

Air Force Civil Engineer Center



Per- and Polyfluoroalkyl Substances (PFAS) Update

Joint Base Cape Cod
Cleanup Team Meeting
25 March 2026



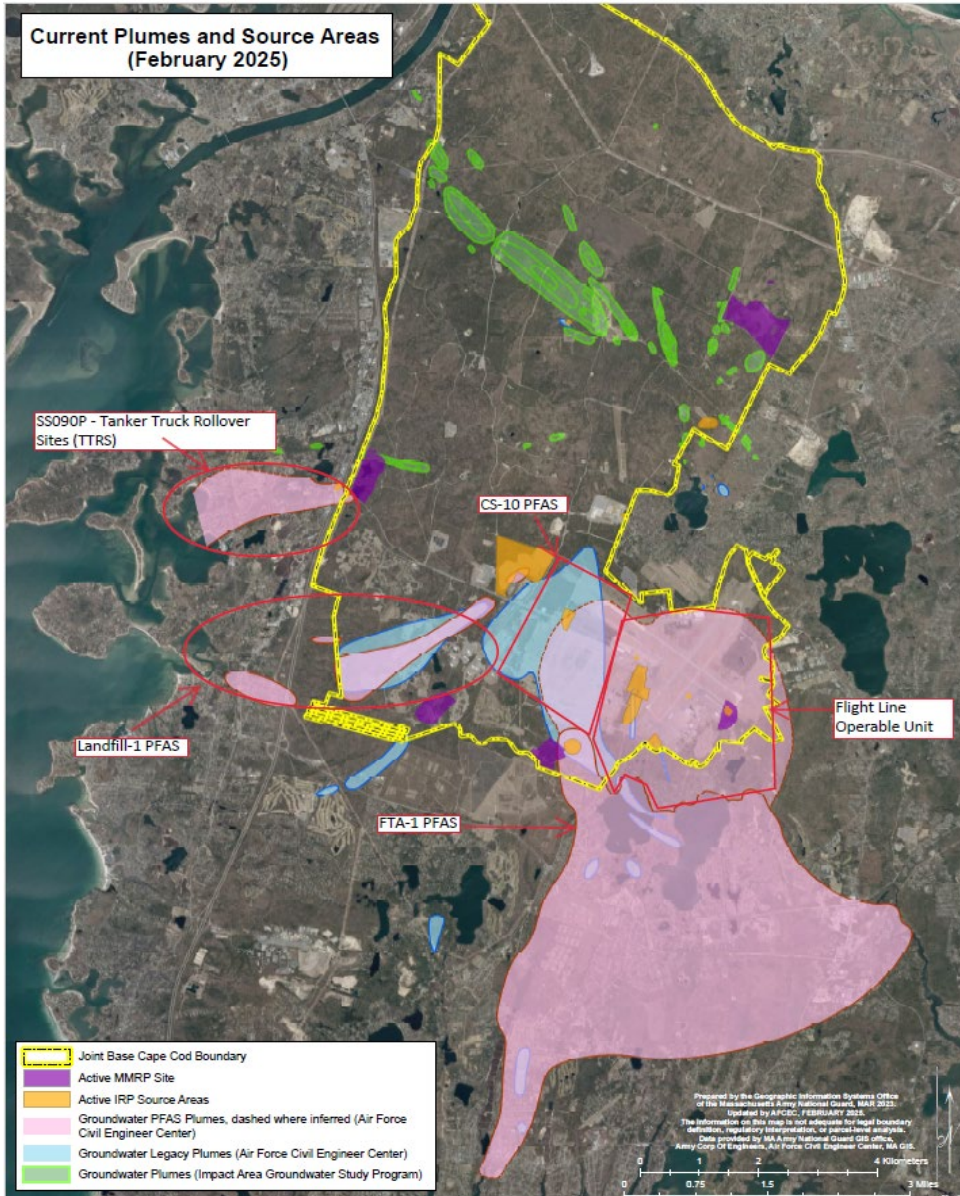
Overview



- PFAS Base Wide Snapshot
- PFAS Site Reviews and Status
 - Ashumet Valley (AV)/Fire Training Area-1 (FTA-1 PFAS)
 - Flight Line Operable Unit
 - Chemical Spill-10 (CS-10 PFAS)
 - Tanker Truck Rollover Site (TTRS)
 - Landfill-1 (LF-1 PFAS)



PFAS Base Wide Snapshot





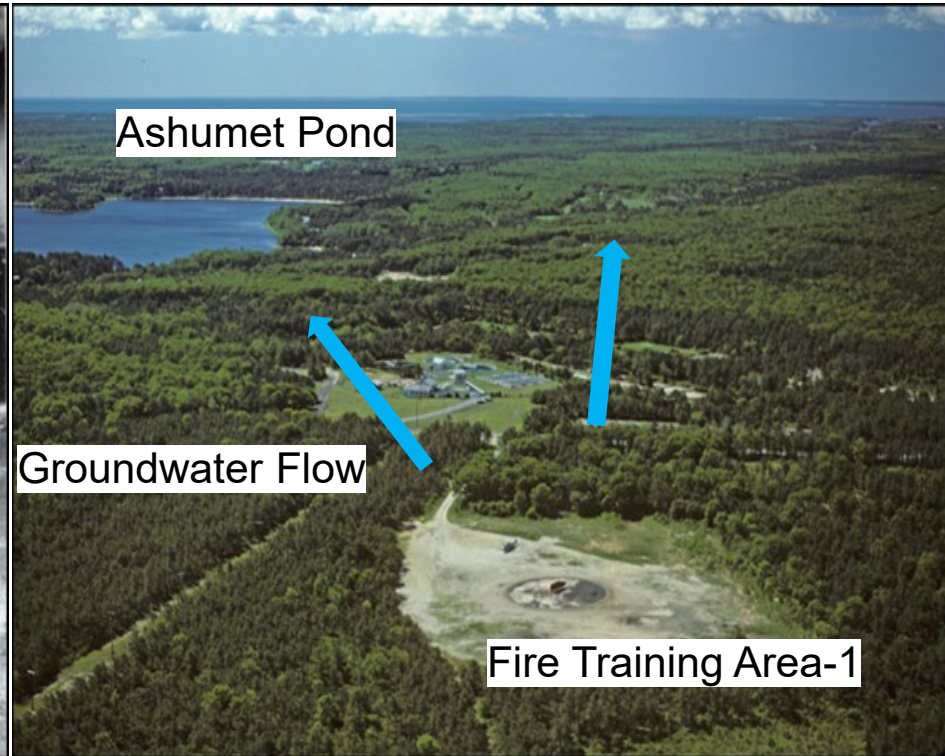
Ashumet Valley/FTA-1 PFAS Source Overview



- The primary source of PFAS to Ashumet Valley (AV) is from FTA-1
 - PFAS plume called “FTA-1” to distinguish it from AV Legacy
- FTA-1 operated from 1958 – 1985
 - Use of aqueous film forming foam (AFFF or “A Triple F”) with PFAS began in 1970
- Additional AFFF release in 1997
 - AFFF used to suppress a fire during thermal treatment of the FTA-1 soils to remove volatile organic compound contamination



Ashumet Valley/FTA-1 PFAS



Ashumet Pond

Groundwater Flow

Fire Training Area-1



Ashumet Valley/FTA-1 PFAS CERCLA Actions



- **Interim Removal Actions (2015-current)** eliminate exposure in drinking water
 - Included time-critical and non-time critical removal actions documented in Action Memorandums
 - Municipal Wellhead Treatment Systems (4), connected residences to municipal water (+130), bottled water, residential treatment systems
- **Supplemental PFAS Remedial Investigation (RI)** completed March 2024
 - RI started in 2015
 - Describes Nature and Extent of Contamination
 - Includes Human Health and Ecological Risk Evaluation
 - Contaminants of Concern (COCs):
 - PFOA, PFOS, PFHxS, PFNA in groundwater and soil (leaching potential)
 - PFOS in fish (human consumption)

