



# Restoration Advisory Board Biddle Air National Guard Base

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NGB/A4VR

7 December 2023



# Updates Since 14 September 2023



- Environmental Restoration Program Sites:
  - Willow Grove Site 1 (Privet Road):
    - Completed groundwater sampling
- Coordinating with SAF IEE on signing amendment to Navy Federal Facility Agreement
  - Air Force and Navy have an issue with of the language outlined FFA. Waiting for Navy proposal/response on new language. Pending legal coordination for all stakeholders to discuss proposed changes
- PFAS Remedial Investigation:
  - Completed all Phase II wells and 30-day automated water level gauging event at 30 wells
  - Completed comprehensive gauging event and conducting comprehensive groundwater sampling event
  - Continued development of groundwater flow model
  - Meetings with EPA/PADEP to discuss RI schedule and proposed activities to support RI completion Sep 2024:
    - 18 October meeting with EPA
    - 19 December 2023 Risk Assessors meeting
- Interim Groundwater Action:
  - Completed pre-pilot test groundwater sampling event
  - Completed pilot test
  - Conducting post-test groundwater sampling event
  - Reviewing and evaluating test data



# 3 Month Forecast of Activities



- Sign Navy Federal Facilities Agreement January 2024:
  - Complete Surface Water Response Action Memorandum
  - Complete Residential Drinking Water Action Memorandum
- Continued drinking water response actions (sampling, bottled water, and coordination with North Wales Water Authority (NWWA) and Warminster
- Start Baseline Human Health and Eco-risk assessment
- Finish Base-wide groundwater monitoring in support of final RI
- Plan and schedule Phase III RI activities
- Finalize Memos for Surface Water Sampling Events 15 & 16
- Continued storm water treatment operations (Warminster)
- Long Term Monitoring Groundwater Sampling January 2024 Site 1 Privet Road
- Draft Pilot Test Report February 2024

