Welcome to the RAB Meeting!

Thank you for joining the
Restoration Advisory Board (RAB) Meeting for NASJRB Willow Grove and the Biddle Air National Guard Base

The meeting will start at 6:00 p.m.

For closed captioning, select Panel Options icon (3 dots) and select Multimedia Viewer.

If you are experiencing technical difficulties, contact WebEx by telephone at 1-866-779-3239.

Virtual Meeting Instructions

- The virtual meeting will show the presentations
- The presenters will be audio only

Questions:

- Via telephone and e-mail prior to the meeting
- Q&A Feature available in WebEx
- BRAC PMO, ANG, EPA, and PADEP contacts after meeting

- WebEx sign-in names will be used for the record

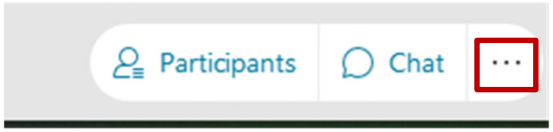
RAB Meeting Agenda

6:00 pm	Meeting starts
6:10 pm	Navy Environmental Restoration Presentation
6:50 pm	RAB member or community comments/questions
7:05 pm	Air National Guard Env. Restoration Presentation
7:20 pm	RAB member or community comments/questions
7:30 pm	Environmental updates conclude. Health professionals available
8:00 pm	Virtual Meeting conclusion

How to Ask a Question

On a Computer

1. In the bottom right of the screen, click on 3-dot 'Panel Options' icon



2. On the menu, click Q&A

3. Type your question/comment in the box
4. Click Send

On a Mobile Device

1. Click the More Options icon.
2. On Android, More Options icon is 3 vertical dots
3. On iOS, More Options icon is 3 horizontal dots
4. Select Q&A
5. Type your question in the box
6. Click Send

NASJRB Willow Grove

Restoration Advisory Board (RAB)

15 September 2021

Navy Presentation

- RAB background
- Environmental Restoration Status
- Per- and Polyfluoroalkyl Substances (PFAS)
- Focus Topic: PFAS Research Supported by DoD
- Action summary
- Questions

RAB Meeting Background

- A Restoration Advisory Board (RAB) is a stakeholder group that meets on a regular basis to discuss environmental restoration at a specific property that is either currently or was formerly owned by Department of Defense (DoD), but where DoD oversees the environmental restoration process.
- RABs enable people interested in the environmental cleanup at a specific installation to exchange information with representatives of regulatory agencies, the installation, and the community. RABs may only address issues associated with environmental restoration activities.
- The community co-chair position is vacant. Please contact the BEC if you are interested.
- Health related issues are not addressed by the RAB. Health agency professionals will be available after the Navy and Air National Guard Environmental Restoration presentations.

Source: DoD RAB Rule Handbook

Environmental Restoration Status

Site 3 and Site 12 Landfills

- Record of Decisions
  - The Final Record of Decision for Site 3 was sent to PADEP for concurrence and EPA for final signature on August 31, 2021.
  - The Draft Final Record of Decision for Site 12 was sent to the PADEP and EPA for final review on August 31, 2021.
- Additional Groundwater Sampling
  - The EPA requested additional groundwater sampling for dioxins and chromium at Site 12. The sampling plan was finalized on July 1, 2021. Sampling was completed on July 19 to July 21, 2021. The results are currently being evaluated.

Site 5 Groundwater

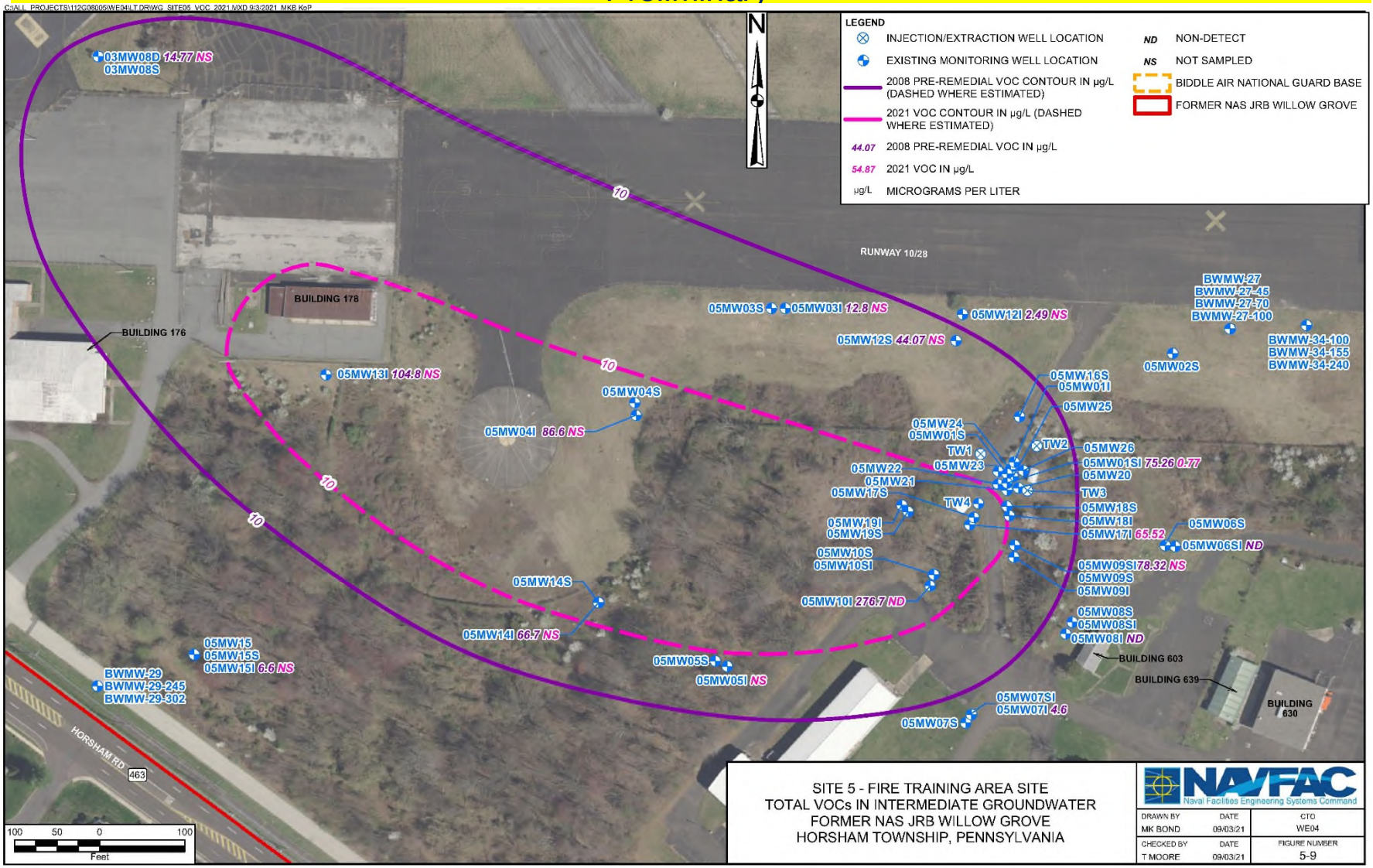
Remedial Action

- Anaerobic bioremediation system continues to operate successfully.
- Monitoring is conducted in accordance with approved Operation, Maintenance, and Monitoring Plan.
- Results continue to show good conditions for biodegradation of the volatile organic compounds (VOCs) and decreasing trends of the parent VOCs (PCE and TCE).
- Addition of amendments will now be conducted twice per year to ensure consistent conditions are maintained. A strategy to redevelop the injection wells is currently being evaluated.
- 2020 Annual report was finalized on July 7, 2021.
- 2021 Annual report is currently in internal review.
- Quarterly monitoring was completed the last week of August 2021.
- The following figure shows the reduction in plume size since implementation of the remedy.

Site 5 Groundwater

VOC Reduction

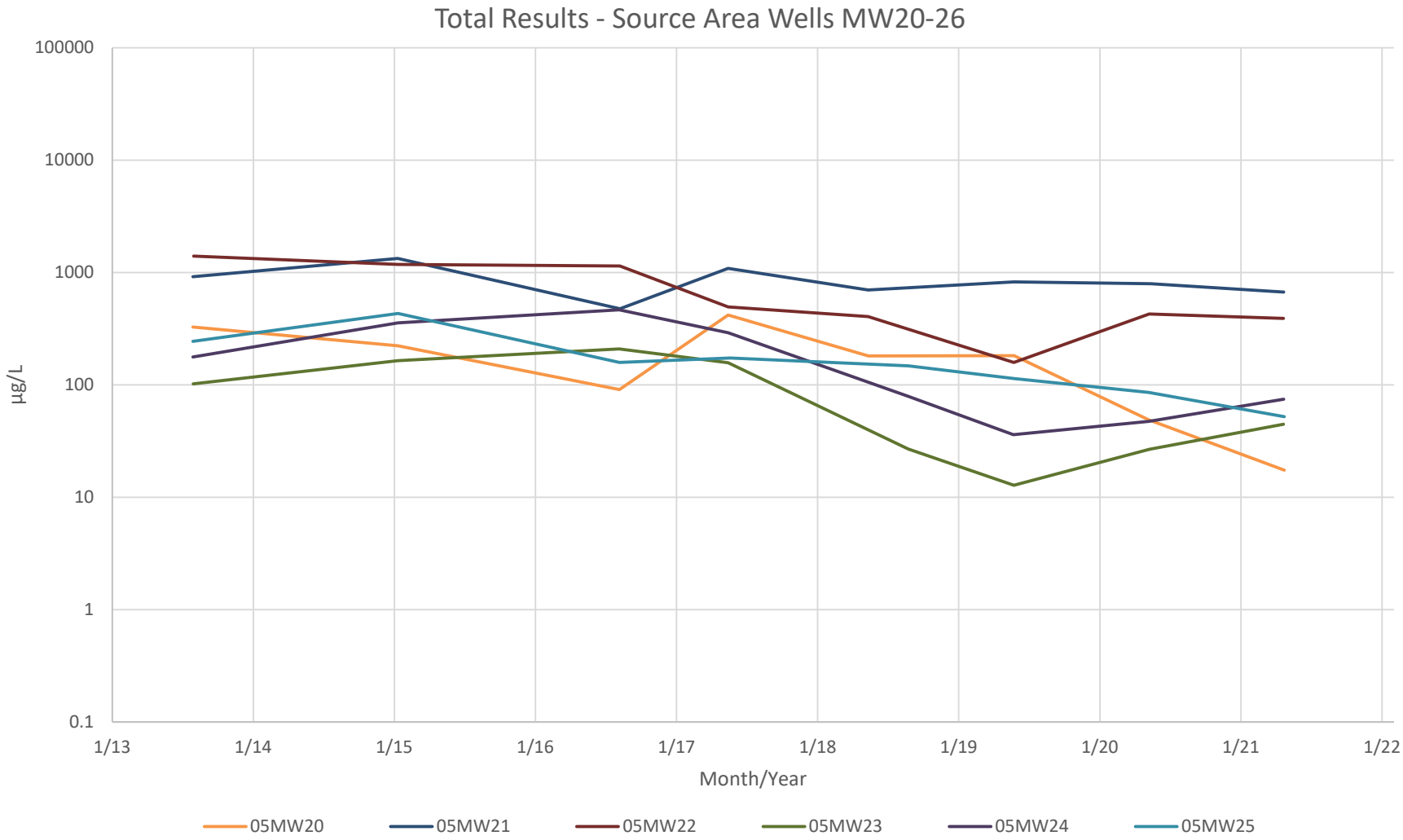
Preliminary



Site 5 Groundwater

VOC Reduction

Preliminary



Per- and Polyfluoroalkyl Substances (PFAS)

Summary of Drinking Water Actions

Due to COVID-19 precautions, private well sampling resumed from interior faucets in June 2021. Affected property owners were notified.