PFOA = Perfluorooctanoic acid
PFOS = Perfluorooctane sulfonic acid
PFHxS = Perfluorohexane sulfonic acid
PFNA = Perfluorononanoic acid

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act



FTA-1 PFAS Extent



PFAS Detections in Groundwater

- Above PFAS MCL* or MassDEP PFAS6 MMCL**
- Below PFAS MCL and MassDEP PFAS6 MMCL
- No Detection

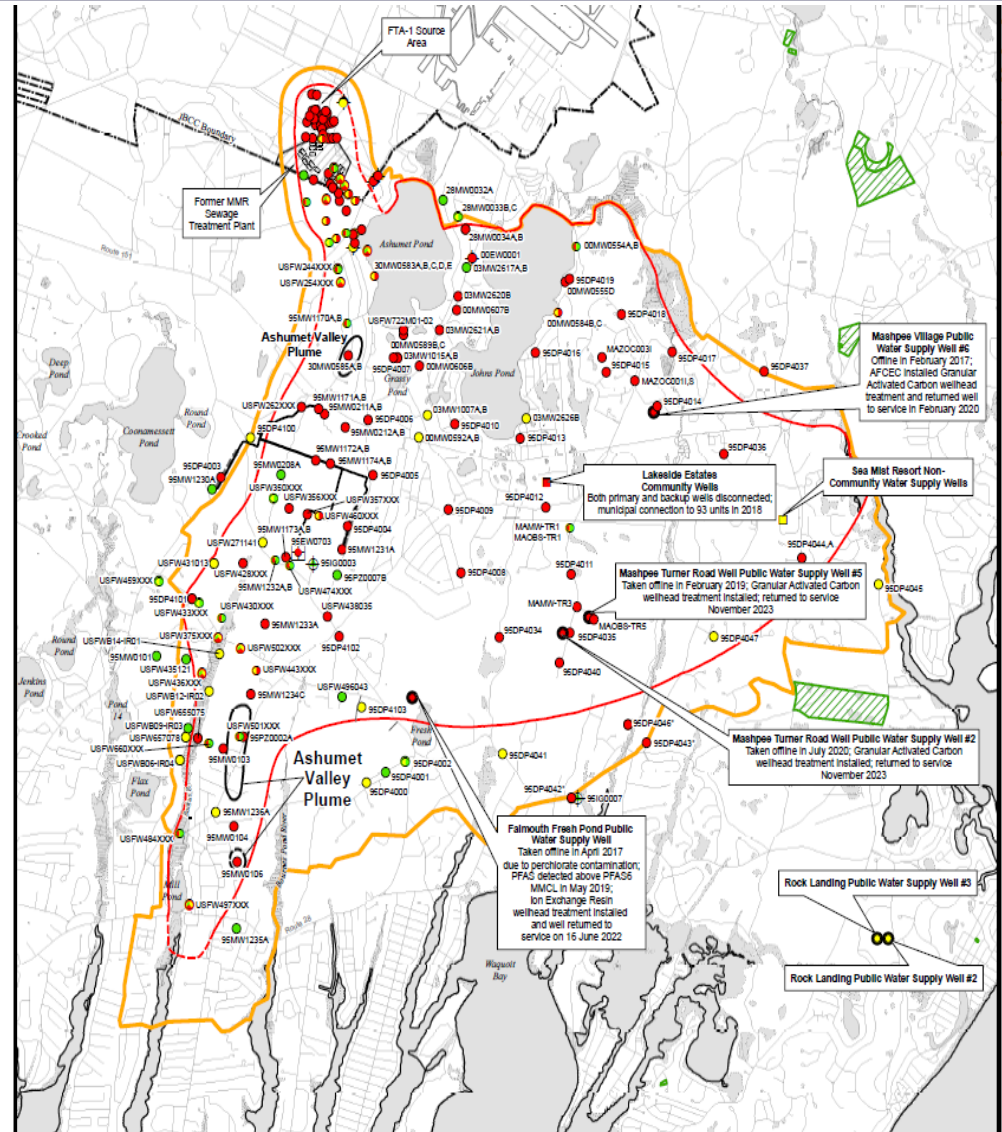
— FTA-1 PFAS Plume Boundary

— FTA-1 Land Use Control Area

Exposure to PFAS-contaminated groundwater addressed with bottled water, in-house treatment systems, connections to public water supply, and treatment systems on municipal wells.

*MCL = maximum contaminant level

**MMCL = Massachusetts maximum contaminant level





Ashumet Valley/FTA-1 PFAS CERCLA Actions (continued)



- Draft Supplemental PFAS **Feasibility Study (FS)** for groundwater and soil prepared in April 2023
 - Groundwater FS is on hold while other work proceeds and interim action performance can be evaluated
 - Soil to be addressed in future Base Wide Soil FS
 - Private well sampling and mitigation will continue
- Draft PFAS **Explanation of Significant Differences (ESD)** prepared in March 2024
 - Modifies legacy remedy for Ashumet Valley groundwater to include interim remedial action for PFAS
 - Adds Land Use Controls for groundwater and fish
 - ESD Public Comment Period expected in Spring 2026



Ashumet Valley/FTA-1 PFAS



- PFAS is impacting Ashumet Pond and Johns Pond
- Do not eat any fish
- Safe for swimming
 - Avoid swallowing water and contact with foam

PUBLIC HEALTH ADVISORY

Ashumet Pond
Falmouth, Mashpee



Fish Contaminated with Mercury & Per and Polyfluoroalkyl Substances (PFAS)

CHILDREN UNDER 12; AND PEOPLE WHO ARE NURSING, PREGNANT, OR MAY BECOME PREGNANT:	• Do not eat any fish
ALL OTHER PEOPLE:	• Do not eat any fish

Issued by the Massachusetts Department of Public Health. For additional information, please scan the QR code or call 617-624-5757.



PUBLIC HEALTH NOTIFICATION

ASHUMET POND
Falmouth / Mashpee



PFAS* DETECTED AT PUBLIC BEACH
SWIMMING NOT A HEALTH RISK

AVOID SWALLOWING WATER
AVOID CONTACT WITH FOAM (if present)

*Per- and Polyfluoroalkyl Substances (PFAS)

SCAN THE QR CODE FOR MORE INFORMATION ON PFAS AND SWIMMING OR CONTACT



Environmental Toxicology Program
Massachusetts Department of Public Health
617-624-5757

