



Installation Restoration Program



Air Force Civil Engineer Center

Air Force Civil Engineer Center (AFCEC) Emerging Contaminants Update

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JBCC Cleanup Team Meeting

11 March 2020

Update on Ongoing Activities:

- Response Actions
- Ashumet Valley (AV) – Supplemental Remedial Investigation (RI) for 1,4-Dioxane, perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA)
- Tanker Truck Rollovers (TTRS) – RI for PFOS/PFOA
- Chemical Spill-10 (CS-10) – Explanation of Significant Difference (ESD) for 1,4-Dioxane
- CS-20 – Supplemental RI for 1,4-Dioxane
- Landfill-1 (LF-1) – Supplemental Feasibility Study (FS) for 1,4-Dioxane and PFOS/PFOA
- Flight Line Sites – Expanded Site Inspection (SI) for PFOS/PFOA at seven sites

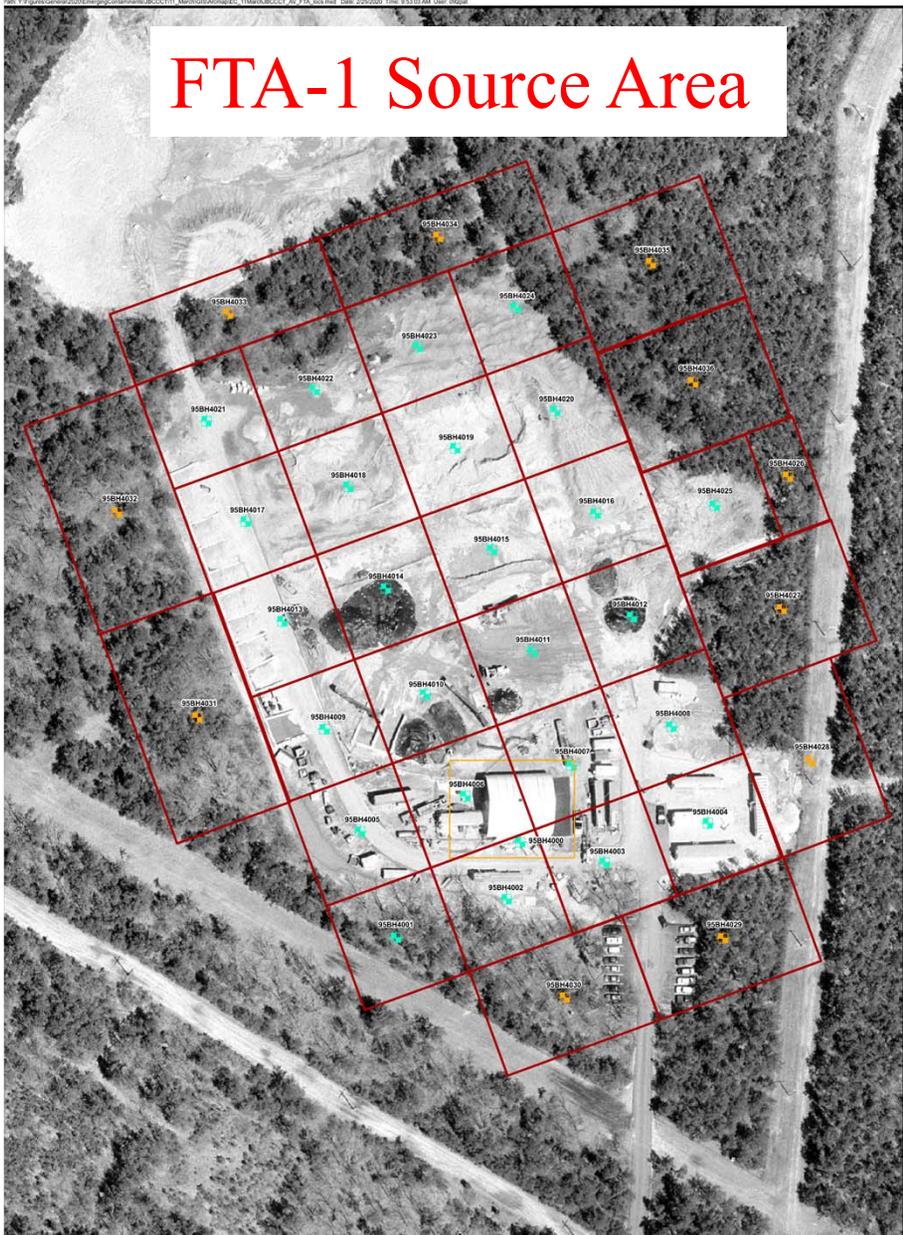
Response Actions:

- 102 private wells sampled; currently 3 private wells with PFOS/PFOA greater than (>) the EPA Lifetime Health Advisory (LHA) of 0.07 micrograms per liter ($\mu\text{g/L}$).
- 8 public/community water supply wells sampled by AFCEC; 2 had PFOS/PFOA detections > LHA
 - Mashpee Village Public Water Supply Well was shut down in Feb 2017; AFCEC/USACE installed a wellhead treatment system to remove PFOS/PFOA which began operation on 14 Feb 2020.
 - Lakeside Estates in Mashpee connected to municipal water supply (93 units).
- 1 residence is currently receiving bottled water (MassDEP providing bottled water to additional residences)
- 13 residential point-of-entry filtration systems installed
 - 4 removed when connections to municipal water were completed
 - 5 are no longer maintained since concentrations are below the LHA
- 108 connections made to municipal water supply
 - 93 connections at Lakeside Estates and 15 single-family residences