- The Navy has provided funds to HWSA for filtration system costs and drinking water connections above the HA. The total funding is over $18 million.
- The Navy has funded filtration systems at five Horsham Water and Sewer Authority (HWSA) public wells (#10, 17, 21, 26, and 40) which were found to be above the HA. All are back to drinking water service, some are being modified with improved treatment systems.
- Sampling was temporarily suspended March – June 2020 due to COVID-19. Since sampling resumed in June 2020, 264 private wells were sampled and provided validated results. No LHA exceedances since April 2019.

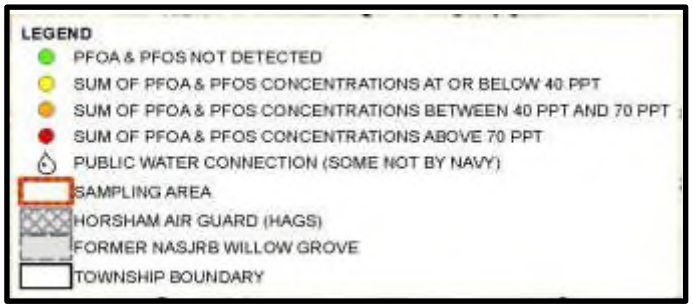
Private well sampling (as of 1 Sep 2021)	Current
Private wells sampled for PFOA/PFOS*	582
Private wells above lifetime HA (>70 ppt)	102
Private wells not yet connected **	7
Private wells below HA/monitored (>40 ppt) ***	66

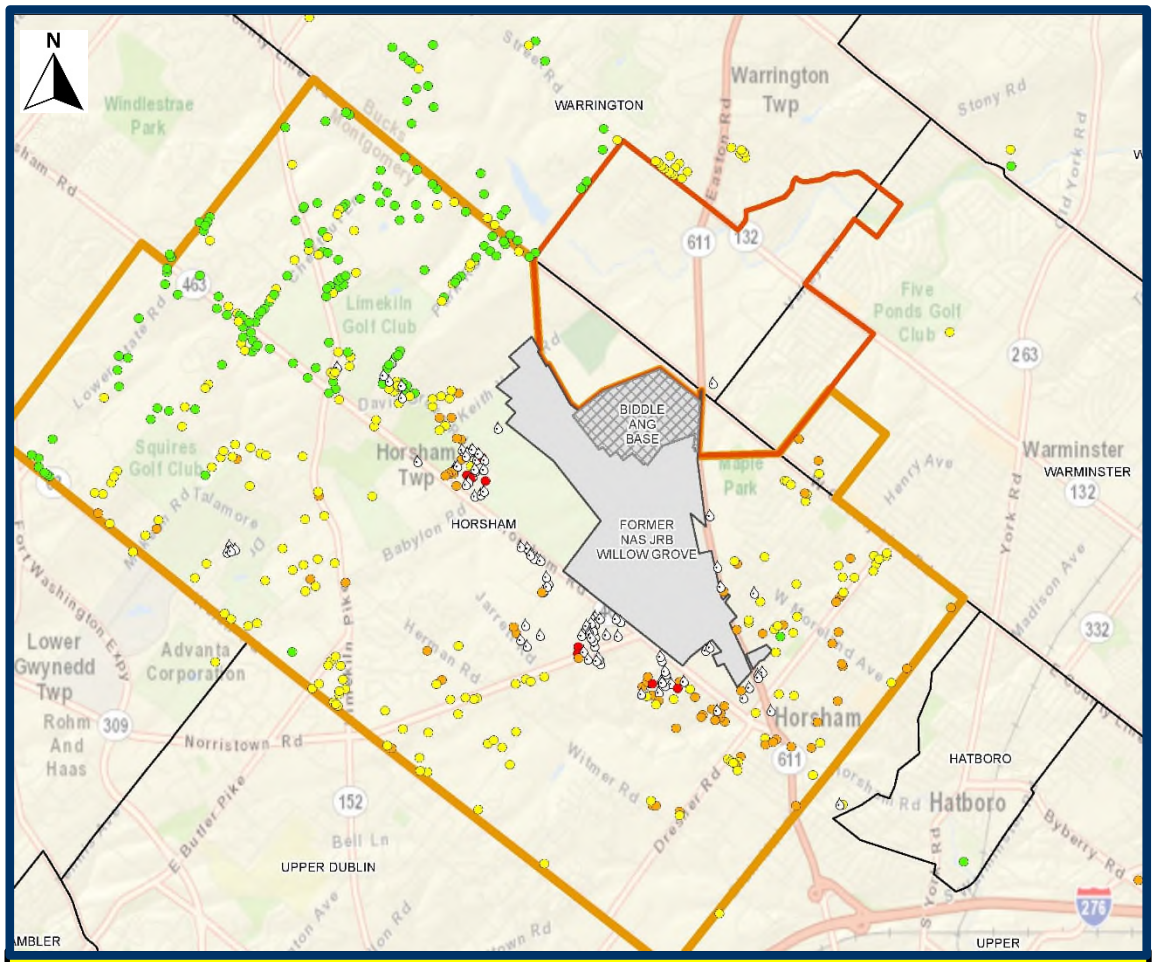
* Wells sampled in Warrington, now managed by Air National Guard are not included
** This include rejected connection offers and connections inprogress
*** Some monitored wells are now below 40 ppt

Private Drinking Water Well Sampling Area

Private drinking water well sampling for PFOA/PFOS and provision of bottled drinking water is being performed by Tetra Tech, a U.S. Navy contractor.

Point-of-contact is:
Tricia Moore
Tetra Tech Project Manager
tricia.moore@tetratech.com
Phone: (610) 382-1171





Updated figure (4-19-2021) is available on Navy BRAC PMO website

Phase II PFAS Investigation

Surface Water / Sediment Monitoring

- Quarterly surface water sampling event (Round 7) was performed March 15 and 16, 2021. Validated results were uploaded to the BRAC PMO website.
- Quarterly surface water sampling event (Round 8) was performed June 28 and 29, 2021. The results are currently being validated.
- Next event (Round 9) being planned for September 2021.
- The Navy will continue quarterly sampling in cooperation with the Air National Guard. USGS will support the sampling efforts.
- The below reports are currently in regulatory review.
  - 2019-2020 Annual report included data from July/October 2019 and January/May 2020 sampling events.
  - Round 5 surface water/Round 2 sediment sampling.
  - Round 6 surface water/Round 2 sediment sampling.
  - Round 7 surface water/Round 2 sediment sampling.
- The 2019-2020 Annual report which includes Rounds 5, 6, 7, and 8 is currently being drafted.

Phase II PFAS Investigation

Hangar 680 Groundwater Treatment Pilot Test

- Pilot Test at former Aircraft Maintenance Hangar 680
  - Full-time operations commenced in March 2020. Over 14 million gallons of water have been treated to date.
  - Influent concentration ranges of combined PFOA and PFOS:
    - 17,700 to 83,300 ppt in the shallow extraction well.
    - 8,100 to 80,000 ppt in the intermediate extraction well.
    - 9,400 to 50,600 ppt in the system influent.
  - System effluent continues to meet all PADEP discharge requirements.
  - An extension to continue the pilot test another 6-months was granted by PADEP on July 23, 2021.
  - PADEP also approved the request to add one additional extraction point into the pilot test system on January 27, 2021. Planning for the modification is currently underway.

Pilot tests provide valuable groundwater and treatment information for design of a full-scale treatment system.

Phase II PFAS Investigation

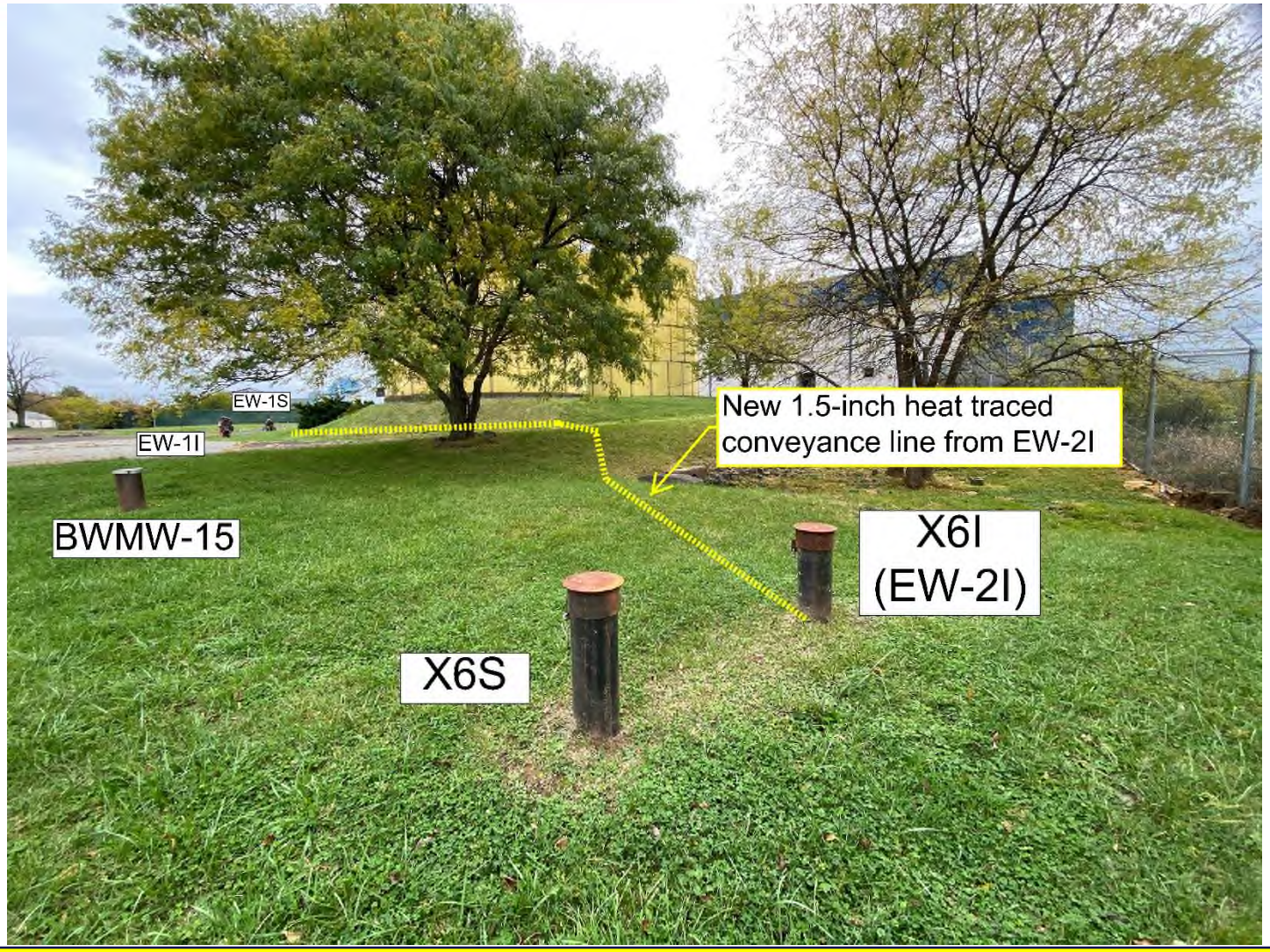
Hangar 680 Groundwater Treatment Pilot Test (cont.)

