PFAS Roundtable
Portsmouth City Council
March 19, 2018

Summary of:

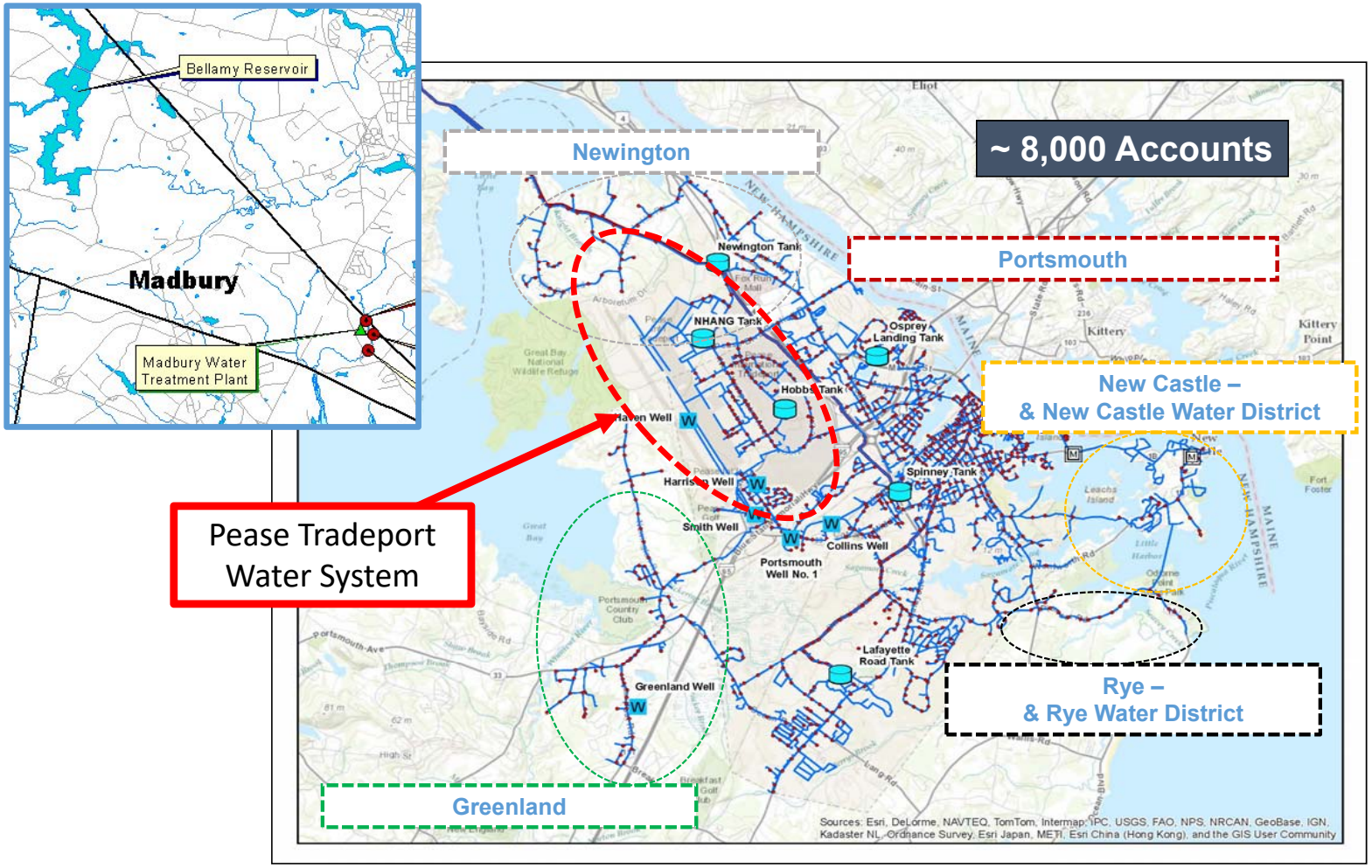
"Report Back to City Council regarding PFAS"

from: City of Portsmouth – March 5, 2018 City Council Packet and Meeting

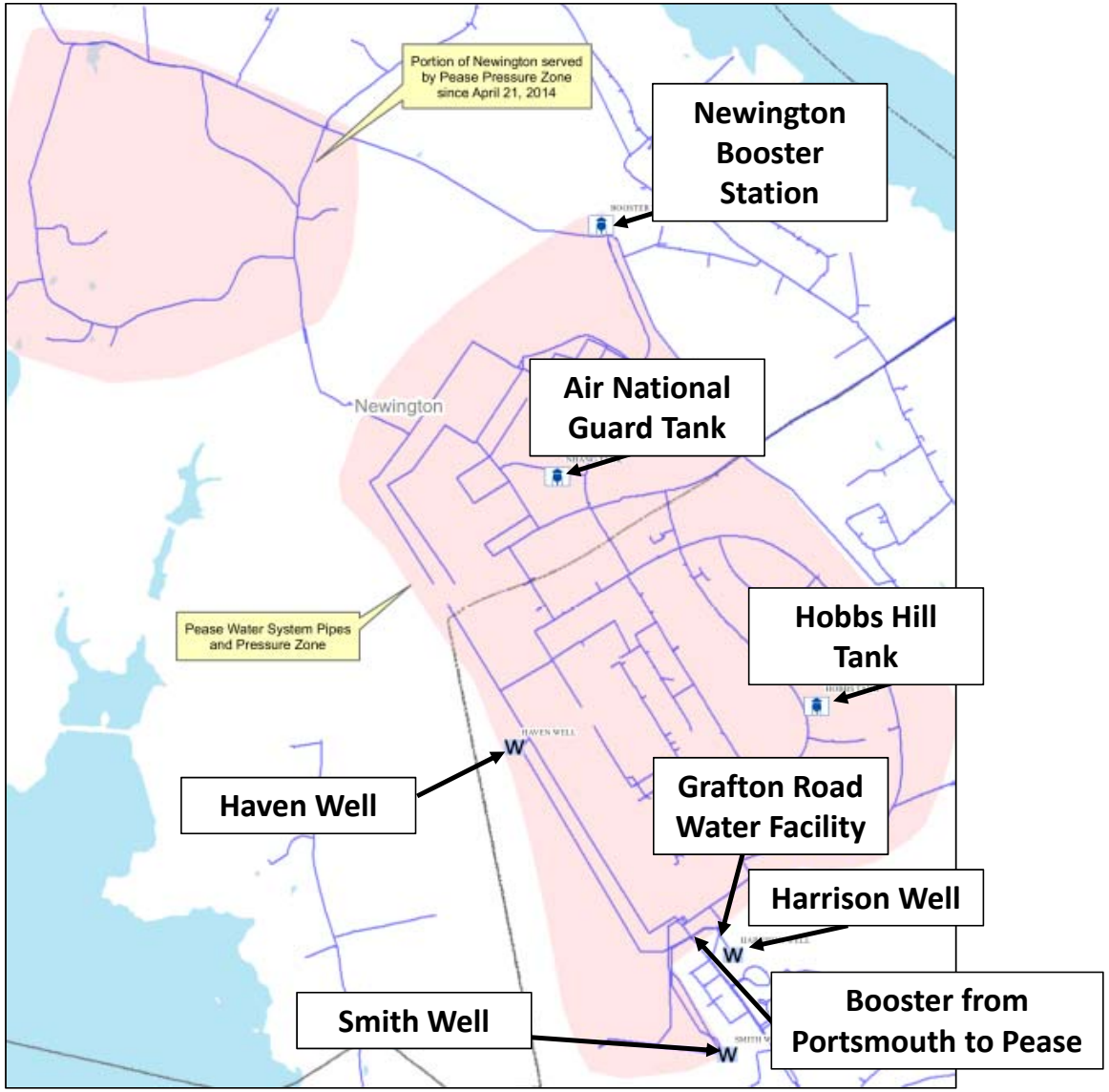
What is 1 Part-per-Trillion (ppt)?

- 1 Second in 32,000 years
- 1 Grain of Sand in an Olympic-size swimming pool
- Approximately 1 Grain of Sand in the new Pease Hobbs Hill Storage Tank (600,000 gallons)

