Why Is the Navy Sampling Drinking Water Wells Nationwide?

To request sampling, click the sampling icon below the poster station or call **844-NBKBNGR (844-625-2647).**

The Navy is committed to protecting our neighbors' drinking water and taking responsibility for our previous operations.

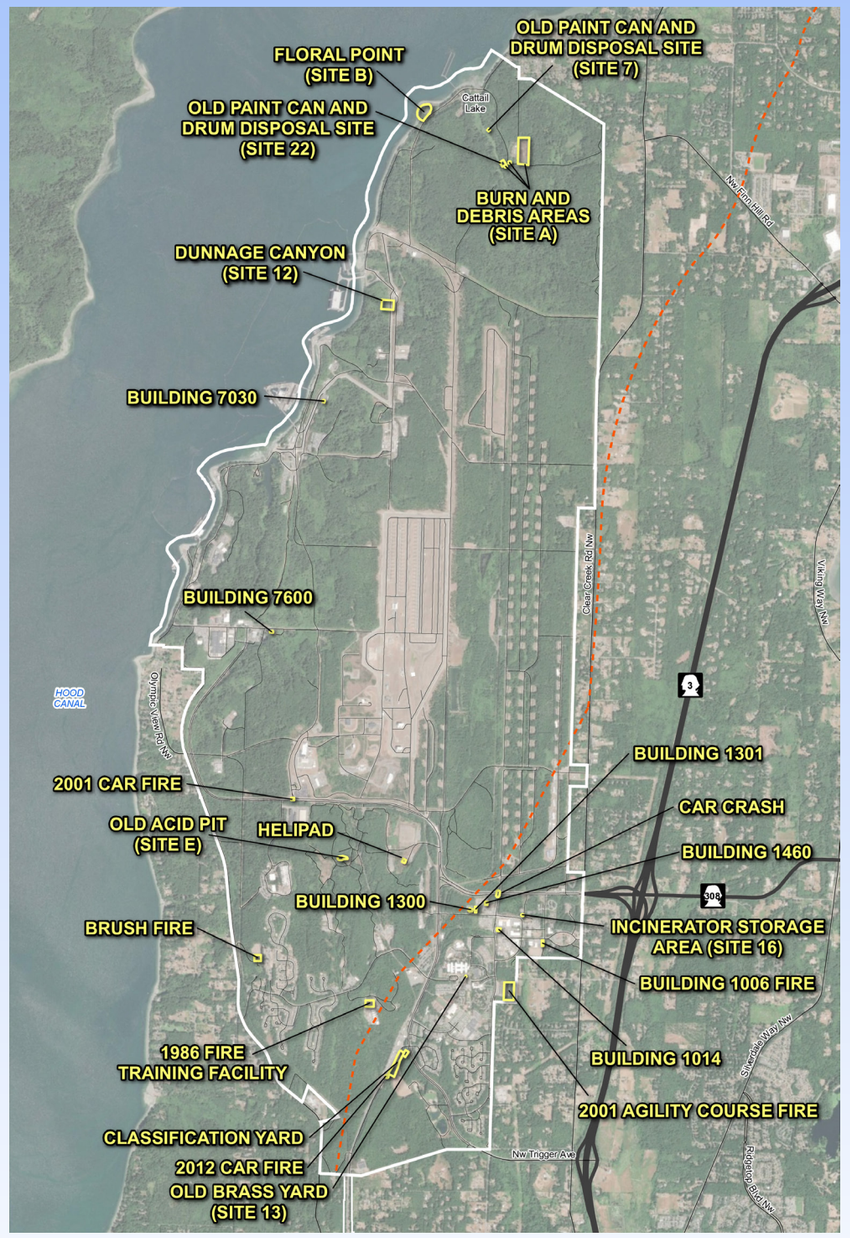
- In 2016, the EPA established a drinking water lifetime health advisory for two currently unregulated PFAS, specifically PFOS and PFOA.
- The most common historical Navy use of PFOS and PFOA was in firefighting foam.
- The Navy no longer uses firefighting foam for training.
- In 2016, the Navy issued a proactive policy to identify and prioritize sites with the potential for exposure to PFOS and PFOA.
- The Navy has started assessing bases to identify and address the potential for exposure to PFOS and PFOA.
- The Navy has identified possible PFAS release areas.

ACRONYMS & ABBREVIATIONS

EPA	U.S. Environmental Protection Agency	PFOA	perfluorooctanoic acid
PFAS	per- and polyfluoroalkyl substances	PFOS	perfluorooctane sulfonate

Potential PFAS Releases

To request sampling, click the sampling icon below the poster station or call **844-NBKBNGR (844-625-2647).**



- A Preliminary Assessment was completed because of previous uses of PFAS-containing materials, such as firefighting foam.
- NBK Bangor is following the EPA's Environmental Cleanup Process for assessment of PFAS releases.
- **23 on-base areas have been identified as potential PFAS release areas.**
- Findings are documented in a Preliminary Assessment report, which was finalized in 2020 and can be found online.

FOR MORE INFORMATION click the links icon below the poster station

LEGEND

- Installation boundary
- Potential PFAS release area
- Shallow aquifer groundwater divide

0 0.5 1 mile N

ACRONYMS & ABBREVIATIONS

EPA U.S. Environmental Protection Agency
NBK Naval Base Kitsap
PFAS per- and polyfluoroalkyl substances

Off-Base Drinking Water Well Sampling Summary

To request sampling, click the sampling icon below the poster station or call **844-NBKBNGR (844-625-2647).**

PFAS was not detected above the EPA lifetime health advisory in the expanded sampling area. Based on the sampling results, the Navy is not expanding the off-base sampling area further.

If you have a drinking water well in the sampling area that has not been tested, you can still request that the Navy test it.

The Navy has provided bottled water for cooking and drinking to households whose water exceeds the EPA lifetime health advisory for PFOS and/or PFOA.

