Former Fort Devens Army Installation
Project Status Update
18 January 2018

Restoration
Advisory Board
Meeting

U.S.ARMY

US Army Corps of Engineers
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Agenda

- Per- and Polyfluoroalkyl Substances (PFAS)
  - Town supply well sampling update
  - Army sampling update
    - Site Inspection (SI) results and SI Report Status
  - Remedial Investigation (RI) planning & approach
- Shepley's Hill Landfill (SHL) updates
- Additional Environmental Program Updates
  - Area of Contamination (AOC) 50 Long-Term Monitoring (LTM) program and Remedial Action
  - Main Post AOCs LTM

Background – PFAS

- Perfluorinated compounds (PFCs) are found in many household and commercial/industrial products
  - carpeting, water-proof clothing, rain gear, Teflon pans, food wrappers
  - metal plating operations
  - fire-fighting foams
- 2014 – EPA identified perfluorooctane sulfonate (PFOS) and perflurorooctanoic acid (PFOA) as an emerging contaminants
  - PFOS & PFOA most-widely produced PFAS compounds in U.S.
  - Adverse effects identified in laboratory animals
- 2016 – EPA issues Lifetime Health Advisory (LHA) for PFOS & PFOA
  - Lifetime HA (0.07 micrograms per liter [µg/L]) applies to sum of PFOS and PFOA detections in drinking water
  - Many different types of PFAS compounds exist
  - Typically sample for 6 or 14 of these compounds

Public Supply Wells PFAS Sampling

- Periodic sampling of public water supply wells
  - Grove Pond wells (Town of Ayer)
  - MacPherson well (Devens)
- On Oct. 31, the Army, regulatory agencies, municipalities, and stakeholders met to discuss potential options to modify water supply systems and/or install treatment, should the LHA be exceeded in finished drinking water
  - Town of Ayer currently evaluating treatment plant options to address PFAS detections
  - Town report planned for late January

Public Supply Well PFAS Data

Location	Well ID	Date	PFOS (ug/L)	PFOA (ug/L)	PFOS+PFOA (ug/L)
Ayer Wells	Ayer Multi-Finished 4 Grove	9/1/2016	0.028	0.010	0.038
		11/15/2016	0.029	0.011	0.040
		1/11/2017	0.025	0.010	0.035
		4/12/2017	0.045	0.014	0.059
		8/3/2017	0.038	0.015	0.053
		10/17/2017	0.038	0.016	0.054
	Ayer RW-06G/GW 6	9/1/2016	<0.004	0.006	0.006
		11/15/2016	<0.004	0.006	0.006
		1/11/2017	<0.004	0.007	0.007
		4/12/2017	<0.004	0.007	0.007
		8/3/2017	<0.004	0.007	0.007
		10/17/2017	<0.004	0.008	0.008
	Ayer RW-07G/GW 7	9/1/2016	0.007	0.009	0.016
		11/15/2016	0.006	0.009	0.015
		1/11/2017	0.005	0.008	0.013
		4/12/2017	0.005	0.007	0.012
		8/3/2017	0.017	0.013	0.030
		10/17/2017	0.014	0.014	0.028
	Ayer RW-08G/GW 8	9/1/2016	0.085	0.018	0.103
		11/15/2016	0.077	0.017	0.094
		1/11/2017	0.070	0.017	0.087
		4/12/2017	0.080	0.021	0.101
		8/3/2017	0.081	0.024	0.105
		10/17/2017	0.091	0.023	0.114
Devens Wells	MacPherson Well 03G	7/28/2016	0.044	0.025	0.069
		9/1/2016	0.041	0.021	0.062
		12/28/2016	0.044	0.024	0.068
		2/22/2017	0.046	0.022	0.068
		5/16/2017	0.044	0.022	0.066
		9/19/2017	0.040	0.021	0.061
		12/19/2017	0.040	0.022	0.062
	Patton Well 05G	9/1/2016	<0.004	0.004	0.004
	Shabokin Well 06G	9/1/2016	0.004	0.004	0.008
		4/12/2017	0.004	0.007	0.011
W. Groton Well	W. Groton Well 2G	9/1/2016	<0.004	<0.002	--
Shirley Wells	Patterson 03G	9/1/2016	<0.004	<0.002	--
	Walker 04G	9/1/2016	<0.004	<0.002	--