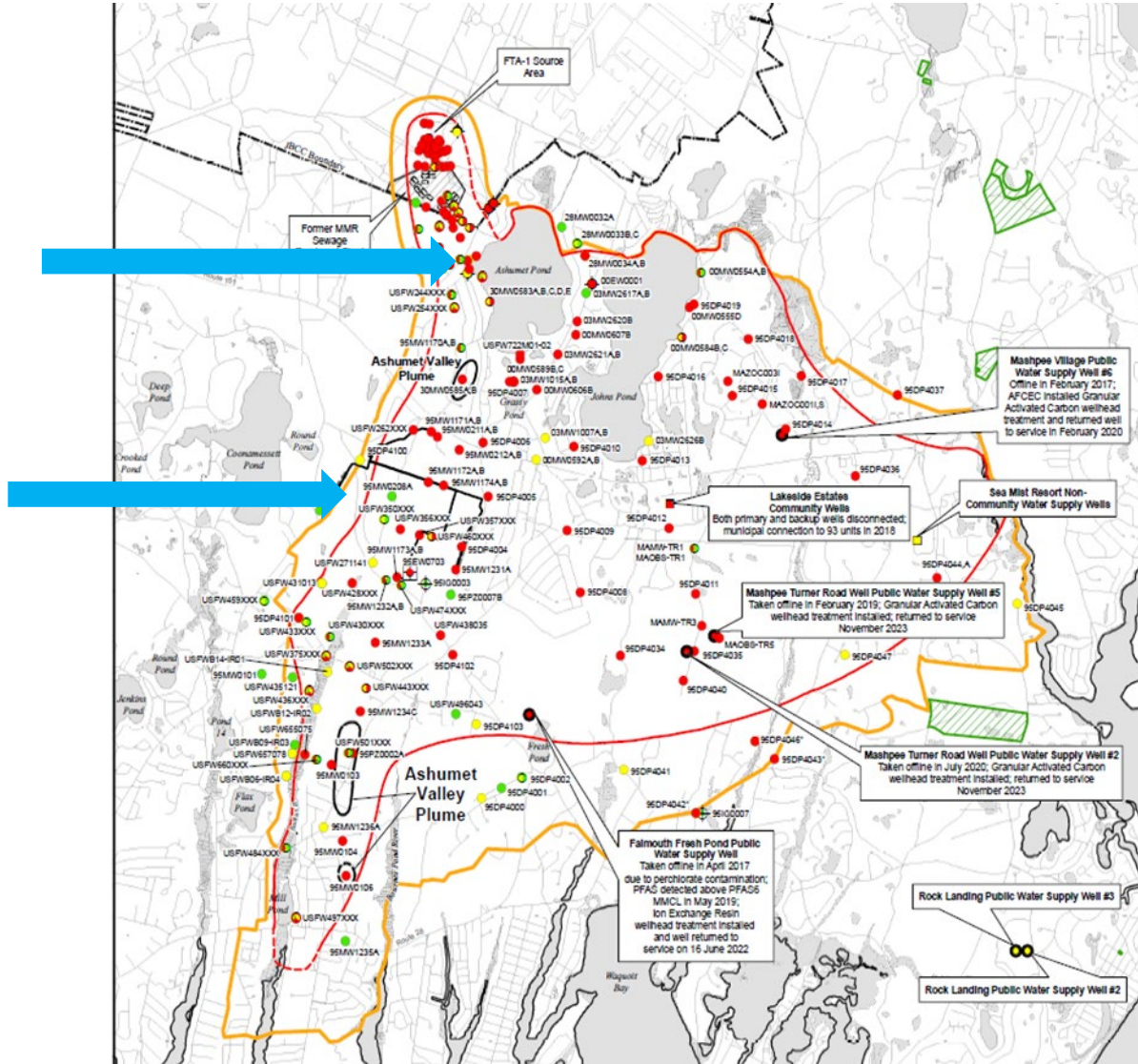


FTA-1 PFAS Interim Remedial Action Locations



**New Sandwich Rd
Extraction Fence**

**Restart Ashumet Valley
Treatment System**

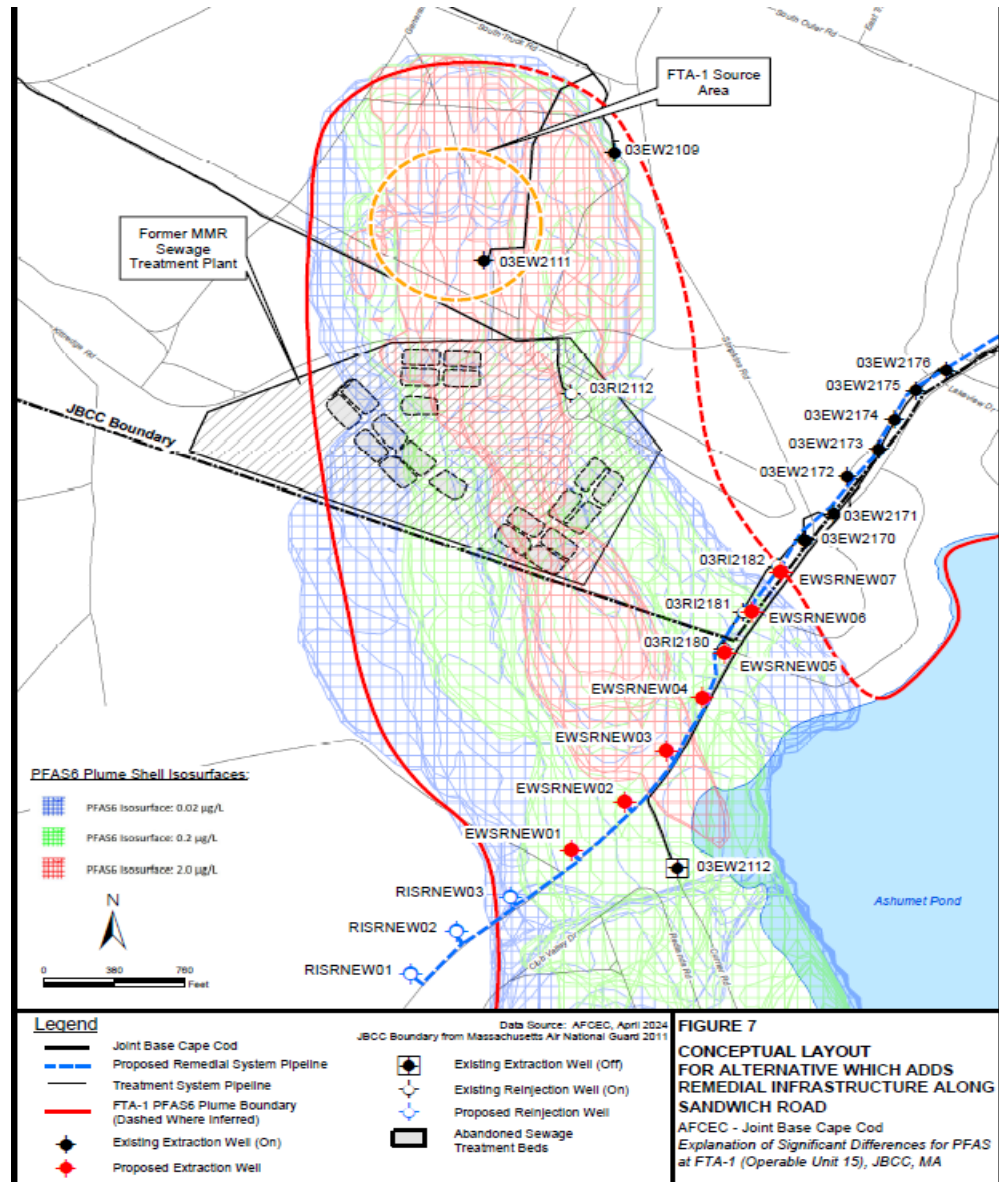




FTA-1 PFAS Sandwich Rd Extraction Fence



- Install 7 new extraction wells and 3 new reinjection wells
- Total flow rate estimated at 1,350 gallons per minute (gpm)
- Water to be treated at Sandwich Road Treatment Facility (Granular Activated Carbon [GAC])