Key Milestones

ACRONYMS & ABBREVIATIONS

EPA	U.S. Environmental Protection Agency	PFOA	perfluorooctanoic acid
PFAS	per- and polyfluoroalkyl substances	PFOS	perfluorooctane sulfonate

Initial Area: PFAS Drinking Water Results near NBK Bangor

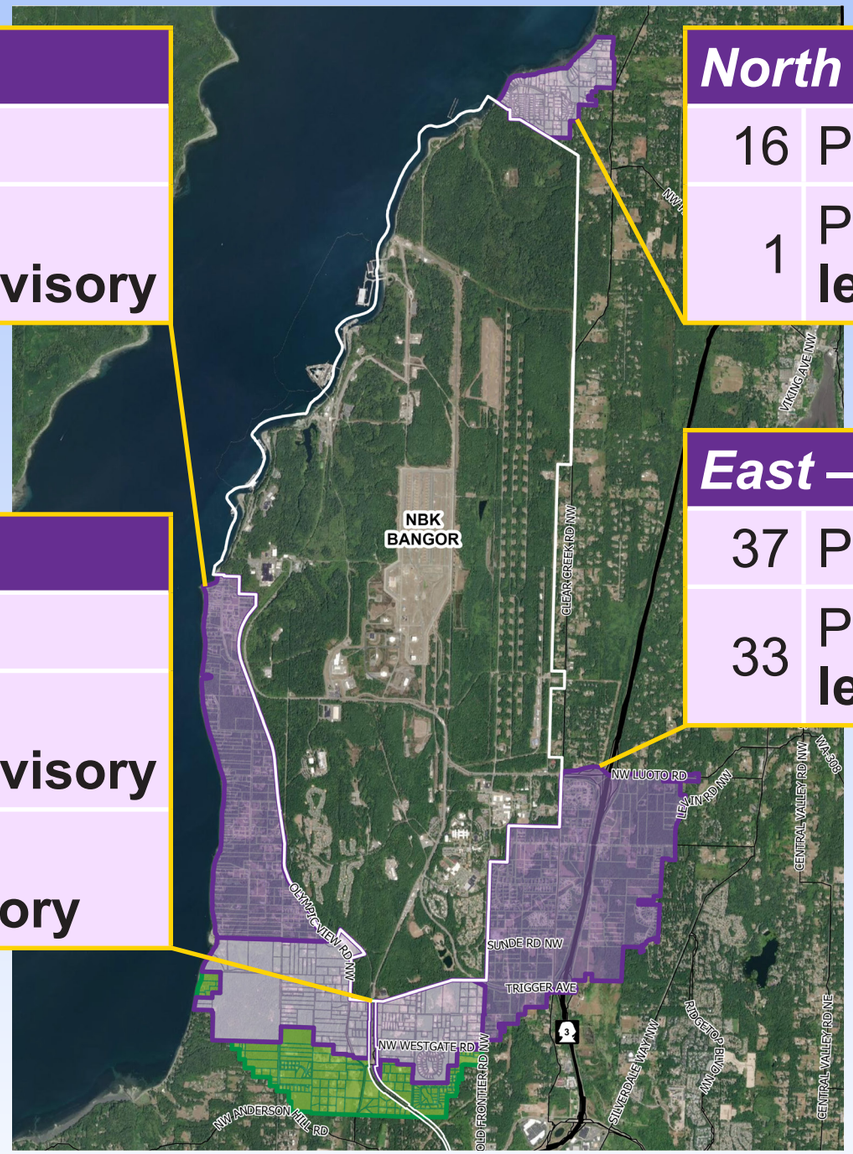
To request sampling, click the sampling icon below the poster station or call **844-NBKBNGR (844-625-2647).**

West – 144 wells sampled	
111	PFOA/PFOS **not detected**
33	PFOA/PFOS detected **less than lifetime health advisory**

North – 17 wells sampled	
16	PFOA/PFOS **not detected**
1	PFOA/PFOS detected **less than lifetime health advisory**

South – 75 wells sampled	
55	PFOA/PFOS **not detected**
18	PFOA/PFOS detected **less than lifetime health advisory**
2	PFOA/PFOS detected **above lifetime health advisory**

East – 70 wells sampled	
37	PFOA/PFOS **not detected**
33	PFOA/PFOS detected **less than lifetime health advisory**