AV Supplemental RI:

- The Supplemental RI field program has been ongoing and includes groundwater, soil, surface water, sediment, private well, and treatment system sampling.
- Recent work was completed for further delineation of contamination in the source areas, sediment sampling in Ashumet Pond, and monitoring well sampling.
 - Source Area - Data collected to date show PFOS and PFOA present in both source areas but the Fire Training Area-1 source area has higher concentrations (up to 630 micrograms per kilogram [$\mu\text{g}/\text{kg}$] and 240 $\mu\text{g}/\text{kg}$) than the former Sewage Treatment Plant source area (up to 30 $\mu\text{g}/\text{kg}$ and 0.82 $\mu\text{g}/\text{kg}$).
 - Highest PFOS+PFOA groundwater concentration to date is 130.39 $\mu\text{g}/\text{L}$.
 - Ashumet Pond - Sediment samples were collected near the public beach at the boat ramp/swimming area and near a well cluster where elevated PFOS/PFOA groundwater concentrations were detected.
 - PFOS was detected above the limit of quantitation (LOQ) in one sample (1.1 $\mu\text{g}/\text{kg}$) and PFOA was not detected above the LOQ.
 - Monitoring Well Sampling - Four AV monitoring wells that previously had 1,4-dioxane concentrations above the risk-based concentration (RBC) of 0.46 $\mu\text{g}/\text{L}$ were resampled and concentrations in one well decreased below the RBC.
 - 1,4-Dioxane groundwater contamination at AV is very limited in extent (3 of 135 monitoring wells sampled) and the highest concentration is currently 0.75 $\mu\text{g}/\text{L}$.

FTA-1 Source Area



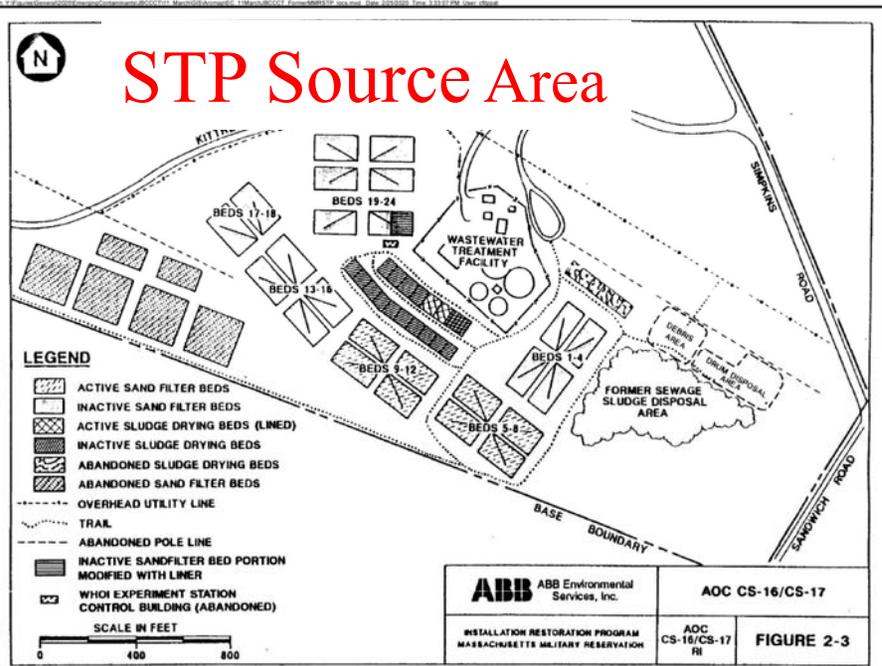
Legend

- Soil Boring
- Composite Soil Sample
- Thermal Treatment Unit Fire Area

Data Source: AFCEC, February 2020
1997 Aerial Photography from AFCEC

ASHUMET VALLEY FTA-1 SOURCE AREA SOIL SAMPLING LOCATIONS
AFCEC - Joint Base Cape Cod
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STP Source Area



Legend

- Soil Sample Location
- Joint Base Cape Cod Boundary

Data Source: AFCEC, February 2020
JBCC Boundary from Massachusetts Air National Guard 2011
2018 Aerial Imagery © Google
Figure 2-3 Source: ABB (ABB Environmental Services, Inc.) 1998
Remedial Investigation Report: Sewage Treatment Plant/Former
Sewage Sludge Disposal Area (AOC CS-16/CS-17) Revised to
Include Supplemental RI Data and Preliminary Risk Assessment,
Installation Restoration Program, Massachusetts Military Reservation,
Cape Cod, Massachusetts, prepared by HAZWRAP for Air Force
Center for Environmental Excellence (AFCEE)

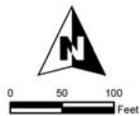
FORMER MMR STP (CS-16/CS-17) SOURCE AREA AND PROPOSED SOIL SAMPLING LOCATIONS
AFCEC - Joint Base Cape Cod
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Legend

