Naval Facilities Engineering Systems Command
NAVFAC MID-ATLANTIC

Overview of Per- and Polyfluoroalkyl Substances (PFAS) Investigation and Results

NAVAL WEAPONS STATION (NWS)
YORKTOWN, VIRGINIA

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28 June 2023

PFAS Background

- **What are PFAS?**
  - Family of manufactured chemicals that last a long time in the environment.
  - Found in the environment around the world (in air, water, soil, animals, plants, as well as in people).
  - Used since 1950s in many products, such as:


firefighting foam


water-resistant fabrics


stain-resistant carpets


some nonstick cookware


personal care products


food packaging

PFOA and PFOS are the mostly commonly used and most studied in the PFAS family.

PFAS Criteria

PFAS are considered “emerging” and not yet federally regulated contaminants, and investigations are guided by:

- ✓ Health Advisories: Identify concentration of a contaminant in drinking water at which adverse health effects are not anticipated to occur over a duration (lifetime). Health Advisories are not legally enforceable.

- ✓ Maximum Contaminant Levels (MCLs) are the highest level of a contaminant that is allowed in public water supplies. MCLs are legally enforceable. MCLs are public water supply standards and not groundwater standards, and federal MCLs have been proposed but not finalized.

- ✓ Regional Screening Levels (RSLs) are used to screen site data and evaluate risk.

Available PFAS Criteria

2016 Health Advisories

May 2016 - EPA established drinking water lifetime health advisories.

- 70 parts per trillion (ppt) for PFOA & PFOS
- Value currently used for off-base investigation

Regional Screening Levels

May 2022 – EPA Regional Screening Levels published

- Designed to be protective
- Guide for investigation

DoD uses the RSLs:

At the SI phase: to determine if further investigation of PFAS in the Remedial Investigation (RI) phase is warranted or if no further PFAS investigation is required.

At the RI phase: to identify the initial list of chemicals of potential concern that will be carried forward to the site-specific baseline risk assessment.

1 ppt = 1 ng/L

2022 Health Advisories

- June 2022 - EPA issued new health advisories for drinking water
  - Interim for PFOA & PFOS
  - Non-regulatory
  - Levels are below detectable limits
  - The DoD is instead looking to EPA to finalize a regulatory drinking water standard

March 2023 Proposed EPA Regulations

EPA announced proposed National Primary Drinking Water Regulation for 6 PFAS on March 14, 2023.

- Proposed regulation consists of Maximum Contaminant Levels (MCLs) for 2 PFAS:
  - PFOA – MCL of 4 parts per trillion (ppt)
  - PFOS – MCL of 4 ppt
  - PFNA, PFHxS, PFBS, and HFPO-DA – evaluated using the Hazard Index.

  Hazard Index is a tool to evaluate risk from chemical mixtures. Considers the combined effect of these chemicals in drinking water.

- Proposed regulation does not require any action until finalized.

- In anticipation of the final standard that EPA expects to publish by the end of 2023, the Department is assessing what actions DoD can take to be prepared to incorporate EPA's final regulatory standard into our current cleanup process.

PFAS Project Screening Levels

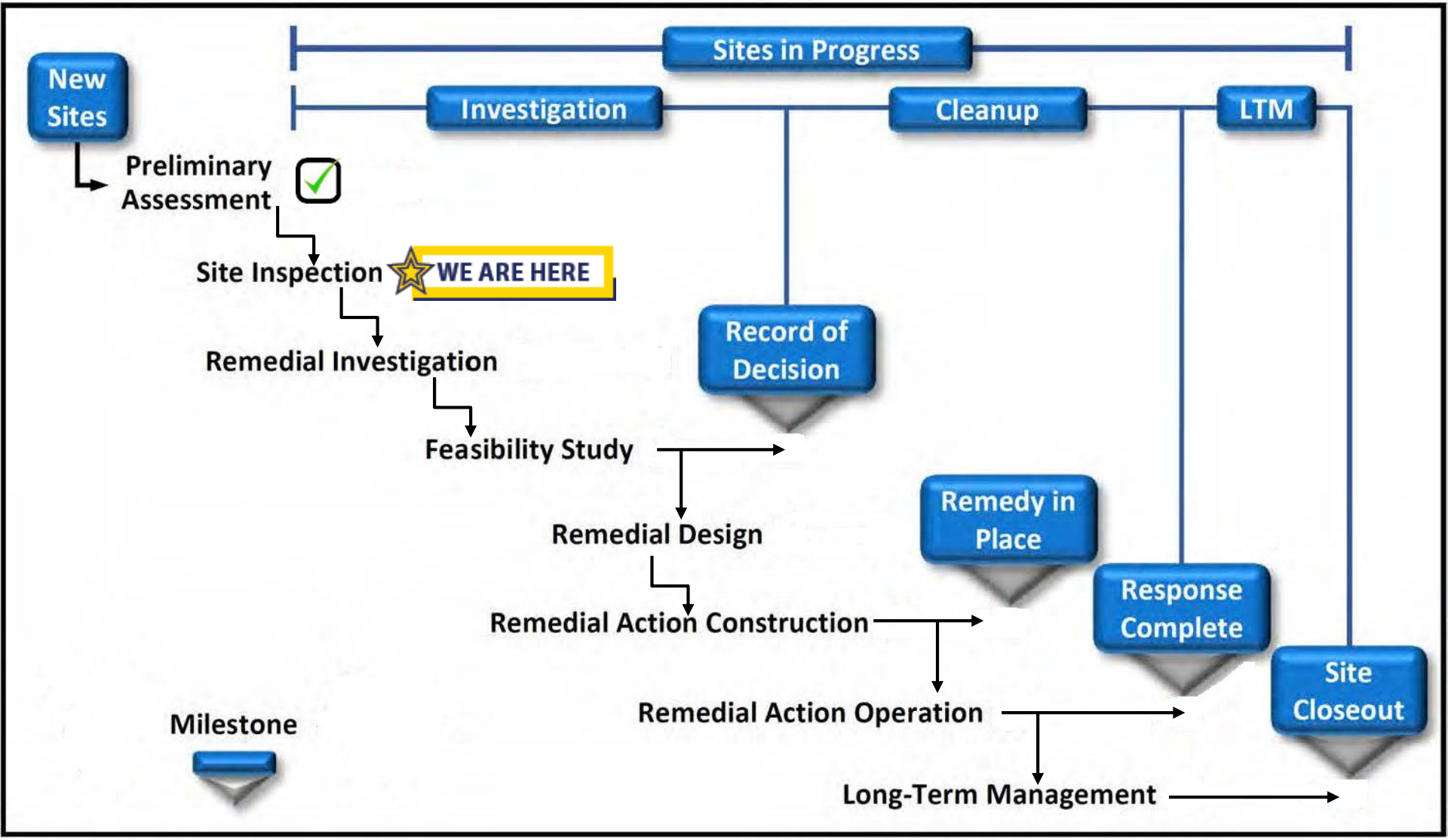
- **Project Screening Levels are based on the EPA Regional Screening Levels.**

