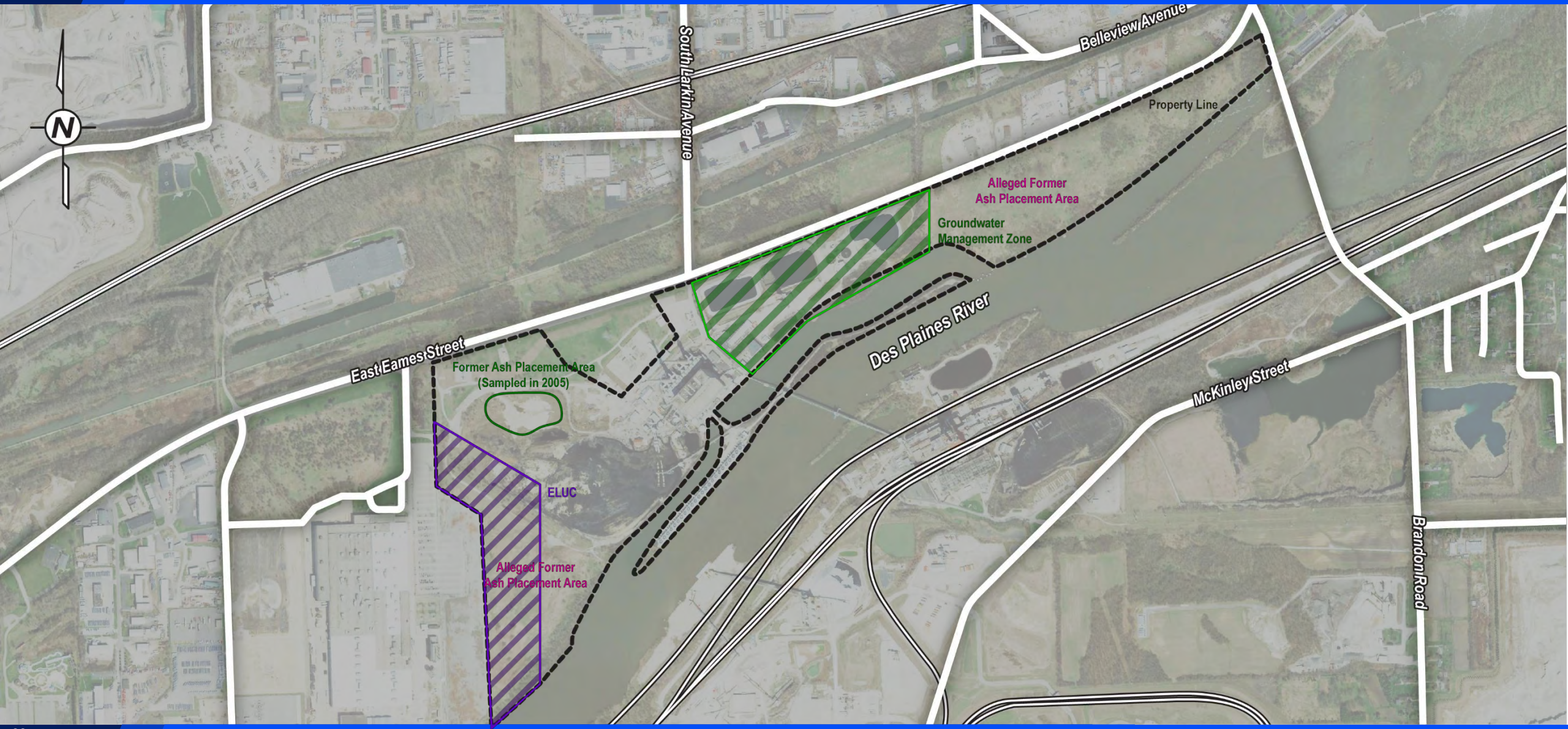
Constituent	Constituent is an Indicator of Leachate from Ash Currently Stored in Impoundments [1]	Constituents Detected During Most Recent Year (2016-Q3 to 2017-Q2) of Quarterly Groundwater Monitoring [2]										
		Joliet No. 29 Generating Station										
		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11
Arsenic				x	x		x	x		x		x
Barium	Yes (Table 5-1)	x	x	x	x	x	x	x	x	x	x	x
Boron	Yes (Table 5-1)	x	x	x	x	x	x	x	x	x	x	X
Cobalt					x					x		
Iron				x			x			x		
Manganese		x					x	x	x	x		
Mercury										x		
Nickel		x	x	x	x	x	x	x	x	x		x
Selenium		x		x		x	x					x
Sulfate	Yes (Table 5-1)	x	x	x	x	x	x	x	x	x	x	x
Number of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [3]		3	1	4	3	2	5	3	2	6	0	3
Percentage of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [4]		50%	25%	57%	50%	40%	63%	50%	40%	67%	0%	50%

Joliet #29 – Updated Table 5-4

Quarterly Groundwater Monitoring (2016-Q3 to 2017-Q2) Compared to Indicators in Impoundments/ponds (EPRI, 2006)

Constituent	Constituent is an Indicator of Leachate from Ash in Impoundments [1]	Constituents Detected during Most Recent Year (2016-Q3 to 2017-Q2) of Quarterly Groundwater Monitoring [2]										
		Joliet No. 29 Generating Station										
		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11
Antimony	Yes (Table 5-2)											
Arsenic	Yes (Table 5-2)			x	x		x	x		x		x
Barium	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	X	x
Boron	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	X	x
Cadmium	Yes (Table 5-2)											
Chromium	Yes (Table 5-2)											
Cobalt	Yes (Table 5-2)				x					x		
Copper	Yes (Table 5-2)											
Iron				x			x			x		
Lead	Yes (Table 5-2)											
Manganese	Yes (Table 5-2)	x					x	x	x	x		
Mercury	Yes (Table 5-2)									x		
Nickel	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x		x
Selenium	Yes (Table 5-2)	x		x		x	x					x
Sulfate	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	X	x
Zinc	Yes (Table 5-2)											
Number of Observed Constituents that are not Consistent with Indicators of Leachate from Ash in Impoundments [3]		9	11	10	9	10	9	9	10	8	12	9
Percentage of Observed Constituents that are not Consistent with Indicators of Leachate from Ash in Impoundments [4]		56%	69%	63%	56%	63%	56%	56%	63%	50%	75%	56%

Joliet #29


N
South Larkin Avenue
Belleview Avenue
Property Line
Alleged Former
Ash Placement Area
Groundwater
Management Zone
Des Plaines River
East Eames Street
Former Ash Placement Area
(Sampled in 2005)
McKinley Street
ELUC
Alleged Former
Ash Placement Area
Brandon Road

Joliet #29

Updated Groundwater Constituent Temporal Trend Testing Results

Monitoring Well	Barium		Boron		Manganese		Sulfate	
	Trend Direction [a]	Slope (mg/L/yr)	Trend Direction [a]	Slope (mg/L/yr)	Trend Direction [a]	Slope (mg/L/yr)	Trend Direction [a]	Slope (mg/L/yr)
MW-01	Decreasing	-0.005	Decreasing	-0.020	No conclusion	--	Decreasing	-13
MW-02	Decreasing	-0.0035	Decreasing	-0.046	Decreasing	-0.00023	Decreasing	-15
MW-03	Increasing	0.0011	Increasing	0.023	Decreasing	-0.0057	Decreasing	-9.7
MW-04	No conclusion	--	No conclusion	--	Decreasing	-0.018	Decreasing	-15
MW-05	No conclusion	--	Increasing	0.031	No conclusion	--	Increasing	8.7
MW-06	Increasing	0.0045	Decreasing	-0.022	Decreasing	-0.0074	No conclusion	--
MW-07	No conclusion	--	Decreasing	-0.034	Decreasing	-0.012	Decreasing	-8.1
MW-08	No conclusion	--	No conclusion	--	No conclusion	--	No conclusion	--
MW-09	Decreasing	-0.0025	No conclusion	--	Increasing	0.23	Increasing	680
MW-10	No conclusion	--	Decreasing	-0.022	Decreasing	-0.0042	Decreasing	-10
MW-11	No conclusion	--	No conclusion	--	No conclusion	--	No conclusion	--

Joliet #29

Updated Temporal Trend Testing of Groundwater Concentrations for Site-Specific Indicators of Ash in Ponds

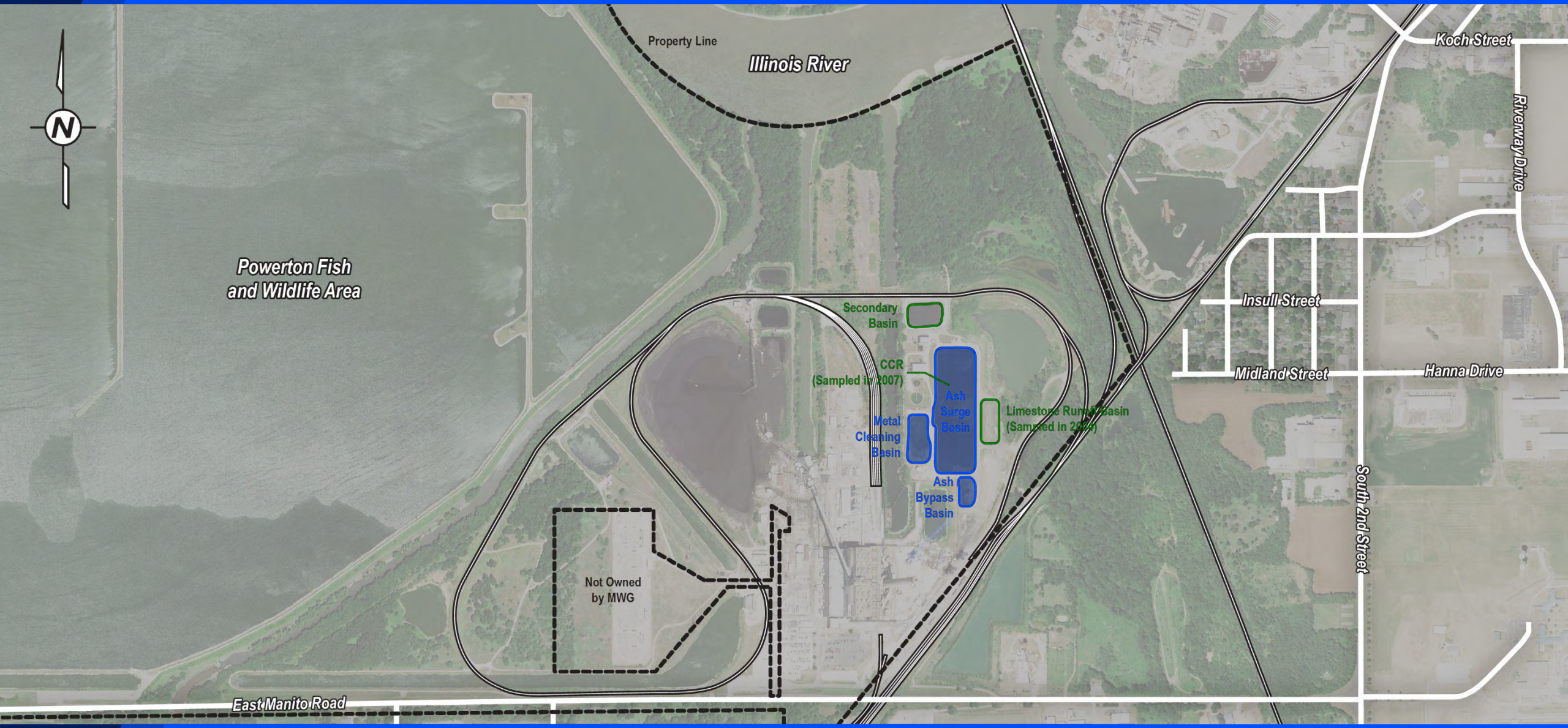
Trend	Barium	Boron	Manganese	Sulfate
Increasing	2 wells	2 wells	1 well	2 wells
Decreasing	3 wells	5 wells	6 wells	6 wells
No conclusion	6 wells	4 wells	4 wells	3 wells

- Overall, it appears that groundwater concentrations are slightly decreasing because:
  - The indicators are increasing at 1 to 2 wells out of 11 wells
  - The indicators are decreasing at 3 to 6 wells out of 11 wells
  - No conclusions could be made at 3 to 6 wells out of 11 wells

Powerton – Site History and Surroundings

- Operating since 1920s
- Review of Impoundments/Ponds
  - Ponds lined and relined
  - Secondary Basin underdrain system
- Pond ash sample results (2004 and 2007)
- Historic areas and samples (2004)
- Administrative controls/GMZ and ELUC
- No potable water wells/no risk to receptors

