



PFAS Treatment and Investigation at a Former Chromium Plating Facility – A Case Study

Brad Hoare
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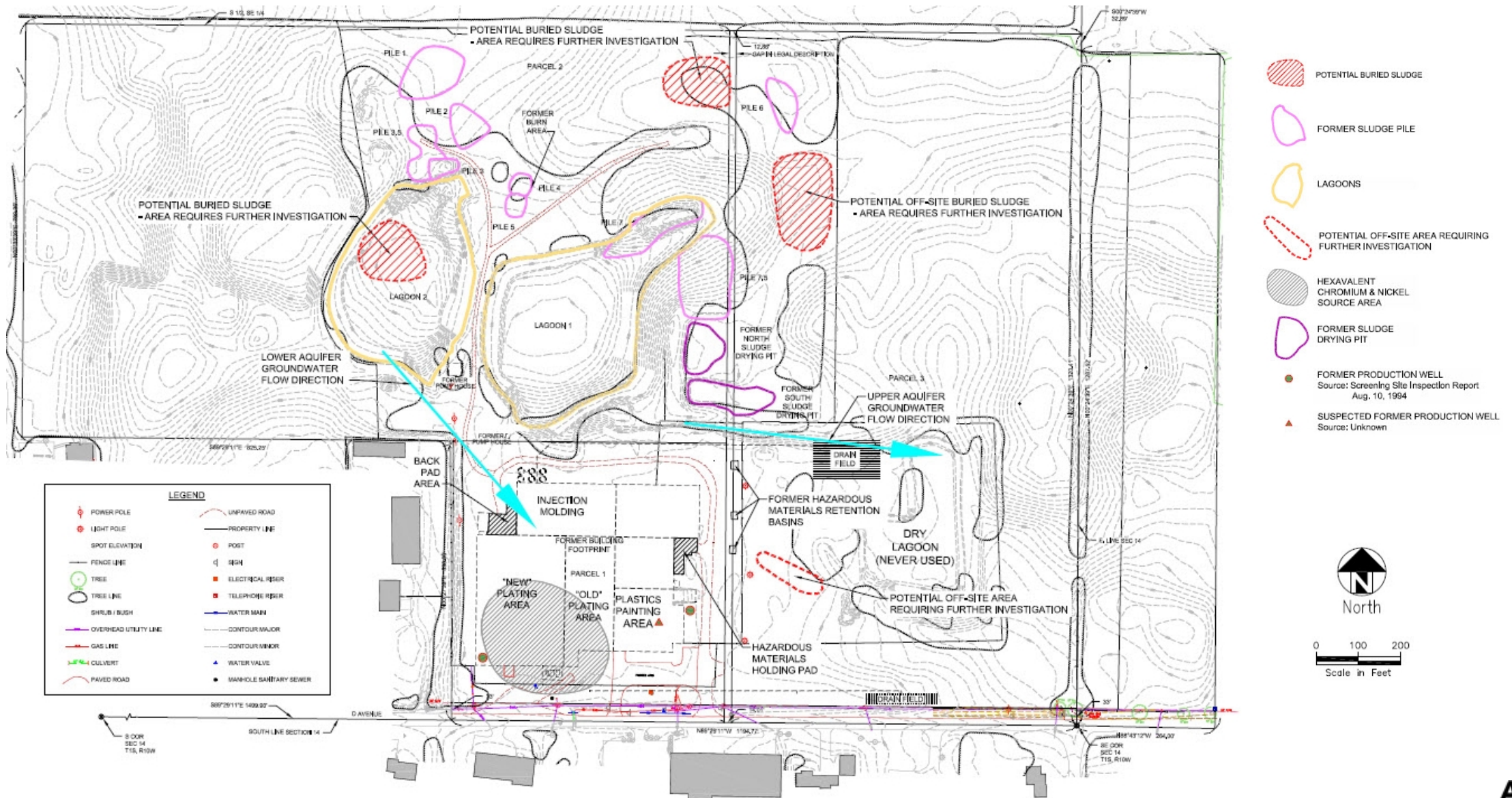
Nathan Whitmyer
EGLE-RRD

David Harn
EGLE-RRD

History

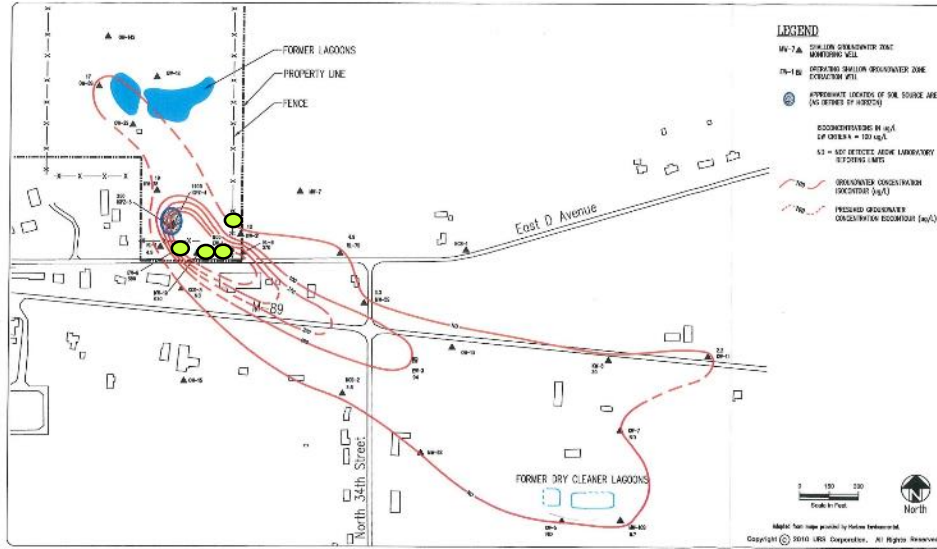
- \ Former plastics plating company (~1966 – bankruptcy in 1991)
 - Production Plated Plastics (PPP)
- \ 1977 – Heavy metal contamination discovered in residential wells
 - Company replaced affected wells
- \ 1985 – Chlorinated Volatile Organic Compounds discovered at the site
- \ PPP conducted investigations and operated a groundwater cleanup system
- \ 1988 – Municipal water extended to area
- \ 1991 – PPP bankrupt, State took over response activities

