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<b>Subject</b>	<b>Status Update Meeting Notes for Stanton Street Facility RCRA Project, May 16, 2018</b>	
<b>Attendees</b>	Conor Neal/USEPA Dave Franc/USEPA (via phone) Heather Ziegelbauer/Jacobs Dave Finney/Jacobs Bill Andrae/Jacobs Bruce Manning/Jacobs (via phone) Dave Mitchell/Jacobs (via phone)	Angela Carey/WDNR Judy Fassbender/WDNR Jeff Danko/Tyco-JCI Ryan Suennen/Tyco-JCI Rich Mator/Tyco-JCI (via phone) Joe Janeczek/Tyco-JCI (via phone)
<b>Meeting Date</b>	May 16, 2018	
<b>Location</b>	Milwaukee, Wisconsin	

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## Status Update Meeting Notes

Meeting started: 9:04 AM Central Time

Presentation slides are attached.

### 1. Introductions

Representatives from the U.S. Environmental Protection Agency (USEPA), Wisconsin Department of Natural Resources (WDNR), Jacobs, and Tyco-JCI attended the meeting in person or via phone.

### 2. Pump Down Program Update (slides 3 – 9)

Tyco provided an update of the program and status. Minimal questions.

USEPA asked if achieving target groundwater elevations by May 31 is likely.

Tyco is more confident on the former Salt Vault (SV) but not as sure about the former 8<sup>th</sup> Street Slip (8SS); however, are making progress and groundwater elevations are below the river level in both cells. Will continue to pump and maintain progress.

### 3. Permit Variance (slide 10)

Tyco stressed the need for the WPDES variance. Asked for any assistance from USEPA RCRA or WDNR to communicate this message to USEPA Water.

Conor Neal/USEPA stated he cannot influence USEPA Water and is glad we are moving forward with conveyance system. Tyco should discuss with WDNR Water as soon as possible to be sure the economic message is included with Trevor Moen, anyone else in WDNR that would listen, and follow up with memo. (Ryan Suennen/Tyco-JCI to schedule a call with Trevor Moen WDNR Water for May 17 or May 18). Conor Neal stated all he can do is ask USEPA Water to stick to the time frames spelled out. Tyco will have a second opportunity to comment during the comment period, and USEPA Water is required respond to these.

Ryan Suennen mentioned Trevor Moen sent an e-mail yesterday asking for information related to selection of this option and why other options were eliminated.

Tyco indicated that it cannot continue with design of the upgraded treatment system necessary to treat groundwater from the 8SS and SV until arsenic discharge criterion is understood; however, Tyco/Jacobs will continue moving forward with the conveyance design (pipe water from PDP area to manage at the existing GWCTS).

#### **4. Conveyance System (slides 12 & 13)**

Tyco is moving forward with conveyance design and discussions about timing, rough timeline provided. WDNR indicated that a Chapter 30 permit will likely be required due to its proposed proximity to the shoreline (Shoreline Disturbance Permit). The permit could be either a General Permit (30-day WDNR review) or an Individual Permit (100-day WDNR review).

Discussion focused on this, what is required and why one permit over the other. WDNR indicated they will take the information back to WDNR Water to get a list of what may be needed and if this will be a General Permit or Individual Permit (likely by May 22).

It was indicated that the conveyance lines will not go through any wetlands. Tyco provided a map to WDNR with the current proposed conveyance route plan to aid WDNR in their list generation and sent Bill Andrae's contact information, as well, if there are detailed questions on the location/design immediately following the meeting.

#### **5. Groundwater Treatment Plant Upgrades (Slide 11 & 14)**

Jacobs went through the slides along with discussion. Short conversation as it was already stated the design was placed on hold. USEPA and Jacobs discussed what was completed, and USEPA was happy to hear that Jacobs did start the design but understood Tyco's position based on a call that occurred on May 14 (Rich Mator, Joe Janeczek, Conor Neal).

#### **6. Dye Test Alternative (slides 15 to 32)**

A draft responses to comments (RTCs) document was provided to USEPA and WDNR at the beginning of the meeting. Jacobs provided an overview of the program and then reviewed details of USEPA's comments on the Tyco pilot diffusive gradients in thin film (DGT) passive sampler work plan.

USEPA commented that the RTCs provided a deeper dive into the potential leakage from the wall than provided in the Draft Work Plan. USEPA indicated that the requirement to monitor 15% of wall was not an arbitrary number, but on the lower end of the coverage range that was indicated would occur with the proposed dye testing.

USEPA asked if Jacobs had any discussion with the DGT manufacturer regarding longer DGTs. Jacobs said the team is looking at 6-inch-long and not the smaller disks. Not confident the manufacturer could produce longer DGTs. The manufacturer mentioned possibility of 8-inch-long samplers, which was not promising. It would require months to design and fabricate, and they only have small operations to produce these.

USEPA wanted to know how Jacobs came to the 0.006 gallons per minute (gpm) flow rate with no sealant in the joint/seam. Jacobs responded that the flow rate was based on design calculations provided

by the sheet pile manufacturer. It was similar to estimates provided previously on seepage to pump down areas during the February 2018 meeting. Used the manufacturers research on seepage through joints (different factors for sealed versus unsealed). Assumed an unsealed joint along the height of the river water column (~20 feet) with a 2-foot higher head inside plant versus river level. This also did not consider any additional fines/soil that would fill in the seam during driving or over time.

WDNR asked what concentration value Jacobs used for the 0.15 gpm rate for recontamination. Jacobs used a weighted average and then using the worst of the worst sensitivity at one of the high concentrations. During conversation, Jacobs looked up actual value and reported that the concentration assumed for that calculation was ~255 mg/L, which was just for the Main Plant. This was documented in the July 30, 2014 CH2M Technical Memorandum *Supplemental Evaluation: Potential for Recontamination of Menominee River Sediments due to Groundwater Migration from the Main Plant Area*.

Jacobs said the estimates of contamination made the highly conservative assumption that all arsenic (255 mg/L) in groundwater will quickly partition to suspended sediment and deposit to sediments near the wall. Actual concentrations of arsenic in the Main Plant are approximately 130 ppm at most; generally, concentrations at wells are 55 ppm, so using the July 30, 2014 Supplemental Evaluation from the Main Plant is likely conservative. This evaluation looked at what it would take to accumulate 20 mg/kg in sediment within 100 years (implying a large leak would be needed to contaminate quicker/sooner).

Conor Neal/USEPA mentioned he had been reading a lot of information from the Mike Mikulka days to get up to speed on the history. Would assume a leak of around 1 gpm assuming the current monitoring program; doesn't think the current monitoring program would get to 0.15 gpm and may require a lot of monitoring wells along the wall to look at head difference. USEPA still feels that a tight monitoring network along the wall would be beneficial. USEPA stated that in most cases where there is this situation (containment wall), the agency requires a reverse gradient. This (the details in the RTC) is a much better deep drive of the review/numbers on the spacing along the wall of the DGTs. If a permanent monitoring system were in place, it would eliminate the need to do this test and the 2023 test (which USEPA thought was required).

WDNR added that they believed the DGT sampling would only be a snapshot in time rather than a permanent monitoring method. Tyco indicated the dye test is only a one-time test, and USEPA thought it was two times. Tyco said only the sediment sampling was two rounds. The 2014 Agreement on Resolution indicated that in subsequent Five-Year Reviews (after the 2018 Five-Year Review) if sediment sampling confirms that there are no arsenic concentrations in the sediment analyzed in excess of 20 ppm and the wall inspections confirm that there are visible leaks or deflections that additional dye testing will not be required.

WDNR finds it difficult to assess how to monitor the effectiveness of the barrier wall as the methods (such as the proposed DGT network) method is much different than what is typically used at a site. USEPA wanted to know what a barrier wall monitoring network would be in a perfect world and how would Tyco monitor. USEPA's preference is to monitor for hydraulic independence by installing and monitoring a network of nested wells 50 to 100 feet apart. Their concern is that DGTs will only provide a snapshot in time that says whether a portion of the wall has or has not leaked in the past.

Tyco said the 2009 Administrative Order on Consent (AOC) states that it will construct and maintain a below-grade barrier wall to contain on-site groundwater to the extent practicable, not absolute. Tyco is concerned that if the DGT or other measures are implemented, that the agencies will require additional measures in the future, in effect, moving the finish line.

WDNR said the agencies have discussed whether they have confidence that the proposed monitoring system provides the answer they want and if they feel confident that they have the correct answer? WDNR is concerned about the effectiveness of the measurement tool (DGTs).

Jacobs said there are a number of steps that are needed yet for the proposed DGT system to work.

USEPA appreciated that statistics were provided in the RTCs, such as the estimate that the proposed DGT network would have a 98% probability of monitoring a leak. USEPA asked what the next steps would be if a leak on a single seam was detected and asked if we are going to be getting the right data, and what does it mean to the wall going forward? Tyco asked for clarification on what is a system that predicts the wall going forward, and USEPA said a closely spaced (vertically and horizontally) well system.

Tyco asked what would change in required monitoring if a closely-spaced monitoring well network was installed?

USEPA said most sites like this are required to have a reverse gradient. Jacobs did not agree that reversing gradients is a requirement for all containment remedies. Tyco said all agree that reverse gradient is not achievable in the Main Plant, but it looks like the agencies keep changing the finish line. WDNR said it is not moving the finish line, but they don't want to require a false finish line. Tyco stated USEPA's "finish line" looks to be line of well nests and nothing else.

USEPA is interested in the cost of nested wells and transducers along the wall and if that network were installed, other parts of long-term monitoring should be and could be reconsidered.

Tyco asked about the need to include transducers, because if they are required USEPA just added \$15K to \$20K to cost of each nest, and ongoing maintenance requirements for transducers can be significant, too (Tyco is replacing a transducer or two every 6 to 12 months).

USEPA said Tyco should look at pressure monitors, transducers, and suggest what would work best. It was agreed that looking at this alternative would only be focused on the Main Plant area since the 8SS and SV are controlled by the Pump Down Program.

A discussion regarding Five-Year Review requirements ensued. USEPA said only the alternative to the dye test component of the 5-year review could be delayed. USEPA will need to go back and see management's appetite for permanent solution versus 5-year review reliance components. Tyco will have to submit the 5-year review on time with all other components.

WDNR said they are concerned about this (the DGT approach) and would like the parties to come to an agreement on the "finish line" before starting alternative to dye testing.

USEPA said it may not be worth going through the rest of the comments on the pilot DGT work plan now given their concerns that DGT monitoring program won't provide the desired monitoring.

USEPA Next Steps: Will follow-up on RTCs and get back to Tyco and Jacobs and requested Tyco look into potential for the following:

- Tier 1 – Nest at 100 feet
- Tier 2 – Every 50 feet

- Tier 3 – transducers in wells vs. manual water level measurements

It was agreed that Tyco would look at the costs and feasibility of a dense monitoring well network, as well as other potential more permanent solutions to ensuring barrier wall effectiveness.