LEGEND

- Installation boundary
- Initial sampling area
- Expanded sampling area

0 0.5 1 mile N

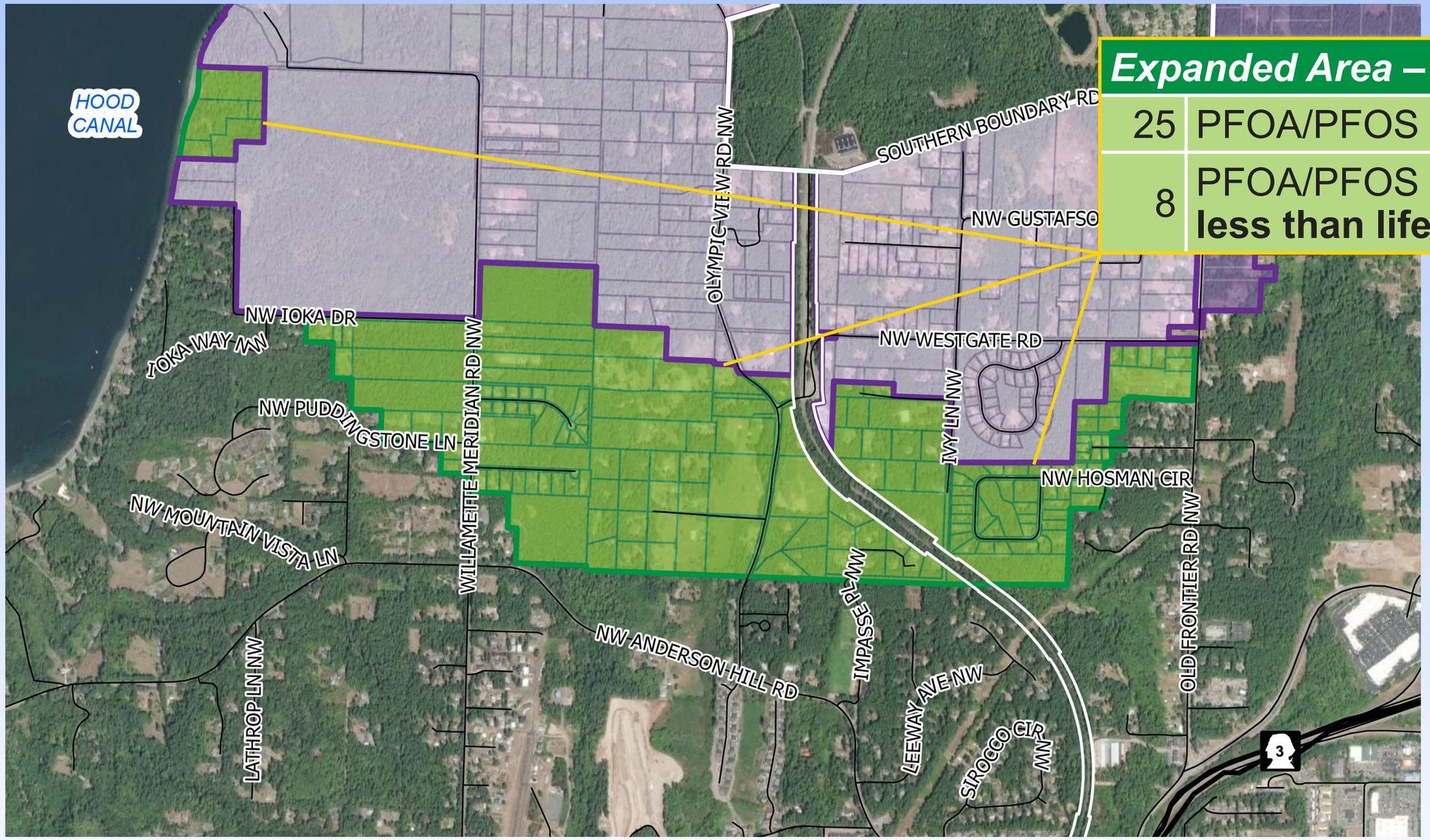
FOR MORE INFORMATION click the map icon below the poster station

ACRONYMS & ABBREVIATIONS

NBK	Naval Base Kitsap	PFOA	perfluorooctanoic acid
PFAS	per- and polyfluoroalkyl substances	PFOS	perfluorooctane sulfonate

Expanded Area: PFAS Drinking Water Results near NBK Bangor

To request sampling, click the sampling icon below the poster station or call **844-NBKBNGR (844-625-2647).**



Expanded Area – 33 wells sampled	
25	PFOA/PFOS **not detected**
8	PFOA/PFOS detected **less than lifetime health advisory**

FOR MORE INFORMATION click the map icon below the poster station

LEGEND

- Installation boundary
- Initial sampling area
- Expanded sampling area

0 — 0.25 — 0.5 mile — N

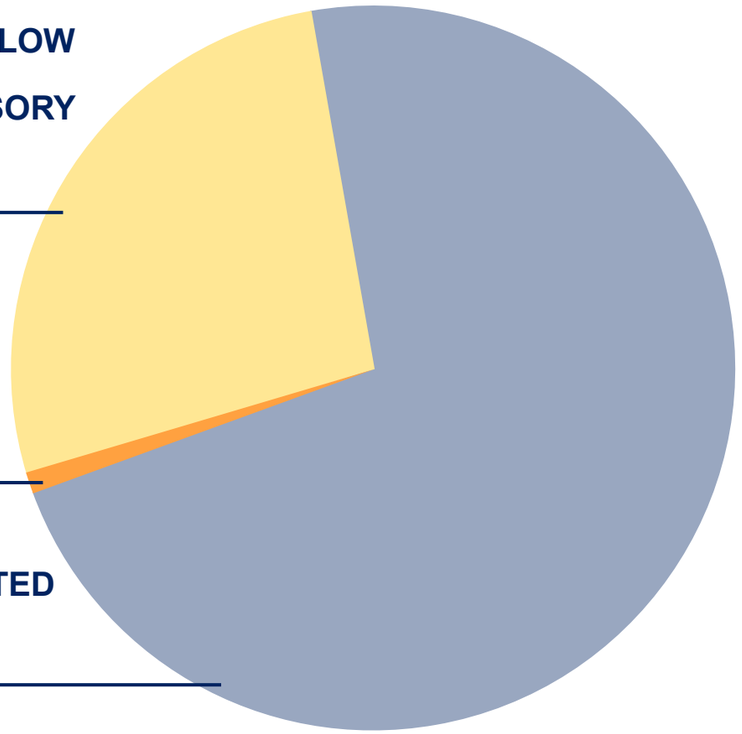
ACRONYMS & ABBREVIATIONS

NBK	Naval Base Kitsap	PFOA	perfluorooctanoic acid
PFAS	per- and polyfluoroalkyl substances	PFOS	perfluorooctane sulfonate

PFAS Drinking Water Results near NBK Bangor

To request sampling, click the sampling icon below the poster station or call **844-NBKBNGR (844-625-2647).**

339 Wells Sampled



PFAS	Standard	Limit	Above	Below	Not Detected
PFOA + PFOS	EPA lifetime health advisory	70 ppt	2	93	244
PFOA*	Draft Washington State Action Level	10 ppt	5	55	279
PFOS*	Draft Washington State Action Level	15 ppt	1	70	268
PFBS	Draft Washington State Action Level	860 ppt	0	103	236
PFNA	Draft Washington State Action Level	14 ppt	0	12	327
PFHxS	Draft Washington State Action Level	70 ppt	0	82	257

* These detection counts include the PFOA + PFOS results above.

The Navy is taking action on the EPA lifetime health advisory.

- The Draft Washington State Action Levels are included in the table for reference.
- They are current as of May 26, 2021, and are subject to change.

