



Former NASJRB Willow Grove and Biddle ANG Base Restoration Advisory Board (RAB) Meeting

November 14, 2024

Today's Agenda

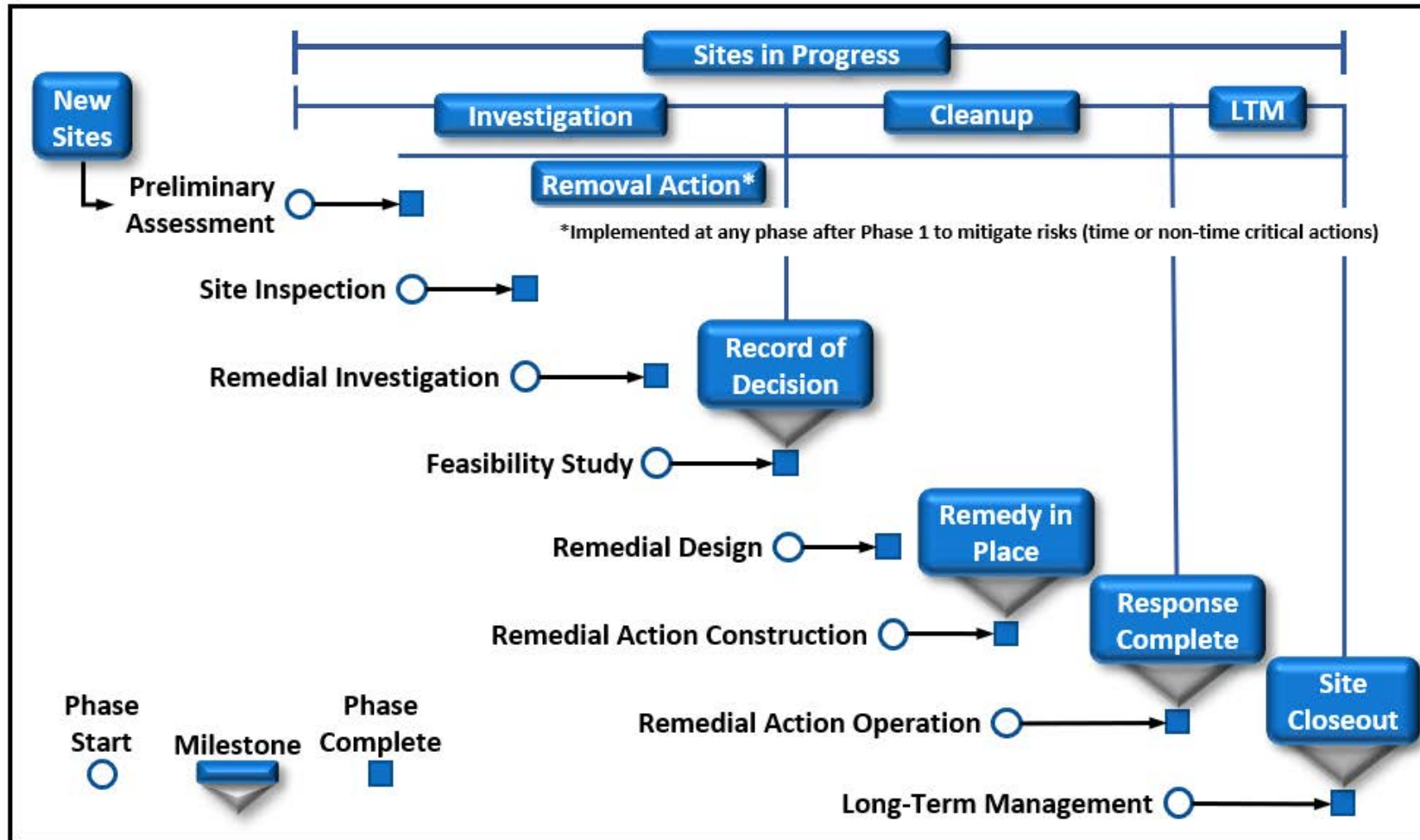
**1:00 p.m. Meeting / Poster Session
Begins**

