NAVAL AIR STATION JOINT RESERVE BASE (NAS JRB) WILLOW GROVE
Restoration Advisory Board (RAB) Meeting Minutes

Meeting Date: September 13, 2018
Meeting Time: 6:00 p.m.
Meeting Place: Horsham Township Library

	Name	Organization
Attendance:	Willie Lin (R)	Navy BRAC PMO
	Greg Preston	Navy BRAC PMO
	Martin Schy	NAS JRB Navy Caretaker's Office, BRAC
	Jim Rugh	NAS JRB Navy Caretaker's Office, BRAC
	Sarah Kloss (R)	EPA
	Deborah Goldblum	EPA
	Matt Konfirst	EPA
	Roger Reinhart	EPA
	Mark Leipert	EPA
	Colin Wade (R)	PADEP
	Jessica Kasmari (R)	PADEP
	Rose Wuenschel (R)	PADEP
	Andrew Frebowitz	Tetra Tech
	Lt Col Jacqueline Siciliano	PA Air National Guard
	Capt. Lydia Stefanik	PA Air National Guard
	Keith Freihofer	Air National Guard
	Lt. Christine Lloyd	ATSDR
	Farhad Ahmed	Pennsylvania Department of Health
	Amil Nair	Pennsylvania Department of Health
	Andrew Salerno	Pennsylvania Department of Health
	Sharon Watkins	Pennsylvania Department of Health
	Kyle Shmeck	Montgomery County Health Department
	Toby Kessler	Gilmore Associates/Horsham Water and Sewer
	Mike Pickel	Horsham Water and Sewer
	Christian Jones	Warrington Township Water and Sewer
	Carol Baker	Warrington Township
	Dan Goode	United States Geological Survey
	Tom Ames	HLRA
	Bill Walker	Horsham Township
	Veronica Hill Milbourne	Horsham Township Council
	Dawn Byers	PA Rep. Watson's Office
	Matt Machusick	Leidos
	Carrie McGowan	AECOM
	Chris Crockett	Aqua PA
	Charles Hertz	Aqua PA

Jim Vetrini (R)	RAB
Joseph McGrath (R)	RAB
Robert Grigg	Envirogen
Zeta Cross	Springfield Environmental Action Committee
Kathleen Jayne	Resident
Susan Neise	Resident
Harvey Turner	Resident
Nancy Jaeschke	Resident
Mike Tyrmbiski	Resident
Pam Keys	Resident
Hope Grosse	Resident
Other Unidentified Residents	

(R) Designates RAB Member

Willie Lin, the Navy's Base Realignment and Closure (BRAC) Environmental Coordinator and RAB Co-Chair, opened the meeting by greeting the attendees. Mr. Lin noted that this meeting will include presentations from the Navy and Air National Guard (ANG). Mr. Lin noted that following the environmental restoration presentations, a separate health presentation by the Pennsylvania Department of Health (PADOH) would occur. Mr. Lin asked RAB members and government representatives to introduce themselves.

Mr. Lin commenced with the Navy presentation. Mr. Lin discussed the purpose of the RAB and gave an overview of the means in which regulatory agencies exchange information with the community. The RAB is established to address environmental restoration activities and not as a forum to discuss health issues. The Pennsylvania Department of Health is present and will be available after the RAB meeting to discuss health concerns.

Mr. Lin presented a summary of the phases of the environmental restoration process. Mr. Lin introduced Andrew Frebowitz to provide an update on the cleanup sites, including landfill Sites 3 and 12, and Site 5, the former Fire Training Area. Mr. Frebowitz provided background on Sites 3 and 12 stating that they were former landfills used by the Public Works Department at the former facility. Results from the remedial investigations (RIs) at both sites showed soils with elevated levels of metals and polycyclic aromatic hydrocarbons. In addition, groundwater at Site 3 showed elevated levels of the volatile organic compound (VOC) tetrachloroethene (PCE). Feasibility studies have been submitted for both sites to present various clean-up alternatives. The Navy is in the process of responding to review comments from the regulatory review and preparing the revised reports. The next step is to prepare the proposed remedial action plan and record of decision selecting the final remedy for the sites.

Mr. Frebowitz discussed the remediation for Site 5 groundwater. The site was a former fire training area where solvents were stored and burned. An active anaerobic bioremediation system is in place to reduce the parent compounds trichloroethene (TCE) and PCE. Quarterly monitoring to assess anaerobic conditions and annual performance monitoring to obtain concentrations of VOCs was conducted in May 2018. Monitoring results show good conditions for bioremediation and a reduction in concentrations of VOCs. Additional injections of amendments for the treatment system will be conducted based on monitoring results.

Mr. Frebowitz explained that the second five-year review is being finalized for the facility and will be completed in September 2018. The five-year review is a requirement of the Superfund (CERCLA) process to ensure that remedies that have been implemented are effectively protecting public health and the environment. The Navy is preparing the review for Site 5 and ANG is preparing the review for Site 1. A public notice was published in a local paper in November 2017 announcing the review and requesting public participation. Community members who were interested in providing comments contacted the Navy and interviews were conducted. The results of the interviews will be included on the five-year review.

Mr. Lin began the presentation for the next agenda item, perfluorinated compounds (PFCs)/perfluoroakyl substances (PFAS). These chemicals are man-made and found in fire-fighting solutions. In mid-2014, the PFCs perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) were found in public drinking water wells near NASJRB Willow Grove as part of sampling under EPA's Unregulated Contaminant Monitoring Rule 3 (UCMR3). At that time, the health advisory levels were 0.4 micrograms per liter, or 400 parts per trillion (ppt) for PFOA, and 0.2 micrograms per liter, or 200 ppt for PFOS. In 2014, the Navy began sampling private drinking wells in the area and Horsham Water and Sewer municipal drinking wells. In May 2016, the EPA released new lifetime health advisory levels of 70 ppt for combined PFOA and PFOS. The Navy is providing bottled water to those well users with PFOA and PFOS above the health advisory level until they can be connected to public water. Mr. Lin stated that if there are health concerns, they should be addressed with a health professional. Links to health information were included in the presentation.

Mr. Lin provided a summary of the Navy's private well sampling activities. Tetra Tech., a Navy contractor, has assumed sampling responsibilities previously conducted by EPA. Approximately 500 wells have been sampled, of which approximately 100 locations have levels above the health advisory of 70 ppt combined PFOA and PFOS. Mr. Lin showed the locations of the samples and results. The figure is in the handouts and locations in red exceed the health advisory level, locations in orange are between 40 and 70 ppt and are sampled quarterly, and yellow and green are below 40 ppt. The figure is updated periodically and may be found on the Navy website.

Of the wells above the health advisory, about 15 remain to be connected to the public water supply. Connections are being arranged through Horsham Water and Sewer Authority. Bottled water is being provided to locations above the health advisory where connections have not yet been completed. The Navy is also funding filtration systems at Horsham Water and Sewer. Treated public water is now below the lifetime health advisory and the wells are back to drinking water service. The Navy has funded approximately $16 million to date to Horsham Water and Sewer for public water treatment.

Mr. Lin introduced Carrie McGowan from AECOM/Resolution, a Navy consultant, to discuss the RI for PFAS. A draft report was submitted in November 2016 summarizing the data collected and identifying data gaps and strategies to collect additional needed data. Much of the additional data has been collected, but some additional data collection will be required. Ms. McGowan explained that the next step will also include some source control activities in the hangar area and at Site 5 Work will likely include additional well installation, soil sampling and design of a groundwater recovery and treatment system.

Ms. McGowan provided information on an ongoing storm water investigation. The outfalls were sampled; concentrations are lower during storm events. The outfalls to Park Creek on the northern end of the base have been closed and the outlet at the retention basin has been raised to hold more water back from discharging to the creek. An evaluation to determine where groundwater is entering the storm sewer on the facility is also being conducted. Some groundwater has been seen in the storm system during a dry period. A camera will be used to see what these areas look like and determine the best way to prevent infiltration of groundwater into the system.