Chemical	Groundwater (ng/L)	Soil (µg/kg)	Surface Water (ng/L)	Sediment (µg/kg)
HFPO-DA	6	23	210	160
PFBS	600	1,900	21,000	13,000
PFHxS	39	130	1,200	850
PFNA	5.9	19	170	130
PFOS	4	13	140	85
PFOA	6	19	210	130

Calculated with EPA tool.

1 ppt = 1 ng/L (water)

CERCLA Process



PFAS Work Completed

The Preliminary Assessment (PA) is a desktop research phase to review site history, determine if a potential source exists, and determine if investigation is warranted.

✓ Final PA Report: October 2021

- 75 areas screened
- 9 Areas of Interest recommended for additional Site Inspection (SI).
  Site 1 Dudley Road Landfill, Site 4 Burn Pad Residue Landfill, Site 22 Burn Pad, Building 461 Fire Station No. 14, SSA 3 Fire Training Pits and Vicinity, Building 24 (Betty Warehouse), Building 27, Building 71 Former Fire Station, Building 703 Main Fire Station No. 13.

The purpose of a Site Inspection (SI) is an on-site investigation intended to gather more information to determine whether there is a release or potential release.

✓ SI Field Investigation

- Main Base (March thru May 2022): Installation of 35 monitoring wells, collection of 78 soil samples and 40 groundwater samples.
  - ❖ Site 1 Data Gap SI (December 2022): collection of groundwater samples from 7 wells.

• SI Reporting

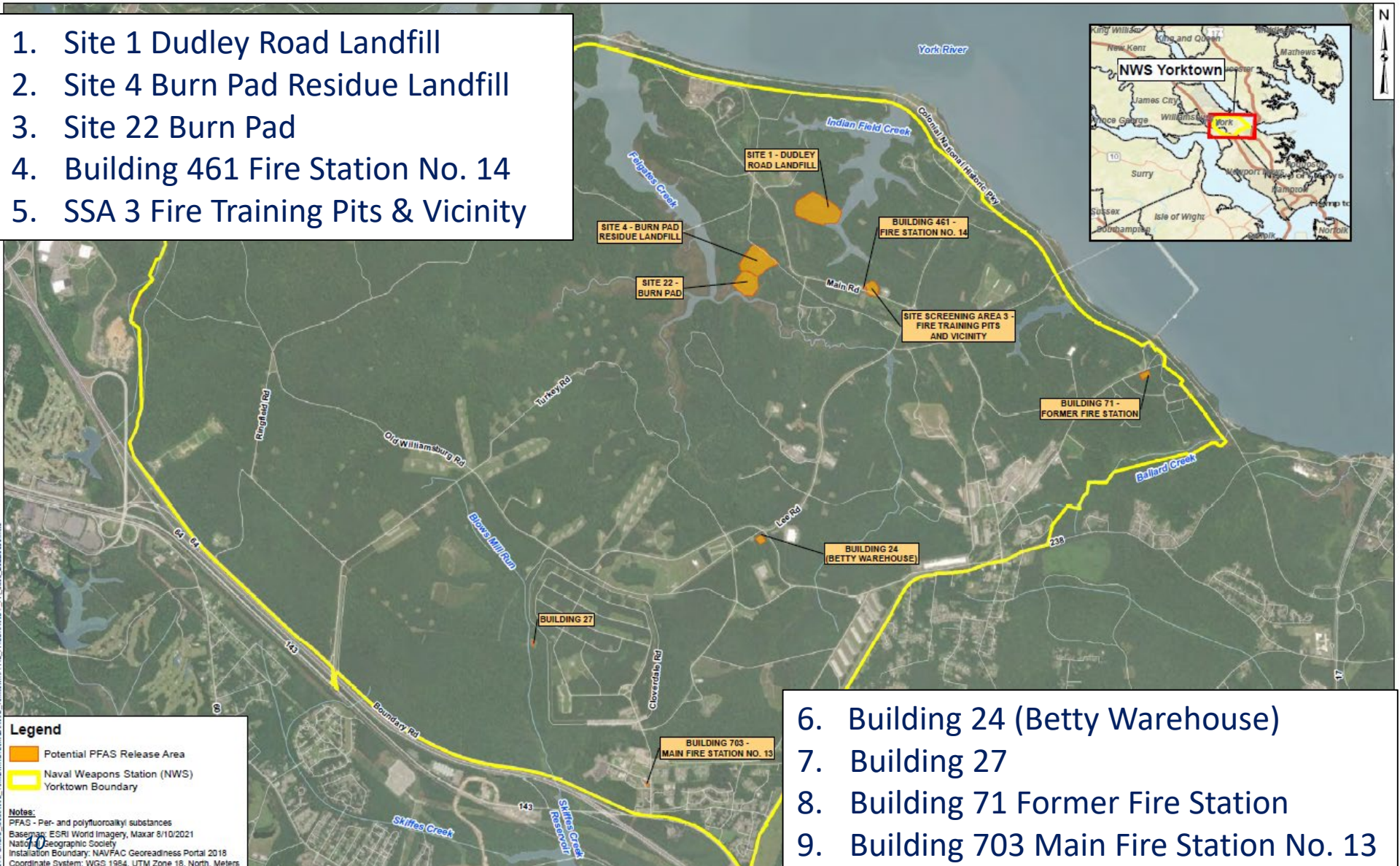
- Draft SI Report submitted for regulatory review March 2023
- Currently under comment resolution with EPA and VDEQ