Powerton

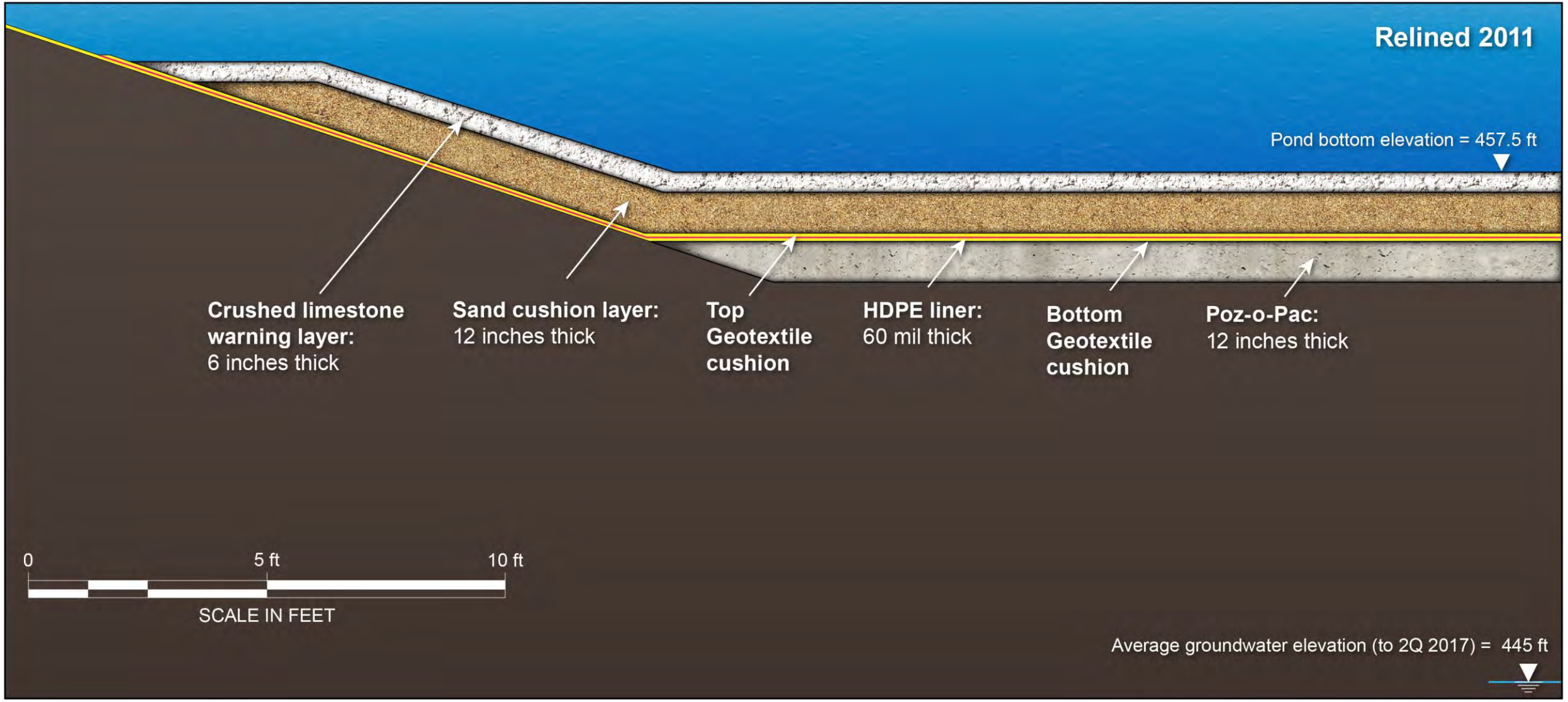


Powerton – Impoundments

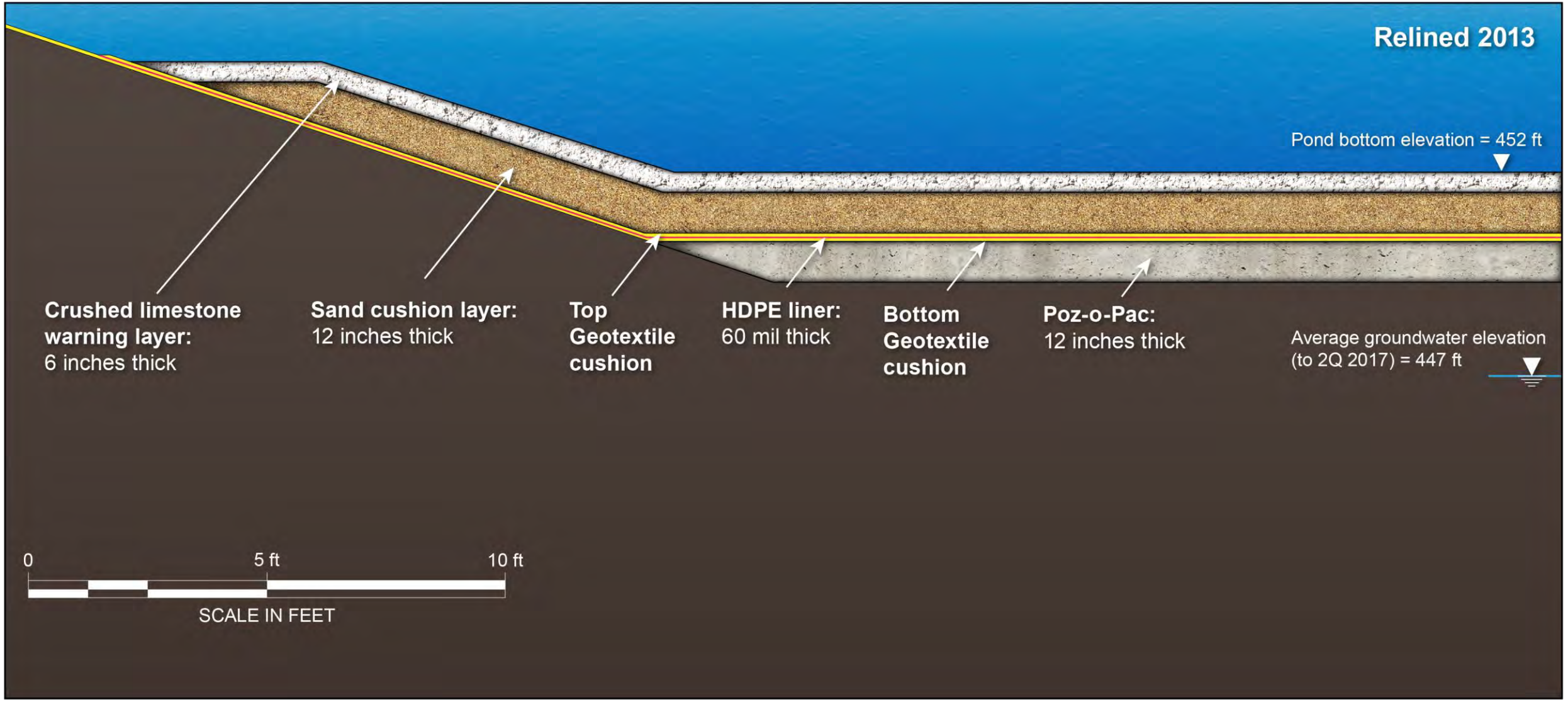
Station	Ash Pond	Date Constructed/Liners	Date Relined With HDPE	Scheduled Ash Removal
Powerton	Ash Surge Basin	1978 • Bituminous seal coat • Poz-o-Pac—12 inches thick on the bottom • Hypalon® liner on the sides • Compacted granular material	2013 12” Poz-o-Pac; geotextile; HDPE; geotextile; sand; warning layer	NONE since 2013 relining 6-8 years – as needed*
	Ash Bypass Basin Used only when emptying Ash Surge Basin	1978 12” Poz-o-Pac liner and Hypalon® sides	2010 Prepared subgrade; geotextile; HDPE; geotextile; sand; warning layer	6-8 years
	Metal Cleaning Basin	1978 • Bituminous seal coat • Poz-o-Pac—12 inches thick • Hypalon® liner along the sloped sides • Compacted granular material—12 inches thick	2010 12” Poz-o-Pac; geotextile; HDPE; geotextile; sand; warning layer	Temporary laydown area Ash removed annually, if needed
	Secondary Ash Basin/ Service Water Basin Finishing Pond	1978 Hypalon	2013 Prepared subgrade; geo-textile; under-drain system; geotextile; sand cushion; geo-textile; HDPE	De minimis ash/ Only emptied for relining