Highlighted data cell indicates an exceedance of the EPA Health Advisory Level (0.070 ug/L)

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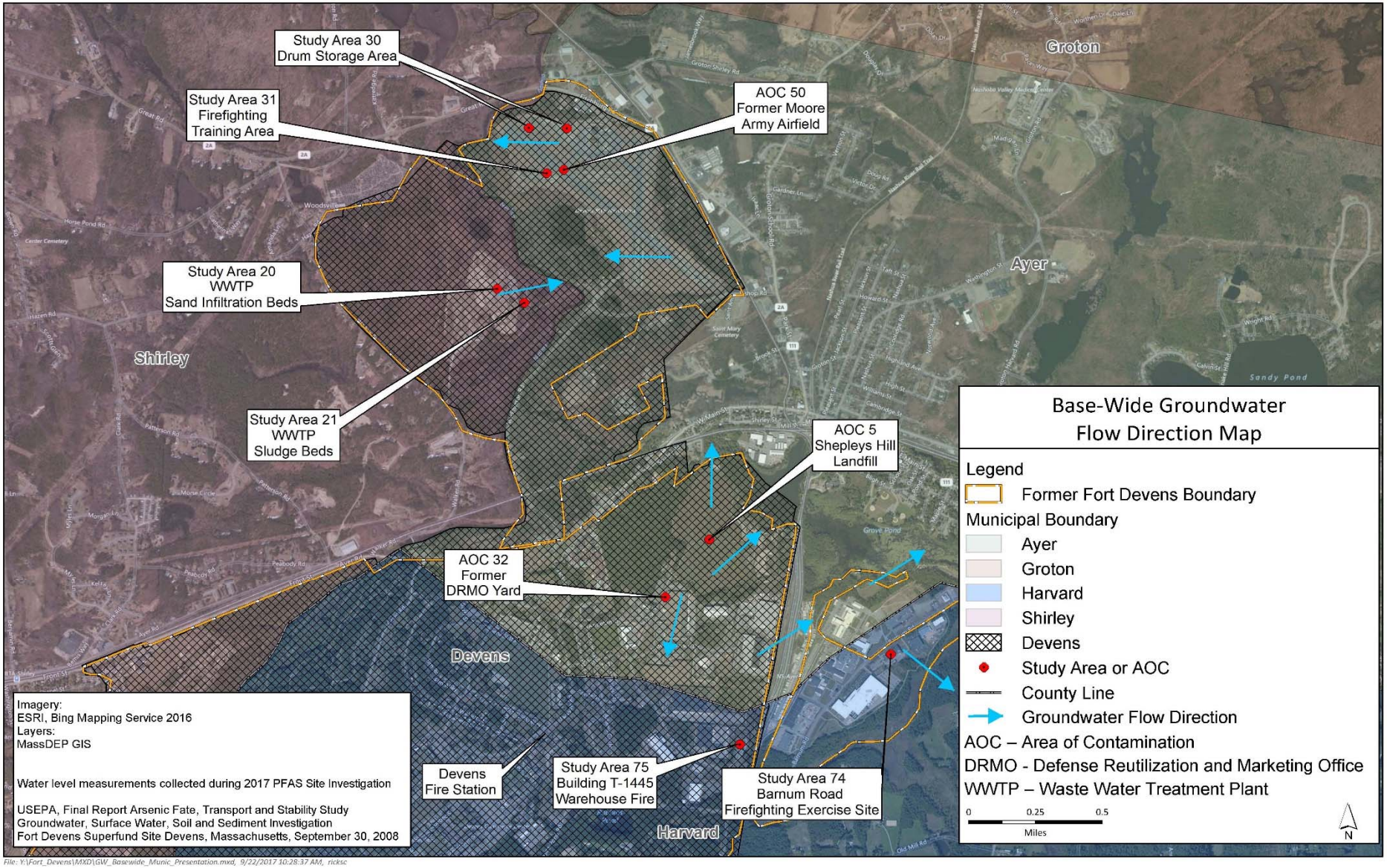
Army PFAS Site Inspection