Update of the Per- and Polyfluoroalkyl Substances (PFAS) Site Investigations and Results

NAVAL WEAPONS STATION (NWS)
YORKTOWN, VIRGINIA
28 June 2023

Site Inspection Phase Areas of Interest

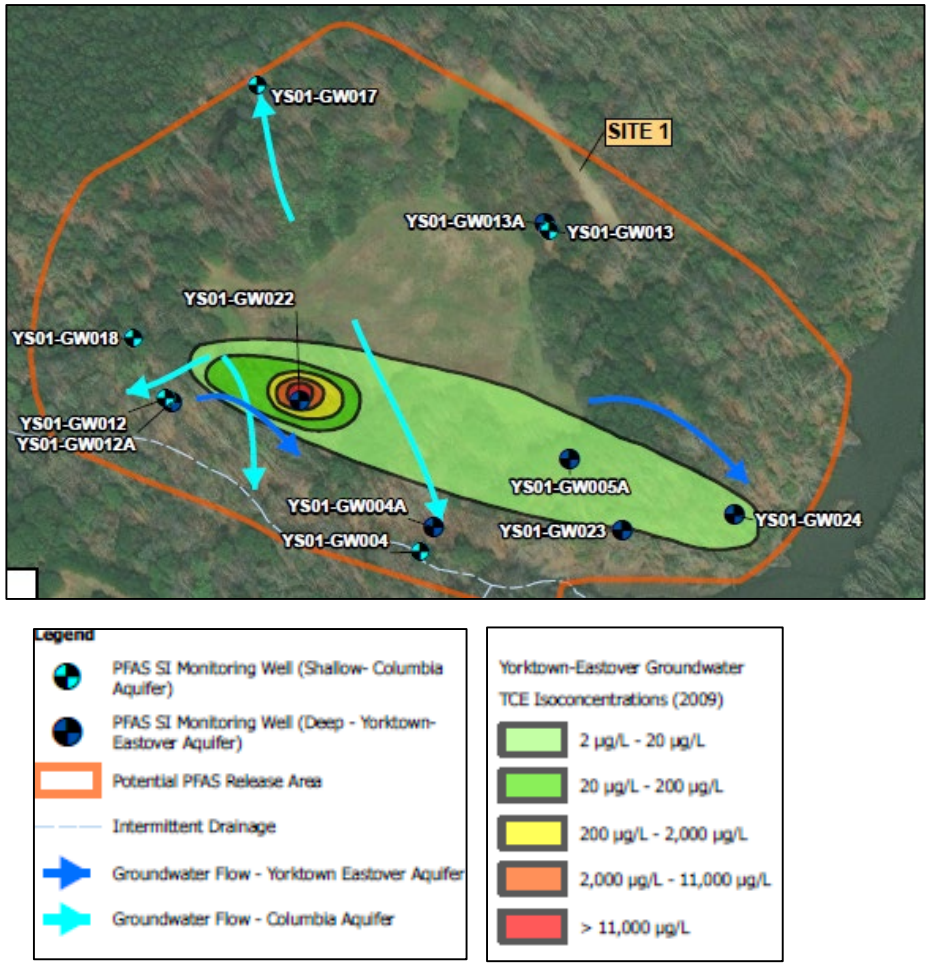
1. Site 1 Dudley Road Landfill
2. Site 4 Burn Pad Residue Landfill
3. Site 22 Burn Pad
4. Building 461 Fire Station No. 14
5. SSA 3 Fire Training Pits & Vicinity



6. Building 24 (Betty Warehouse)
7. Building 27
8. Building 71 Former Fire Station
9. Building 703 Main Fire Station No. 13