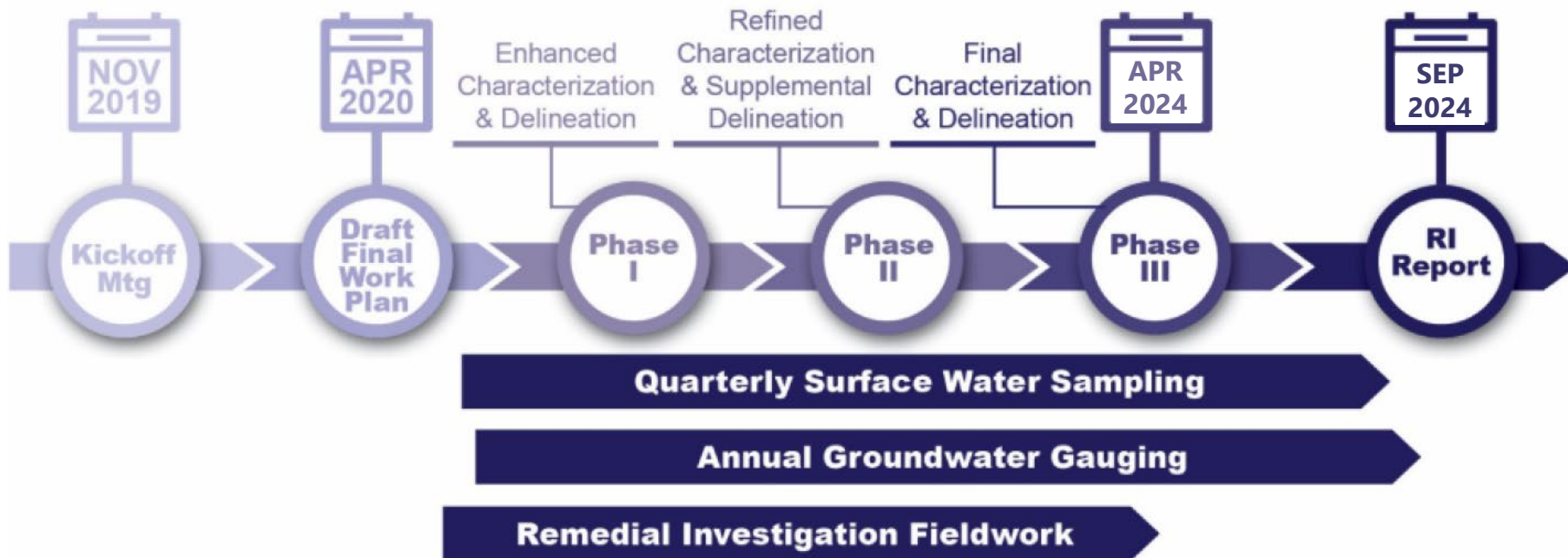


# Remedial Investigation Project Objectives



- Delineate the nature and extent of PFAS contamination, the threat to human health and the environment and prepare a Remedial Investigation (RI) Report.
  - Collect soil, sediment, surface water, and groundwater PFAS data on and around Biddle ANGB.
  - Conduct Baseline Risk Assessment (BRA).
  - Investigate link between groundwater and unnamed tributary to Park Creek.