- Sept 2016 – Army submits draft Preliminary Assessment (PA)
  - Evaluated historical use of PFAS compounds
  - Identified 9 potential source areas for the SI
- June 2017 – Army begins Expedited Site Inspection
  - Intended to determine presence or absence of PFAS
- Sept 2017 – Draft SI Report
  - Nov/Dec – EPA/DEP comments
  - Draft Final SI Report planned for Feb 2018
- Dec 2017 – Army commences supplemental groundwater sampling of LTM wells identified by EPA in 2 Nov 2017 request to assess potential off-site migration of PFAS ahead of the RI

Site Inspection (SI) Sampling Locations



File: Y:\Fort_Devens\MXD\GW_Basewide_Munic_Presentation.mxd, 9/22/2017 10:28:37 AM, ricksc

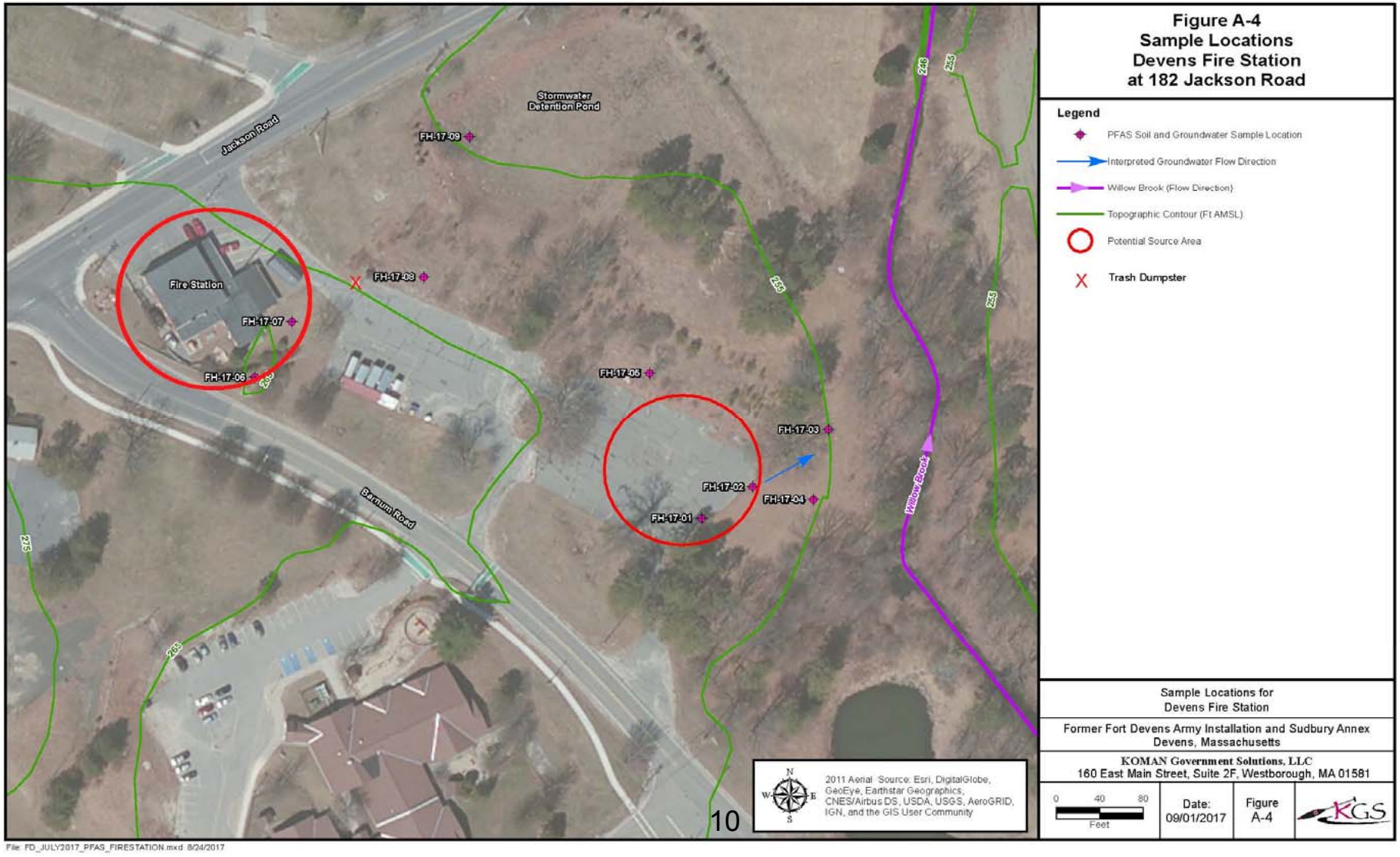
SI – General Conclusions

- PFAS detected in groundwater and soil at several sites
- PFAS in Ayer supply wells potentially from historic releases along Barnum Road (AOCs 74, 75)
- PFAS in MacPherson Well potentially from historic releases at Army's former DRMO, SHL, or Town of Ayer WWTP
- Finished water samples from all of the supply wells tested are currently below the LHA

SI Addendum
Devens Fire Station

- 1996 – Jackson Road Fire Station transitioned to MassDevelopment and Devens Fire Department
  - No records on prior storage/use of Aqueous Film-Forming Foam (AFFF)
- Reported use of foam to extinguish dumpster fire in early 1990s
- Foam application on pavement as part of training since 1996
- Sept 2017 – ESI Work Plan Addendum issued
  - Sampling of Devens Fire Station planned for Jan 22
  - 9 locations for soil and groundwater

Devens Fire Department
Proposed Sampling



PFAS Remedial Investigation

- Next step in the CERCLA process after the SI

- Ongoing planning of the RI Work Plan
  - Draft planned for Apr 2018
  - Data Quality Objectives
  - Sampling Approach

CERCLA RI Process

- Field Work (planned to start summer 2018)