Portsmouth Regional Water System



Pease Tradeport Water System



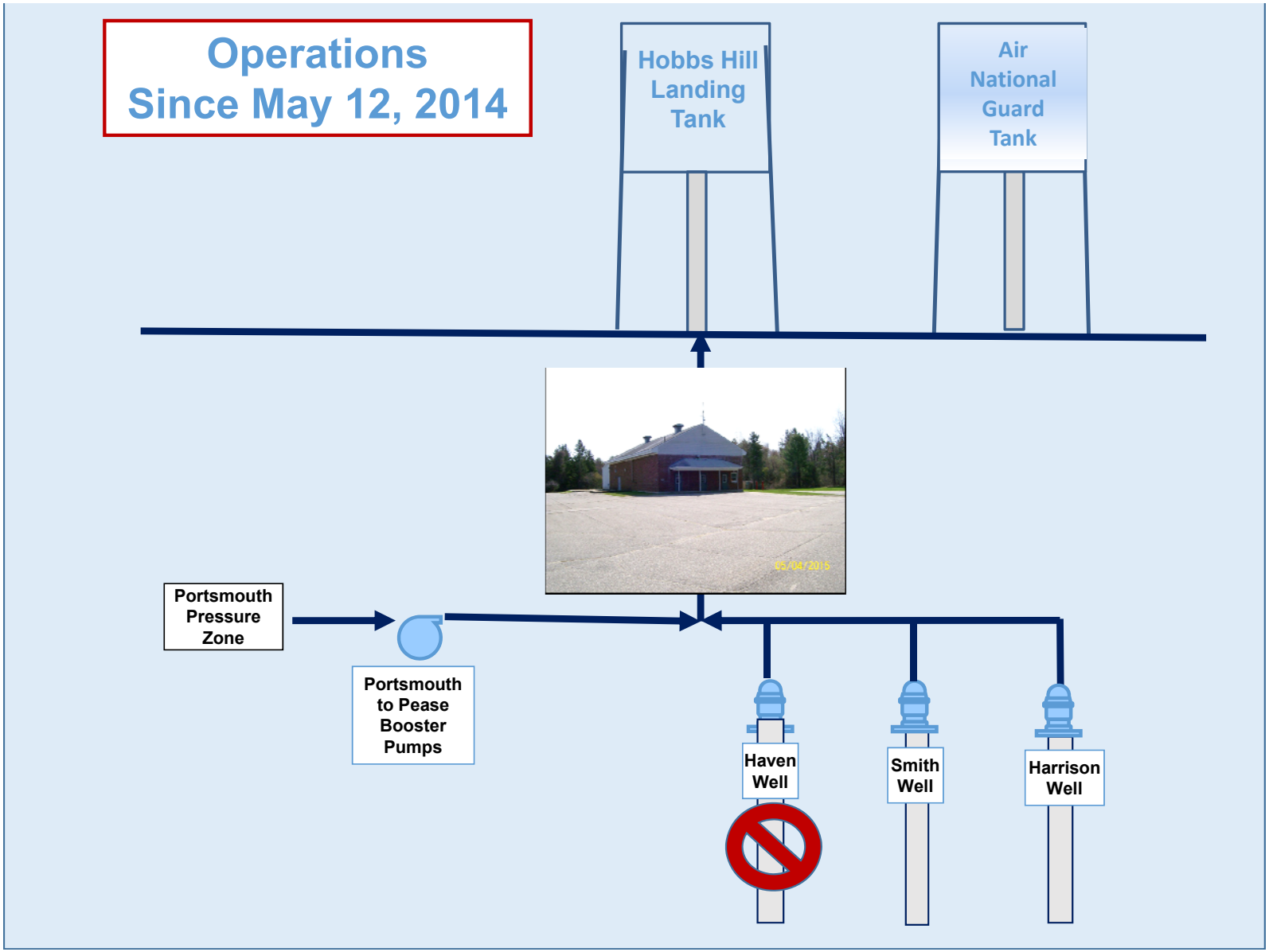
Haven Well

- Installed in 1875 (Haven Springs)
- City of Portsmouth Supply until mid ‘50’s
- Pease Air Base: 1956 to 1992
- Pease Tradeport: 1992 to 2014 (shut down due to PFAS contamination)

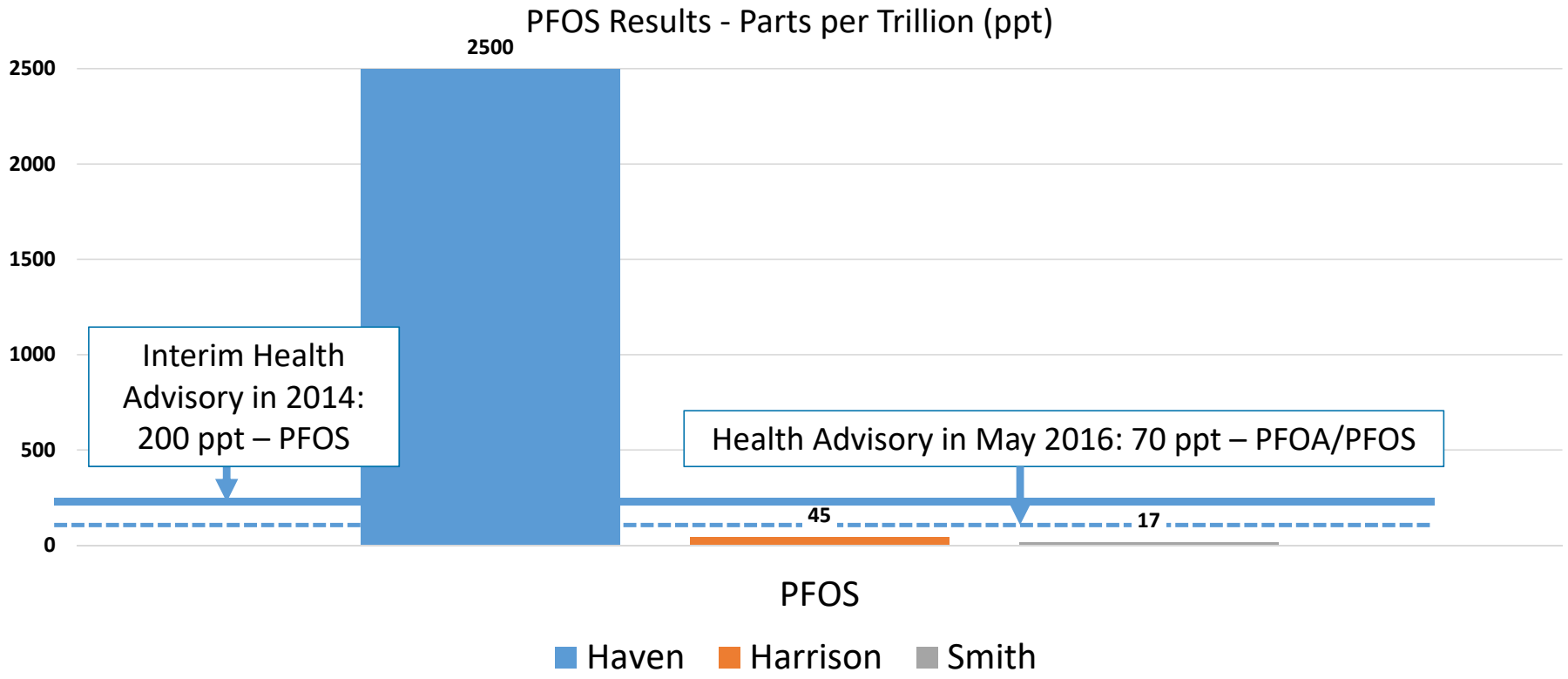
Haven Well Shutdown: Chronology of Events

- May 12, 2014 – City staff are notified that PFAS levels in Haven Well exceeded the EPA's Health Advisory Standard for PFOS
  - 2,500 ppt (Preliminary Health Advisory = 200 ppt)
- May 12, 2014 - Haven Well is shut down
- Ongoing Monitoring of PFAS by the Air Force's consultant
- July 2015 – EPA Order to Air Force to treat aquifer and wells
- 2015 and 2016 – Treatment design and piloting studies
- September 2016 – Activated Carbon Filters on Harrison and Smith Wells
- 2017 – Ongoing design of treatment system for all three Pease wells
- 2018 – Anticipated construction of treatment system

Operations Since May 12, 2014

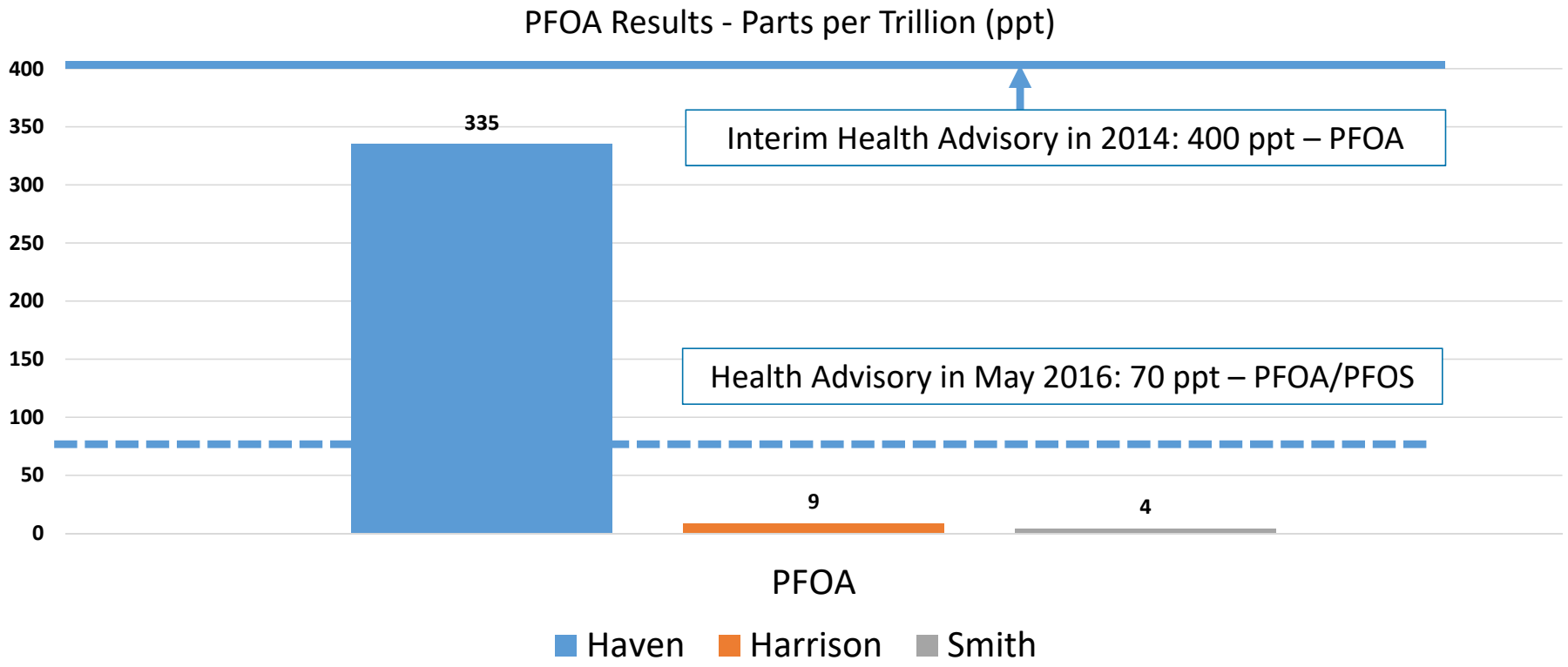


Pease Wells – 2014 PFOS Sampling



Note: Recent testing results of Haven Well = 1360 ppt (Haven Pilot Data)

Pease Well – 2014 PFOA Sampling



Note: Recent testing results of Haven Well = 242 ppt (Haven Pilot Data)

What are PFAS?