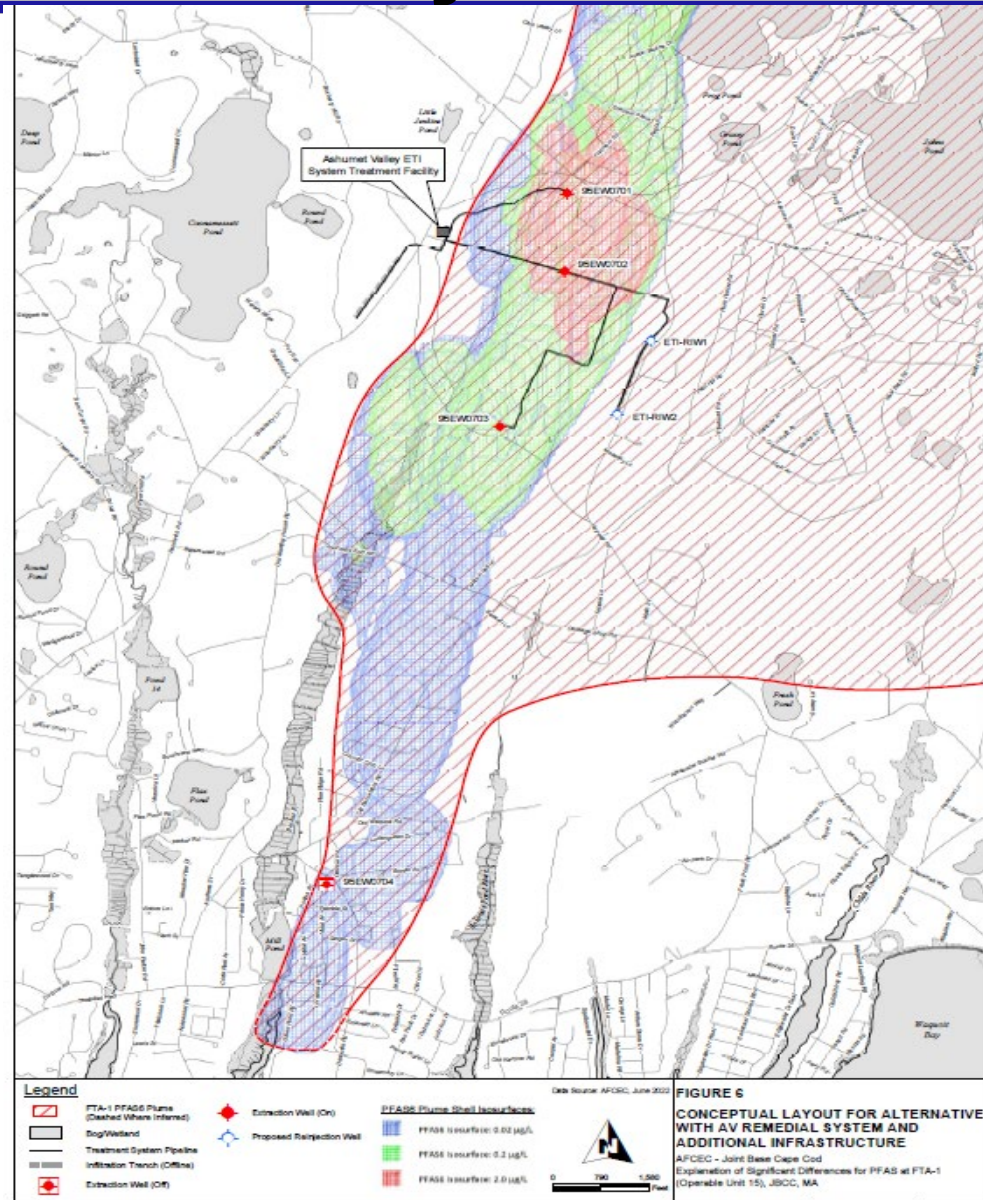




FTA-1 PFAS Restart Ashumet Valley Treatment System



- Restart existing 3 extraction wells
- Install 2 new reinjection wells
- Total flow rate estimated at 1,400 gpm
- Treatment at existing Ashumet Valley system (GAC)





Proposed FTA-1 PFAS GW Interim Remedial Action Status



ESD Status

- Apr 2026: Estimated Completion of Draft Final FTA-1 ESD
 - To be followed by 30-day public comment period
 - Issue Final ESD with response to public comments

Design/Construction Status

- Sep 2024: Awarded contract for design of FTA-1 PFAS Interim Remedy
- Aug 2025: Awarded contract modification for construction
 - Nov 2025: Draft Design/Remedial Action Workplan submitted to AFCEC
 - Spring/Summer 2026: Clearing, drilling, piping along Sandwich Rd and Crane Wildlife Management Area
 - Spring 2027: System Startup
- AFCEC will continue to update the JBCCCT regarding the design/construction of interim remedial action



Flight Line Operable Unit (OU)

Source Overview



- The sources of PFAS in the Flight Line OU are direct AFFF releases associated with:
 - Fire Station operations and testing
 - Hangar fire suppression systems
 - Emergency Responses
- Possible indirect PFAS releases due to surface application of wastewater treatment plant (WWTP) composted sludge
 - AFFF entered WWTP collection system
 - PFAS transfer from AFFF to sludge
 - Sludge is now transported off-base to industrial treatment facility



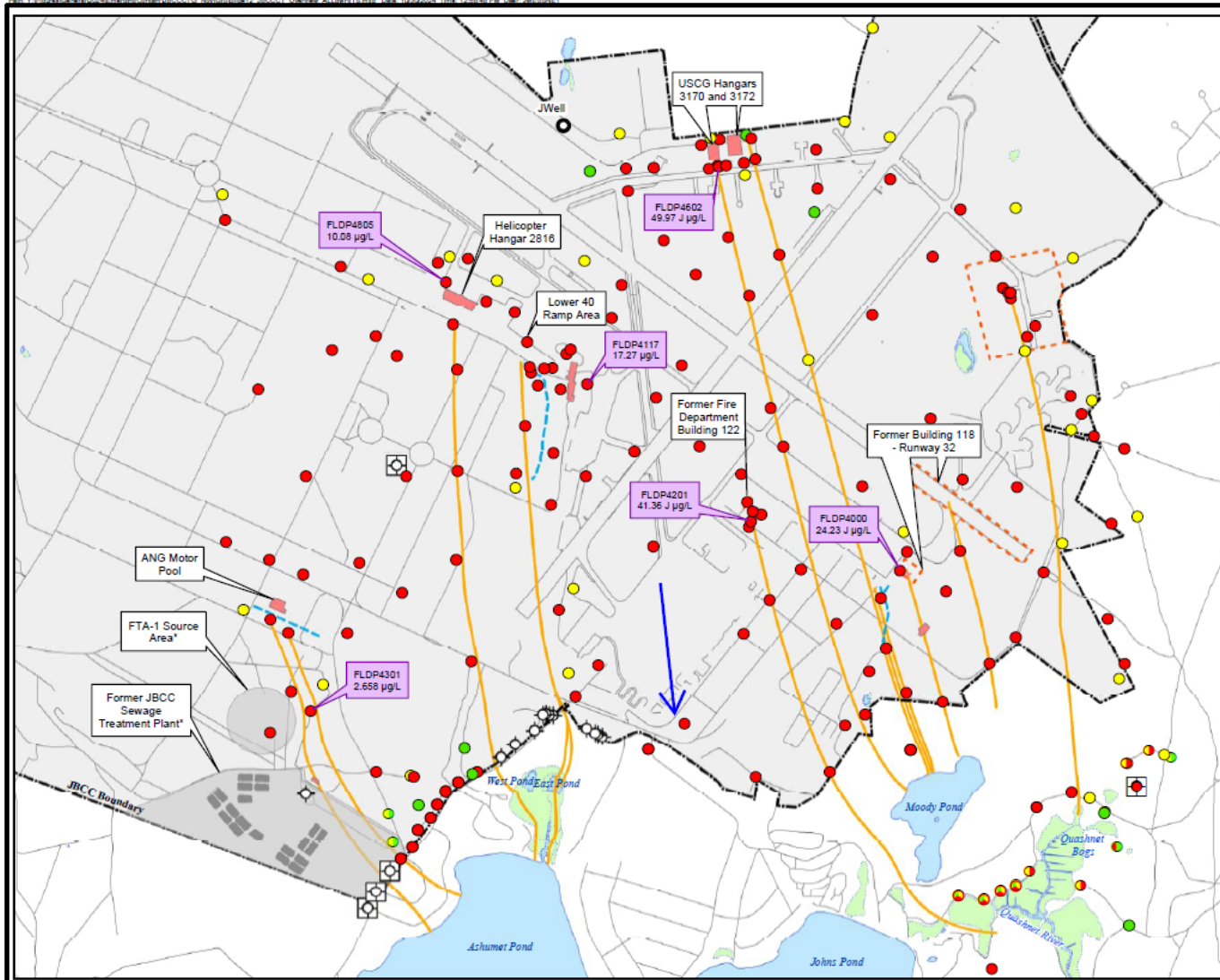
Flight Line Operable Unit (OU) CERCLA Actions (Continued)