Mr. Lin stated an action memorandum for a soil removal action near the hangar area was completed on June 11, 2018. The removal will target soils with high concentrations of PFAS and is scheduled for this fall. There are no standards for soils, but the Navy conducted a statistical analysis to determine hot spots and a removal action goal of approximately 1 milligram per kilogram (mg/kg) (1,000 microgram per kilogram) of PFOS. Soil results near the aircraft maintenance hangar were detected at levels up to 98 mg/kg. The impacted soils will be removed with the intention to remove a source of PFAS which could migrate to groundwater.

Mr. Lin referred attendees to the handouts for links to additional information and resources, then asked for questions from the RAB members.

Jim Vetrini inquired about a time frame for the completion of work at the sites and whether the land use would be restricted or not. Mr. Lin explained that Sites 3 and 12 will begin to undergo remedial action most likely in 2020. Land use restrictions are based on whether contamination is left in place or the site is remediated to unrestricted use. The Site 5 remedy is underway and is working in reducing the contaminants.

Tom Ames asked whether the results from performance monitoring that occurred in June would be made available. Mr. Frebowitz answered that once the report is finalized the data will be made available to the public.

Mr. Ames requested information on the soil removal by the Navy, the possibility of installation of additional monitoring wells, and more insight into the five-year review. Mr. Lin responded that the final work plan for soil removal will be released shortly, and soil removal will be performed after the work plan is approved. He continued that a five-year review was prepared and submitted to the regulators. It will be completed by the end of September. Mr. Lin also stated that additional monitoring wells will be installed to delineate the extent of the plume during the upcoming Phase 2 remedial investigation.

An unidentified attendee inquired about the availability of the Site 5 reports. Mr. Lin explained the old reports are in the administrative record and the new reports will also be submitted there.

An unidentified attendee requested to know the location where the soil that is to be removed will be taken. Mr. Lin explained the contractor responsible for the disposal was not present, but it will be taken to a permitted RCRA Subtitle D landfill. The Navy has a requirement to notify the landfill that the soil contains PFAS.

An unidentified attendee asked about the boundary of the area being tested for PFAS contamination as well as water suppliers in the area. Mr. Lin responded the entire base was being investigated. Private and Horsham Water and Sewer Authority public wells near the base are also monitored.

An unidentified attendee expressed concern about the contamination at Neshaminy Plant. Mr. Lin responded the Air National Guard presentation will address that issue later in the meeting.

An unidentified attendee inquired about the levels for unrestricted PFC use and what are the goals for PFOA and PFAS on the base. Mr. Lin responded there currently are no established regulatory standards and that the base is focusing on soil removal now in the absence of the established standard. The attendee asked if the base wells were currently being monitored for PFCs and if the database regarding private drinking wells had been updated. Mr. Lin responded the current contract does not call for PFC sampling, but it will be in the new contract. Regarding the private dinking well database, the last update posted to the website was in January 2018, but more recent results indicated no significant changes since that posting. The attendee asked about sampling for PFCs in storm water flowing into Park Creek. Mr. Lin responded the current contract does not call for PFC sampling, but it will be in the new contract.

Hope Grosse inquired about the effectiveness of removing the soil and what it would accomplish. Mr. Lin replied that by removing the contaminated soil it would help to remove the source of the contamination in the groundwater. Ms. Grosse asked if there had been any investigation in groundwater that was off-base. Mr. Lin answered that there is a Phase 2 investigation for off-site investigation being planned.

Paula Myers asked if there was another process besides soil removal and disposal in a landfill to contain the contamination. Mr. Lin replied that it is currently the best option and would help address the source area. Ms. Myers inquired if there was groundwater contamination spreading to the areas of Upper Dublin, Abington, and Cheltenham. Mr. Lin replied that there is no indication that groundwater in areas outside of Horsham and Warrington are being impacted by the base.

An unidentified attendee asked what the highest concentration of PFCs in the groundwater has been. Mr. Freihofer answered that the highest recorded level has been 300,000 parts per trillion.

There were no additional questions for the Navy. Mr. Lin added that future RAB meetings are scheduled for December 12, 2018 at 2:00 pm; March 14, 2019; and May 30, 2019. Mr. Lin introduced Mr. Freihofer to commence with the ANG presentation.

Mr. Freihofer provided an update on Site ST01, a former fuel yard where a jet fuel spill occurred in the 1970s. A biosparge system for groundwater remediation was operating but was replaced by persulfate injections in 2016. The petroleum tanks were removed in 2016 to allow access to impacted soils. Approximately 175 tons of petroleum impacted soil was removed and disposed of at a licensed facility.

Mr. Freihofer continued the presentation with an update on the Privet Road Site. This was a former solid waste management area that has levels of TCE and PCE in groundwater below EPA's Maximum Contaminant Levels (MCLs). Leidos has been contracted to conduct long-term,

biannual monitoring. A five-year review is being conducted for the Privet Road Compound Site. The interviews for the five-year review have been completed.

Mr. Freihofer began the discussion on PFAS at the facility. A preliminary assessment conducted in 2015 identified 10 potential PFAS source areas. These include areas where PFAS may have been used or stored, such as hangars, or where firefighting foam may have flowed to, such as the storm basin and waste water treatment plant. Mr. Freihofer introduced Matt Machusick of Leidos to provide more details on the PFAS investigation.

Mr. Machusick discussed the PFOS/PFOA investigation Leidos has been conducting. Another round of groundwater sampling was completed in March. A joint Navy and ANG well elevation measurement event was also conducted to produce a regional groundwater flow map. A baseflow and storm water sampling events were also performed. A conceptual design for improving treatment of the storm water discharge is also in preparation.

Mr. Machusick discussed the results of surface water sampling and referred to figures in the handout showing sampling locations and results. PFCs were detected at the ANG facility as well as samples in Park Creek, Little Neshaminy Creek, and Neshaminy Creek with the highest concentrations at the Base with decreasing levels with distance downstream. PFCs were also detected in upstream locations indicating other sources may be contributing to the PFCs in the watershed. Mr. Machusick stated that the main discharge to surface water from the Base is through the storm basin which is equipped with a treatment system to reduce PFC concentrations.

Mr. Machusick continued with the groundwater investigation and stated a water elevation study was conducted concurrently with the Navy to develop a better understanding of groundwater flow. Sampling was also conducted in March 2018 with results in 78 or the 85 locations exceeding the health advisory level of 70 ppt. The highest concentrations were detected in the southern portion of the ANG facility as well as near buildings in the central portion of the facility. The maximum concentration detected was approximately 300,000 ppt combined PFOA and PFOS. No additional sampling is scheduled at this time.

Mr. Freihofer discussed PFOS and PFOA in drinking water. There's an agreement with Warrington Township to install carbon filtration on five of their supply wells. Private well locations with detections above 70 ppt are being connected to the public supply. Mr. Freihofer presented a slide showing the number of private wells sampled with the number above the 70 ppt health advisory level and number of connections completed. Wood (formerly Amec Foster Wheeler) is conducting the private well sampling within ANG's area of responsibility and the contact information is included in the handouts.

An unidentified attendee inquired about the elevated PFC levels in the areas of Abington, Upper Dublin, and Cheltenham and if the Base could be the source. Mr. Machusick answered that PFCs are used in an array of processes and are present in many places and those locations are far from the Base.

An unidentified attendee asked about the level of protection the samplers were wearing while collecting samples. Mr. Machusick answered that the samplers follow a strict protocol to protect the sample, which is basic non-pfas containing work clothes with gloves, or OSHA level D attire.

An unidentified attendee inquired about what levels were being discharged after treatment at the basin at the facility. Mr. Machusick explained the results ranged from 3 to 2,000 ppt. On average when the system was properly operating, it was 3 ppt. Plans for improving the system are being prepared.

An unidentified attendee asked if the water at the ANG facility was safe to drink. Mr. Freihofer replied that bottled water is being provided.

There were no other questions and Mr. Lin adjourned the RAB meeting. After a short break, the Agency for Toxic Substances and Disease Registry (ATSDR) and Sharon Watkins with the Pennsylvania Department of Health (PADOH) provided a health discussion to community members.