*Kelly Testimony

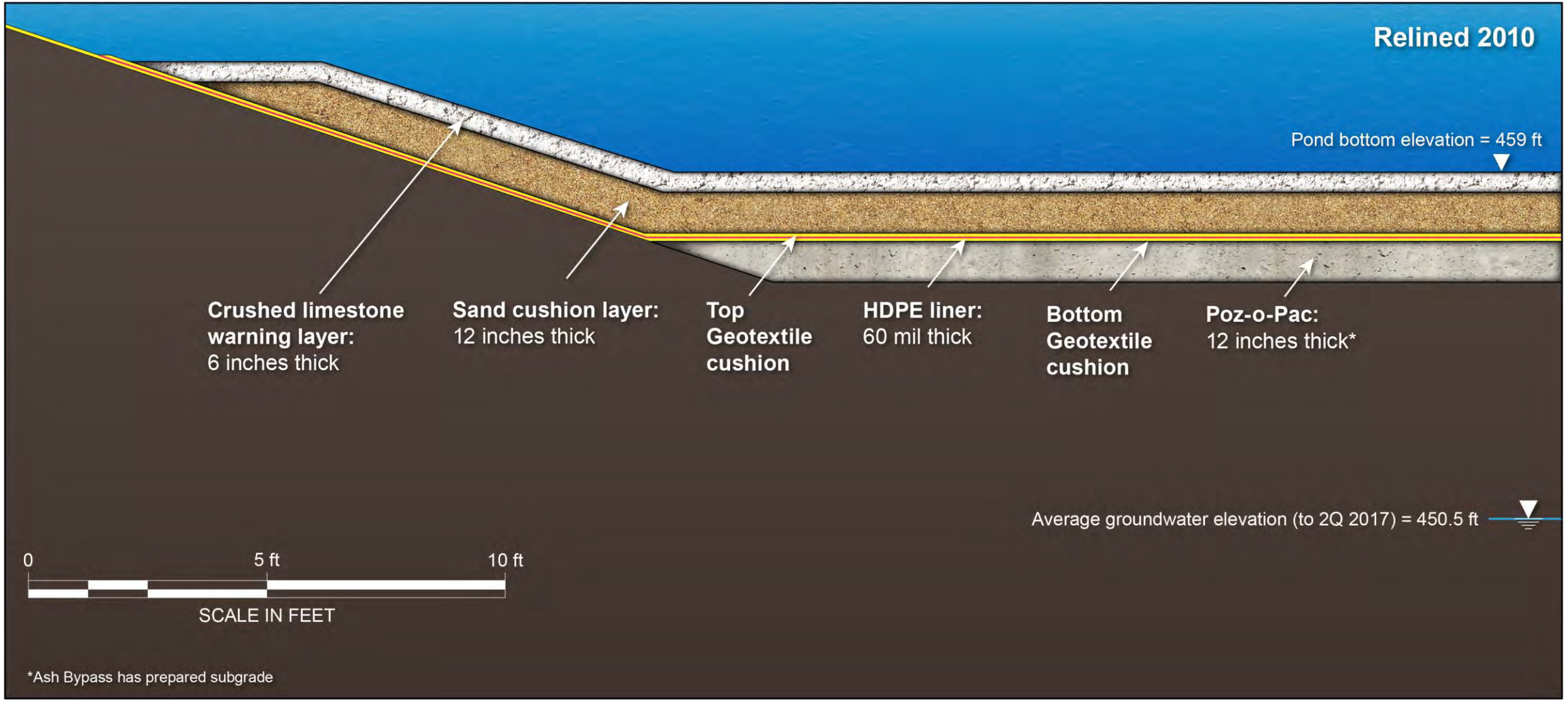
Powerton – Metal Cleaning Basin



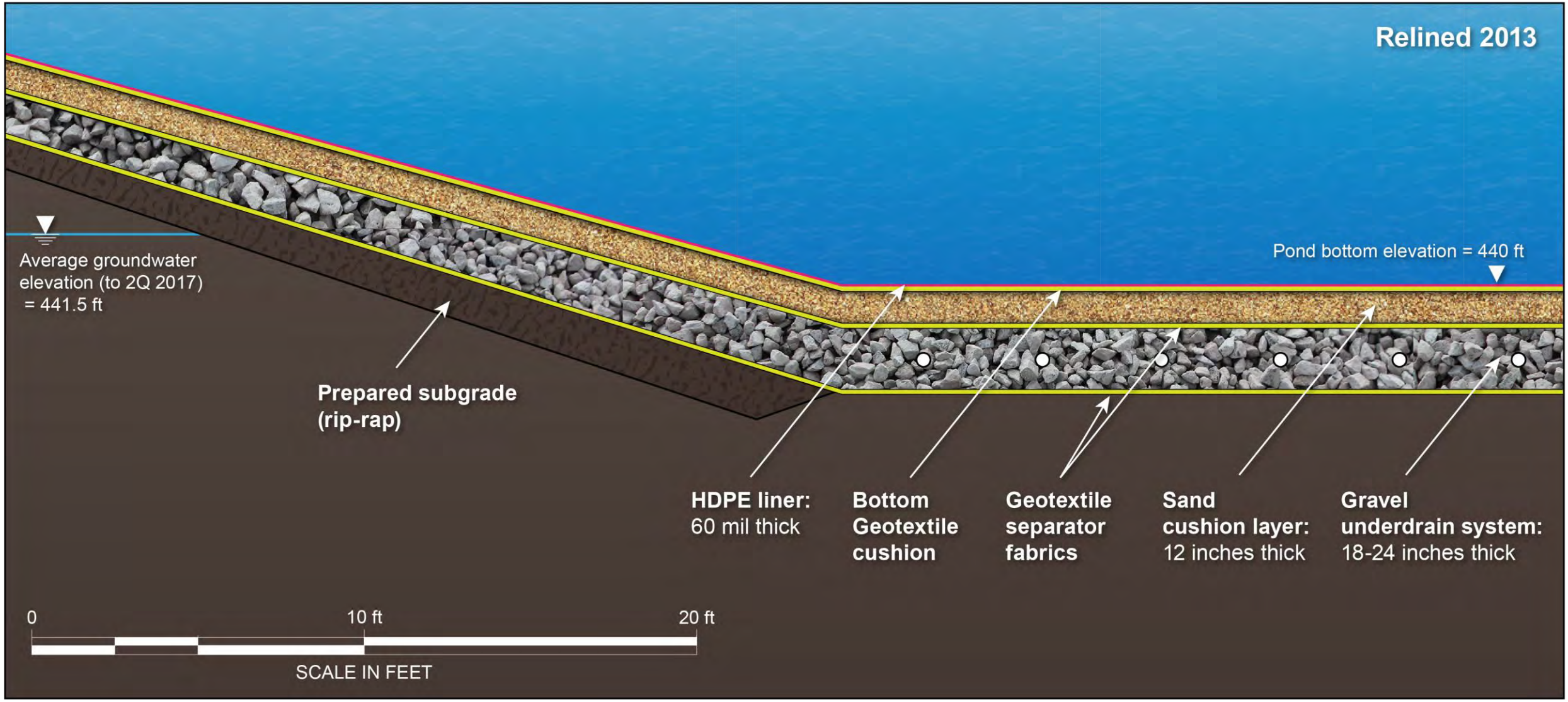
Powerton – Ash Surge Basin



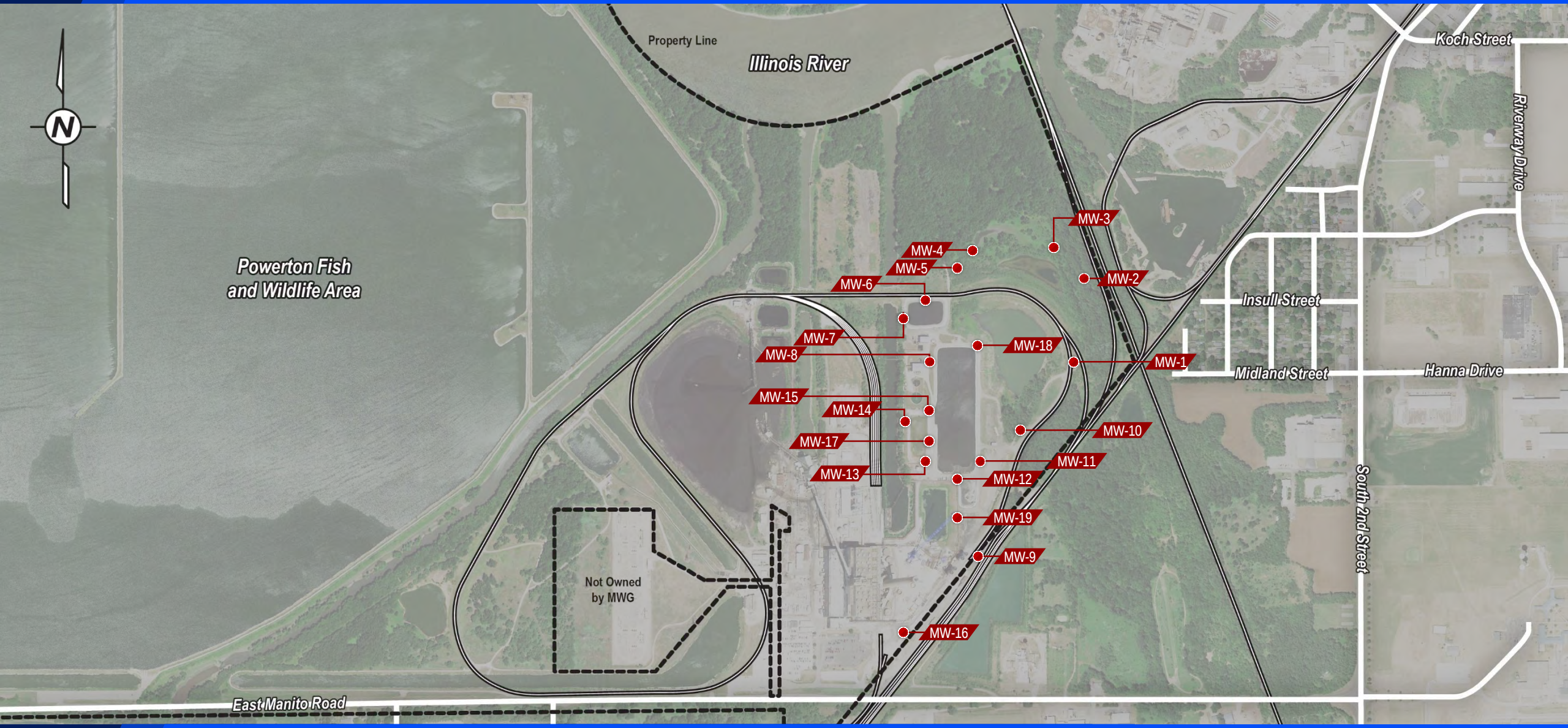
Powerton – Ash Bypass Basin



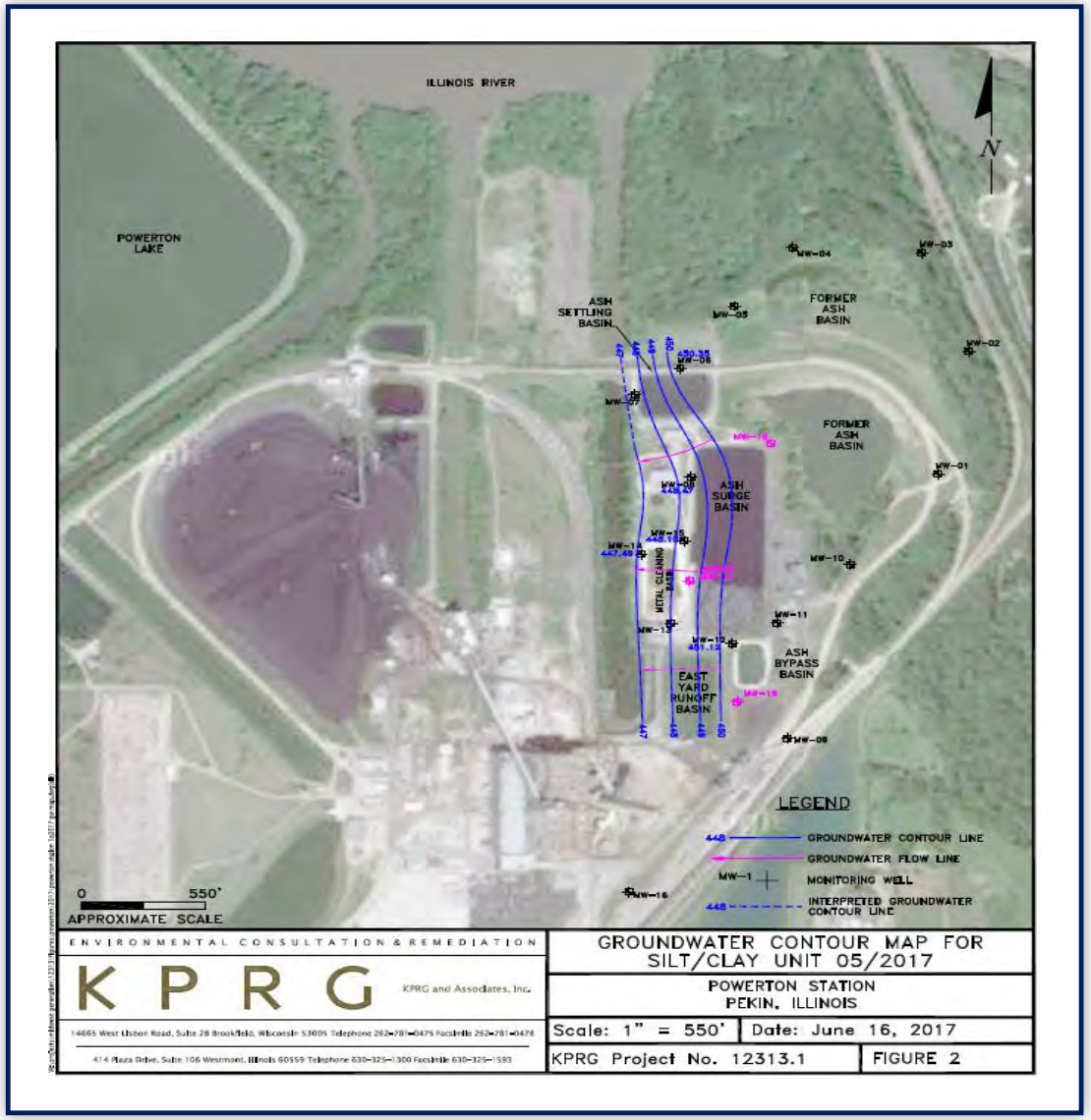
Powerton – Secondary Basin



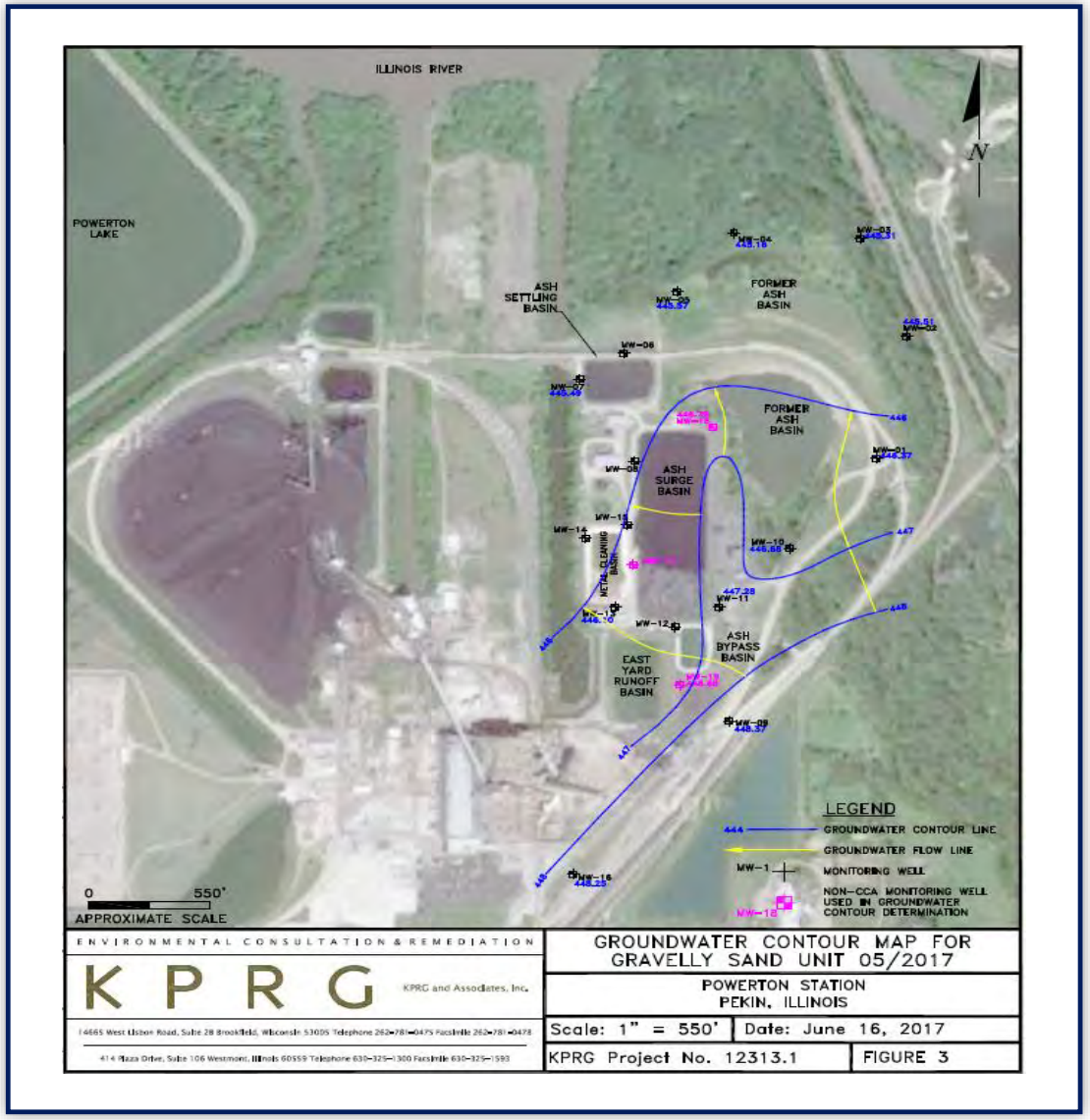
Powerton


Property Line
Illinois River
Powerton Fish and Wildlife Area
Not Owned by MWG
East Manito Road
Koch Street
Riverway Drive
Insull Street
Midland Street
Hanna Drive
South 2nd Street
MW-1
MW-2
MW-3
MW-4
MW-5
MW-6
MW-7
MW-8
MW-9
MW-10
MW-11
MW-12
MW-13
MW-14
MW-15
MW-16
MW-17
MW-18
MW-19

Shallow Silty Clay Unit GQ Flow – 2Q 2017



Deeper Gravelly Sand Unit – 2Q 2017



Powerton – Updated Table 5-5

Quarterly Groundwater Monitoring (2016-Q3 to 2017-Q2) Compared to Indicators in Impoundments/ponds (MWG site specific analyses)

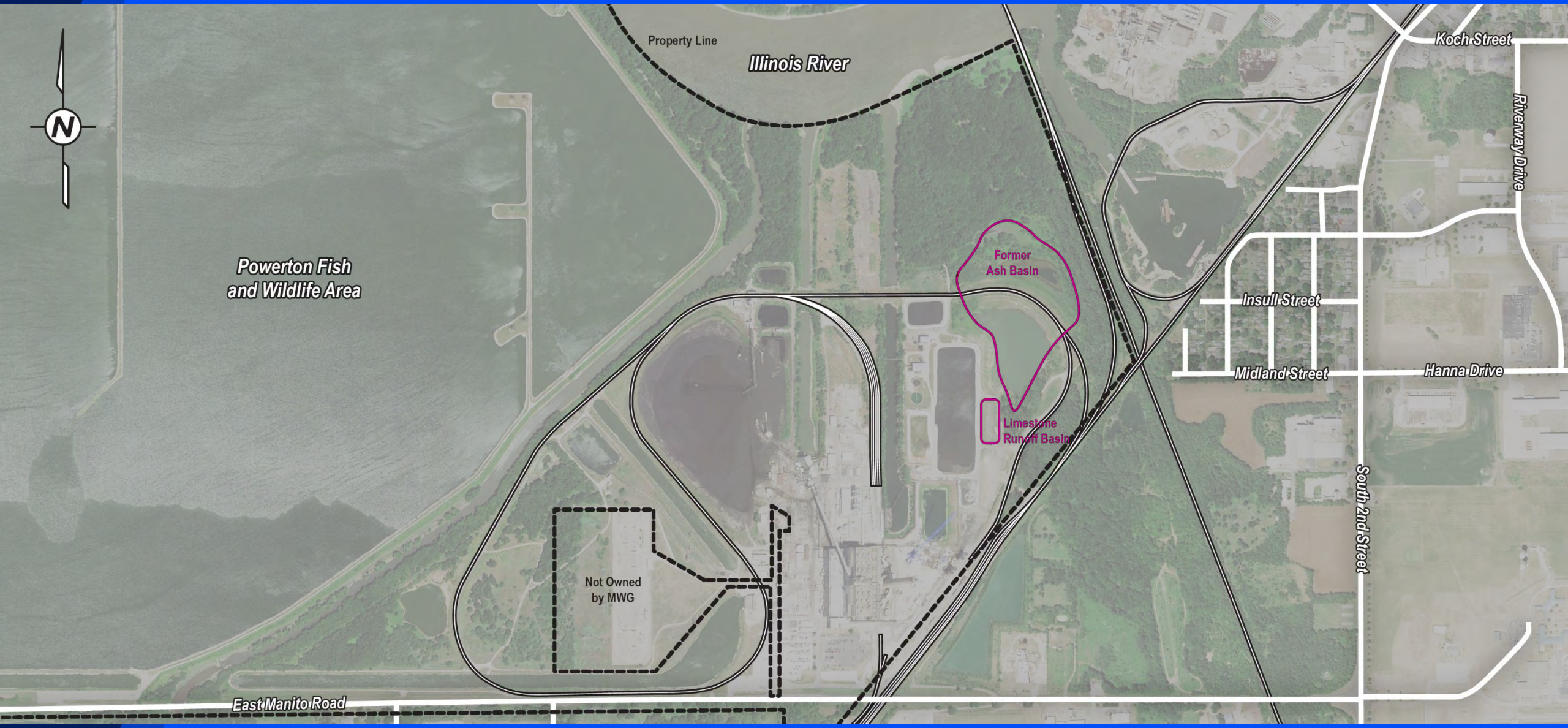
Constituent	Constituent is an Indicator of Leachate from Ash Currently Stored in Impoundments [1]	Constituents Detected during Most Recent Year (2016-Q3 to 2017-Q2) of Quarterly Groundwater Monitoring [2]															
		Powerton Generating Station															
		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-12	MW-13	MW-14	MW-15	MW-16
Arsenic			x				x	x	x			x	x	x	x	x	
Barium	Yes (Table 5-1)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Boron	Yes (Table 5-1)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Cadmium															x		
Cobalt								x			x	X			x		
Copper					x						x						
Iron							x	x	x		x	x	x	x	x	x	
Lead											x						
Manganese		x			x	x	x	x	x	x	x	x	x	x	x	x	x
Nickel						x		x	x		x	x	x		x	x	
Selenium				x	x					x	x			x	x	x	
Sulfate	Yes (Table 5-1)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Number of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [3]		1	1	1	3	2	3	5	4	2	7	5	4	4	8	5	1
Percentage of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [4]		25%	25%	25%	50%	40%	50%	63%	57%	40%	70%	63%	57%	57%	73%	63%	25%

Powerton – Updated Table 5-4

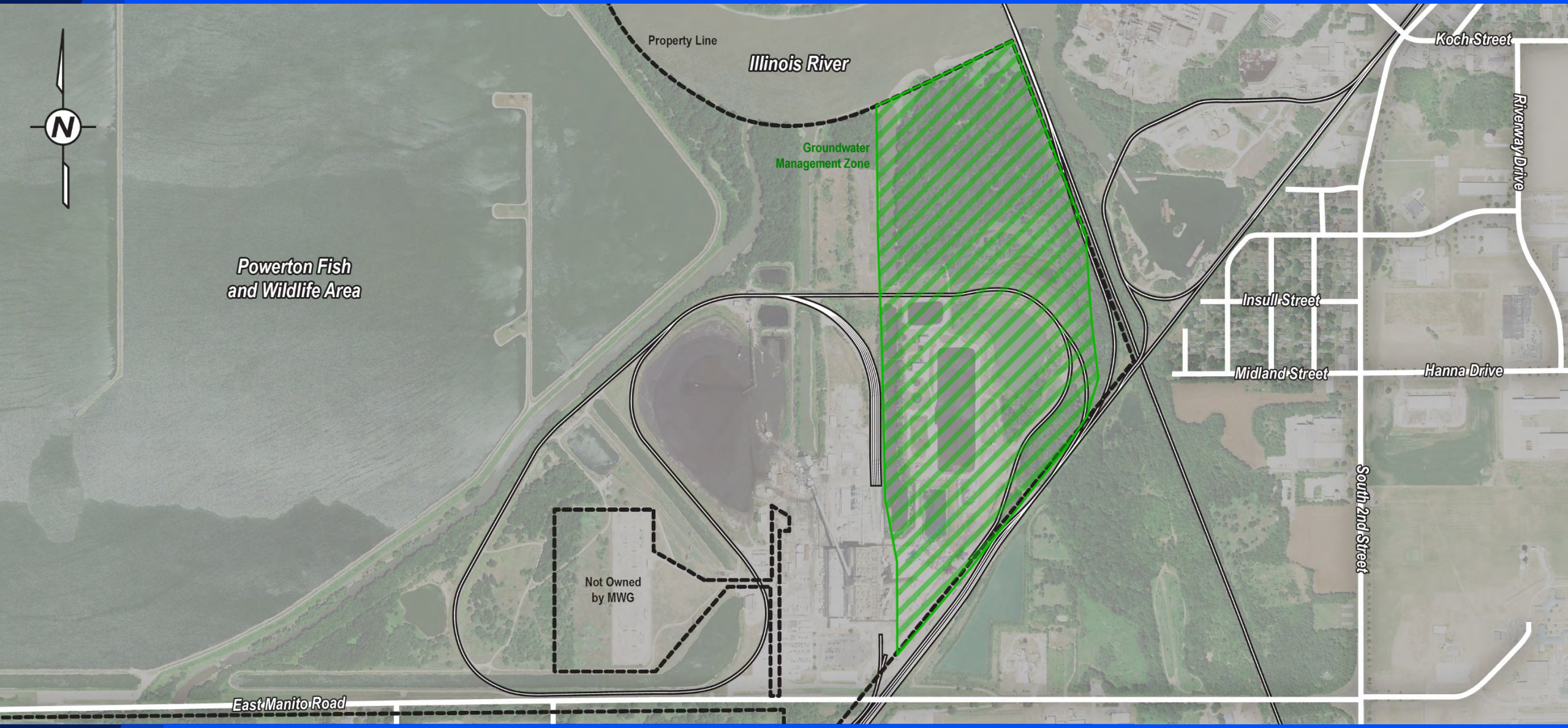
Quarterly Groundwater Monitoring (2016-Q3 to 2017-Q2) Compared to Indicators in Impoundments/ponds (EPRI, 2006)