2:30 p.m. Base Tours Begin

**4:30 p.m. Return to Horsham
Township Community Center**



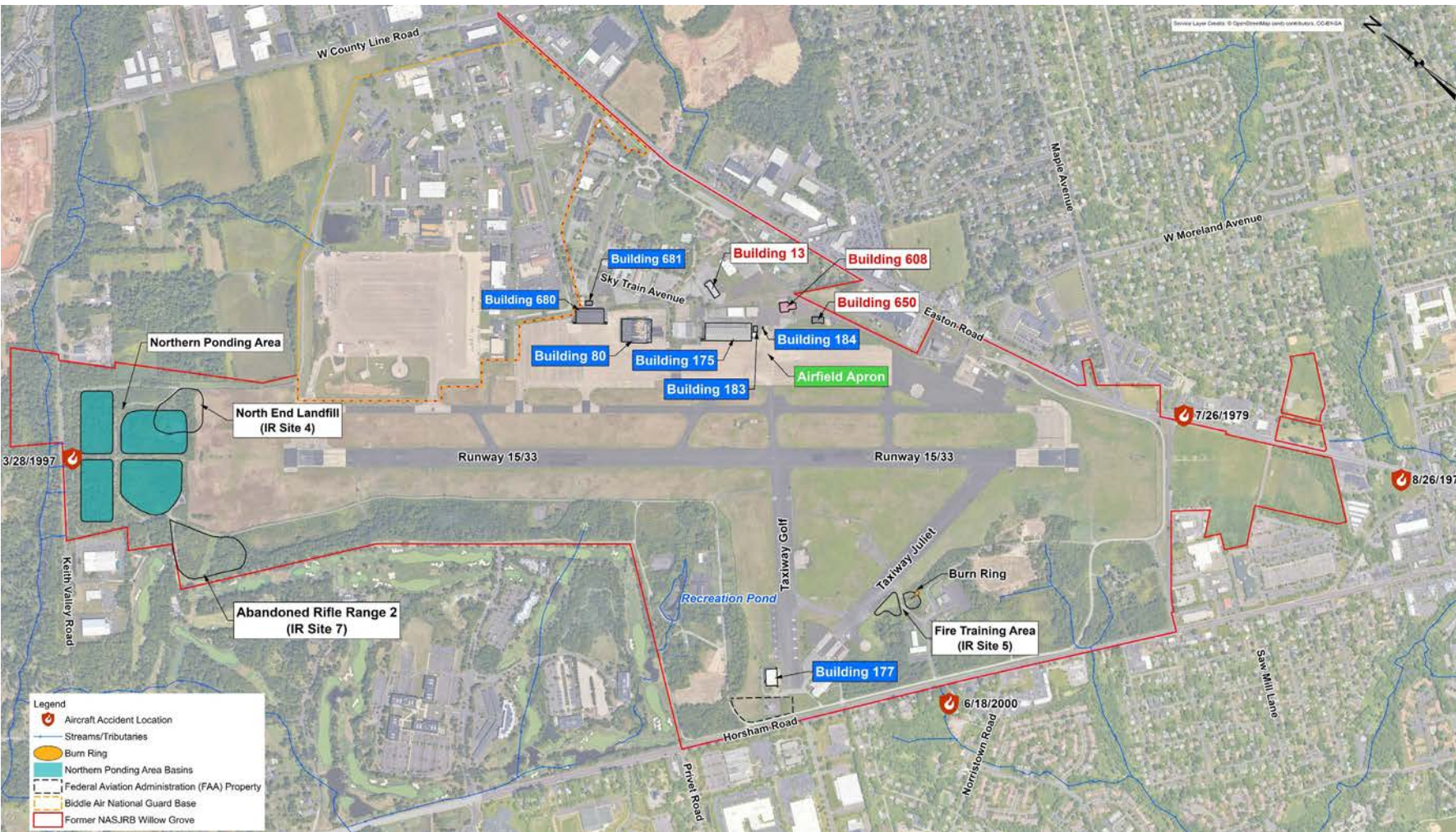
Former Naval Air Station Joint Reserve Base Willow Grove The CERCLA Process



*Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as Superfund.