Site 1 Dudley Road Landfill

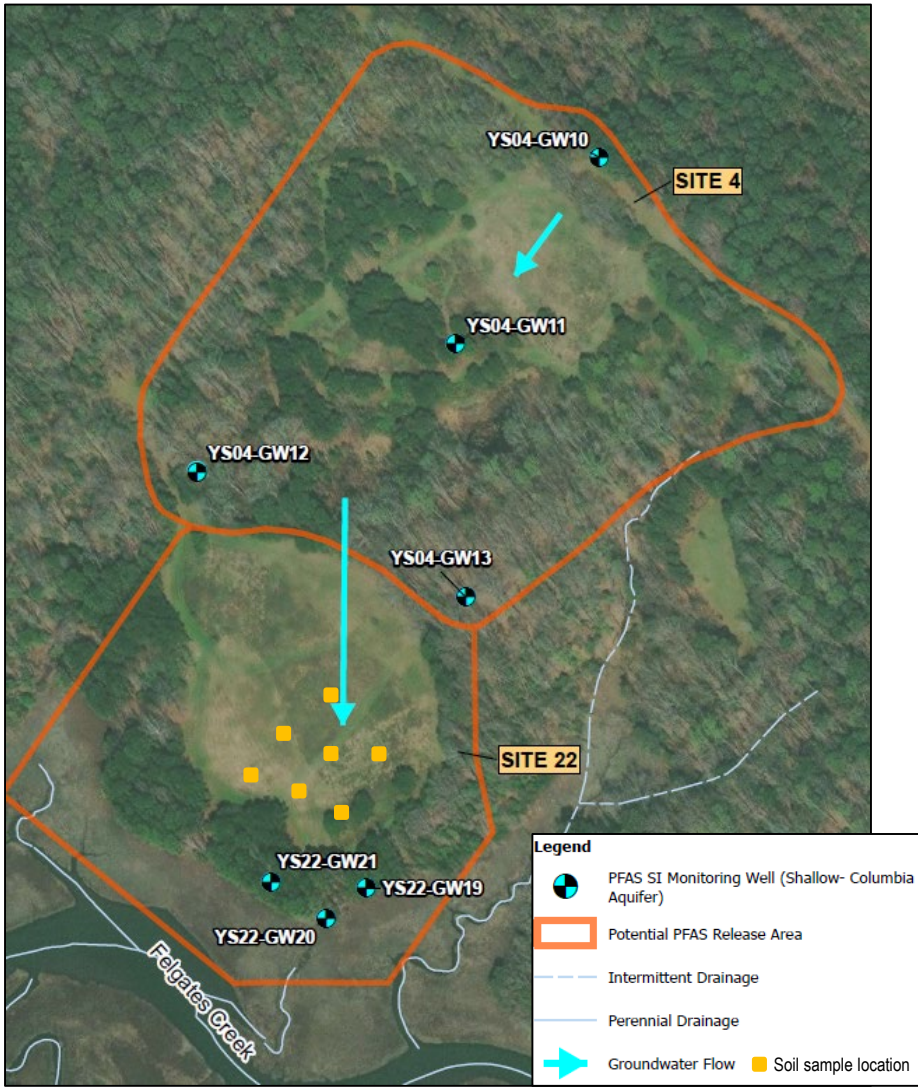
- **Overview:**
  - Reported disposal of oily wastewater containing fire fighting foam pumped from fire training pits at Site Screening Area 3
  - 1999 soil/debris removal action
  - Trichloroethene (TCE) delineated in groundwater in 2009; Proposed Plan for treatment August 2022 via CERCLA Process
- **Investigation:**
  - 12 Groundwater samples from existing wells
- **Groundwater Results:** 3 PFAS Exceeded screening levels
  - **PFOA** in 3 wells **6.3 ng/L** to **47.9 ng/L**
  - **PFOS** in 3 wells **5.19 ng/L** to **39.3 ng/L**
  - **PFHxS** in 3 wells **59.4 ng/L** to **240 ng/L**
- **DON Recommended Path Forward:** Proceed to Remedial Investigation (RI)



1 ppt = 1 ng/L (water)

Site 22 Burn Pad and Site 4 Burn Pad Residue Landfill

- **Site 22 Overview:**
  - Used for burning waste explosives from munitions loading operations
  - 2017 groundwater samples showed elevated levels of PFOS
  - Site 4 is the associated landfill
- **Site 22 Investigation:**
  - 10 Surface soil and 10 subsurface soil samples
  - Groundwater samples from 3 new wells
- **Site 22 Investigation Results:**
  - In soil PFAS did not exceed screening levels
  - In groundwater 3 PFAS exceeded screening levels
    - **PFOA** in 1 well **6.83 J ng/L**
    - **PFOS** in 3 wells **10.8 ng/L** to **52.8 J ng/L**
    - **PFHxS** in 1 well **86.5 J ng/L**