NASJRB WILLOW GROVE

RESTORATION ADVISORY BOARD (RAB)

SEPTEMBER 13, 2018

RAB Agenda

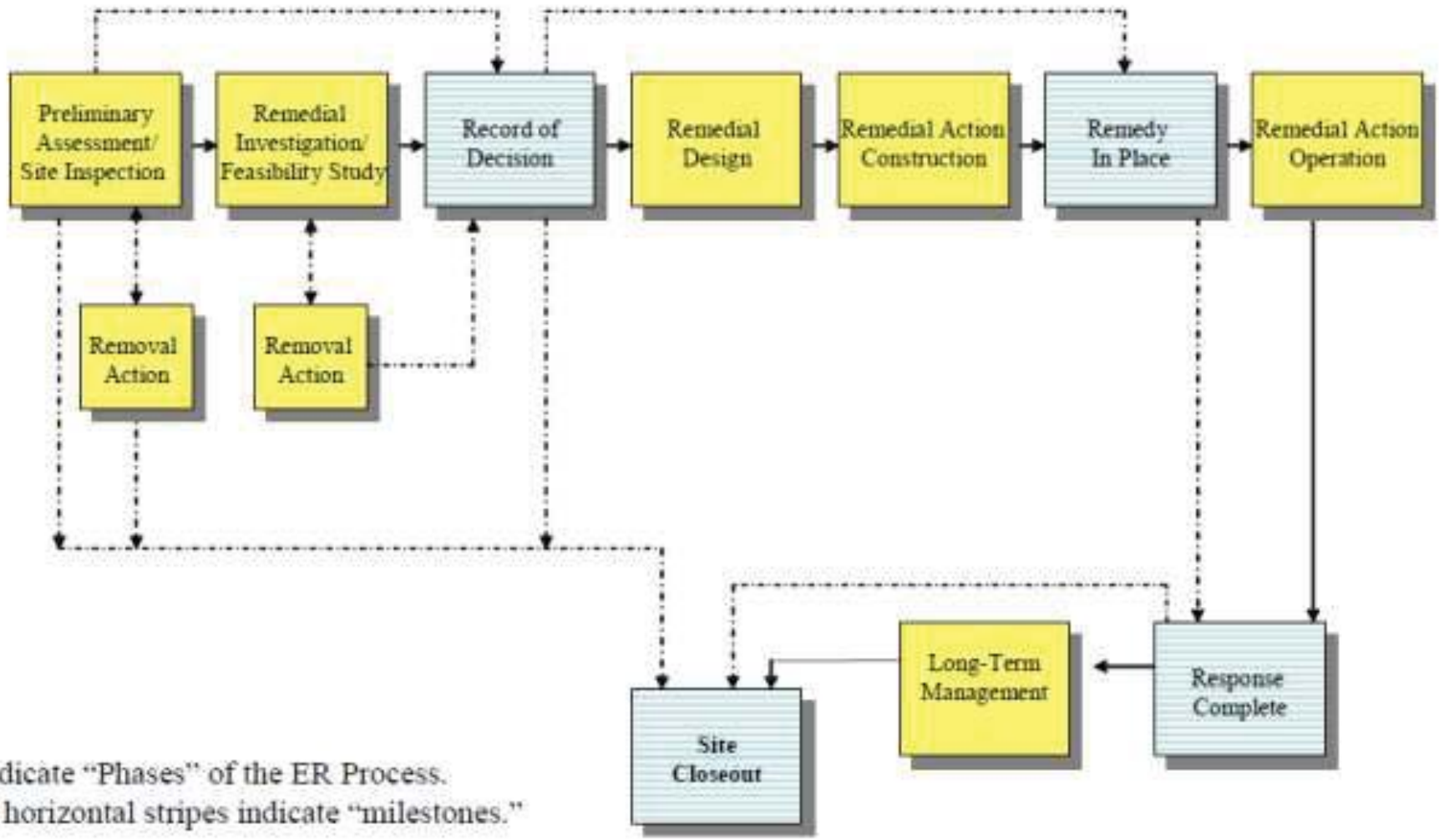
- Welcome Community and RAB Members
- Environmental Restoration Status
- Perfluorinated Compounds (PFC)/Perfluoroalkyl Substances (PFAS) Status
- Questions
- Closing Remarks

What is a RAB?

- 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 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.
- Health related issues are not addressed by the RAB. The Pennsylvania Department of Health will be available after the Navy and Air National Guard Environmental Restoration presentations.

Source: DoD RAB Rule Handbook

Environmental Restoration Program

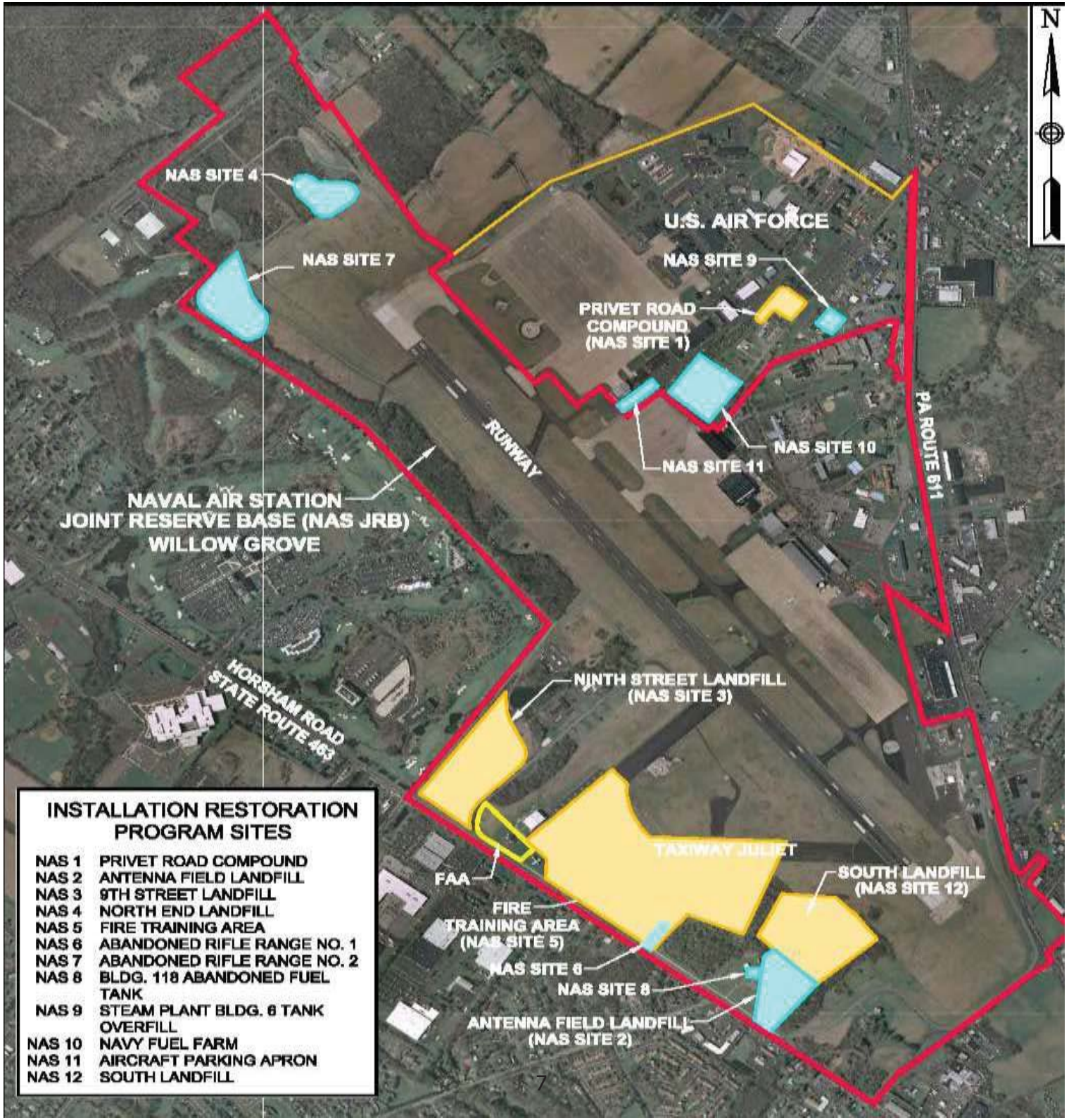


Notes:
Yellow boxes indicate "Phases" of the ER Process.
Boxes with blue horizontal stripes indicate "milestones."