Former Naval Air Station Joint Reserve Base Willow Grove Potential PFAS Source Areas



Site ID	Site / Building Name
Buildings 80, 175, 177, 183, 184, 680, and 681	Hangar Area Buildings With Fire Suppression Systems and AFFF Above Ground Storage Tanks (ASTs)
Buildings 13, 608, and 650	Fire Rescue or Storage Buildings
IR Site 4	North End Landfill
IR Site 5	Fire Training Area
IR Site 7	Abandoned Rifle Range No. 2
--	Airfield Aprons

Source: 2019 Remedial Investigation Report. Full document available in the administrative record.



Former Naval Air Station Joint Reserve Base Willow Grove Phase 1 PFAS Remedial Investigation – Groundwater



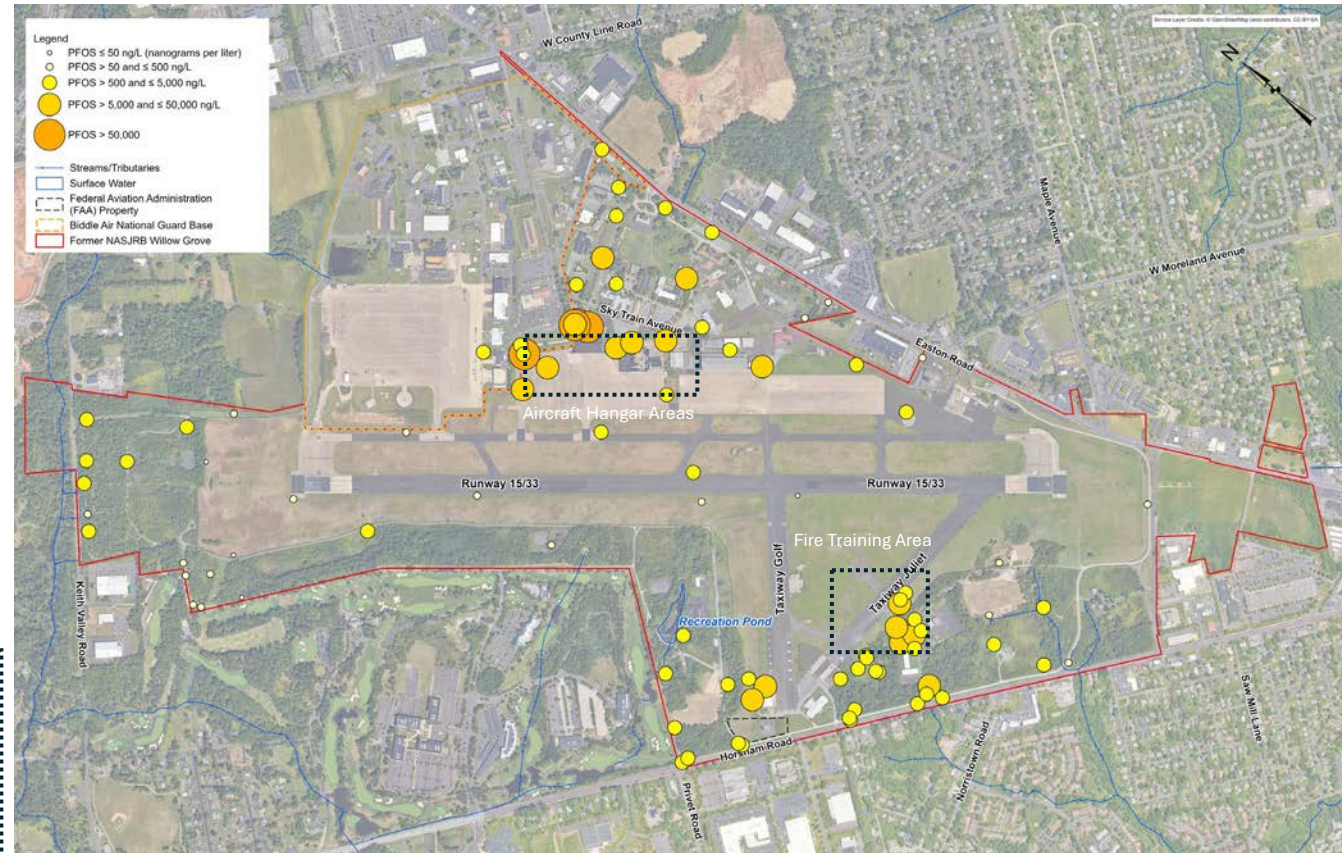
A Remedial Investigation (RI) conducted from 2014 through 2019 included sampling of groundwater, surface water, soil, and sediments.



