Former Fort Devens Army Installation
Project Status Update
4 May 2017

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US Army Corps of Engineers
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Agenda

- Shepley's Hill Landfill Update
  - 2016 Annual Report
  - Summary of GW Monitoring Events
  - Overview of Arsenic Trends
  - Update on Upcoming Field Activities
- AOC 50 Update
  - Remedy Update
  - Summary of GW Monitoring Events
  - 2017 Injection Program
- PFAS Update
  - Expedited Site Investigation Field Work
  - Public Supply Well PFAS Data

Shepley's Hill Landfill 2016 Annual Report

SHL 2016 Annual Report submitted on 31 Mar 2017 summarizes the following:

- Landfill Maintenance and Monitoring
- Arsenic Treatment Plant O&M
- Land Use Controls
- LTM Groundwater and Hydraulic Monitoring

SHL Landfill Maintenance and Monitoring

- Landfill Inspection and Monitoring includes:
  - Observation of cover surface, vegetative growth, gas vents/points, wells and piezometers, drainage swales, settlement, erosion, access roads, culvert and catch basins, security and fencing, wetland encroachment, perimeter gas monitoring/results, and landfill monitoring/results.
- Landfill Condition and Maintenance
  - Landfill cover system was reported in good condition in 2016
  - Completed annual grass mowing and large vegetative growth removal
  - Repaired/maintained gas vents/points and wells
  - 2016 landfill gas monitoring results were consistent with historical results for proper landfill gas venting

Arsenic Treatment Plant O&M Summary for 2016

- Arsenic Treatment Plant (ATP) uptime = 95%
- Average extraction rate = 55.6 gallons per minute
- 28 million gallons treated (220.7 since 2006 startup)
- 264 tons of sludge removed
- Average arsenic influent concentration = 2,500 ug/L
- Average arsenic effluent concentration = 17.8 ug/L
- Maintenance Activities
  - Upgrades to system software
  - Upgrades to clean in-place system

Land Use Controls (LUCs)

- Conducted annual review of LUCs and ICs for the NIA
- Moratorium on GW extraction in NIA remains in effect
- Completed annual interviews with:
  - Ayer DPW, Builder Inspector, BOH, Nashoba Associated BOH, and USACE
- Reviewed informational pamphlet and contact information on town website
- Updated list of property owners and resident addresses within the LUCs area
- Distributed the LUC Implementation Plan
- Next door to door survey to be conducted in 2019

May-June 2016 mailing to people in NIA – homeowners not renter/address

every 5 years

LTM Groundwater Program

May to June 2016

- 30 wells were sampled in Spring
- Hydraulic data was collected

November to December 2016

- 67 wells were sampled in Fall
- Hydraulic data was collected

May 2017

- LTMMP addendum to incorporate EPA additional well sampling locations and hydraulic monitoring

May to June 2017 – Spring Sampling

October to November 2017 – Fall Sampling

Annual Report Summary of Arsenic Trends

- Groundwater flow directions are from the southwest corresponding to Shepley's Hill to the north toward Nonacoicus Brook with deflection of groundwater to the north in the area west of the barrier wall
- Concentrations of arsenic, iron, and manganese continue to exceed cleanup goals in various wells at SHL and NIA
- Arsenic data from wells downgradient of the ATP exhibit a mix of increasing and decreasing concentration trends, with a many wells exhibiting no statistically significant trends
- Mann-Kendall (MK) Statistical Analysis
  - 10 well locations exhibited decreasing As trends
  - 12 well locations exhibited increasing As trends
  - 19 well locations exhibited insufficient evidence of a trend

Army analysis - not in agreement w/ EPA - EPA hasn't completed review + made comments yet

Upcoming SHL Field Work

Phase 1 Field Work to Demonstrate Plume Capture includes GW profile sampling to:

- Task 1 – Delineate the capture zone (5 locations)
- Task 2 – Delineate the lateral and vertical extent of the contaminant plume upgradient of extraction system (7 locations)
- Task 3 – Delineate the lateral and vertical extent of the contaminant plume downgradient of the extraction system (6 locations)

Same scope of work requested by EPA Feb 2016 Army did something different - now work closed out EPA to ensure agreement

Phase 1 Major Milestone Completion Schedule

- 15 Jun 2017 – Submit Draft Work Plan
- Aug and Sep 2017 – Field Work
- 01 Dec 2017 - Submit Phase 1, Task 1, 2, and 3 Tech Memos