Constituent	Constituent is an Indicator of Leachate from Ash in Impoundments [1]	Constituents Detected During Most Recent Year (2016-Q3 to 2017-Q2) of Quarterly Groundwater Monitoring [2]															
		Powerton Generating Station															
		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-12	MW-13	MW-14	MW-15	MW-16
Antimony	Yes (Table 5-2)																
Arsenic	Yes (Table 5-2)		x				x	x	x			x	x	x	x	x	
Barium	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Boron	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Cadmium	Yes (Table 5-2)														x		
Chromium	Yes (Table 5-2)																
Cobalt	Yes (Table 5-2)							x			x	x			x		
Copper	Yes (Table 5-2)				x						x						
Iron							x	x	x		x	x	x	x	x	x	
Lead	Yes (Table 5-2)										x						
Manganese	Yes (Table 5-2)	x			x	x	x	x	x	x	x	x	x	x	x	x	x
Mercury	Yes (Table 5-2)																
Nickel	Yes (Table 5-2)					x		x	x		x	x	x		x	x	
Selenium	Yes (Table 5-2)			x	x					x	x			x	x	x	
Sulfate	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Zinc	Yes (Table 5-2)																
Number of Observed Constituents that are not Consistent with Indicators of Leachate from Ash in Impoundments [3]		11	11	11	9	10	11	9	10	10	7	9	10	10	8	9	11
Percentage of Observed Constituents that are not Consistent with Indicators of Leachate from Ash in Impoundments [4]		69%	69%	69%	56%	63%	69%	56%	63%	63%	44%	56%	63%	63%	50%	56%	69%

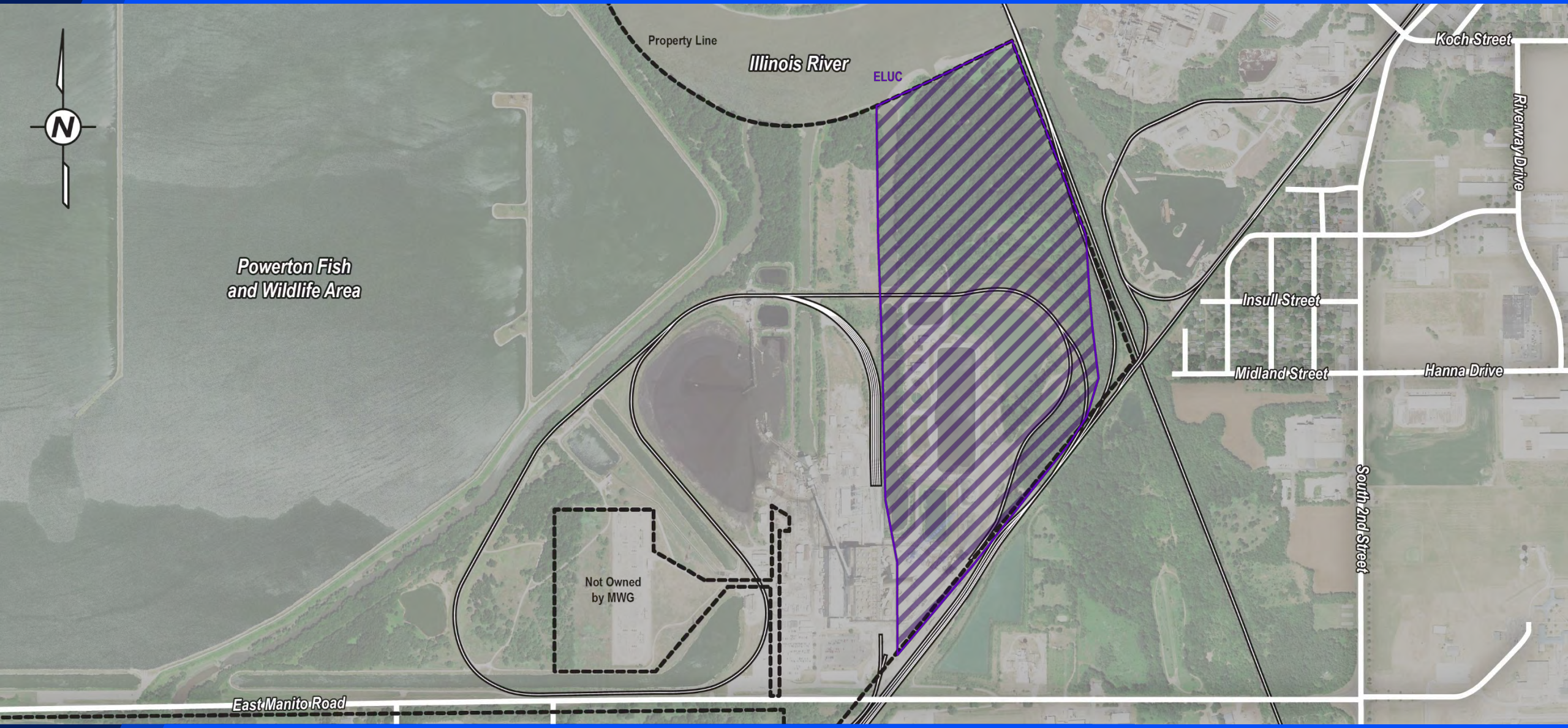
Powerton



Powerton

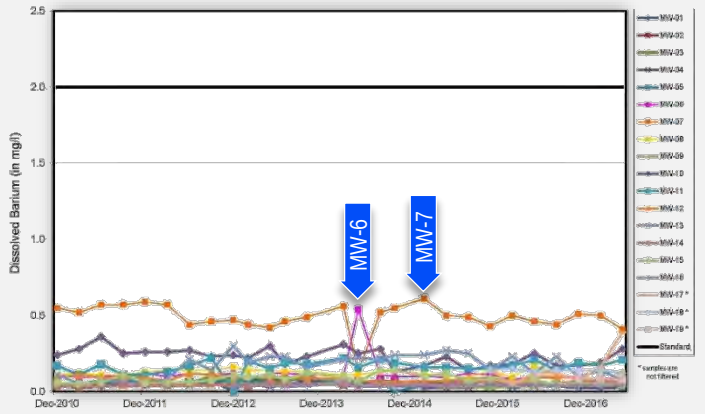

N
Property Line
Illinois River
Groundwater
Management Zone
Powerton Fish
and Wildlife Area
Not Owned
by MWG
East Manito Road
Koch Street
Riverway Drive
Insull Street
Midland Street
Hanna Drive
South 2nd Street

Powerton

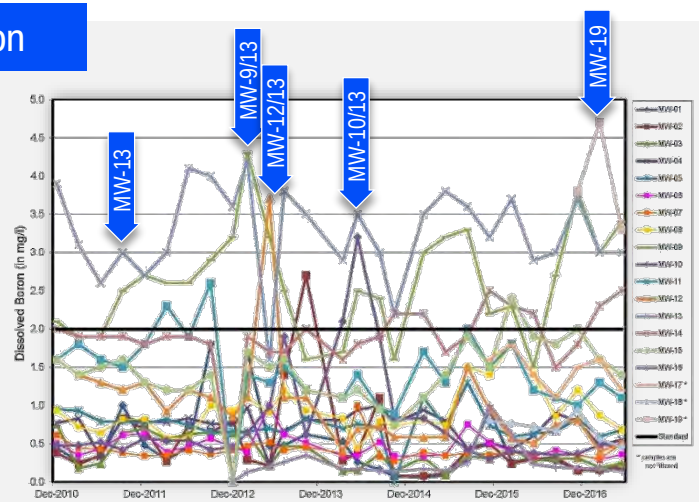

Property Line
Illinois River
ELUC
Koch Street
Riverway Drive
Powerton Fish
and Wildlife Area
Insull Street
Midland Street
Hanna Drive
South 2nd Street
Not Owned
by MWG
East Manito Road

Powerton

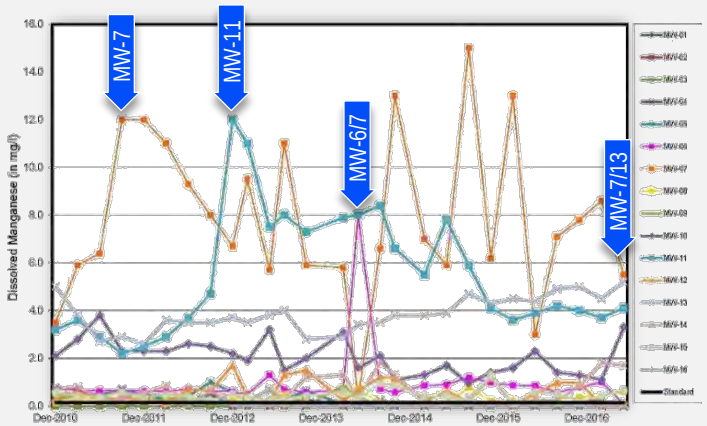
Barium



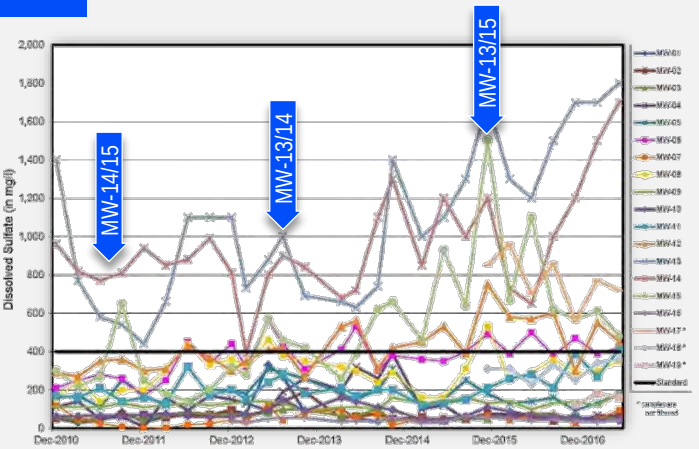
Boron



Manganese



Sulfate



Updated Groundwater Constituent Temporal Trend Testing Results

Monitoring Well	Barium		Boron		Manganese		Sulfate	
	Trend Direction [a]	Slope (mg/L/yr)	Trend Direction [a]	Slope (mg/L/yr)	Trend Direction [a]	Slope (mg/L/yr)	Trend Direction [a]	Slope (mg/L/yr)
MW-01	No conclusion	--	Decreasing	-0.086	No conclusion	--	No conclusion	--
MW-02	No conclusion	--	Decreasing	-0.065	No conclusion	--	No conclusion	--
MW-03	No conclusion	--	Decreasing	-0.057	No conclusion	--	No conclusion	--
MW-04	Decreasing	-0.0049	No conclusion	--	Decreasing	-0.079	No conclusion	--
MW-05	Decreasing	-0.0018	No conclusion	--	Decreasing	-0.11	No conclusion	--
MW-06	No conclusion	--	Decreasing	-0.024	No conclusion	--	Increasing	29
MW-07	Decreasing	-0.011	No conclusion	--	No conclusion	--	Increasing	3.5
MW-08	Decreasing	-0.004	Increasing	0.062	Increasing	0.026	Increasing	12
MW-09	Decreasing	-0.0012	Increasing	0.076	Decreasing	-0.039	Increasing	4.2
MW-10	Decreasing	-0.015	No conclusion	--	Decreasing	-0.18	No conclusion	--
MW-11	Increasing	0.006	Decreasing	-0.094	No conclusion	--	Increasing	19
MW-12	Decreasing	0.00	Decreasing	-0.15	No conclusion	--	Increasing	40
MW-13	Increasing	0.012	No conclusion	--	Increasing	0.23	Increasing	140
MW-14	Increasing	0.004	Increasing	0.056	Increasing	0.073	Increasing	66
MW-15	No conclusion	--	Increasing	0.056	No conclusion	--	Increasing	92
MW-16	Decreasing	-0.340	No conclusion	--	Decreasing	-0.0013	No conclusion	--

Updated Temporal Trend Testing of Groundwater Concentrations for Site-Specific Indicators of Ash in Ponds

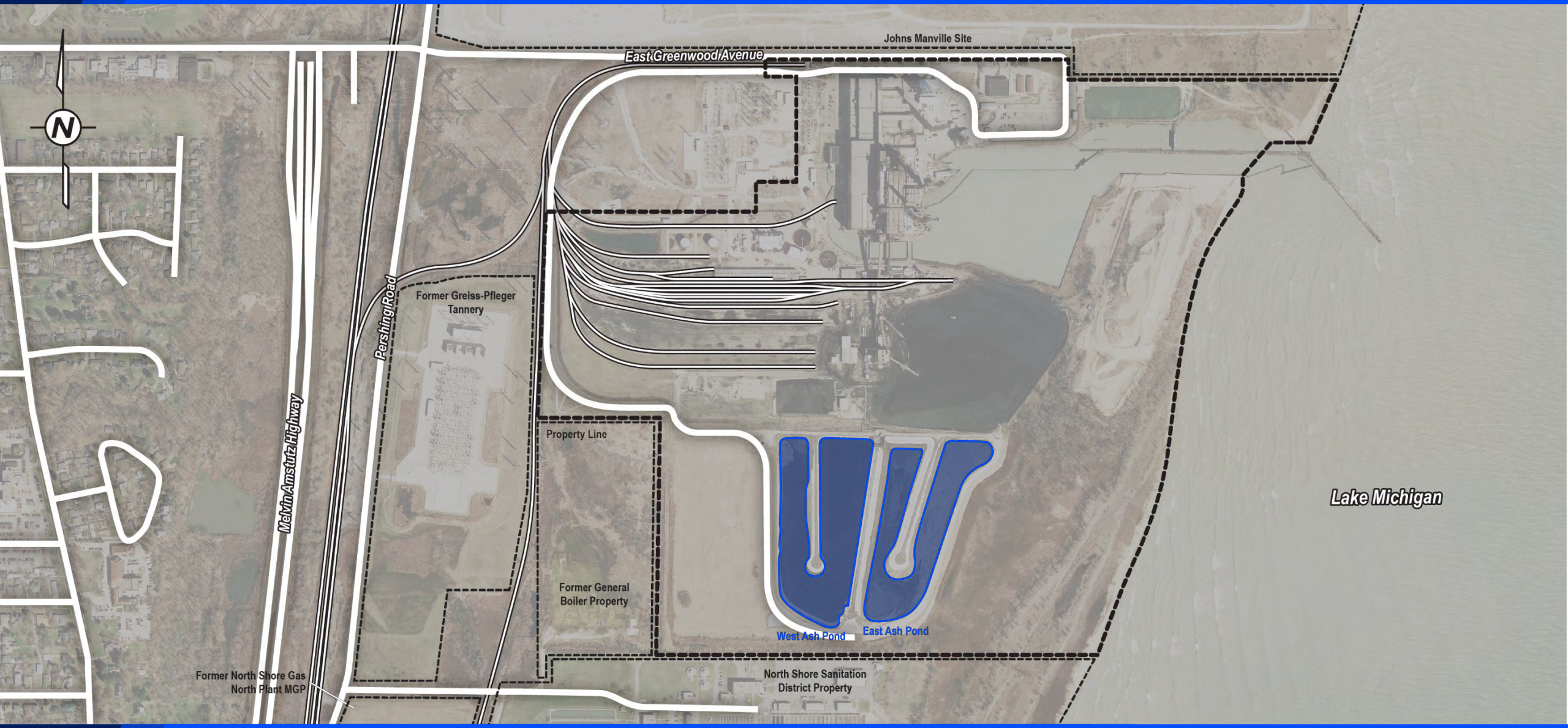
Trend	Barium	Boron	Manganese	Sulfate
Increasing	2 wells	4 wells	3 wells	9 wells
Decreasing	8 wells	6 wells	5 wells	No wells
No conclusion	5 wells	6 wells	8 wells	7 wells

- Overall, it appears that groundwater concentrations are neither increasing nor decreasing because:
  - The indicators are increasing at 3 to 9 wells out of 16 wells
  - Three indicators show decreasing trends at 5 to 8 wells out of 16 wells
  - No conclusions could be made at 5 to 7 wells out of 16 wells