WDNR said it would like Tyco and Jacobs to consider areas with high arsenic concentration behind wall, variations in hydraulic conductivity behind wall, areas with bigger head differential, areas with high head response When designing/considering a water level monitoring network. Jacobs said HPT testing could be used as a tool to identify areas with increased hydraulic conductivity and focus monitoring well locations. WDNR likes those types of recommendations; the aquifer materials behind the wall are not a homogenous mass.

It was agreed that all parties need to provide quick responses on issues raised during this discussion to determine path forward. Tyco will review potential alternatives to the dye test or DGT tests that provide a more permanent solution to demonstrating barrier wall effectiveness, while the agencies will review the Draft RTCs on the Pilot DGT Work Plan.

### **7. Sediment Sampling (slide 36 - 37)**

Tyco reported on sediment sampling status with little discussion. USEPA will split samples from the bottom 6 inches above the till. Tyco is moving ahead with planning for July 9 start date and that date should work for Tetra Tech (USEPA contractor), which will be there for the split sampling.

### **8. Groundwater Sampling (slide 38 – 39)**

No discussion.

### **9. 2017 Annual Report (slide 40)**

No discussion.

### **10. PFAS Sampling (slide 41)**

Tyco discussed the PFAS sampling approach.

USEPA received Tyco's response to the information request and asked if they can discuss. USEPA indicated they will provide a response to Tyco's request for clarification. USEPA believes Tyco chose a narrow definition of hazardous waste and that USEPA believes that any substance that exhibits hazardous properties is a hazardous waste. USEPA plans to provide a response before the end of the month.

Tyco indicated they were not prepared to discuss the requested information in detail during today's meeting but is willing to do so at a later date. USEPA request the follow up meeting occur the next week and they are willing to review questions one by one.

USEPA commented regarding groundwater data. USEPA is currently using 70 parts per trillion as drinking water criteria. USEPA has received preliminary results which indicate all samples contain total PFOA/PFOS in the parts per billion range. Tyco said it has not yet received preliminary results for samples it sent for analysis; preliminary data due approximately May 25.

USEPA indicated that if final data proves similar, it will require a work plan be developed to characterize PFAS compounds. Tyco indicated that, due to the wall and the hydraulic control it exerts, investigation/response may be different than at other sites. USEPA agreed that those items could be considered in the investigation. USEPA noted that reverse osmosis is effective in treating for PFAS; however, Tyco may want to bring this to Trevor Moen's attention when discussing the permit variance.

Call next Wednesday, May 23 from 11:30 to 1 EDT; Rich Mator/Tyco to issue Outlook invite.

(From USEPA: Conor Neal, Tammy Moore, Joe Cisneros; from WDNR Angie Carey, Judy Fassbender, or alternative, if available)

### **11. Surface Water Sampling (slide 42)**

No discussion.

**1:15 PM**

### **12. Stormwater upgrades (slides 43 – 46)**

No discussion.

### **13. Barrier Wall Inspection (slide 47)**

Tyco presented slide. A small leak was found at a seam and three bolts require tightening. Maintenance and a full bolt tightening event will be conducted soon to address the issues identified.

#### **Action Items**

- 1) PDP, Tyco to keep pumping away
- 2) Angie Carey/WDNR – get back to Tyco on Chapter 30 permit issues for the conveyance system along the river by Tuesday next week
- 3) USEPA/WDNR to meet next week after reviewing the draft pilot work plan responses and then discuss and see if DGTs will answer the questions
- 4) Tyco to look at monitoring alternatives along the Main Plant – tiers of alternatives (next 2 weeks)
- 5) Conor Neal to look at possibility of dye test alternative later than 5-year report
- 6) Tyco to complete outfall post improvement sampling
- 7) PFAS Meeting next week Wednesday, Rich Mator/Tyco to set up call
- 8) USEPA to respond on PFAS authority by end of month
- 9) Next face to face meeting to be determined. No date set. May need to occur after the PFAS, WPDES variance and/or alternative to the dye test items are addressed.



## Meeting Notes

Status Update Meeting Notes for  
Stanton Street Facility RCRA Project,  
May 16, 2018  
Milwaukee, Wisconsin

Presentation





# Fire Suppression Products

**Tyco Fire Products LP – Marinette, WI**

*Project Status Meeting*

*May 16, 2018*





# Introductions

USEPA, WDNR and Tyco Meeting

Milwaukee, WI

May 16, 2018

# Pump Down Program

USEPA, WDNR and Tyco Meeting

Milwaukee, WI

May 16, 2018

## 2018 Aggressive Pump Down Operations

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- Commenced system re-installation on March 29, 2018, completed on April 12, 2018
- Pump down operations re-commenced on April 19, 2018.
  - Inclement weather April 14-18 prevented start-up by April 15.
- Extraction system currently operates 6 days per week
- Still in drawdown period
- Recovered water being transported off-site to Vickery.
  - Estimated total volume transported – 203,910 gallons (through May 11, 2018)
  - Vickery only accepting water Monday-Friday.
  - Currently 3 trucks/per day (approximately 15,000 gallons)
- Approximate volume recovered (through May 11, 2018 AM)
  - Total Estimated Volume – 204,520 gals
- Approximate recovery rates per area (based on operation time on Friday May 11)
  - Former Salt Vault – 7.1 gpm
  - Former 8<sup>th</sup> Street Slip – 6.55 gpm

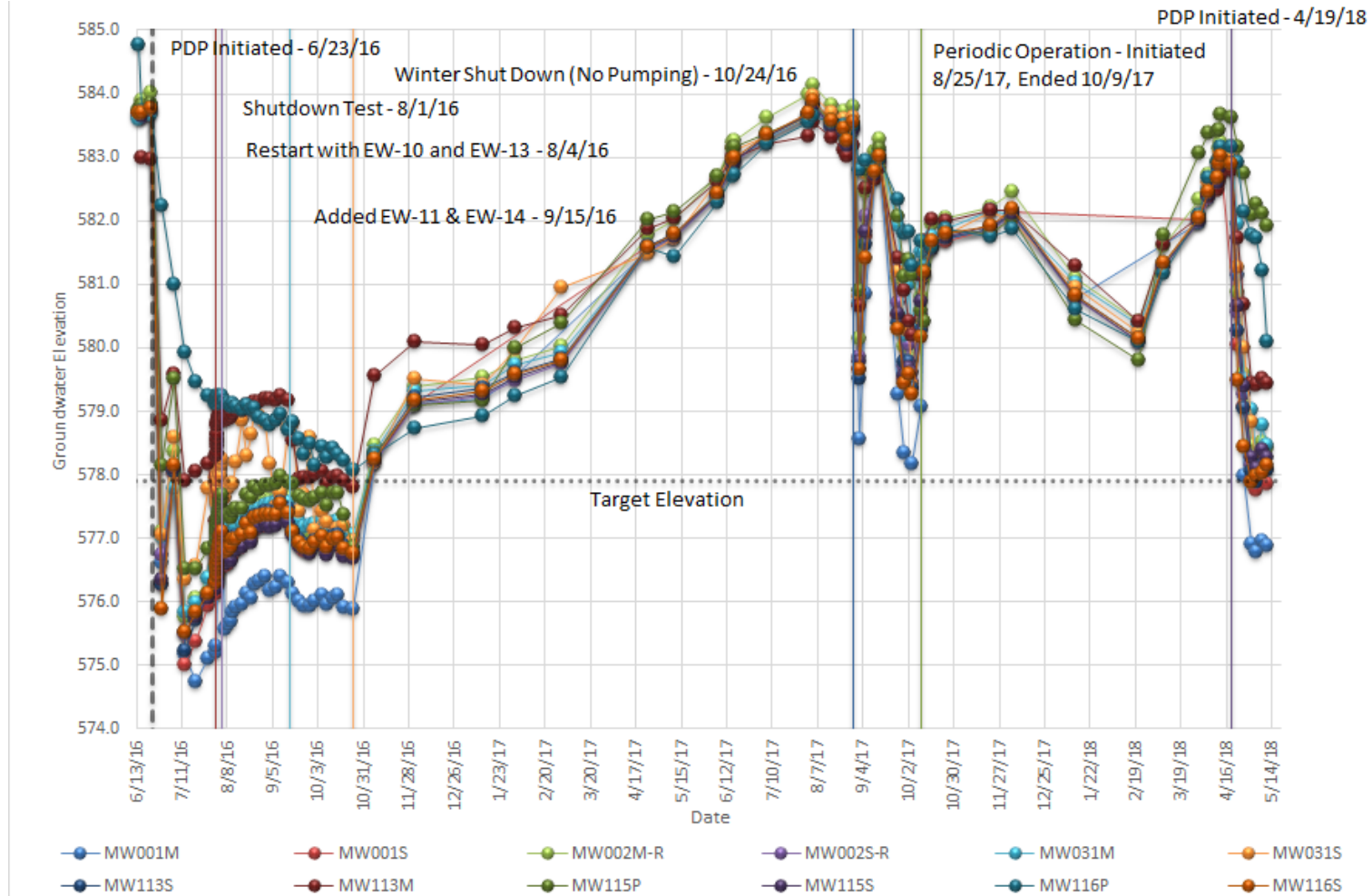
## 2018 Aggressive Pump Down Operations

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- Pumping started at peak groundwater elevation for 2018
- Summary of start and recent water levels

Area	Starting Elevation (Apr 19)	Variance from Target	Elevation on May 10	Variance from Target
Former Salt Vault	582.92	5.02	578.17	0.27
Former 8 <sup>th</sup> Street Slip	581.30	3.40	579.27	1.37