Example of Monitoring Well Installation: Wells are used to sample groundwater.
Source: Tetra Tech

Navy's Investigative Activities:

- Installed 38 monitoring wells.
- Collected 231 groundwater samples.
- Summary of conclusions:
 - Further groundwater studies needed.
 - PFAS detected in all samples, including the deepest wells.
 - PFAS levels highest at aircraft hangar areas and the former fire training area. Pilot test systems are located here.



Source: 2019 Remedial Investigation Report. Full document available in the administrative record.



Former Naval Air Station Joint Reserve Base Willow Grove Phase 1 PFAS Remedial Investigations – Surface Water, Soil, and Sediments



A Remedial Investigation (RI) conducted from 2014 through 2019 included sampling of groundwater, surface water, soil, and sediments.



**Example Of Soil
Sample Collection**
Source: Tetra Tech



Example Of Soil Sampling
Source: Tetra Tech

Navy Investigative Activities:

- Collected 277 Soil, 60 Sediment And 67 Surface Water Samples.
- Summary of conclusions:
 - Northern Ponding Area, Storm-Water Drainage System, and Ecologic Receptors need additional evaluation.
 - Continue monitoring of Park Creek and Pennypack Creek.
 - Highest PFOS in soil found at aircraft hangars, fire rescue, and foam storage areas. Navy removal action at several locations.



Former Naval Air Station Joint Reserve Base Willow Grove Phase II PFAS Remedial Investigation – Ongoing Efforts



The 2019 Remedial Investigation Report recommended further investigations

Groundwater - Monitor off-base groundwater wells to delineate pathways:

- 9 PADEP monitoring wells were sampled.
- 15 HWSA observation and supply wells were sampled.

Surface Water - Periodic Monitoring of Pennypack and Park Creeks:

- 21 surface water and 3 sediment sampling events since July 2019.
- On-going effort, reports available on Navy website.



Stormwater

- Four miles of stormwater pipes evaluated.
- Repairs were completed 2021.