FOR MORE INFORMATION click the links icon below the poster station

FOR MORE INFORMATION see Station #X

ACRONYMS & ABBREVIATIONS

EPA	U.S. Environmental Protection Agency	PFBS	perfluorobutane sulfonic acid	PFOA	perfluorooctanoic acid
NBK	Naval Base Kitsap	PFHxS	perfluorohexane sulfonic acid	PFOS	perfluorooctane sulfonate
PFAS	per- and polyfluoroalkyl substances	PFNA	perfluorononanoic acid	ppt	part(s) per trillion

Understanding Data Packages

To request sampling, click the sampling icon below the poster station or call **844-NBKBNGR (844-625-2647).**

FOR MORE INFORMATION | click the links icon below the poster station

The result for PFOA:

PFOA was detected in the sample at 0.29 ng/L (0.29 ppt).

The "J" qualifier means that the result detected is an estimated level.

The result for PFOS:

PFOS was detected in the sample at 2.34 ng/L (2.34 ppt).

All other results:

All other PFAS were not detected (ND) in the sample.

BATTELLE
It can be done

Project Client:
Project Name:
Project No.:

Client ID

Battelle ID					
Sample Type		SA			
Collection Date		02/21/2020			
Extraction Date		02/25/2020			
Analysis Date		02/27/2020			
Analytical Instrument		Sciex 5500 LC/MS/MS			
% Moisture		NA			
Matrix		DW			
Sample Size		0.275			
Size Unit-Basis		L			
Analyte	CAS No.	Result (ng/L)	DL	LOD	LOQ
PFHxA	307-24-4	ND	0.21	0.45	2.27
PFHpA	375-85-9	ND	0.21	0.45	2.27
PFOA	335-67-1	0.29 J	0.18	0.45	2.27
PFNA	375-95-1	ND	0.11	0.36	2.27
PFDA	335-76-2	ND	0.10	0.36	2.27
PFUnA	2058-94-8	ND	0.09	0.36	2.27
PFDoA	307-55-1	ND	0.13	0.45	2.27
PFTrDA	72629-94-8	ND	0.09	0.36	2.27
PFTeDA	376-06-7	ND	0.20	0.45	2.27
NMeFOSAA	2355-31-9	ND	0.18	0.45	2.27
NEtFOSAA	2991-50-6	ND	0.15	0.45	2.27
PFBS	375-73-5	ND	0.11	0.36	2.27
PFHxS	355-46-4	ND	0.11	0.36	2.27
PFOS	1763-23-1	2.34	0.14	0.45	2.27
HFPO-DA	13252-13-6	ND	0.08	0.36	2.27
Adona	919005-14-4	ND	0.11	0.36	2.27
11Cl-PF3OUdS	763051-92-9	ND	0.09	0.36	2.27
9Cl-PF3ONS	756426-58-1	ND	0.11	0.36	2.27

Surrogate Recoveries (%)	Recovery
13C2-PFHxA	107
13C2-PFDA	90
d5-EtFOSAA	88
13C3-HFPO-DA	97

1 nanogram per liter (ng/L) = 1 part per trillion (ppt)

This column includes the data qualifiers that apply to a given result.

The detection limit (**DL**) is the lowest level at which the laboratory can reliably "see" that this compound is present.

The limit of detection (**LOD**) is the lowest level at which the laboratory can reliably "see" this compound is not present.

The limit of quantitation (**LOQ**) is the lowest level at which the laboratory can reliably measure this compound with a known degree of confidence and accuracy.