# 2016-2018 Water Level Monitoring – Former Salt Vault



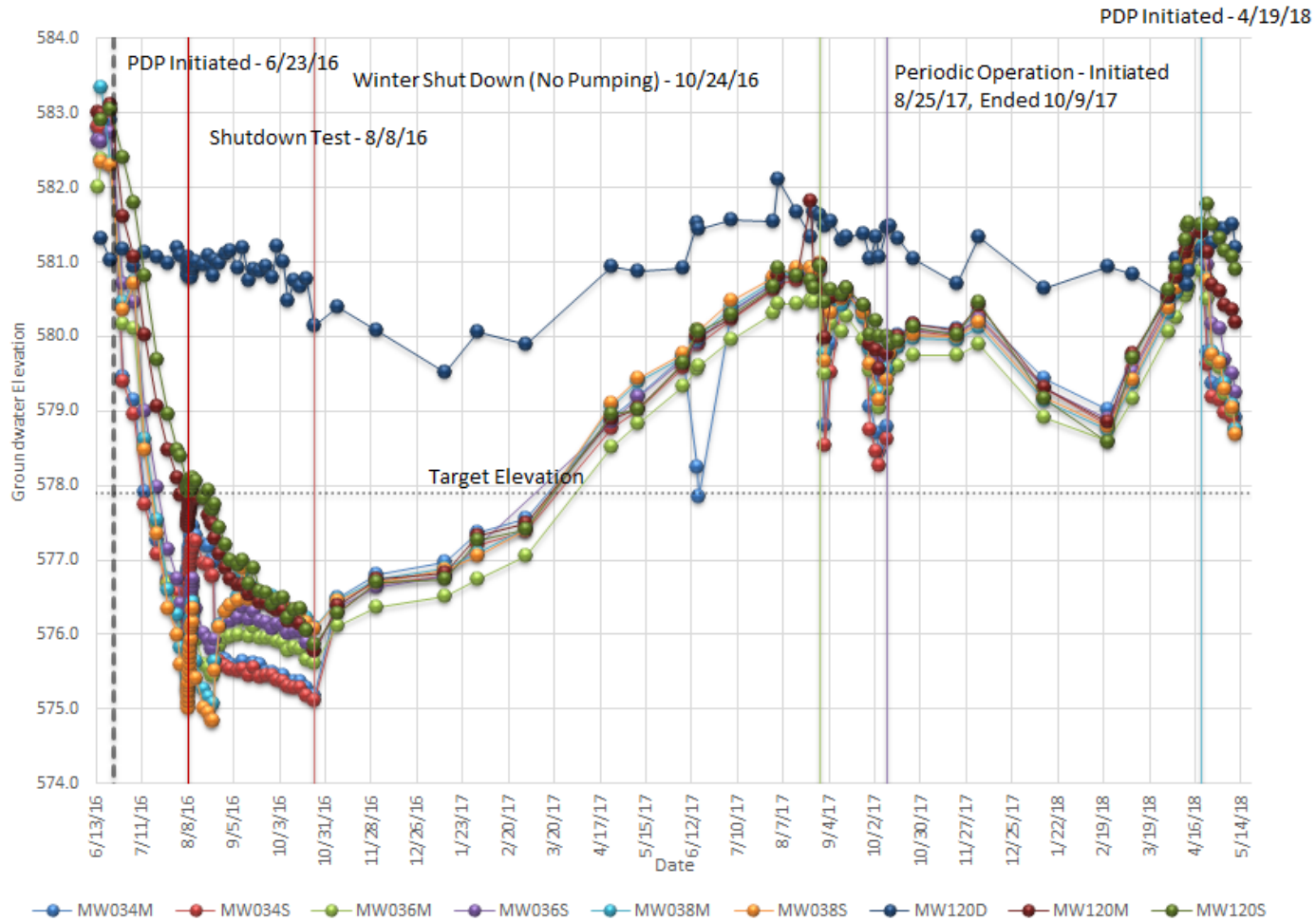


# 2018 Water Level Monitoring – Former Salt Vault

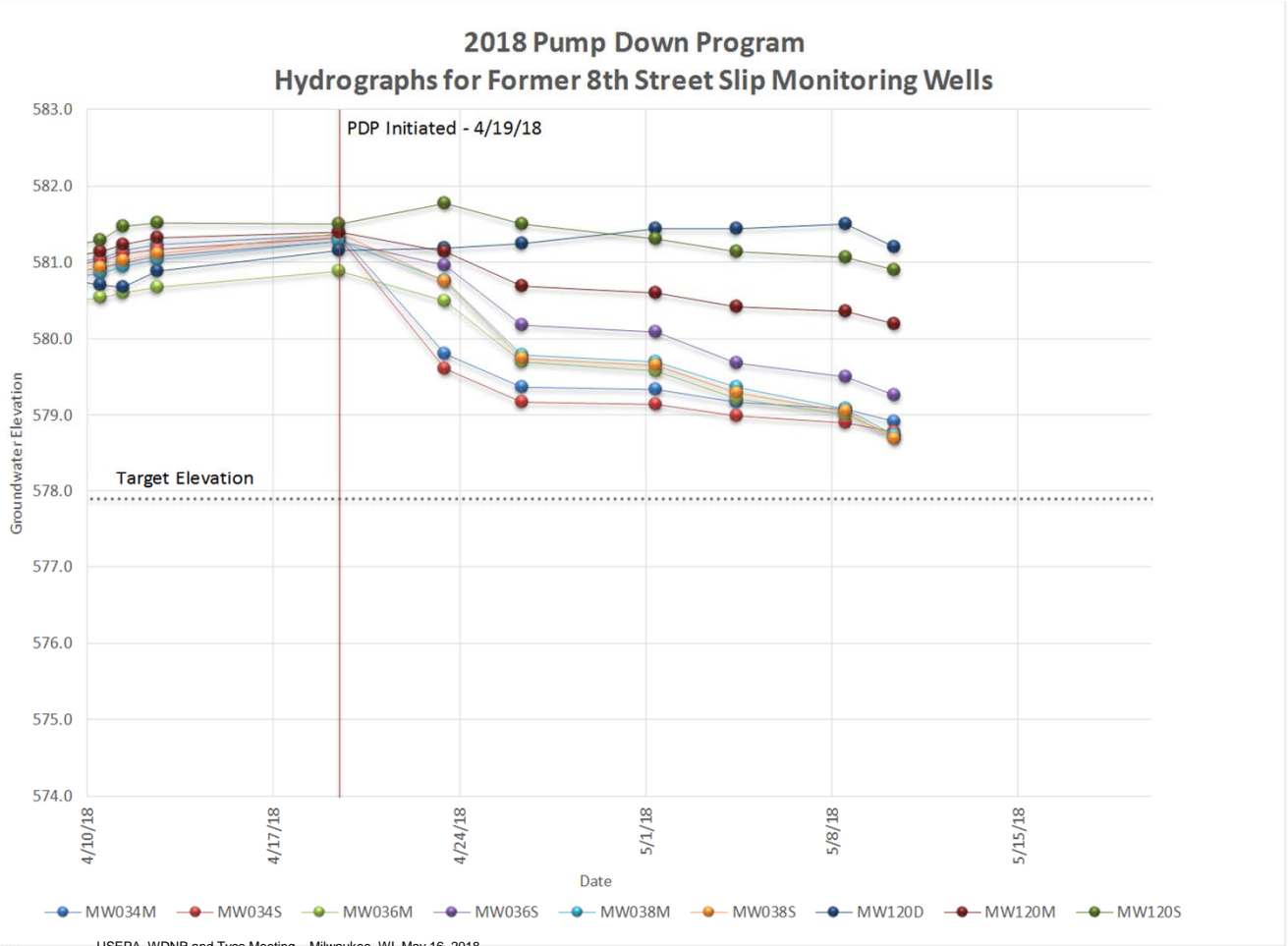
2018 Pump Down Program  
Hydrographs for Former Salt Vault Monitoring Wells



# 2016-2018 Water Level Monitoring – Former 8th Street Slip



# 2018 Water Level Monitoring – Former 8th Street Slip



## Permit Limitations – Variance Status

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- Current WPDES permit limits for Arsenic – 680 ppb
- Items to understand related to permit limits
  - Without variance, there will be an impact to facility manufacturing operations and potential viability
  - Existing remedial system installed at the site (and approved by the agencies)
    - Containment structure and necessary groundwater recovery and treatment system to manage water levels within contained area
    - Existing treatment system may not be capable of consistently achieving a lower permit limit even when excluding former Salt Vault and 8<sup>th</sup> Street Slip waters
  - Any permit limit below 500 ppb will require Tyco to re-evaluate the permanent solution
  - Tyco will need to delay design, and subsequent implementation, until either such assurance is obtained or the final permit is issued and a decision may be made on permanent water management solution is obtained
  - Tyco will continue to operate temporary system as appropriate during this period

## GWCTS Modifications

- During the February 2018 meeting it was agreed the recommended alternative to manage pump down program groundwater involves improving the treatment capability of the existing system and conveying groundwater from existing extraction wells using a combination of above and below ground piping
- Approach
  - Replace the existing microfiltration (MF) unit and double pass reverse osmosis (RO) unit at the GWCTS with 2 new PALL MF systems and 2 new PALL triple pass RO systems
  - Upgrade the control system to manage flow rates from new wells to provide a consistent influent and add a new separate control system for new MF and RO units - will allow management of arsenic concentrations
  - Enhance quantity and quality of existing monitoring sensors as well as a supervisory control and data acquisition (SCADA) alarm system to notify operator of any system upsets
  - Evaluate existing pretreatment system consisting of coagulation/flocculation equipment and clarifier to improve performance and reduce loading to MF membranes
  - Install combination of below grade conveyance lines in the SV and 8SS to a pump house in the SV and then above ground piping to GWCTS



Proposed PALL RO Units



Proposed PALL MF Units



## Conveyance System Design Status

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- Provide submittal to WDNR for review in 5 to 6 weeks from today
  - Include drawings and a short memo of design details
  - Conveyance and treatment system design will be submitted separately. Is there anything more needed than the above?
- Anticipated WDNR review time?
- Working to get into the field by or before September 2018 to avoid inclement weather
- Estimate is 6 to 8 weeks to construct



## Groundwater Treatment System Design

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- Path forward is contingent on WPDES permit criterion for arsenic
- Design/procurement, construction, and startup to take 9-18 months
- Timing will depend largely on variance approval
- Activities completed to date
  - Site visit
  - PFD
  - P&IDs
- Submittal to WDNR for review will be at the 30% design level along with the other required form – Will 30% level be sufficient for WDNR review/approval?
- Note that upgrades, if selected, will require a system shutdown period

# Alternative to Dye Test

USEPA, WDNR and Tyco Meeting

Milwaukee, WI

May 16, 2018

## Passive Arsenic Sampler Pilot Test Agenda

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- Review of Conceptual Site Model
- Barrier Wall Monitoring Overview/Timeline
- Pilot Testing Overview
- Full Scale Testing Overview
- Responses to Comments
- Discussion/ Next Steps