- **Preliminary Assessment (PA)** completed in 2015
- **Site Inspections (SI)** completed in 2017 and 2021
 - Confirmed PFAS in groundwater migrating off-base with potential drinking water impacts
- **Remedial Investigation (RI)** began in 2021
 - Groundwater sampling and analysis complete, numerous graphics provided
 - Awaiting FY26 contract to prepare RI report for non-soil media
 - Draft RI due to EPA on 4 Apr 2027
 - Much soil data collected; additional data collection in future Base Wide Soil RI



Flight Line Operable Unit (OU) PFAS Groundwater Detections



Legend

- Groundwater Model Particle Track
- Storm Drainage Ditch
- Approximate Site Boundary
- Joint Base Cape Cod Boundary
- Existing Structure
- Former Structure
- Abandoned Cranberry Bog/Wetland
- Abandoned Sewage Treatment Beds
- Public Water Supply Well
- Extraction Well (Off)
- ReInjection Well (On)
- ReInjection Well (Off)

Highest PFAS6 Concentration in Groundwater (µg/L) Detected to Date During RI
49.97 J µg/L

Sum of PFAS6 Detections in Groundwater From Flight Line Area Site Inspections:

- PFAS6 = 0
- PFAS6 Greater Than 0 and At or Below the MMCL
- PFAS6 Above the MMCL

MassDEP PFAS6 MMCL (sum of PFOS, PFOA, PFHxS, PFNA, PFHpA, and PFDA) = 0.02 µg/L
MMCL = Massachusetts Maximum Contaminant Level

*Sites Being Investigated Under the FTA-1 Remedial Investigation

Groundwater Flow Direction

Data Source: AFCEC, October 2024
JBCC Boundary from Massachusetts Air National Guard 2011

FLIGHT LINE OPERABLE UNIT SITES
AFCEC - Joint Base Cape Cod
13 November 2024 JBCCCT Meeting





Flight Line Operable Unit (OU) CERCLA Actions (continued)

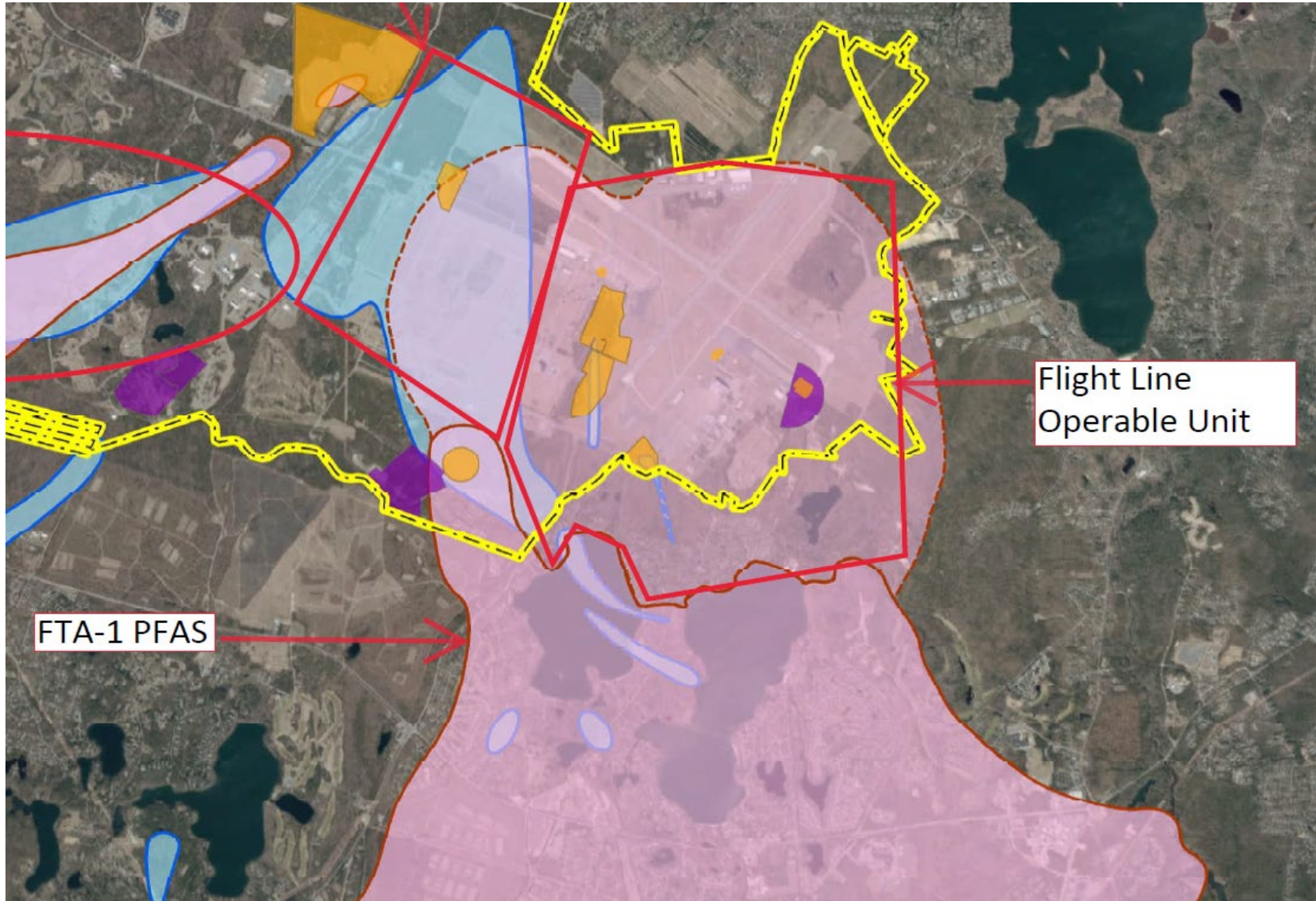


- Air Force discussing a **Non-Time Critical Removal Action (NTCRA)** for groundwater after RI completion – planned for FY27 initiation (subject to funding)
 - **Engineering Evaluation/Cost Analysis (EE/CA)** to evaluate alternatives to prevent/reduce migration across base boundary
 - EE/CA Public Comment Period
 - Followed by **Action Memorandum** to authorize NTCRA
- Non-soil media **FS, Proposed Plan (PP), Record of Decision (ROD)** on hold until soil remedy is understood and performance of groundwater interim system can be evaluated (post-2030)
 - May be combined with FTA-1 FS/PP/ROD-A due to commingling



Flight Line Operable Unit (OU)

FTA-1 and Flight Line OU Commingling





Flight Line Operable Unit (OU) CERCLA Actions (continued)



- Flight Line Soil will be combined with FTA-1 and CS-10 PFAS soils in a separate **Base Wide Soil FS, PP, and ROD**
 - Next step is Base Wide Soil Remedial Investigation of Flight Line and CS-10 Soils (on-hold due to limited funding)
 - FTA-1 Soil RI has been completed



CS-10 PFAS

Source Overview/CERCLA Status



- One source identified (composted sludge)
 - Groundwater detections indicate other sources exist
- **Base Wide Soil Remedial Investigation (RI)** will determine nature and extent of source areas – on hold due to limited funding
- **CS-10 Supplemental Remedial Investigation (RI)** will determine nature and extent of groundwater contamination – on hold due to limited funding