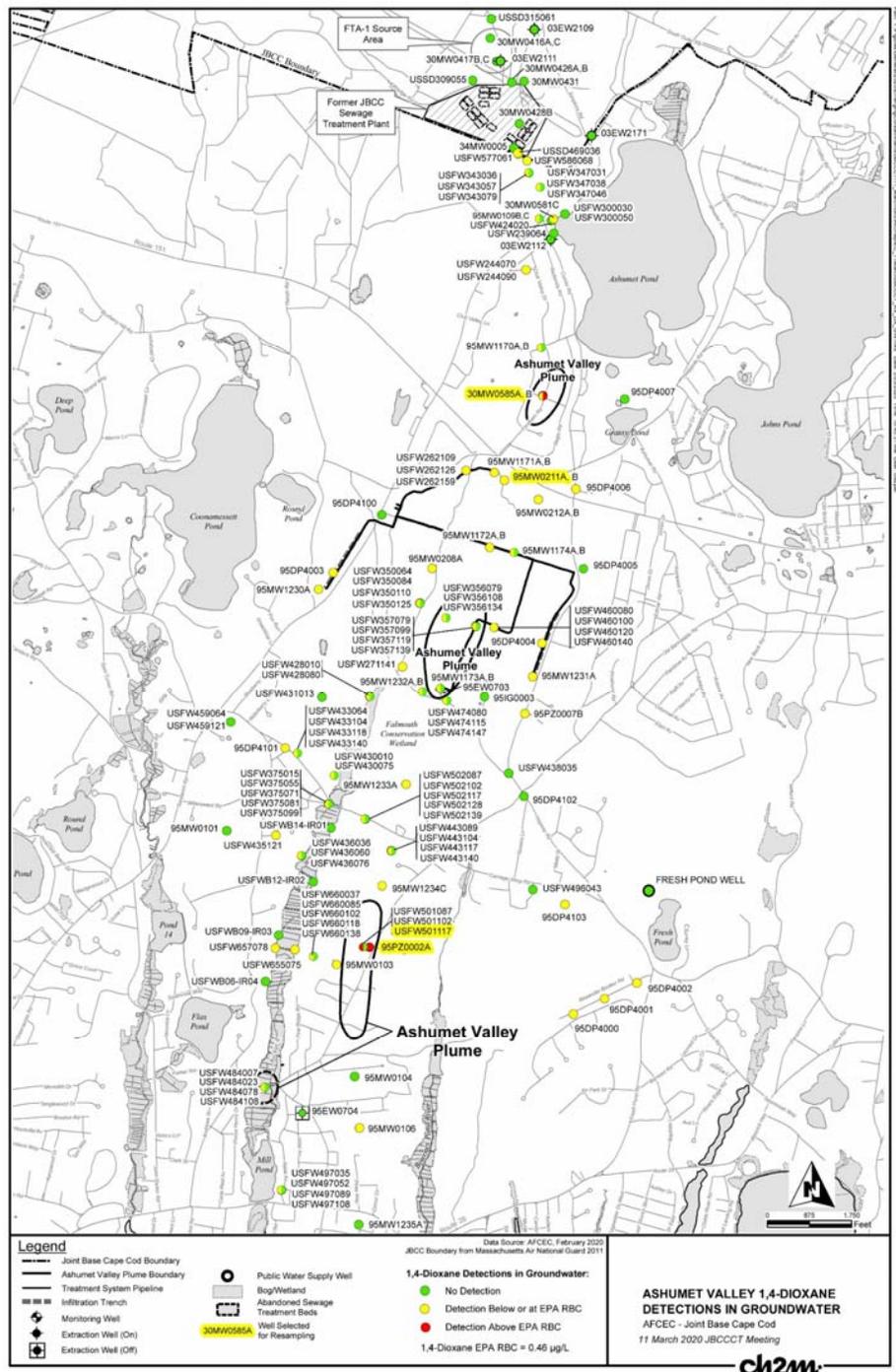
- ⊙ Surface Water Sample Location
- ▼ Sediment Sample Location
- ◆ Monitoring Well