- Perfluoroalkyl and polyfluoroalkyl substances (PFAS) are a large group of man-made chemicals that have been used since the 1950s.
- Used in products as clothing, furniture, adhesives, food packaging, heat-resistant non-stick cooking surfaces, and the insulation of electrical wire.
- Previously referred to as perfluorochemicals (PFCs).
- Do not occur naturally, but are widespread in the environment.
- Found in people, wildlife and fish all over the world.
- Can stay in people's bodies a long time. (bioaccumulate)
- Chemicals in this group, including perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA), have been a concern because they do not break down in the environment, can move through soils and contaminate drinking water sources, and they build up (bioaccumulate) in fish and wildlife.

https://www.cdc.gov/biomonitoring/PFAS_FactSheet.html

https://www.atsdr.cdc.gov/pfc/docs/pfas_fact_sheet.pdf

PFAS Health Effects

- Some scientific studies suggest that certain PFAS may affect different systems in the body.
- Although more research is needed, some studies in people have shown that certain PFAS may:
  - affect growth, learning, and behavior of infants and older children
  - lower a woman's chance of getting pregnant
  - interfere with the body's natural hormones
  - increase cholesterol levels
  - affect the immune system and
  - increase the risk of cancer \

https://www.atsdr.cdc.gov/pfc/docs/pfas_fact_sheet.pdf

Pease Tradeport Blood Testing and Studies

- State and Federal Health agencies have taken the lead regarding the impacted population served by the Pease Tradeport water system
- Blood testing revealed higher levels of PFAS compounds in Pease population versus national averages
- Pease Citizens Advisory Panel (CAP) is currently involved in potential development of long-term health studies
- ATSDR “Feasibility Assessment for Epidemiological Studies at Pease International Tradeport, Portsmouth, New Hampshire” released in November 2017
  - **https://www.atsdr.cdc.gov/sites/pease/documents/Pease_Feasibility_Assessment_November-2017_508.pdf**

What caused this contamination?

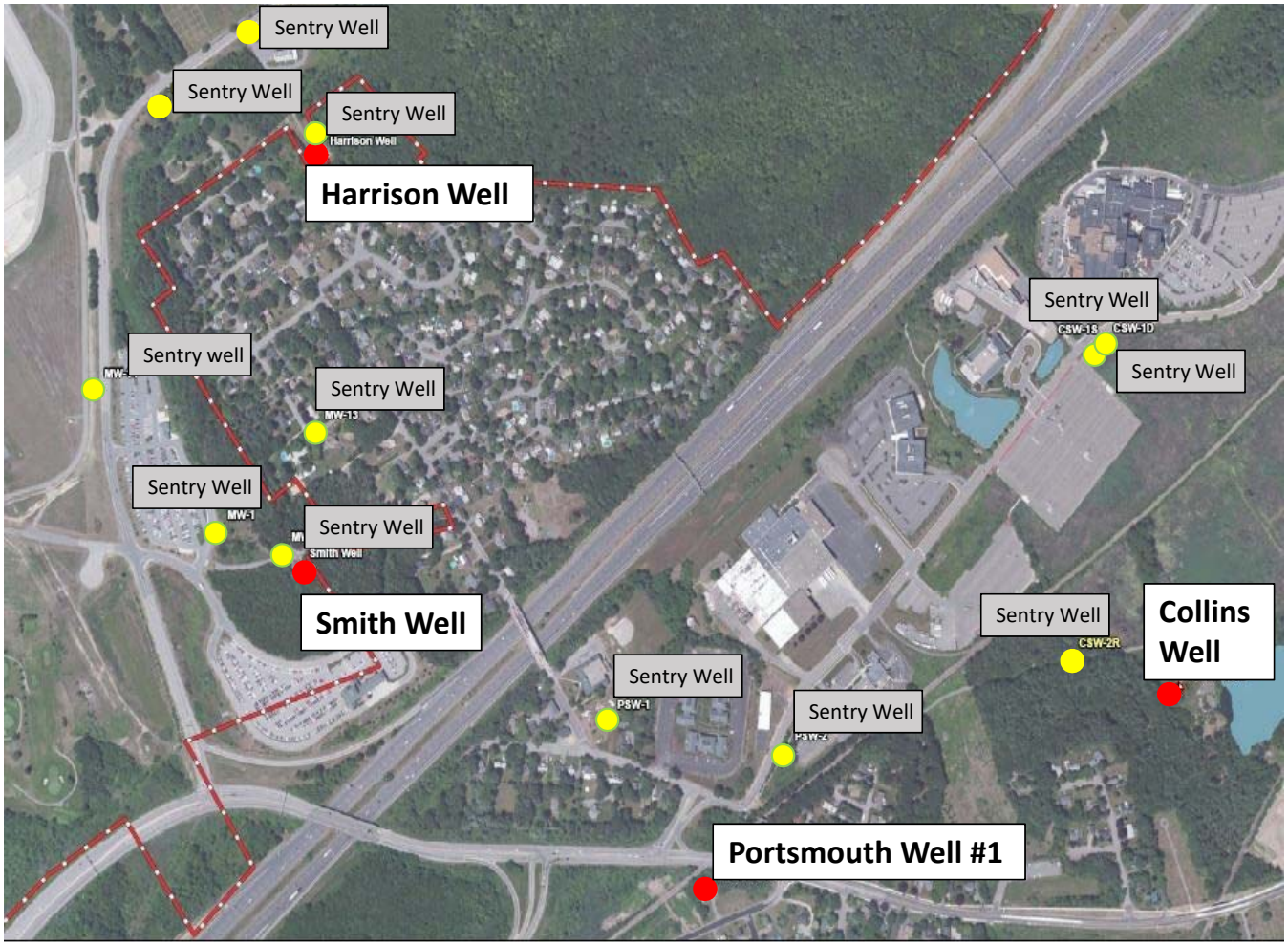
PFOS and PFOA are components of legacy Aqueous Film Forming Foam (AFFF) the Air Force began using in the 1970s as a firefighting agent to extinguish petroleum fires, used or released at:

- Fire Training Center for former Pease Air Base
- Use to fight fires
- Potential spills

KC-135E Fire at Pease AFB January 1990

https://www.youtube.com/watch?v=8W_zJfJGhSI&feature=youtu.be

Southern Water Supply Well Field Municipal and Monitoring Wells
Monthly PFAS Sampling Since May 2014



Treatment Options?

- Activated Carbon Filtration is most widely accepted for drinking water applications
- Membrane Filtration
- Anion Exchange
- Advanced Oxidation

Oakdale, Minnesota
Activated Carbon

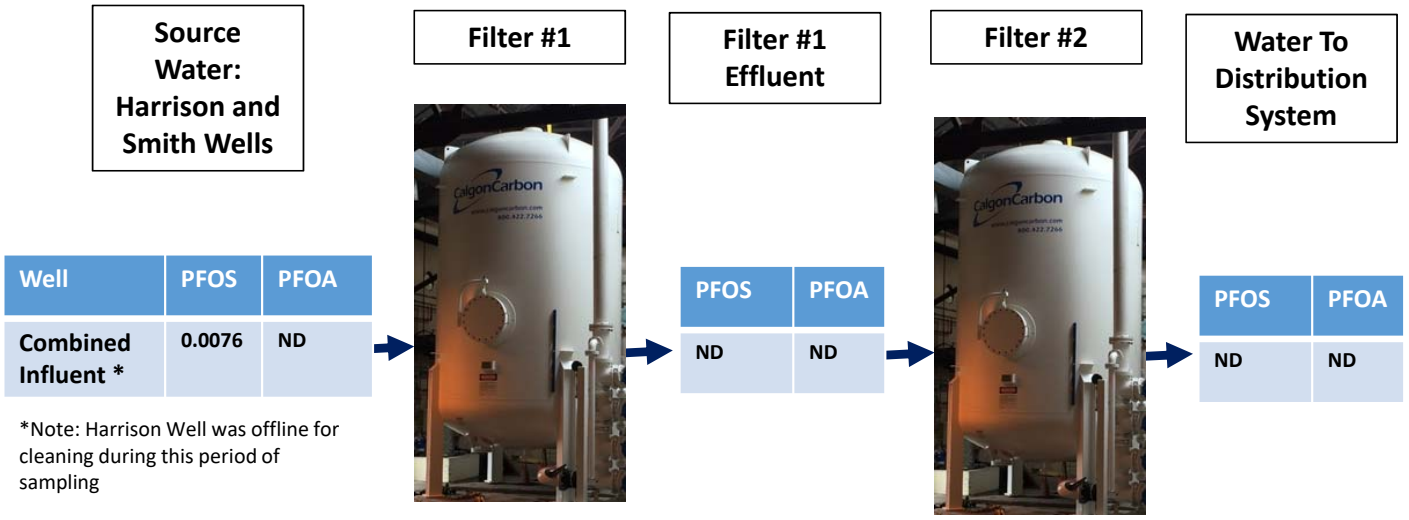
Newcastle, Delaware
Activated Carbon

City's analysis of other water systems with PFAS contamination – How are they treating the water?