More than 14 M gallons treated to date. Effluent continues to meet all discharge requirements since operations commenced in March 2020. System combined influent PFOA+PFOS ranges: approx. 9,400 up to 50,600 ppt

Location of Hangar 680 treatment system

Phase II PFAS Investigation

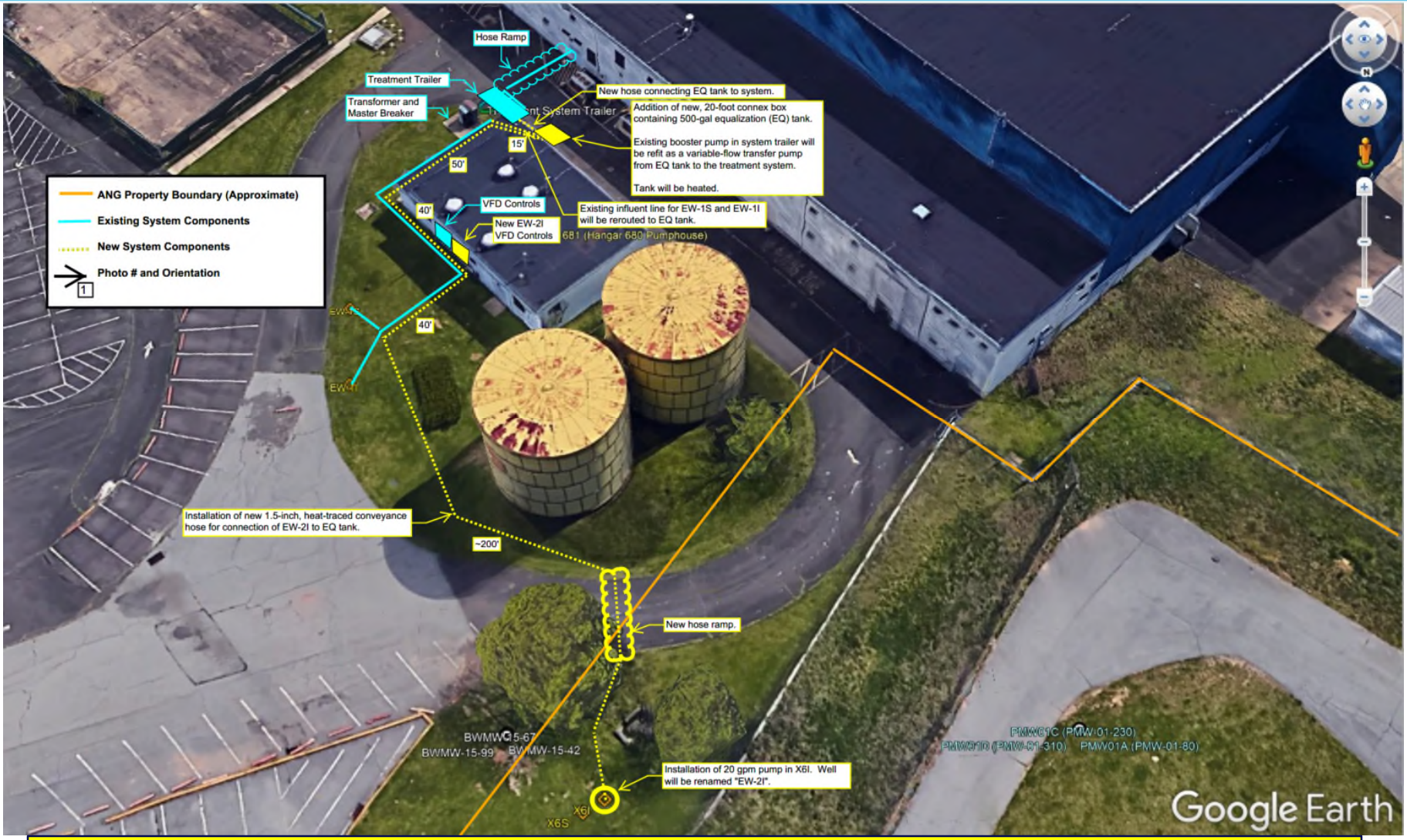
Hangar 680 Groundwater Treatment Pilot Test (cont.)



Hangar 680 treatment system modification

Phase II PFAS Investigation

Hangar 680 Groundwater Treatment Pilot Test (cont.)



Hangar 680 treatment system modification

Phase II PFAS Investigation

Former Fire Training Area Groundwater Treatment Pilot Test

- Pilot Test at the former Fire Training Area (Site 5)
  - An in-situ bio-stimulation remedy is operating successfully to reduce VOCs.
    - PFAS extraction wells and treatment cannot interfere with that remedy.
    - Extraction wells will likely be between the VOC plume and the base boundary.
  - The draft final pilot test work plan was submitted to regulators in May 2021. The EPA is currently reviewing Navy's response to comments.
  - Construction of pilot system is underway. Expect operation to commence fall 2021.
  - A discharge application was submitted to PADEP in September 2020. The PADEP issued the WQM approval No. 0920203 on January 12, 2021. The approval was effective February 1, 2021.
  - Completed geophysical logging at 15 of 15 potential extraction wells.
  - Completed packer testing at 9 of 15 potential extraction wells.

2nd Pilot Test – located near Horsham Road, close to FAA radar tower

Phase II PFAS Investigation

Former Fire Training Area Groundwater Treatment Pilot Test (cont.)

Phase II PFAS Investigation

Former Fire Training Area Groundwater Treatment Pilot Test (cont.)

Phase II PFAS Investigation

Former Fire Training Area Groundwater Treatment Pilot Test (cont.)

Non-Time-Critical Removal Actions

EE/CA

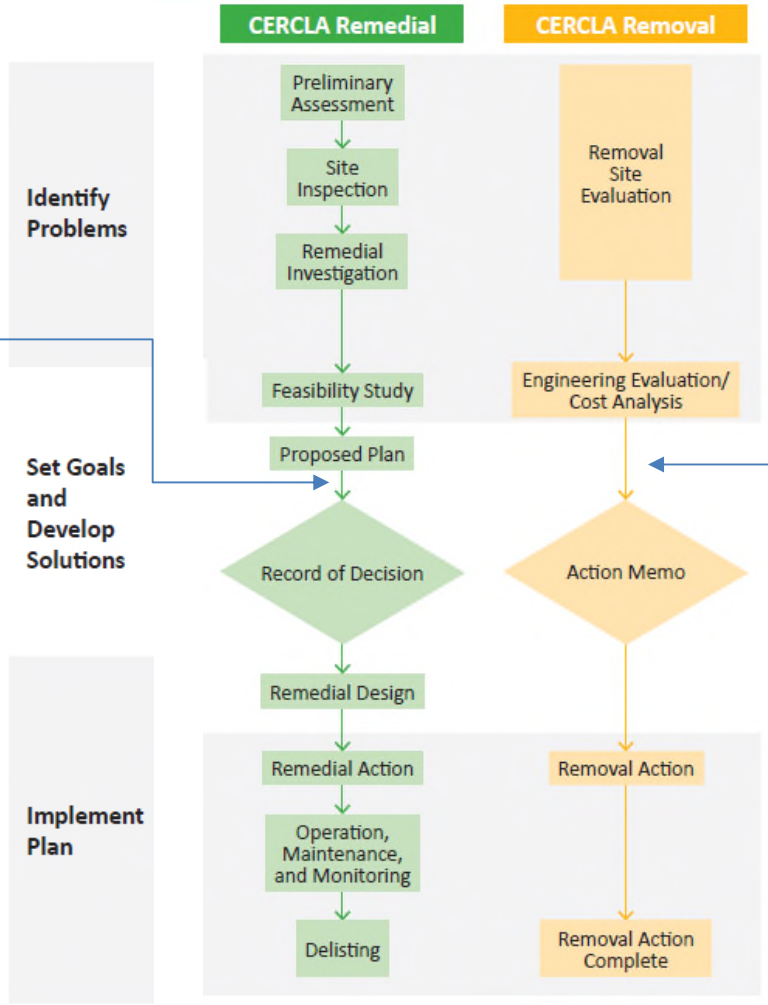
- Navy submitted an Engineering Evaluation/Cost Analysis (EE/CA) for a 500-gpm groundwater extraction and treatment system for regulatory review in May 2021. EPA comments have been received. PADEP is still reviewing the document. Currently preparing a response to EPA comments.

- A public comment period will be held after the EE/CA is finalized.

- Following the public comment period, an Action Memo will be generated to document the selection of an interim remedy and will include a response to public comments.

CERCLA Process

Public Comment Period after Proposed Plan is finalized. Comments are incorporated into Record of Decision



Public Comment Period after EE/CA is finalized. Comments are incorporated into Action Memo.

Phase II PFAS Investigation

Phase II Remedial Investigation

- Evaluation of Existing Off-Base Monitoring and Production Wells
  - HWSA has offered access to fifteen existing observation and supply wells:
    - Work was initiated in August 2020 and includes geophysical logging and packer testing.
    - Borehole geophysical logging has been performed at 12 of 15 well locations.
    - Packer testing has been performed at 10 of 15 well locations.
    - Planning for future sample collection activities at 4 of 5 locations.
  - PADEP has offered access to nine existing monitoring wells. Sampling is anticipated in Fall 2021.
- The draft final Sampling and Analysis Plan (SAP) for on-base soil was submitted for regulatory review in April 2021. EPA provided comments on 8/9/21.
- The draft SAP for on-base groundwater was submitted for regulatory review on July 27, 2021. EPA provided comments on 9/14/21.

Focus Topic: PFAS Research Supported by DoD

Overview of Presentation

- What is SERDP/ESTCP?
- Integrating Research into Existing Activities
- Examples of Completed and Ongoing Projects
- Summary and Discussion
- Questions

What is SERDP and ESTCP?