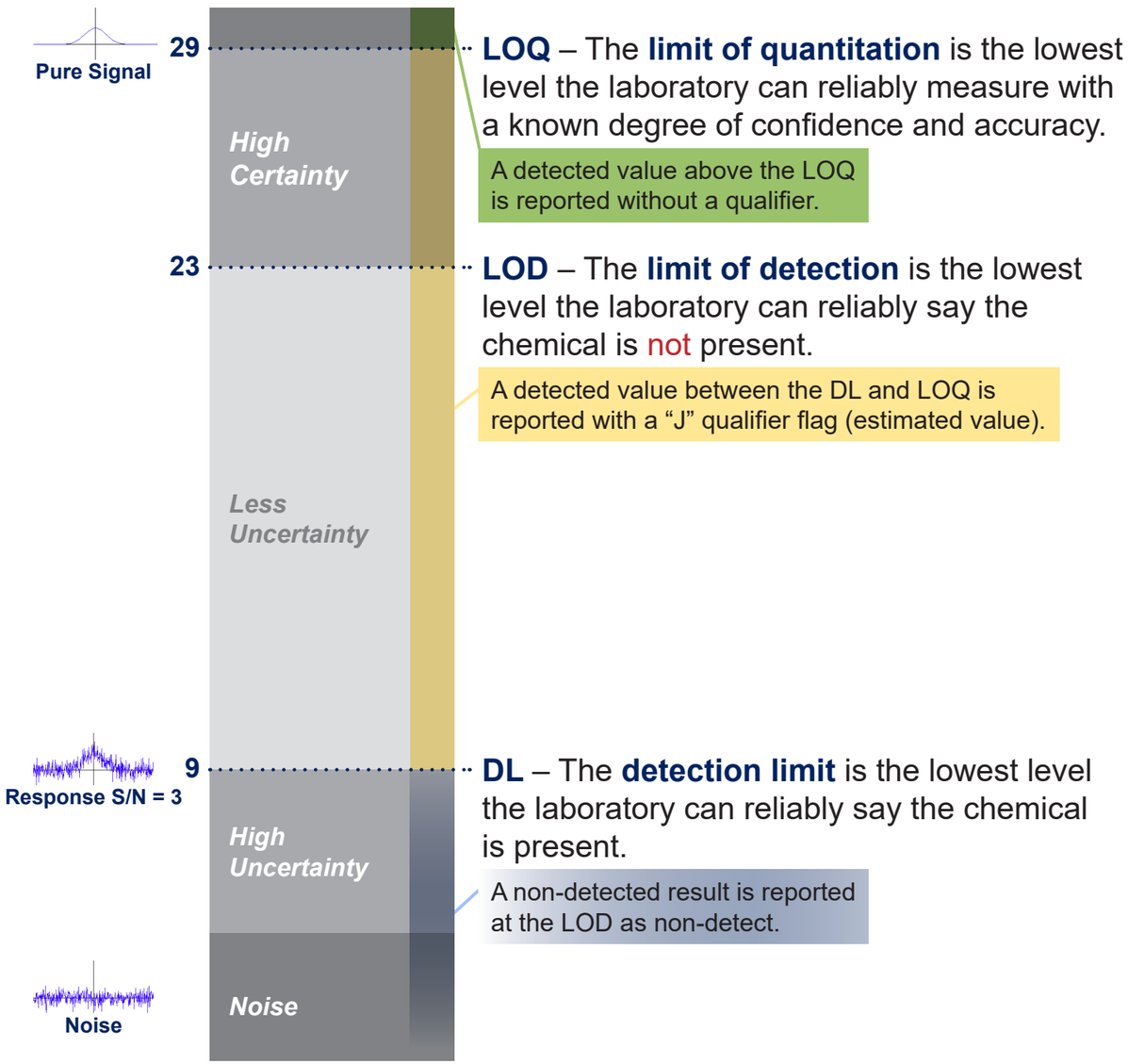
ACRONYMS & ABBREVIATIONS

ND	not detected	PFAS	per- and polyfluoroalkyl substances	PFOS	perfluorooctane sulfonate
ng/L	nanogram(s) per liter	PFOA	perfluorooctanoic acid	ppt	part(s) per trillion

Understanding Data Packages

To request sampling, click the sampling icon below the poster station or call **844-NBKBNGR (844-625-2647).**

Instrument Measurements and Analytical Reporting



LOQ – The **limit of quantitation** is the lowest level the laboratory can reliably measure with a known degree of confidence and accuracy.

A detected value above the LOQ is reported without a qualifier.

LOD – The **limit of detection** is the lowest level the laboratory can reliably say the chemical is not present.

A detected value between the DL and LOQ is reported with a "J" qualifier flag (estimated value).

DL – The **detection limit** is the lowest level the laboratory can reliably say the chemical is present.

A non-detected result is reported at the LOD as non-detect.

How Are Amounts of Chemicals in Samples Reported?

This table is an example of how PFOA results might be reported by the laboratory given the DL, LOD, and LOQ shown on the figure to the left.

Sample	Instrument Result	Reported Result
1	non-detect	ND
2	10	10 J
3	25	25 J
4	30	30
5	40	40

J = Estimated

What Is a Surrogate?

- A substance similar to the analytes of interest
- Not found naturally in the substance
- Intentionally added to the sample at a known amount to monitor the performance of the sample's preparation and analysis

ACRONYMS & ABBREVIATIONS

PFOA perfluorooctanoic acid

Per- and Polyfluoroalkyl Substances (PFAS) and Exposure

To request sampling, click the sampling icon below the poster station or call **844-NBKBNGR (844-625-2647).**

Where Do PFAS Come From?

- Manufactured compounds; do not naturally occur.
- Used since 1950s in products and industry.
- Last a long time in the environment.

firefighting foam

U.S. Navy / Photographer's Mate 3rd Class Tommy Gilligan

stain-resistant carpets and fabrics

Image: freepik.com

water-resistant fabrics

Image: Kyler Boone / unsplash

personal care products

Image: freepik.com

nonstick cookware

Image: Valeria_Aksakova / freepik

food packaging

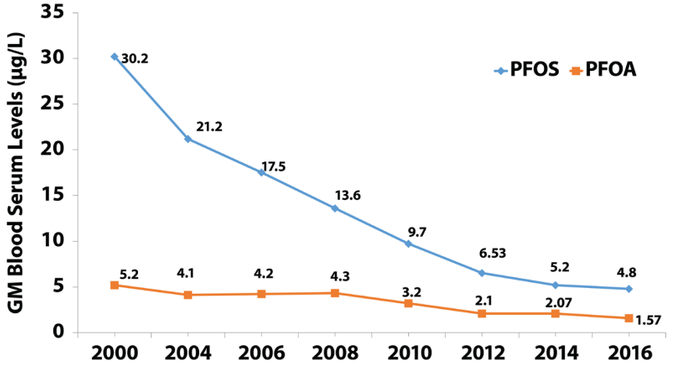
Image: freepik.com

How Are People Exposed to PFAS?

- Drinking water containing PFAS may be a significant source of exposure.
  - Infants may have higher exposure than adults when formula is mixed with tap water or when breastfeeding.
  - Very little PFAS exposure occurs during bathing, showering, washing dishes, or washing clothes.
- PFAS may also be in food, some consumer products, indoor dust or air, and workplaces.

PFAS in People

- Nearly all people tested have some PFAS in their blood.
- Levels of PFOS and PFOA have declined in people as these compounds are phased out.
- Some PFAS stay in the body a long time.



Source: Centers for Disease Control and Prevention
National Health and Nutrition Examination Survey

- The PFAS blood test is not a regular test offered by a doctor or health department.
  - Blood test results can tell you the amount of PFAS in your blood.
  - Results will not tell you how PFAS will affect your health now or in the future.

ACRONYMS & ABBREVIATIONS

PFAS per- and polyfluoroalkyl substances
PFOA perfluorooctanoic acid
PFOS perfluorooctane sulfonate

Potential Health Effects and Recommendations

To request sampling, click the sampling icon below the poster station or call **844-NBKBNGR (844-625-2647).**

How Might PFAS Exposure Affect People's Health?

- Scientists are still learning about how people's exposure to PFAS might affect their health. Certain PFAS **may** lead to the following:
  - Increased cholesterol levels.
  - Changes in liver enzymes.
  - Decreased vaccine response in children.
  - Small decrease in infant birth weight.
  - Increased risk of high blood pressure or preeclampsia in pregnant women.
  - Increased risk of kidney or testicular cancer.
- Studies in animals show that PFAS can:
  - Damage the liver, kidney, and immune system.
  - Alter hormone levels and the growth or development of offspring.
  - Produce certain tumors.

What Is the EPA Lifetime Health Advisory?