  - Geology, hydrogeology
  - Sampling of soil, groundwater, sediment, surface water
- RI Report
  - Conceptual Site Model
  - Nature and extent of contamination
  - Fate and transport of contamination
  - Human Health Risk Assessment
  - Ecological Risk Assessment
  - Recommendations

RI Conceptual Approach

- Iterative sampling process to delineate extent of PFAS
- Evaluate all areas and all media with PFAS detections
- Source area investigations
  - Sampling of AOCs where PFAS was detected in soil and groundwater during the SI
- Receptor investigations
  - Sampling of areas surrounding Grove Pond and MacPherson supply wells
    - Sampling transects around the supply wells
    - Vertical profiling of soil and groundwater
- Risk-based approach (TBD)

Shepley's Hill Landfill Update

- EPA's 24 Feb 2016 Scope of Work for Additional Work
  - Phase 1 – Demonstrate plume capture – demonstrate that existing groundwater extraction/treatment system provides sufficient capture/containment of contamination migrating from SHL
    - Sampling for Tasks 1-3 completed 15 Sep 2017
    - Task 3 (delineate lateral/vertical extent of contamination downgradient of extraction system) – revised draft Tech Memo issued 30 Nov 2017
    - Task 1 (define lateral and vertical extent of the capture zone of the two extraction wells) – revised draft Tech Memo – 31 Aug 2018
    - Task 2 (delineate lateral and vertical extent of contamination upgradient of extraction system) – revised draft Tech Memo – 31 Aug 2018
    - Task 4 (update Groundwater Flow Model) – due 17 July 2018

SHL EPA SOW (continued)

- Task 4 (demonstrate that field data support/validate model predictions of groundwater flow) – Submit Tech Memo – 17 Aug 2018
- Task 5 – (validate extent of capture by evaluating concentration trends in NIA compared to flow paths developed from the updated GW flow model) – Submit Tech Memo – 4 Sep 2018