History

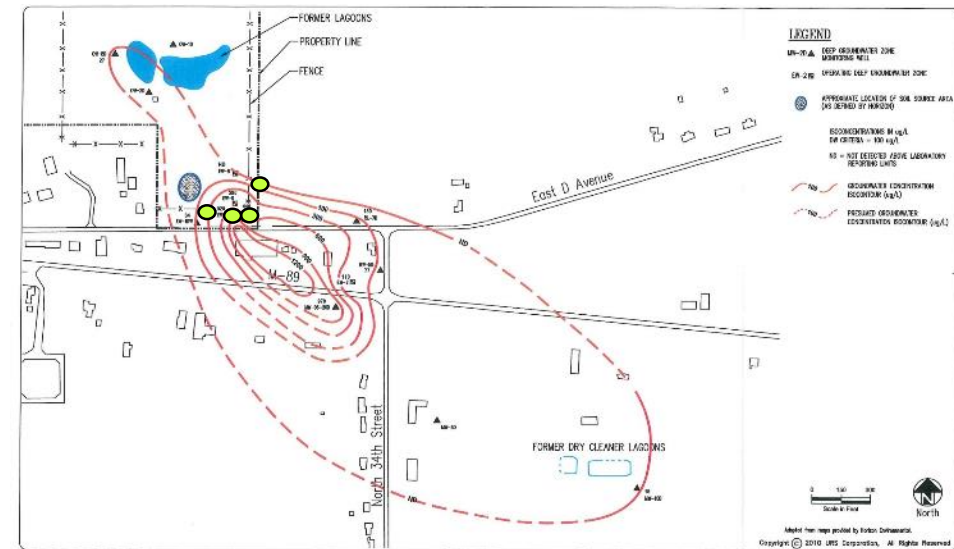


History

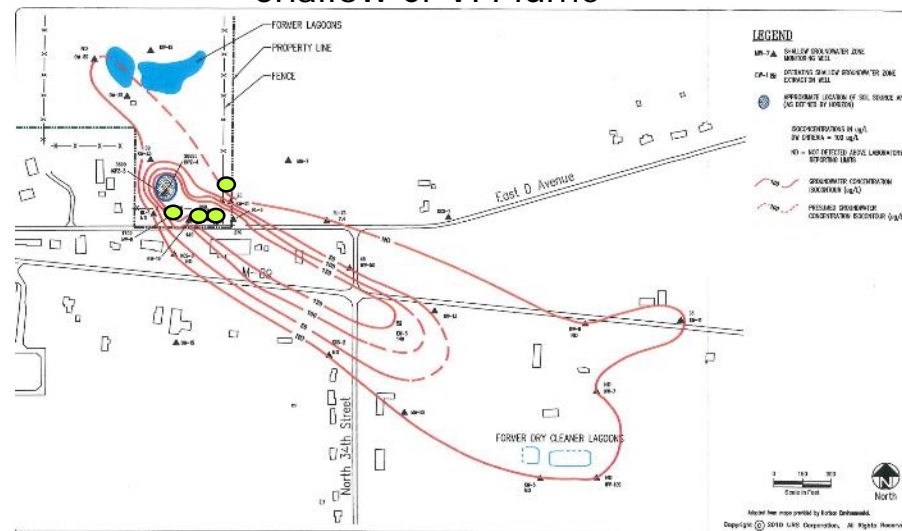
Shallow Ni Plume



Deep Ni Plume



Shallow Cr VI Plume



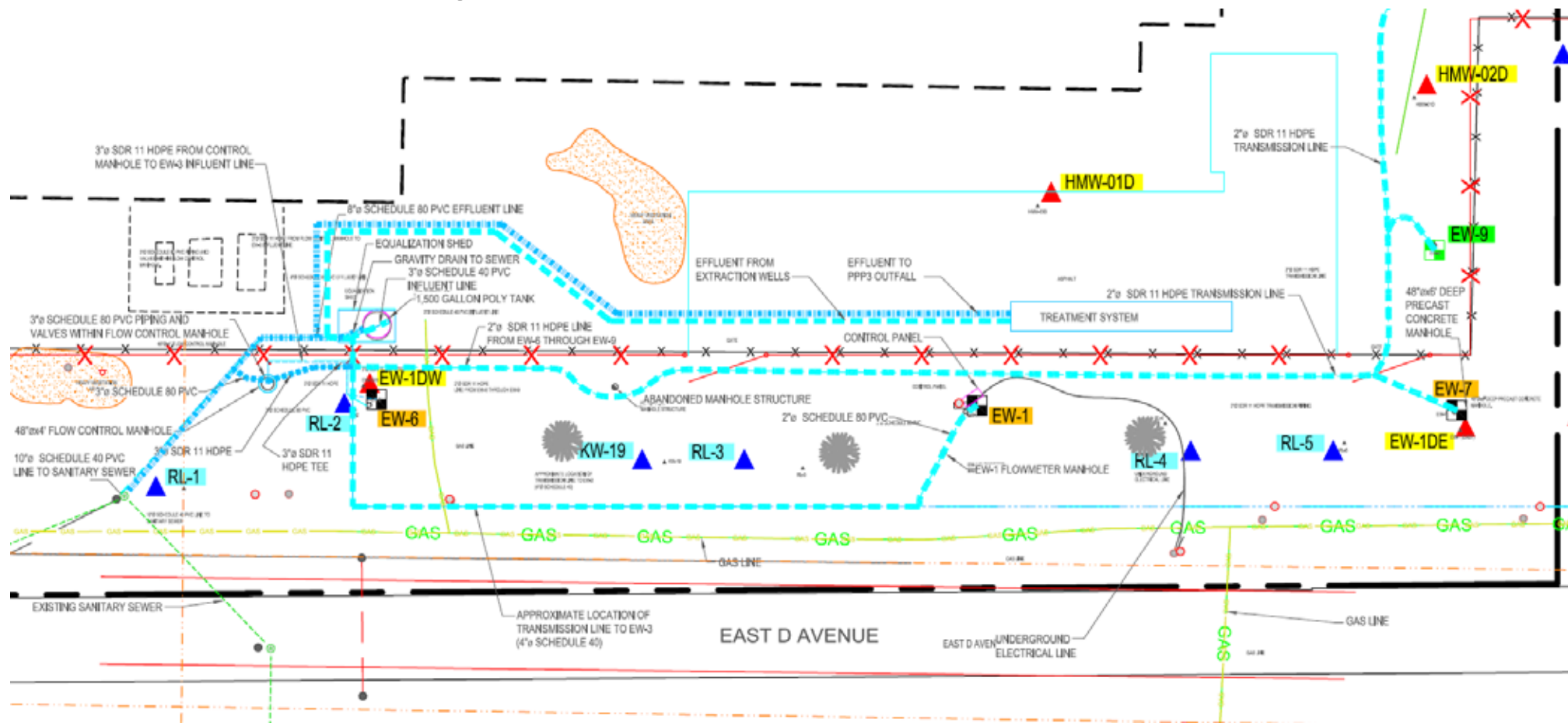
The Turning Point

- \ Michigan PFAS Action Response Team (MPART)
 - Surface Water Investigation
 - \ POTW
 - Industrial Pretreatment Program (IPP)
- \ Extraction system discharges to the City of Kalamazoo's Water Reclamation Plant under an ICD
- \ 9,640 ppt PFOS in discharge sample (April 2018)