- Advises use of alternate drinking water if PFOS and PFOA combined occur above 70 ppt.
- Set to protect health over a lifetime of exposure.
  - Includes sensitive populations such as a baby in the womb.
  - Accounts for PFAS exposure from sources other than drinking water.
- Established in 2016. Based on developmental effects in animal studies and review of studies in people.

Health Recommendations

- The best intervention is to stop the source of exposure (such as drinking water). This allows levels in the body to decrease over time.
- If the concentration of PFAS in your tap water exceeds health advisory levels:
  - Use alternative water for drinking, cooking, and brushing teeth.
  - Mix infant formula with alternative water or use a premixed formula.
  - If nursing, pediatricians advise continuing to breastfeed your child. The substantial health benefits of breastfeeding outweigh the risks for infants exposed to PFAS in breast milk.

FOR MORE INFORMATION click the links icon below the poster station

- Talk to your primary care physician if you have concerns.

ACRONYMS & ABBREVIATIONS

EPA	U.S. Environmental Protection Agency	PFOA	perfluorooctanoic acid
PFAS	per- and polyfluoroalkyl substances	PFOS	perfluorooctane sulfonate
ppt	part(s) per trillion		

Washington State Takes Action on PFAS

State drinking water standards – Rulemaking

- Washington State Board of Health is in the process of setting State Action Levels (SALs) for five PFAS.
- SALs are health protection levels for long-term daily water consumption.
- WA SALs were derived by state scientists and account for higher exposure to breastfed infants.
- A final rule is expected in fall 2021.

DRAFT State Action Levels for PFAS

Individual PFAS	Level in Drinking Water
PFOA	10 parts per trillion
PFOS	15 parts per trillion
PFNA	14 parts per trillion
PFHxS	70 parts per trillion
PFBS	860 parts per trillion

Draft values are current as of May 24, 2021, and are subject to change.

Draft rule would…

- Require Group A public water systems to test for PFAS (systems that serve 15 or more connections, or 25 or more people).
- Help us understand occurrence of PFAS in state drinking water.
- Ensure that consumers are informed and can protect themselves when PFAS are above a SAL.

Acronyms

PFOA	perfluorooctanoic acid	PFNA	perfluorononanoic acid
PFOS	perfluorooctane sulfonic acid	PFHxS	perfluorohexane sulfonic acid
		PFBS	perfluorobutane sulfonic acid

State actions to protect drinking water

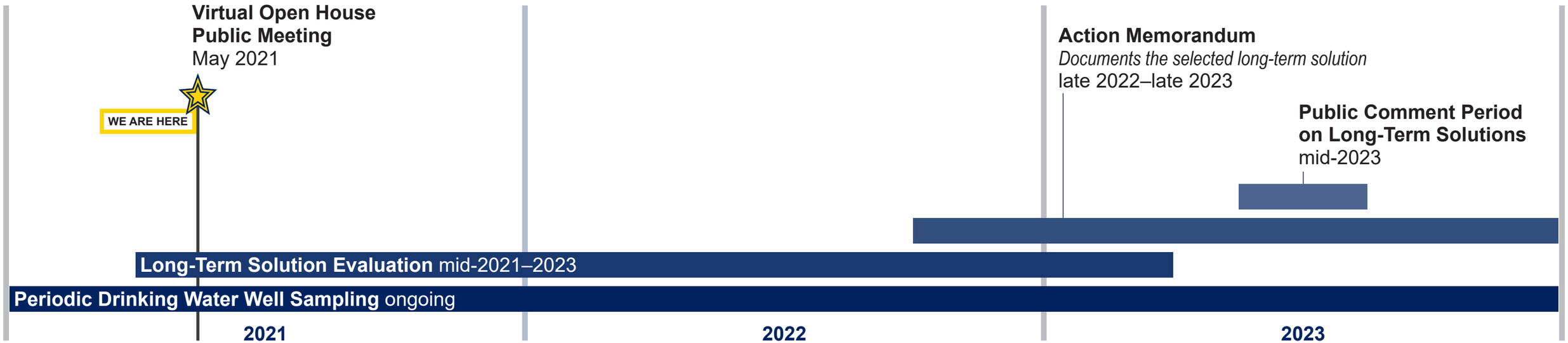
- 2021 – Statewide PFAS Action Plan with recommendations and state actions underway.
- 2020 – Sale of PFAS firefighting foams banned for most uses. Excludes military until they approve an alternative foam.
- 2019 – State Department of Ecology helps local fire departments swap out and safely dispose of PFAS firefighting foams.
- 2018 – Fire training with PFAS foams banned.

Washington State Department of Health

FOR MORE INFORMATION click the links icon below the poster station

Timeline for Off-Base Drinking Water Solution

To request sampling, click the sampling icon below the poster station or call **844-NBKBNGR (844-625-2647).**



- The Navy is dedicated to ensuring that appropriate long-term solutions are in place, and will remain fully engaged throughout the process.
- Potential long-term solutions may include:
  - Well filtration system
  - Connect to alternative source
  - New well
- An Engineering Evaluation and Cost Analysis will evalute the potential alternatives for the best long-term solution.
- The Navy works with regulatory partners throughout the investigation.
- The Navy will continue to monitor the evolving science and any state and federal regulations for PFAS in drinking water.
- Public involvement is encouraged throughout the process.
- The Navy's PFAS investigation website will be updated regularly to keep the public informed.