- Research on municipal drinking water systems with the same general groundwater quality indicates Granular Activated Carbon (GAC) as the preferred treatment alternative
  - GAC only – 9/13 utilities
  - GAC and resin – 1/13 utilities
  - Point of use (carbon) – 1/13 utilities
  - No treatment – 1/13 utilities
  - No information – 1/13 utilities
- A Report summarizing this information will be completed soon by the City's engineering consultant

Harrison/Smith Well Filter Demonstration Project
Activated Carbon Filtering Since September 2016

Demonstration Project Sampling: January 10, 2018 Results



Well	PFOS	PFOA
Combined Influent *	0.0076	ND

*Note: Harrison Well was offline for cleaning during this period of sampling

PFOS	PFOA
ND	ND

PFOS	PFOA
ND	ND

Sample Rounds – 37
Gallons Treated – 199 million gallons
Filter Bed Volumes – 38,386

Notes: All samples in parts-per-billion (ppb)
ND = Non Detect
All samples collected by Weston & Sampson and analyzed by Maxxam Laboratory

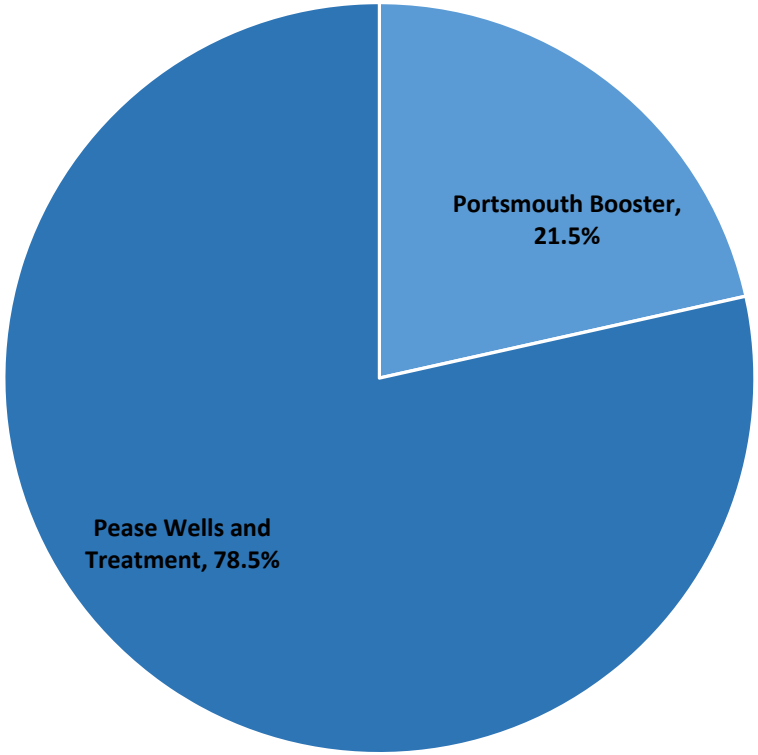
Ongoing Haven Well Treatment Pilot

- Filter Media Comparisions:
  - Activated Carbon, same as utilized in the Demonstration Treatment system
  - Resins
- Running well water at 1.5 gallons per minute through filter columns
- Periodic water quality sampling to assess performance of filters
- Resins have proven to be a viable option
- **Current design, agreed upon by Air Force, is to treat wells through resin filters followed by activated carbon**

- Pilot Treatment System

Percentage of Pease Tradeport Water - 2017

Pease Water is predominantly supplied by water from the Smith and Harrison wells through the carbon treatment system, with some boosted Portsmouth water depending on demand. 2017 data totaled 78.5% of water from Pease sources and 21.5% supplemented from Portsmouth system.

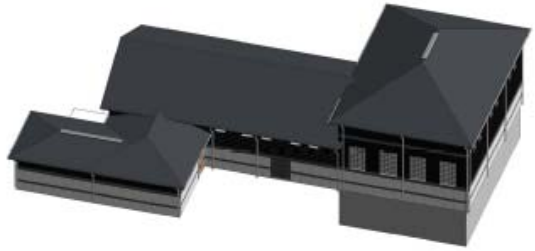


Air Force Agreements to Address the Loss of the Haven Well

- September 2014
  - Hydrogeologic study for replacement well - $154,000
  - Technical support assistance reimbursement - $25,000
- November 2015
  - Preliminary Treatment Assessment - $60,000
- April 2016
  - Treatment Pilot and Demonstration Project - $947,700
- February 2017
  - Additional Treatment Design Evaluation - $46,623
- August 2017
  - Final Design of Treatment for Pease Tradeport wells - $1,329,080
- Pending
  - Facility Construction Cost
  - Long-term operations and maintenance

Grafton Road Drinking Water Treatment Plant Proposed Design

3 3D VIEW - GROUND LEVEL



1 3D - COMPLETE / FINISHED

2 OVERALL BLDG RENDERING

Haven Well Reactivation – Hydrogeologic and Water Quality Monitoring Program

- Intend to develop comprehensive water quality monitoring plan of PFAS and other key water quality parameters
- Sampling to occur prior to reactivation of Haven Well and will continue thereafter
- Meeting with Air Force again in early 2018 to review

Pease Water System Updates on City Website

City of PORTSMOUTH NH | DEPARTMENT OF PUBLIC WORKS

WATER

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Quality & Status | Water Efficiency | New Service, Meters & Backflows | Billing | Information | Contact

City of Portsmouth > Public Works Home > Water > Pease Tradeport Water System

PEASE TRADEPORT WATER SYSTEM

WATER QUALITY AND RESPONSE TO PFAS COMPOUNDS

View the latest report **here**.

For information about the Portsmouth Water System's PFAS sampling, click **here**.

The City of Portsmouth's Water Division has been actively working with the United States Air Force (Air Force), the United States Environmental Protection Agency (EPA), and the New Hampshire Department of Environmental Services (NHDES) in response to the detection of elevated levels of the unregulated contaminant perfluorooctane sulfonic acid (PFOS) from the Haven Well in 2014. This well was one of three wells that served the Pease International Tradeport water system. PFOS is one of a class of chemicals known as **Per- and polyfluoroalkyl substance** (often referred to as PFCs or PFAS). PFAS compounds are a diverse group of compounds resistant to heat, water, and oil. For decades, they have been used in hundreds of industrial applications and consumer products such as carpeting, apparels, upholstery, food paper wrappings, fire-fighting foams and metal plating. The contamination at the Haven Well has been attributed to the past use of **firefighting foam at the air base** and the air base's fire training center. Because the level of PFOS exceeded the "**provisional health advisory**" set by the EPA, the well was shut down and it has been off ever since. A number of actions have been taken by the project response technical team, which includes the City of Portsmouth, the **Air Force Civil Engineering Center**, the EPA, the **NHDES** and the **Pease Development Authority**. The following are key events and actions taken as part of the response:

April 2014	Pease wells are sampled for PFAS compounds.
May 12, 2014	**PFAS results** are reported to City of Portsmouth and Haven Well is taken out of service. The other two wells continue to supply water to the Tradeport and are supplemented and blended with City of Portsmouth water.
May 2014 to present	Technical team convenes and starts PFAS response and investigation. Comprehensive water quality sampling program is implemented by the Air Force. Sampling includes monitoring of other water supply wells and surrounding areas of Pease.
2014 to present	Numerous public meetings and outreach materials are provided to the public about the **history and status of the Tradeport water system**.
January 2015	"**Testing for Pease**" organizes and advocates for blood testing of Tradeport water users effected by contamination.
July 2015	The **EPA issues an order to the Air Force** that they design a treatment system for the Tradeport' s drinking water system and also design a separate treatment system to treat PFAS in the Pease aquifer.
September 1, 2015	Senator's Jean Shaheen and Kelly Ayotte arrange a meeting with the Air Force and the City. At the meeting the **City presents information** about the water system's operations and proposes treatment of all three wells at Pease.

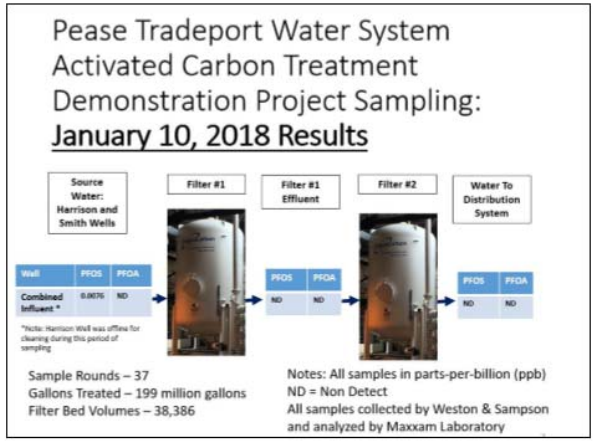
City of
Portsmouth
Department of Public Works

January 29, 2018

PEASE TRADEPORT WATER SUPPLY UPDATE

Demonstration Filter Performance

The City's engineering consultant continues to sample the performance of the activated carbon filters based on the amount of water treated. The graphic below shows the most recent source water sampling and treated filter water quality results for the PFOS and PFOA.