Environmental Restoration Status

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 Pending
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 to follow
PFCs/PFAS	Perflourinated Compounds/Per- and Polyfluoroalkyl substances	OU 12	TCRA Sept. 2015, Final PA/SI Mar. 2016, RI in progress.


N
NAS SITE 4
NAS SITE 7
U.S. AIR FORCE
NAS SITE 9
PRIVET ROAD COMPOUND (NAS SITE 1)
RUNWAY
PA ROUTE 611
NAS SITE 10
NAS SITE 11
NAVAL AIR STATION JOINT RESERVE BASE (NAS JRB) WILLOW GROVE
HORSHAM ROAD STATE ROUTE 463
NINTH STREET LANDFILL (NAS SITE 3)
TAXIWAY JULIET
FAA
SOUTH LANDFILL (NAS SITE 12)
FIRE TRAINING AREA (NAS SITE 5)
NAS SITE 6
NAS SITE 8
ANTENNA FIELD LANDFILL (NAS SITE 2)
INSTALLATION RESTORATION PROGRAM SITES
NAS 1 PRIVET ROAD COMPOUND
NAS 2 ANTENNA FIELD LANDFILL
NAS 3 9TH STREET LANDFILL
NAS 4 NORTH END LANDFILL
NAS 5 FIRE TRAINING AREA
NAS 6 ABANDONED RIFLE RANGE NO. 1
NAS 7 ABANDONED RIFLE RANGE NO. 2
NAS 8 BLDG. 118 ABANDONED FUEL TANK
NAS 9 STEAM PLANT BLDG. 6 TANK OVERFILL
NAS 10 NAVY FUEL FARM
NAS 11 AIRCRAFT PARKING APRON
NAS 12 SOUTH LANDFILL

Site 3 and Site 12 Landfills

- Both sites are former landfills used by the Base Public Works Dept.
- Remedial Investigations showed elevated levels of metals and PAHs in surface and subsurface soils.
- Site 3 groundwater showed low levels of PCE.
- Feasibility Studies (FS) evaluated remedial alternatives.
- EPA/PADEP have reviewed drafts of both FS. Navy has prepared responses and is revising the documents for completion in 2018.
- Record of decision (ROD) will be prepared in 2019.

Site 5 – Fire Training Area Groundwater

Site 5 Groundwater Remedial Action

- Anaerobic bioremediation system continues to operate successfully.
- Annual performance monitoring is being conducted in accordance with approved Operation, Maintenance, and Monitoring Plan.
  - Annual performance monitoring sampling conducted in May 2018
- Quarterly monitoring of anaerobic conditions conducted
  - Last monitoring conducted in August 2018
- Additional injections of amendments will be conducted based on monitoring results.
- Results continue to show good conditions for biodegradation of volatile organic compounds (VOCs) and decreasing trends of VOCs.

Five Year Review

- The Second Five Year Review for Former NASJRB Willow Grove is being prepared.
  - The Five Year Review process is required under Comprehensive Environmental Response, Compensation and Liability Act (also known as Superfund) for actions at sites where contaminants remain above levels that allow for unlimited use and unrestricted exposure.
  - The purpose is to ensure that implemented remedies are effectively protecting public health and the environment. The review assesses the remedy at Site 5, Fire Training Area.
  - Public participation was encouraged through public notice (Nov. 2017). Interviews with interested community members were conducted
- The Five Year Review will be completed in September 2018.

Perfluorinated Compounds (PFC) Perfluoroalkyl Substances (PFAS) Status

PFOA / PFOS Background

- In mid-2014, PFCs 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 found in 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.

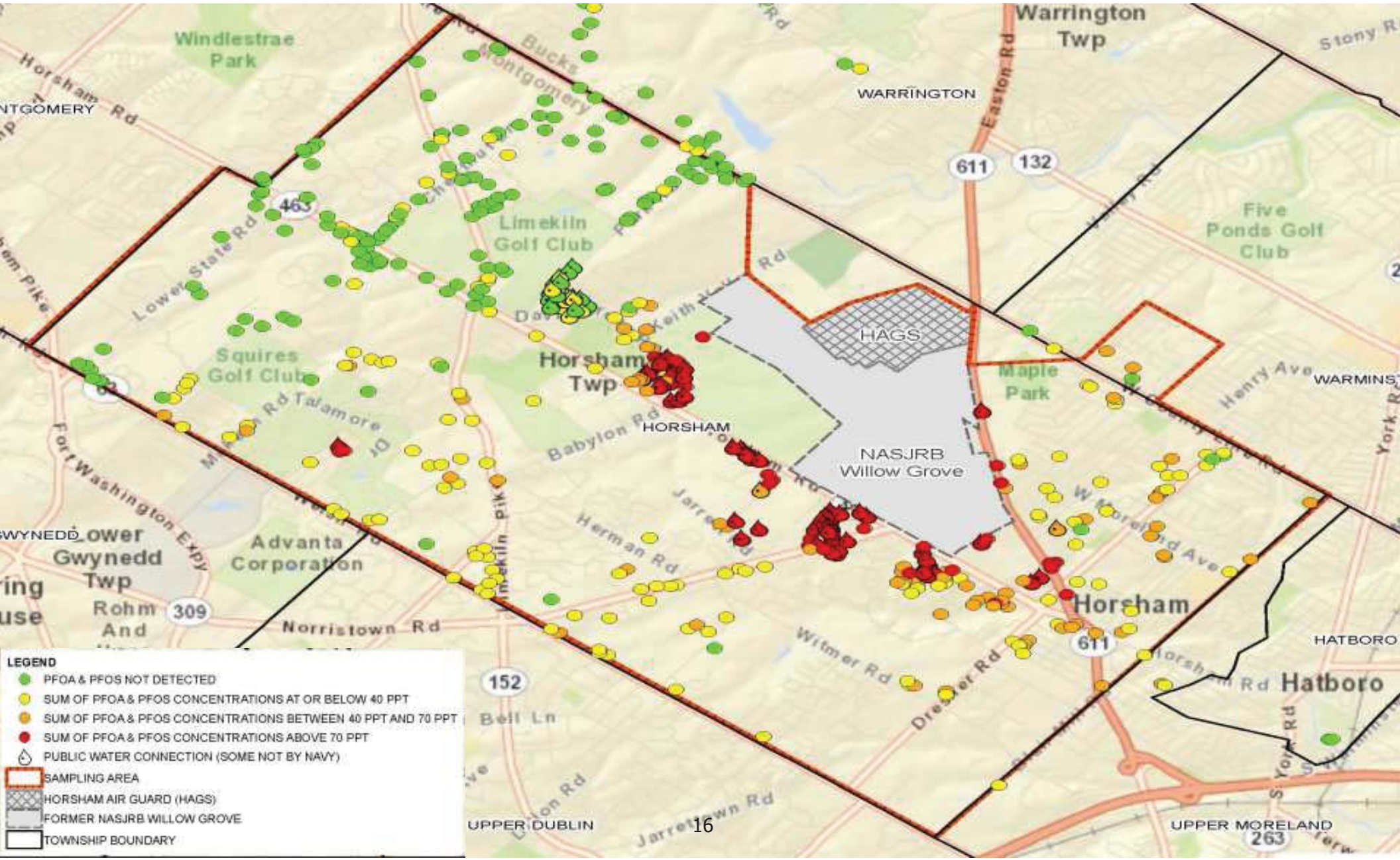
PFOA / PFOS Background

- Bottled drinking water is provided for those above the PFOA/PFOS health advisory levels, due to Navy sources of contamination, until connections to municipal water can be made.
- 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.