  - Obtain data required to inform future development of a Feasibility Study.
  - Conduct quarterly surface water sampling for PFAS in coordination with the Navy.
  - Conduct potentiometric gauging, as needed to support USGS model.

# Remedial Investigation General Process and Schedule





# Remedial Investigation Progress

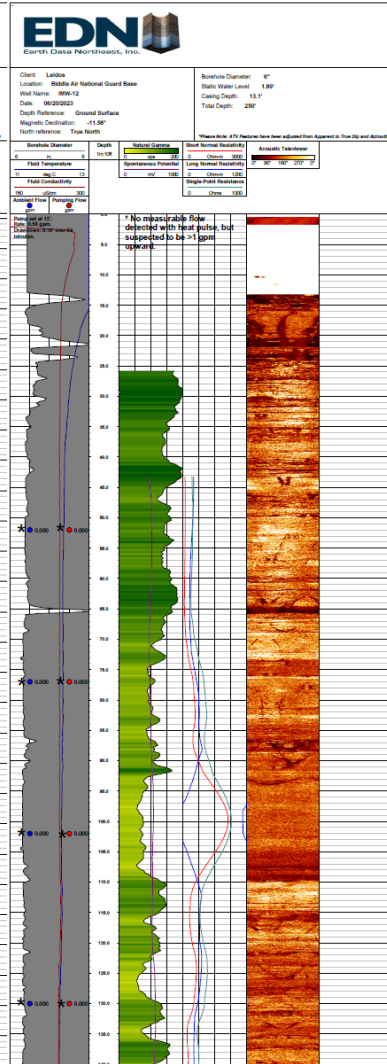
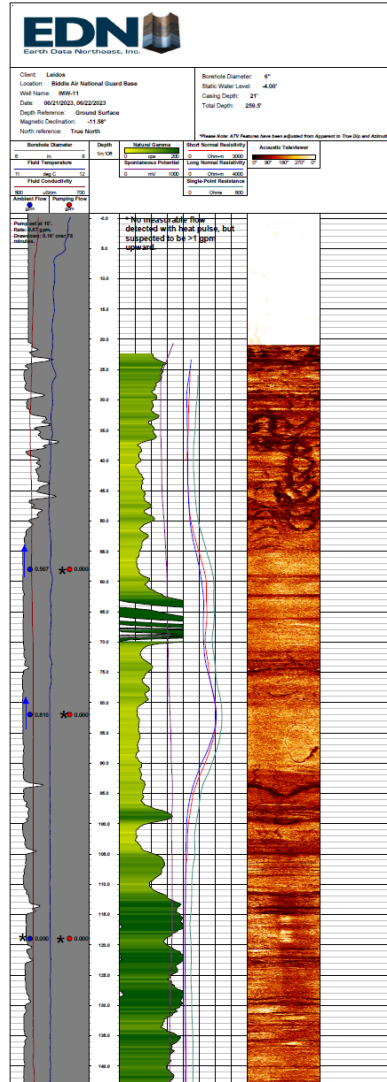
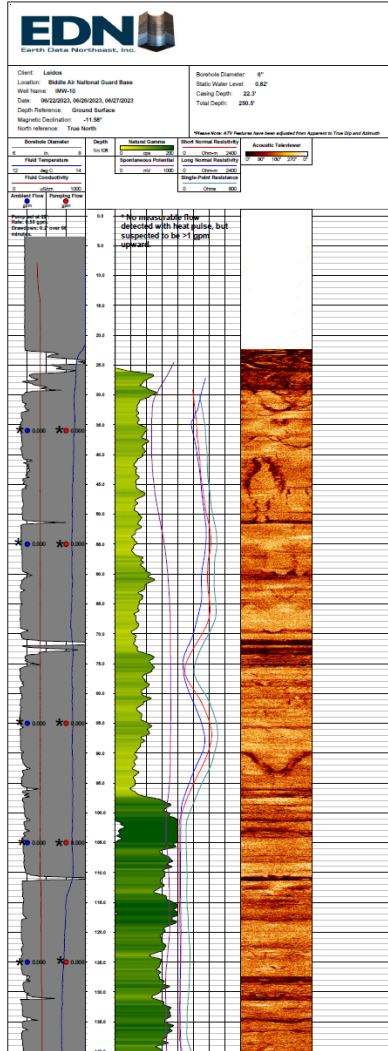