Data Source: AFCEC, February 2020
2018 Aerial Imagery © Google



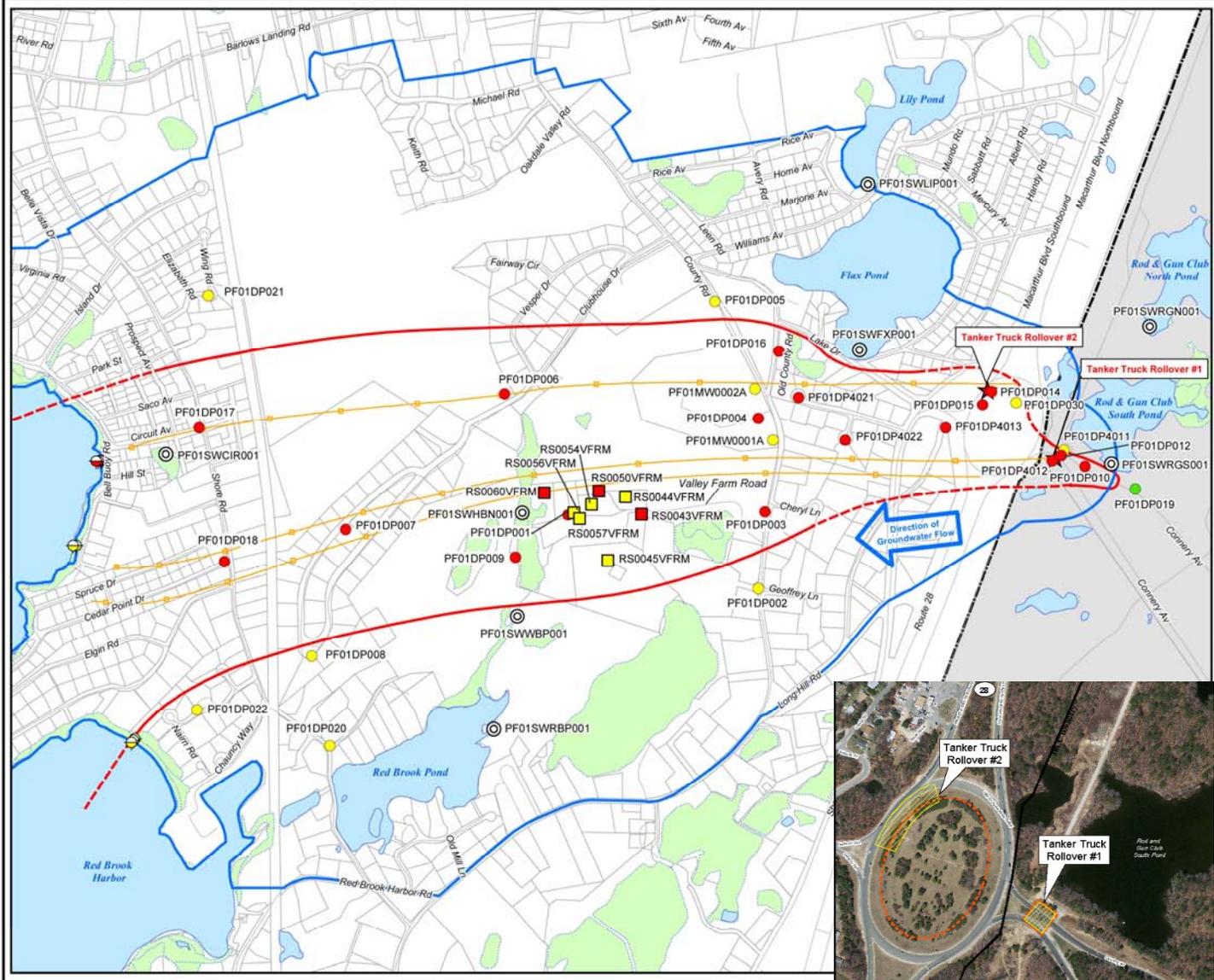
**ASHUMET POND SEDIMENT/
SURFACE WATER
SAMPLING LOCATIONS**
AFCEC - Joint Base Cape Cod
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TTRS RI Summary:

- The RI field program is ongoing and includes groundwater, soil, surface water, sediment, and private well sampling.
 - Based on results to date PFOS groundwater contamination extends from the TTRS source areas near and at the Route 28 rotary to Shore Road and discharges into Hen Cove, located approximately 7,600 ft to the west. Highest PFOS+PFOA groundwater concentration to date is 13.22 µg/L.
- Recent work was completed for further delineation of contamination in the source area and in the groundwater discharge area of Red Brook Harbor.
 - Source Area - Highest PFOS (570 µg/kg) and PFOA (17 µg/kg) soil concentrations are located in the median strip on Connery Avenue where the tanker truck overturned. PFOS concentrations decreased significantly with distance from the rollover site and generally decreased with depth. Additional soil sampling is being completed.
 - Red Brook Harbor - Groundwater data confirm the southern extent of the PFOS/PFOA plume boundary and indicate PFOS/PFOA groundwater contamination from TTRS is also discharging into Red Brook Harbor. PFOS and PFOA concentrations in surface water and sediment were below the LOQ or were not detected.
- The majority of the planned RI field work is complete. AFCEC's request to sample shellfish was not approved. The Bourne Shellfish Constable and MassDEP are evaluating shellfish sampling.



Legend

- Outreach Area
- Parcel
- ★ Tanker Truck Rollover Site
- Joint Base Cape Cod Boundary
- Particle Track
- PFAS Plume Boundary (Dashed Where Inferred)
- Surface Water Sample Location
- Seep/Pushpoint Sample

Sum of PFOS/PFOA Detections in Seep/Pushpoint Samples

- Sum of PFOS and PFOA At or Below LHA
- Sum of PFOS and PFOA Above LHA

Sum of PFOS/PFOA Detections in Private Wells (Latest Available Result)

- Sum of PFOS and PFOA At or Below LHA
- Sum of PFOS and PFOA Above LHA

Sum of PFOS and PFOA Detections in Groundwater

- No Detection
- Sum of PFOS and PFOA At or Below LHA
- Sum of PFOS and PFOA Above the LHA

EPA LHA (PFOS + PFOA) = 0.07 µg/L
 PFOS = Perfluorooctane Sulfonic Acid
 PFOA = Perfluorooctanoic Acid
 EPA LHA = U.S. Environmental Protection Agency Lifetime Health Advisory

Data Source:
 AFCEC - February 2020
 JBCC Boundary from Massachusetts Air National Guard 2011



TANKER TRUCK ROLLOVER SITES PFOS AND PFOA DETECTIONS IN GROUNDWATER
 AFCEC - Joint Base Cape Cod
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Legend

- ▼ Sediment Sample
- ⊕ Seep/Pushpoint Sample
- ⊙ Surface Water Sample
- PFAS Plume Boundary (Dashed Where Inferred)

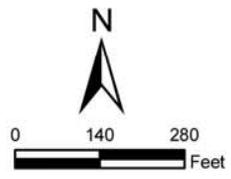
Sum of PFOS and PFOA Detections in Groundwater