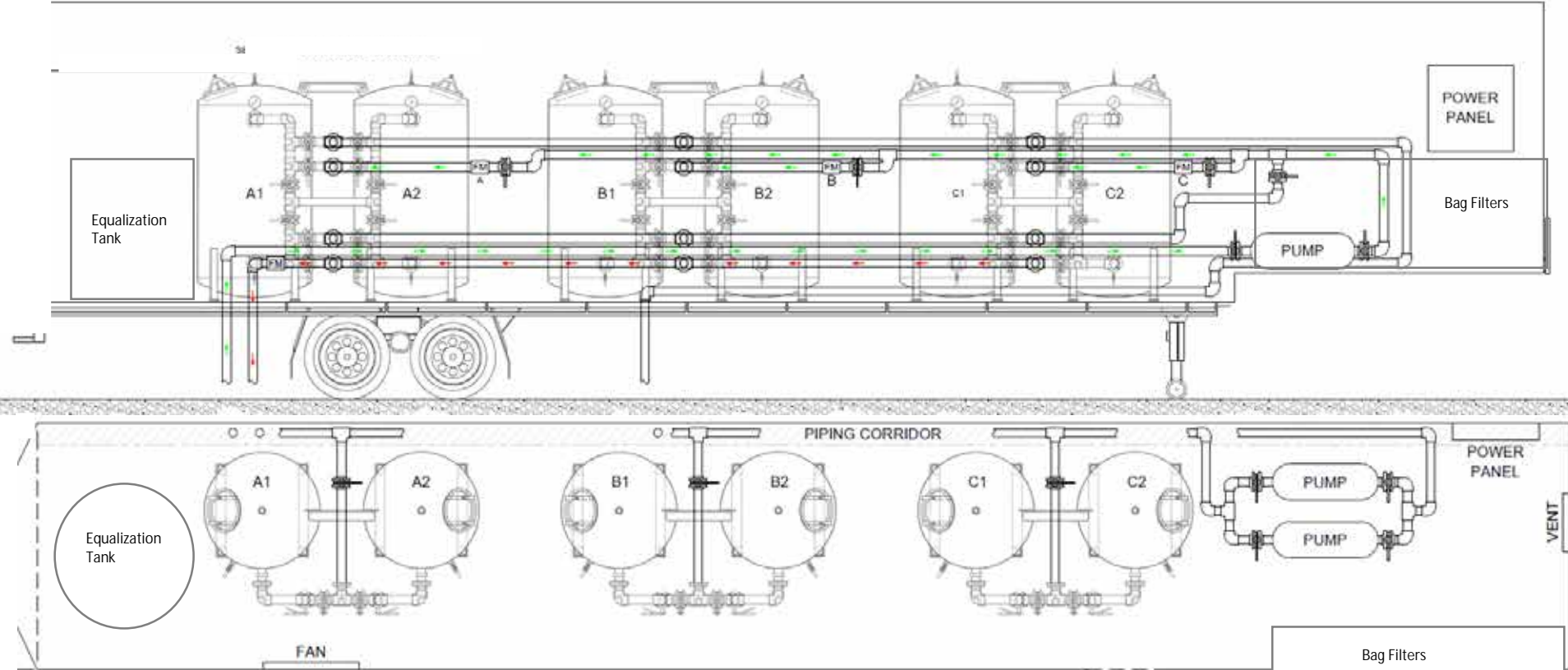
Pre-Treatment System

- \ Installation and startup of a pre-treatment system
 - <2 month TAT with a July 31th deadline
- \ Incorporate into existing extraction well infrastructure



Pre-Treatment System

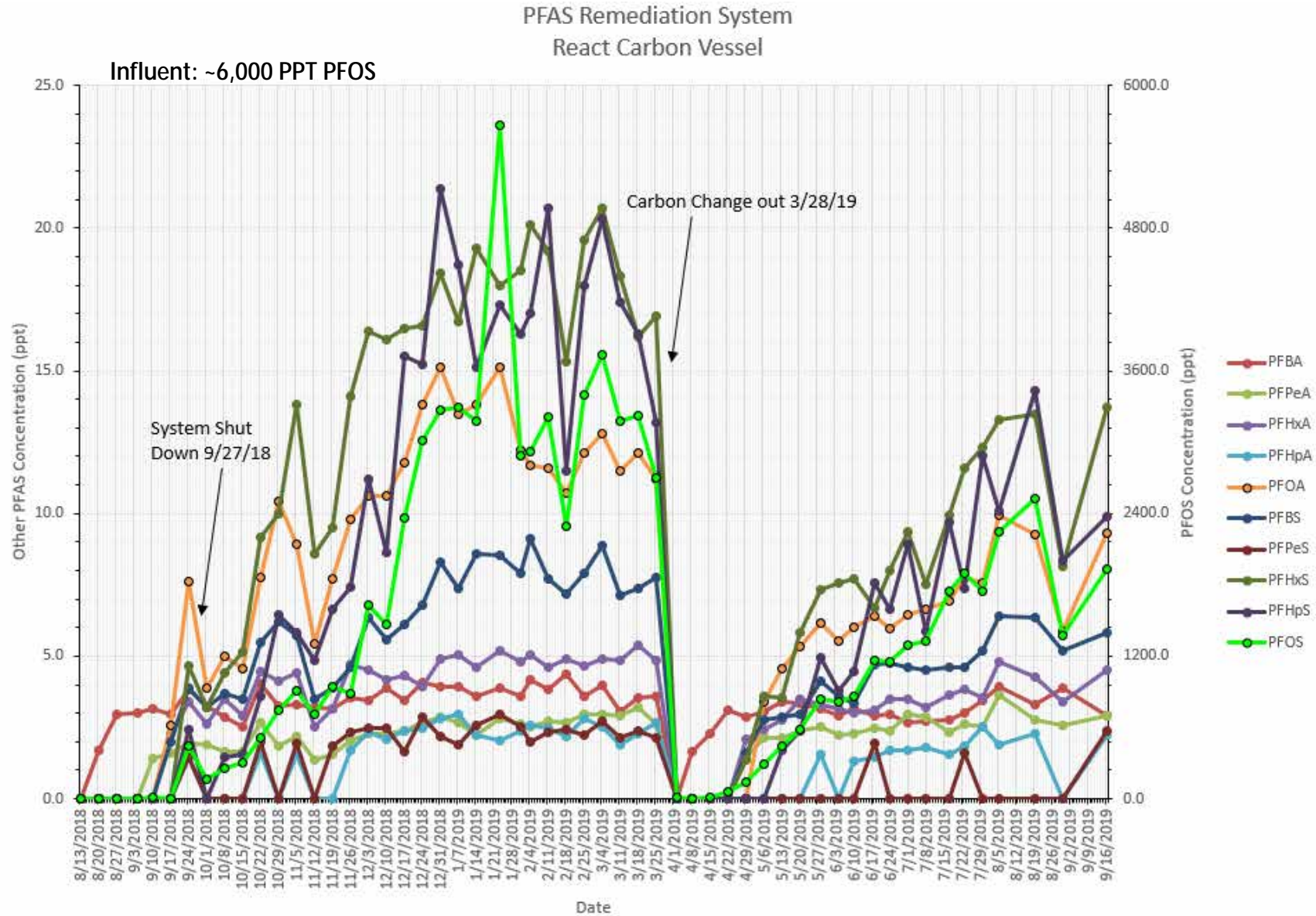
- \ Equalization Tank (500 gal.)
- \ Bag filters
- \ (6) 2,000 lbs. vessels - (1) Reactivated Carbon, (1) Resin, (4) Virgin Carbon
- \ Flow: 60 GPM; Adjust up to 75 GPM
- \ Telemetry for remote operation and alarms