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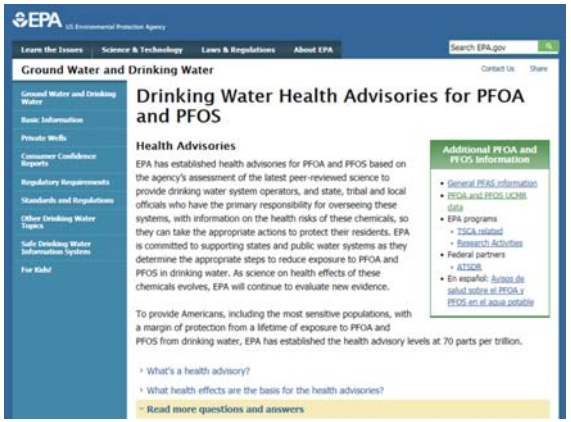
Federal Regulatory Standards for PFAS

- There are currently no national primary drinking water regulations in place for PFOA, PFOS or other PFASs.
- In recent years EPA has:
  - Established provisional health advisories (PHAs) for short-term exposures to PFOA and PFOS through drinking water (2009)
  - Drafted health effects documents that summarize the available data from scientific studies of PFOA and PFOS (2014), and
  - Issued lifetime health advisories (LHAs) for long-term exposures to PFOA and PFOS through drinking water (2016).

https://www.epa.gov/ground-water-and-drinking-water/supporting-documents-drinking-water-health-advisories-pfoa-and-pfos

PFOA/PFOS Health Advisory Update – May 2016



- "To provide Americans, including the most sensitive populations, with a margin of protection from a lifetime of exposure to PFOA and PFOS from drinking water, **EPA has established the health advisory levels at 70 parts per trillion**."
- "These health advisories are specifically for PFOA and PFOS and do not apply to other perfluoroalkyl substances (PFASs). **The Agency is continuing to gather information about other PFAS**."

https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos

New Hampshire Standards for PFAS

- After a review of EPA's information, on May 31, 2016, NHDES filed an emergency rule to establish the health advisories as Ambient Groundwater Quality Standards (AGQS).
- NHDES set three groundwater standards: 70 parts per trillion (ppt) for PFOA, 70 ppt for PFOS and 70 ppt for PFOA and PFOS combined.

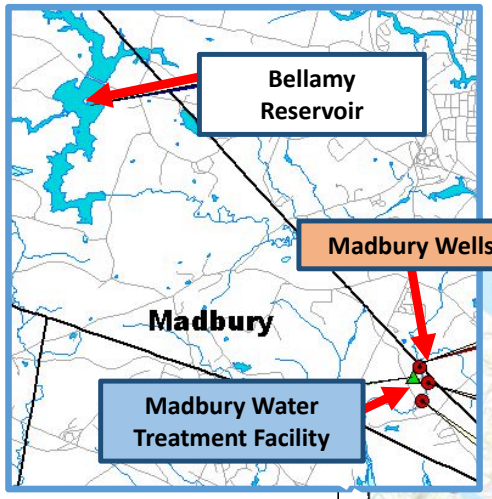
https://www4.des.state.nh.us/nh-pfas-investigation/?page_id=92

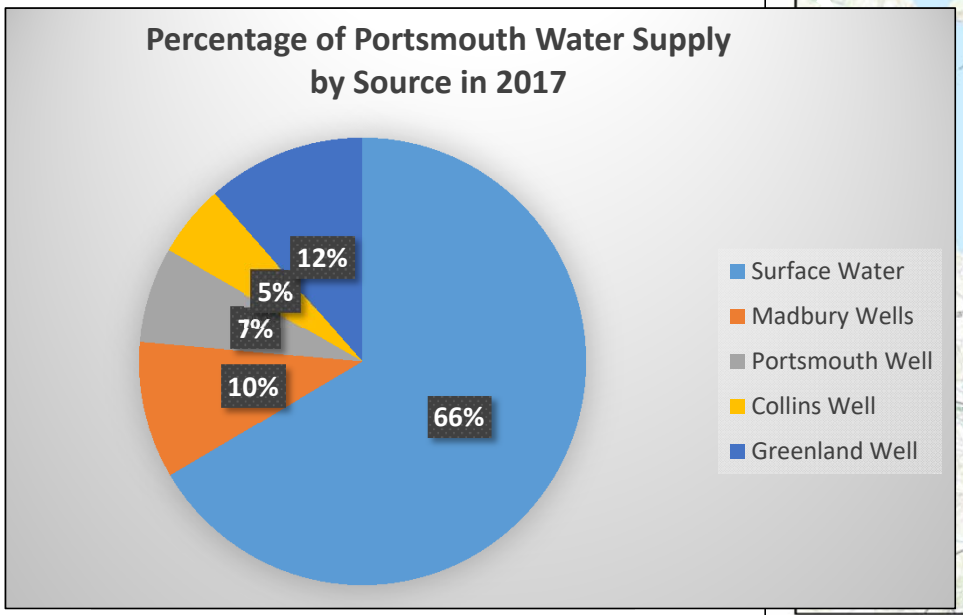
"It's important to understand that for DES these are emerging contaminates. We're constantly staying in touch with what is happening in other states and on the federal level." – Jim Martin, NHDES: quote from Keene Sentinel - Mar 12, 2018

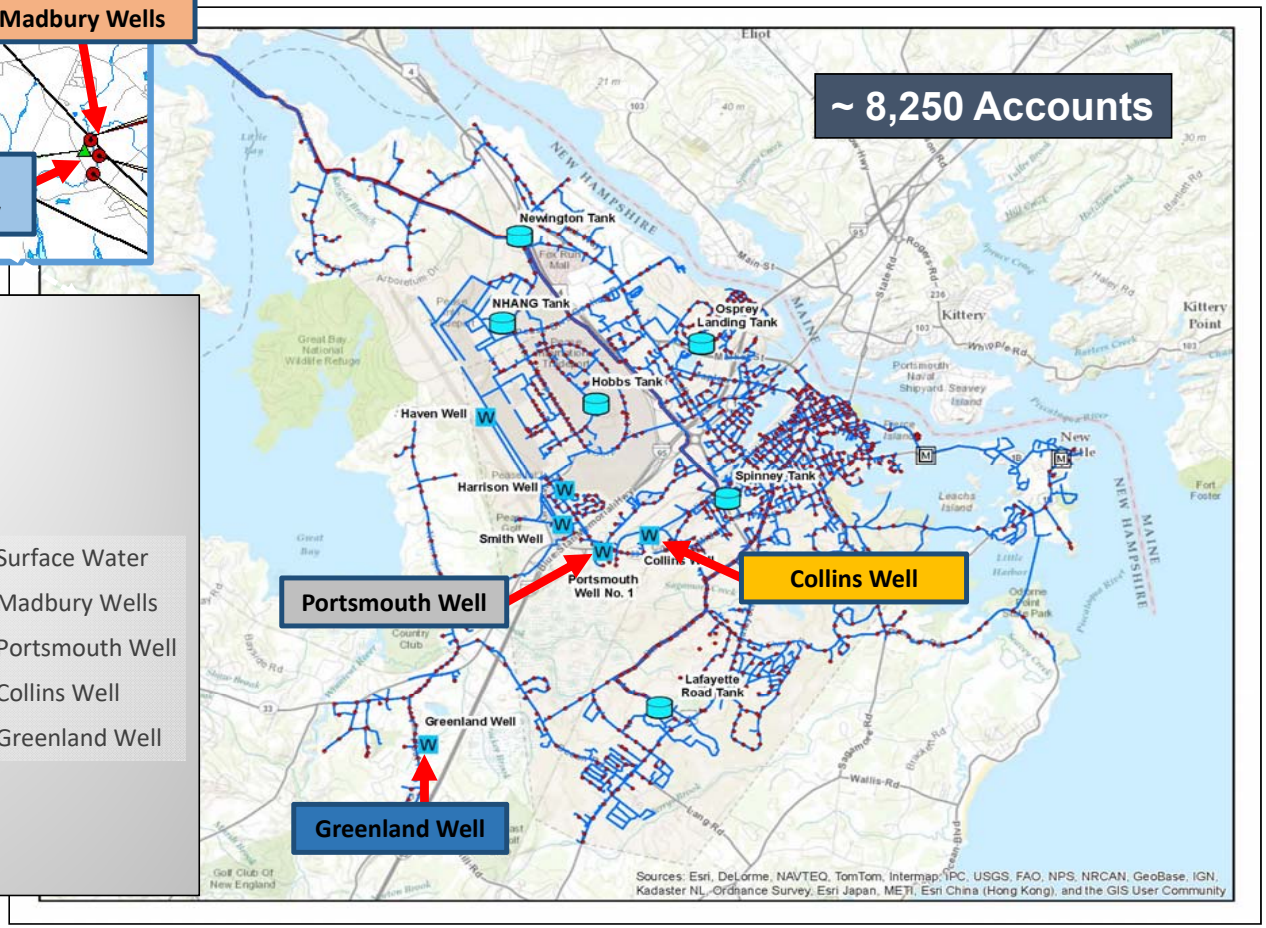
Future Standards for PFAS

- Research into the HA limits for PFAS compounds continues.
- Per discussions with regulators it is our understanding that the NHDES continues to review any new science or analysis related to these and other UCMR PFAS chemicals. It is their understanding that by the summer of 2018, the Centers for Disease Control and Prevention (CDC) will release Toxicological Profiles that will establish Minimal Risk Levels for PFOA and PFOS, as well as PFNA and PFHxS.
- This information will likely guide any new HA or MCL standard.
- If these standards do change, the City's water operations staff will continue to test for the levels of these contaminants in our source waters and respond accordingly if they exceed any parameter.