CS-10 PFAS

Source Overview/CERCLA Status



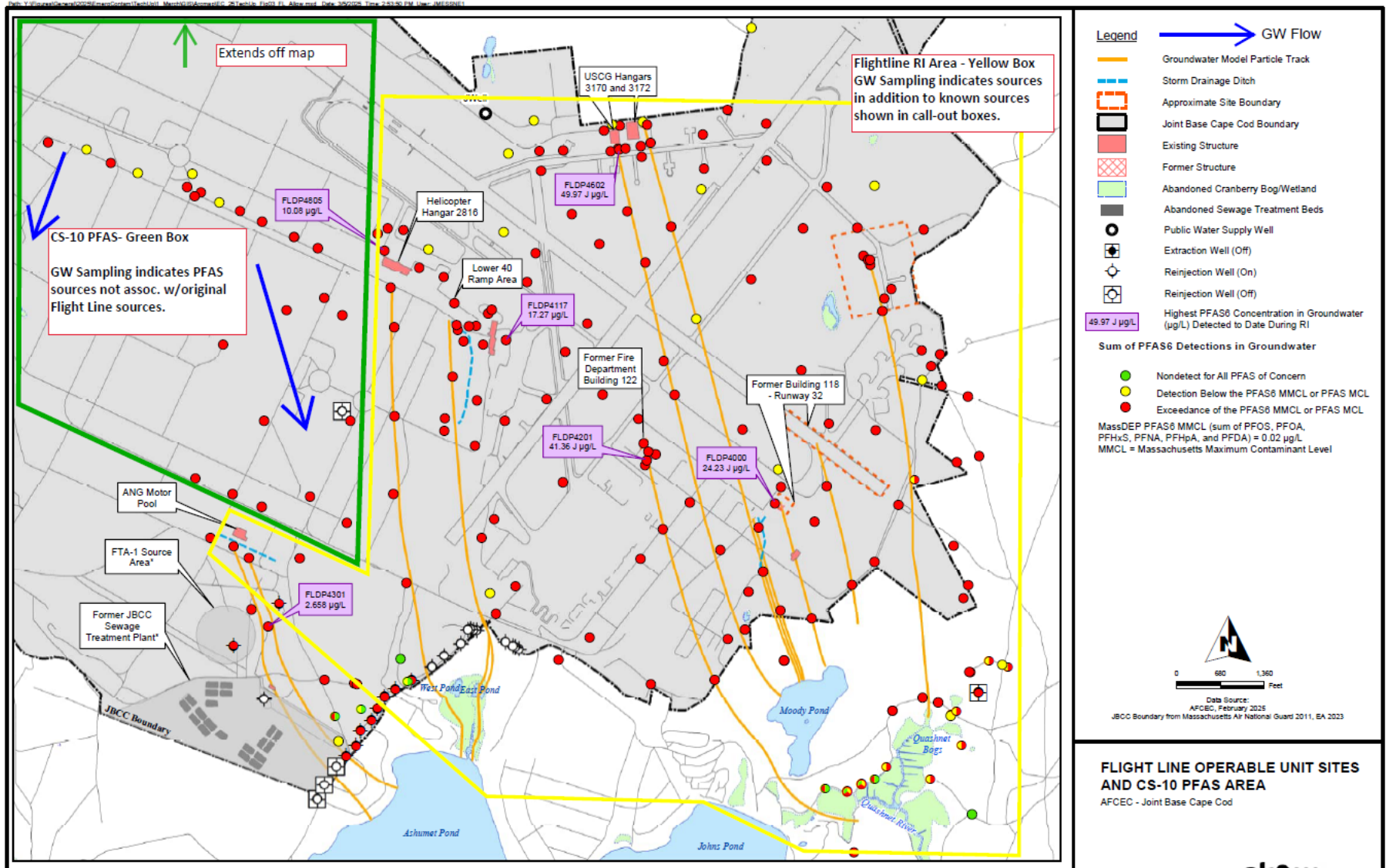
- **CS-10 Focused Feasibility Study (FFS)** will evaluate remedial alternatives for groundwater
 - Follows Supplemental Remedial Investigation completion
 - PFAS currently being treated in CS-10 In-Plume and Sandwich Road groundwater treatment facilities
 - Unknown if additional treatment is needed
- Planning an **Explanation of Significant Differences (ESD)** to add PFAS as contaminant of concern at CS-10 after groundwater RI/FFS



CS-10 PFAS



PFAS Groundwater Detections (Green Box)



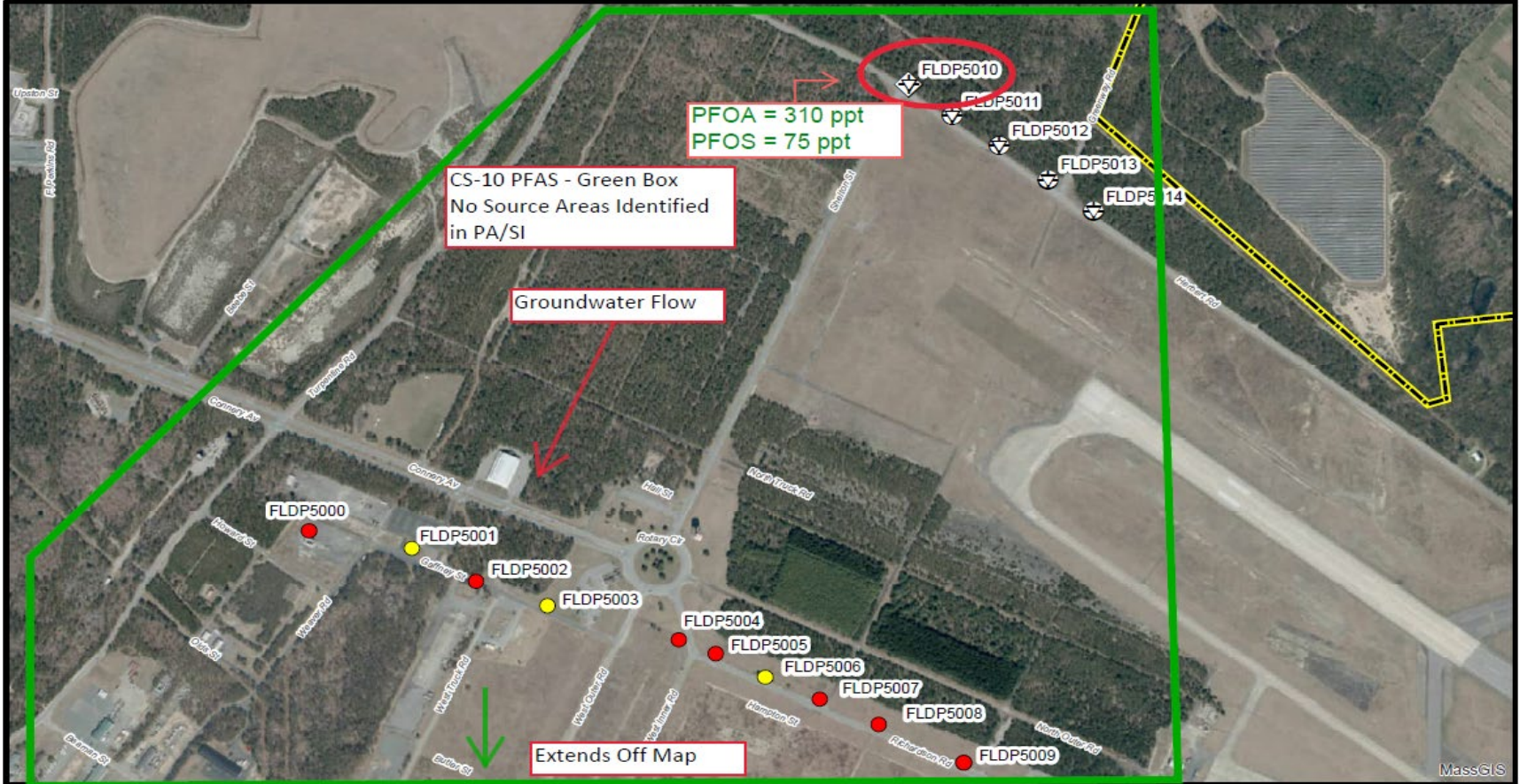


CS-10 PFAS



PFAS Groundwater Detections (Green Box)