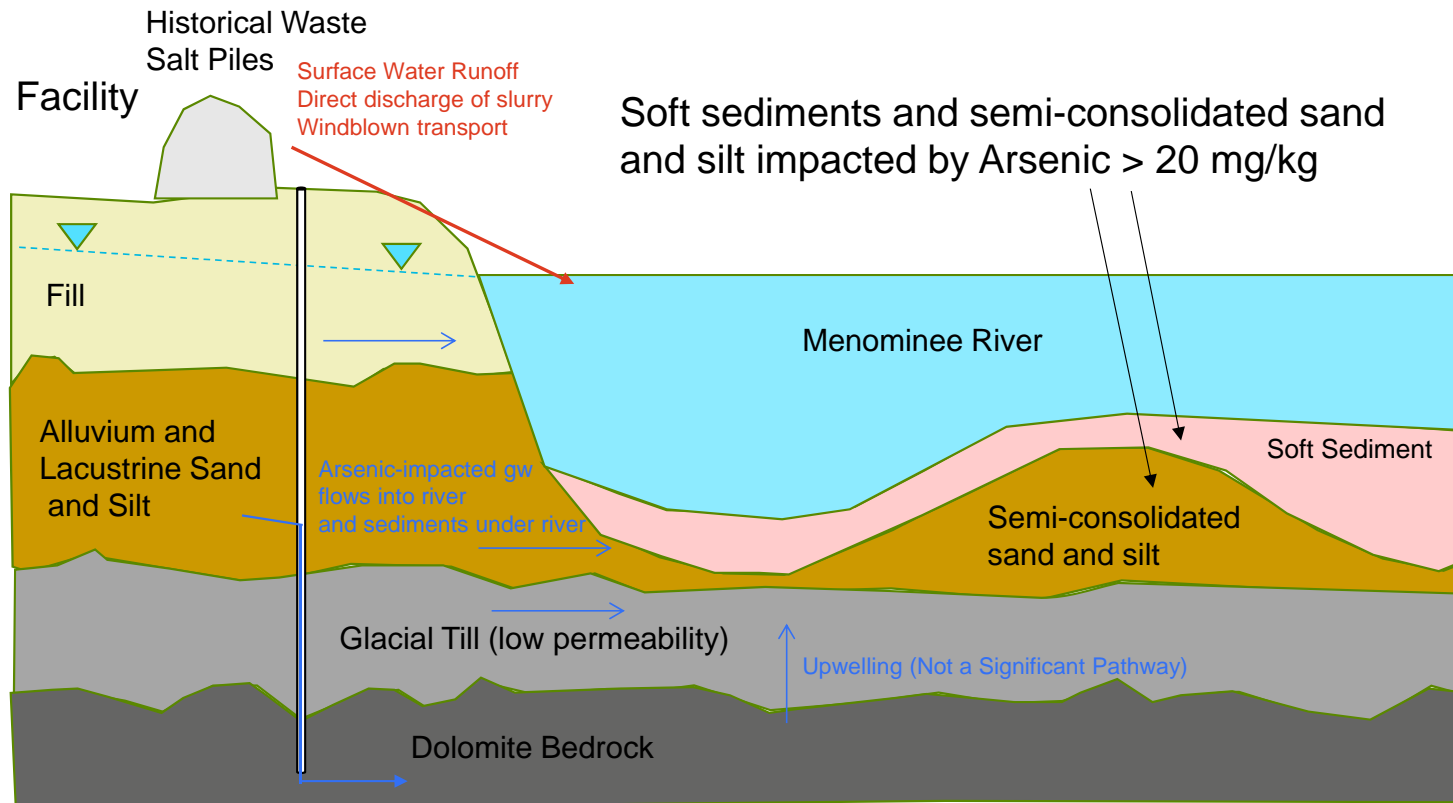
## Historical River Media Contamination Pathways and Remedy

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- Overland transport via surface water and stormwater runoff (Salt piles removed, asphalt caps, surficial soil capping)
- Windblown transport of salts into river (Salt piles removed)
- Dissolution and infiltration into groundwater beneath the site with subsequent subsurface transport to river (Vertical Barrier walls installed)
- Arsenic concentrations historically detected in alluvium/semi-consolidated materials (SCM) primarily attributed to lateral groundwater flow; limited impacts to till (Sediments dredged to 20 ppm)

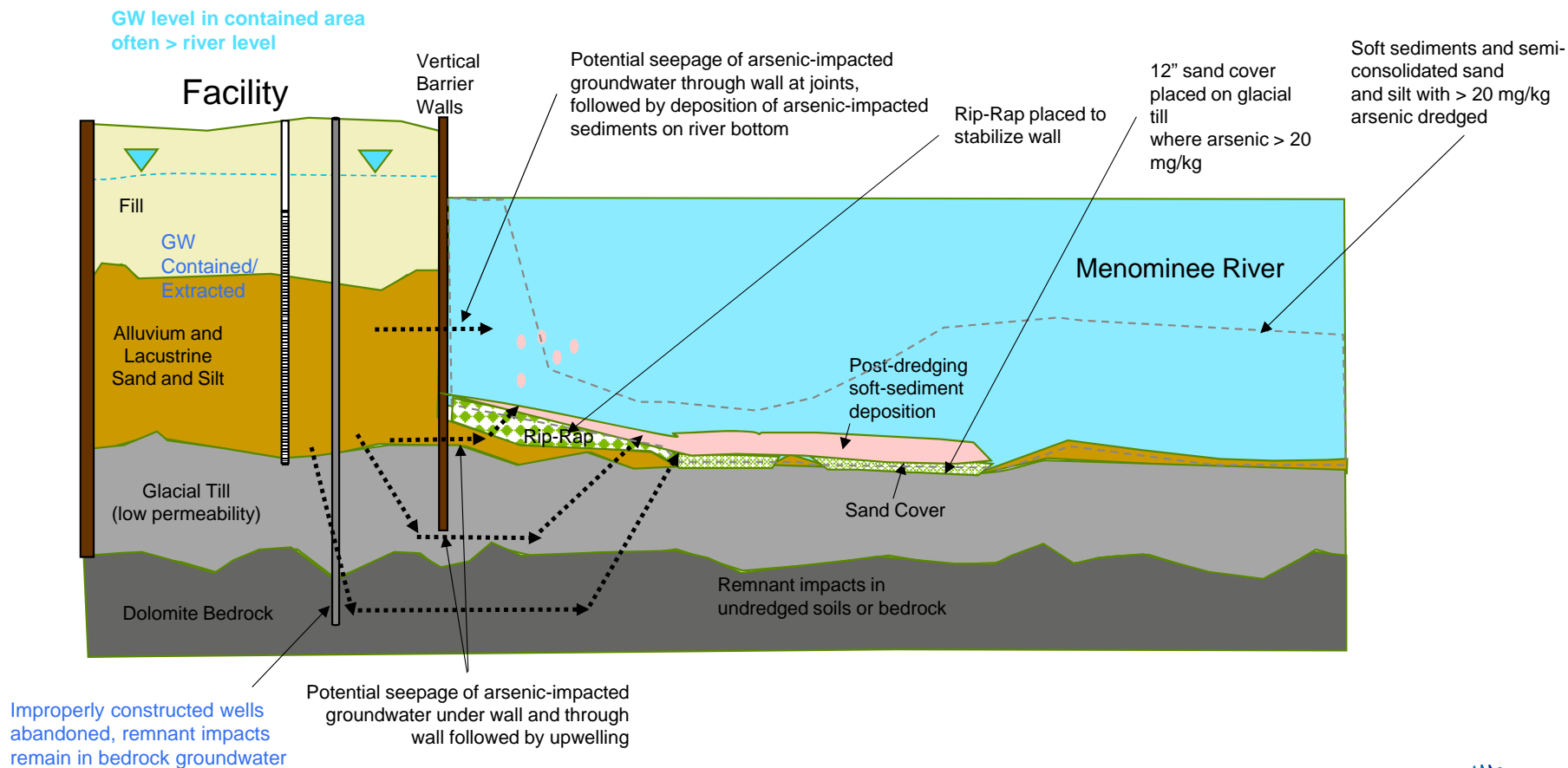
## Significant Remedial Actions Completed to Eliminate/Mitigate Pathways

# Conceptual Site Model (Pre-Remedy Conditions)

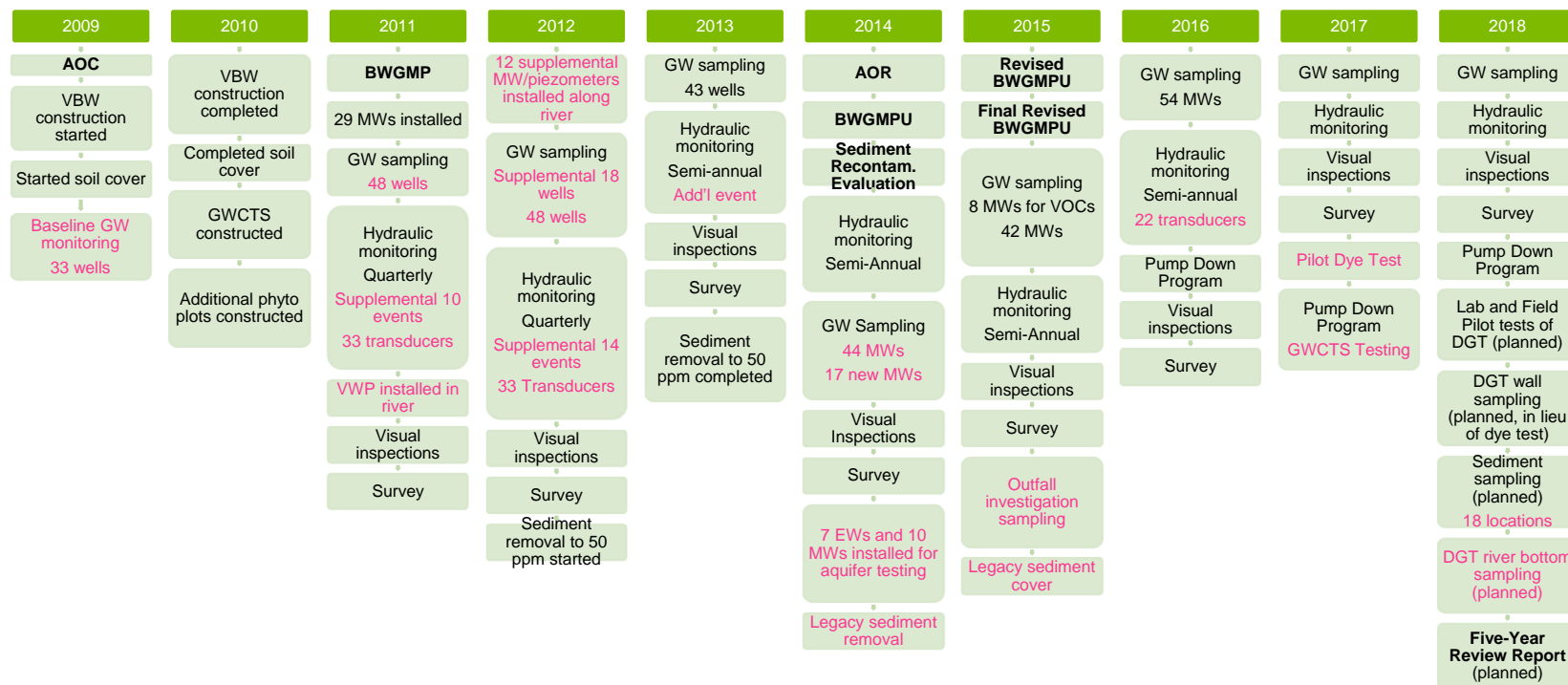


Limited Arsenic impacts in bedrock  
Groundwater (improper well construction in past)