Portsmouth Water System Sources of Supply

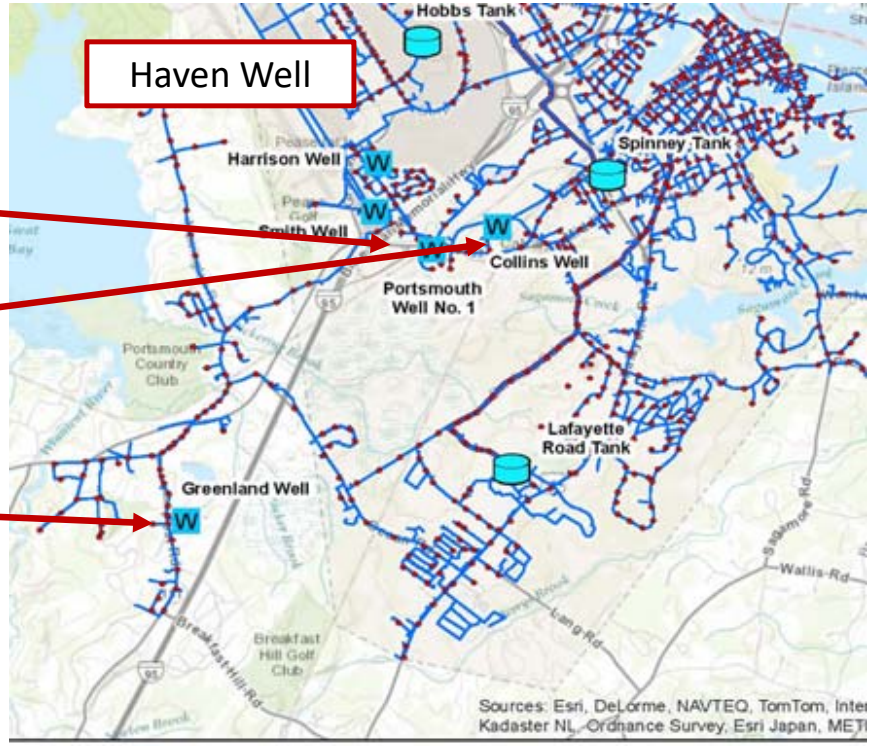






Distance from Pease
Distance from Coakley Landfill

- Portsmouth Well
  - 1.67 miles from Haven Well
- Collins Well
  - 1.88 miles from Haven Well
- Greenland Well
  - 2.0 miles from Coakley Landfill



Coakley Landfill

Portsmouth Water Source PFAS Sampling

- All water sources sampled in May 2014 and in 2015 as part of the EPA's Unregulated Contaminant Monitoring Program (UCMR3)
  - Surface Water - "non detect"
  - Madbury Wells - "non detect"
  - Portsmouth Well - "non detect"
  - Collins Well - "non detect"
  - Greenland Well - "non detect"
- When resampled using lower detection limits (same as Pease sampling), some sources show low levels of detections

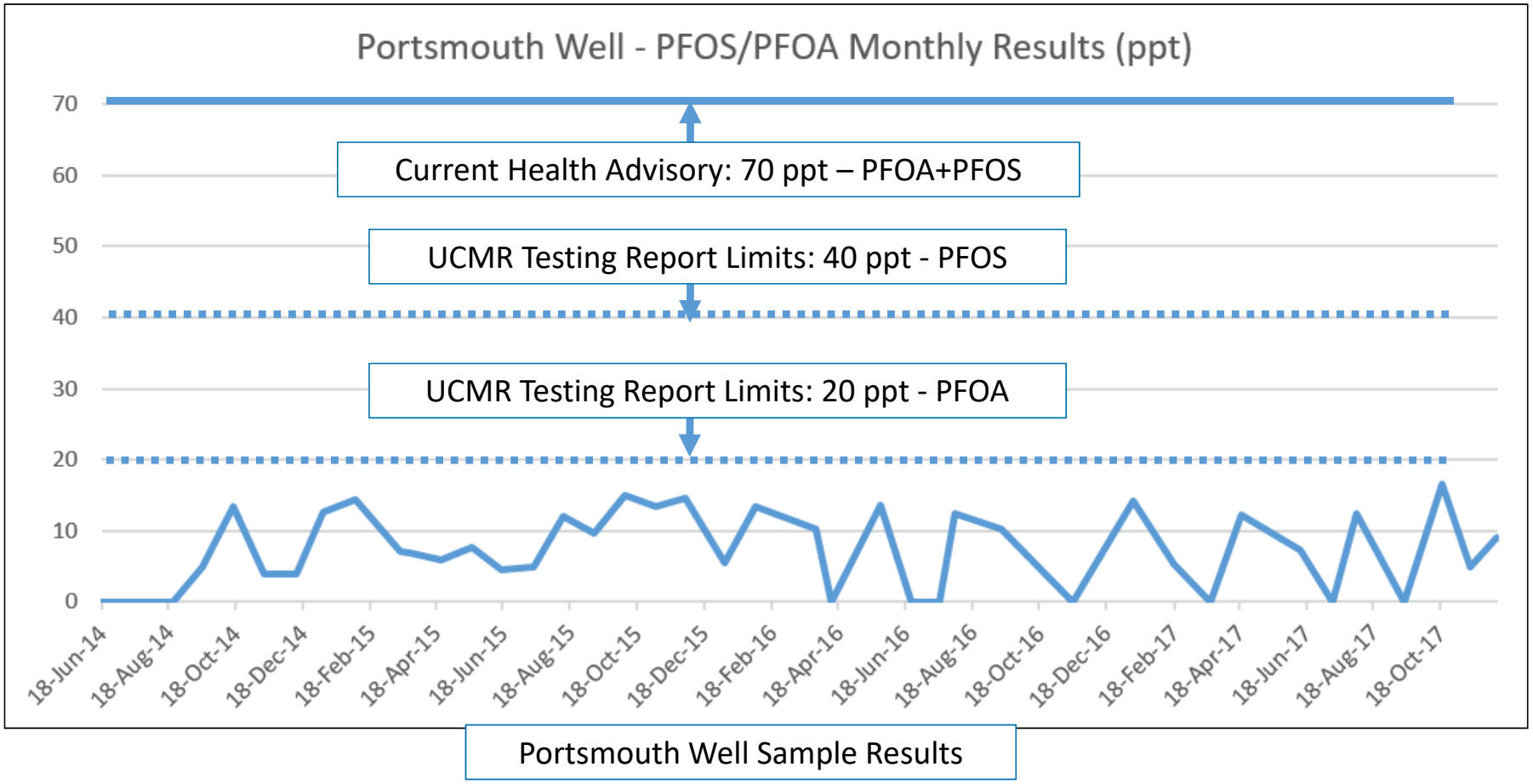
Lower Sampling Limits -

Portsmouth/Pease Sampling versus UCMR3

		Maxxam Lab/In-House Reporting Levels		UCMR REPORTING LIMIT	Order of Magnitude: Maxxam MDL vs. UCMR
	Units	RDL	Typical MDL - reported on lab reports		
Perfluorobutane Sulfonate (PFBS)	ug/L	0.020	0.0019	0.090	47 x
Perfluoroheptanoic Acid (PFHpA)	ug/L	0.020	0.0047	0.010	2 x
Perfluorohexane Sulfonate (PFHxS)	ug/L	0.020	0.0040	0.030	8 x
Perfluoro-n-Octanoic Acid (PFOA)	ug/L	0.020	0.0053	0.020	4 x
Perfluorononanoic Acid (PFNA)	ug/L	0.020	0.0046	0.020	4 x
Perfluorooctane Sulfonate (PFOS)	ug/L	0.020	0.0033	0.040	12 x

RDL – Reportable Detection Limit
MDL – Minimum Detection Limit
UCMR3 – EPA's Unregulated Contaminant Monitoring Rule

Portsmouth Well Sampling – Detections using lower sample detection limits than UCMR testing



Sampling for more PFAS compounds than UCMR3 (23 versus 6):