- Sum of PFOS and PFOA Below the LHA
EPA LHA (PFOS + PFOA) = 0.07 µg/L

Shellfish Area Classification

- Approved
- Conditionally Approved

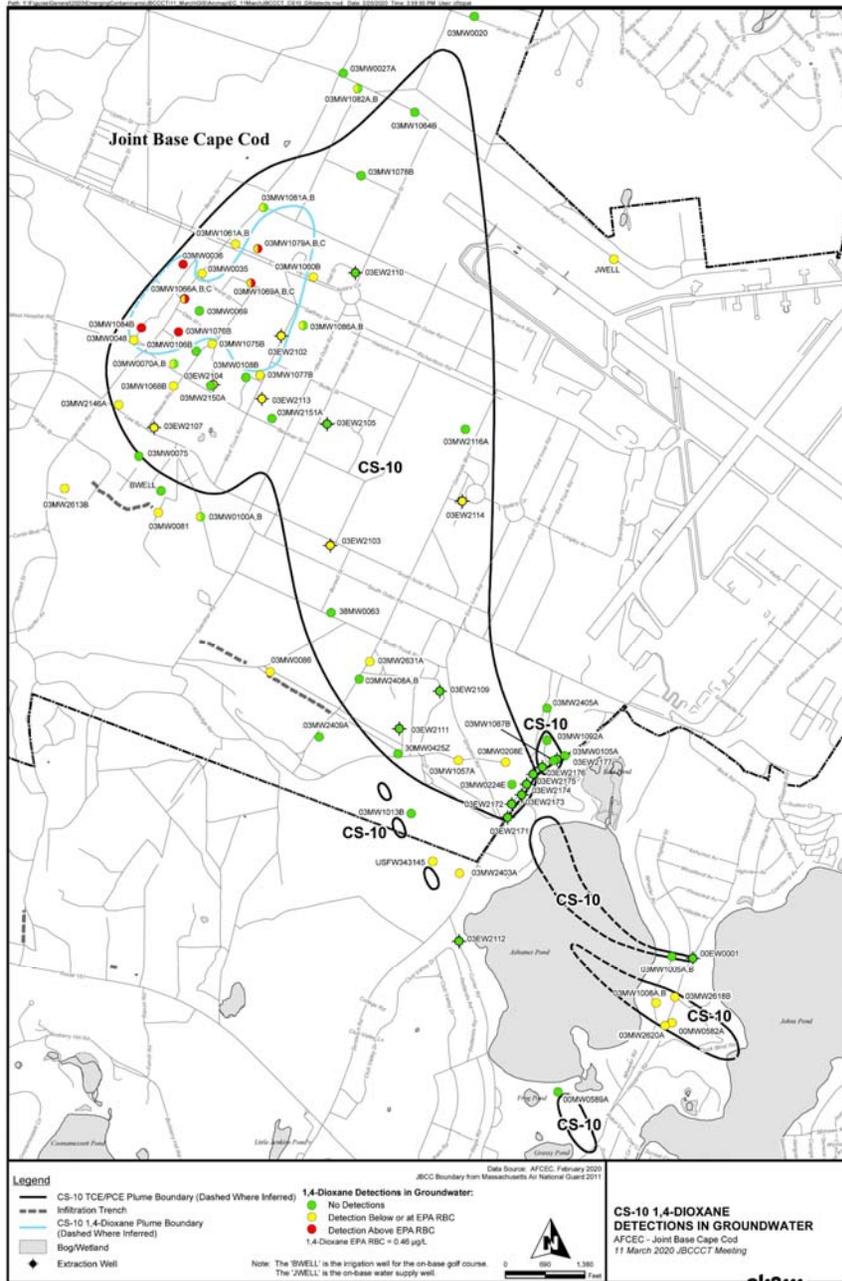
Data Source: AFCEC, February 2020
2018 Aerial Imagery © Google



**RED BROOK HARBOR
SAMPLING LOCATIONS**

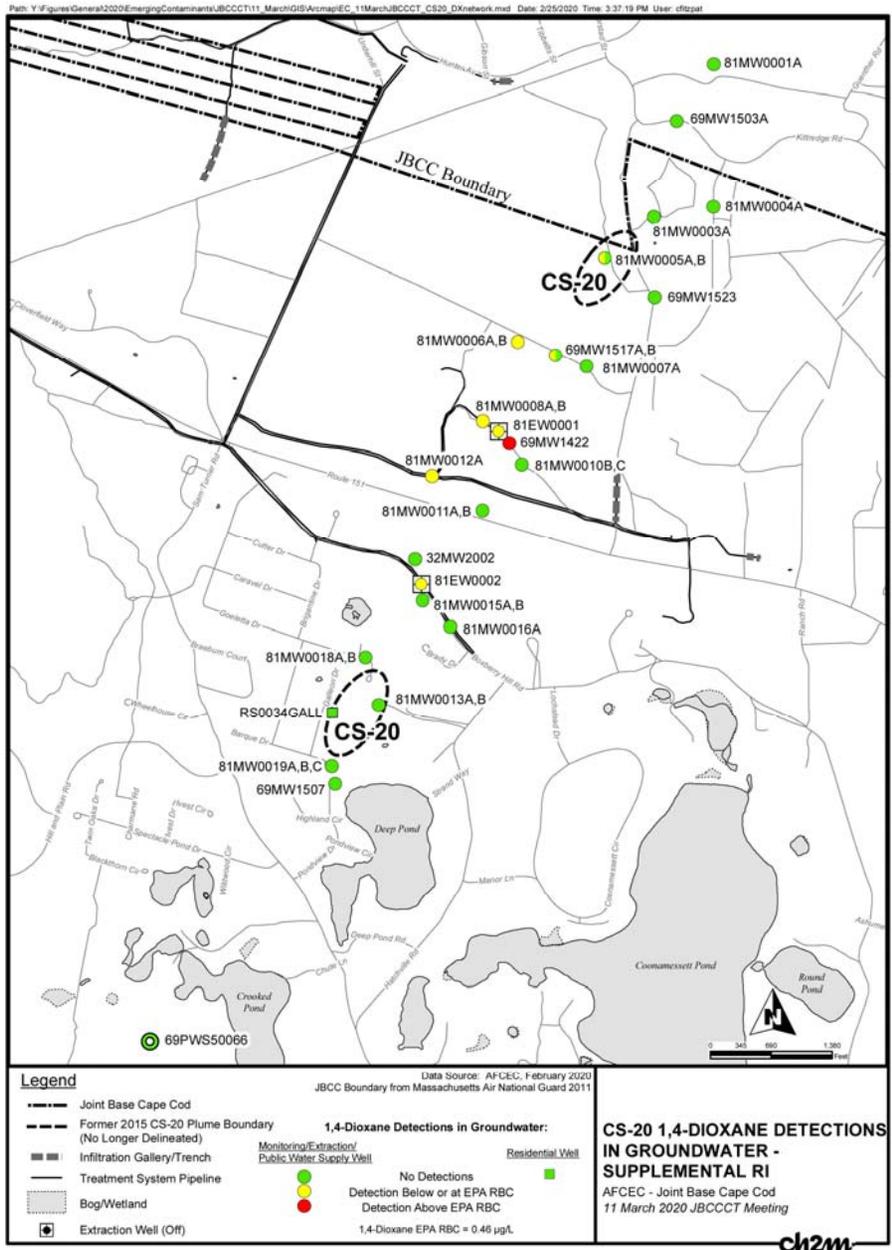
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CS-10 1,4-Dioxane