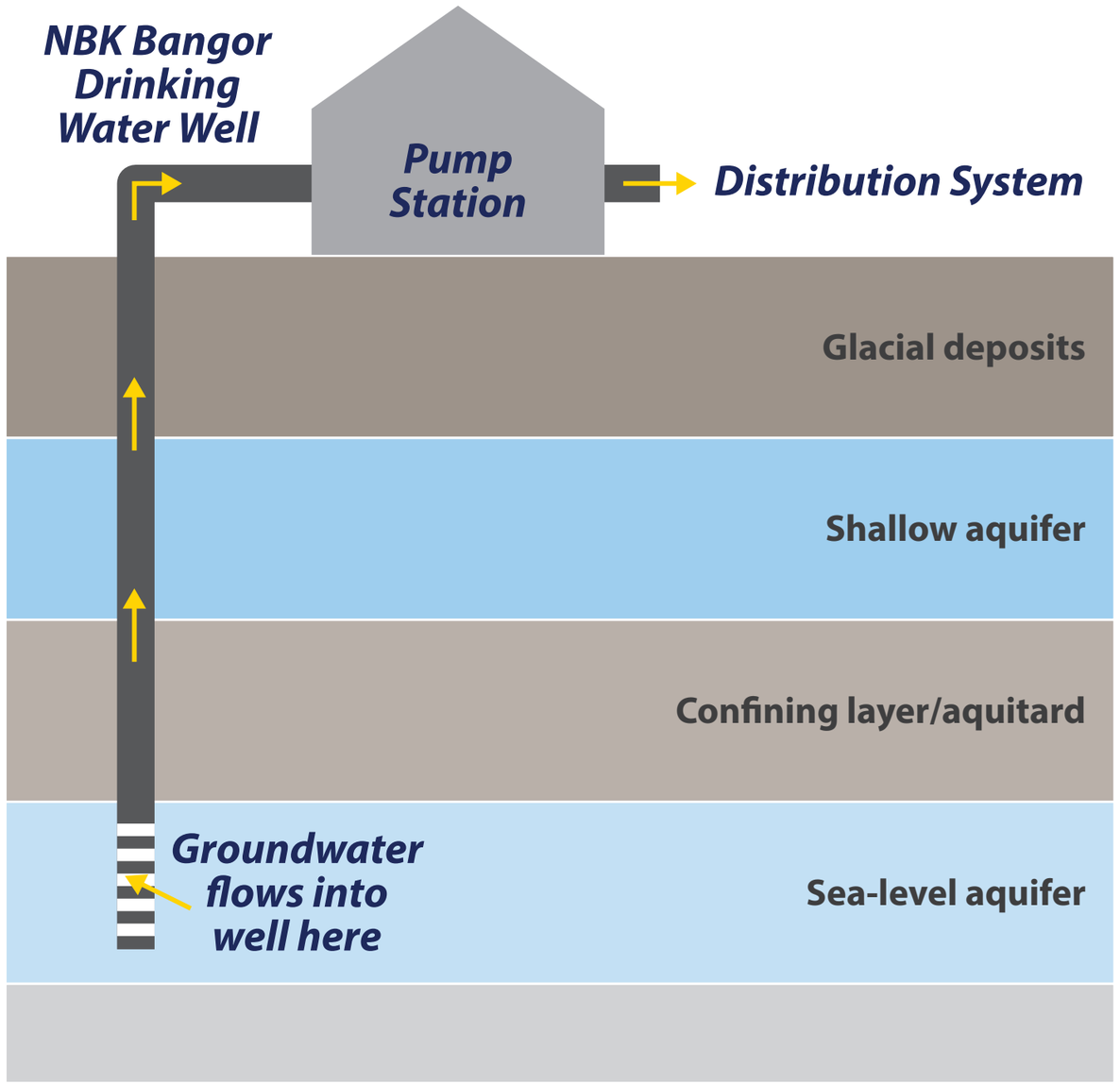
FOR MORE INFORMATION click the links icon below the poster station

ACRONYMS & ABBREVIATIONS

NBK Naval Base Kitsap
PFAS per- and polyfluoroalkyl substances

On-Base (NBK Bangor) Drinking Water

To request sampling, click the sampling icon below the poster station or call **844-NBKBNGR (844-625-2647).**



NBK Bangor's drinking water meets all safe drinking water standards.

- On-base drinking water wells are upgradient from potential PFAS release areas and collect groundwater from the deep, sea-level aquifer.
- PFAS have not been detected in on-base drinking water wells.
  - On-base drinking water wells were tested for PFAS in 2014 and were resampled in the fall of 2020.
- Results of other water quality sampling can be found in annual Consumer Confidence Reports online.