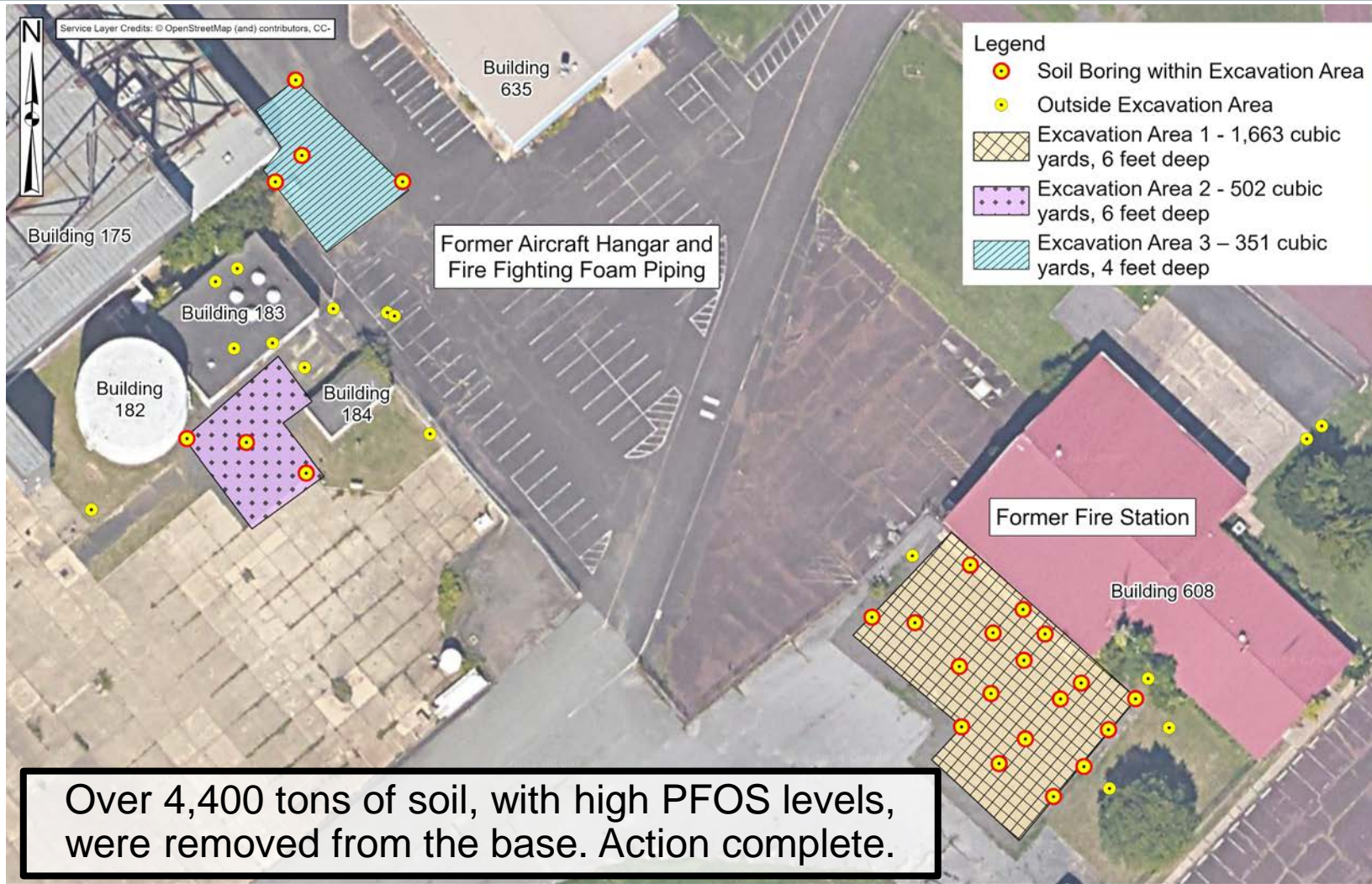
Soil Samples – refine source areas:

- 845 on-base soil samples were collected.
- Results used to evaluate migration pathways.

Photos: Examples of Surface Water And Sediment Sampling at Little Neshaminy Creek, and Storm Sewer Sampling on the Base
Source: Tetra Tech



Former Naval Air Station Joint Reserve Base Willow Grove PFAS Soil Removal Action



Soil Removal Action
Source: U.S. Navy



Former Naval Air Station Joint Reserve Base Willow Grove PFAS Interim Removal Actions - Groundwater Pilot Tests



Pilot-scale groundwater extraction and treatment systems (GWETS) were installed to assess treatment systems for PFAS in groundwater



Hangar 680 Pilot Test

- Operations began in March 2020.
- PFAS levels reduced from 94,900 ppt* to non-detect.
- Over 38.6 million gallons treated.