Upcoming SHL Field Work

Groundwater Model and Progress Update

compare model to data

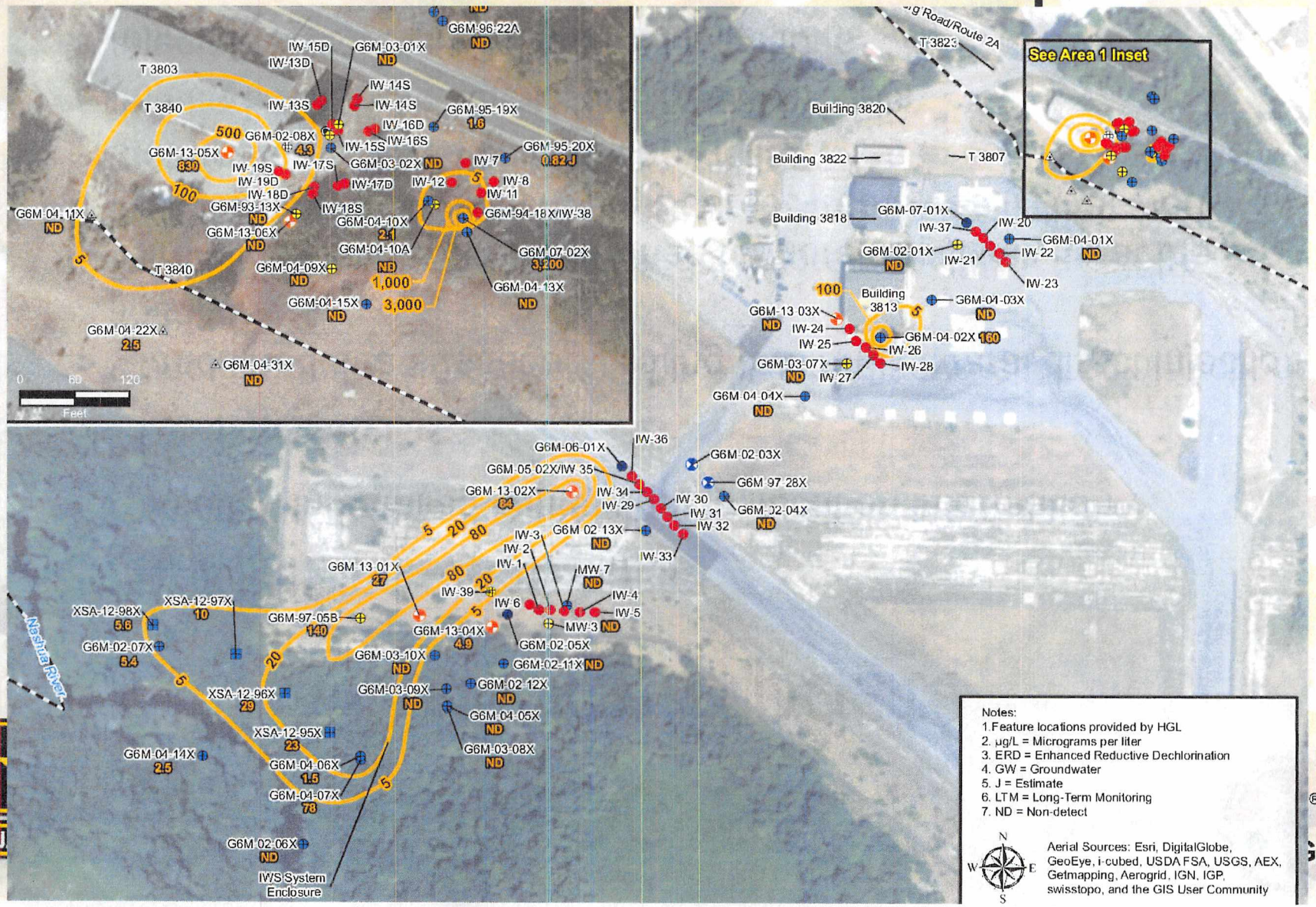
- Task 4 – Validate the updated GW flow model with sufficient field-measured hydraulic data
  - Ongoing collaborative technical meetings with EPA and MassDEP
  - Submit Final Updated GW Flow Model – 1 Jan 2018
  - Submit Task 4 Tech Memo -- 1 Feb 2018
- Task 5 – Validate extent of capture by evaluating concentration trends in NIA monitoring locations as compared to flow paths developed from the updated GW flow model
  - Submit Task 5 Tech Memo -- 16 Feb 2018

AOC 50
Remedy Update

- 2014 MiHPT investigation
  - Resulted in detailed contamination location information
- 2015 injections
  - Conducted at a subset of existing IWs and several direct injection locations
  - Direct injections were performed to more effectively treat the residual contamination in the Source Area (Area 1) that would not get treated by existing injection wells
  - Injected ABC+Ole' in existing injection wells
  - Injected ABC+Ole'+Fe in direct injections