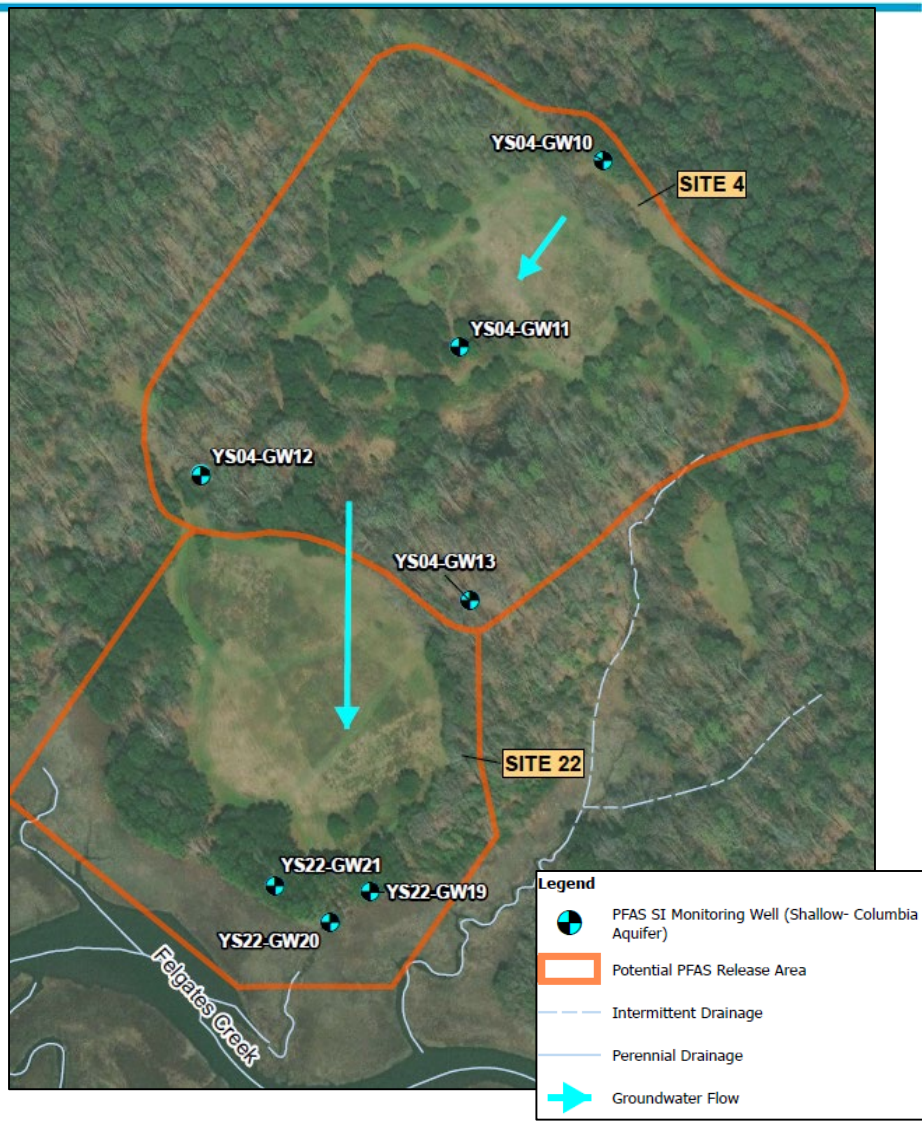


J = The result is an estimated quantity

1 ppt = 1 ng/L (water)

Site 22 Burn Pad and Site 4 Burn Pad Residue Landfill

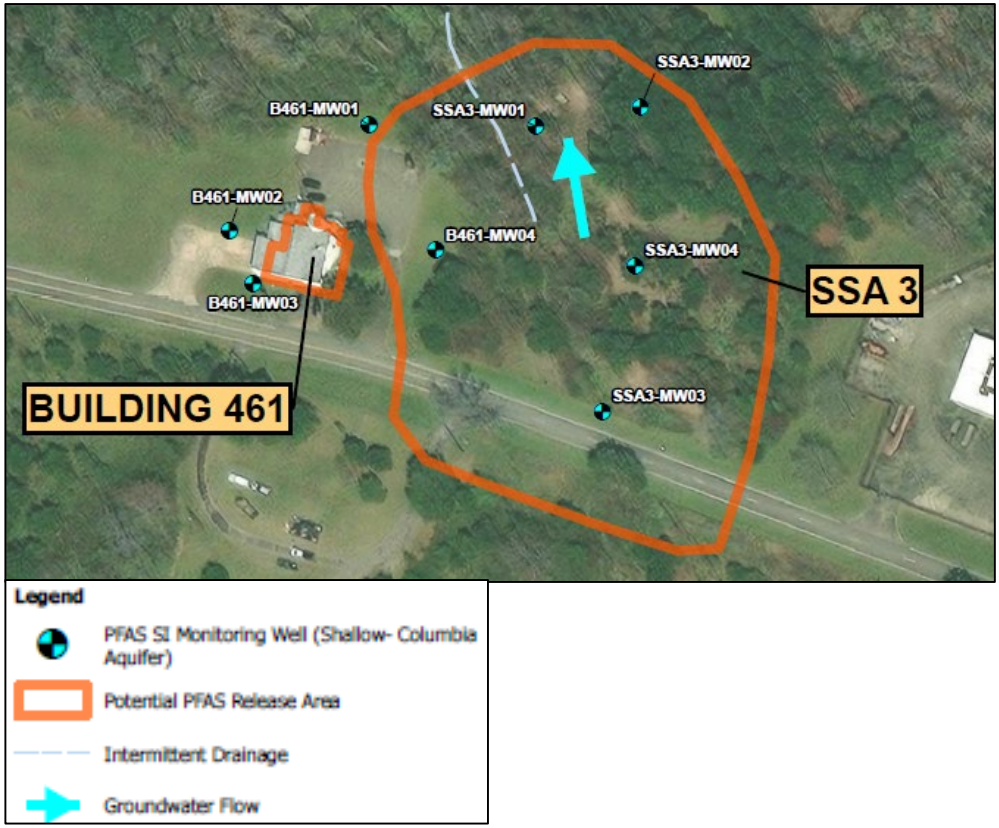
- **Site 4 Overview:**
  - Main landfill for debris from Site 22
  - Previous Cleanup: Several removal actions addressed under CERCLA . This site was closed with no further action in 2005 (soil) and 2011 (groundwater/surface water/sediment)
- **Site 4 Investigation:**
  - Groundwater samples from 4 new wells
- **Investigation Results:** 1 PFAS exceeded screening levels in groundwater
  - **PFOS** in 1 well **76.1 ng/L**
- **DON Recommended Path Forward:**
  - Combine Site 22 and Site 4 and proceed to remedial investigation as a single site