Hangar 680 PFAS Pilot Test Treatment System
Source: Tetra Tech



Site 5 PFAS Pilot Test Filtration System
Source: Tetra Tech

Site 5 Pilot Test

- Operations began in January 2022.
- PFAS levels reduced from 16,600 ppt* to non-detect.
- Over 23.6 million gallons treated.

* ppt = parts per trillion; ng/L = nanograms per liter

Source: Pilot Test documents, available in the administrative record.

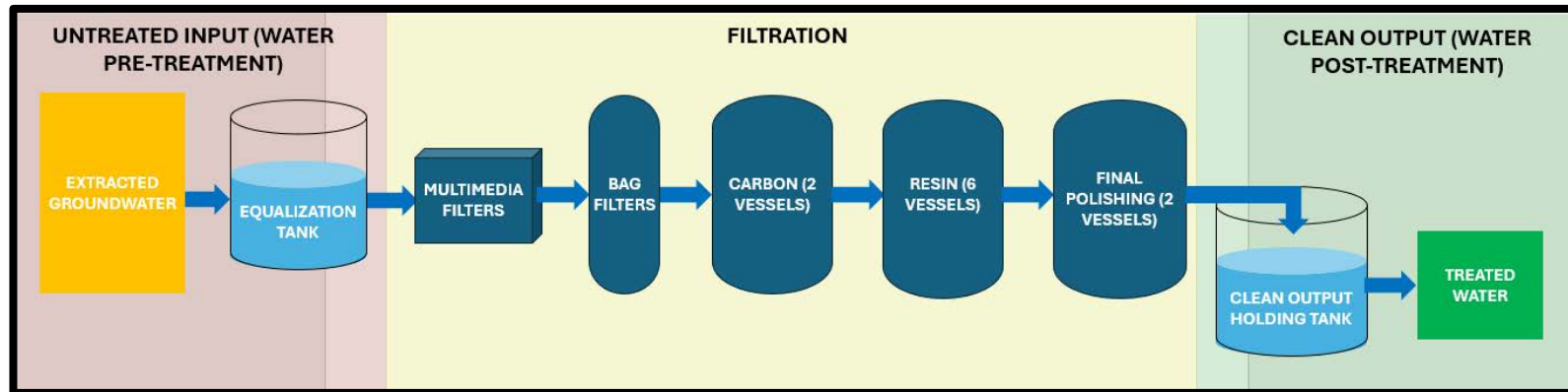


Former Naval Air Station Joint Reserve Base Willow Grove PFAS Groundwater Extraction and Treatment System



A 500-gallon per minute groundwater treatment system is planned

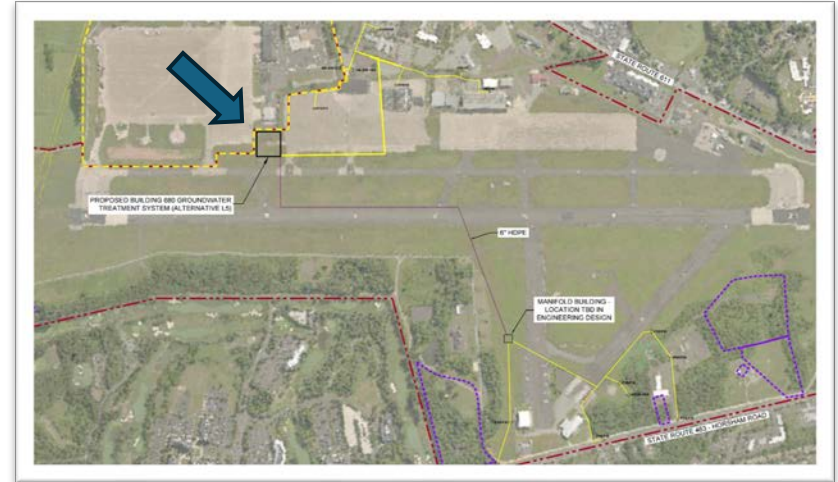
- Engineering Evaluation / Cost Analysis (EE/CA) was conducted for alternatives to address PFAS in groundwater.
- EE/CA considered groundwater remediation alternatives for treatment type, building needs and discharge locations.