oleic acid - makes emulsion ABC last longer in the soil

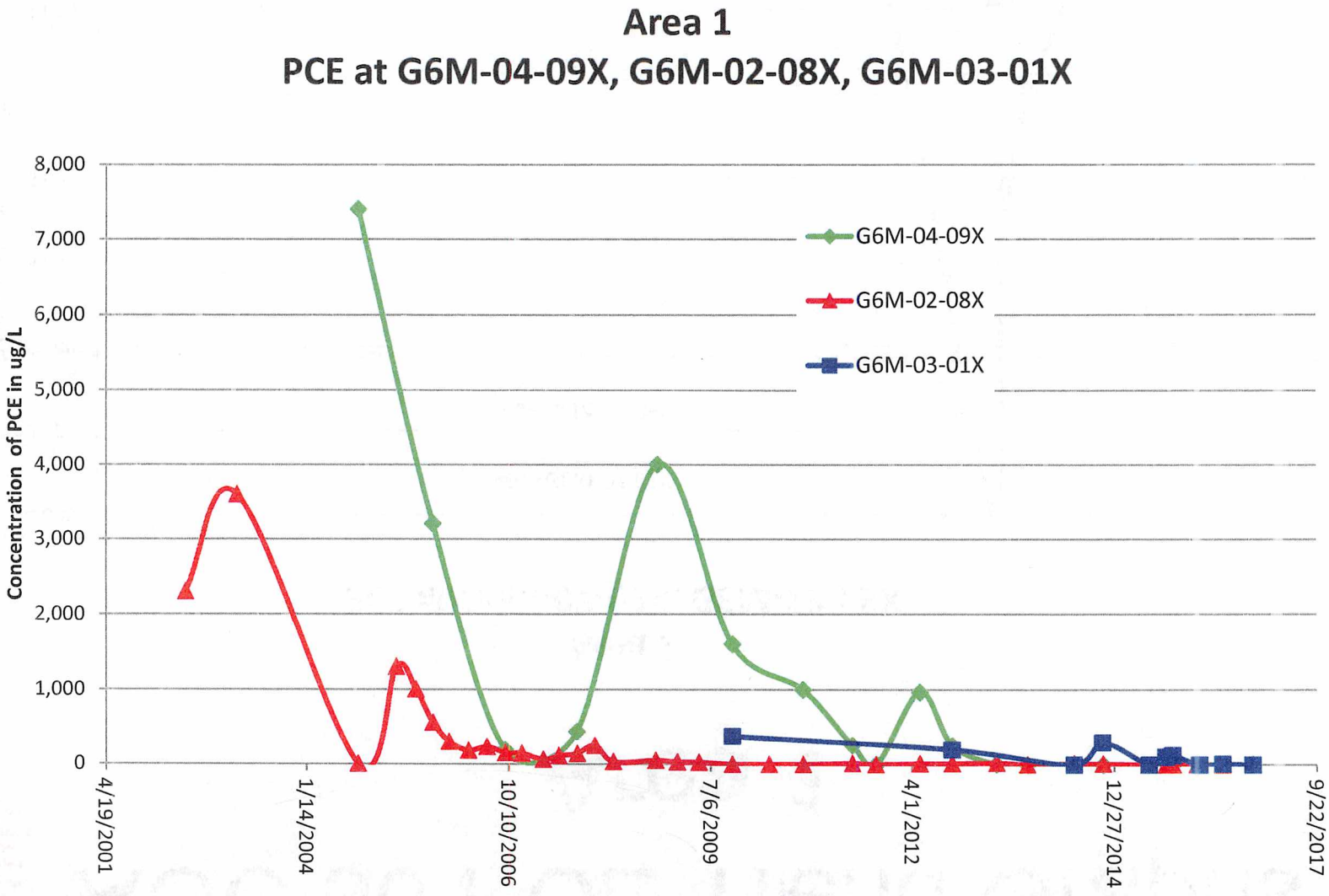
AOC 50
Nov 2016 Plume Map



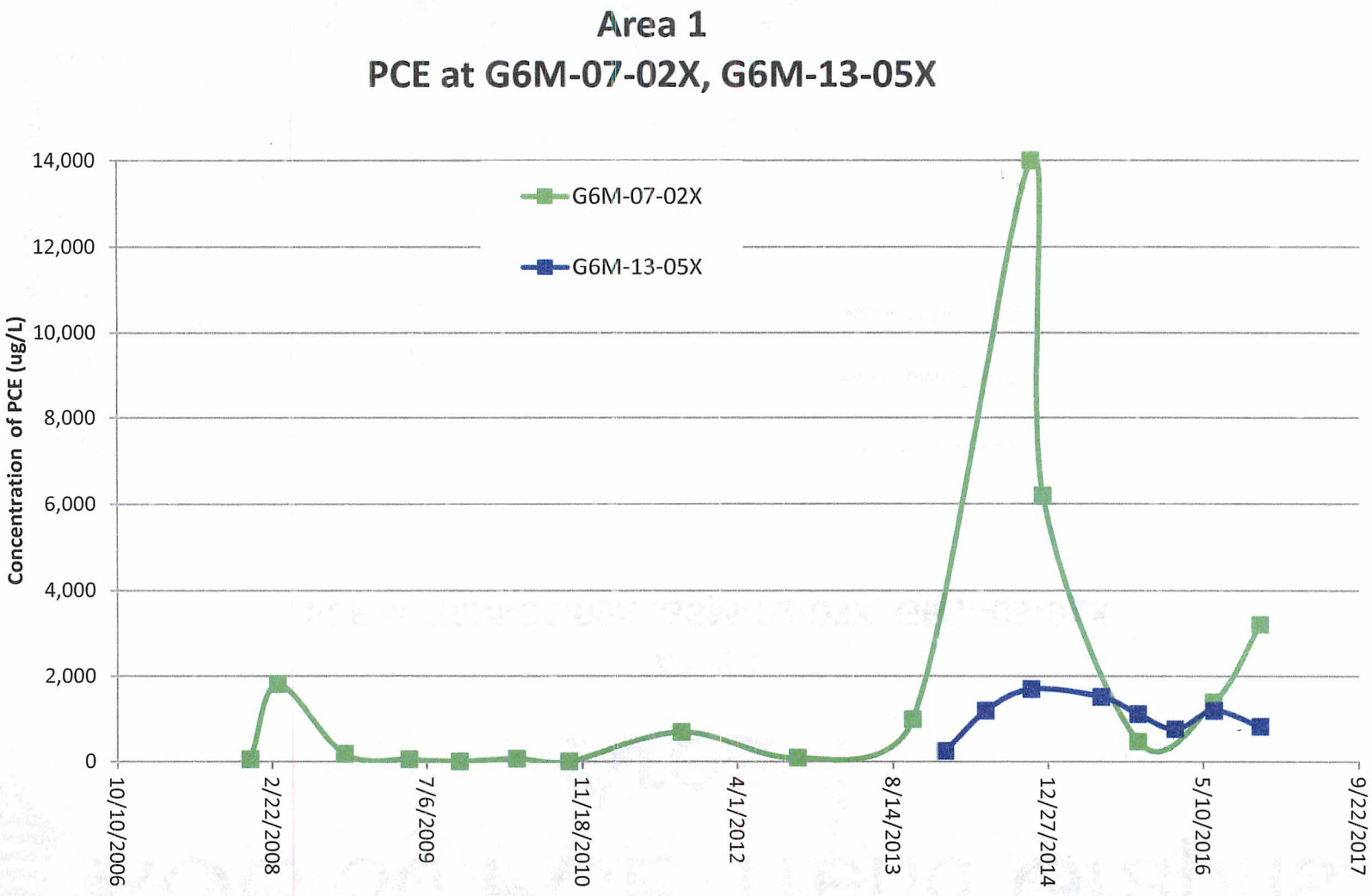
Notes:
1. Feature locations provided by HGL
2. µg/L = Micrograms per liter
3. ERD = Enhanced Reductive Dechlorination
4. GW = Groundwater
5. J = Estimate
6. LTM = Long-Term Monitoring
7. ND = Non-detect