Waukegan – Site History and Surroundings

- Operating for 75 years before MWG (1923)
- Review of Impoundments/Ponds
  - Ponds lined with Hypalon® in 1977
  - Relined by MWG (2003-2004)
- Pond ash sample results (2004 both ponds)
- Historic areas
- Off site impacts
- Administrative controls/ELUCs
- No potable water wells/no risk to receptors

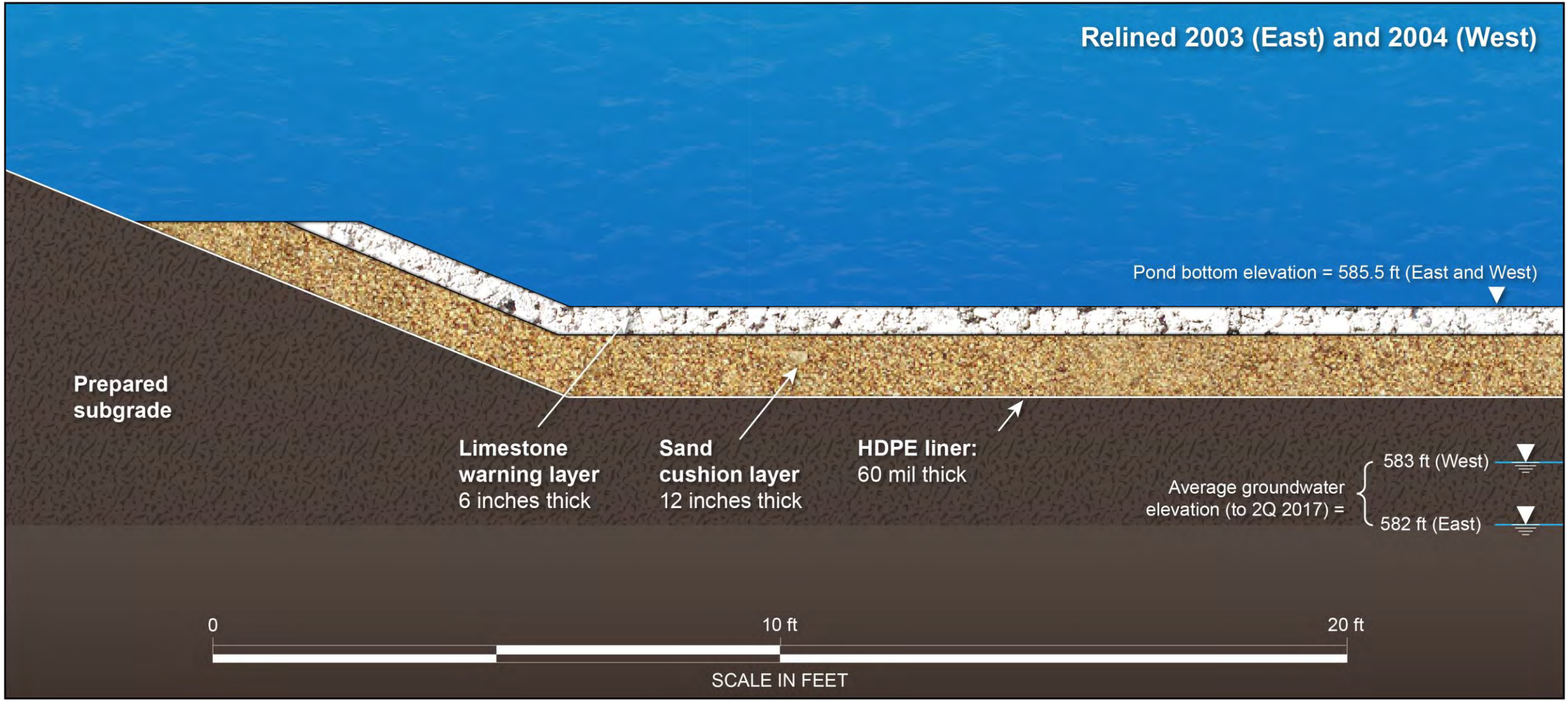
Waukegan



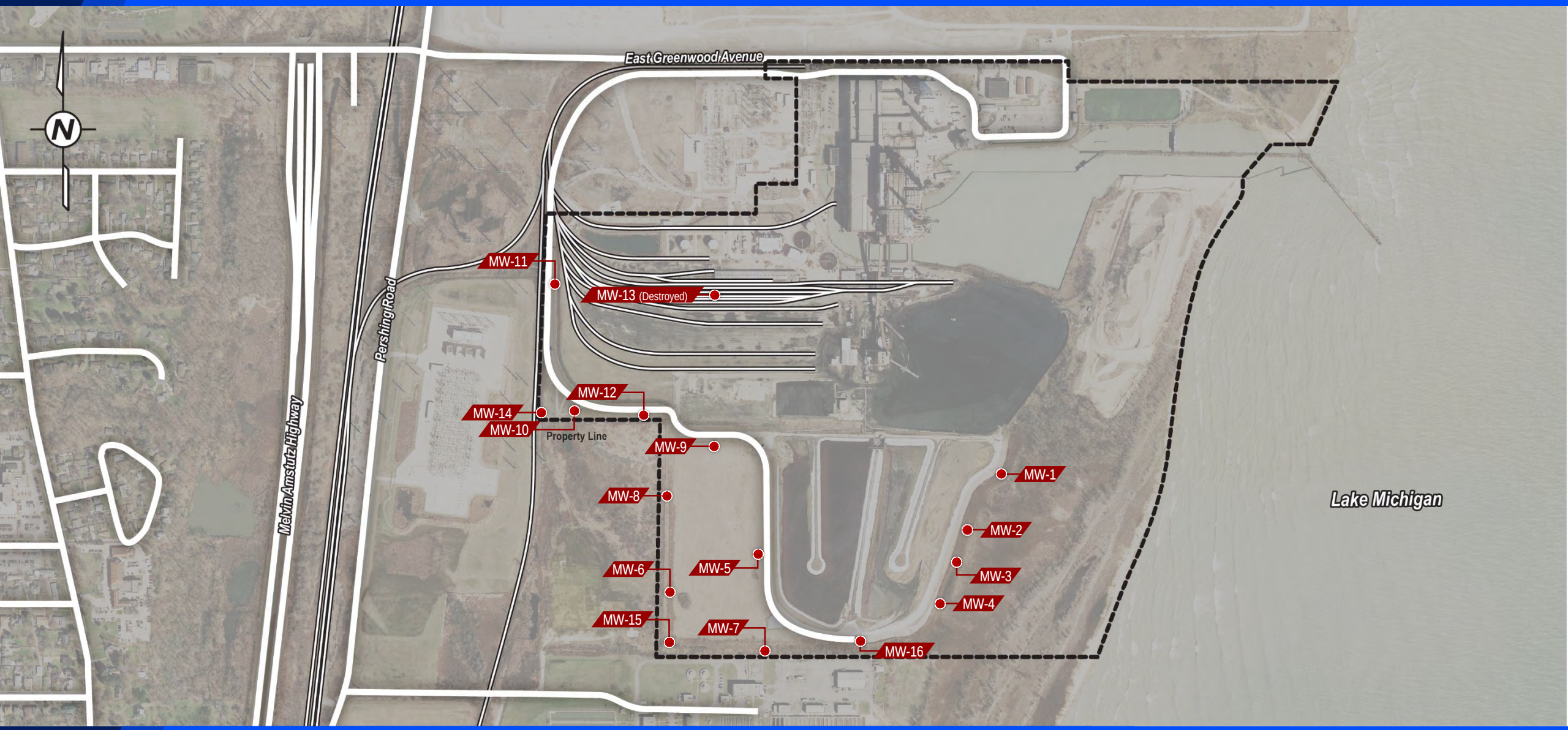
Waukegan – Impoundments

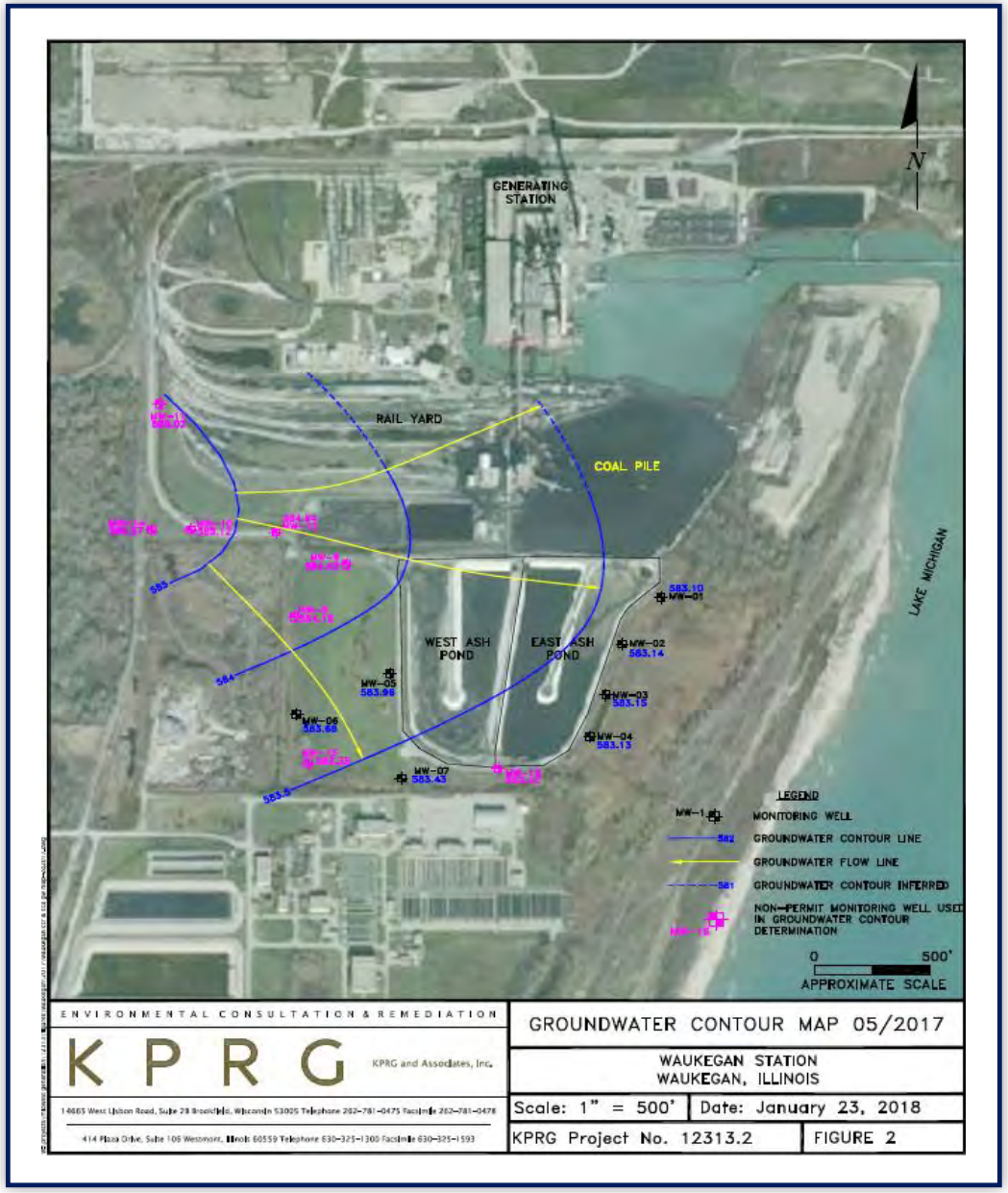
Station	Ash Pond	Date Constructed -Liners	Date Relined With HDPE	Scheduled Ash Removal
Waukegan	East Ash Pond	1977 Hypalon®	2003 Prepared subgrade; HDPE; sand cushion; warning layer	3-4 yrs (prev. 2 yrs)* Bottom area only; inlet side
	West Ash Pond	1977 Hypalon®	2004 Prepared subgrade; HDPE; sand cushion; warning layer	3-4 yrs (prev. 2 yrs)

Waukegan – East and West Ash Ponds



Waukegan




N
GENERATING STATION
RAIL YARD
COAL PILE
LAKE MICHIGAN
WEST ASH POND
EAST ASH POND
MW-01 583.10
MW-02 583.14
MW-03 583.15
MW-04 583.13
MW-05 583.98
MW-06 583.68
MW-07 583.43
585
584
583.5
LEGEND
MW-1 MONITORING WELL
582 GROUNDWATER CONTOUR LINE
GROUNDWATER FLOW LINE
581 GROUNDWATER CONTOUR INFERRED
NON-PERMIT MONITORING WELL USED IN GROUNDWATER CONTOUR DETERMINATION
0 500'
APPROXIMATE SCALE
ENVIRONMENTAL CONSULTATION & REMEDIATION
K P R G
KPRG and Associates, Inc.
GROUNDWATER CONTOUR MAP 05/2017
WAUKEGAN STATION
WAUKEGAN, ILLINOIS
Scale: 1" = 500'
Date: January 23, 2018
KPRG Project No. 12313.2
FIGURE 2

Waukegan – Updated Table 5-5

Quarterly Groundwater Monitoring (2016-Q3 to 2017-Q2) Compared to Indicators in Impoundments/ponds (MWG site specific analyses)

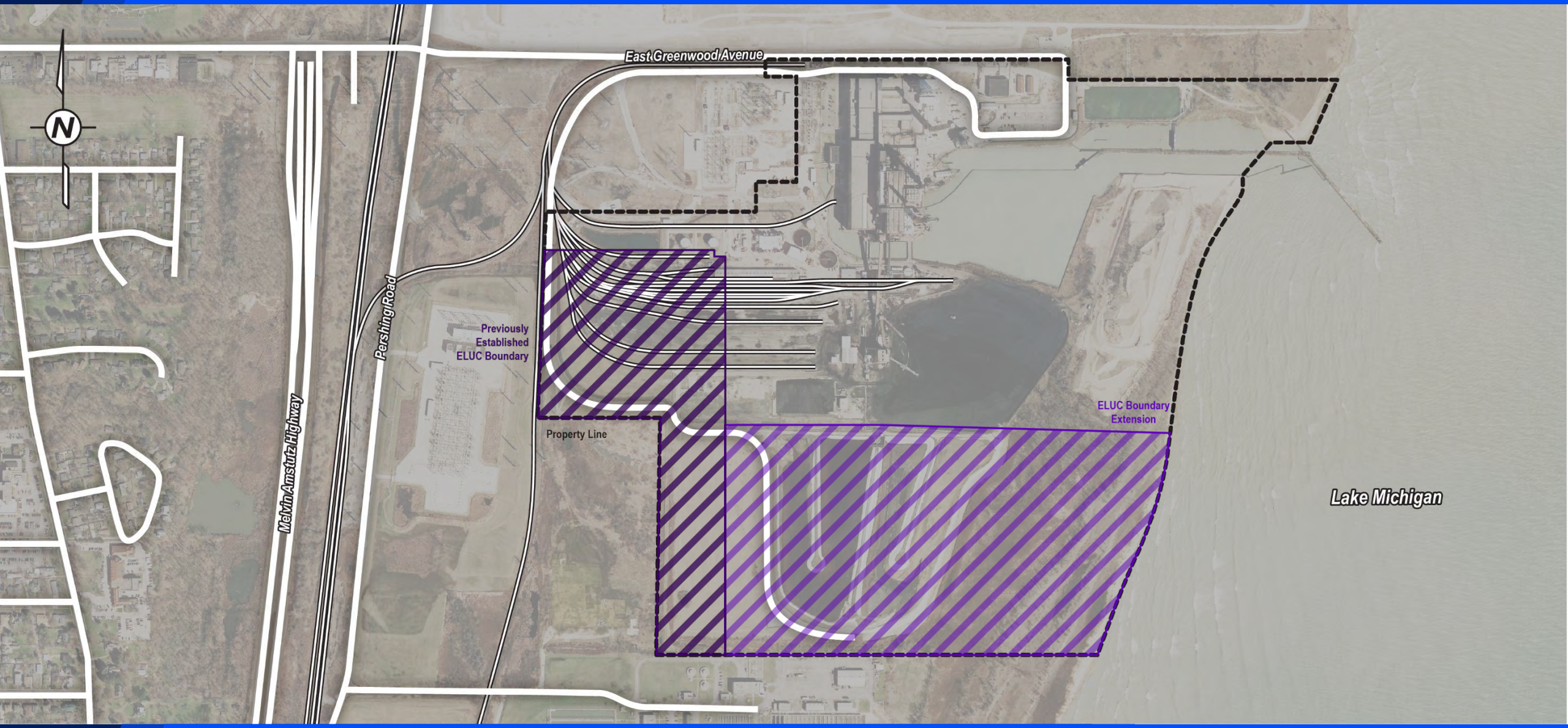
Constituent	Constituent is an Indicator of Leachate from Ash Currently Stored in Impoundments [1]	Constituents Detected During Most Recent Year (2016-Q3 to 2017-Q2) of Quarterly Groundwater Monitoring [2]						
		Waukegan Generating Station						
		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-07
Arsenic		x	x	x	x	x	x	x
Barium	Yes (Table 5-1)	x	x	x	x	x	x	x
Boron	Yes (Table 5-1)	x	x	x	x	x	x	x
Copper								x
Iron					x	x	x	x
Lead								x
Manganese			x	x	x	x	x	x
Nickel						x		
Selenium		x	x	x	x	x	x	
Sulfate	Yes (Table 5-1)	x	x	x	x	x	x	x
Number of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [3]		2	3	3	4	5	4	5
Percentage of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [4]		40%	50%	50%	57%	63%	57%	63%