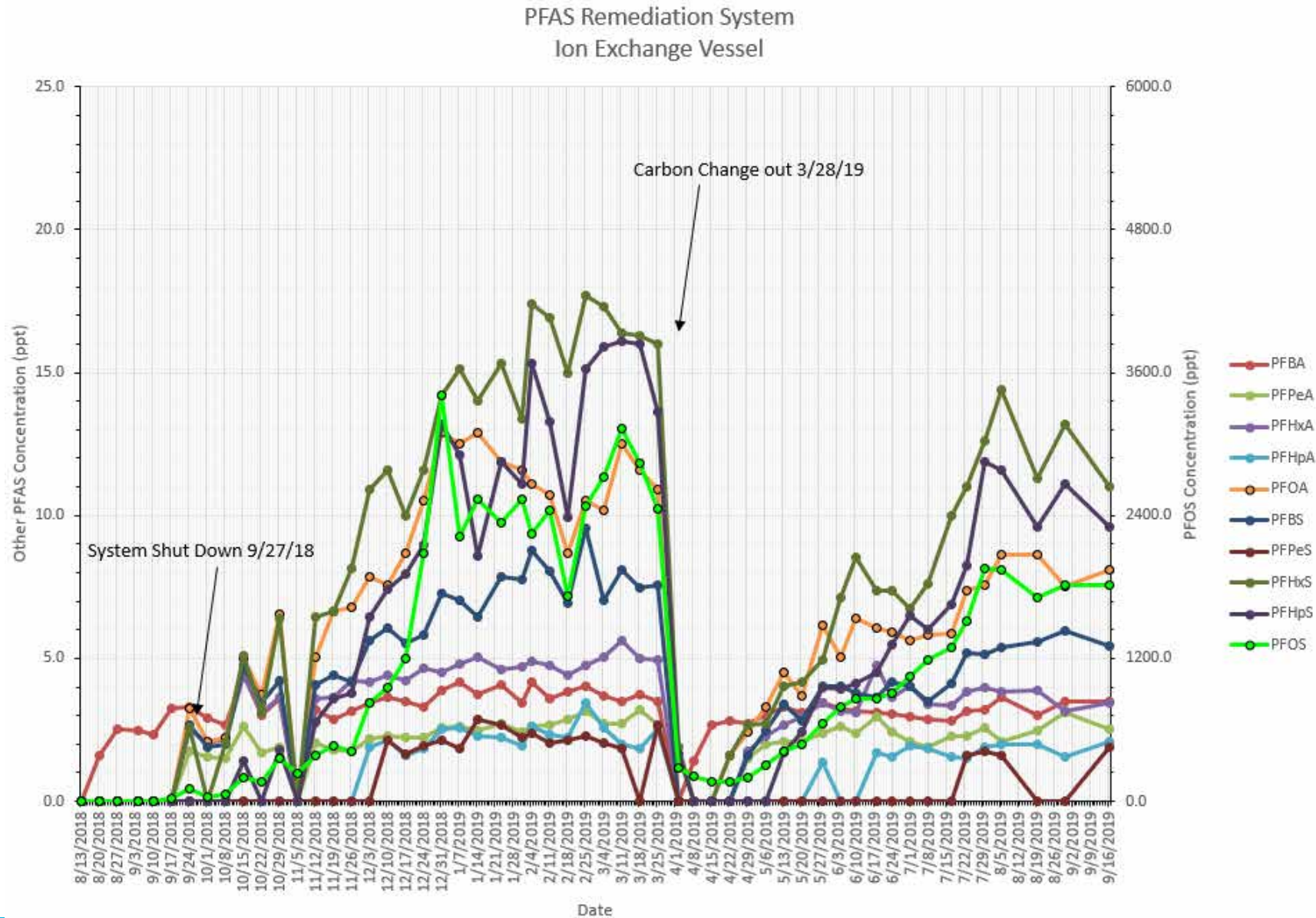
Pre-Treatment System



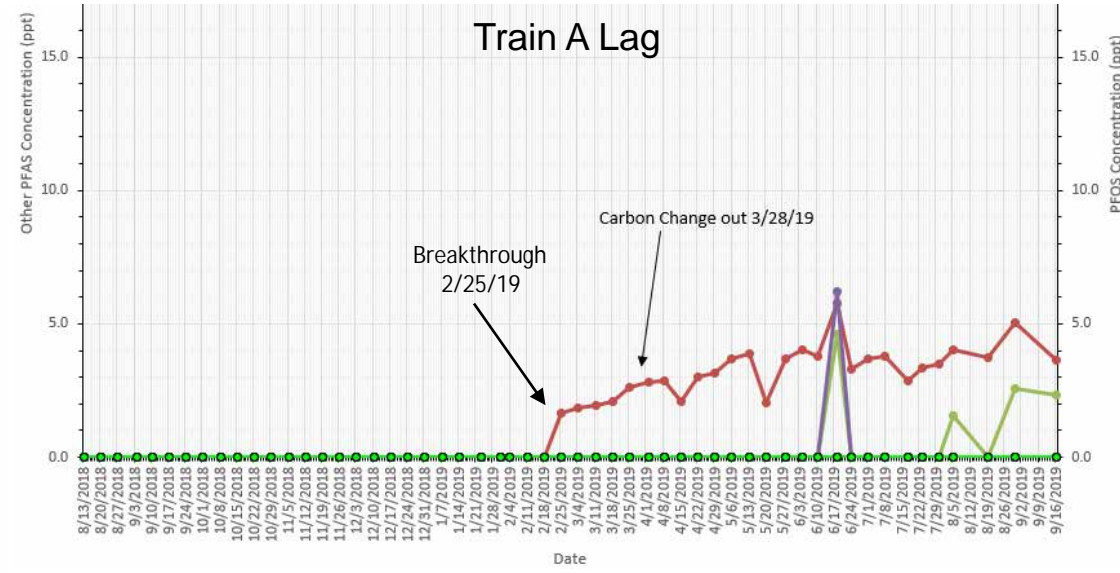
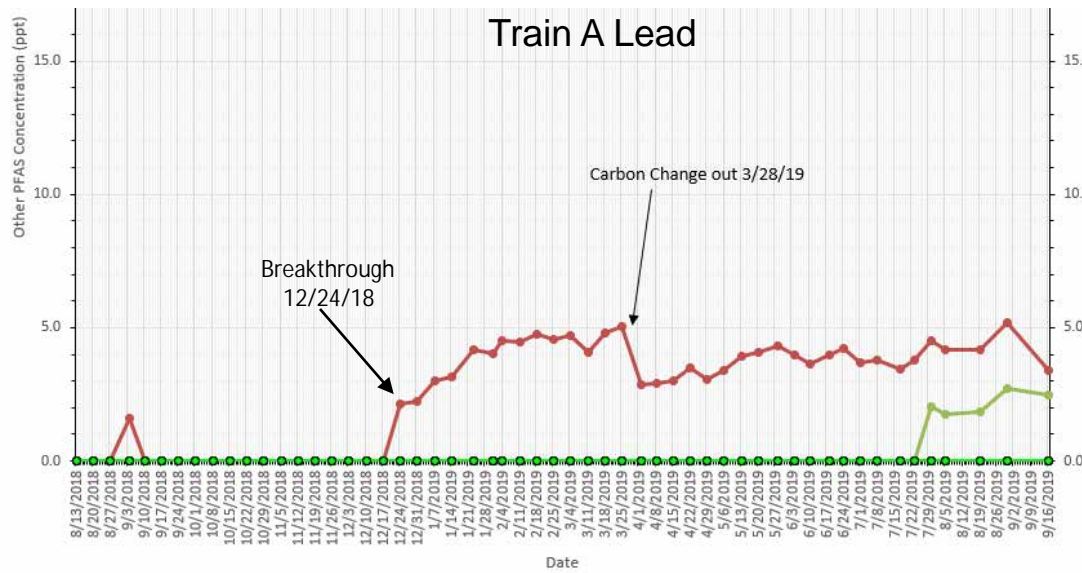
Pre-Treatment System – Reactivated Carbon