- AFCEC submitted the *Draft Explanation of Significant Differences for 1,4-Dioxane at Chemical Spill-10, Joint Base Cape Cod, MA* on 12 Dec 2018.
- This report adds 1,4-dioxane as a contaminant of concern (COC) for the CS-10 groundwater plume and selects the monitored natural attenuation and land use control portion of the existing remedy to address 1,4-dioxane.
- The EPA indicated in their Aug 2019 comment letter that the remediation goal (RG) for 1,4-dioxane should be set at 0.46 µg/L, which is an RBC developed using federal risk assessment guidance.
- The response to comment letter was submitted on 16 Sep 2019; EPA and MassDEP are reviewing AFCEC's responses to their comments on the draft document.

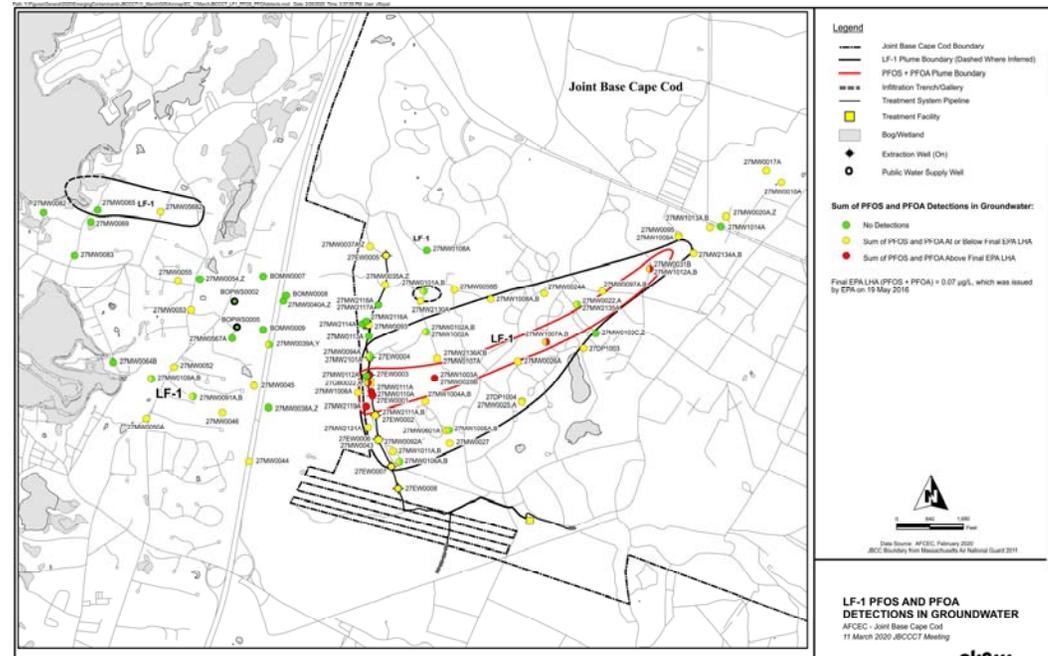
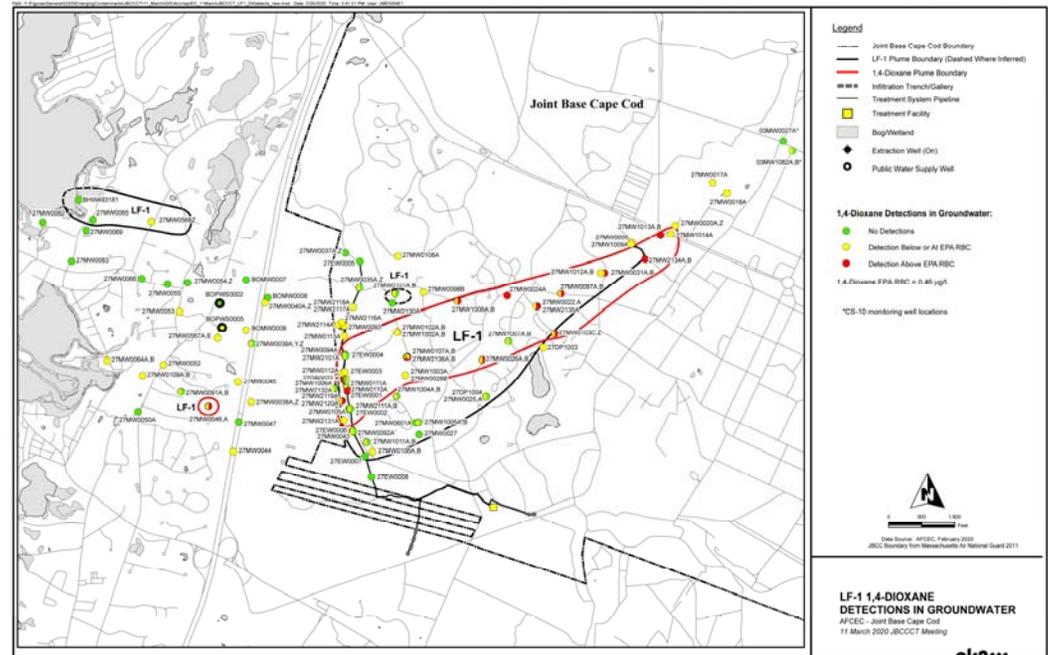
CS-20 1,4-Dioxane