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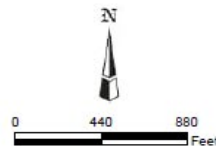
Legend

- Proposed Direct Push Boring
- Recently Completed Direct Push Boring

Sum of PFAS6 Detections in Groundwater

- Detection Below the PFAS6 MMCL or PFAS MCL
 - Exceedance of the PFAS6 MMCL or PFAS MCL
- MassDEP PFAS6 MMCL (sum of PFOS, PFOA, PFHxS, PFNA, PFHpA, and PFDA) = 0.02 µg/L (20 ppt)
MMCL = Massachusetts Maximum Contaminant Level

Data Source: AFCEC, February 2025
2023 Aerial Imagery From MassGIS



CS-10 PFAS DETECTIONS IN GROUNDWATER

AFCEC - Joint Base Cape Cod



Tanker Truck Rollover Site Source Overview



- The sources of PFAS are AFFF applications associated with two fuel tanker truck rollovers at the Route 28 rotary (JBCC entrance)
 - AFFF applied to reduce risk of explosion or fire
 - Tanker Truck Rollover #1 – January 2000
 - Tanker Truck Rollover #2 – September 1997



Tanker Truck Rollover Site CERCLA Actions



- **PFAS Preliminary Assessment (PA)** completed June 2015
 - Identified potential AFFF release locations
- **Interim Removal Actions (2016-2022)**
 - Bottled water, carbon treatment, and municipal connections at seven residences
 - Included time-critical and non-time critical removal actions documented in Action Memorandums
- Focused **Site Inspection (SI)** completed April 2017
 - Confirmed releases of AFFF due to PFAS in groundwater



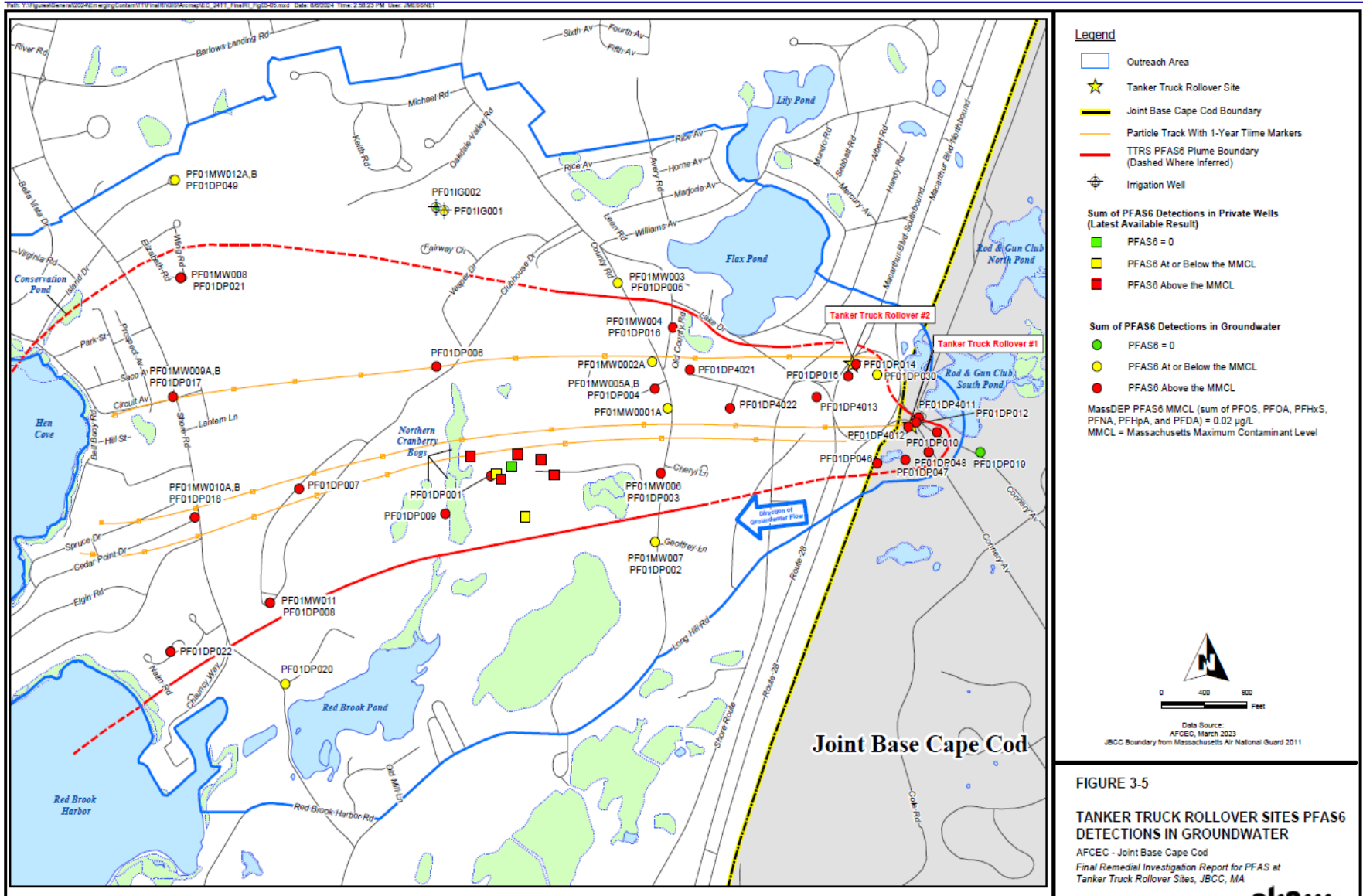
Tanker Truck Rollover Site CERCLA Actions (Continued)



- **Remedial Investigation (RI)** completed in March 2025
 - RI started in 2017
 - Describes Nature and Extent of Contamination
 - Includes Human Health and Ecological Risk Evaluation
 - Contaminants of Concern (COCs):
 - PFOA, PFOS in groundwater and soil (leaching potential and potential ecological impacts)



Tanker Truck Rollover Site PFAS Groundwater Detections





Tanker Truck Rollover Site PFAS Soil Rollover #1



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Legend

- Soil Sample Location
 - Estimated Extent of Petroleum-Impacted Soil Excavation
 - Catch Basin
 - Joint Base Cape Cod Boundary
 - Drainage Pathway
 - Approximate Extent of Soil PFOS Concentrations Greater Than 4.0 µg/kg
 - Approximate Extent of Soil PFOS Concentrations Greater Than 12.6 µg/kg
- Note: Exceedances of the EPA SSL (12.6 µg/kg) are not likely present under paved surfaces.

Data Source: AFCEC, November 2022
2019 Aerial Imagery from MassGIS



0 40 80 Feet

FIGURE 3-3

EXTENT OF SOIL CONTAMINATION - TANKER TRUCK ROLLOVER #1

AFCEC - Joint Base Cape Cod
Final Remedial Investigation Report for PFAS at Tanker
Truck Rollover Sites, JBCC, MA



Tanker Truck Rollover Site

PFAS Soil Rollover #2

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- Legend**
- Soil Sample Location
 - Estimated Extent of Petroleum-Impacted Soil Excavation
 - Manhole
 - Catch Basin
 - Catch Basin Curb Inlet
 - Drainage System Pipeline

- Approximate Extent of Soil PFOS Concentrations Greater Than 4.0 µg/kg (Dashed Where Inferred)
- Approximate Extent of Soil PFOS Concentrations Greater Than 12.6 µg/kg (Dashed Where Inferred)

Data Source: AFCEC, November 2022
2019 Aerial Imagery from MassGIS

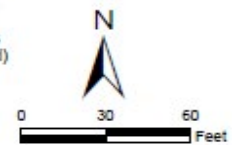


FIGURE 3-4
EXTENT OF SOIL CONTAMINATION - TANKER TRUCK ROLLOVER #2
AFCEC - Joint Base Cape Cod
Final Remedial Investigation Report for PFAS at Tanker Truck Rollover Sites, JBCC, MA