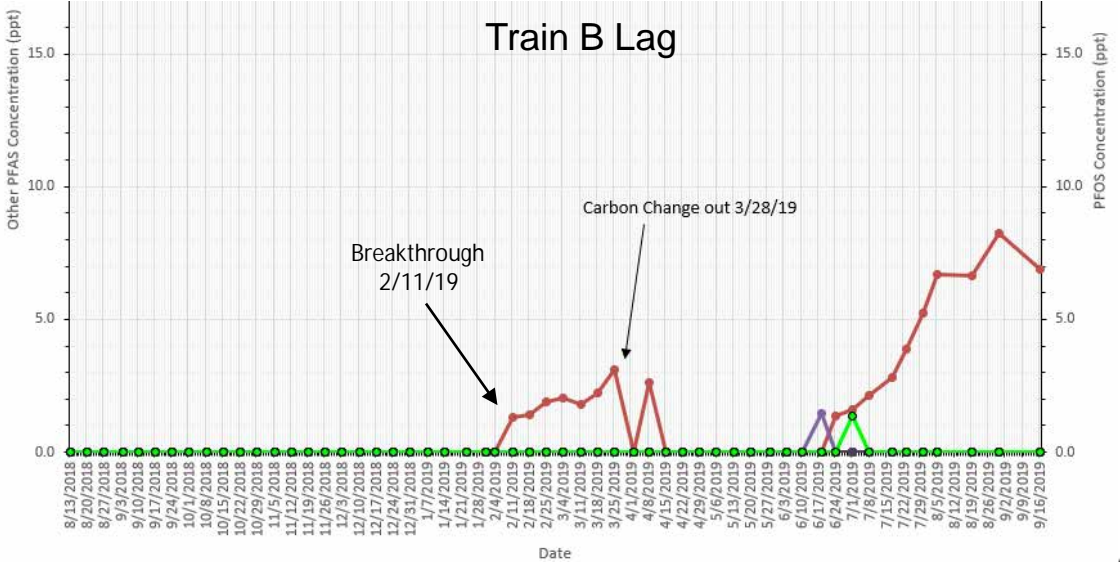
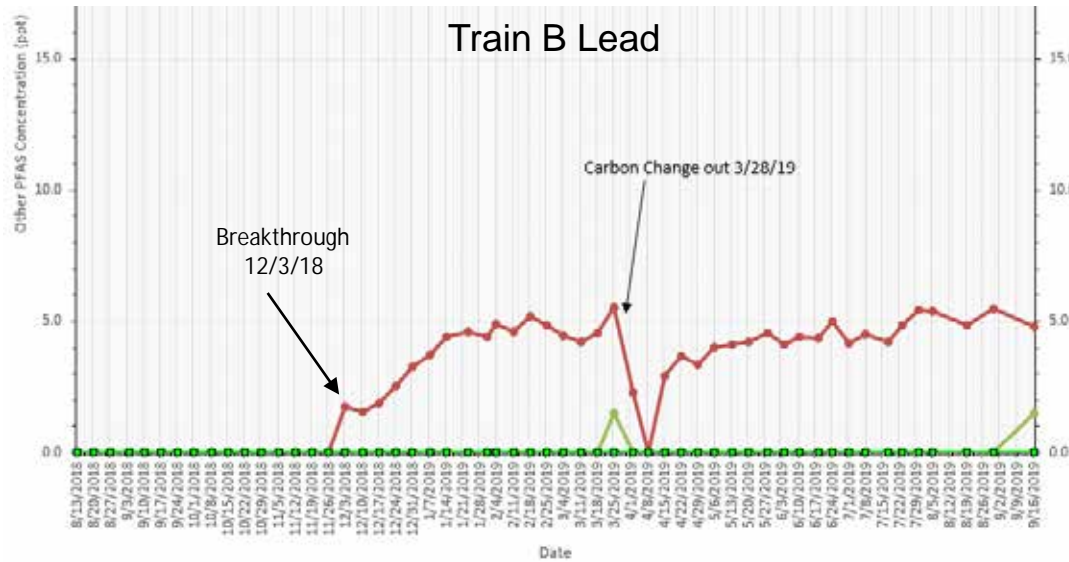
Pre-Treatment System – Ion Exchange



Pre-Treatment System – Lead/Lag



- PFBA
- PFPeA
- PFHxA
- PFHpA
- PFOA
- PFBS
- PFPeS
- PFHxS
- PFHpS
- PFOS



Pre-Treatment System – Ion Exchange: Metals

Sample Location		EW-7	EW-6	EW-9	EW-1	REACT CARBON	ION EXCHANGE	TRAIN B LEAD	TRAIN B LAG	TRAIN A LEAD	TRAIN A LAG
Date Collected		10/1/2018	10/1/2018	10/1/2018	3/25/2019	1/23/2019	1/23/2019	1/23/2019	1/23/2019	1/23/2019	1/23/2019
Date Received		10/3/2018	10/3/2018	10/3/2018	3/26/2019	1/23/2019	1/23/2019	1/23/2019	1/23/2019	1/23/2019	1/23/2019
Analyte	Units										
Hexavalent Chromium	ug/L	170	420	32	1,200	610	610	600	630	630	630
Nickel	ug/L	320	430	100	810	460	36	48	42	50	37