1 ppt = 1 ng/L (water)

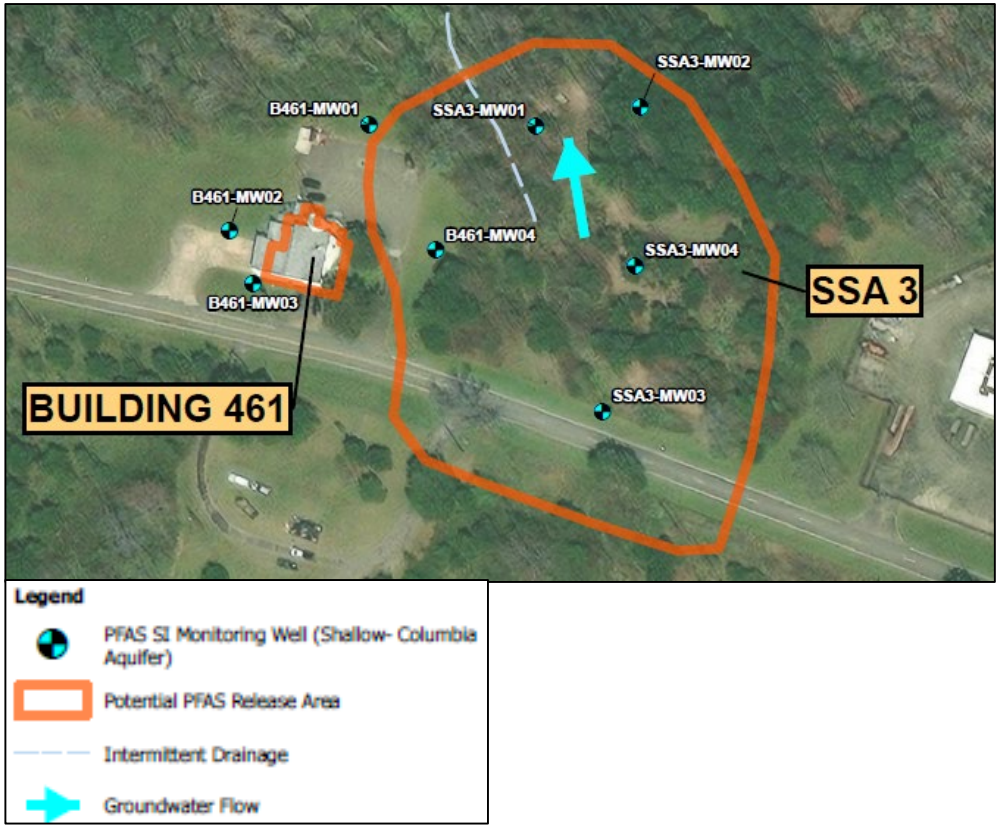
Building 461 Fire Station No. 14 & Site Screening Area 3 Fire Training Pits & Vicinity

- **Overview:**
  - Documented use of firefighting foam for firefighter training activities at the former fire training pits
  - 1996 removal of concrete pits, tanker trailer, and burnt soil
- **Investigation:**
  - 8 Surface soil and 8 subsurface soil samples collected from locations of well installs
  - Groundwater samples collected from 8 new wells
- **Investigation Results:**
  - In soil 1 PFAS exceeded screening levels
    - **PFOS** in 4 surface soil and 3 subsurface soil locations **20.5 µg/kg** to **437 µg/kg**



Building 461 Fire Station No. 14 & Site Screening Area 3 Fire Training Pits & Vicinity

- **Investigation Results Continued:**
  - In groundwater 5 PFAS exceeded the screening levels
    - **PFOA** in 8 wells **8.88 ng/L** to **3,940 J ng/L**
    - **PFOS** in 8 wells **273 ng/L** to **148,000 J ng/L**
    - **PFBS** in 1 well **1,010 J ng/L**
    - **PFHxS** in 7 wells **160 ng/L** to **28,200 ng/L**
    - **PFNA** in 5 wells **16.1 ng/L** to **380 ng/L**
- **DON Recommended Path Forward:**
  - Combine Building 461 and SSA 3 and proceed to RI as a single site



J = The result is an estimated quantity

1 ppt = 1 ng/L (water)