SERDP
DOD ▪ EPA ▪ DOE

Strategic Environmental Research and Development Program

Science and Technology

- Fundamental research to impact DoD environmental management
- Advanced technology development to address near-term needs

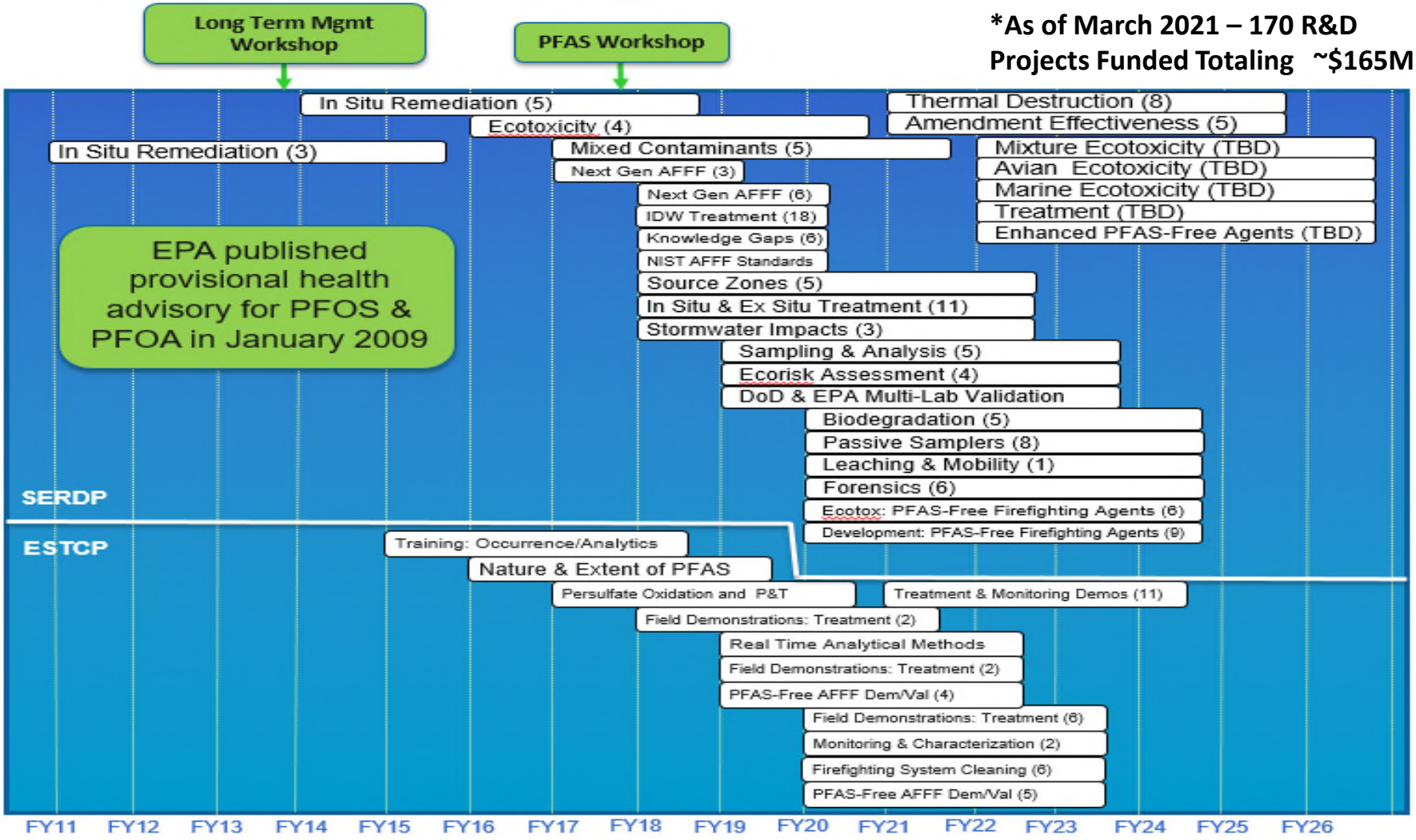
ESTCP

Environmental Security Technology Certification Program

Demonstration/Validation

- Innovative cost-effective environmental and energy technology demonstrations
- Promote technology implementation by direct insertion and partnering with end users and regulators

SERDP/ESTCP PFAS Timeline Efforts



https://map.serdp-estcp.org/Featured-Initiatives/Per-and-Polyfluoroalkyl-Substances-PFASs/pfas_efforts.pdf

SERDP/ESTCP Efforts Addressing PFAS in the Environment

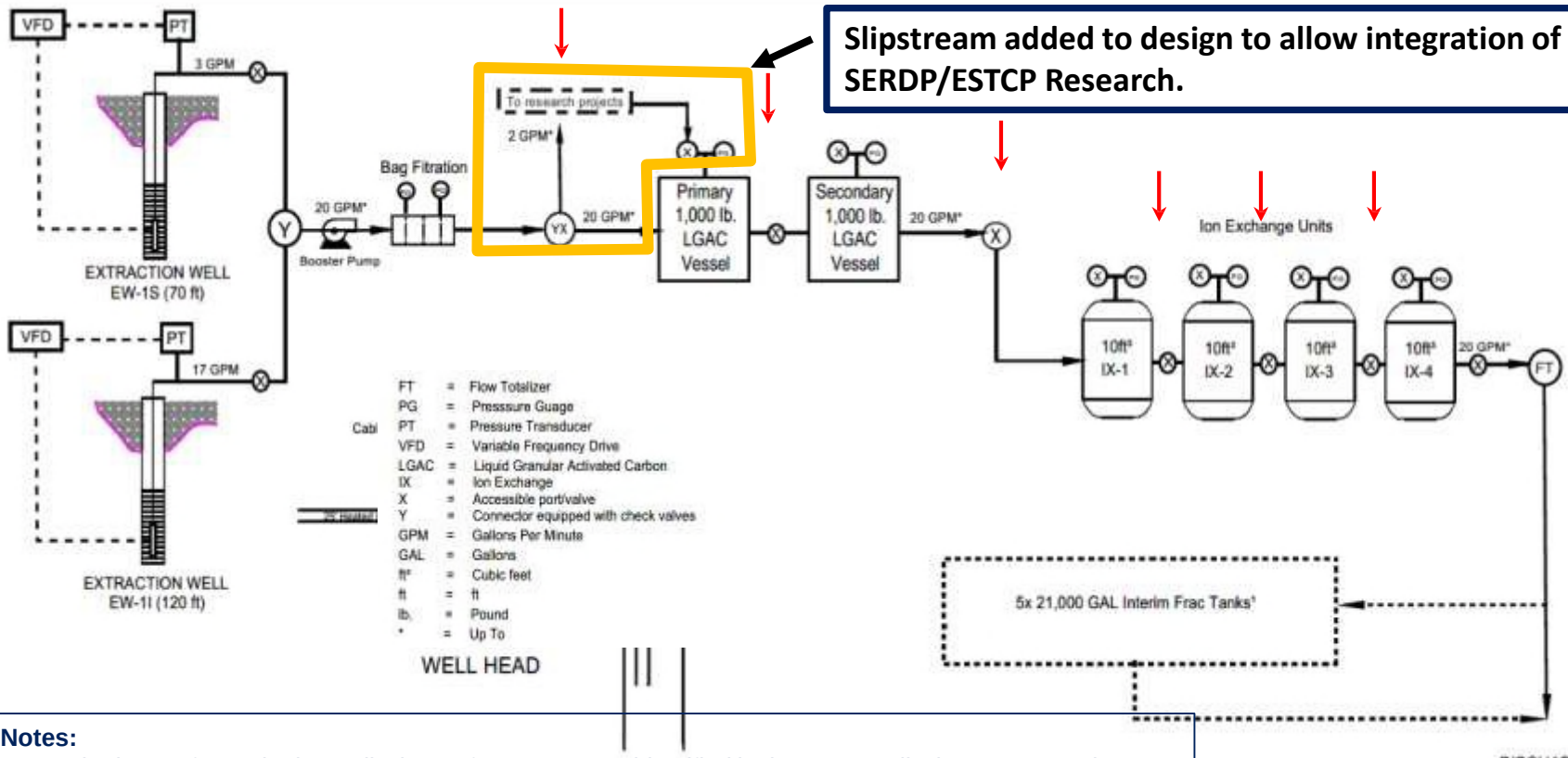
- Development of treatment approaches for PFAS-impacted matrices
  - Initiated in 2011; over 75 research and demonstration projects
  - ~20 of these are field demonstrations with most initiated in FY20 and FY21
  - Invested & committed over $65M
- Testing of new sampling and analytical methodologies
  - Working closely with EPA to develop validated methods for groundwater, surface water, soils, sediment, landfill leachate, wastewater, tissues and biosolids
  - Developing new field screening methodologies
- Ecotoxicology of PFAS
  - Filling data gaps for specific species
- Understanding of occurrence, fate and transport of PFAS in the subsurface
  - Provides supporting information to allow for better treatment design

Integrating Research in Ongoing Work

- BRAC Team has been supportive of SERDP/ESTCP Research for the last several years as research has increased within both programs.
  - Updates have been included in RAB Updates during this time.
- How has integration occurred?
  - Coordinate collection of PFAS impacted media with ongoing CERCLA Investigations, Removal Actions, and Pilot Studies
    - Collection of soils, groundwater, and surface water for research completed at researchers' laboratories.
  - Integration into Pilot GWETS at Building 680 to complete assessment of existing and newly developed absorptive media or technologies with actual field groundwater.
  - Work with researchers to collect and complete long-term assessment to improve understanding of PFAS in the environment and improve understandings of potential ecological risks posed.
- Typical SERDP/ESTCP project length – 3 to 4 years, but some shorter.
- Goals for BRAC at Willow Grove
  - Support very critical research to learn more about the assessment of PFAS in the environment and expand knowledge of potential technologies for treatment.
  - Collectively utilize pilot projects and SERDP/ESTCP research to identify technologies that might be more effective and cost efficient in long-term.

Integration into Building 680 Pilot System

Treatment Direction



Notes:
- Monitoring performed prior to discharge for parameters identified in the PADEP discharge approval.
- Internal monitoring points (red arrows) are sampled to ensure all effluent limits are met before discharge

Hangar 680 Pilot Test Treatment System

Example Integrations into Building 680 Pilot

*Field Work Completed

SERDP Project ER18-1300

THE COLLEGE OF WOOSTER

*Field Work Ongoing

ESTCP Project ER19-5181

ARCADIS

AQUA-AEROBIC SYSTEMS, INC. A Metawater Company

*Field Work Completed

SERDP Project ER18-1063

SCHOOL OF MINES 1874 COLORADO

Building 680 Pilot SERDP/ESTCP Projects with more Focus

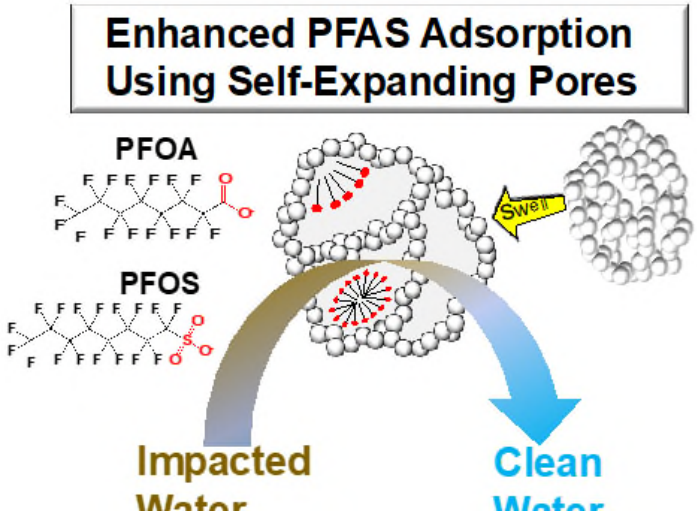
SERDP Project ER18-1300

SERDP Project ER18-1300

$199,998 Pilot test March 2020 – April 2020

Project Goal: Development of specialized adsorbents tailored for PFAS.

Summary: A new type of silica-based adsorbent that swells like a sponge was developed and pilot tested at at Willow Grove. The work at Willow Grove gave researchers new insights how to create optimal low cost adsorbents to purify water.



SERDP Project ER18-1300

Key Findings ER18-1300:

- The new adsorbent is granular and can be used in standard water purification cartridges.
- High removal efficiency of PFOA and PFOS with total PFAS adsorption capacity of 2,600 μg/g of adsorbent during pilot test.
- Adsorbent can be regenerated with solvent rinse.