Waukegan – Updated Table 5-4

Quarterly Groundwater Monitoring (2016-Q3 to 2017-Q2) Compared to Indicators in Impoundments/ponds (EPRI, 2006)

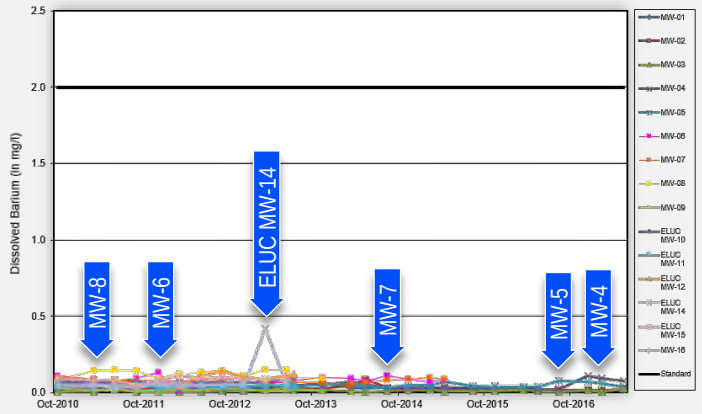
Constituent	Constituent is an Indicator of Leachate from Ash in Impoundments [1]	Constituents Detected during Most Recent Year (2016-Q3 to 2017-Q2) of Quarterly Groundwater Monitoring [2] — Waukegan Generating Station						
		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7
Antimony	Yes (Table 5-2)							
Arsenic	Yes (Table 5-2)	x	x	x	x	x	x	x
Barium	Yes (Table 5-2)	x	x	x	x	x	x	x
Boron	Yes (Table 5-2)	x	x	x	x	x	x	x
Cadmium	Yes (Table 5-2)							
Chromium	Yes (Table 5-2)							
Cobalt	Yes (Table 5-2)							
Copper	Yes (Table 5-2)							x
Iron					x	x	x	x
Lead	Yes (Table 5-2)							x
Manganese	Yes (Table 5-2)		x	x	x	x	x	x
Mercury	Yes (Table 5-2)							
Nickel	Yes (Table 5-2)					x		
Selenium	Yes (Table 5-2)	x	x	x	x	x	x	
Sulfate	Yes (Table 5-2)	x	x	x	x	x	x	x
Zinc	Yes (Table 5-2)							
Number of Observed Constituents that are not Consistent with Indicators of Leachate from Ash in Impoundments [3]		10	9	9	10	9	10	9
Percentage of Observed Constituents that are not Consistent with Indicators of Leachate from Ash in Impoundments [4]		63%	56%	56%	63%	56%	63%	56%

Waukegan

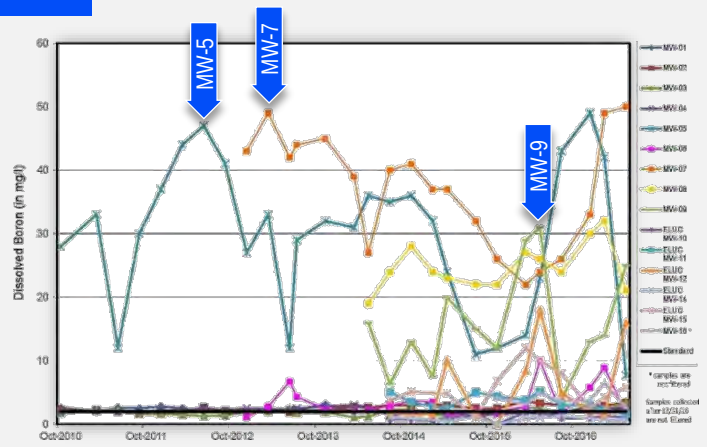


Waukegan

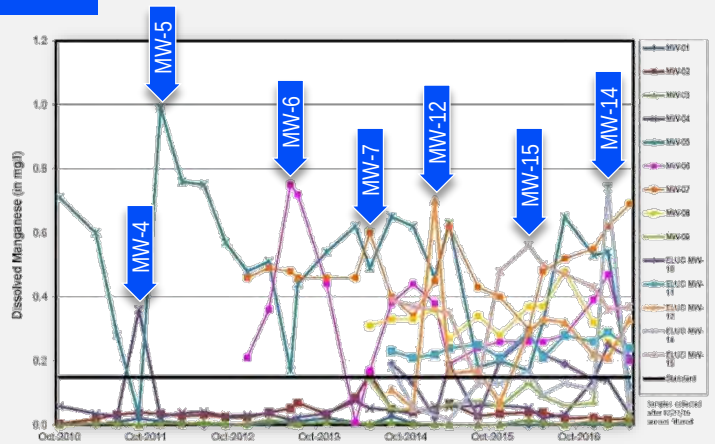
Barium



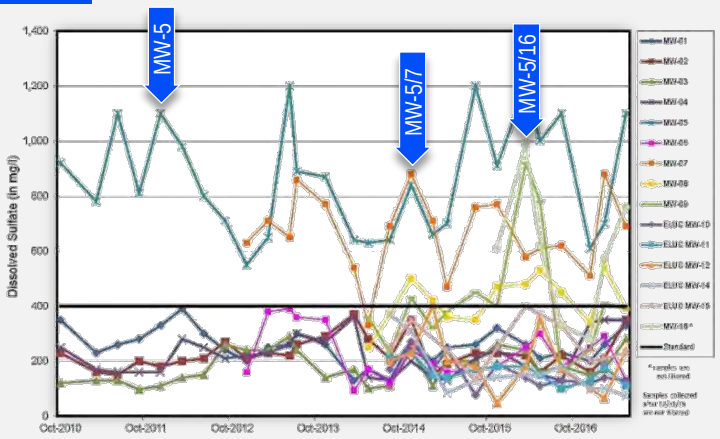
Boron



Manganese



Sulfate



Updated Groundwater Constituent Temporal Trend Testing Results

Monitoring Well	Barium		Boron		Manganese		Sulfate	
	Trend Direction [a]	Slope (mg/L/yr)	Trend Direction [a]	Slope (mg/L/yr)	Trend Direction [a]	Slope (mg/L/yr)	Trend Direction [a]	Slope (mg/L/yr)
MW-01	Decreasing	-0.0026	Decreasing	-0.093	Decreasing	-0.0010	Decreasing	-8.3
MW-02	No conclusion	--	Increasing	0.22	No conclusion	--	No conclusion	--
MW-03	No conclusion	--	Increasing	0.11	No conclusion	--	Increasing	10
MW-04	Increasing	0.0048	No conclusion	--	No conclusion	--	No conclusion	--
MW-05	Decreasing	-0.0019	No conclusion	--	Decreasing	-0.035	No conclusion	--
MW-06	No conclusion	--	Increasing	0.49	Decreasing	-0.033	Decreasing	-19
MW-07	No conclusion	--	Decreasing	-2.1	Increasing	0.022	No conclusion	--
MW-08	No conclusion	--	No conclusion	--	No conclusion	--	No conclusion	--
MW-09	No conclusion	--	No conclusion	--	No conclusion	--	No conclusion	--

Updated Temporal Trend Testing of Groundwater Concentrations for Site-Specific Indicators of Ash in Ponds

Trend	Barium	Boron	Manganese	Sulfate
Increasing	1 well	3 wells	1 well	1 well
Decreasing	2 wells	2 wells	3 wells	2 wells
No conclusion	6 wells	4 wells	5 wells	6 wells

- Overall, it appears that groundwater concentrations are neither increasing nor decreasing because:
  - The indicators are increasing at 1 to 3 wells out of 9 wells
  - The indicators are decreasing at 2 to 3 wells out of 9 wells
  - No conclusions could be made at 4 to 6 wells out of 9 wells

Notes:
1) All units are in milligrams per liter (mg/L).
2) Groundwater data for Griess Pfleger site wells are from October 1997. (MWG13-15_46419-48421)
3) Groundwater data for General Boiler wells are from March 1998. (MWG13-15_46418-48419)
4) Groundwater data for Environmental Land Use Control wells and Ash Pond wells are from February 2017.
5) Locations of Griess-Pfleger and General Boiler property boundaries obtained from MWG13-15_46226. Monitoring well locations obtained from MWG13-15_46226.

Barium Concentrations
Former Griess Pfleger Tannery

January 2018	Geosyntec consultants	Figure 1

Notes:
1) All units are in milligrams per liter (mg/L).
2) Groundwater data for Griess Pfleger site wells are from October 1997. (MWG13-15_46419-48421)
3) Groundwater data for General Boiler wells are from March 1998. (MWG13-15_46418-48419)
4) Groundwater data for Environmental Land Use Control wells and Ash Pond wells are from February 2017.
5) Locations of Griess-Pfleger and General Boiler property boundaries obtained from MWG13-15_46226. Monitoring well locations obtained from MWG13-15_46226.

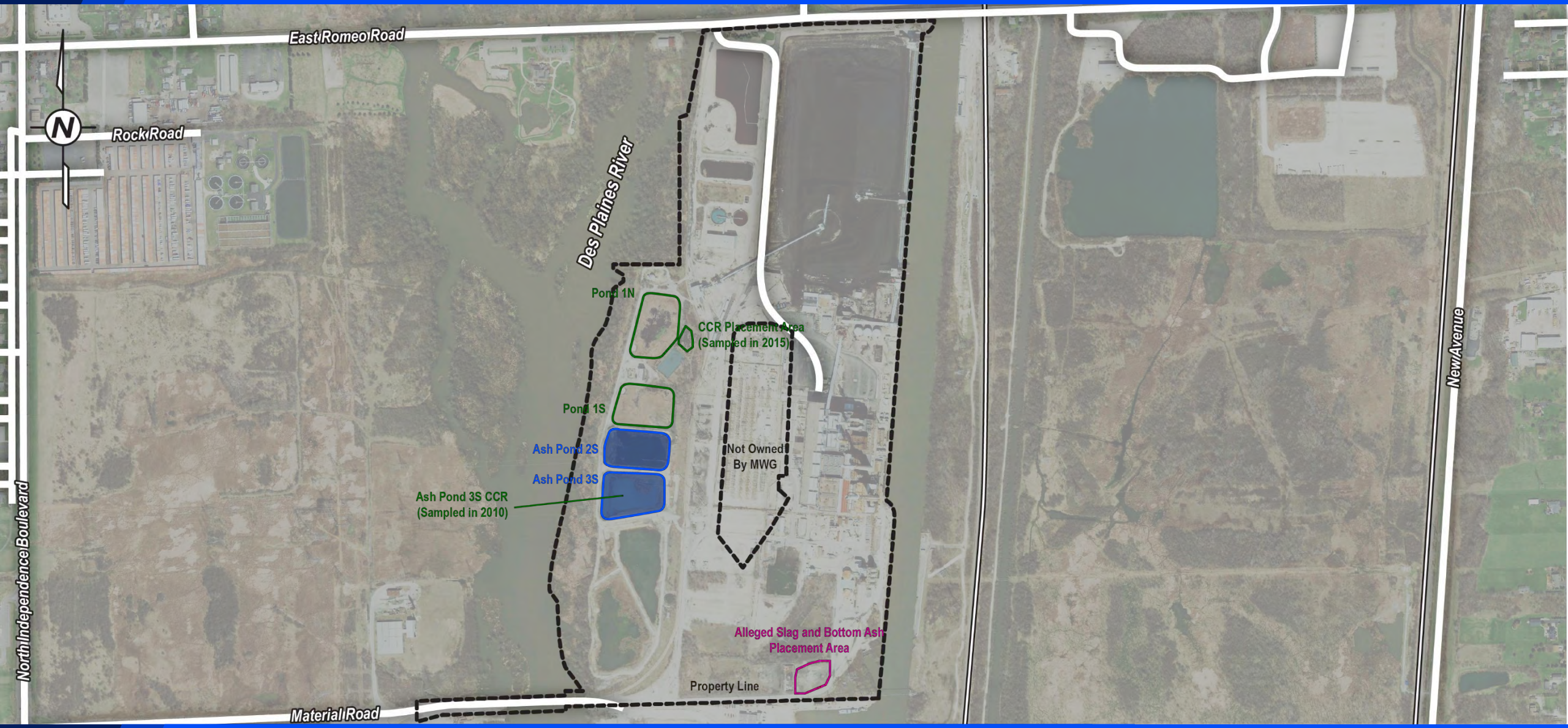
Manganese Concentrations
Former Griess Pfleger Tannery

January 2018	Geosyntec consultants	Figure 2

Will County – Site History and Surroundings

- Operating for 40+ years before MWG (1955)
- Review of Impoundments/Ponds
  - IN and 1S removed from service/1'water
  - 2S and 3S lined and relined
- Pond ash sample results (2010)
- Historic areas and samples (2015)
- Administrative Controls/ GMZ and ELUC
- No potable water wells/no risk to receptors

Will County

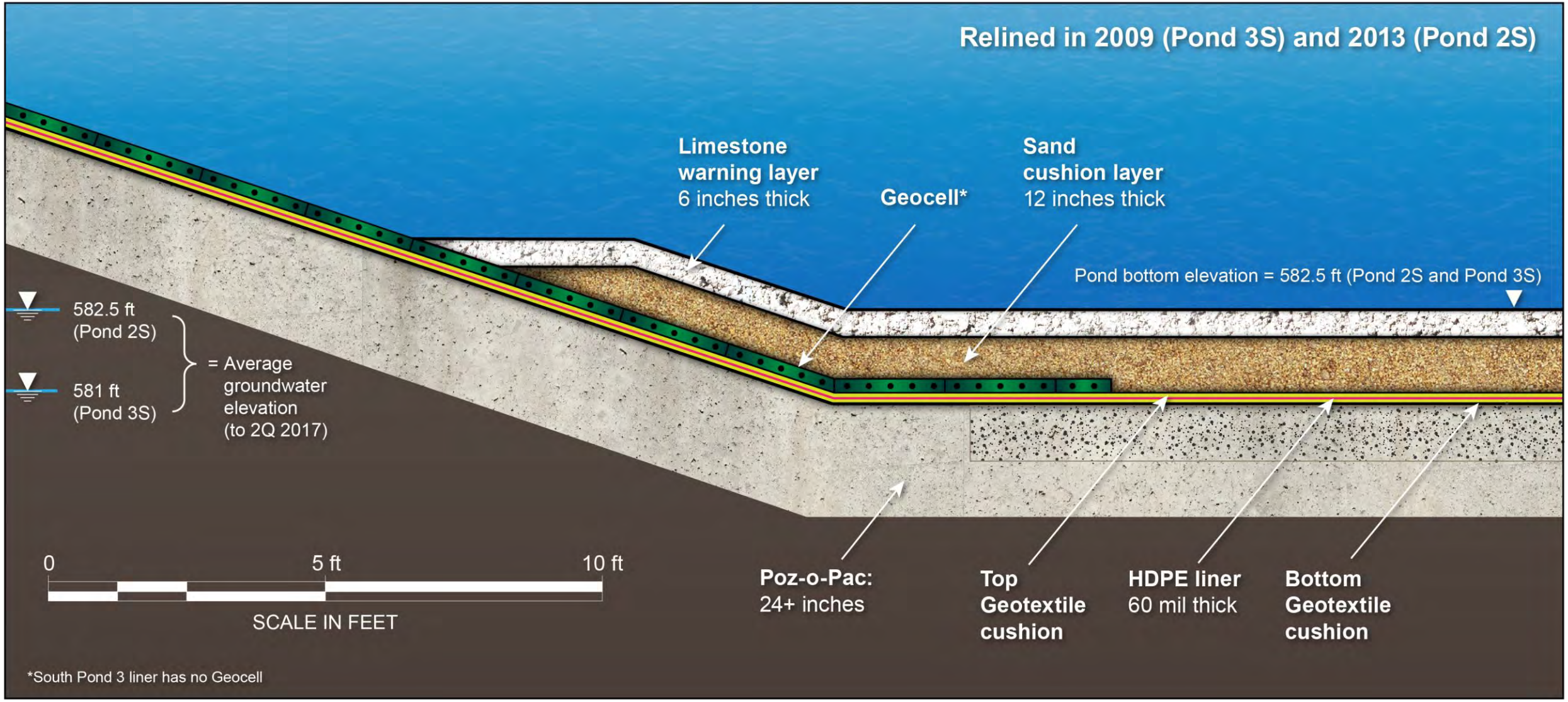

East Romeo Road
Rock Road
Des Plaines River
Pond 1N
CCR Placement Area
(Sampled in 2015)
Pond 1S
Ash Pond 2S
Ash Pond 3S
Ash Pond 3S CCR
(Sampled in 2010)
Not Owned
By MWG
Alleged Slag and Bottom Ash
Placement Area
Property Line
North Independence Boulevard
Material Road
New Avenue