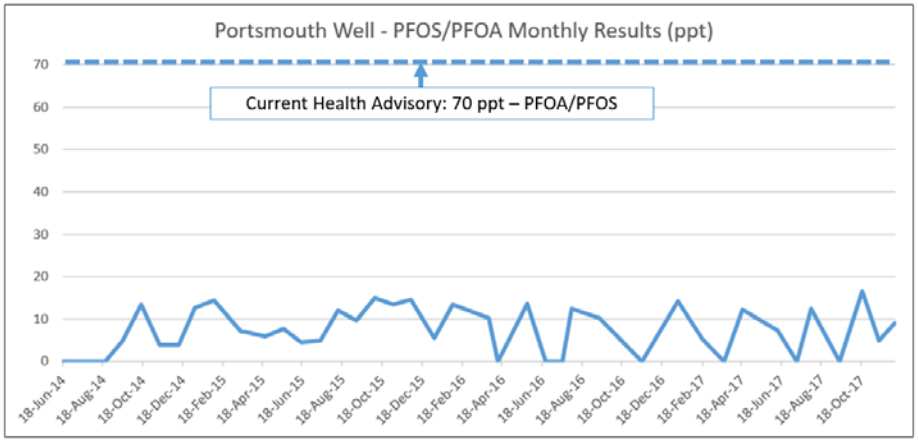
Chemical	Abbreviation	Chemical Formula	Group
Perfluorobutanesulfonic acid - (UCMR3)	PFBS	$C_4HF_9SO_3$	Perfluoroalkylsulfonate
Perfluoroheptanoic acid – (UCMR3)	PFHpA	$C_7HF_{13}O_2$	Perfluoroalkylcarboxylic Acid
Perfluorohexanesulfonic acid – (UCMR3)	PFHxS	$C_6F_{13}SO_3^-$	Perfluoroalkylsulfonate
Perfluorooctanoic acid – (UCMR3)	PFOA	$C_8HF_{15}O_2$	Perfluoroalkylcarboxylic Acid
Perfluorononanoic acid – (UCMR3)	PFNA	$C_9HF_{17}O_2$	Perfluoroalkylcarboxylic Acid
Perfluorooctanesulfonic acid – (UCMR3)	PFOS	$C_8F_{17}SO_3^-$	Perfluoroalkylsulfonate
6:2 Fluorotelomer sulfonate	6:2 FTS	$C_8H_4F_{13}SO_3^-$	Fluorinated Telomer Sulfonate
8:2 Fluorotelomer sulfonate	8:2 FTS	$C_{10}H_4F_{17}SO_3^-$	Fluorinated Telomer Sulfonate
N-Ethyl perfluorooctane sulfonamide	EtFOSA	$C_{10}H_6F_{17}NO_2S$	Perfluorooctanesulfonamide
N-Ethyl perfluorooctane sulfonamidoethanol	EtFOSE	$C_{12}H_{10}F_{17}NO_3S$	Perfluorooctanesulfonamidoethanols
N-Methyl Perfluorooctane Sulfonamide	MeFOSA	$C_9H_4F_{17}NO_2S$	Perfluorooctanesulfonamide
N-Methyl Perfluorooctane Sulfonamidoethanol	MeFOSE	$C_{11}H_8F_{17}NO_3S$	Perfluorooctanesulfonamidoethanols
Perfluorobutanoic acid	PFBA	$C_4HF_7O_2$	Perfluoroalkylcarboxylic Acid
Perfluorodecane sulfonate	PFDS	$C_{10}F_{21}SO_3$	Perfluoroalkylsulfonate
Perfluorodecanoic acid	PFDA	$C_{10}HF_{19}O_2$	Perfluoroalkylcarboxylic Acid
Perfluorododecanoic acid	PFDoA	$C_{12}HF_{23}O_2$	Perfluoroalkylcarboxylic Acid
Perfluoroheptane sulfonate	PFHpS	$C_7F_{15}SO_3$	Perfluoroalkylsulfonate
Perfluorohexanoic acid	PFHxA	$C_6HF_{11}O_2$	Perfluoroalkylcarboxylic Acid
Perfluorooctane sulfonamide	PFOSA	$C_8H_2F_{17}NO_2S$	Perfluorooctanesulfonamide
Perfuoropentanoic acid	PFPeA	$C_5HF_9O_2$	Perfluoroalkylcarboxylic Acid
Perfluorotetradecanoic acid	PFTeDA	$C_{14}HF_{27}O_2$	Perfluoroalkylcarboxylic Acid
Perfluorotridecanoic acid	PFTrDA	$C_{13}HF_{25}O_2$	Perfluoroalkylcarboxylic Acid
Perfluoroundecanoic acid	PFUdA	$C_{11}HF_{21}O_2$	Perfluoroalkylcarboxylic Acid

What about sampling for more than 23 PFAS Compounds?

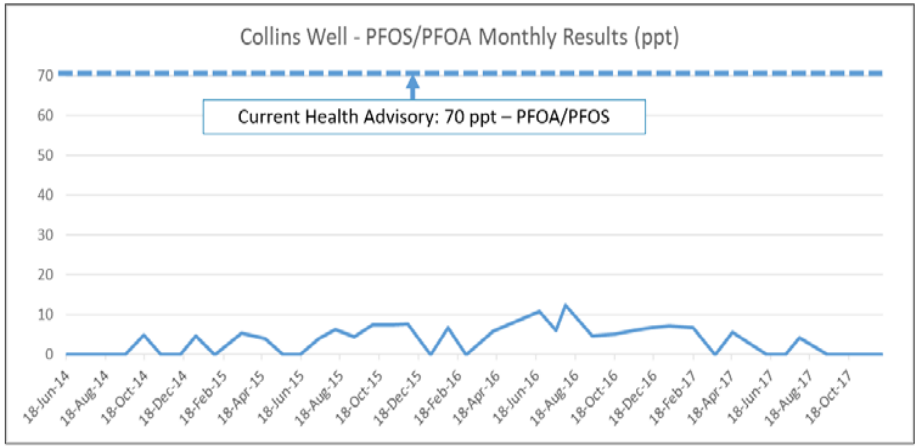
- City has been in communication with EPA and DES regarding potential studies and is willing to participate
- Testing methods must be peer reviewed and accepted
- EPA has a work group that has been formed to explore both additional testing and testing methodology
- Very complex science

Are PFAS Concentrations Increasing? Trends show no increase over four years

Portsmouth Well Trend



Collins Well Trend



Greenland Well – 6 Sample Events

Date	PFOA/PFOS (ppt)	Notes
21-Jul-14	Non detect	using UCMR method
10-Feb-15	Non detect	using UCMR method
01-Aug-16	7	
17-Nov-16	14	
17-Nov-16	7	Lab Duplicate Sample
27-Apr-17	4	
31-Oct-17	5	
EPA Health Advisory	**70**	**As of May 2016**

Portsmouth System PFAS Testing Summary - 2017

PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)									
PER- AND POLYFLUOROALKYL SUBSTANCE (concentrations* reported in **ng/L** or **ppt**)		PORTSMOUTH #1 WELL	COLLINS WELL	GREENLAND WELL	MADBURY WELL 2	MADBURY WELL 3	MADBURY WELL 4	BELLAMY RESERVOIR	WATER TREATMENT PLANT
# of samples in 2017:		11	11	2	1	2	2	2	2
% of water supplied in 2017:		6.9%	5.2%	11.5%	1.8%	3.7%	4.4%	66.5%	
Perfluorobutane-sulfonic acid (PFBS)	Average	BD	**13**	BD	ND	ND	ND	ND	ND
	Range	ND to 8	8 to 20	ND to 6	ND	ND	ND	ND	ND
Perfluorobutanoic acid (PFBA)	Average	ND	ND	ND	ND	ND	ND	ND	**10**
	Range	ND	ND	ND	ND	ND	ND	ND	ND to 18
Perfluorohexane-sulfonic acid (PFHxS)	Average	**7**	BD	**4**	ND	ND	ND	ND	ND
	Range	ND to 11	ND to 8	ND to 6	ND	ND	ND	ND	ND
Perfluorohexanoic acid (PFHxA)	Average	BD	BD	BD	ND	ND	ND	ND	ND
	Range	ND to 12	ND to 9	ND to 3	ND	ND	ND	ND	ND
**Perfluorooctane-sulfonic acid (PFOS)	Average	**3**	**3**	**4**	ND	ND	ND	ND	ND
	Range	ND to 8	ND to 7	4 to 5	ND	ND	ND	ND	ND
**Perfluorooctanoic acid (PFOA)	Average	**6**	ND	ND	ND	ND	ND	ND	ND
	Range	ND to 10	ND	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	Average	**4**	BD	ND	ND	ND	ND	ND	ND
	Range	ND to 8	ND to 7	ND	ND	ND	ND	ND	ND
** PFOS + PFOA	Average	**9**	**3**	**4**	ND	ND	ND	ND	ND
	Range	ND to 14	ND to 7	4 to 5	ND	ND	ND	ND	ND

* Due to laboratory analytical method limitations, low concentrations reported for these chemicals are considered estimates unless the amount measured is above 20 ng/L (ppt)

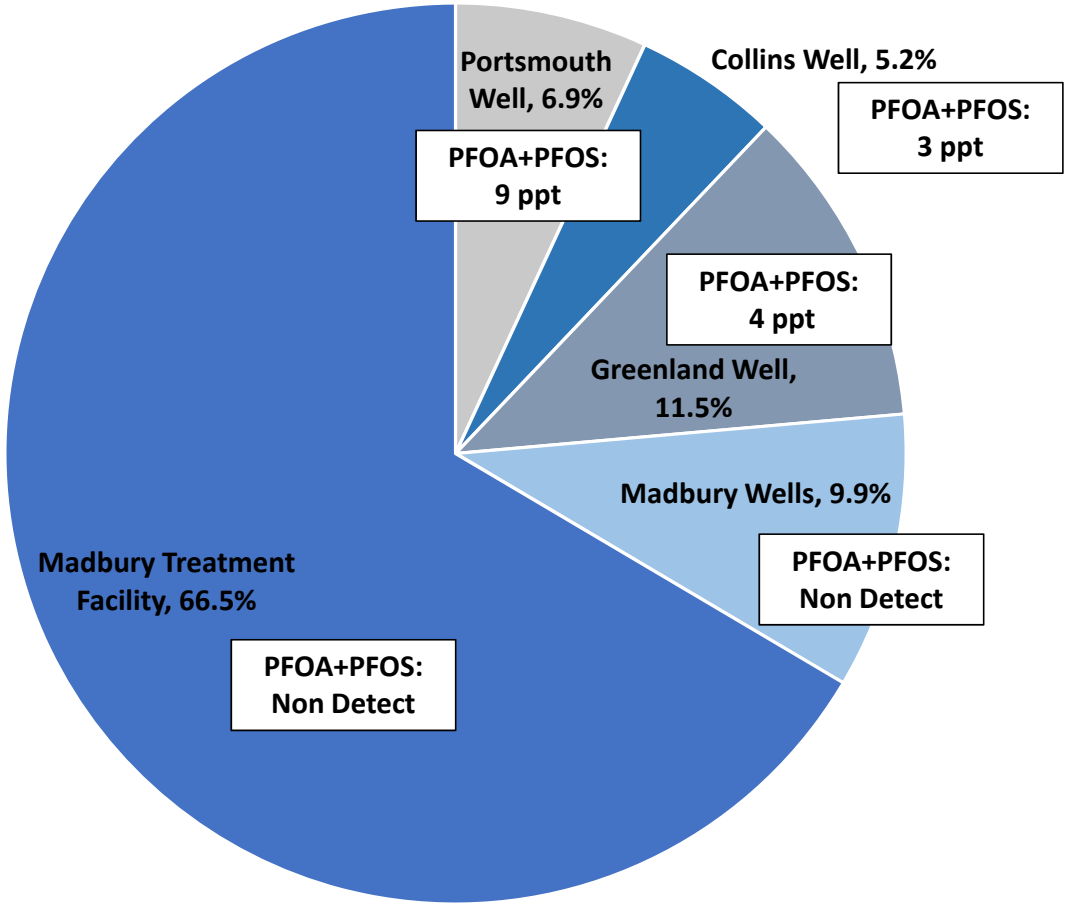
** EPA Health Advisory Level and NHDES AGQS for PFOS and PFOA concentration separately or combined is **70 ng/L** (ppt)