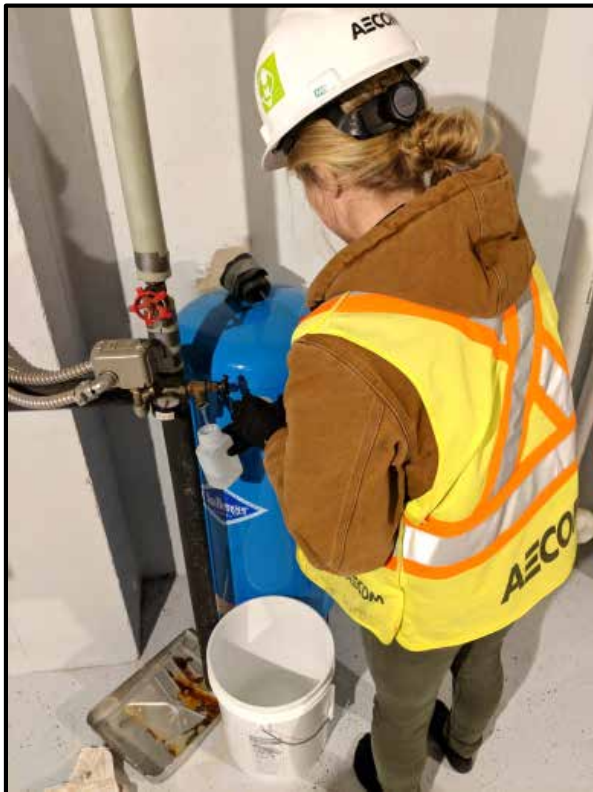
Remedial Investigation – Residential Sampling



Remedial Investigation

\ Residential Wells

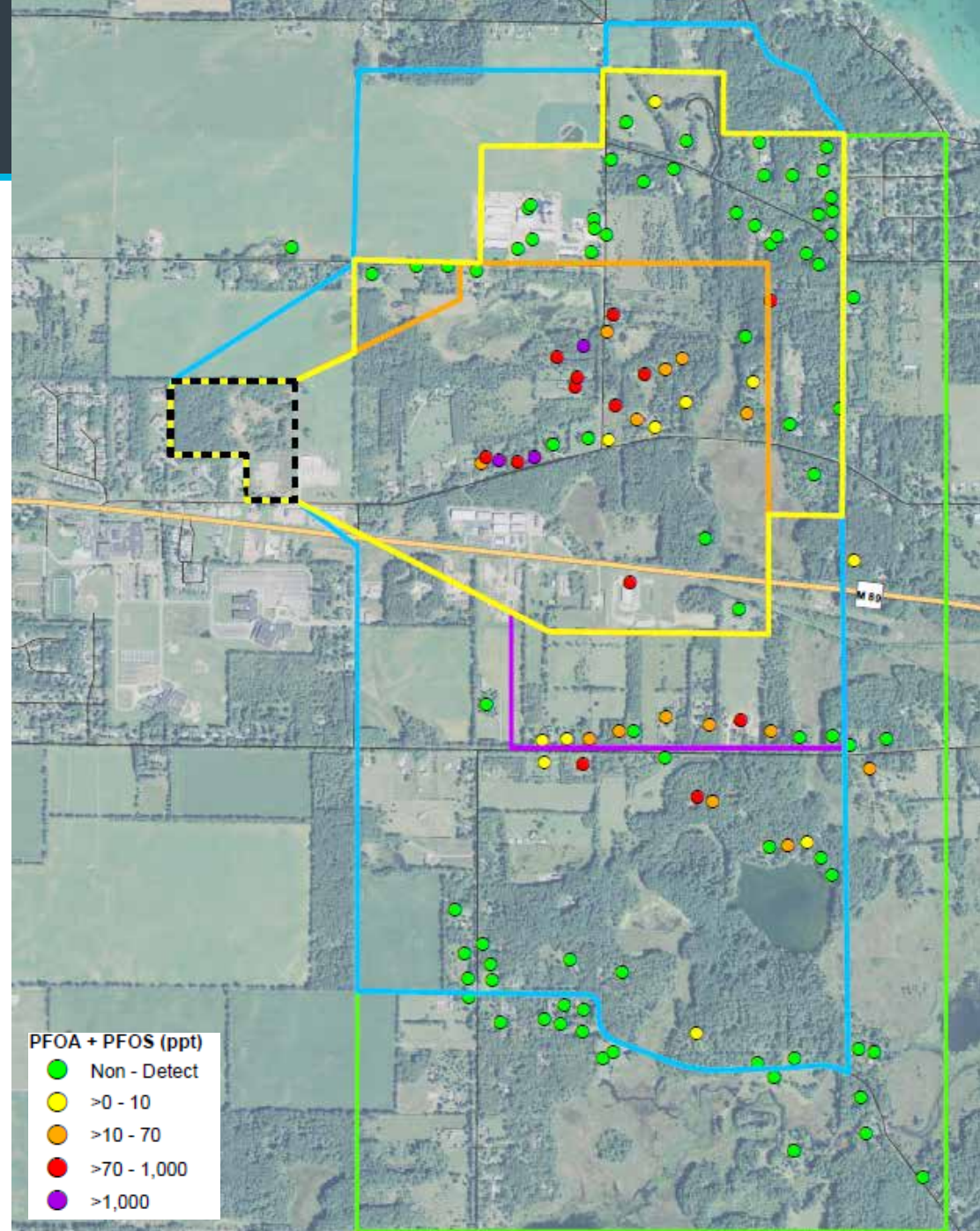
- 4 Phases of sampling
- Later phases guided by well results
 - 121 samples collected