PFAS	BV (L/kg) at breakthrough	Gallons treated by 1000 lbs		PFAS	BV (L/kg) at breakthrough	Gallons treated by 1000 lbs
PFBA	20,000	2,100,000		PFBS	34,000	4,600,000
PFPeA	21,000	2,300,000				
PFHxA	25,000	2,700,000		PFHxS	58,000	7,060,000
PFHpA	33,000	3,600,000				
PFOA	45,000	5,440,000		PFOS	113,000	13,500,000
PFNA	98,000	11,800,000				

SERDP Project ER18-1063

SERDP Project ER18-1063

Project Funding: $1.4M

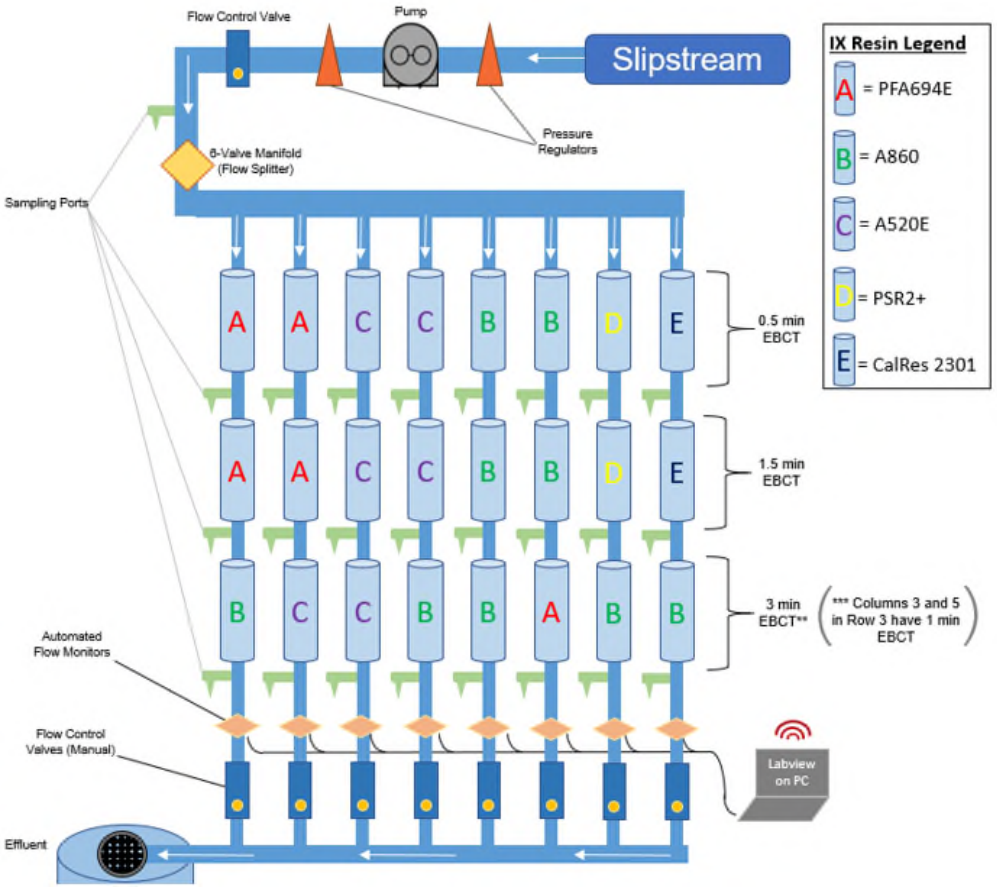
Start Date: May 1, 2018

Completion Date: Dec 2022

Project Goals: Develop a sustainable resin-based treatment system for remediation of the full diversity of PFASs. Optimal treatment strategy incorporates resin performance data, a life cycle assessment (LCA) framework, and a life cycle costing (LCC) methodology.

Project Partners:

Site Pilot: Eight parallel streams of Willow Grove groundwater treated with different ion exchange resins



SERDP Project ER18-1063

Influent PFAS Composition

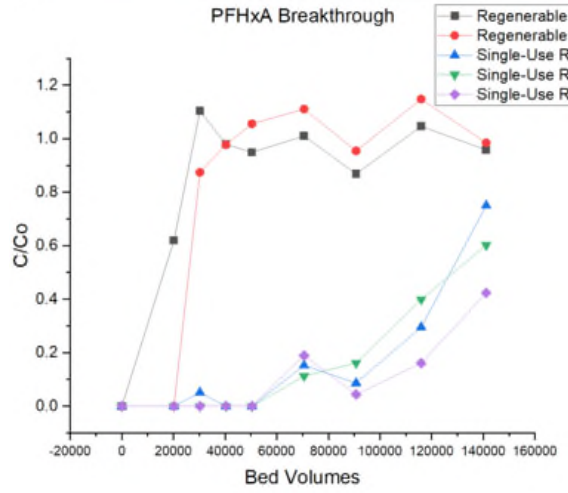
ΣPFAS = 35-45 µg/L

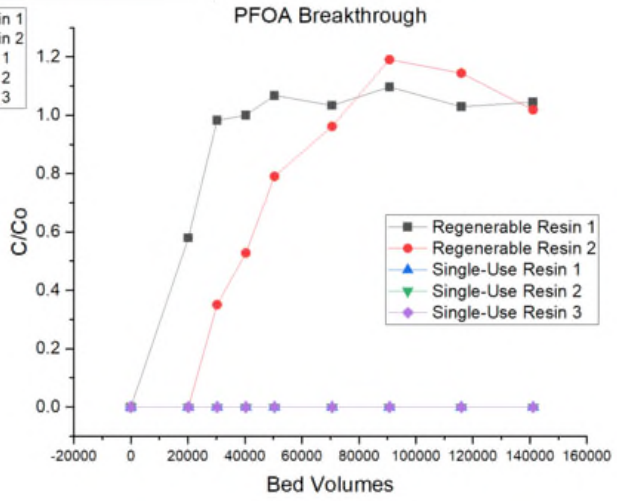
PFAS Listed in the EPA's UCMR3 Monitoring Rule	
PFOS: 18-25 µg/L	PFOA: 2.1-2.6 µg/L
PFHxS: 3-6 µg/L	PFHpA: 0.3 µg/L
PFBS: 0.6-0.8 µg/L	PFNA: <0.02 µg/L

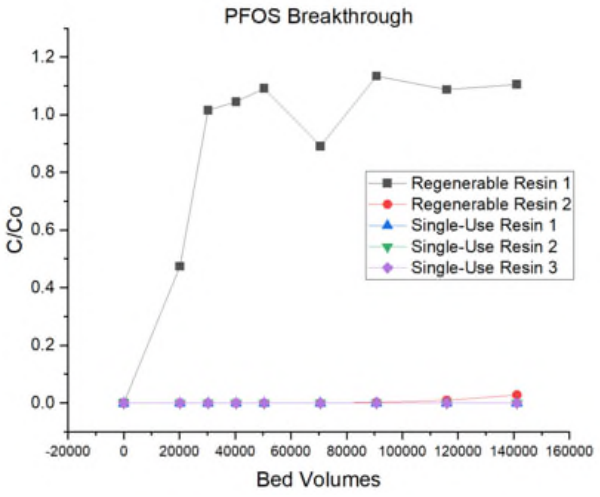
PFOS + PFOA = 20-28 µg/L

Key Findings:

- Single-use anionic resins (e.g., Purolite PFA694E) effectively treat Willow Grove sourcewater for >150,000 bed volumes prior to elution of PFASs listed in UCMR3
- All three brands of single-use "PFAS-selective" resins outperform traditional regenerable ion exchange resins
- All three single-use resins demonstrate similar capacity for removing PFAS from AFFF-impacted groundwater
- No detection of PFOS or PFOA in single-use resins' effluent







ESTCP Project ER19-5181

ESTCP Project ER19-B3-5181

Project Funding: $935,580

Start Date: November 18, 2019

Completion Date: September 22, 2022

Project Goals: Demonstrate reduced life-cycle cost and increased treatment efficacy for PFAS using superfine powdered activated carbon and ceramic membrane filter (SPAC-CMF)

Site Pilot: The field-scale demonstration and validation of the SPAC-CMF system consisted of a multi-month field pilot at an existing groundwater treatment system at two DoD facilities.

Project Partners:

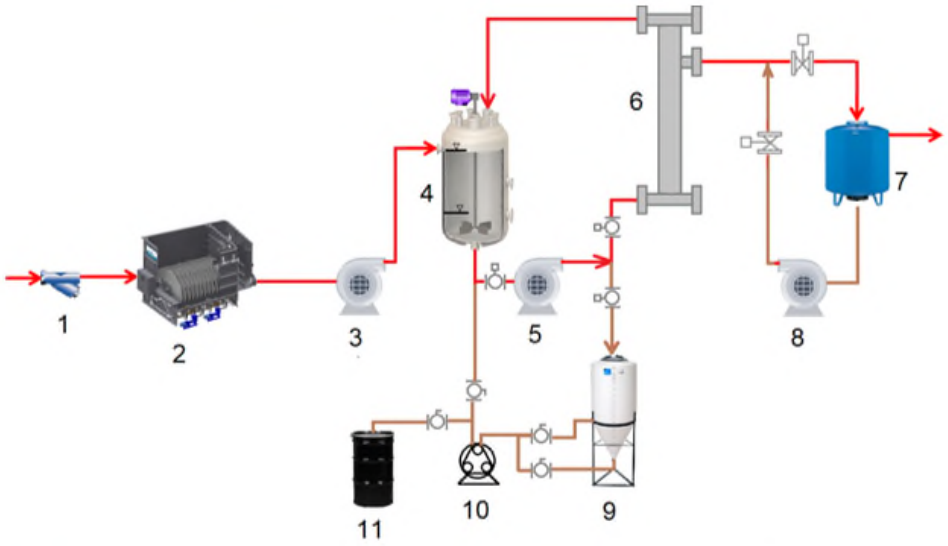
ESTCP

SCHOOL OF MINES 1874 COLORADO

AQUA-AEROBIC SYSTEMS, INC. A Metawater Company

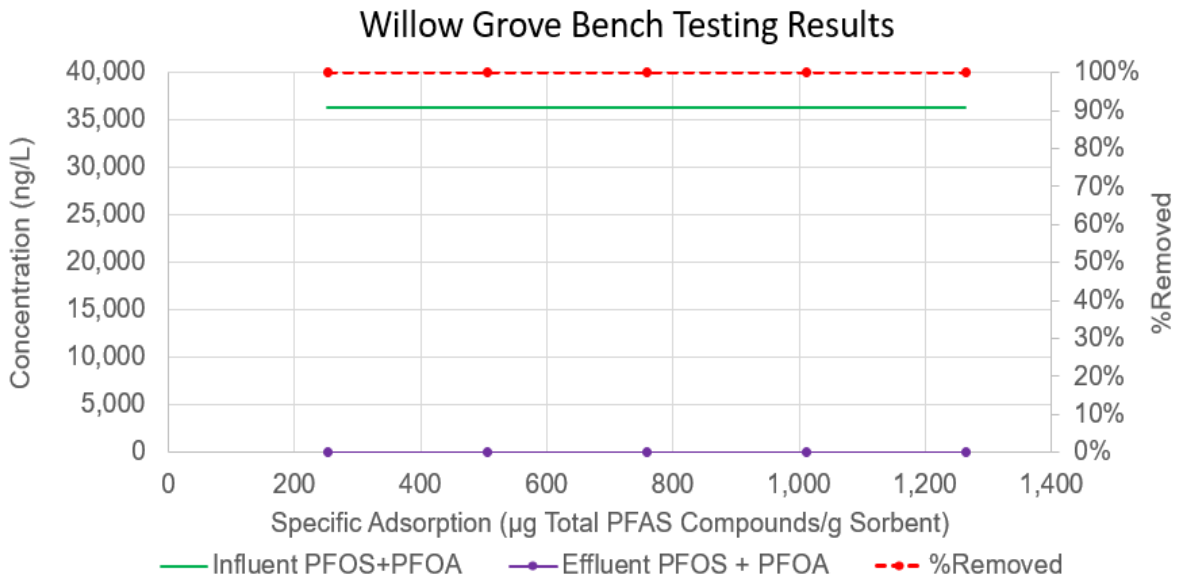
ARCADIS

SPAC-CMF Flow Diagram



1. Influent Strainer
2. Cloth Media Filter
3. Feed Pump
4. Adsorption Reactor
5. Recycle Pump
6. Separator
7. Effluent Tank
8. Backpulse Pump
9. Sorbent Concentrator
10. Supernatant Pump
11. Waste Container