# Conceptual Site Model (Potential Recontamination Pathways)



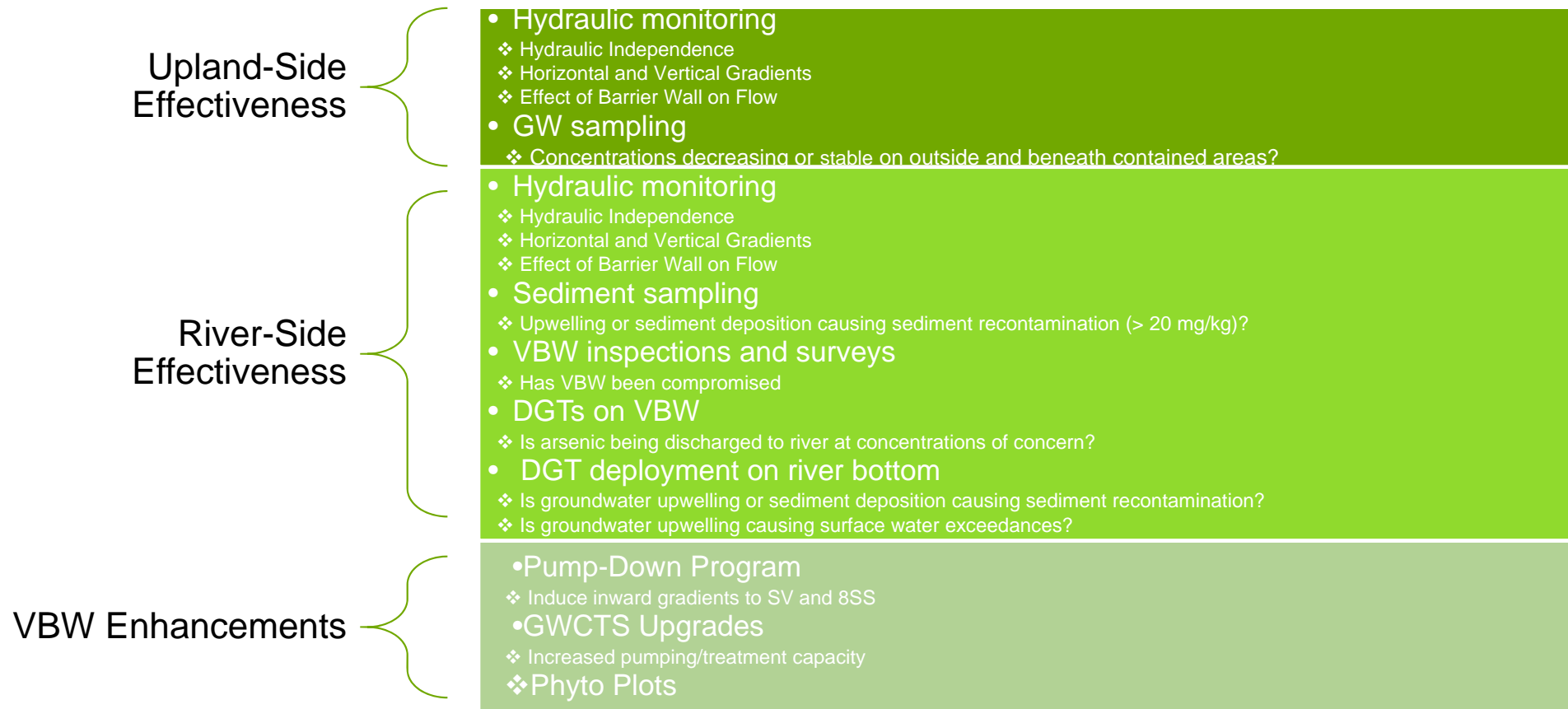
# Vertical Barrier Wall Timeline



Supplemental activities, beyond those required in AOC or AOR, are highlighted in pink

**All Barrier Wall Monitoring Reports to date have concluded that barrier wall is an effective hydraulic barrier**

# Barrier Wall Monitoring Components



# Pilot DGT Work Plan Summary

## Laboratory Testing

- Arsenic Absorption Study
- Deployment Time Study
- MDL Study

## Field Pilot Testing

- Test Deployment Methods
- Test Deployment Geometries
- Collect background surface water samples

## Full-Scale Testing - VBW (Conceptual)

- 10% of seams tested
- Up to 5 DGTs per tested seam
- If DGT > surface water criteria, follow-up surface water sampling

## Full-Scale Testing – river bottom (Conceptual)

- 8 DGTs in river bottom to measure collocated pore water and surface water concentrations
- Compare DGT surface water results to surface water criteria



Image from  
[www.dgtresearch.com](http://www.dgtresearch.com)

### General Comments

- Increase DGT coverage to 15% of total seam length
- Pore-water importance not recognized
- Add performance criteria to Pilot WP

## Pilot DGT Work Plan- General Comment on Deployment Coverage

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### Increase DGT coverage to 15% of total seam length

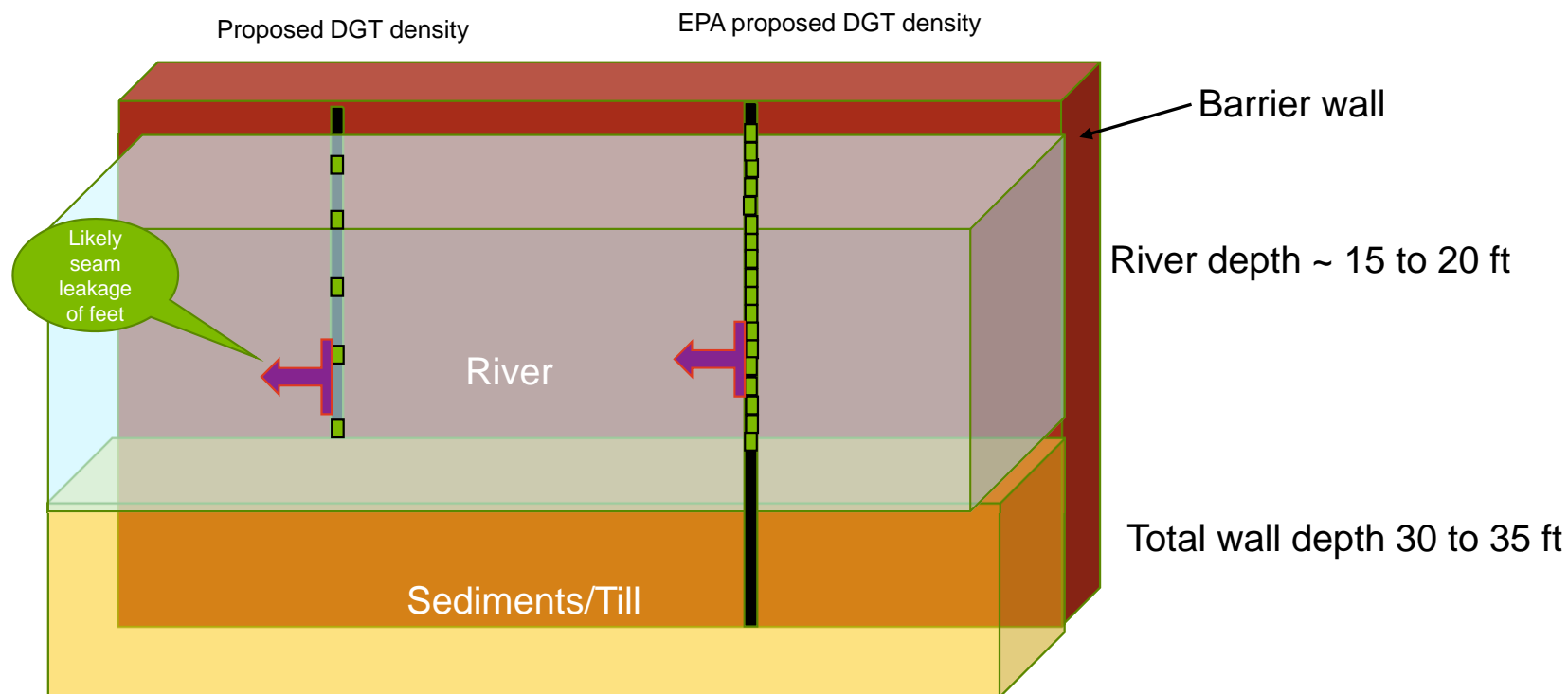
- Only 15 to 20 ft of VBW is adjacent to river (rest is in subsurface)
  - Seams below river bottom tested by DGTs in river bottom
- Proposed coverage by EPA would represent 3,465 DGTs if have to consider seams under river bottom
  - 1,980 DGTs if consider only seams exposed to river
- Significant deployment and retrieval times (20 weeks total); would not be able to complete in 2018
- Significant cost, given other VBW monitoring occurring
- Not necessary to deploy DGTs along the full exposed seam
  - Seam failure likely to be result of repeated driving of sheet piling causing loss of Adeka sealant
  - This mechanism would affect on the order feet of the seam, rather than cause a pinhole leak
- 2014 SEDCAM evaluation suggested 0.15 gpm leakage rate required to recontaminate sediments
  - If seam totally unsealed, 0.006 gpm flow would occur through that seam
  - 23 seams would need to be completely unsealed to reach 0.15 gpm (6.9% failure rate)

### Proposed Adjustments

- Test 15% of seams (50 seams)
- Deploy DGTs every 3 feet on each tested seam
- 98% chance that testing 50 seams will detect a “bad seam” if there is a 6.9% failure rate



# Schematic of proposed vertical DGT deployment



## Pilot DGT Work Plan - General Comment on Pore Water Significance

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### Pore water sampling an important part of assessment for potential sediment recontamination and surface water impacts

- Ultimate measure of success of VBW is preventing sediment recontamination to 20 mg/kg
- Sediment will be sampled in 2018 as part of Five-Year Review
- Sediment recontamination mechanisms include sediment deposition and groundwater upwelling/partitioning
- Pore water sampling, and river bottom assessment are not part of AOR
- DGTs will be deployed to measure pore water and surface water concentrations at river bottom
- In Five-Year Review, pore water, surface water, and sediment data will be evaluated to assess potential contribution of groundwater migration on sediment concentrations

### Proposed Adjustments

- Use Freundlich isotherm developed for site to assess equilibrium sediment concentration indicated by DGT pore water result

## Pilot DGT Work Plan - General Comment on Performance Criteria

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### Specific Performance Criteria should be included for each component of Pilot Testing

- Agreed

### Proposed Performance Criteria

- **Arsenic Absorption Study**
  - Does arsenic concentration measured by DGT match, within  $\pm 30\%$ , average water concentration?
  - If performance criteria outside  $\pm 30\%$ , consider use of correction factor
  - More effective binding gel (DGT-measured concentration closest to actual water concentration) selected
- **Deployment Time Study**
  - Select deployment time that can measure 1 ug/L to at least 340 ug/L arsenic (ideally 1,000 ug/L)
  - If higher arsenic concentrations, DGT binding gel capacity may be consumed, concentrations reported as greater than value.
- **Field Pilot**
  - For deployment method, which method 1) best adheres the DGT to wall and 2) easiest to deploy/retrieve by a SCUBA diver.
  - For deployment geometry, which geometry measures the higher arsenic concentrations.