► Phase 2 – Evaluate remedy performance

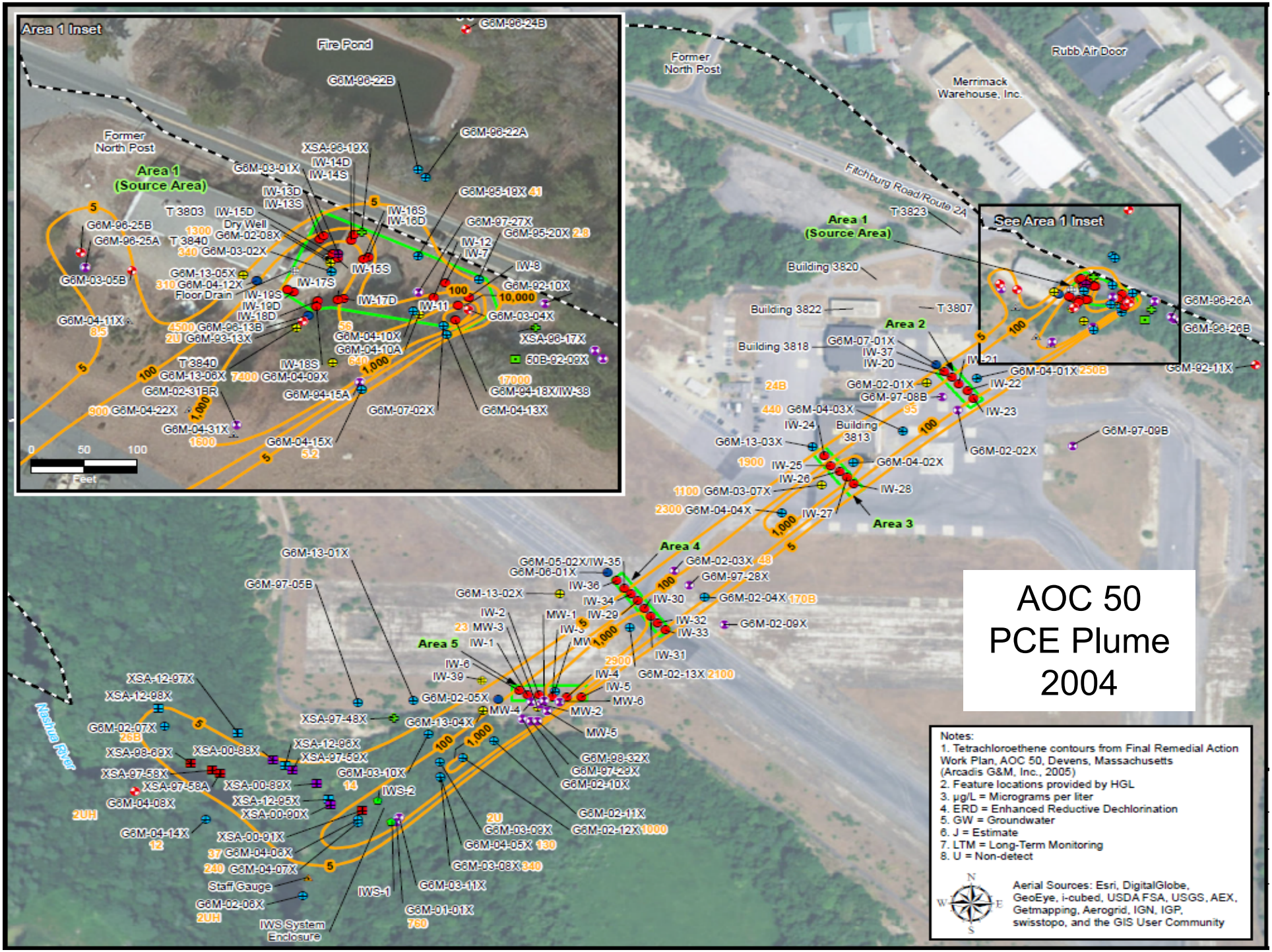
- Task 1 – Collect/analyze geochemical and hydrologic data, for minimum of 5 years, to evaluate remedy's ability to achieve cleanup goals and ensure long-term protectiveness:
- Task 2 – Perform study to determine the site-specific background level of arsenic in groundwater