ESTCP Project ER19-5181



Willow Grove Pilot Testing Results

	PFOS			PFOA		
Willow Grove Test	Influent (ng/L)	Effluent (ng/L)	Adsorption (µg PFAS/g Sorbent)	Influent (ng/L)	Effluent (ng/L)	Adsorption (µg PFAS/g Sorbent)
Lab Pilot	33,000	< LOQ	1,146	3,400	12	118
Test 1A	24,333	38	1,636	2,967	70	169
Test 1B	24,333	59	1,648	2,967	46	197

Key Findings:

- Treatment at Horsham Air Guard station indicated specific adsorption at 200 to more than 400 times than GAC for PFOA and PFOS, resulting in potential 90% reduction in OPEX compared to GAC (not shown)
- Initial treatment at Willow Grove Naval Station indicated specific adsorption at 200 to more than 1,600 times GAC for PFOA and PFOS.
- Additional optimization trials at Willow Grove to be completed through September will enable comparison with ion exchange resin

SERDP/ESTCP Project with Focus on the Assessment of Ecological Exposure to PFAS

SERDP Project ER21-3464

SERDP Project ER21-3464

USGS – Upper Midwest Environmental Sciences Center, La Crosse, WI

Project Funding: $330,000

Start Date: March 2021

Completion Date: Sept. 2023

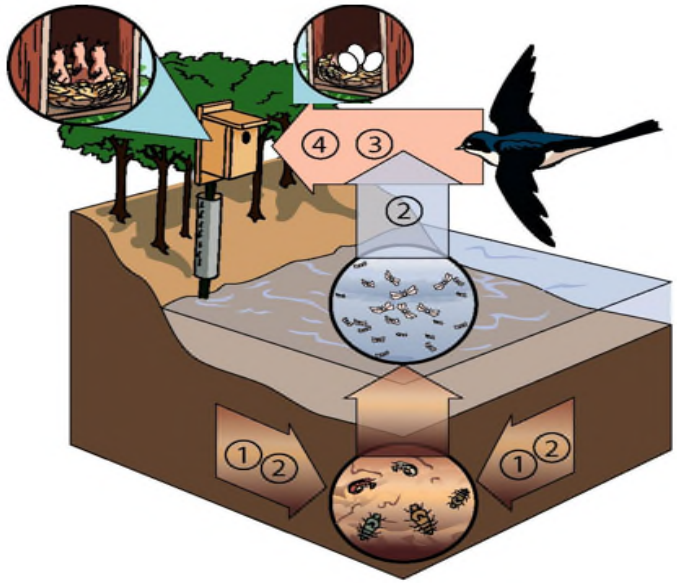
Project Goals: Use tree swallows to assess exposure to and quantify effects, if any, of PFAS at DOD sites compared to reference sites, and sites with other PFAS sources.

Project Partners:

USGS science for a changing world Laurel, MD

SGS AXYS

Baylor University



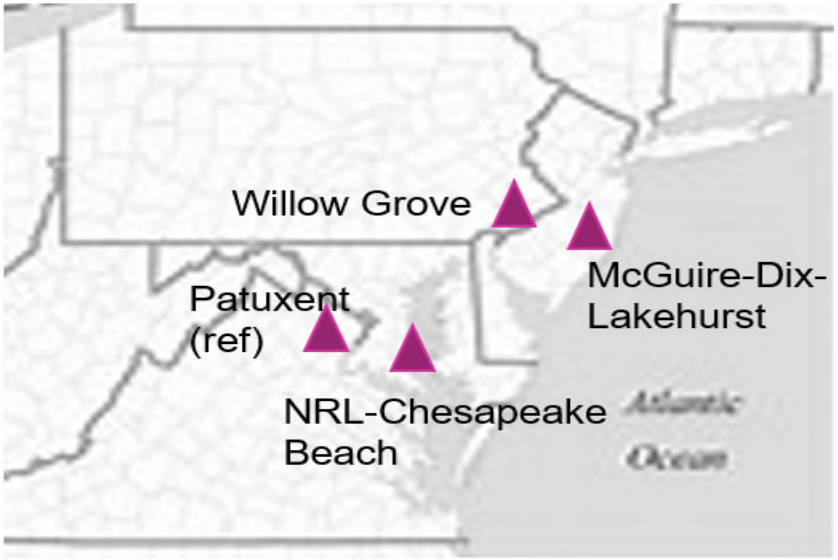
Why swallows?

- Tissues are reflective of sediment contamination
- Short, easily interpreted food chain
- Feed locally (~1km of nest box)
- Can be attracted to specific sites
- Multiple endpoints have been developed for exposure and effects

SERDP Project ER21-3464

SERDP Project ER21-3464 cont.

Study Sites



Methods

- Place 20 nest boxes/site
- Monitor nests weekly
- Collect samples at appropriate times
- Analyze popul. and biomarker endpoints

Population level assessment as it relates to contaminants exposure
- hatching success

Biomarker responses/effects
- EROD (liver enzyme, AhR pathway)
- DNA damage (red blood cells)
- thyroid hormone levels
- oxidative stress (cellular damage)
- immune function, &
- transcriptomics

Put in context with reference and other PFAS study results

Perfluorinated chemicals (PFAS) In tree swallow plasma (n=90 sites)

Summary and Discussion

- Since SERDP projects often include fundamental and basic research they may not always prove to be successful, but we still learn from the science completed.
  - Example: A potentially promising technology for remediation might not achieve potential remediation goals or prove to be more cost effective than other technologies.
- ESTCP projects look at demonstrating promising technologies that when scaled up could be cost effective and applicable under certain site related conditions.
- Continued support for ESTCP/SERDP PFAS related research at Former NAS JRB Willow Grove allows for:
  - Advancement of scientific knowledge for assessment and remediation of PFAS within the environment.
  - Assists in developing potential cost efficient technologies that may or may not be directly applicable to ongoing efforts to address PFAS impacts.
  - Help the Navy's BRAC team to look at projects results, and see how their results could refine investigation or remediation efforts in the future.

Notes of Thanks!!!!

- Andrea Leeson, Ph.D. – Deputy Director & Environmental Program
- Paul Edmiston, Ph.D.
- Timm Strathmann, Ph.D and Anderson Ellis
- Joe Quinnan PE, PG
- Christine Custer, Ph.D.

Action Summary Since Previous RAB Meeting

- Submitted the Site 3 final ROD for PADEP concurrence and EPA signature.
- Submitted the Site 12 draft final ROD for regulatory review.
- Completed Site 12 groundwater sampling for dioxin/chromium.
- Submitted the EE/CA for an interim 500-gpm groundwater pump and treat system.
- Completed Site 5 bioremediation system quarterly monitoring.
- Submitted the Round 6 (January 2021) and Round 7 (March 2021) surface water monitoring technical memos for regulatory review.
- Completed Round 8 surface water sampling (June 2021) event.
- Continued operation of the Hangar 680 pilot test system.
- Continued construction for the Site 5 PFAS pilot test system.
- Responded to comments on the draft final Site 5 PFAS pilot test workplan.
- Responded to comments on the draft final On-Base Soil SAP.
- Continued off-base groundwater investigation at existing HWSA and PADEP wells.
- Completed geophysical logging at Site 5 and started Site 5 packer testing.
- Continued stormwater system repairs.
- Continued private drinking water well sampling.

Actions Anticipated to be Completed by next RAB

- Finalize the Site 3 final ROD.
- Finalize the Site 12 final ROD.
- Submit the Site 12 technical memo for dioxin/chromium results in groundwater.
- Submit the draft final EE/CA for a 500-gpm groundwater pump and treat system.
- Complete the Site 5 bioremediation system quarterly monitoring.
- Complete Round 9 surface water sampling (September 2021) event.
- Submit the 2020-2021 Annual surface water and sediment sampling report
- Continue operation of the Hangar 680 pilot test system.
- Finalize the Site 5 PFAS pilot test workplan.
- Start operation of the Site 5 PFAS pilot test system.
- Finalize the On-Base Soil SAP.
- Continue off-base groundwater investigation at existing HWSA and PADEP wells.
- Complete Site 5 packer testing.
- Complete stormwater system repairs.
- Continue private drinking water well sampling.

NASJRB Willow Grove

The Navy presentation has concluded.

RAB member or community comments/questions will now be addressed.

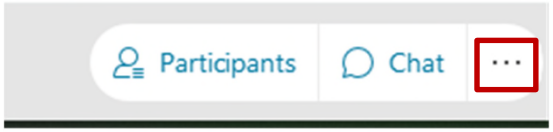
Additional Navy information is available at the NASJRB Willow Grove website:
https://www.bracpmo.navy.mil/brac_bases/northeast/reserve_base_willow_grove.html

Dawn DeFreitas
BRAC Environmental Coordinator
BRAC Program Mgmt. Office East
4911 South Broad St.
Philadelphia, PA 19112
Phone: (215) 897-4903
dawn.m.defreitas.civ@us.navy.mil

How to Ask a Question

On a Computer

1. In the bottom right of the screen, click on 3-dot 'Panel Options' icon



2. On the menu, click Q&A

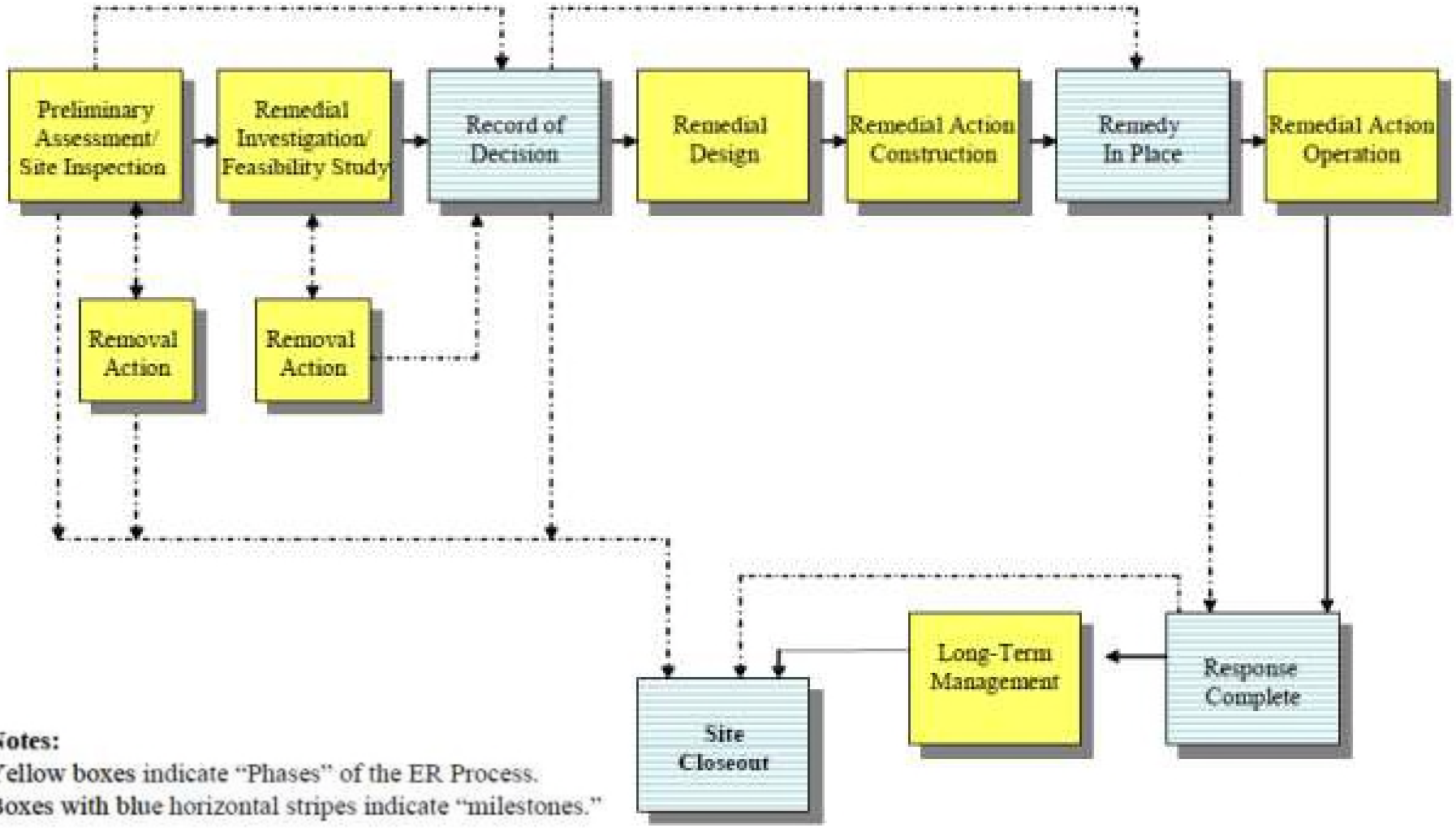
3. Type your question/comment in the box
4. Click Send