FOR MORE INFORMATION click the links icon below the poster station

ACRONYMS & ABBREVIATIONS

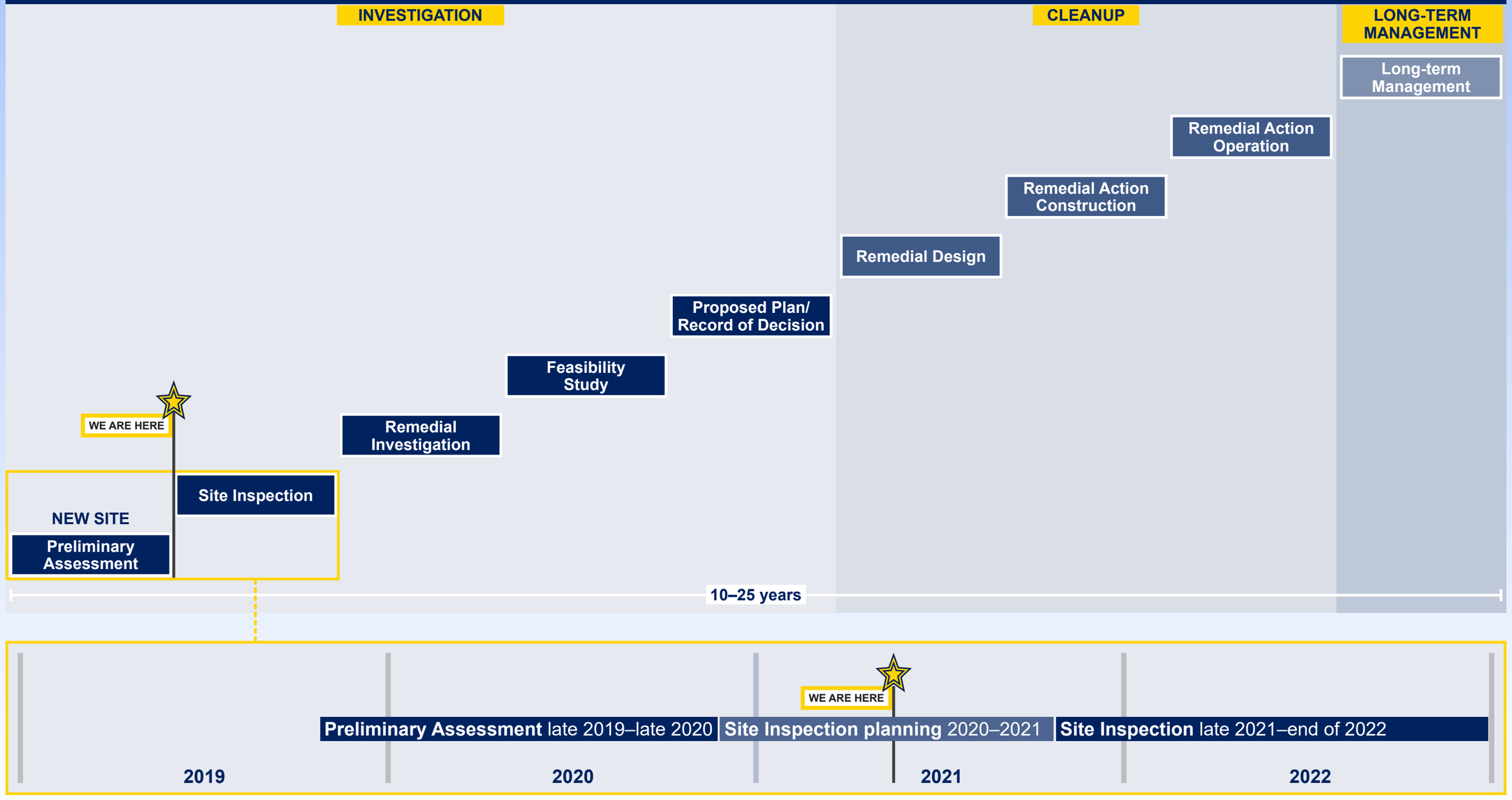
NBK Naval Base Kitsap PFAS per- and polyfluoroalkyl substances

On-Base Path Forward

To request sampling, click the sampling icon below the poster station or call **844-NBKBNGR (844-625-2647).**

Environmental Clean-Up Process

Activity boxes do not indicate the relative length of any activity.



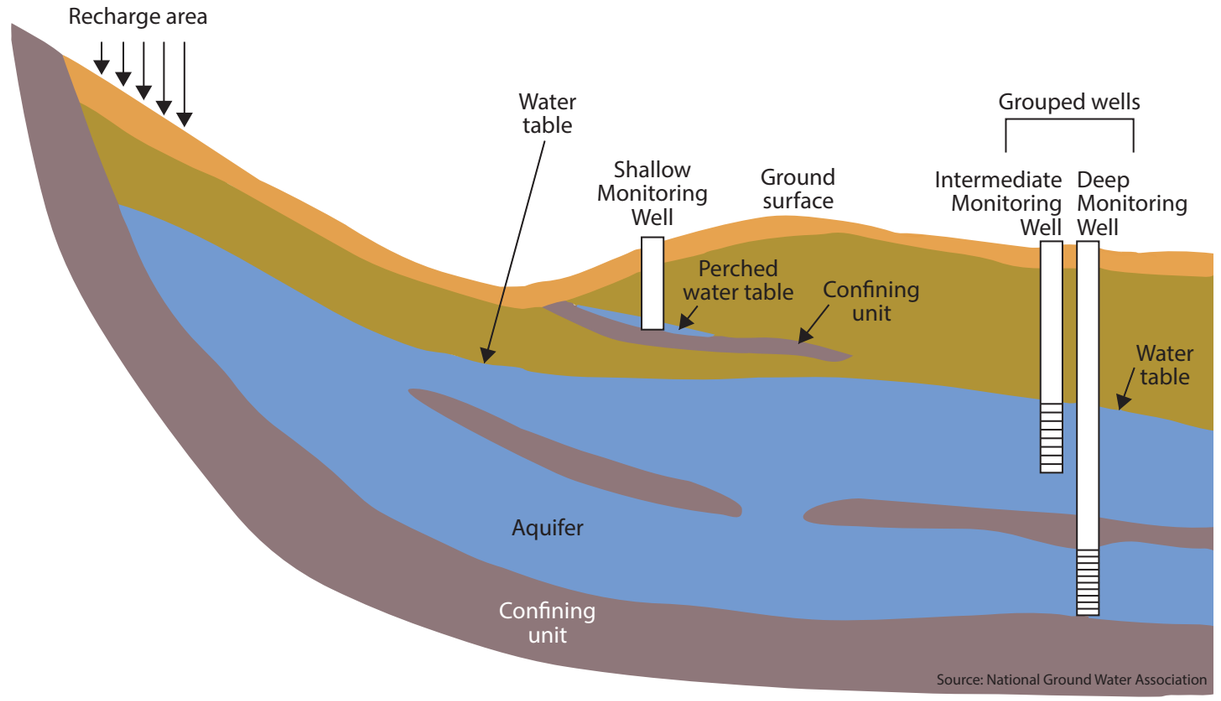
NBK Bangor Site Inspection

To request sampling, click the sampling icon below the poster station or call **844-NBKBNGR (844-625-2647).**

Objectives of Site Inspection

- The objective of the Site Inspection is to confirm if there is a release of PFAS to soil and/or groundwater and develop the conceptual site model:
  - Measure PFAS concentrations in on-base soil and groundwater
  - Determine aquifer characteristics, including groundwater flow and direction
  - Identify potentially impacted off-base drinking water wells based on on-base and off-base groundwater results
- Partner with multi-agency team in activities that include:
  - Evaluate site data and information
  - Plan additional investigation to fill any data gaps
  - Identify potential removal actions
  - Develop path forward and continuing public outreach

Example Conceptual Site Model



ACRONYMS & ABBREVIATIONS

NBK Naval Base Kitsap PFAS per- and polyfluoroalkyl substances PFOA perfluorooctanoic acid PFOS perfluorooctane sulfonate