# Pilot DGT Work Plan – Specific Comments

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## 1. River bottom DGTs will also assess sediment recontamination prevention

- Agreed

## 2. Co-locate DGT samplers with sediment sample locations

- Freundlich isotherm already developed for site
- Sediment sampling likely conducted before DGT sampling
- DGTs will be placed as close as possible to VBW, may not coincide with sed. sample locations

## 3. Place DGT samplers so that pore water flows through binding gel

- DGTs will be placed so portion of DGT is in pore water and portion is in surface water
- Standard DGT practice (EPA 2017)

## 4. Fasten DGTs to wall so only groundwater interacts

- Not recommended by DGT developer
- DGT requires flow across the membrane to prevent diffusive boundary layer development
- Would be difficult to quantify arsenic concentration
- DGTs will be placed within cm of the wall



## Pilot DGT Work Plan – Specific Comments Continued

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### 5. How will TWA pore water concentrations be used

- Freundlich isotherm to estimate sediment concentration from DGT concentration

### 6. Contradictory information on DGT dimensions in WP

- Disk DGTs have 3.14 sq. cm exposure window, 2 cm diameter
- Rectangle DGTs have 15 cm by 1.8 cm exposure window

### 7. Lab testing does not assess porewater analysis of DGTs

- DGTs on barrier wall unique application, therefore focus of Pilot Test
- Lab pilot test goal is whether DGTs accurately measure arsenic concentrations given site-specific arsenic species present
- Lab results applicable to both wall and pore water DGTs

### 8. Pilot test should include testing DGTs at river bottom

- Deployment of DGTs in pore water and surface water is standard

## Pilot DGT Work Plan – Specific Comments Continued

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### 9. Groundwater samples should be analyzed for As species

- Agreed.

### 10. Provide information why speciation data from 2000 being used

- MW005M and MW010M analyzed in 2000, since abandoned
- Nearby wells MW117M and MW108M have not been sampled for speciation
- MW117M and MW108M will be analyzed for speciation

### 11. Recommend 1 day deployment time test in Lab Deployment Time Study

- CH2M re-assessed deployment times given maximum uptake capacity of DGTs
- Recommends lab deployment times adjust to 1, 2, and 4 days
- Recommends adjusting Arsenic Absorption Study deployment time to 4 days and tested concentration to 200 to 500 ug/L

### 12. Suggest testing SCUBA deployment during Field Pilot

- Due to costs, scheduling, and safety requirements, do not recommend SCUBA tests in Pilot
- A scientific SCUBA diver will likely be part of field pilot

## Pilot DGT Work Plan – Specific Comments Continued

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13. DGT Deployment Methods A and B referenced in table, but not defined

- Method A is use of magnetics, Method B is used of marine epoxy/adhesive
- Recommend rectangle DGTs only

14. Remove averaging of TWA DGT concentrations across a seam

- Agreed

15. Figure 2 should include decisions for assessing pore-water DGT data

- Agreed

16. Adjust language regarding ability to use pore-water data to assess sediment recontamination from groundwater upwelling

- Text will be adjusted

# Pilot DGT Work Plan Summary-Key Proposed Adjustments

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## Laboratory Testing

- Arsenic Absorption Study
  - **Adjust deployment time to 4 days, tested concentration to 200 to 500 ug/L**
- Deployment Time Study
  - **Adjust tested deployment times to 1, 2, and 4 days**
- MDL Study

## Field Pilot Testing

- Test Deployment Methods
  - **Test only DGT rectangles**
- Test Deployment Geometries
- Collect background surface water samples

## Full-Scale Testing - VBW (Conceptual)

- 10% of seams tested
  - **Adjust to 15% of seams**
- Up to 5 DGTs per tested seam
  - **Adjust to DGTs every 3 feet**
- If DGT > surface water criteria, follow-up surface water sampling

## Full-Scale Testing – river bottom (Conceptual)

- 8 DGTs in river bottom
- Measure pore water and surface water
- Compare DGT surface water results to surface water criteria
- **Use DGT pore water results to estimate sediment concentration, compare to 20 mg/kg sediment standard**



# Discussion/ Next Steps

USEPA, WDNR and Tyco Meeting

Milwaukee, WI

May 16, 2018

# Other Items

USEPA, WDNR and Tyco Meeting  
Milwaukee, WI  
May 16, 2018

## 2018 Additional Activities

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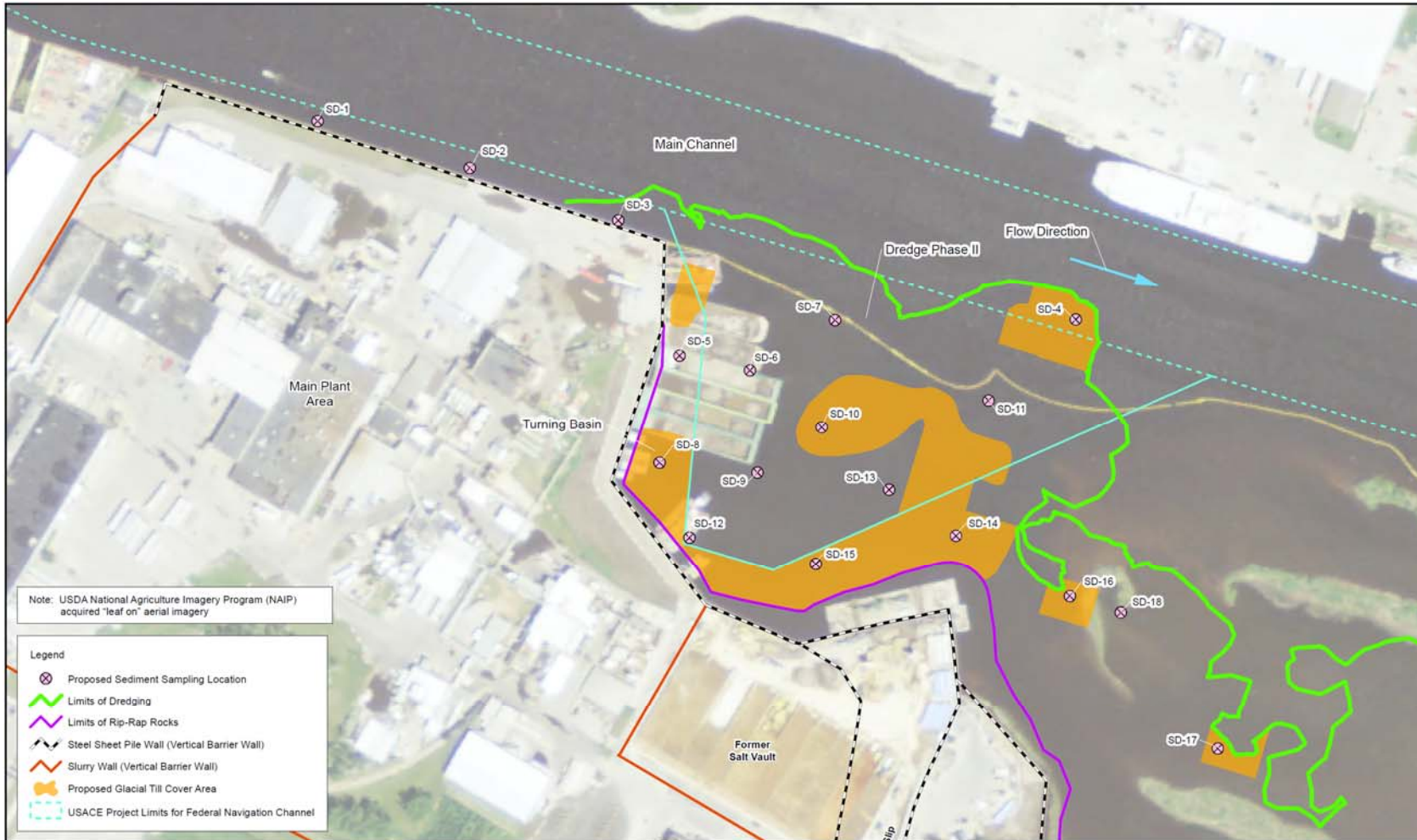
- Sediment Sampling
- Groundwater Sampling – Spring Event
- 2017 Annual Report
- PFAS Sampling
- Surface Water Sampling
- Storm Sewer Modifications and System Sampling
- Barrier Wall Inspection

## Sediment Sampling

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- Component of 5-year Review
- Scope presented in the Barrier Wall Groundwater Monitoring Plan Update
- 18 pre-determined locations within Menominee River Main Channel and Turning Basin
  - Evaluate quality of soft sediments accumulated since dredging operations
  - Collect sediment to top of semi-consolidated materials, glacial till or bedrock (whichever comes first)
  - Analysis of two sample intervals per core (assuming sufficient thickness obtained) from top and 1 foot above the bottom interval
- Tentatively scheduled for week of July 9, 2018