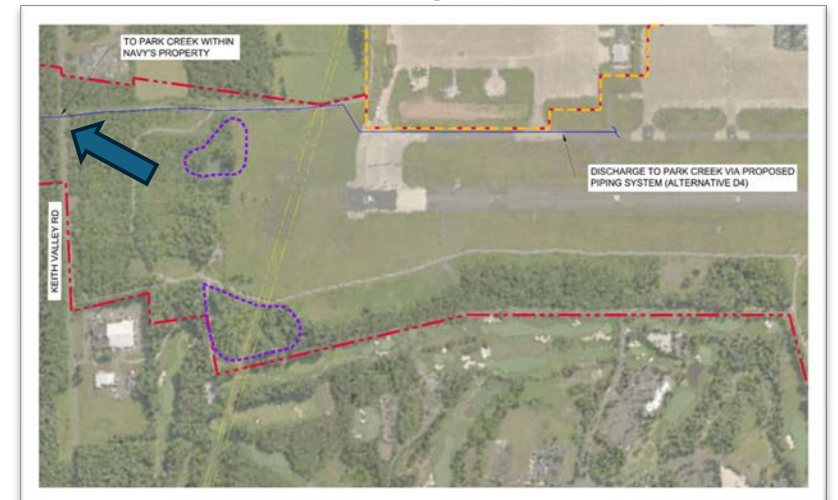
Planned treatment system

The system is planned for initial operation by 2026. The system will replace the pilot systems in place since 2020.

EE/CA documents will be available on the administrative record.



Planned GWETS System Location



Planned Discharge to Park Creek



Former Naval Air Station Joint Reserve Base Willow Grove Current PFAS Private Drinking Water Well Sampling Program