- Phase II Groundwater Activities

- Began 5 June 2023, estimated to be completed mid-December
- Installed well clusters to investigate 6 data gap areas
- 9 intermediate depth wells (~70 to 285 ft) and 6 shallow wells
- Borehole geophysics and packer testing at each intermediate well including review and discussions with EPA/PADEP
- Borehole liner installation and transmissivity profiling
- Comprehensive groundwater gauging event completed
- Comprehensive groundwater sampling event underway
- Automated groundwater level monitoring
  - 30 wells monitored with data-logging pressure transducers for 1 month
  - Data to be processed and used for groundwater model



# Remedial Investigation Progress



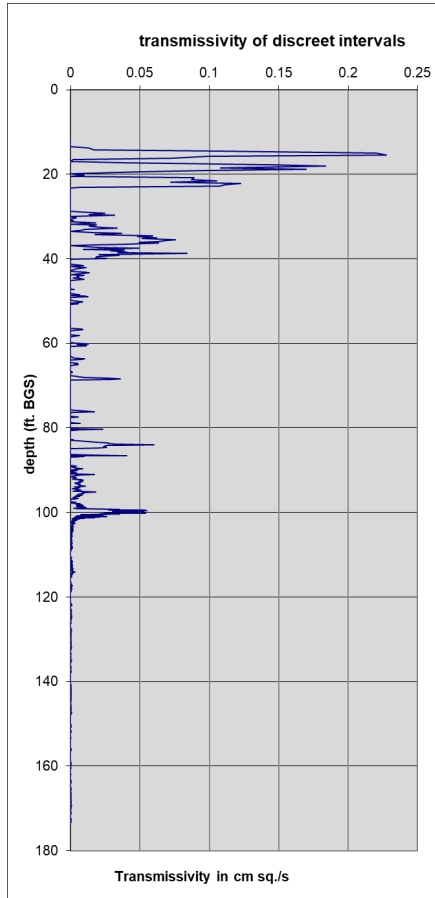


# Remedial Investigation Progress

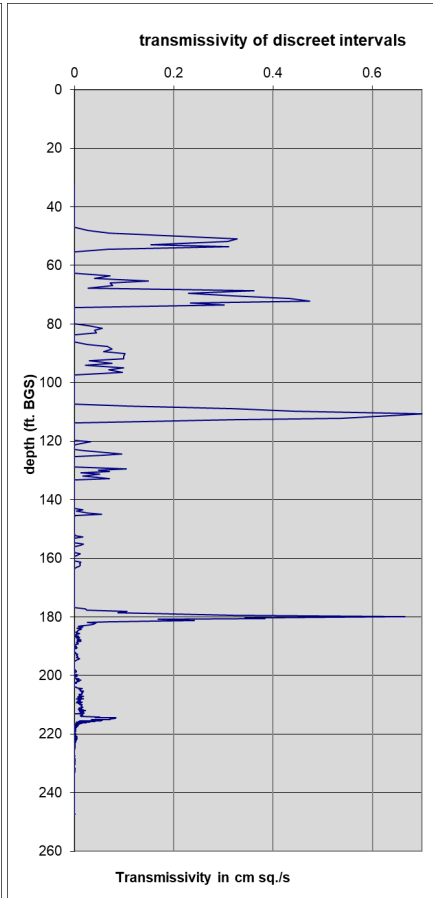




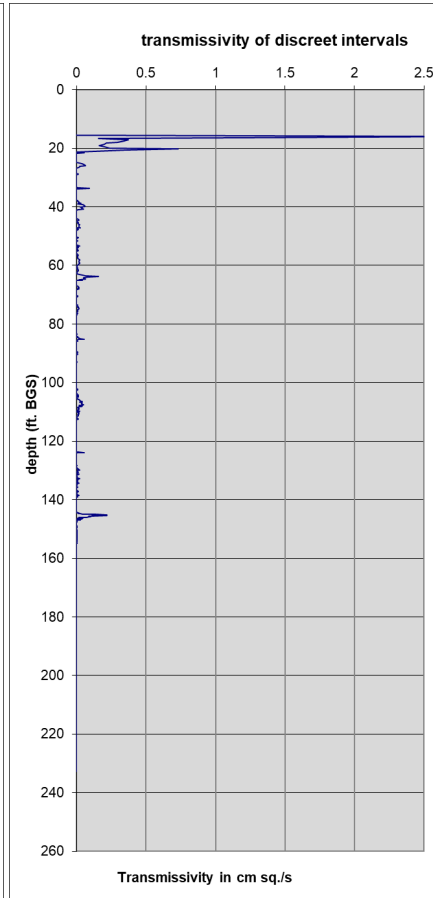
# Remedial Investigation Progress



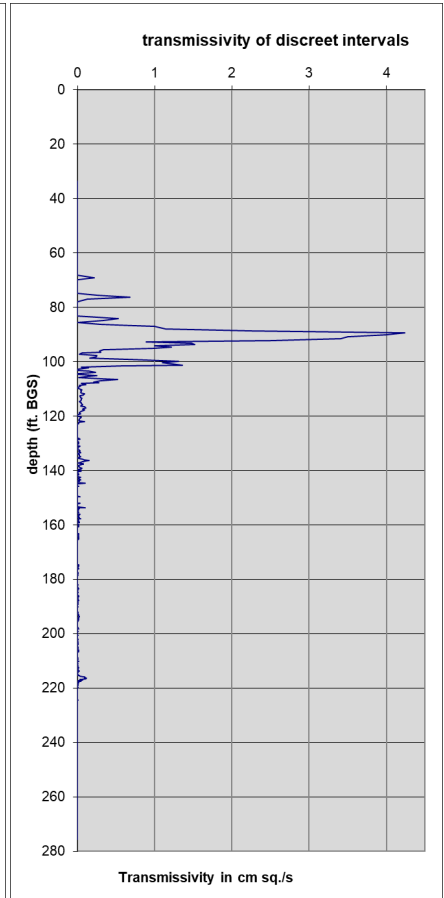
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IMW10