Private Drinking Water Well Sampling

- From 2014 – mid 2017, the Navy requested support from the EPA to sample nearby private drinking water wells for PFOA and PFOS.
- Private drinking water well sampling for PFOA/PFOS and provision of bottled drinking water is now being performed by Tetra Tech, a U.S. Navy contractor.
- The primary point-of-contact is:
  - **Mr. Andrew Frebowitz, Tetra Tech Project Manager**
  - **E-mail: andy.frebowitz@tetratech.com**
  - **Phone: (610) 382-1170**

Private Drinking Water Well Sampling



Summary of Drinking Water Actions

- Private drinking water wells sampled for PFOA/PFOS near NASJRB Willow Grove:
  - Private wells sampled: ~ 500
  - Private wells above lifetime HA (>70 ppt): 99
  - Private wells remaining to be connected: 15
  - Private wells below HA/monitored (>40 ppt): 68
- The Navy has funded filtration systems at five Horsham Water and Sewer Authority (HWSA) public wells (#10, 17, 21, 26, and 40) which are above the HA. All are back to drinking water service.
- The Navy has provided funds to HWSA for filtration system costs and drinking water connections above the HA. The total funding is over $16 million. Additional funds are being provided in 2018.

PFAS Investigation

- The Navy is performing a Remedial Investigation (RI) to better understand the nature and extent of the PFAS contamination at the Navy base.
- Draft RI Data Report prepared November 2016.
  - Identified data gaps for further investigation
  - Additional field investigation performed in 2017
  - Source control actions are being developed from RI information
- A Phase I RI Report will be issued in 2018.

PFAS Investigation (continued)

Phase II Remedial Investigation:

- Will initiate late in 2018
- Focused on source areas identified in phase I.
  - Aircraft maintenance facilities
  - Former fire training area
- The investigation includes, but is not limited to:
  - Additional monitoring wells and soil sampling in source areas
  - Evaluation of groundwater extraction and treatment systems
  - Periodic surface water monitoring

PFAS Stormwater Evaluation

Outfalls/Storm Sewers

- Outfall sampling conducted in August 2017 showed PFOA/PFOS concentrations in northern outfalls to Park Creek and Pennypack Creek were significantly lower after a rain event.
- Outfalls along the northern end of the base that discharge to Park Creek have been closed. The retention basin has been modified to hold additional storm water. Additional actions are being evaluated.

PFAS Stormwater Evaluation (cont.)

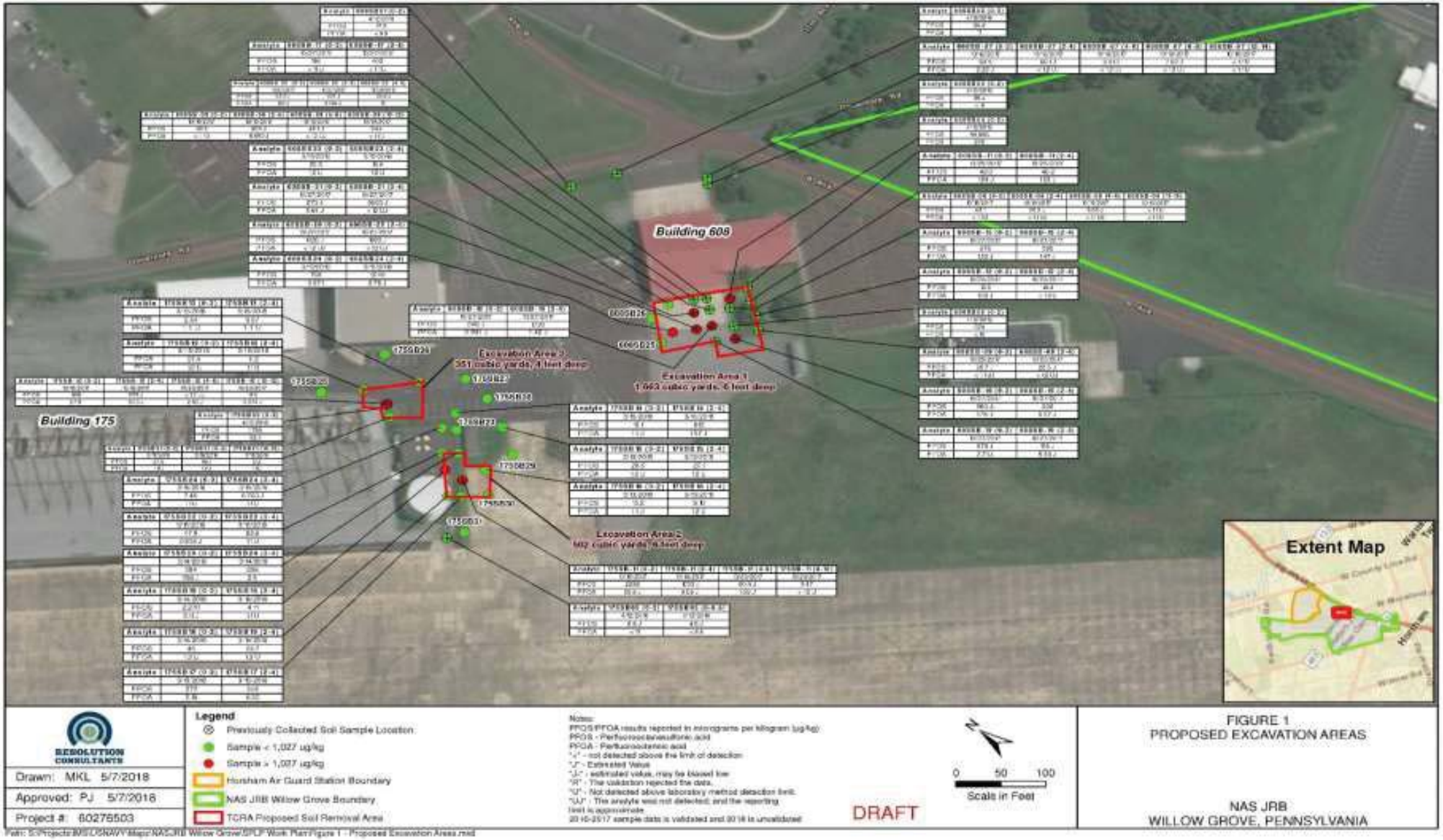
Outfalls/Storm Sewers (continued)

- Stormwater system being evaluated to locate portions where contaminated groundwater may infiltrate and discharge to local surface water. Over two miles of storm sewer lines reviewed.
- A survey of the systems identified several storm sewer lines for remote TV inspections, planned for fall 2018, delayed due to unusually wet weather.
- A report with recommendations for storm sewer rehabilitation and inlet closures planned late 2018.

PFAS Removal Action

- A removal action to excavate soils with high levels of PFAS will be performed this fall.
- PFOA and PFOS are water soluble substances
- Quantitative and site-specific Soil-to-Groundwater leachability criteria for PFOA and PFOS have not been established.
- In the absence of established leachability criteria for soil, a statistical analysis was performed to identify the extent of removal. PFOS had the highest magnitude concentrations detected at the site in both soil and groundwater and was the focus of the statistical analysis.
- 1,027 µg/kg (or 1 mg/kg) for PFOS was calculated as the 95th upper percentile level and is used as the removal action boundaries
- The Time-Critical Removal Action Memorandum is available in the administrative record.

PFAS Removal Action (cont.)