# Sediment Sampling Locations

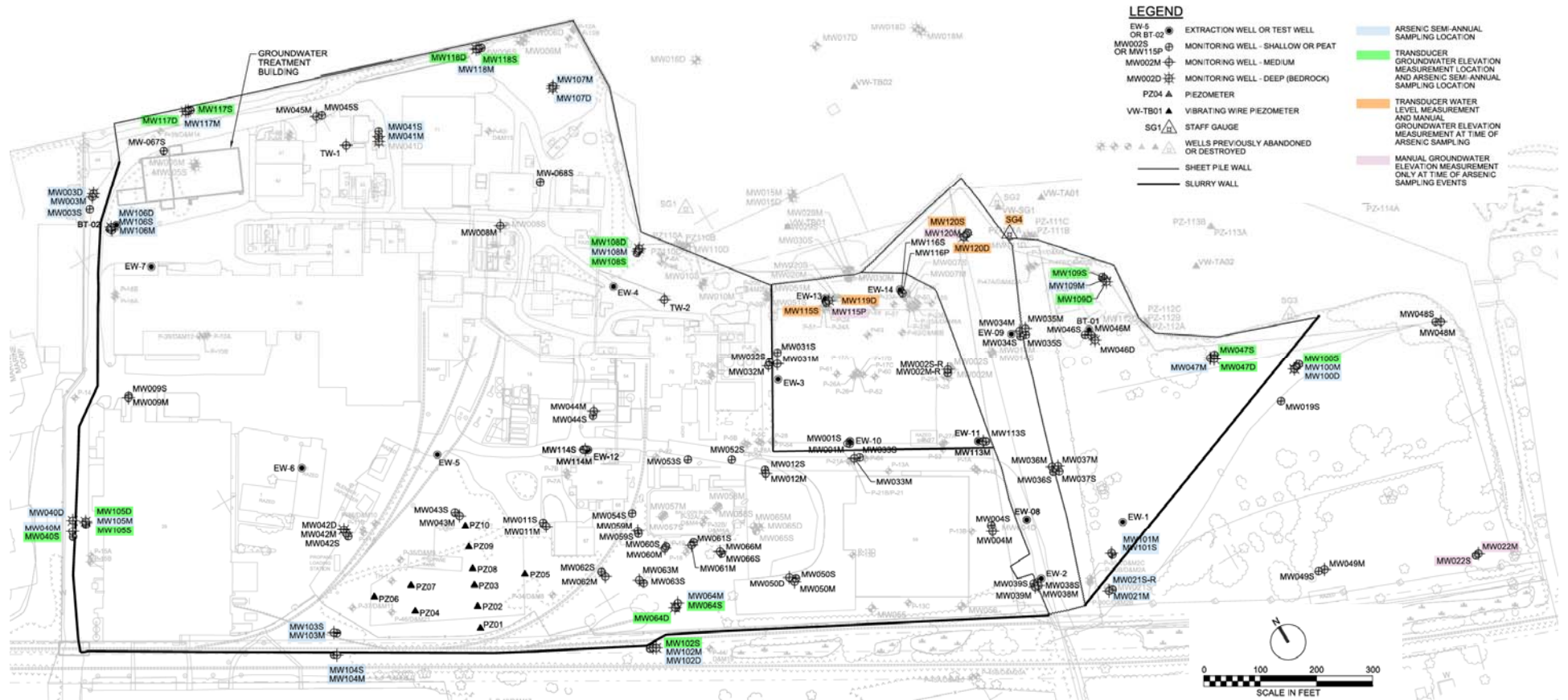


## Groundwater Sampling – Spring Event

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- Completed May 1 – 8, 2018
  - Water Levels and Depth to Bottom of Well
  - Total As
  - Select VOC analysis
  - Unable to sample MW105M and MW105D due to water conditions
  - Unable to sample MW118D – possible well damage
- Data to be reported in 5-year Review

# Groundwater Sampling – Spring Event



## 2017 Annual Report

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- Nearly complete
  - Some issues with transducer data download that appear to be resolved
  - Transducer data download evaluation only remaining item to be completed and included in report
- Submittal anticipated in June



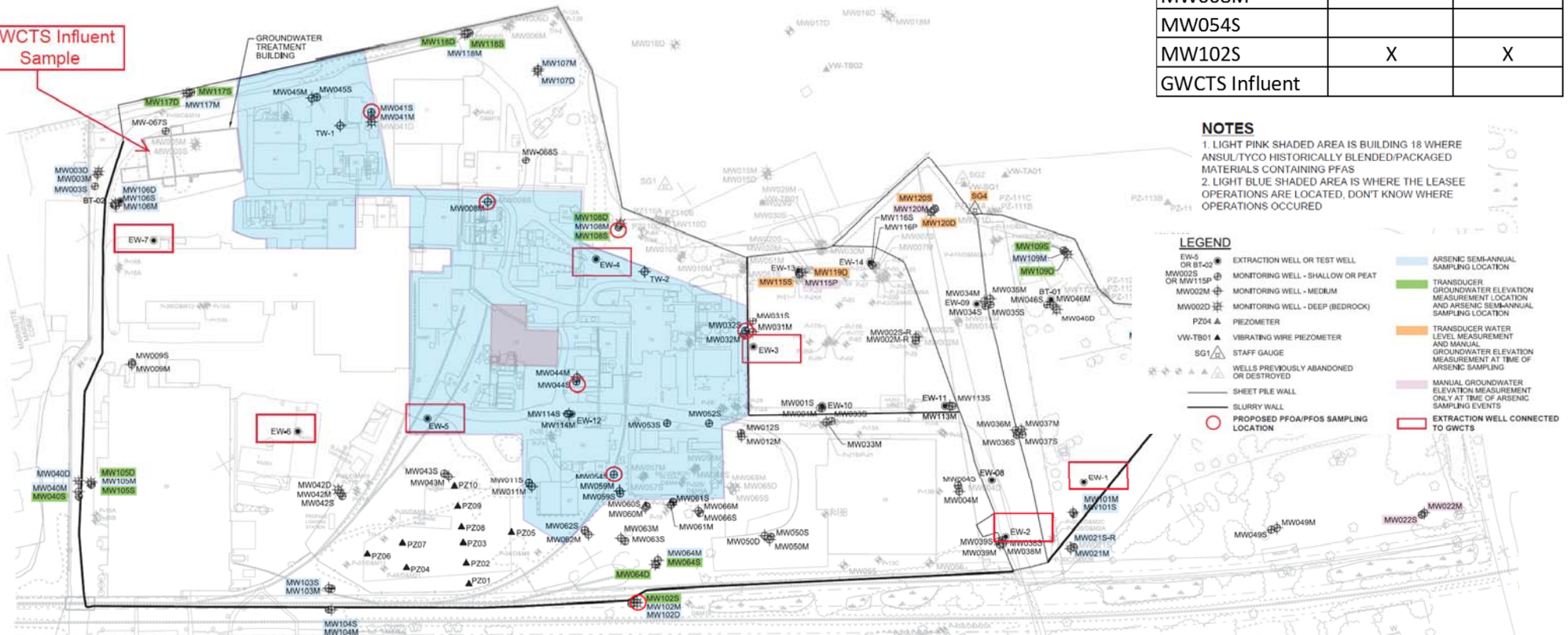
# PFAS Sampling

- Conducted April 30-May 1, 2018
- Sampled 7 wells and groundwater treatment system composite influent
- USEPA split samples at all locations

Proposed PFOA/PFOS Sampling Locations

Location	Barrier Wall Sampling Well	Transducer
MW041S	X	
MW108S	X	X
MW044S		
MW032S		
MW008M		
MW054S		
MW102S	X	X
GWCTS Influent		

GWCTS Influent Sample



## Surface Water Sampling

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- Requested as part of WPDES permitting
- Last of four quarterly rounds of sampling completed on May 10, 2018
- Four surface water samples collected at pre-determined locations, consistent with 3 previous events
- Samples collected at Marinette and Menominee drinking water raw water intake ports
- All data to be provided to agencies upon receipt from laboratory

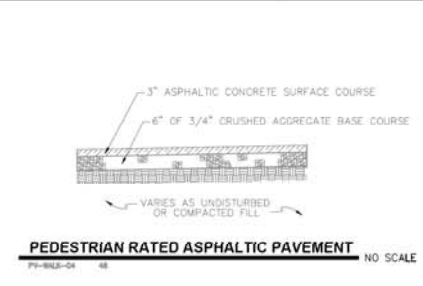
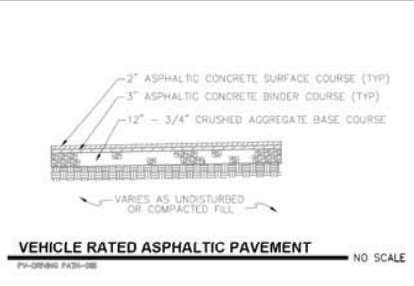
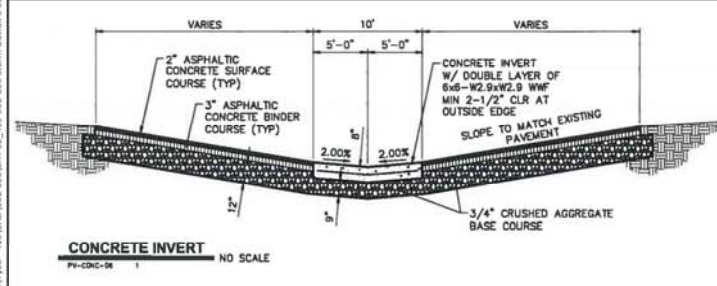
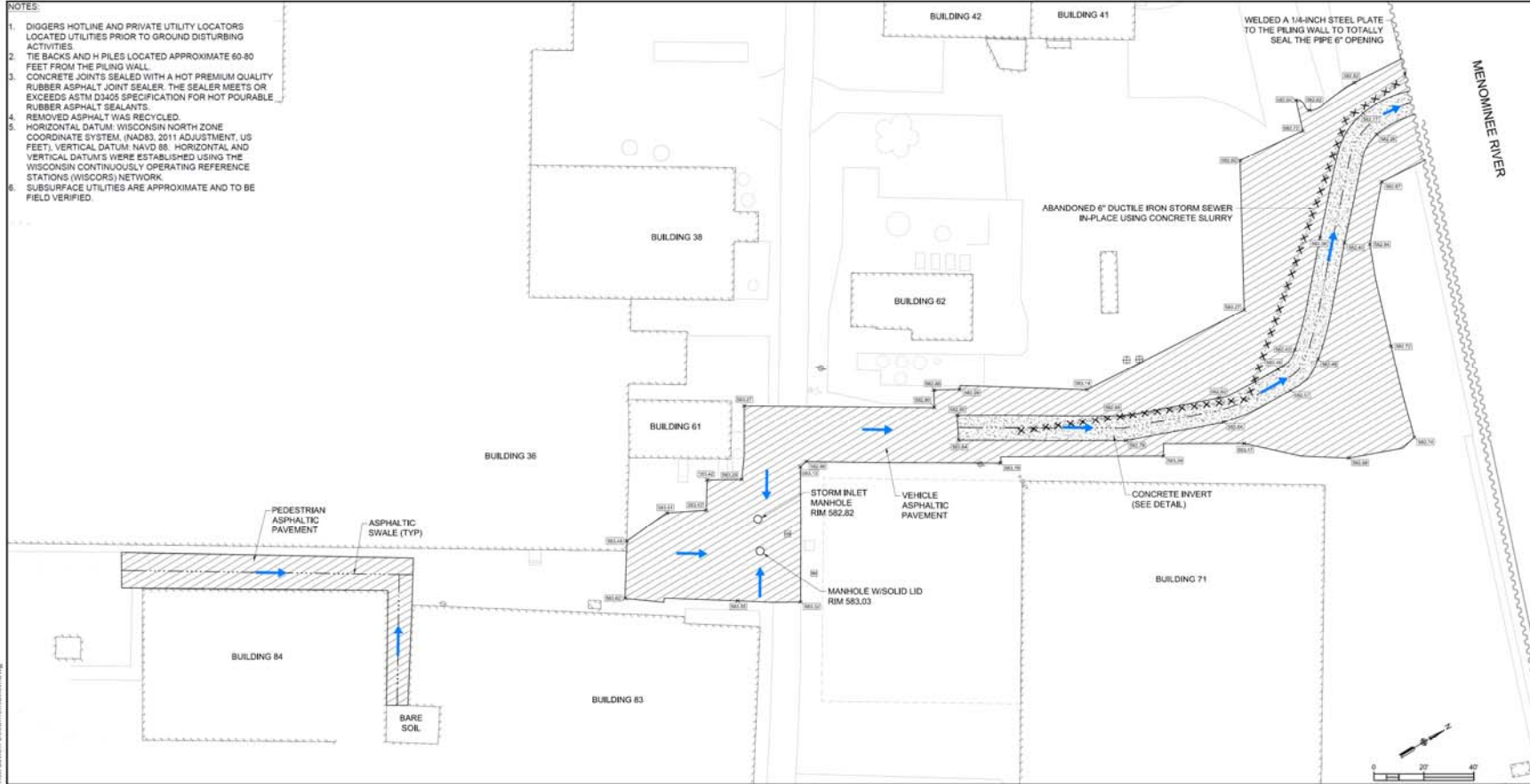
# Storm Sewer Modifications and System Sampling