Tanker Truck Rollover Site CERCLA Actions (Continued)



- Draft Supplemental PFAS **Feasibility Study (FS)** for groundwater and soil prepared in Jul 2022 and revised in March 2023
 - FS requires update to integrate federal PFAS maximum contaminant levels (MCLs), update risk assessments, and re-model groundwater alternatives
 - FS requires more extensive analysis of source area treatment technologies
- Final all-media **FS, Proposed Plan (PP), Record of Decision (ROD)** on hold due to limited funding



LF-1 PFAS

Source Overview/CERCLA Status

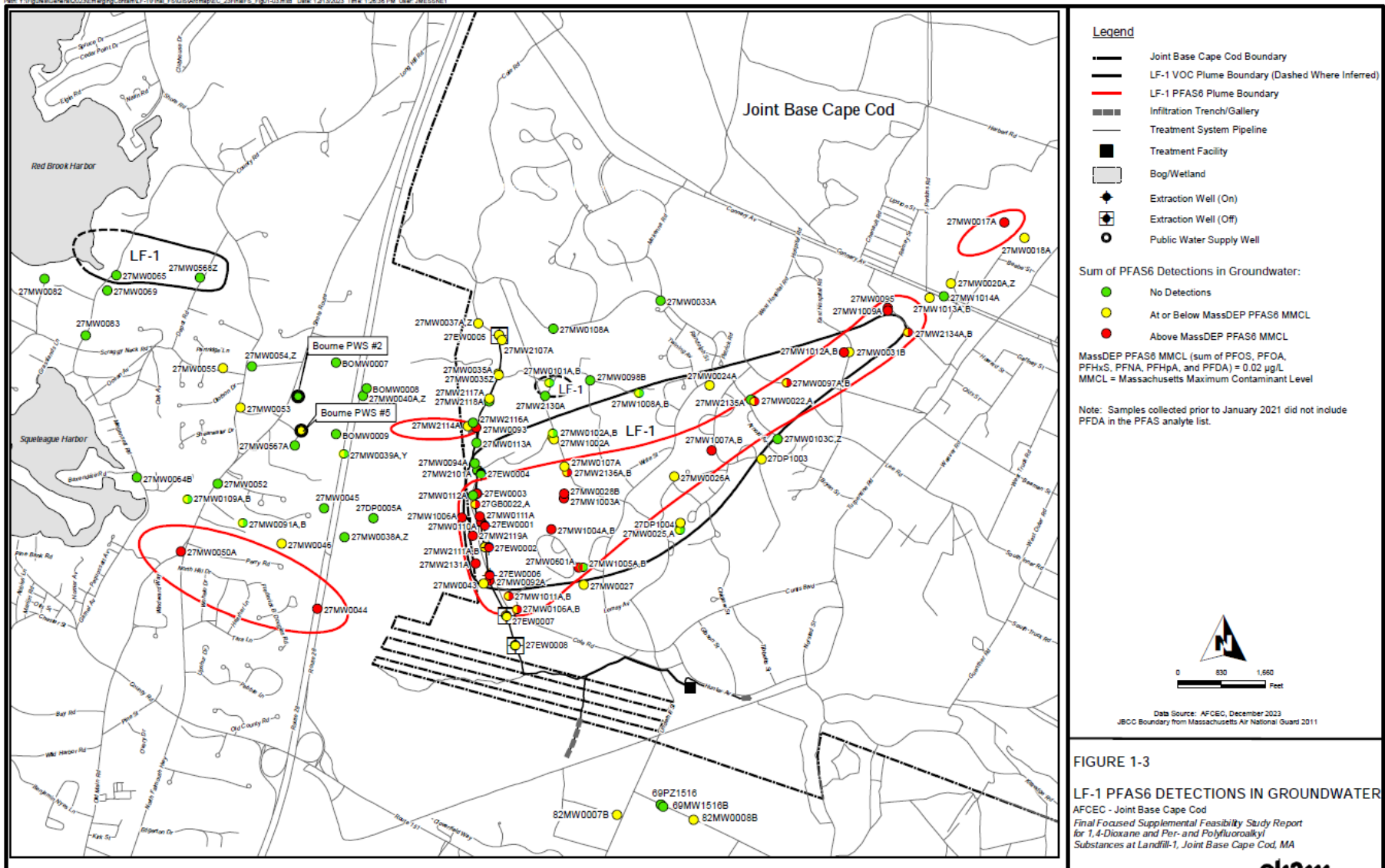


- PFAS Source: Disposal in base landfill
- PFAS is being removed from groundwater as part of legacy LF-1 operation
- **Supplemental Remedial Investigation (RI)** completed January 2018
 - RI started in 2015 (Included 1,4-dioxane)
 - Describes Nature and Extent of Contamination
 - Includes Human Health Risk Evaluation
 - Contaminants of Concern (COCs): PFOA, PFOS, 1,4-dioxane in groundwater



LF-1 PFAS

PFAS Groundwater Detections



Date Source: AFCEC, December 2023
 JBCC Boundary from Massachusetts Air National Guard 2011





LF-1 PFAS



Source Overview/CERCLA Status

- **Focused Feasibility Study (FS)** completed in December 2023
 - Evaluated three remedial alternatives
 - Existing remedy, No-Action for PFAS
 - Use existing treatment system/Land Use Controls for PFAS
 - Expand existing system/Land Use Controls for PFAS
- Draft **Explanation of Significant Differences (ESD)** submitted in December 2023
 - Will select alternative and add PFAS (and 1,4-dioxane) as contaminants of concern at LF-1
 - Draft ESD needs an addendum to integrate federal PFAS MCLs, update risk assessment, re-model groundwater alternatives
 - On hold due to limited funding



PFAS Investigations/Reports Impacted by Funding Limitations



- Near-Term (next two years) CERCLA actions that are on hold due to funding limitations:
 - Flight Line Groundwater EE/CA**
 - CS-10 PFAS Groundwater RI*
 - Flight Line and CS-10 PFAS Soil RI*
 - TTRS FS and Proposed Plan*
 - LF-1 ESD w/addendum completion***

* The Air Force did not propose Federal Facility Agreement (FFA) milestones in 2026 or 2027 for these activities. In EPA review.

** No FFA milestone required for EE/CAs

*** FFA milestone already met for submission of Draft document



PFAS CERCLA Strategy



JBCC PFAS SITES - CERCLA STRATEGY

PFAS SITE/OU	MEDIA	Preliminary Assessment	Site Inspection	Remedial Investigation	Feasibility Study	Interim Action	Proposed Plan	Record of Decision	
FIRE TRAINING AREA-1 (FTA-1) PFAS	Groundwater	N/A	N/A	2024	Future	In Progress	Future	Future	Combine with Flight Line OU FS/PP/ROD
	Sediment, Surface Water	N/A	N/A	2024	Future	N/A	Future	Future	
	Soil	N/A	N/A	2024	Future	N/A	Future	Future	Address in PFAS Soil OU FS/PP/ROD
FLIGHT LINE OU	Groundwater	2015	2021	2027	Future	Future	Future	Future	Combine with FTA-1 FS/PP/ROD
	Sediment, Surface Water	2015	2021	2027	Future	N/A	Future	Future	
	Soil	2015	2021	Pending	Future	N/A	Future	Future	Address in PFAS Soil OU FS/PP/ROD
CHEMICAL SPILL-10 PFAS	Groundwater	N/A	N/A	Pending	Future	In Progress	N/A	ESD-Future	
	Soil	N/A	N/A	Pending	Future	N/A	Future	Future	Address in PFAS Soil OU FS/PP/ROD
TANKER TRUCK ROLLOVER SITES (TTRS)	Groundwater, Soil, Sediment, Surface Water	2015	2017	2025	Pending	2016-2022	Future	Future	
LANDFILL-1 PFAS	Groundwater	N/A	N/A	2018	2023	In Progress	N/A	ESD-Pending	