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

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

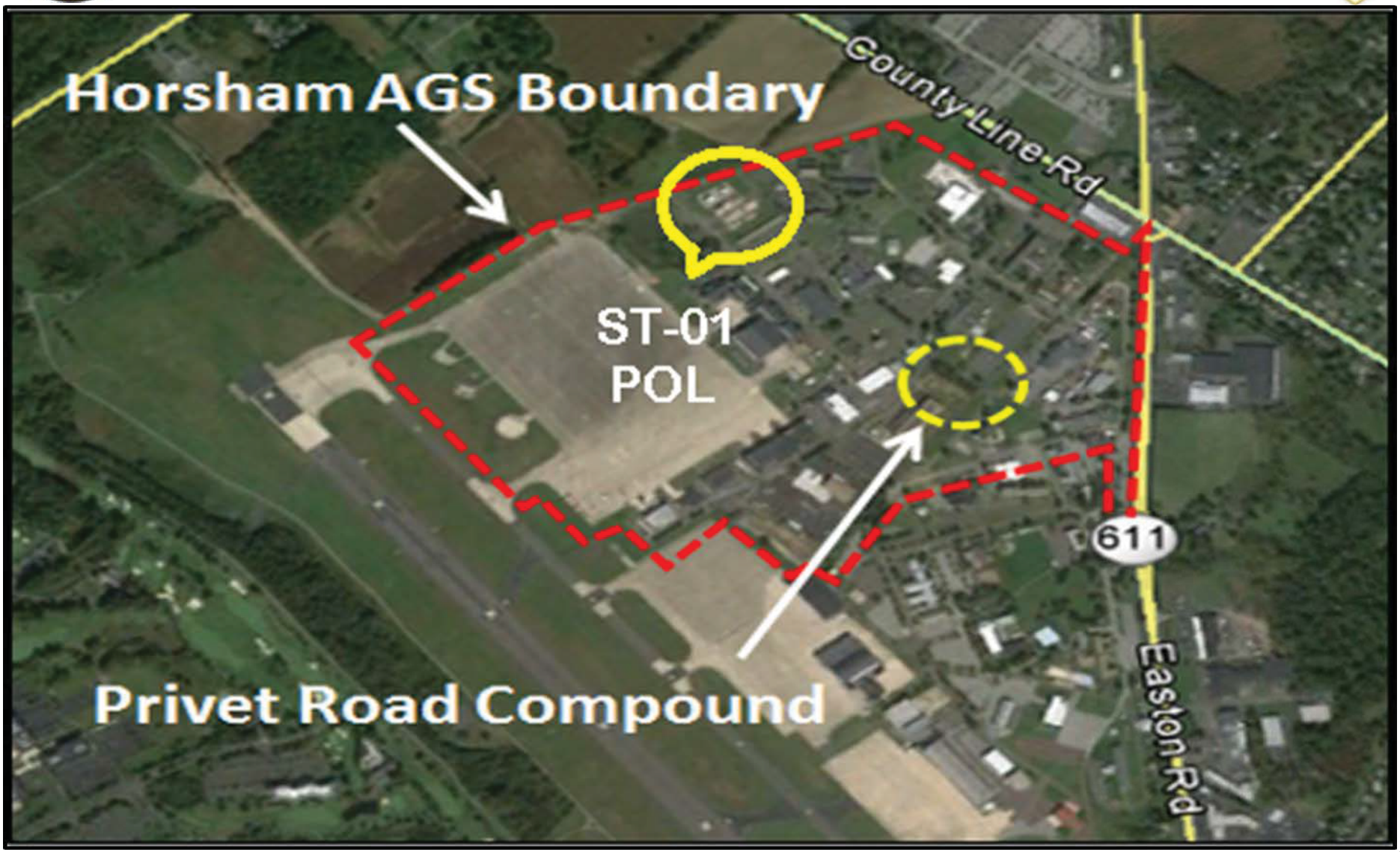
NASJRB Willow Grove

- Questions or comments from the RAB?
- Community questions or comments?
- Future RAB Meetings
  - December 12, 2018 @ 2:00 p.m. (Wed.)
  - March 14, 2019 @ 6:00 p.m. (Thurs.)
  - May 30, 2019 @ 6:00 p.m. (Thurs.)
- Closing Navy Remarks

Restoration Advisory Board
Horsham Air Guard Station

Keith Freihofer
NGB/A4OR
13 September 2018

Environmental Restoration Program Sites



Air Force Reserve ST-01 POL

- Former Air Force Reserve Petroleum Tank Area
  - Site originated from a jet fuel spill in the 1970's
  - Injections of persulfate and Epsom salt replaced the biosparge system in 2016
  - Petroleum tanks were dismantled in 2016 allowing for removal of any petroleum impacted soil that may be present under the tanks. 175 tons of presumed petroleum impacted soil removed from beneath tanks and disposed of at licensed facility.
  - Confirmatory sampling expected to begin Summer 2018 in accordance with 25 Pennsylvania Code, Section 245.310 of the Department of Environmental Protection (DEP)'s Rules and Regulations.

- POC: Ms. Margaret Patterson: margaret.patterson@us.af.mil

Privet Road Compound

- Former waste management area for Naval Air Station Joint Reserve Base Willow Grove
- Sampling completed in June 2016 indicates trichloroethene (TCE) and tetrachloroethene (PCE) exist in the groundwater but levels are below maximum contaminant levels (MCL) set by the U.S. Environmental Protection Agency for drinking water quality
- Leidos, Inc. is contracted for continued long-term monitoring. Biannual groundwater sampling and land use control inspections will continue to be conducted pending a final site remedy
- Second Five-Year Review underway for Privet Road groundwater contamination by BB&E Inc. on behalf of the ANG
- The purpose of the Five-Year Review is to evaluate the implementation and performance of the remedy to determine if it is and will continue to be protective of human health and the environment

PFOS/PFOA on Horsham AGS

- In 2015, ANG completed a Preliminary Assessment of potential PFOS/PFOA release sites at the Horsham Air Guard Station (AGS). Ten potential source areas identified in the PA include:
  - Buildings that contained foam fire suppression systems
  - Areas that may have received runoff from foam releases
  - Stormwater sediment basin
  - Former waste water treatment plant
  - Former storage area for wastewater treatment sludge
  - These potential source areas are being further investigated by Leidos in a PFOS/PFOA Facility Investigation

Potential PFOS/PFOA Source Areas

Field Investigation Update

- GW sampling event conducted in March 2018
- Joint gauging event conducted 8-9 March 2018
- Baseflow SW sampling conducted 19 March 2018
- Rain event SW sampling conducted 28-29 June 2018

Reporting Update

- Final Facility Investigation Report available on Administrative Record. http://afcec.publicadmin-record.us.af.mil/Search.aspx
- Final Groundwater Monitoring Report for December 2017 event submitted.
- Final Groundwater Monitoring Report for March 2018 event submitted.
- Draft Final Stormwater Study Tech Memo submitted September 2018. Under review.
- Conceptual Design Report submitted to ANG.
- NPDES application submitted to PADEP 28 August. Public notices submitted to township, county, and local newspaper.