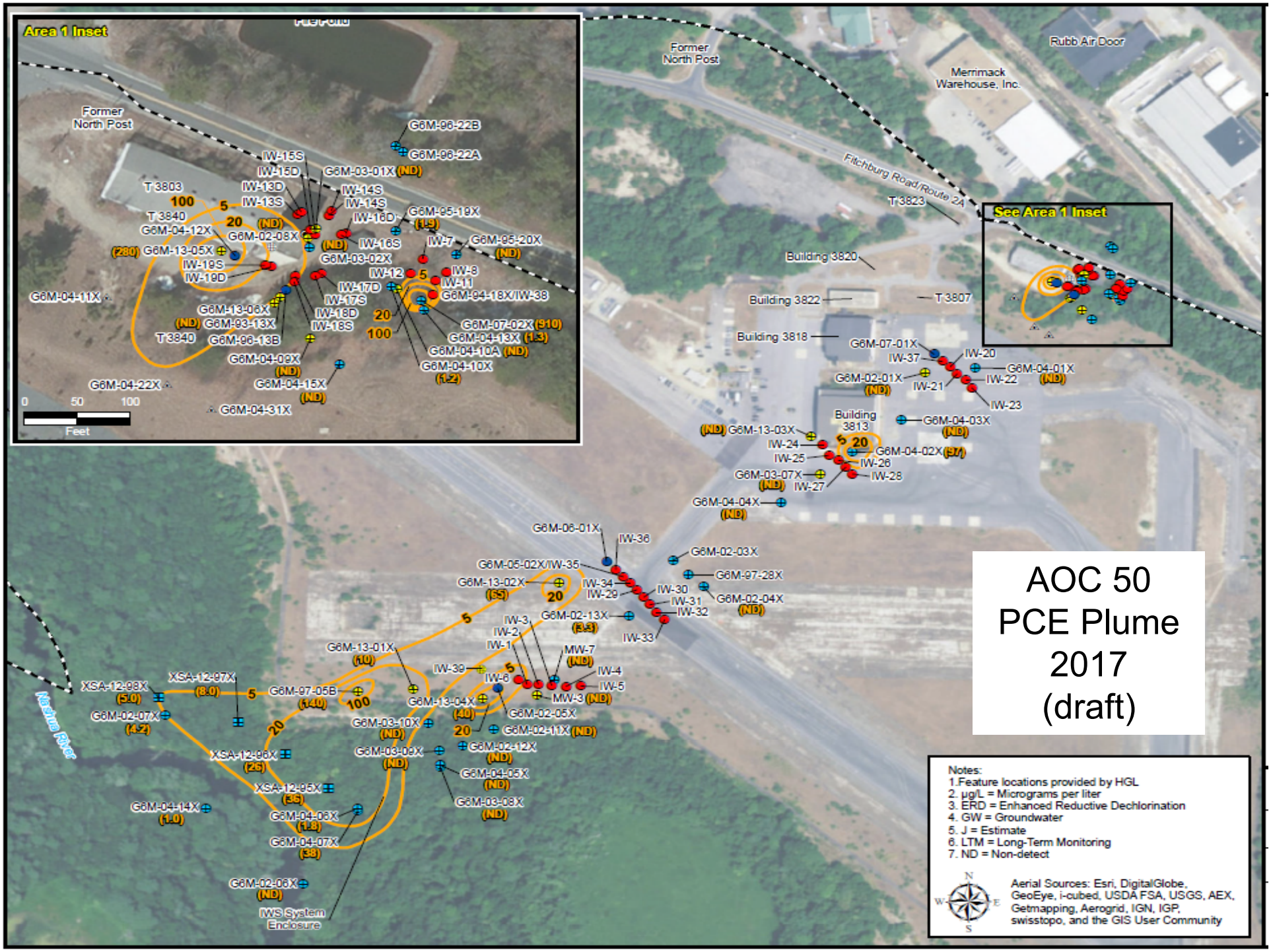
► Phase 3 – Document final remedy

- Explanation of Significant Differences (ESD) or Record of Decision (ROD) Amendment

Additional Environmental Program Updates

- AOC 50 – Remedy Operations and Monitoring
  - July 2017 – Completed substrate injections to reduce the chlorinated volatile organic compound (CVOC) plume in groundwater
    - Injected approximately 34,000 gallons
    - 6 injection wells and 41 direct-push locations
    - Groundwater monitoring conducted in Oct 2017
    - Results to be presented in 2017 Annual Report (April)
    - Continuing decrease of CVOC concentrations across the site toward cleanup goals
  - Nov 2017 – updated Long-Term Monitoring & Maintenance Plan (LTMMP)
    - Updated to account for changes in the plume and site geochemistry
    - Revised the approach for the treatment (injection) program