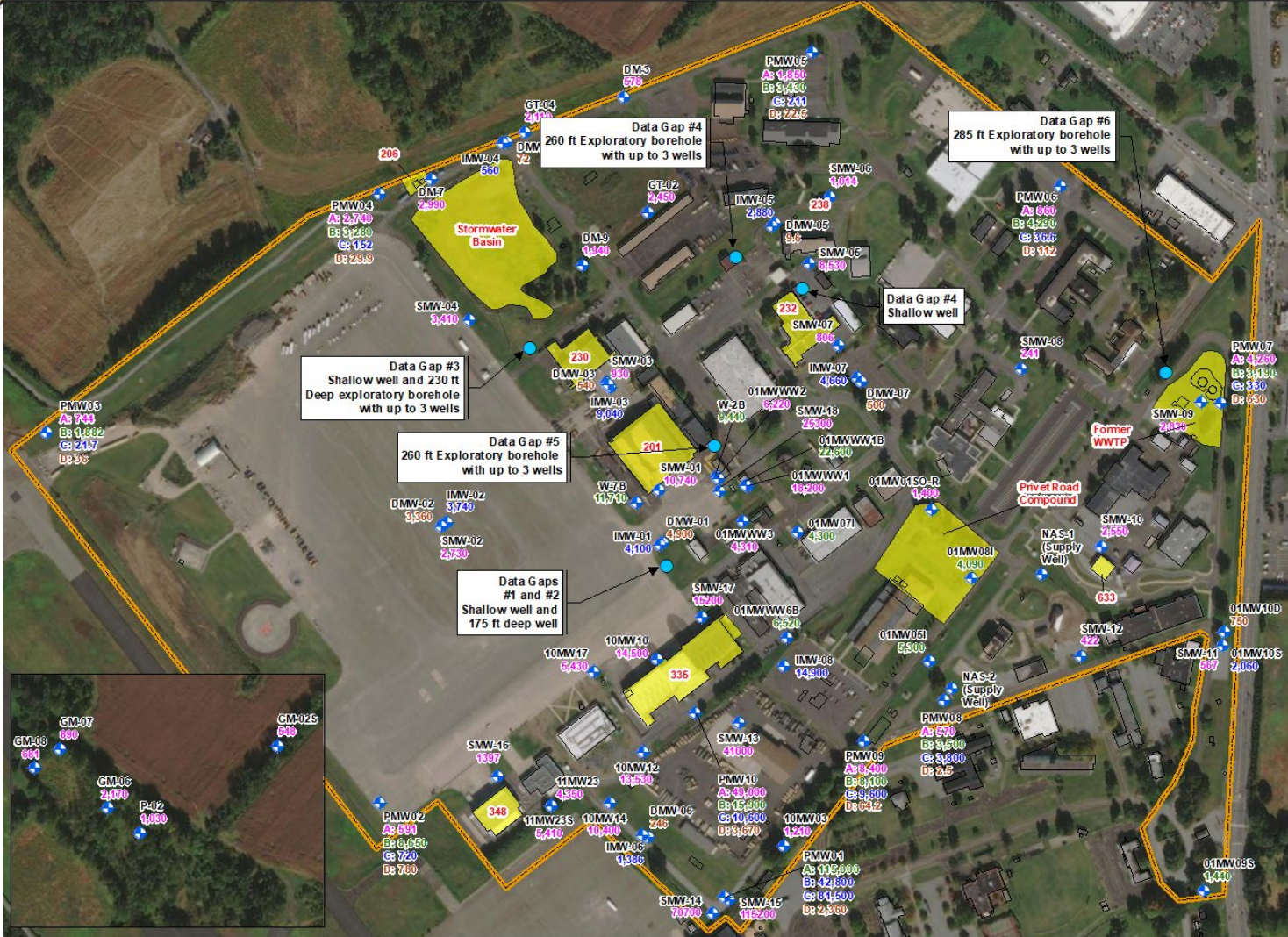
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# Remedial Investigation Progress





# Remedial Investigation Progress



- Remaining Phase 2 activities include:
  - Review/evaluate groundwater sampling data
  - Review/evaluate groundwater gauging data
  - Process transducer data and continue building groundwater flow model
  - Discuss results, conclusions, and recommendations with EPA/PADEP to collaboratively determine Phase III activities
  - 19 Dec 2023 meeting to discuss preliminary risk assessments and data analysis methodology for final risk assessment (Human Health and Ecological Risk)

# Quarterly Surface Water Sampling



- Completed final (Round 16) Surface Water Sampling with Navy and USGS in June 2023
- Submitted Draft Final Reports for Rounds 14, 15, and 16, awaiting EPA/PADEP comments
- Held joint discussions with Navy, ANG, EPA, PADEP, and USGS regarding additional surface water monitoring

# Groundwater Pilot Study Overview



- ANG conducting Pilot Study to inform plans for subsequent interim groundwater action
- Pilot Study includes design, construction, operation of 30-day pilot test to evaluate feasibility of hydraulic containment of groundwater plume near Building 201
- Conducted 3 scoping sessions with EPA and PADEP to present, discuss, and refine plans
- UFP-QAPP (Work Plan) Addendum 2 approved by EPA and PADEP in early July 2023



# Groundwater Pilot Study Overview



- Three extraction wells with an estimated combined 40-50 gpm extraction rate. Wells to target unique depths/zone of the aquifer
- Pilot Study included series of variable rate step-tests, followed by series of constant rate pump tests with hydraulic and chemical monitoring throughout 30-day period
- 30-day test conducted between 1 Nov and 30 Nov
- Maximum sustainable rates:
  - 8.5 gpm at shallow extraction well (EW-01)
  - 24 gpm at intermediate extraction well (EW-02)
  - 16 gpm at deep extraction well (EW-03)
- Draft Pilot Test Technical Memorandum to ANG 28 February 2024





# Groundwater Pilot Study Overview



- Results, conclusions, and recommendations to be compiled in Technical Memorandum
- Pilot Study will inform plans for full-scale interim action(s)
- Next Steps:
  - Remove data-logging pressure transducers, download data
  - Review and analyze data to determine aquifer properties such as radius of influence, capture zone, transmissivity, storativity, hydraulic conductivity, and well efficiency
  - Update groundwater flow model and run simulations
  - Compile results and recommendations in Technical Memorandum