- Responses to comments for the Draft Supplemental RI was submitted on 13 Nov 2019.
- AFCEC received EPA concurrence letter on 02 Dec 2019. MassDEP offered no additional comments or concurrence.
- AFCEC developed a solid conceptual site model that is documented in the Supplemental RI which concluded that no unacceptable risk from 1,4-dioxane exists at the site.
- Since EPA concurred on the response to comments letter, AFCEC submitted the Final Supplemental RI Report on 29 Jan 2020, which documents that no further action is needed for 1,4-dioxane at CS-20.
- Per the CERCLA process, a Fact Sheet will be prepared to document this decision for CS-20.

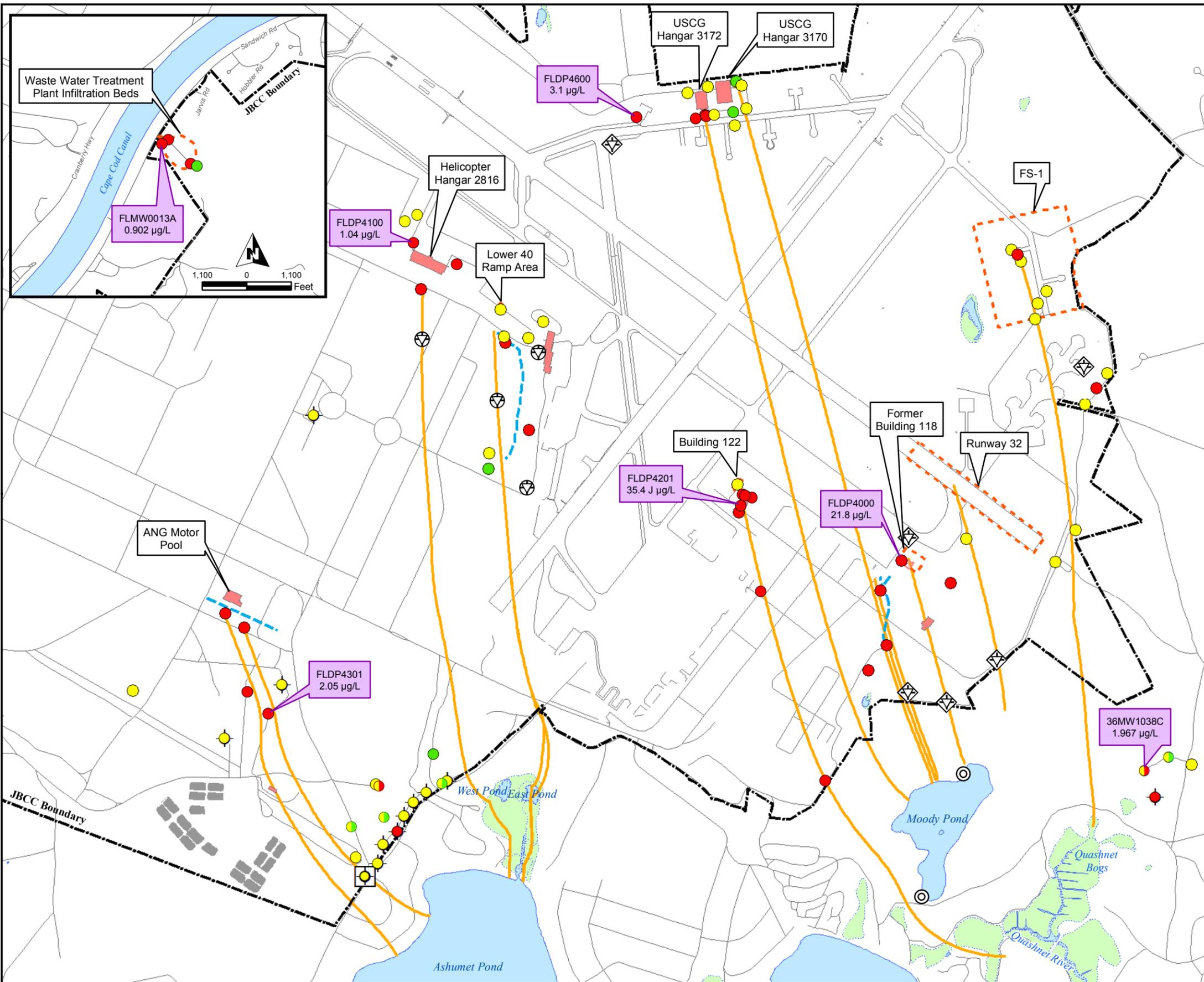
LF-1 Supplemental RI/FS

- Final Supplemental RI Report was submitted in Jan 2018.
 - 1,4-Dioxane, PFOS, and PFOA were recommended to be added as COCs.
- A Supplemental FS will be completed to evaluate remedial alternatives for groundwater following Air Force review and approval of available standards.