Aerial Sources: Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

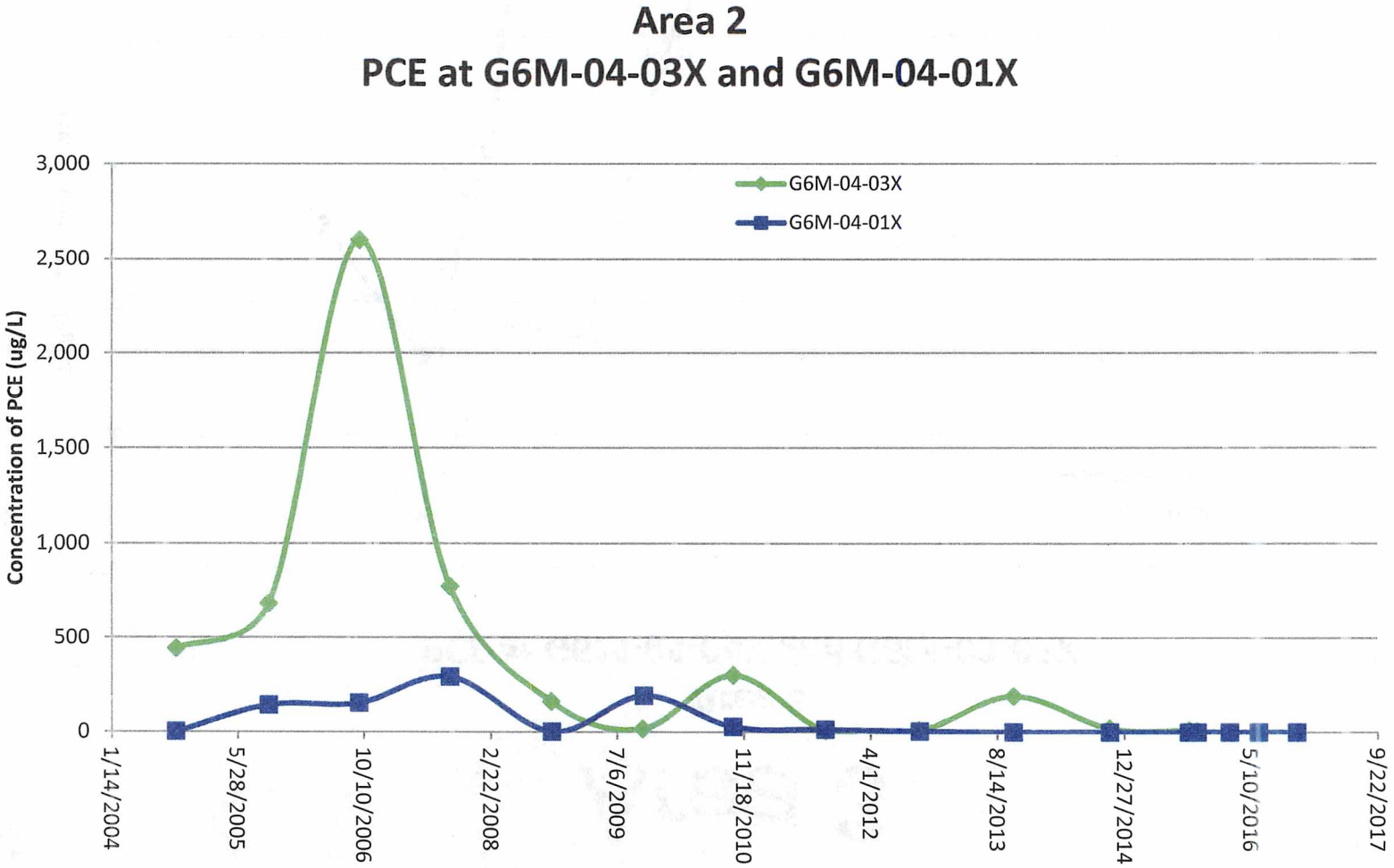
AOC 50 PCE Trend Graphs
Area 1



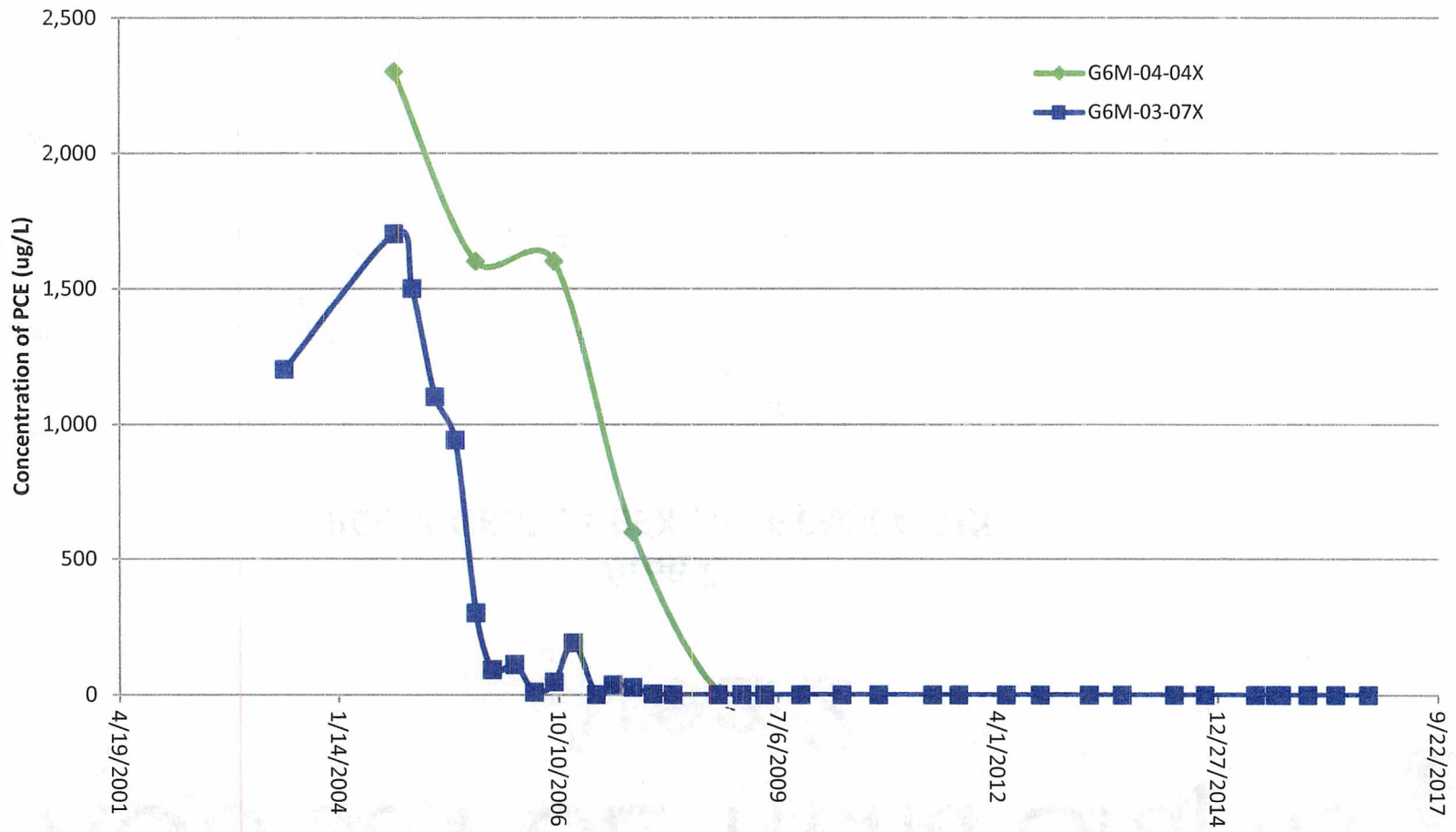
AOC 50 PCE Trend Graphs
Area 1



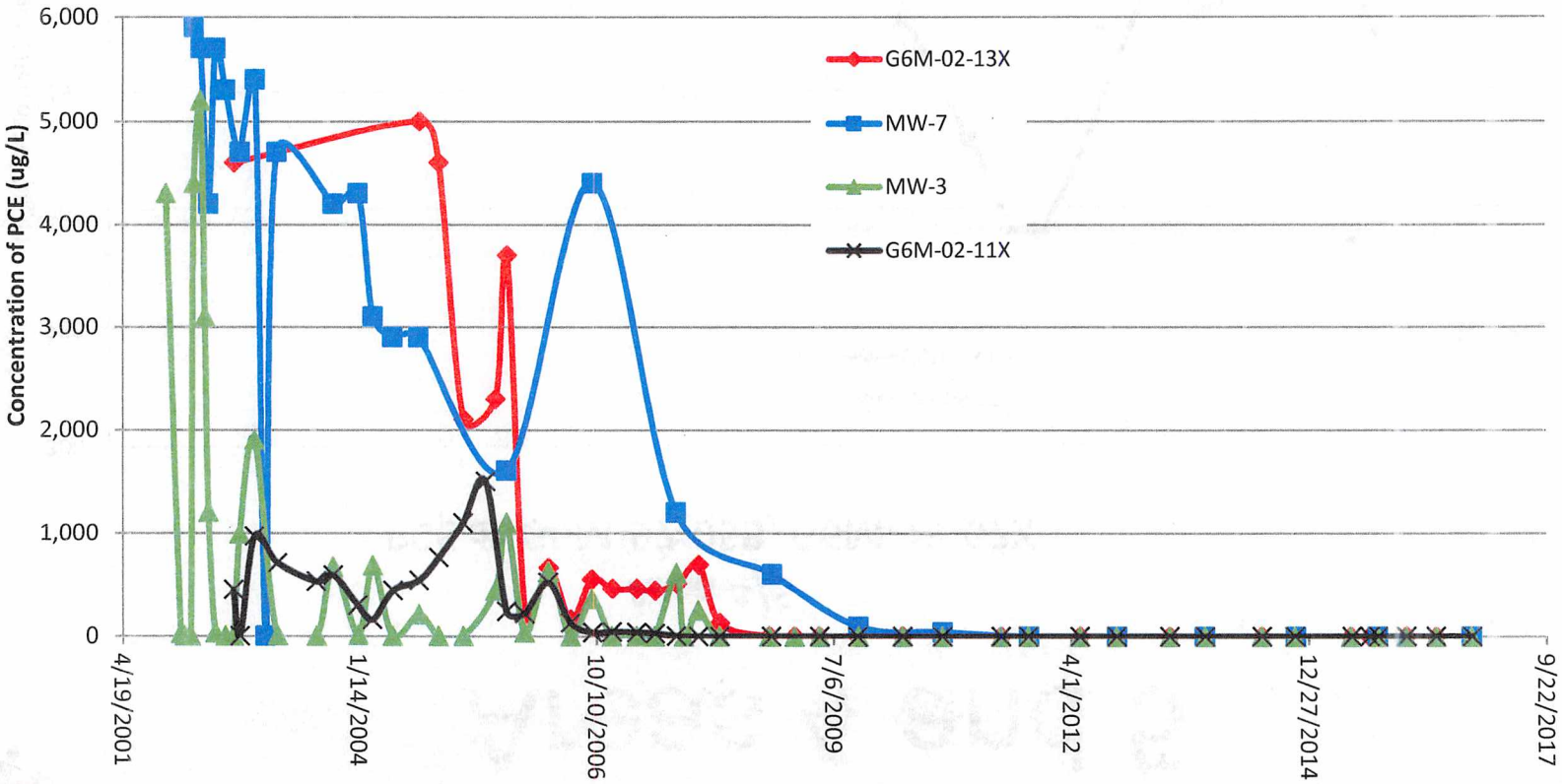