# PFOS/PFOA Water Treatment

## Biddle ANGB



- PFOS/PFOA has been detected in surface water leaving Biddle.
- 500 gallon per minute treatment plant began operations on 11 August 2021. Approximately 260M gallons treated through November 2023.
- 29 monthly composite samples collected from treatment plant effluent. PFOS+PFOA:
  - 14 months not detected
  - 14 months average 6 ppt
  - 1 exceeded discharge limit - April 2023 exceeded due to algae interference, PADEP and EPA notified.
- Pilot of Cyclopure DEXSORB – resin type material that is supposed to be resistant to biofouling.
- Construction and O&M through Warminster Cooperative Agreement.

# NWWA Activities



- North Wales Water Authority assumed responsibility for Warrington water service area. Cooperative agreement for water system actions.
- Installation of GAC treatment for Wells 1, 2, 3, 6 and 9 complete. 4 of 5 wells with high Total Dissolved Solids (TDS)
- TDS resolved with additional pumping. Working on permits to bring the wells back into service.
- Possible additional main extensions and service connections for properties that exceed the State PFAS standards.



# Private Well Sampling



- ANG has identified 16 residential locations/properties with PFOS/PFOA at near or above the PADEP drinking water maximum contaminant levels (MCLs) for residents within our area of responsibility in Horsham, Warminster, and Warrington.
- 5 letters sent to residence at or above the state limit, only one response back for bottled water/sampling
- 22 letters submitted for residence with unknown well status/never been sampled/resampling required
- Week of 18 September 2023 Weston sampled 6 residences in the area
- Philadelphia USACE contract with Verina-Pars Joint Venture drinking water response actions for next 4 years.
- Weston contract for drinking water response actions expired in 25 November 2023

# Private Well Sampling



- ANG has contract in place with Weston to provide PFOS/PFOA testing of private drinking water wells and supply bottled water to properties with PFOS/PFOA at or above the EPA Health Advisory level (HA) for residents within our area of responsibility in Horsham, Warminster, and Warrington.
  - Horsham:
    - 6 wells sampled
    - 5 were above HA
    - 4 have been connected to municipal water
    - 1 well abandoned by Wood
  - Warrington:
    - 156 well sampled
    - 53 are above HA
    - 6 are below State MCL
    - 68 have been connected