Surface Water Data Findings

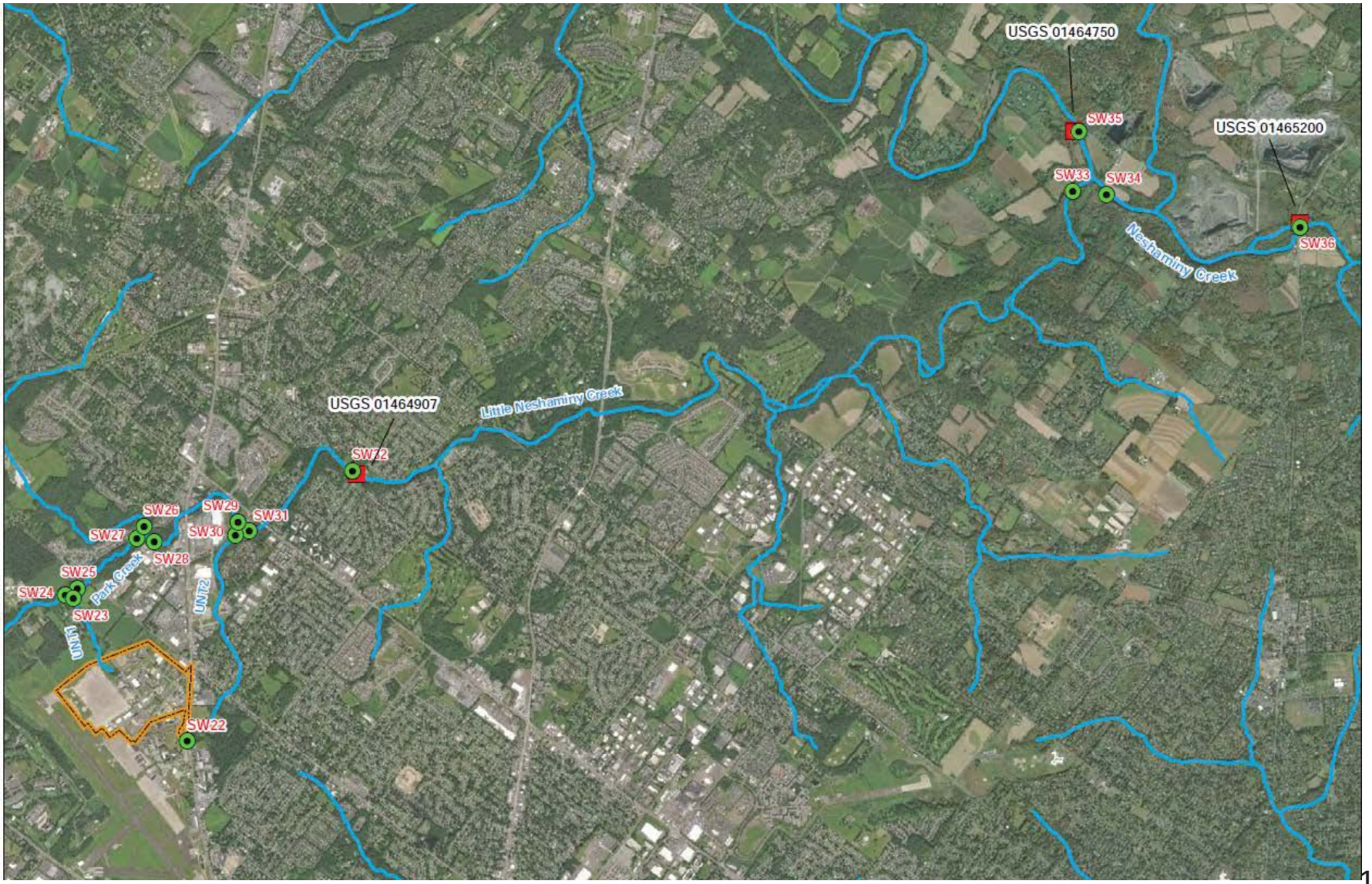
- Study results indicate widespread detections of PFCs at Horsham AGS and in the regional watershed.
- The highest concentrations are observed within Horsham AGS and, in general, decrease with distance from Horsham AGS.
- Conclusions include:
  - Elevated PFC concentrations flow onto Horsham AGS from Willow Grove via locations SW01, SW02, SW03, and SW04. SW04 conveys elevated concentrations during wet and dry weather.
  - Discharge of contaminated groundwater occurs within Horsham AGS, as evidenced by base flow sampling results at SW05, SW15, SW16, SW17, and SW18.
  - Discharge of contaminated groundwater occurs offsite, as evidenced by base flow sampling results at SW23, SW28, and SW30.
  - Basin treatment system reduces (but does not eliminate) PFC concentrations discharges from the basin. Quickly reaches capacity during precipitation. Downstream concentrations are consistently lower than concentrations entering the Basin.

Surface Water Sampling Locations

Surface Water Data Findings

- Conclusions (continued):
  - Increased PFC concentrations downgradient of confluences with tributaries closer to Horsham AGS. However, PFCs are detected in upstream sample locations (e.g., SW24, SW26, and SW31) prior to confluence with impacted streams. Additional upstream sources may be present.
  - Wet-weather sampling within Horsham AGS indicates potential residual sources contributing to PFC concentrations at sampling locations. For example, locations SW07, SW12, SW13, and SW14 were dry during base flow conditions, but contained PFC detections ranging from 29 ng/L (SW12) to 165 ng/L (SW07) during storm events.
  - Locations SW20 and SW21 contained PFC concentrations ranging from 44 ng/L (SW21) to 198 ng/L (SW20) during precipitation events. Source of detections is unknown. These locations discharge to off-site surface water.
  - The storm sample from SW22 indicates that elevated PFC concentrations discharge from Willow Grove to the headwaters of UNT 2.

Surface Water Sampling Locations



Surface Water: Recommendations

- Additional investigation to further characterize the nature and extent of PFC contamination to surface water at Horsham AGS.
- Curtail influx of PFCs from Willow Grove at locations SW01, SW02, SW03, and SW04.
- Evaluate the source of PFCs at locations SW16, SW17, and SW18. Likely due to infiltration of contaminated groundwater, but need to evaluate the potential for residual sources at Horsham AGS.
- Additional investigation to determine the source of PFCs at locations SW12, SW13, SW14, SW20, and SW21.
- Enhanced treatment of surface water discharge from Basin.

Groundwater Data Update

- Gauging conducted 8-9 March 2018
  - Semi-confined multilayer aquifer system, subdivided into four zones for contouring
  - Gradients trends northwest in each zone
- Sampling event conducted 5-15 March, 2018
  - Concentrations similar to previous events
  - 78 of 85 locations exceeded 70 ng/l (combined PFOA/PFOS)
  - Highest concentrations found in three general areas: along the southern boundary, near Building 335, and near Building 201.
  - Highest concentrations at PMW01, Zones A, B, and C: 329,500 ng/l, 147,400 ng/l, and 186,900 ng/l, respectively.
  - Next highest concentration at IMW-06 (49,000 ng/L) along the southern boundary).
  - Four wells near Buildings 201 and 335 contained concentrations above 10,000 ng/L.
- No additional sampling or gauging planned at this time.

GW Results: March 2018

PFOS/PFOA in Surface Water on Horsham AGS

- PFOS/PFOA has been detected in surface water leaving the Horsham Air Guard Station. This water flows from a storm water detention basin on the northwest boundary of the Base to Park Creek which flows to the Little Neshaminy Creek.
  - ANG is taking action to reduce this release of PFOS/PFOA to the Creek:
    - An updated carbon filtration system was installed on the outfall in August 2018 replacing the original system from September 2017.
    - The system is designed to reduce dry weather flow PFOS/PFOA concentrations to below 70 PPT.
    - Additional funding was received this month to enhance the surface water treatment.

PFOS/PFOA in Drinking Water

- The Air National Guard has a $13.5 million Cooperative Agreement with Warrington Township to:
  - Connect residents with PFOS/PFOA impacted drinking water wells above the Health Advisory to municipal water and abandon the impacted private wells
  - Install water mains as needed
  - Installation and maintenance of carbon filters on five Township wells
  - Install municipal water system interconnections with North Wales Water Authority to ensure Warrington Township has adequate access to water until carbon filtration is installed on municipal wells