AOC 50 PCE Trend Graphs
Area 2



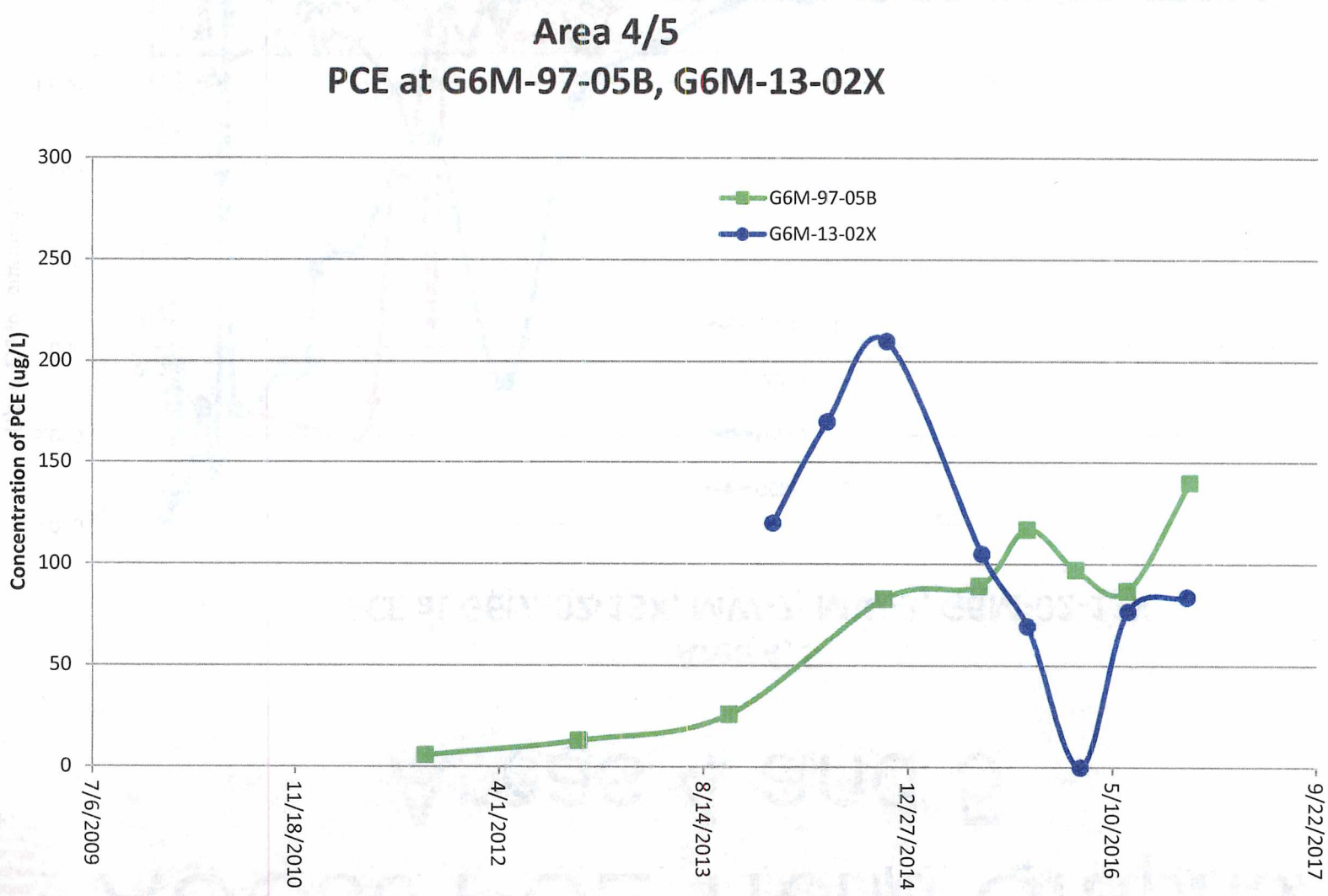
AOC 50 PCE Trend Graphs
Area 3



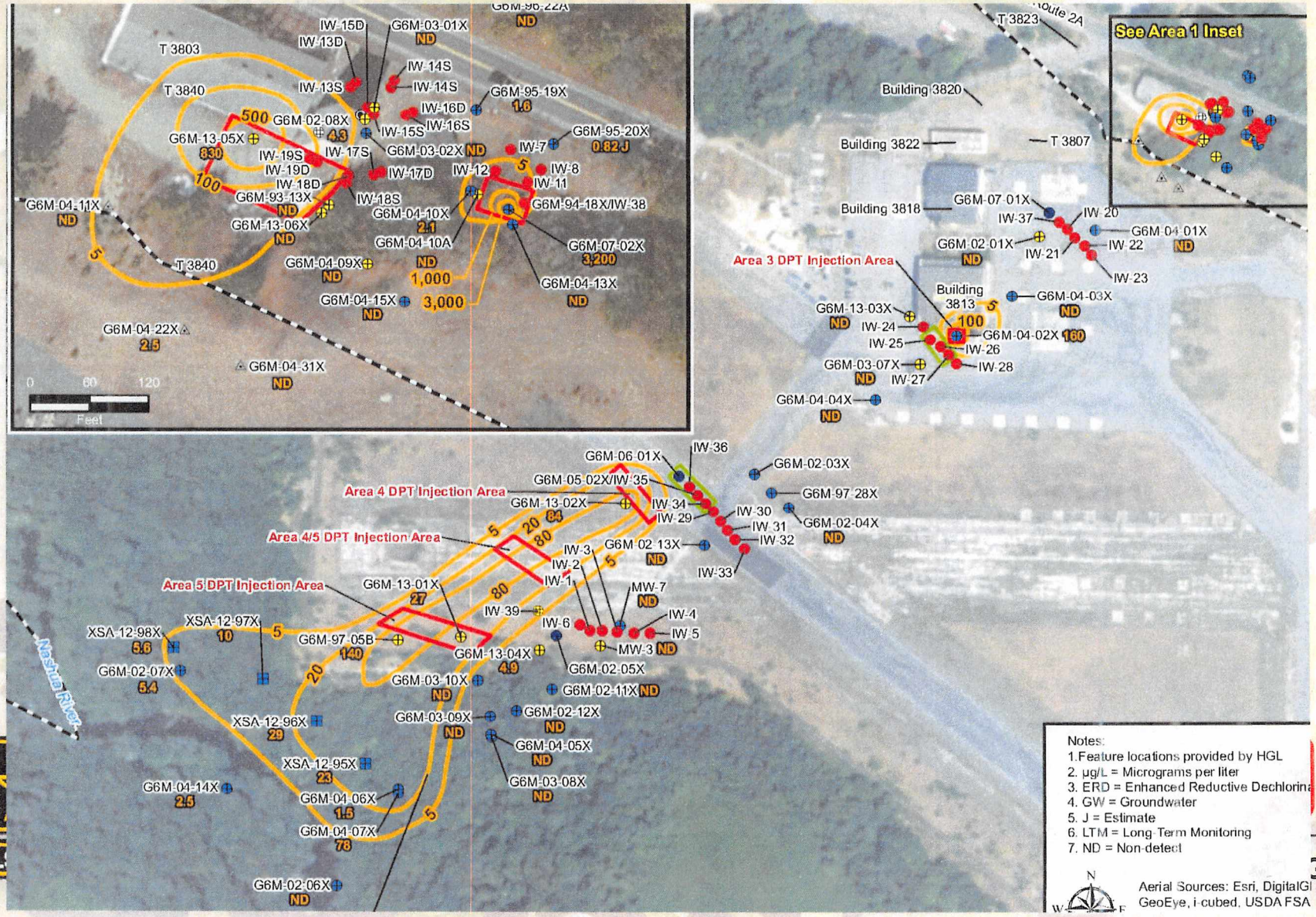
AOC50 PCE Trend Graphs
Areas 4 and 5



AOC50 PCE Trend Graphs
Areas 4 and 5



AOC 50
2017 ERD Injection Program



AOC 50 Schedule

- LTMMP Update – 26 May 2017
- 2016 Annual Report – 20 May 2017
- 2017 Field Work
  - Synoptic water level event, groundwater sampling – May/Jun
  - Injection Program – Jun/Jul
  - Synoptic water level event, groundwater sampling – Oct/Nov

PFAS Expedited Site Inspection (ESI) Schedule

- 2 May 2017
  - ▶ Final ESI Work Plan for EPA & DEP approval
- May - Jun 2017
  - ▶ Field Work
- Summer 2017
  - ▶ Laboratory Analysis and Data Validation
- Fall 2017
  - ▶ Submit Draft SI Report