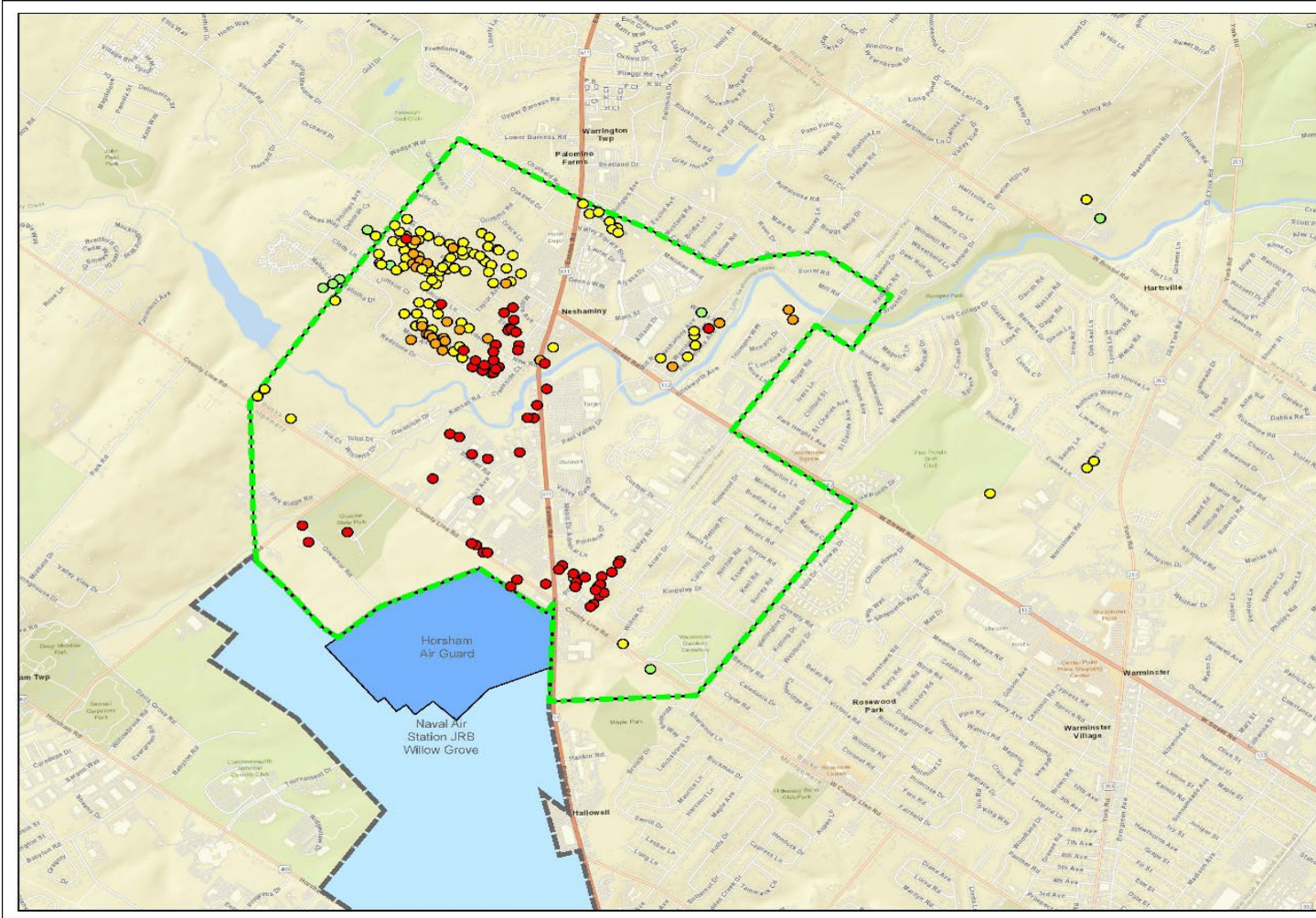
# Private Well Sampling (cont.)



- Warminster: 12\* wells sampled
  - 11 are above HA
  - 10 have been connected municipal water
  - 1 residence above HA not connected
  - \* Some of these properties are on Valley Road with Warminster mailing addresses but are located in Warrington Township
  - \* wells sampled using the US EPA 2016 Health Advisory standards, 70 part per trillion (ppt) for PFOA and PFOS
- Sampling contact for ANG area of responsibility: Transitioning to Verina-Pars, Mr. Eric White, 609-838-9414, epwhite@montrose-env.com



# Private Well Sampling Map



**PFAS Sample Results for January 2022**  
Biddle Air Guard Base  
Horsham and Warrington Townships, Pennsylvania

### Legend

- PFOS+PFOA not detected
- PFOS+PFOA at or below 0.040 µg/L
- PFOS+PFOA between 0.040 and 0.070 µg/L
- PFOS+PFOA above 0.070 µg/L
- ANG Sampling Area
- Horsham Air Guard
- Former NAS JRB Willow Grove

### Notes & Sources

**Notes:**  
µg/L - micrograms per liter

PFAS - Per- and polyfluoroalkyl substances  
PFOS - Perfluorooctanesulfonic acid  
PFOA - Perfluorooctanoic acid

Health Advisory Level (HAL) is the sum of PFOS+PFOA (0.070 µg/L)

**Base Map Source:**  
Street map data from ArcGIS Online map services.  
Map service information available at:  
[http://gto.arcgisonline.com/maps/World\\_Street\\_Map](http://gto.arcgisonline.com/maps/World_Street_Map)



**wood.**

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**FIGURE**  
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# Community Involvement Plan Biddle Air National Guard Base

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# Community Involvement Plan



- Dawson, Native Hawaiian 8a firm awarded contract in July 2023 to update, develop CIPs, RAB assessment/execution at multiple ANGBs
- Develop/update Biddle ANGB CIP
- In lieu of RAB assessment/execution ANG coordinating with Navy to use ANG contractor to support the update of Navy RAB Operating Procedures and other support as needed for conducting joint RAB meeting
- Six Tier 1 facilitation meetings with ANG, EPA, and PADEP
- 21 Nov 2023 Biddle CIP contract Kickoff meeting hosted with ANG PAO, EM, and ANG PM



**Defense Innovation Unit  
Environmental Security Technology Security  
Program (ETCSP)  
Allonnia Foam Fractionation Pilot Test  
Biddle Air National Guard Base**