Will County – Impoundments

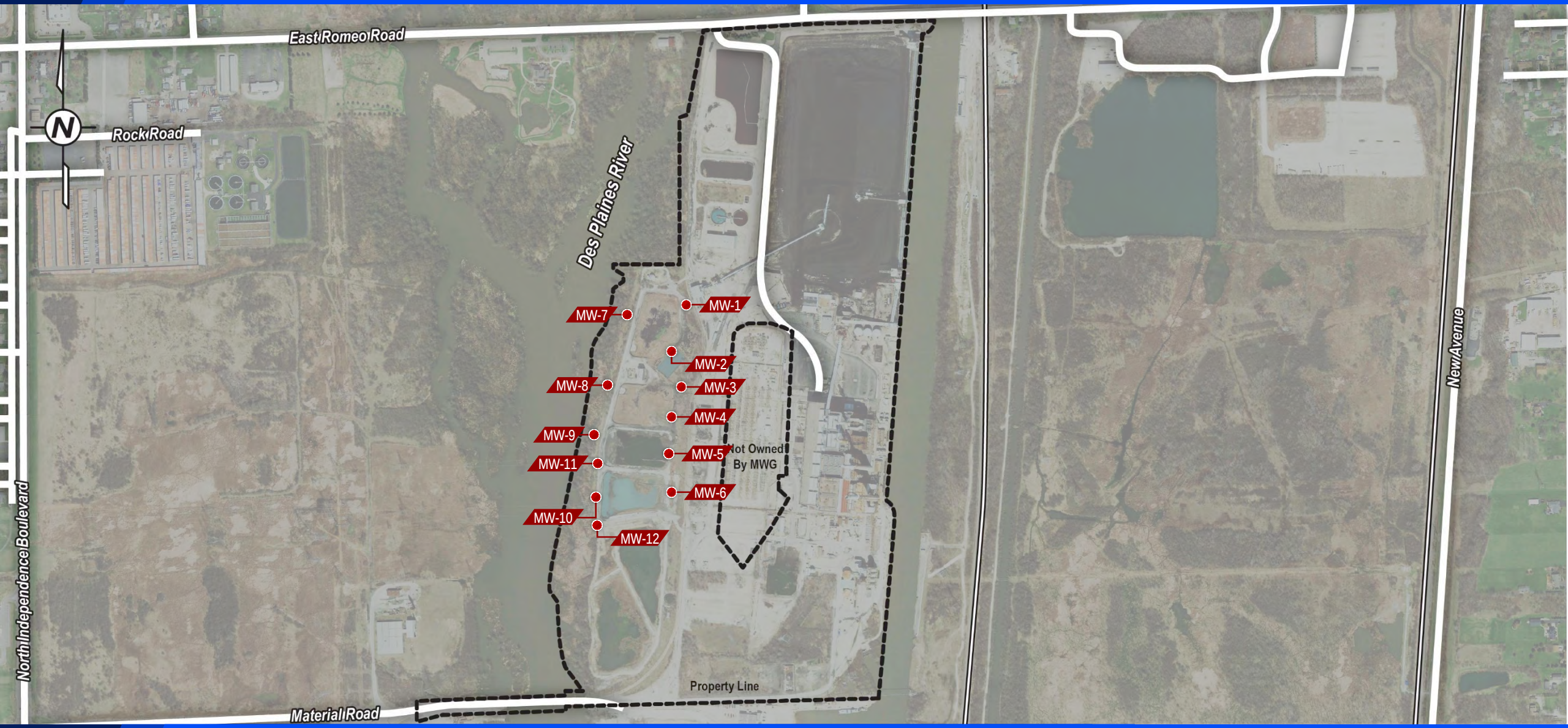
Station	Ash Pond	Date Constructed – Liners	Date Relined With HDPE	Scheduled Ash Removal
Will County Only Unit 4 operating Scheduled to close May 2020	Pond 1N and Pond 1S	1977 Poz-o-Pac—36 inches	Removed from service with dewatering systems	NONE 1' remaining water
	Pond 2S	1977 • Bituminous seal coat • Poz-o-Pac—36 inches thick	2013 Poz-o-Pac; geotextile; HDPE; geo-textile; geocell; sand cushion; warning layer	1-2 yrs*
	Pond 3S	1977 • Bituminous seal coat • Poz-o-Pac—36 inches thick	2009 Poz-o-Pac; geotextile; HDPE; geo-textile; sand cushion; warning layer	1-2 yrs

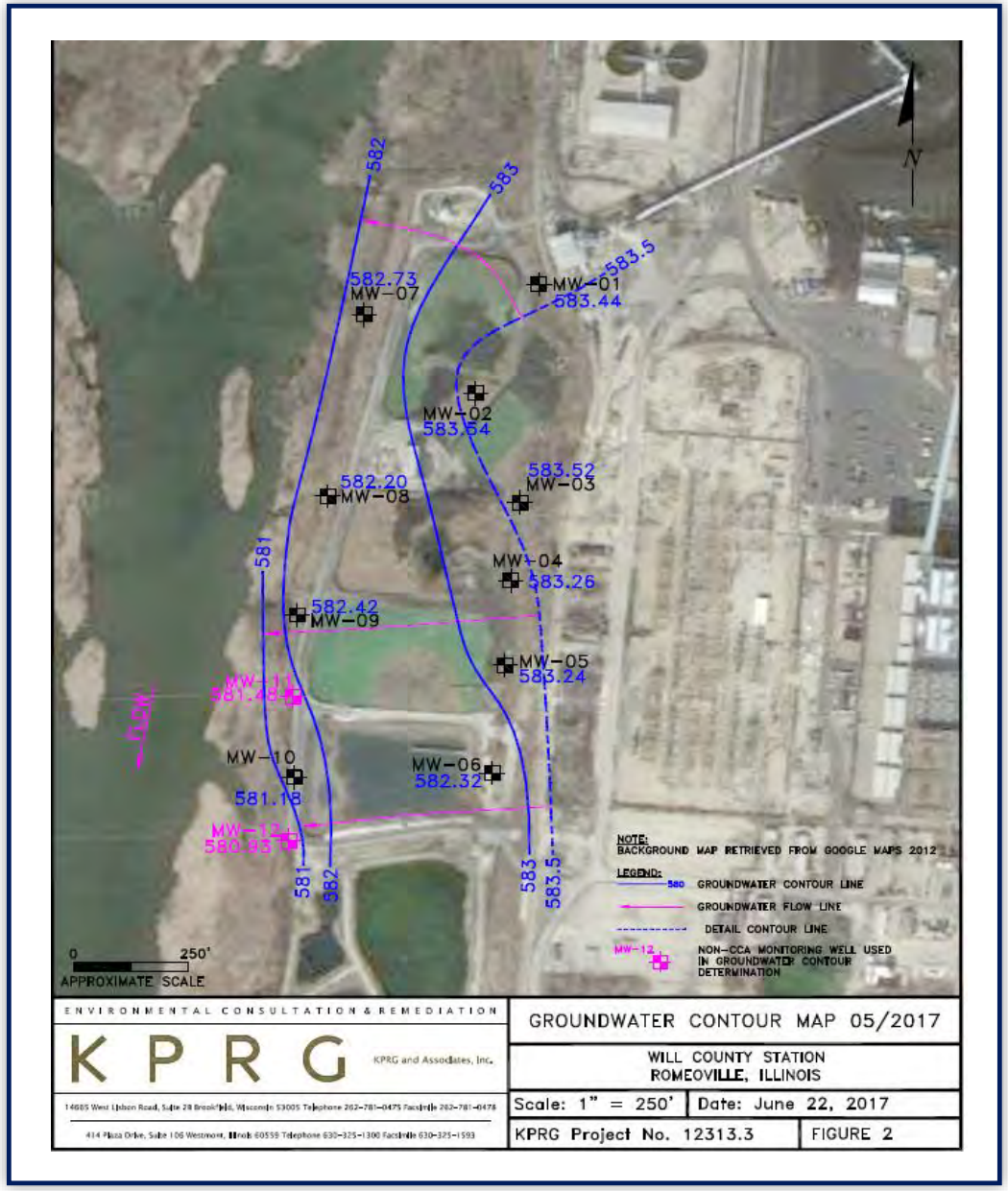
*Maddox testimony

Will County – South Ponds 2 and 3



Will County


East Romeo Road
Rock Road
Des Plaines River
MW-1
MW-2
MW-3
MW-4
MW-5
MW-6
MW-7
MW-8
MW-9
MW-10
MW-11
MW-12
Not Owned By MWG
Property Line
New Avenue
North Independence Boulevard
Material Road


N
582
583
583.5
582.73
MW-07
MW-01
583.44
MW-02
583.54
582.20
MW-08
583.52
MW-03
581
MW-04
583.26
582.42
MW-09
MW-05
583.24
MW-11
581.40
FLOW
MW-10
581.18
MW-06
582.32
MW-12
580.93
581
582
583
583.5
0
250'
APPROXIMATE SCALE
NOTE:
BACKGROUND MAP RETRIEVED FROM GOOGLE MAPS 2012
LEGEND:
580 GROUNDWATER CONTOUR LINE
GROUNDWATER FLOW LINE
DETAIL CONTOUR LINE
MW-12 NON-CCA MONITORING WELL USED IN GROUNDWATER CONTOUR DETERMINATION
ENVIRONMENTAL CONSULTATION & REMEDIATION
K P R G
KPRG and Associates, Inc.
14605 West Lisbon Road, Suite 28 Brookfield, Wisconsin 53005 Telephone 262-781-0475 Facsimile 262-781-0478
414 Plaza Drive, Suite 106 Westmont, Illinois 60559 Telephone 630-325-1300 Facsimile 630-325-1593
GROUNDWATER CONTOUR MAP 05/2017
WILL COUNTY STATION
ROMEOVILLE, ILLINOIS
Scale: 1" = 250'
Date: June 22, 2017
KPRG Project No. 12313.3
FIGURE 2

Will County – Updated Table 5-5

Quarterly Groundwater Monitoring (2016-Q3 to 2017-Q2) Compared to Indicators in Impoundments/ponds (MWG site specific analyses)

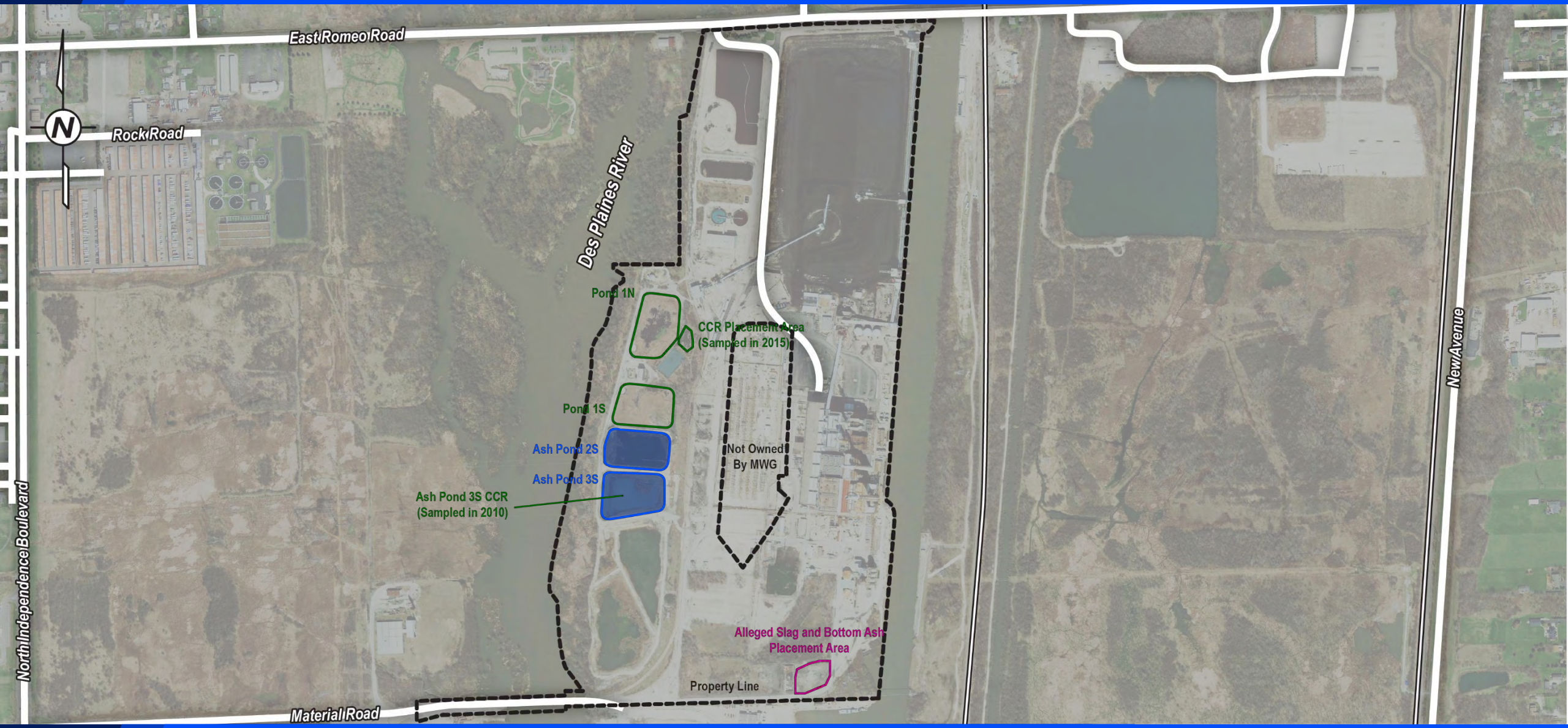
Constituent	Constituent is an Indicator of Leachate from Ash Currently Stored in Impoundments [1]	Constituents Detected During Most Recent Year (2016-Q3 to 2017-Q2) of Quarterly Groundwater Monitoring [2]									
		Will County Generating Station									
		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10
Arsenic			x	x		x	x	x	x	x	x
Barium	Yes (Table 5-1)	x	x	x	x	x	x	x	x	x	x
Boron	Yes (Table 5-1)	x	x	x	x	x	x	x	x	x	x
Cobalt				x	x				x		
Iron		x	x		x		x	x	x		x
Lead			x								
Manganese		x	x	x	x	x	x	x	x	x	x
Mercury		x			x						
Nickel		x	x	x	x	x	x	x	x	x	x
Selenium		x			x	x	x	x	x	x	x
Sulfate	Yes (Table 5-1)	x	x	x	x	x	x	x	x	x	x
Number of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [3]		5	5	4	6	4	5	5	6	4	5
Percentage of Observed Constituents that are not Consistent with Indicators of Leachate from Ash Currently Stored in Impoundments [4]		63%	63%	57%	67%	57%	63%	63%	67%	57%	63%