On a Mobile Device

1. Click the More Options icon.
2. On Android, More Options icon is 3 vertical dots
3. On iOS, More Options icon is 3 horizontal dots
4. Select Q&A
5. Type your question in the box
6. Click Send

Back-up / Additional Information

Environmental Restoration Program



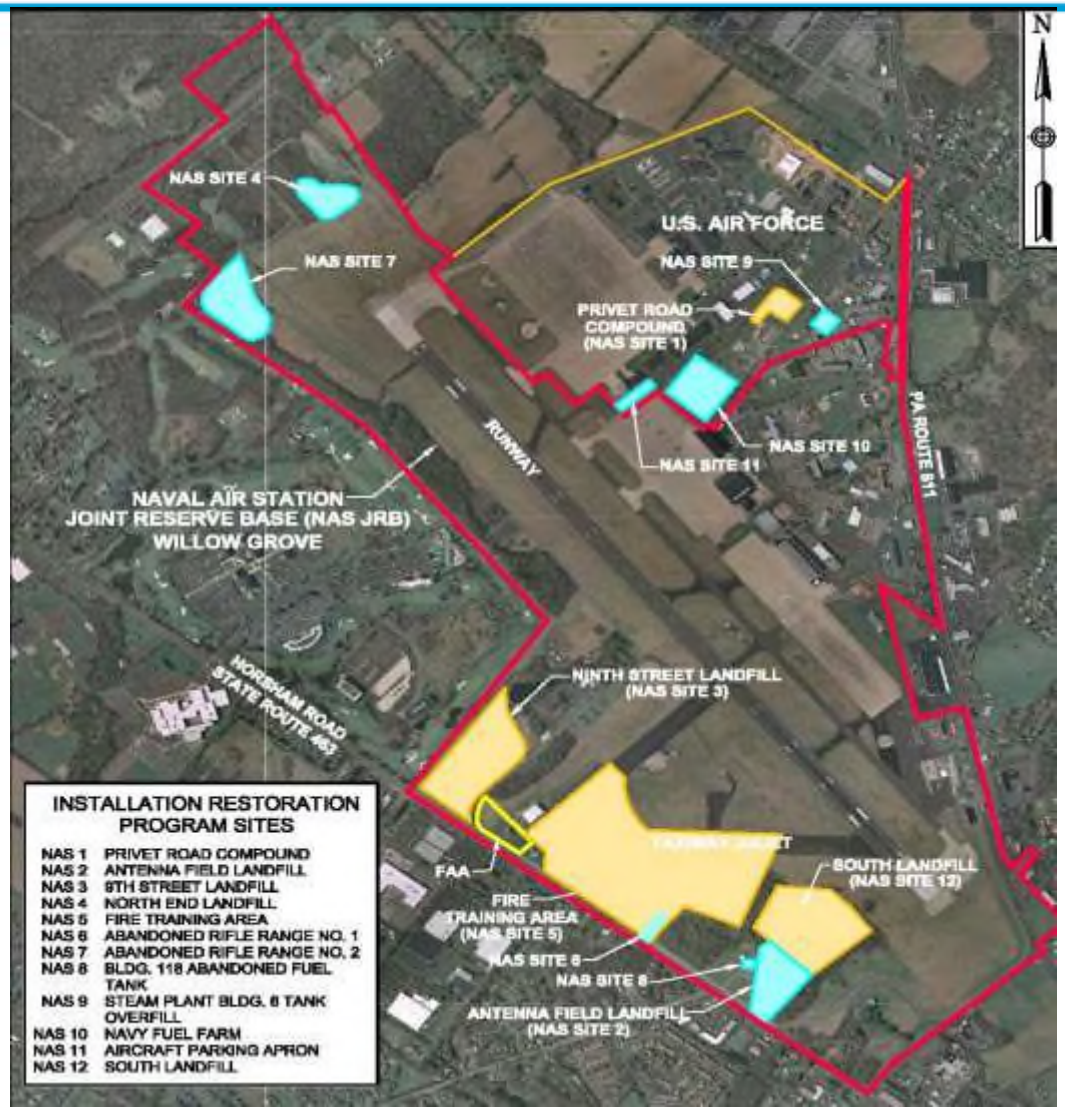
Notes:
Yellow boxes indicate "Phases" of the ER Process.
Boxes with blue horizontal stripes indicate "milestones."

Environmental Restoration Sites

Site	Name	Operable Unit (OU)	Status
2	Antenna Field Landfill	Soil - OU 5 Groundwater - OU 9	No Action ROD Signed June 17, 2010
3	Ninth Street Landfill	Soil - OU 6 Groundwater - OU 10	RI Completed Oct. 2011. FS and PRAP completed. ROD in progress.
4	North End Landfill	. . .	Consensus Agreement for No Action Jan. 2009
5	Fire Training Area	Soil - OU 4 Groundwater - OU 2	Soil (OU 4) NFA ROD signed Sept. 2007 Groundwater (OU 2) ROD signed Sept. 2012 Groundwater (OU 2) RACR signed Sept. 2014 Groundwater (OU 2) Final OPS and OM&M Plan May 2015
6	Abandoned Rifle Range No. 1	. . .	Consensus Agreement for No Action Dec. 2007
7	Abandoned Rifle Range No. 2	. . .	Consensus Agreement for No Action Aug. 2008
8	Building 118 Abandoned Fuel Tank	. . .	NFA Agreement Oct. 2006
SSA 11	Aircraft Parking Apron	. . .	Eliminated From Consideration
12	South Landfill	OU 11	Final RI Feb. 2014. FS and PRAP completed. ROD in progress.
PFCs/PFAS	Perflourinated Compounds/Per- and Polyfluoroalkyl substances	OU 12	TCRA Sept. 2015, Final PA/SI Mar. 2016. RI phase I completed 2019. RI phase II in progress.

NASJRB Willow Grove

Environmental Restoration Sites



PFOA / PFOS Background

- In mid-2014, PFAS known as perfluorooctanoic Acid (PFOA) and perfluorooctane Sulfonate (PFOS) were found in public drinking water wells near NASJRB Willow Grove through an EPA program known as the Unregulated Contaminant Monitoring Rule (UCMR).
- The health advisory levels at that time were 0.4 micrograms per liter (µg/L), or 400 parts-per trillion (ppt), for PFOA and 0.2 µg/L, or 200 ppt, for PFOS.
- PFOA/PFOS are man-made chemicals used in many products, including fire-fighting solutions known as aqueous film-forming foam (AFFF), which were used at NASJRB Willow Grove.
- In the summer of 2014, the Navy began sampling for PFOA/PFOS in private drinking water wells and worked with Horsham Water and Sewer Authority (HWSA) on the municipal drinking water wells.

PFOA / PFOS Background (cont.)

- In May 2016, the Environmental Protection Agency established a lifetime Health Advisory (HA) level of 70 parts-per-trillion (0.07 µg/L) for combined PFOA and PFOS.
- The Navy's priority continues to be eliminating exposure to PFOA/PFOS above health advisory levels in drinking water.
- Any health concerns should be addressed with your health professional. Weblinks to health information is provided at the end of this presentation.

Removal (Interim) Actions for PFOA / PFOS

- PFOA and PFOS above the EPA provisional health advisory (PHA) levels in drinking water sources (2015). The PHA levels were 0.4 micrograms per liter (µg/L), or 400 parts-per trillion (ppt), for PFOA and 0.2 µg/L, or 200 ppt, for PFOS.
- PFOA and PFOS above the EPA lifetime health advisory levels in private drinking water sources (2017).
- PFOA and PFOS above the EPA lifetime health advisory levels in municipal drinking water sources (2017).
- Removal of soils containing PFOS exceeding project screening levels (2018).

Other interim actions to reduce PFOA and PFOS in drinking water sources are being considered.

The interim action memorandums are available in the administrative record

Phase I PFAS Investigation Summary

- Soil, groundwater, and surface water samples were collected in potential sources area.
- Human health screening assessment:
  - PFOS or PFOA sample results exceeding screening levels were detected in the soil, groundwater, and surface water.
  - PFBS sample results did not previously exceed screening levels for soil, groundwater, and surface water. However, PFBS sample results exceed the new screening level in groundwater based on updated toxicity values (May 2021)