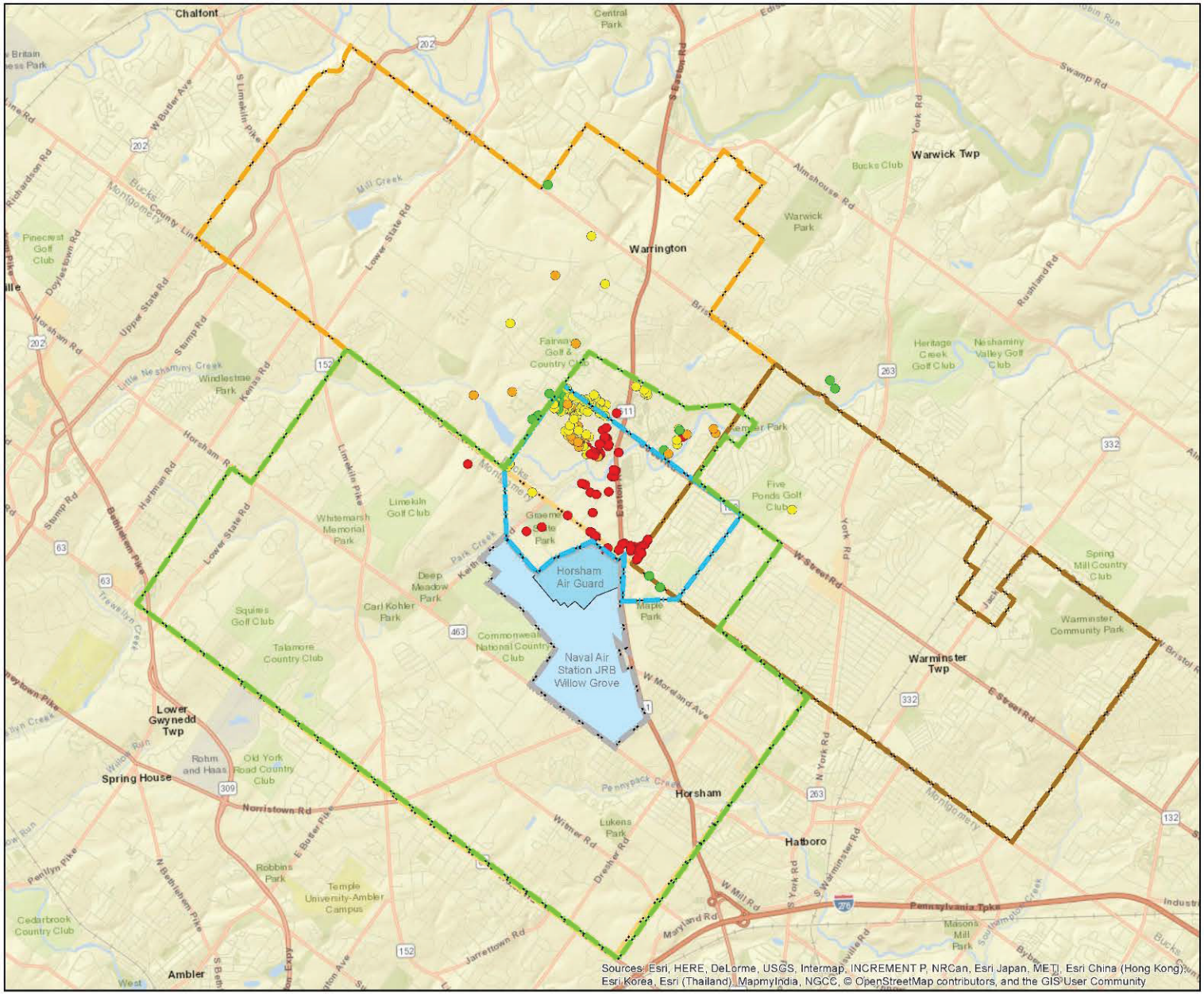
Private Well Sampling

- ANG has contract in place with Wood (formerly Amec Foster Wheeler) to provide PFOS/PFOA testing of private drinking water wells and supply bottled water to properties with PFOS/PFOA at or above the lifetime health advisory level (HAL) for residents within our area of responsibility in Horsham, Warminster, and Warrington
  - The number of private wells sampled by ANG are:
  - Horsham: 5, all above HAL; 4 have been connected to municipal water (remaining one not in use)
  - Warrington: 136, 45 are above HAL; 33 have been connected
  - Warminster: 12*, 11 are above HAL; 8 have been connected

    *Some of these properties are on Valley Road with Warminster mailing addresses but are located in Warrington Township
- Sampling contact for ANG area of responsibility: David Side at david.side@woodplc.com or (610) 877-6111

UNCLASSIFIED

Private Well Sampling Map



PFC Sample Location Map
as of April 2018

Horsham Air Guard Station
Horsham and Warrington Township

Legend

Health Advisory Level (HAL)
HAL is the sum of both PFOA+PFOS
(PFOA 0.070 ug/L, PFOS 0.70 ug/L)

- Sum of PFOA+PFOS concentrations above 0.070 ug/L
- Sum of PFOA+PFOS concentrations detected between 0.040 ug/L and 0.070 ug/L
- Sum of PFOA+PFOS concentrations detected at or below 0.040 ug/L
- PFOA & PFOS not detected
- Horsham Air Guard
- Former NAS JRB Willow Grove
- Sampling Area
- Air Force Administrative Order Boundary
- Horsham Township
- Warrington Township
- Warminster Township

Notes & Sources

Sources:
Street Base Map hosted by ESRI.

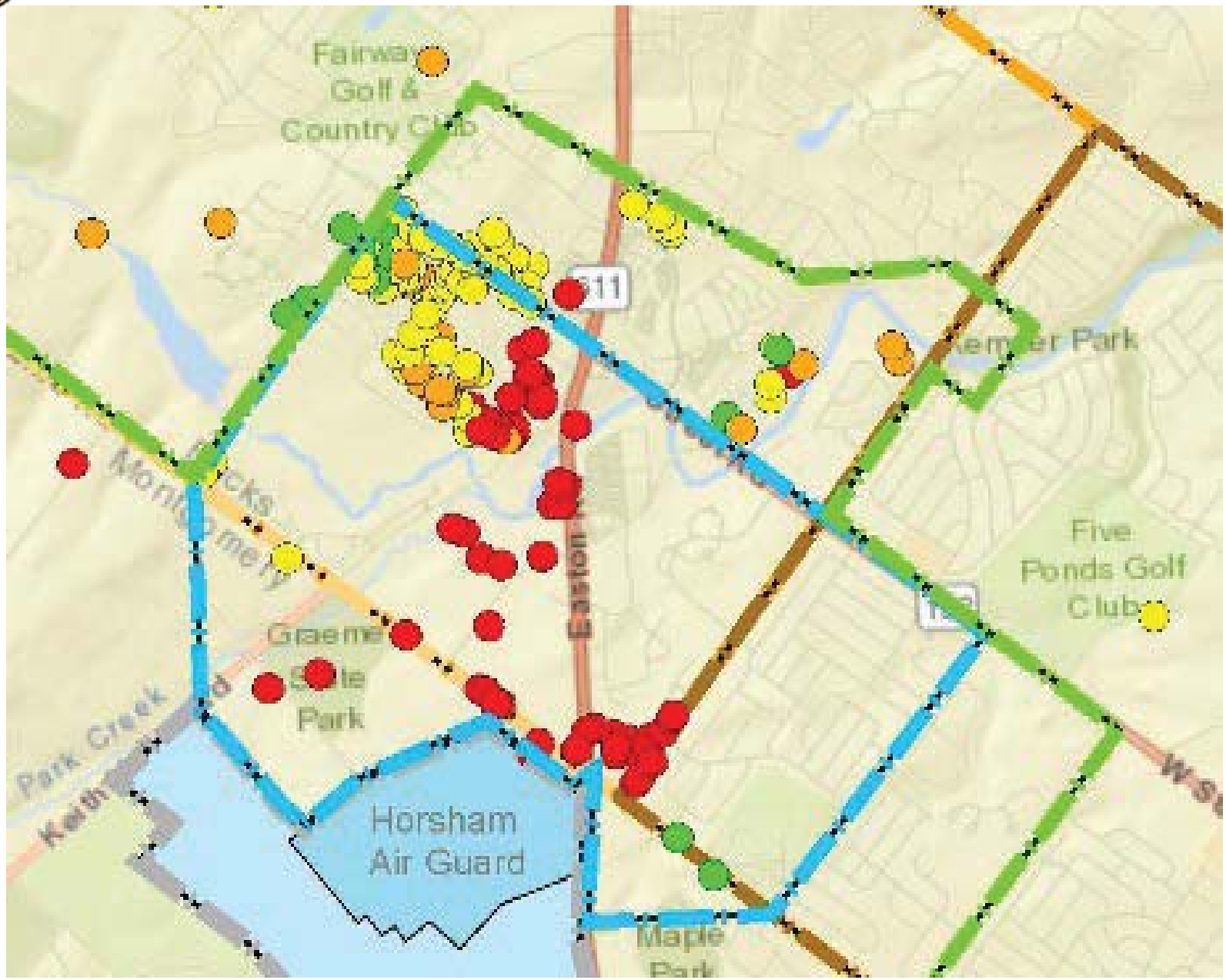
0 1,950 3,900 7,800 11,700 15,600 Feet

N

Wood
Environment & Infrastructure, Inc.
751 Arbor Way
Blue Bell, PA 19422
(610) 828-8100

Figure 2

Private Well Sampling Map



Questions?

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240-612-8762

Air National Guard Administrative Record:
http://afcec.publicadmin-record.us.af.mil/Search.aspx
select “Air National Guard”, then “Horsham AGS”, then click Search