Area 1 Inset
Fire Pond
Former North Post
Area 1 (Source Area)
Area 2
Area 3
Area 4
Area 5
See Area 1 Inset
Rubb Air Door
Merrimack Warehouse, Inc.
Fitchburg Road/Route 2A
Building 3820
Building 3822
Building 3818
Building 3813
Nashua River
Staff Gauge
IWS System Enclosure
AOC 50
PCE Plume
2004
Notes:
1. Tetrachloroethene contours from Final Remedial Action Work Plan, AOC 50, Devens, Massachusetts (Arcadis G&M, Inc., 2005)
2. Feature locations provided by HGL
3. µg/L = Micrograms per liter
4. ERD = Enhanced Reductive Dechlorination
5. GW = Groundwater
6. J = Estimate
7. LTM = Long-Term Monitoring
8. U = Non-detect
Aerial Sources: Esri, DigitalGlobe, GeoEye, i-cubed, USDA FSA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community


Area 1 Inset
Former North Post
Rubb Air Door
Merrimack Warehouse, Inc.
Fitchburg Road/Route 2A
See Area 1 Inset
Building 3820
Building 3822
Building 3818
Building 3813
T 3803
T 3840
T 3823
T 3807
G6M-96-22B
G6M-96-22A
G6M-03-01X (ND)
G6M-95-19X (1.9)
G6M-95-20X (ND)
G6M-04-12X
G6M-02-08X
G6M-13-05X (280)
G6M-03-02X
G6M-04-11X
G6M-94-18X/IW-38
G6M-13-06X (ND)
G6M-93-13X
G6M-96-13B
G6M-07-02X (910)
G6M-04-13X (1.3)
G6M-04-10A (ND)
G6M-04-10X (1.2)
G6M-04-09X (ND)
G6M-04-15X (ND)
G6M-04-22X
G6M-04-31X
G6M-07-01X
G6M-04-01X (ND)
G6M-02-01X (ND)
G6M-04-03X (ND)
G6M-13-03X (ND)
G6M-04-02X (37)
G6M-03-07X (ND)
G6M-04-04X (ND)
G6M-06-01X
G6M-02-03X
G6M-05-02X/IW-35
G6M-97-28X
G6M-13-02X (65)
G6M-02-04X (ND)
G6M-02-13X (3.3)
G6M-13-01X (10)
MW-7 (ND)
MW-3 (ND)
G6M-97-05B (140)
G6M-13-04X (40)
G6M-02-05X
G6M-03-10X (ND)
G6M-02-11X (ND)
G6M-02-12X (ND)
G6M-03-09X (ND)
G6M-04-05X (ND)
G6M-03-08X (ND)
XSA-12-98X (5.0)
XSA-12-97X (8.0)
G6M-02-07X (4.2)
XSA-12-96X (26)
XSA-12-95X (36)
G6M-04-14X (1.0)
G6M-04-06X (1.8)
G6M-04-07X (38)
G6M-02-06X (ND)
Nashua River
IWS System Enclosure
IW-15S
IW-15D
IW-13D
IW-13S
IW-14S
IW-16D
IW-16S
IW-7
IW-19S
IW-19D
IW-12
IW-8
IW-11
IW-17D
IW-17S
IW-18D
IW-18S
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IW-3
IW-2
IW-1
IW-39
IW-6
IW-4
IW-5
0
50
100
Feet
AOC 50
PCE Plume
2017
(draft)
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Additional Environmental Program Updates (continued)

- Main Post AOCs
  - Nov 2017 – completed Fall 2017 LTM Event
    - AOC 43G – consistent results with previous sampling events
    - AOC 69W – consistent metals results; possible decrease in extractable petroleum hydrocarbons (EPH)
    - DCL – no benchmark exceedances in groundwater or leachate
    - SHL - Majority of wells (80%) continue to have stable/decreasing arsenic concentrations
  - Nov 2017 – annual inspection of the Devens Consolidation Landfill (DCL)
- Dec – completed Annual Land Use Control inspections

Next Steps

- PFAS
  - Jan 22 – PFAS sampling at Devens Fire Station
  - Feb 26 – PFAS SI Report (draft final)
  - Mar 9 – Supplemental PFAS sampling results
  - Apr 6 – PFAS RI Work Plan (draft)
- SHL
  - Continue Groundwater Model Workgroup
- LTM Sites (SHL, AOC 50, Main Post AOCs)
  - Apr 2 – 2017 Annual OM&M Reports (draft)

Former Fort Devens Army Installation Project Status Updates

Questions?