Flight Line Area Expanded SI (PFOS/PFOA)

- Expanded SI for 7 Flight Line sites is ongoing, recent work included:
 - Former Building 122 (Former Fire Station): Building has been demolished. PFOS/PFOA is present in samples collected from soil, groundwater, concrete, sediment from inside drains, and water samples from the grease trap and oil/water separator. Completed 2 downgradient borings and confirmed that PFOS/PFOA contamination extends to the base boundary.
 - Highest PFOS+PFOA groundwater concentration to date is 35.4 J µg/L
 - Highest PFOS and PFOA soil concentrations are 330 µg/kg and 28 µg/kg, respectively.
 - USCG Hangars: Asphalt, soil, and groundwater samples collected in advance of construction activities at hangars.
 - The highest PFOS+PFOA groundwater concentration to date is 3.1 µg/L.
 - PFOS and PFOA were not detected in the asphalt samples; the highest PFOS soil concentration was 8 µg/kg and highest PFOA soil concentration was 1.4 µg/kg.



Legend

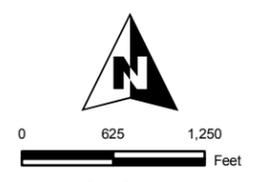
- Groundwater Model Particle Track
- Storm Drainage Ditch
- Approximate Site Boundary
- Joint Base Cape Cod Boundary
- Existing Structure
- Former Structure
- Bog/Wetland
- Abandoned Sewage Treatment Beds
- Proposed Direct Push Boring
- Recently Completed Direct Push Boring
- Surface Water Sample Location
- Extraction Well (On)
- Extraction Well (Off)
- 3.1 µg/L Highest PFOS + PFOA Concentration in Groundwater (µg/L)

Sum of PFOS and PFOA Detections in Groundwater

- No Detection
- Sum of PFOS and PFOA At or Below Final EPA LHA
- Sum of PFOS and PFOA Above Final EPA LHA

Final EPA LHA (PFOS + PFOA) = 0.07 µg/L

Note: Particle tracks were created using the CS-10 2011 zoom model and October 2012 operating conditions.



Data Source: AFCEC, March 2020
JBCC Boundary from Massachusetts Air National Guard 2011

FLIGHT LINE AREA SITES: PFOS AND PFOA DETECTIONS IN GROUNDWATER
AFCEC - Joint Base Cape Cod
11 March 2020 JBCCCT Meeting



Flight Line Area Expanded SI (PFOS/PFOA) (continued)

- ANG Motor Pool: Shallow soil samples were collected from the drainage ditch located to the south of the building where foam and fuel were contained after the 29 Sep 1984 traffic incident. The highest PFOS soil concentration was 410 µg/kg and the highest PFOA soil concentration was 0.86 J µg/kg.
 - Based on groundwater sampling results, PFOS/PFOA groundwater contamination likely extends to the CS-10 Sandwich Road extraction fence; highest PFOS+PFOA groundwater concentration to date is 2.05 µg/L.
- Lower 40 Ramp Area: Collected soil samples near the ramp area and in the drainage ditch. The highest PFOS concentration was 57 µg/kg and the highest PFOA concentration was 0.25 J µg/kg.
 - Groundwater sampling program is ongoing; highest PFOS+PFOA groundwater concentration to date is 1.04 µg/L.

Flight Line Area Expanded SI (PFOS/PFOA) (continued)

- Former Building 118: Completed 4 groundwater borings between the airfield and the base boundary; results are pending. Soil sampling is also planned.
 - Highest PFOS+PFOA groundwater concentration to date is 21.8 µg/L.
- Fuel Spill-1: Completed 2 groundwater borings and sampled 21 monitoring wells.
 - Highest PFOS concentration reported to date is 1.9 µg/L at an off-base monitoring well. Highest PFOA concentration reported to date is 0.074 µg/L at an on-base source area monitoring well.
 - Data indicate the source of the off-base PFOS/PFOA may not be coincident with the source of the former Fuel Spill-1 ethylene dibromide plume. Groundwater investigation is ongoing.

Path Forward:

- Continue AV Supplemental RI field program, AV private well monitoring program, and outreach in areas south of Ashumet and Johns ponds.
- Continue conducting response actions when needed.
- Continue TTRS RI field program and private well monitoring program.
- Finalize the Draft CS-10 ESD.
- Submit the Draft CS-20 Fact Sheet documenting that no further action is needed for 1,4-dioxane at CS-20.
- Submit the Draft Supplemental FS Report for 1,4-dioxane and PFOS/PFOA at LF-1.
- Continue the Flight Line Expanded SI field program
- Present sample results and field program updates to the agencies at Technical Update Meetings and to the public at future JBCC Cleanup Team Meetings.