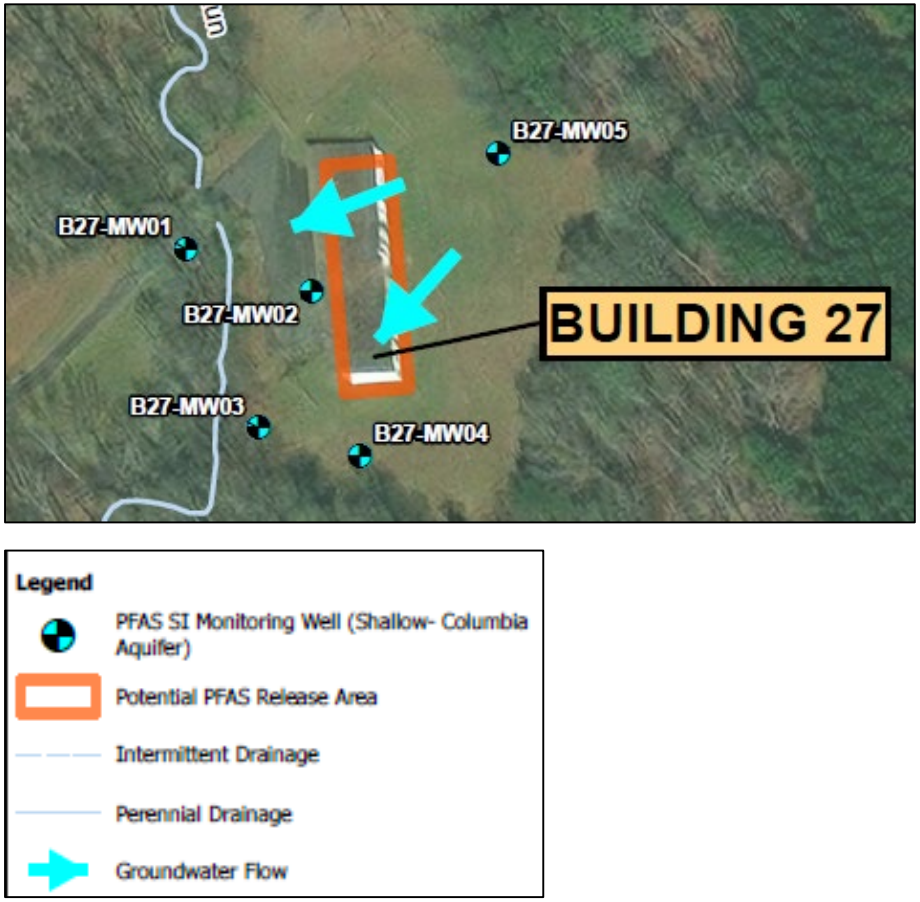
Building 24 (Betty Warehouse)

- **Overview:**
  - Documented use of firefighting foam to extinguish the Building 24 fire
- **Investigation:**
  - 5 Surface soil and 5 subsurface soil samples from locations of new well installs
  - 5 Groundwater samples from new wells
- **Investigation Results:**
  - In soil PFAS did not exceed the screening levels
  - In groundwater 3 PFAS exceeded screening levels
    - **PFOA** in 1 well **7.09 ng/L**
    - **PFOS** in 4 wells **6.47 ng/L** to **411 ng/L**
    - **PFHxS** in 2 wells **68.5 ng/L** to **142 ng/L**
- **DON Recommended Path Forward:**
  - Proceed to Remedial Investigation

1 ppt = 1 ng/L (water)

Building 27

- **Overview:**
  - Use of firefighting foam to extinguish the Building 27 fire
- **Investigation:**
  - 5 Surface soil and 5 subsurface soil samples from locations of new well installs
  - 5 Groundwater samples from new wells
- **Investigation Results:**
  - PFAS were not detected in soil samples
  - PFAS were not detected in groundwater samples
- **DON Recommended Path Forward:** No further PFAS investigation at this time



Building 71 – Former Fire Station

- **Overview:**
  - Use as a fire station and assumed handling and storage of firefighting foam
- **Investigation:**
  - 4 Surface soil and 4 subsurface soil samples at locations of new well installs
  - 4 Groundwater samples from new wells
- **Investigation Results:**
  - In soil PFAS did not exceed screening levels
  - In groundwater 3 PFAS exceeded screening levels
    - **PFOA** in 2 wells **11.2 ng/L** to **34.5 ng/L**
    - **PFOS** in 2 wells **9.93 ng/L** to **17.8 ng/L**
    - **PFHxS** in 2 wells **57.8 ng/L** to **136 ng/L**