Public Supply Well PFAS Data

MassDEP PFAS Sampling Results – 7/2016 to 2/2017

Location	Well ID	Date	PFOS (µg/L)	PFOA (µg/L)	Total PFOS + PFOA (µ/L)	HAL (PFOS + PFOA) (µ/L)
Ayer Wells	Ayer Multi-Finished 4 Grove	9/1/2016	0.028	0.01	0.034	0.070
		11/15/2016	0.029	0.011	0.04	0.070
		1/11/2017	0.025	0.01	0.035	0.070
	Ayer RW-06G/GW 6	9/1/2016	<0.004	0.006	0.006	0.070
		11/15/2016	<0.004	0.006	0.006	0.070
		1/11/2017	<0.004	0.007	0.007	0.070
	Ayer RW-07G/GW 7	9/1/2016	0.007	0.009	0.016	0.070
		11/15/2016	0.006	0.009	0.015	0.070
		1/11/2017	0.005	0.008	0.013	0.070
	Ayer RW-08G/GW 8	9/1/2016	0.085	0.018	0.103	0.070
		11/15/2016	0.077	0.017	0.094	0.070
		1/11/2017	0.070	0.017	0.087	0.070
Devens Wells	used the least-low pH MacPherson Well 03G	*7/28/2016	0.044	0.025	0.069	0.070
		9/1/2016	0.041	0.021	0.062	0.070
		12/28/2016	0.084	0.063	0.147	0.070
		2/22/2017	0.046	0.022	0.068	0.070
	Patton Well 05G	9/1/2016	<0.004	0.004	0.008	0.070
	Shabokin Well 06G	9/1/2016	0.004	0.004	0.008	0.070
Shirley Wells	Patterson 03G	9/1/2016	<0.004	<0.002	--	0.070
	Walker 04G	9/1/2016	<0.004	<0.002	--	0.070

Shaded cell indicates an exceedence of the EPA's Health Advisory Limit (HAL) for total concentrations PFOS+PFOA

* Sample collected by Army for this date only

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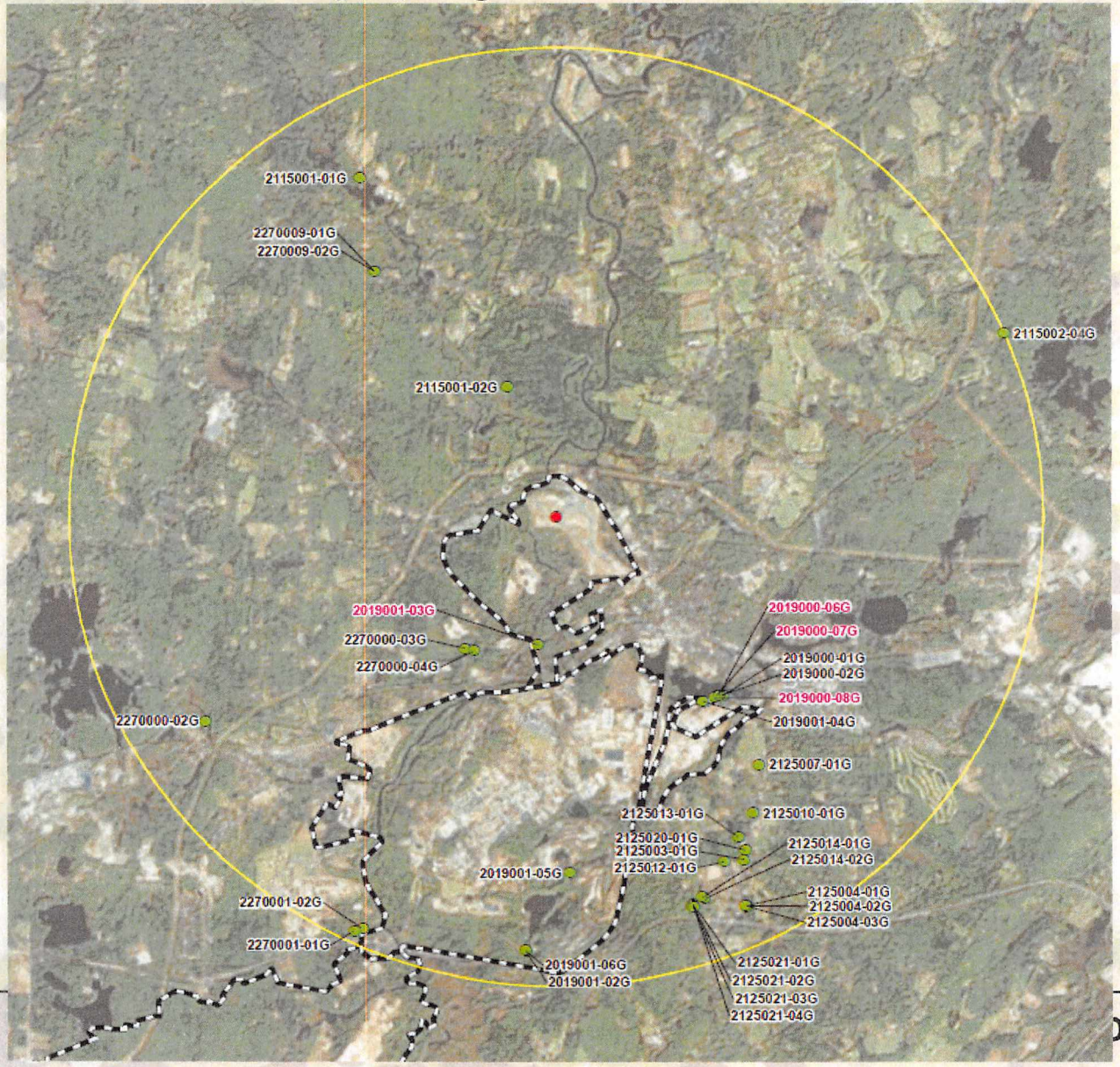
Public Supply Well Locations



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Sept. 21

Questions?