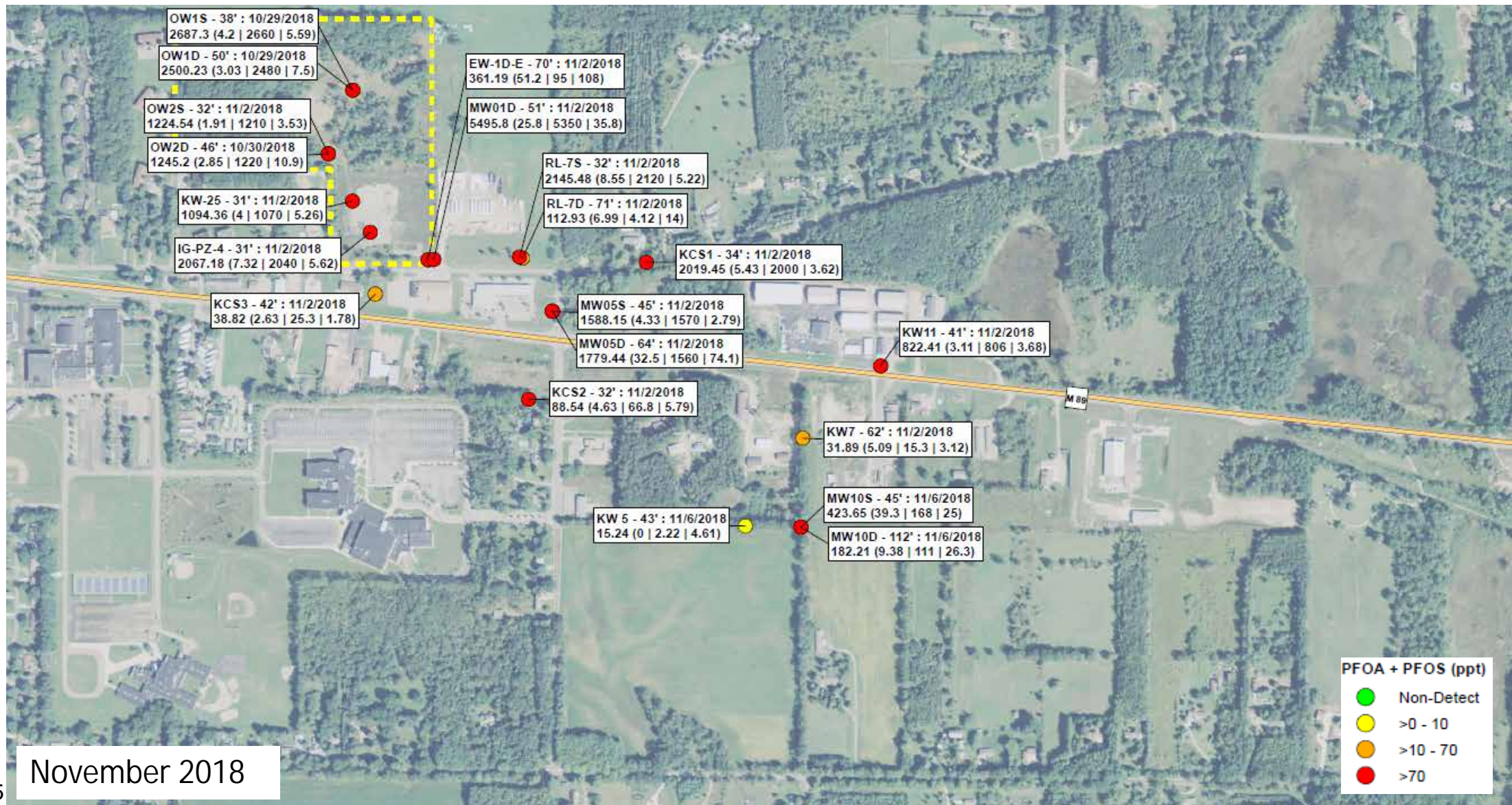
Residential Sampling

- August 2018
- September 2018
- December 2018
- February 2019
- Buffer

- PFOA + PFOS (ppt)
- Non - Detect
 - >0 - 10
 - >10 - 70
 - >70 - 1,000
 - >1,000