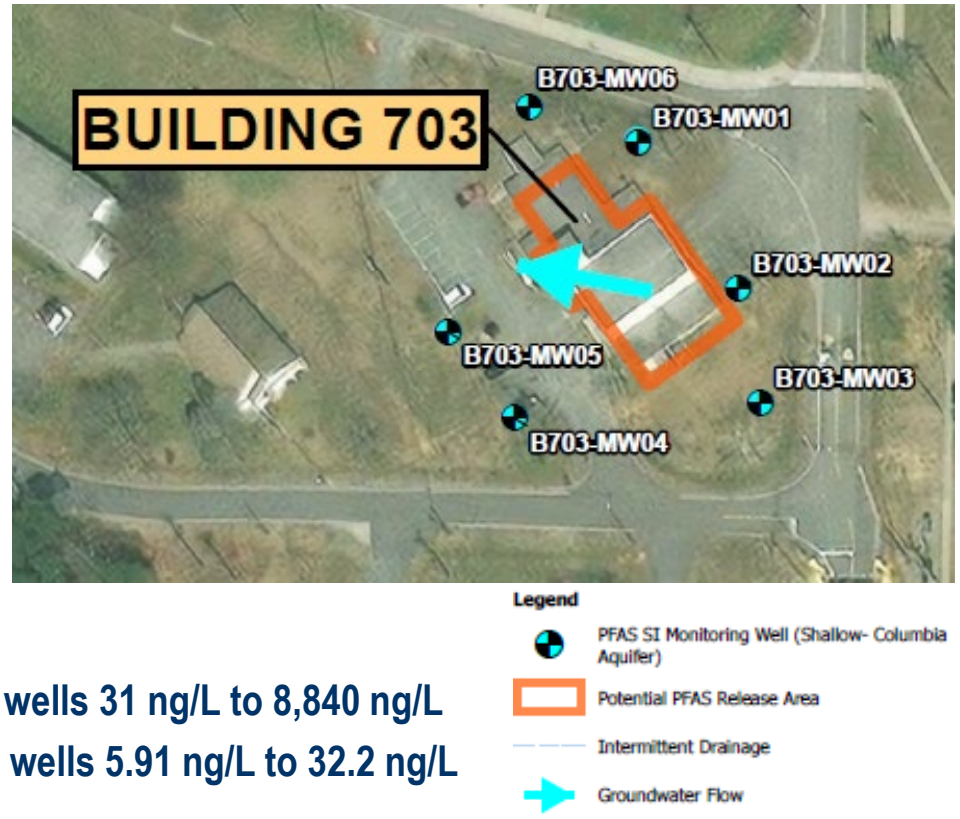
1 ppt = 1 ng/L (water)

Building 71 – Former Fire Station

- **Human Health Risk Screening Evaluation**
  - A risk evaluation was conducted as a tool to help prioritize sites for further investigation
  - Maximum detected PFAS concentrations were conservatively used to estimate site cancer and noncancer risks
  - Risk screening results were compared to and met cancer and noncancer CERCLA risk management benchmarks
- **DON Recommended Path Forward:**
  No further PFAS investigation at this time

Building 703 – Main Fire Station No. 13

- **Overview:**
  - Presumed handling, storage, and potential release of firefighting foam
- **Investigation:**
  - 6 Surface soil and 6 subsurface soil samples at locations of new well installs
  - 6 Groundwater samples from new wells
- **Investigation Results:**
  - In soil 1 PFAS exceeded the screening levels
    - **PFOS** in 3 surface soil and 1 subsurface soil locations **18.8 µg/kg** to **343 µg/kg**
  - In groundwater 4 PFAS exceeded screening levels
    - **PFOA in 6 wells 24.9 ng/L to 5,460 ng/L PFOS in 6 wells 31 ng/L to 8,840 ng/L**
    - **PFHxS in 6 wells 155 ng/L to 6,730 ng/L PFNA in 4 wells 5.91 ng/L to 32.2 ng/L**



- **DON Recommended Path Forward:** Proceed to Remedial Investigation

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Summary of SI Results and Pending Navy Recommendations

AREA OF INTEREST	PENDING RECOMMENDATION
• Site 1 – Dudley Road Landfill	Proceed to Remedial Investigation (RI)
• Site 4 – Burn Pad Residue Landfill	Proceed to RI as a single site with Site 22
• Site 22 – Burn Pad	Proceed to RI
• Building 461 Fire Station No. 14	Proceed to RI as a single site with SSA 3
• SSA 3 – Fire Training Pits and Vicinity	Proceed to RI as a single site with Bldg. 461
• Building 24 (Betty Warehouse)	Proceed to RI
• Building 27	No further PFAS investigation at this time
• Building 71 – Former Fire Station	No further PFAS investigation at this time
• Building 703 – Main Fire Station No. 13	Proceed to RI

The purpose of a Remedial Investigation (RI) Phase is to fully characterize the nature and extent of PFAS and evaluate risks associated with the release.

Next Steps

- **Finalization of SI Report**
  - DEQ and EPA have provided the 1st round of comments on the Draft Site Inspection
  - Recommendations – Comment Resolution in Progress
  - Draft Final SI Report for Regulator Review – July 2023
  - Final SI Report – September 2023

Questions

Additional Information

For additional information regarding the ERP at Naval Weapons Station (NWS) Yorktown, please contact:

Jeff Kissler – Environmental Director for NWS Yorktown
(757) 887-4086 or john.j.kissler.civ@us.navy.mil

NWS Yorktown Publics Affair Officer (757) 887-4939

For information regarding the RAB Meeting or the ERP at NWS Yorktown visit our website:
https://www.navfac.navy.mil/Business-Lines/Environmental/Products-and-Services/Environmental-Restoration/Mid-Atlantic/Yorktown-NWS/

Post Meeting

- Questions can be submitted 10 calendar days after the RAB meeting (July 12, 2023).
- Submit questions to the NWS Yorktown Publics Affair Officer leave a message at (757) 887-4939.
- Similar questions will be combined
- The post meeting Q&A will be available at the Navy's website and captured in the RAB meeting minutes.
- For additional information regarding the RAB Meeting or the ERP at NWS Yorktown visit our website: https://www.navfac.navy.mil/Business-Lines/Environmental/Products-and-Services/Environmental-Restoration/Mid-Atlantic/Yorktown-NWS/