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# Allonnia Foam Fractionation Pilot Test



- DIU awarded \$1.7M contract thru ETCSP (DoD Acquisition Research and Development funding) Note: Navy will give briefing in Spring RAB meeting
- Run and staff the SAFF system for 6 months with Biddle ANG groundwater extraction wells. Estimated influent of 40 GPM, effluent of 40 gpm. (based on DIU supplied aquifer and pump capability).
- Collect influent, effluent, primary, secondary, tertiary, and air samples.
- Remove the bulk of regulated PFAS mass while meeting regulatory limits with a Booster if necessary.
- Identify the potential impact of temperature on SAFF performance.
- Monitor SAFF air quality and potential PFAS aerosolization.
- Demonstrate SAFF's ability to highly concentration PFAS waste.
- Provide PFAS concentrate to destruction vendors also in the DIU Program.

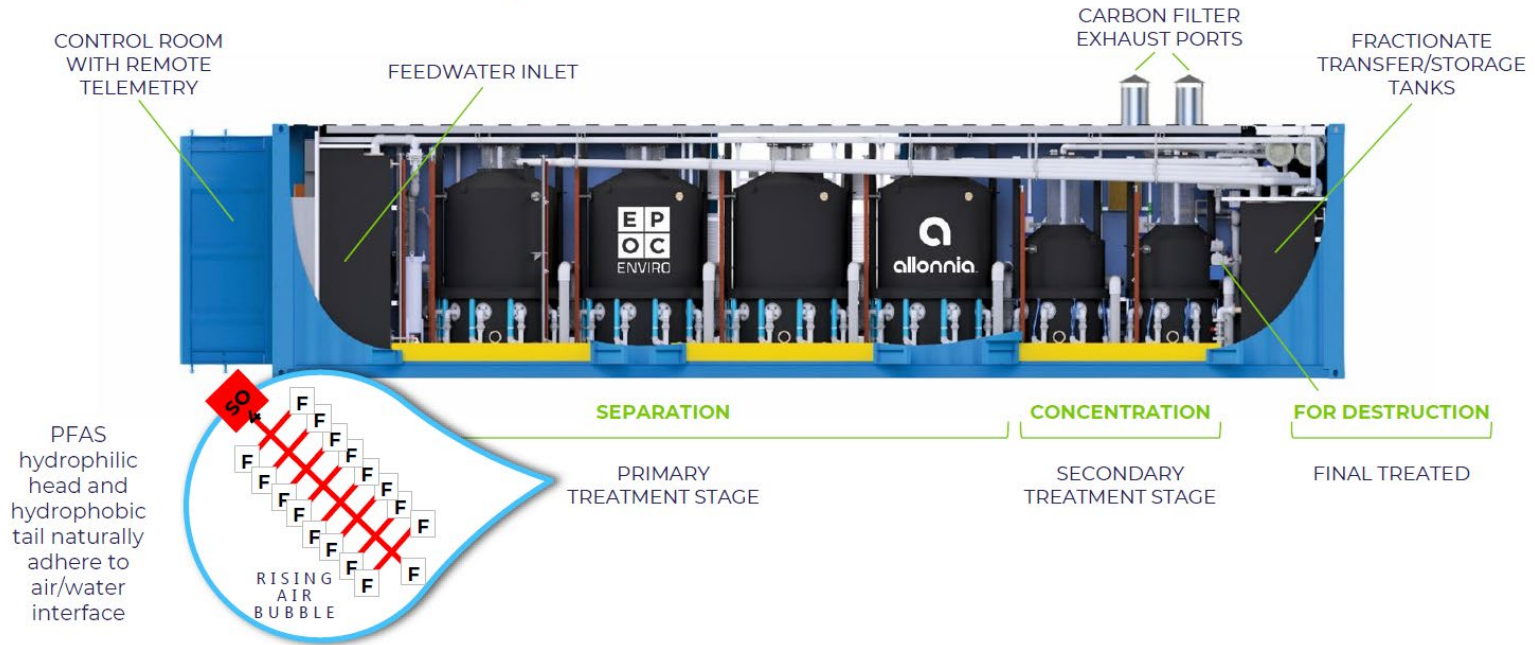




# Allonnia Foam Fractionation Pilot Test



## Concept of Foam Fractionation



Confidential

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