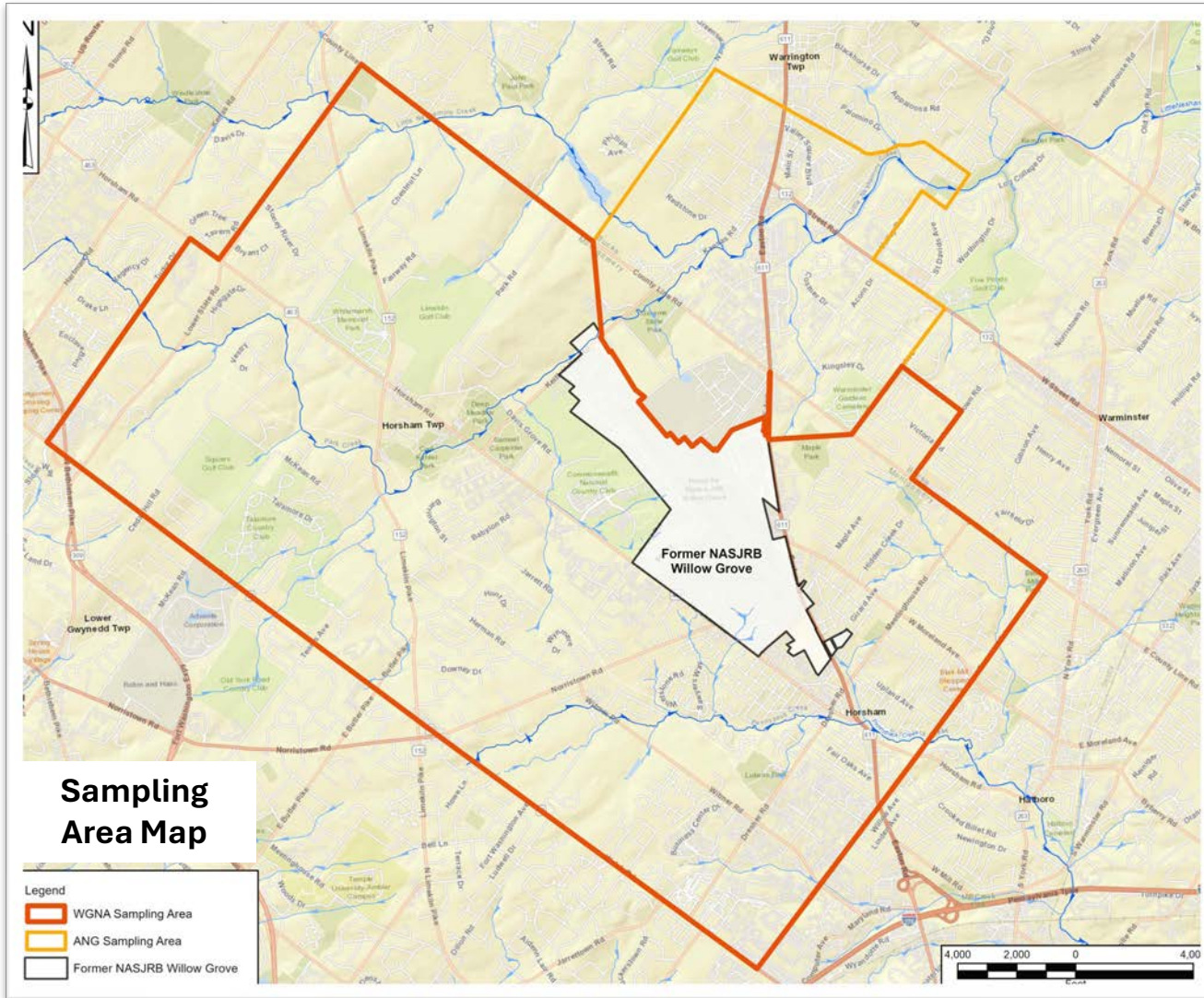
- 2023: PA Maximum Contaminant Levels (MCLs)
 - PFOA: 14 parts per trillion (ppt)
 - PFOS: 18 ppt
- 2024: U.S. Environmental Protection Agency (EPA) MCLs
 - PFOA: 4 ppt
 - PFOS: 4 ppt
 - PFNA: 10 ppt
 - PFHxS: 10 ppt
 - GenX: 10 ppt
 - Mixture of 2 or more: Hazard Index of 1
- September 2024: DoD released implementation guidance authorizing DoD components to initiate removal actions to address private drinking water wells impacted by PFAS from DoD activities where concentrations are known to be at or above 3x the EPA MCL values.
- The Navy has provided over \$25 million to Horsham Water and Sewer Authority (HWSA) to address PFAS in drinking water via a Cooperative Agreement.



**Water Sample Collection
From Outdoor Spigot**
Source: Tetra Tech



Former Naval Air Station Joint Reserve Base Willow Grove Current PFAS Private Drinking Water Well Sampling Program



PFAS Analyte	EPA MCL (ng/L or ppt)	DOD Priority Action Level (ng/L or ppt)
PFOA	4	12
PFOS	4	12
PFHxS	10	30
PFNA	10	30
HFPO-DA	10	30
Mixture of 2 or more of: PFHxS, PFNA, HFPO- DA, & PFBS	Hazard Index =1	Hazard Index =3

* ppt = parts per trillion; ng/L = nanograms per liter

Private drinking water well sampling for PFAS is being performed by Tetra Tech, a U.S. Navy contractor.

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Drinking water action documents are available on the BRAC website or in the administrative record.