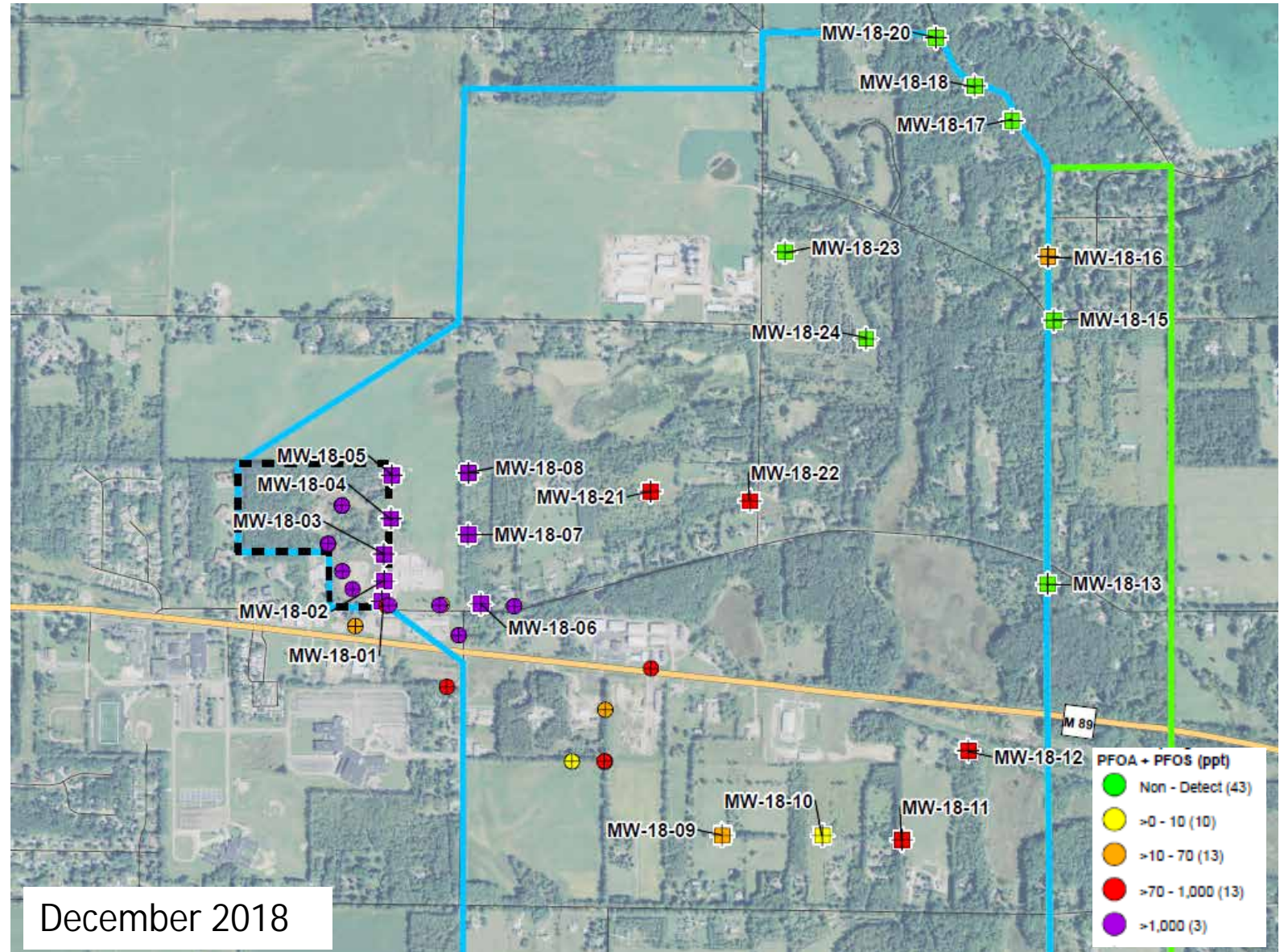


Remedial Investigation – Existing Monitoring Wells

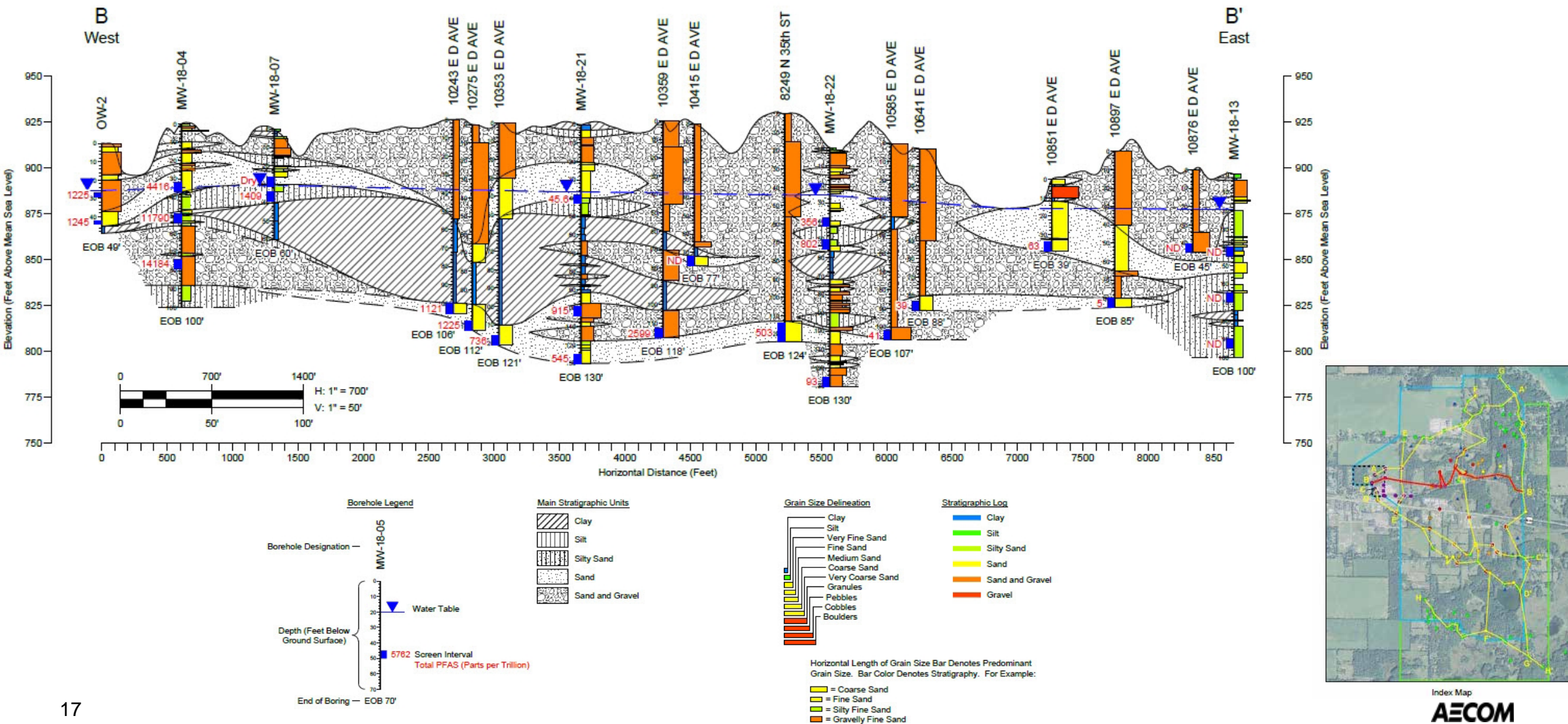


November 2018

Remedial Investigation – New Monitoring Wells



Remedial Investigation – Stratigraphy



Remedial Investigation

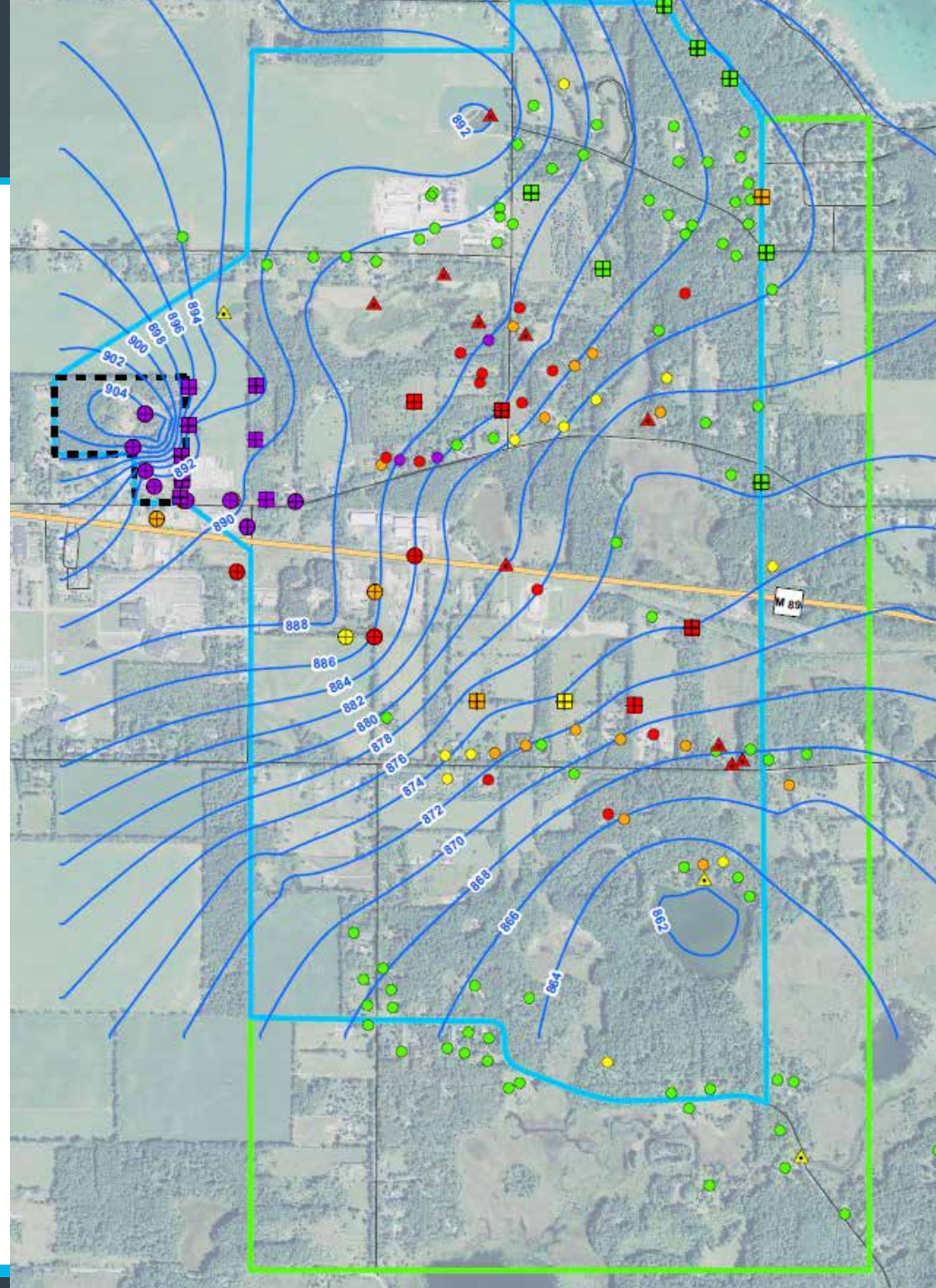


Surface Water Samples PFOS Concentration (ppt)

- ▲ Non-Detect
- ▲ >0 - <12
- ▲ ≥12

PFOA + PFOS (ppt)

- Non - Detect
- >0 - 10
- >10 - 70
- >70 - 1,000
- >1,000



Next Steps

- \ Additional investigation for lateral and vertical extent
- \ Potential local ordinance to limit residential wells
- \ Investigate GSI pathway
- \ Crop and feed samples at farm to the north
- \ Soil sampling of agricultural fields east and north of the site
- \ Municipal water is planned to be extended east of the site



Imagine it.
Delivered.



Image credit: iStock

Thank You!

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