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- Completed Activities
  - Additional Asphalt Pavement
  - Stormwater Conveyance Repair and Lining
    - Structures associated with Outfalls 1, 2, and ChemDesign area
    - Video Survey – Outfall 10 (coal dock area)
  - Outfall 3 Modifications
    - Abandoned underground conveyance system
    - Construct above ground surface water drainage
  - Outfalls 5/6 Modifications
    - Abandoned underground conveyance system
      - Outfall 5 drop pipe (ChemDesign)
      - Outfall 6 – Salt Vault surface water discharge
    - Constructed above ground surface water drainage
      - Combined Outfalls 5/6 discharge
      - Captured additional surface water drainage

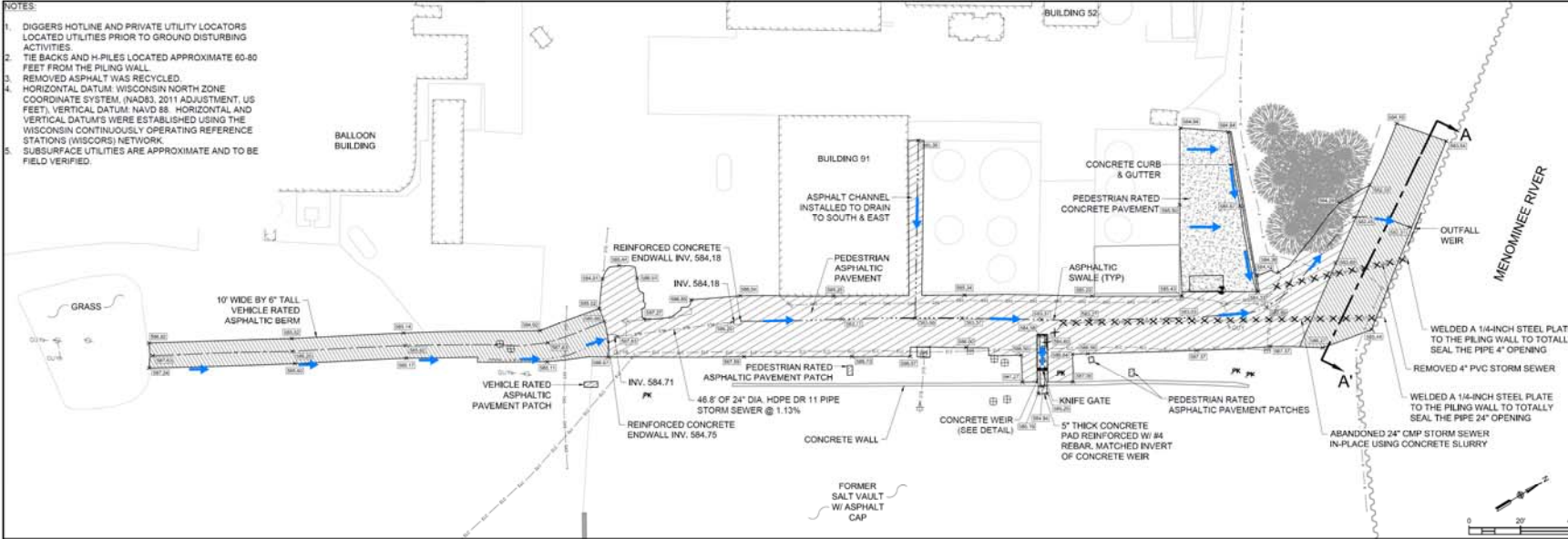
**NOTES:**

1. DIGGERS HOTLINE AND PRIVATE UTILITY LOCATORS LOCATED UTILITIES PRIOR TO GROUND DISTURBING ACTIVITIES.
2. TIE BACKS AND H PILES LOCATED APPROXIMATE 60-80 FEET FROM THE PILING WALL.
3. CONCRETE JOINTS SEALED WITH A HOT PREMIUM QUALITY RUBBER ASPHALT JOINT SEALER. THE SEALER MEETS OR EXCEEDS ASTM D2405 SPECIFICATION FOR HOT POURABLE RUBBER ASPHALT SEALANTS.
4. REMOVED ASPHALT WAS RECYCLED.
5. HORIZONTAL DATUM: WISCONSIN NORTH ZONE COORDINATE SYSTEM, (NAD83, 2011 ADJUSTMENT, US FEET). VERTICAL DATUM: NAVD 88. HORIZONTAL AND VERTICAL DATUMS WERE ESTABLISHED USING THE WISCONSIN CONTINUOUSLY OPERATING REFERENCE STATIONS (WISCORS) NETWORK.
6. SUBSURFACE UTILITIES ARE APPROXIMATE AND TO BE FIELD VERIFIED.



<p><b>Endpoint Solutions</b>                  6871 E. LOVERS LANE                  FRANKLIN, WI 53132                  PHONE: (414) 427-1200</p>	<p>DATE</p>
	<p>REVISIONS</p>
	<p>1. 10/20/17 4008181 REV1 REVISIONS                  2. 10/20/17 4008181 REV1 REVISIONS</p>
<p>TYCO FIRE PROTECTION PRODUCTS  <b>STORM OUTFALL 3</b>  <b>MANAGEMENT AREA</b>                  ONE STANTON STREET                  MARINETTE, WISCONSIN 54143</p>	
<p>DRAWN BY: [Signature] DATE: [Date]                  CHECKED BY: [Signature] 10/20/17                  APPROVED BY: [Signature]</p>	<p>PROJECT NO. ATYCO03-004</p>
<p>SHEET NO.  <b>2</b></p>	
<p>SHEET 2 OF 2</p>	

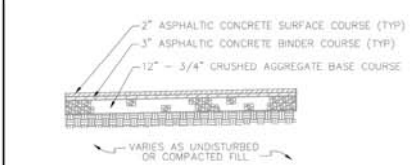
- NOTES:**
1. DIGGERS HOTLINE AND PRIVATE UTILITY LOCATORS LOCATED UTILITIES PRIOR TO GROUND DISTURBING ACTIVITIES.
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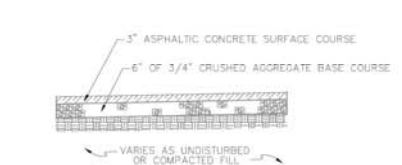
REV	DATE	DESCRIPTION

**Endpoint Solutions**

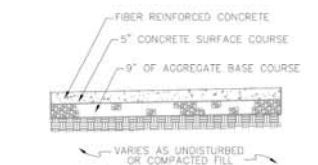
8571 E. OLIVERS LANE  
FRANKLIN, WI 53120  
PHONE: (414) 427-7200



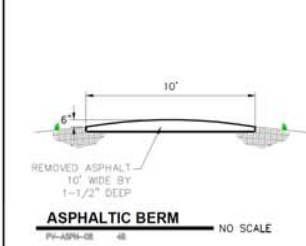
**VEHICLE RATED ASPHALTIC PAVEMENT**  
NO SCALE



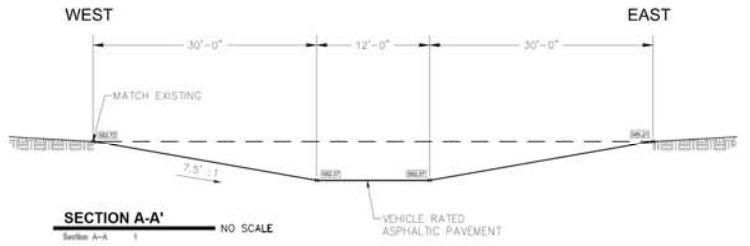
**PEDESTRIAN RATED ASPHALTIC PAVEMENT**  
NO SCALE



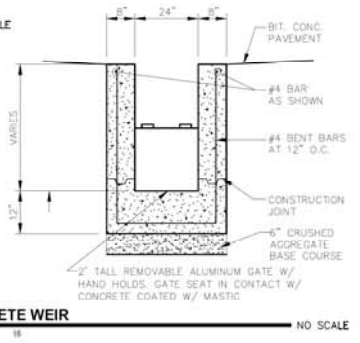
**PEDESTRIAN RATED CONCRETE PAVEMENT**  
NO SCALE



**ASPHALTIC BERM**  
NO SCALE



**SECTION A-A'**  
NO SCALE



**CONCRETE WEIR**  
NO SCALE

**TYCO FIRE PROTECTION PRODUCTS**  
**STORM OUTFALLS 5 & 6**  
**MANAGEMENT AREA**  
ONE STANTON STREET  
MARINETTE, WISCONSIN 54143

DRAWN BY: MJD/DATE	
CHECKED BY: RJB/12/21	
APPROVED BY: ALM	
PROJECT NO: #18-02-08	

SHEET NO. **1**  
SHEET 1 OF 2



# Storm Sewer Modifications and System Sampling

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- Remaining Activities
  - Limited Catch Basin Repair and Lining
  - Installation/Modification of 2 Catch Basins
    - Near Building 14 (Industrial Line)
    - ChemDesign area (near Building 70)
  - Installation of Gate Valve at Outfall 5/6
    - Salt Vault surface water containment
  - Limited seam sealing in Outfalls 3 and 5/6 areas
  - Post-improvement stormwater sampling



## Barrier Wall Inspection

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- Survey Completed on April 30, 2018
- Visual Inspection Completed on May 10, 2018
  - Water level very high, limiting visual assessment
  - 3 waler bolts require tightening
  - One apparent seam repair needed
- Comprehensive waler bolt tightening planned for 2018

# Questions / Discussion

USEPA, WDNR and Tyco Meeting

Milwaukee, WI

May 16, 2018