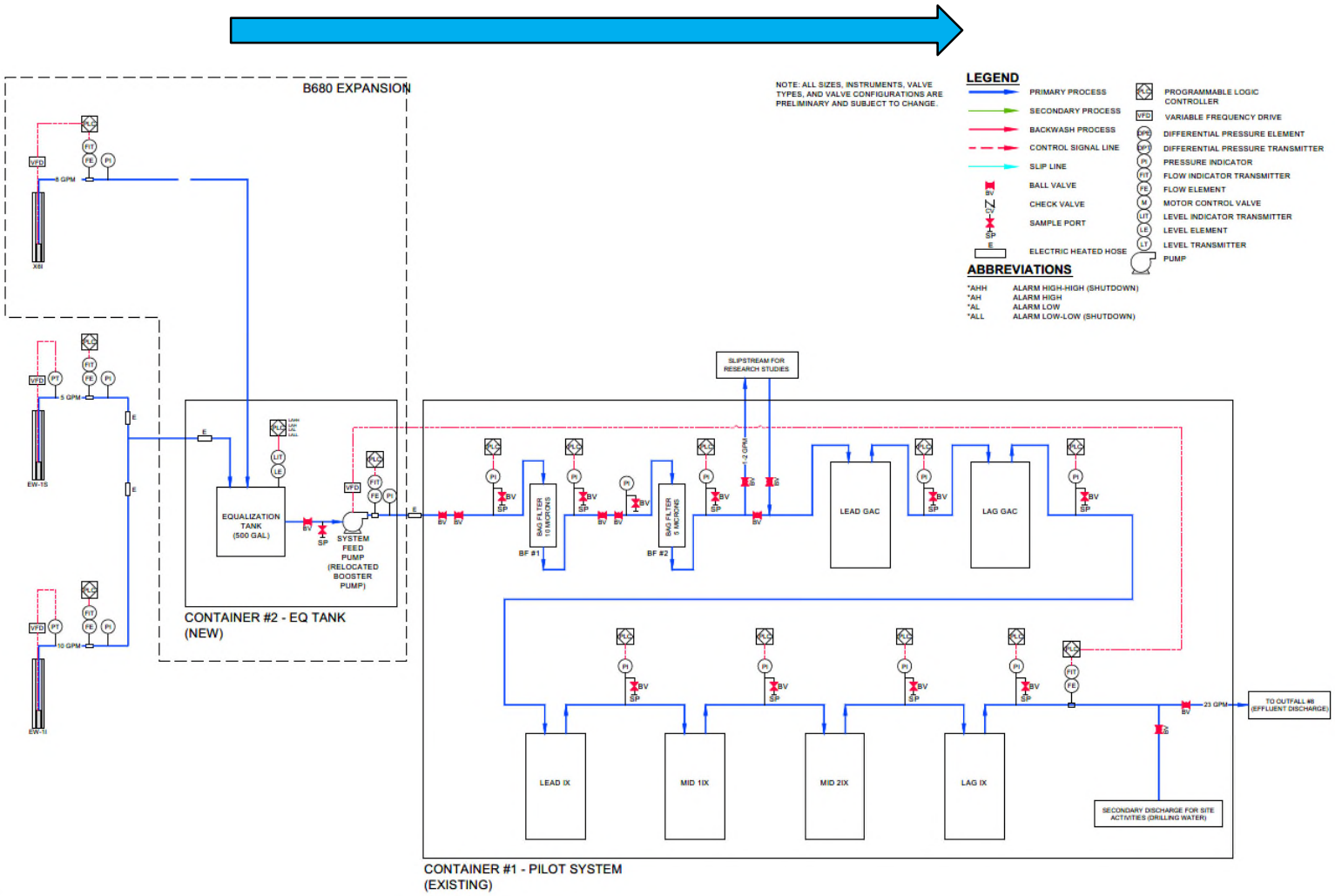
Download available from Administrative record or the Horsham Township Library Information Repository

Phase I PFAS Investigation Summary (cont.)

- Ecological screening assessments:
  - Screening levels for PFAS have not been developed by EPA, so the Navy identified criteria and performed the screening assessment based on a review of available literature. Screening levels were updated in January 2021 with new data available.
  - In sediments:
    - PFOA exceeds screening levels for invertebrate and wildlife.
    - PFOS exceeds screening levels for wildlife at one location.
  - In surface water:
    - PFOS exceeds screening levels for aquatic organisms and wildlife.
  - In soil:
    - PFOS exceeds screening levels.

Hangar 680 Pilot Test Treatment Process

Treatment Direction



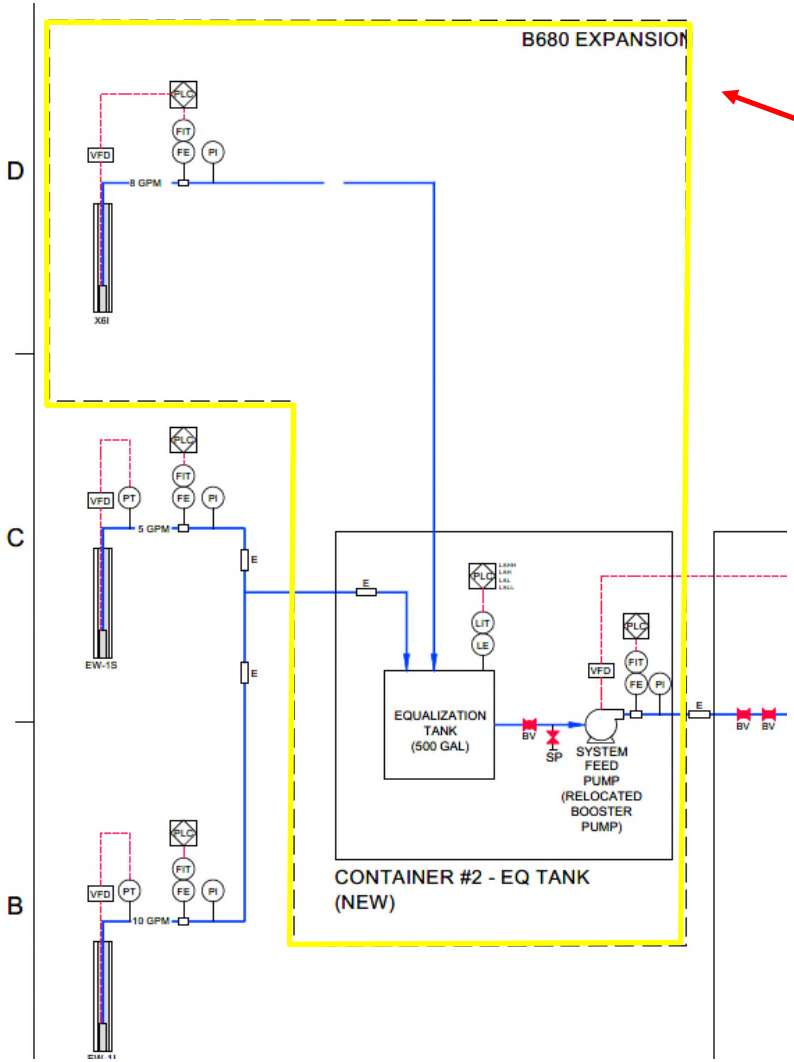
Phase II PFAS Investigation

Hangar 680 Groundwater Treatment Pilot Test

- Planned modifications to the Hangar 680
  - PADEP approved modifications to the Hangar 680 system on January 27, 2021.
  - Modifications will include:
    - Connection of an additional extraction well defined as EW6I.
      - 8-inch diameter open borehole from 70 to 150 feet.
      - PFOS and PFOA detected at 56,600 ppt.
      - Located along ANG property line.
    - Place a second Conex box to house an equalization tank.
    - Reroute piping and electrical from existing extraction wells to the equalization tank.
  - Goal is to optimize mass removal and further test IX resin removal efficiency with potentially higher levels of PFOA and PFOS with incoming influent.

Phase II PFAS Investigation

Hangar 680 Groundwater Treatment Pilot Test (cont.)



Approved Modifications

LEGEND

- PRIMARY PROCESS
- SECONDARY PROCESS
- BACKWASH PROCESS
- CONTROL SIGNAL LINE
- SLIP LINE
- BALL VALVE
- CHECK VALVE
- SAMPLE PORT
- ELECTRIC HEATED HOSE
- PROGRAMMABLE LOGIC CONTROLLER
- VARIABLE FREQUENCY DRIVE
- DIFFERENTIAL PRESSURE ELEMENT
- DIFFERENTIAL PRESSURE TRANSMITTER
- PRESSURE INDICATOR
- FLOW INDICATOR TRANSMITTER
- FLOW ELEMENT
- MOTOR CONTROL VALVE
- LEVEL INDICATOR TRANSMITTER
- LEVEL ELEMENT
- LEVEL TRANSMITTER
- PUMP

ABBREVIATIONS

*AHH	ALARM HIGH-HIGH (SHUTDOWN)
*AH	ALARM HIGH
*AL	ALARM LOW
*ALL	ALARM LOW-LOW (SHUTDOWN)

Phase II PFAS Investigation

PlumeStop Design Verification Test (DVT)

- A workplan for a PlumeStop Design Verification Test (DVT) at the Northern Ponding Area was submitted to the EPA and PADEP in January 2020. The purpose of the study is to evaluate the feasibility of PlumeStop as a permeable reactive barrier (PRB) along the Keith Valley Road property line.
- PlumeStop is an in-situ (in ground) technology composed of very fine particles of activated carbon suspended in water using unique organic polymer dispersion chemistry.
- The test is planned for a phased approach:
  - Phase I – Overburden groundwater and soil study
  - Phase II – PlumeStop injection test
- Phase I occurred in late March 2020. A draft technical memo summarizing Phase I results and the revised workplan for the injection test is currently under regulatory review.

Stormwater System Evaluation

- The NASJRB storm water system was evaluated to locate portions where PFAS impacted groundwater may infiltrate and discharge to surface water. Over four miles of storm sewer lines reviewed, using remote video inspections.
- A Tech Memo with recommended repairs was finalized in July 2020.
  - Joint Rehabilitation on 6,136 LF of concrete pipe (cleaning, joint sealing, testing)
  - Abandonment of four pipes and three structures
  - Replacement of 201 LF of 24” metal pipe
- Repairs to the Outfall 2 line were completed in May 2021. Work on lines to Outfalls 5 and 8 is ongoing.
- Separate efforts have been completed to plug a sewer line discharging to Outfall 2 and to repair collapsed portions of line to Outfall 8.

PFAS Information and Resources

Department of the Navy (DON) Perfluorinated Compounds (PFC) / Perfluoroalkyl Substances (PFAS) website

http://www.secnav.navy.mil/eie/pages/pfc-pfas.aspx#

NAVFAC BRAC PMO Websites (includes links to environmental information and the administrative record):

- http://bracpmo.navy.mil/brac_bases/northeast/reserve_base_willow_grove/documents.html
- http://bracpmo.navy.mil/brac_bases/northeast/former_warfare_center_warminster/documents.html

A subscription service is available on these websites to receive e-mail notification of new information.

PFAS Information and Resources
(continued)

Environmental Protection Agency
https://www.epa.gov/pfas
https://www.epa.gov/superfund/willowgrove

Agency for Toxic Substances and Disease Registry
https://www.atsdr.cdc.gov/pfc/index.html

Pennsylvania Department of Environmental Protection
http://www.dep.pa.gov/Citizens/My-Water/drinking_water/Pages/default.aspx

Horsham Township
http://www.Horsham.org/default.aspx

Warminster Township
http://warminstertownship.org/information-on-perfluorinated-chemicals-pfoa-and-pfos/

PFAS Information and Resources
(continued)

Horsham Water and Sewer Authority
https://www.horshamwater-sewer.com

Warminster Township Municipal Authority
https://www.warminsterauthority.com/

Pennsylvania Department of Health
http://www.health.pa.gov/My%20Health/Environmental%20Health/Pages/default.aspx

Horsham Township Library Information Repository
https://www.horshamlibrary.org/willow-grove-nas

For more Information

Email and phone contact are preferred due to current COVID restrictions.

Dawn DeFreitas
*BR*AC Environmental Coordinator
BRAC Program Mgmt. Office East
4911 South Broad St.
Philadelphia, PA 19112
Phone: (215) 897-4903
dawn.m.defreitas.civ@us.navy.mil

Bill Myer, (COL Ret.), PG
Environmental Restoration Program Manager NGB/A4VR
3501 Fetchet Ave
Shepperd Hall
Joint Base Andrews, MD 20762
Phone: (240) 612-8473
william.myer.2@us.af.mil

Andrea Barbieri
Remedial Project Manager
Environmental Protection Agency, Region III
1650 Arch Street
(Mail Code: 3SD11)
Philadelphia, PA 19103
Phone: (215) 814-3374
Barbieri.Andrea@epa.gov

Colin Wade
Project Officer
Pennsylvania Department of Environmental Protection
2 East Main Street
Norristown, PA 19401
Phone: (484) 250-5722
cowade@pa.gov

Next Restoration Advisory Board (RAB) meeting:
December 8, 2021 at 6:00 p.m. (virtual meeting is planned)

Environmental Restoration discussions have concluded.

Health Professional discussions will now follow.