Will County – Updated Table 5-4

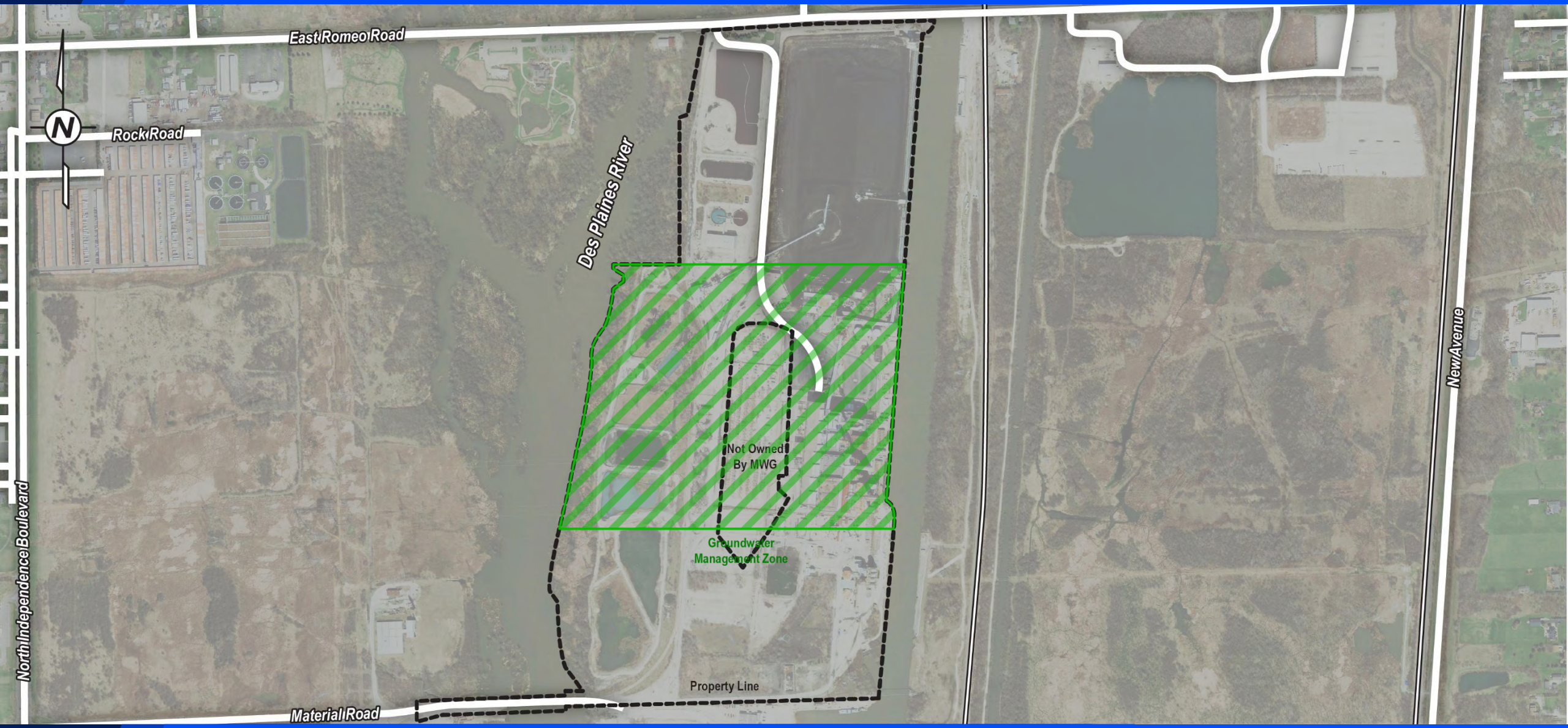
Quarterly Groundwater Monitoring (2016-Q3 to 2017-Q2) Compared to Indicators in Impoundments/ponds (EPRI, 2006)

Constituent	Constituent is an Indicator of Leachate from Ash in Impoundments [1]	Constituents Detected During Most Recent Year (2016-Q3 to 2017-Q2) of Quarterly Groundwater Monitoring [2] — Will County Generating Station									
		MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10
Antimony	Yes (Table 5-2)										
Arsenic	Yes (Table 5-2)		x	x		x	x	x	x	x	x
Barium	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x
Boron	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x
Cadmium	Yes (Table 5-2)										
Chromium	Yes (Table 5-2)										
Cobalt	Yes (Table 5-2)			x	x				x		
Copper	Yes (Table 5-2)										
Iron		x	x		x		x	x	x		x
Lead	Yes (Table 5-2)		x								
Manganese	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x
Mercury	Yes (Table 5-2)	x			x						
Nickel	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x
Selenium	Yes (Table 5-2)	x			x	x	x	x	x	x	x
Sulfate	Yes (Table 5-2)	x	x	x	x	x	x	x	x	x	x
Zinc	Yes (Table 5-2)										
Number of Observed Constituents that are not Consistent with Indicators of Leachate from Ash in Impoundments [3]		9	9	8	8	8	9	9	8	8	9
Percentage of Observed Constituents that are not Consistent with Indicators of Leachate from Ash in Impoundments [4]		56%	56%	50%	50%	50%	56%	56%	50%	50%	56%

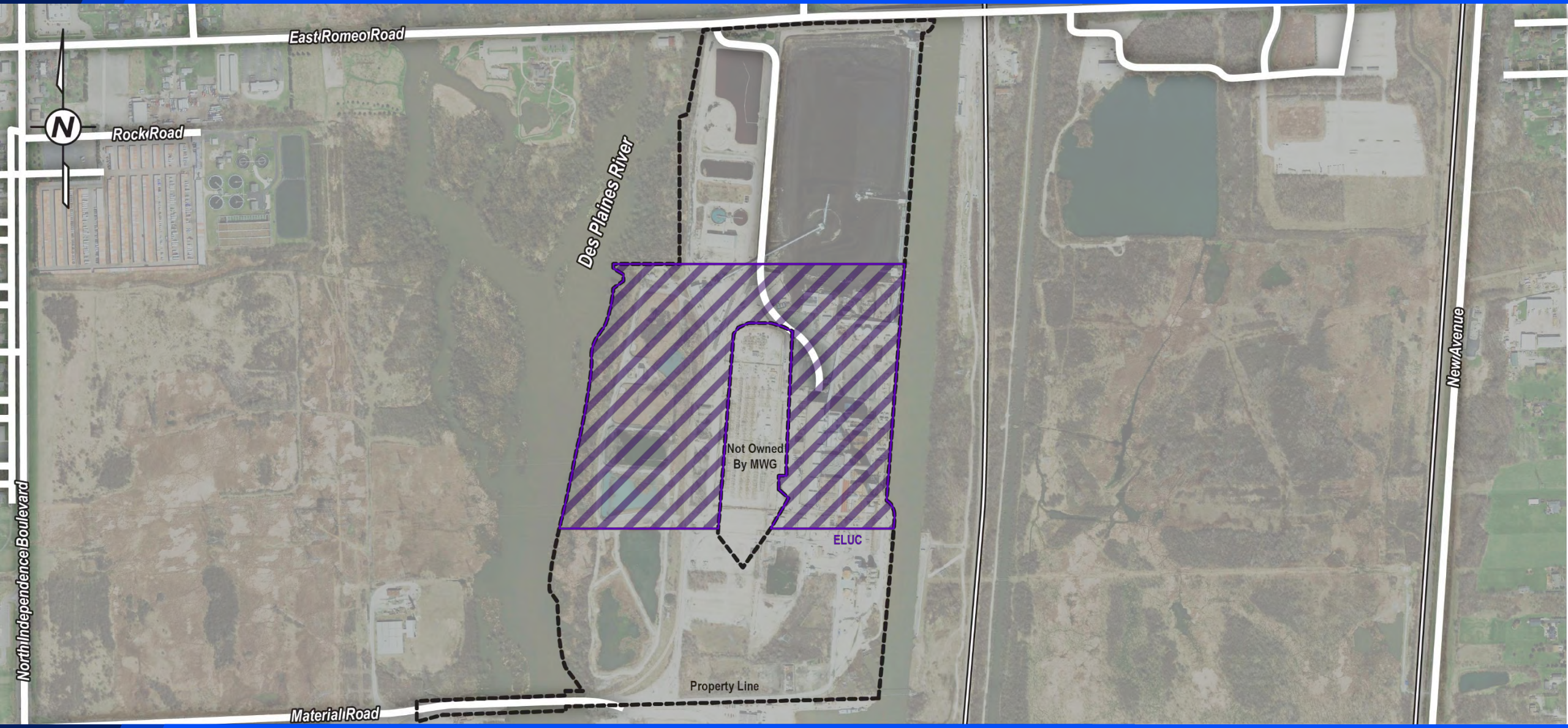
Will County


East Romeo Road
Rock Road
N
Des Plaines River
Pond 1N
CCR Placement Area
(Sampled in 2015)
Pond 1S
Ash Pond 2S
Ash Pond 3S
Ash Pond 3S CCR
(Sampled in 2010)
Not Owned
By MWG
Alleged Slag and Bottom Ash
Placement Area
Property Line
North Independence Boulevard
Material Road
New Avenue

Will County

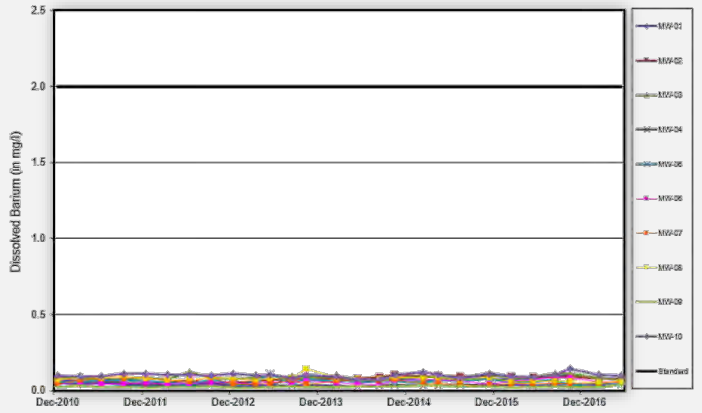

East Romeo Road
Rock Road
Des Plaines River
North Independence Boulevard
Material Road
New Avenue
Not Owned By MWG
Groundwater Management Zone
Property Line

Will County

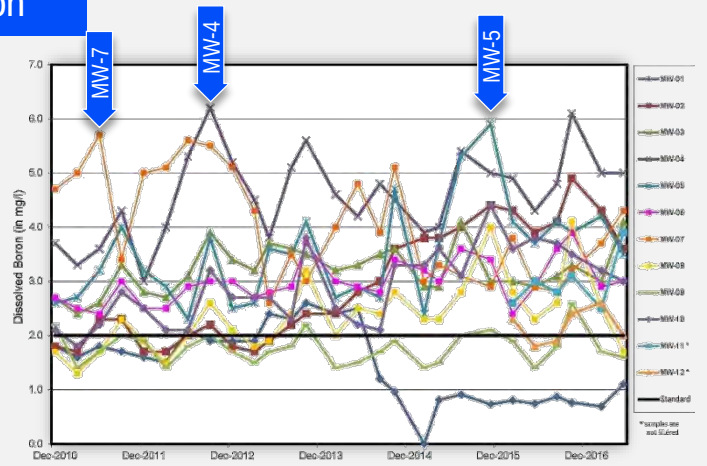

East Romeo Road
Rock Road
Des Plaines River
Not Owned By MWG
ELUC
Property Line
North Independence Boulevard
Material Road
New Avenue

Will County

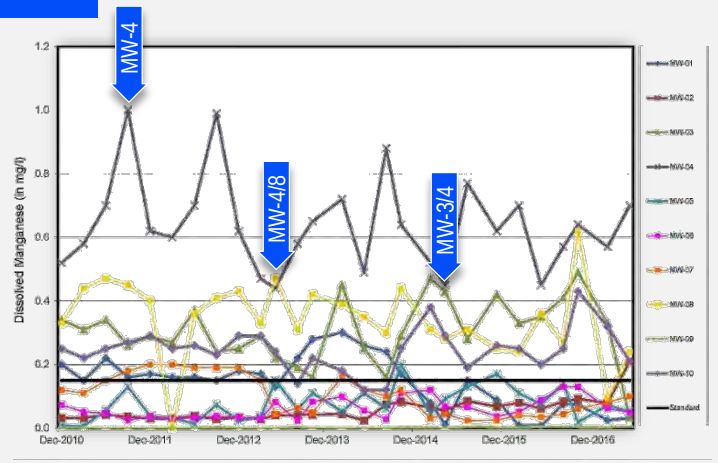
Barium



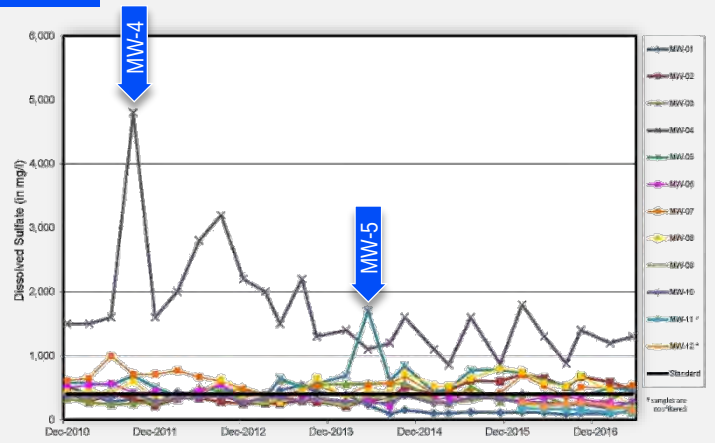
Boron



Manganese



Sulfate



Updated Groundwater Constituent Temporal Trend Testing Results

Monitoring Well	Barium		Boron		Manganese		Sulfate	
	Trend Direction [a]	Slope (mg/L/yr)	Trend Direction [a]	Slope (mg/L/yr)	Trend Direction [a]	Slope (mg/L/yr)	Trend Direction [a]	Slope (mg/L/yr)
MW-01	Increasing	0.0088	Decreasing	-0.22	Decreasing	-0.026	Decreasing	-61
MW-02	Increasing	0.0065	Increasing	0.49	Increasing	0.014	Increasing	55
MW-03	No conclusion	--	Increasing	0.076	No conclusion	--	No conclusion	--
MW-04	Decreasing	-0.0024	Increasing	0.18	No conclusion	--	Decreasing	-220
MW-05	No conclusion	--	Increasing	0.23	Increasing	0.0098	No conclusion	--
MW-06	Increasing	0.0042	No conclusion	--	Increasing	0.0079	Decreasing	-34
MW-07	Decreasing	-0.0039	Decreasing	-0.3	Decreasing	-0.022	Decreasing	-39
MW-08	Decreasing	-0.0036	Increasing	0.19	Decreasing	-0.016	Increasing	26
MW-09	Increasing	0.00091	No conclusion	--	Increasing	0.00034	Decreasing	-22
MW-10	No conclusion	--	Increasing	0.24	No conclusion	--	Decreasing	-20

Updated Temporal Trend Testing of Groundwater Concentrations for Site-Specific Indicators of Ash in Ponds

Trend	Barium	Boron	Manganese	Sulfate
Increasing	4 wells	6 wells	4 wells	2 wells
Decreasing	3 wells	2 wells	3 wells	6 wells
No conclusion	3 wells	2 wells	3 wells	2 wells

- Overall, it appears that groundwater concentrations are neither increasing nor decreasing because:
  - The indicators are increasing at 2 to 6 wells out of 10 wells
  - The indicators are decreasing at 2 to 6 wells out of 10 wells
  - No conclusions could be made at 2 to 3 wells out of 10 wells