PFAS analyzed but Not Detected in the samples:

1. 6:2 Fluorotelomer sulfonate (6:2 FTS),
2. 8:2 Fluorotelomer sulfonate (8:2 FTS),
3. N-Ethyl perfluorooctane sulfonamide (EtFOSA),
4. N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE),
5. N-Methyl Perfluorooctane Sulfonamide (MEFOSA),
6. N-Methyl Perfluorooctane Sulfonamidoethanol (MEFOSE),
7. Perfluorodecane sulfonate (PFDS),
8. Perfluorodecanoic acid (PFDA),
9. Perfluorododecanoic acid (PFDoA),
10. Perfluoroheptane sulfonate (PFHpS),
11. Perfluoroheptanoic acid (PFHpA),
12. Perfluorononanoic acid (PFNA),
13. Perfluorooctane sulfonamide (PFOSA),
14. Perfluorotetradecanoic acid (PFTeDA),
15. Perfluorotridecanoic acid (PFTrDA),
16. Perfluoroundecanoic acid (PFUnA)

70 ppt – EPA Health Advisory
All water sources are below this limit, most water is “non detect”

Percentage of Portsmouth Water Sources – 2017 with 2017 PFOA/PFOS sample result averages



Do we recommend additional treatment at customer taps?

- We do not recommend additional treatment for any compound that already meets regulatory or health advisory standards
- Customers may choose to treat on their own but should make sure to select the appropriate treatment system (not all carbon filters are the same) and assure that it is properly maintained. Sampling for performance is also recommended.
- Informational links to additional treatment are on City's website:

  http://files.cityofportsmouth.com/publicworks/pfoa-inhome-treatment-20160518.pdf

What might be the reason for detections at other Portsmouth Sources of Supply?

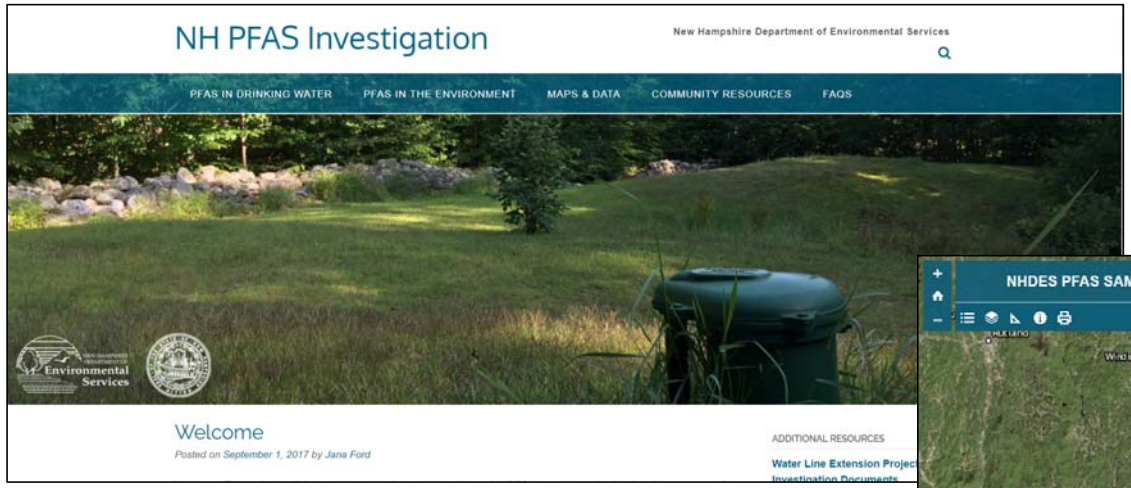
- Very low levels of PFAS may be coming from local sources:
- Historic use of firefighting foam:
  - Accidents
  - House or business fires
- Past disposal practices near water sources
- Car washing
- Septic systems leaching into water sources

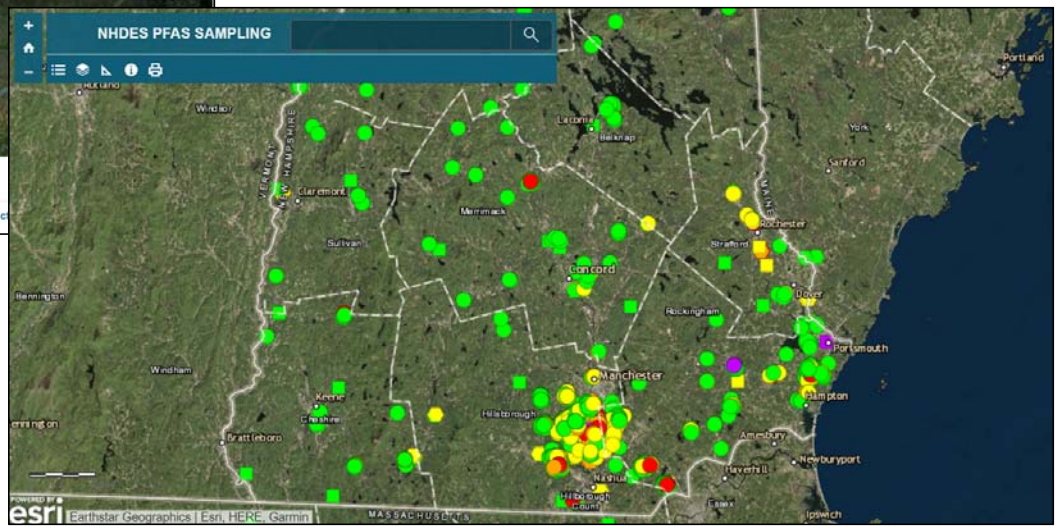
Cape Cod Private Drinking Water Well Study

- **Pollutants from household wastewater—pharmaceuticals and consumer product chemicals—can make their way into people's private wells, and that backyard septic systems are likely to blame.**
- In tests of water samples from private wells on Cape Cod, researchers at Silent Spring Institute sampled water from 20 private wells throughout Cape Cod and tested the samples for 117 different contaminants.
- **70 percent of the wells contained PFASs (perfluoroalkyl substances.**

Link to paper: http://www.sciencedirect.com/science/article/pii/S0048969715312353

New Hampshire PFAS Investigations





https://www4.des.state.nh.us/nh-pfas-investigation/

New Hampshire Public Water Systems with Detections

(Using lower laboratory detection limits as recommended by New Hampshire DES in 2016)

- Merrimack Village Water District
- Aquarion Water (Hampton, North Hampton)
- Pennichuck Water (Nashua)
- Hudson
- Dover
- Rochester
- Bedford
- Rye
- Bow

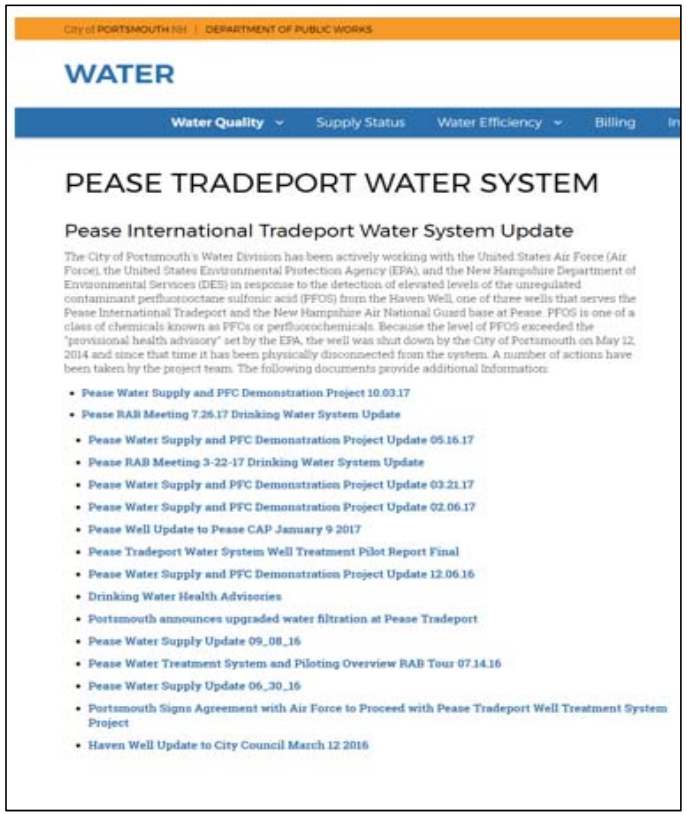
Data source: NHDES communication – February 27, 2018

Other Water Systems with PFAS issues:

With lower sample detection limits many more systems are having detections – many that had “non-detect” during UCMR sampling

- Hoosick Falls, NY (PFAS Manufacturing)
- Bennington, VT (PFAS Manufacturing)
- Hyannis, MA (Fire Training Area)
- Westfield, MA (Airport)
- Horsham, PA (Airport)
- Fountain, CO (Airport)
- Airway Heights, WA (Airport)
- Grand Rapids, Michigan (Manufacturing)
- Aqua America, Pennsylvania
- Kennebunkport, ME (biosolids)

Public Outreach……



City of PORTSMOUTH NH | DEPARTMENT OF PUBLIC WORKS

WATER

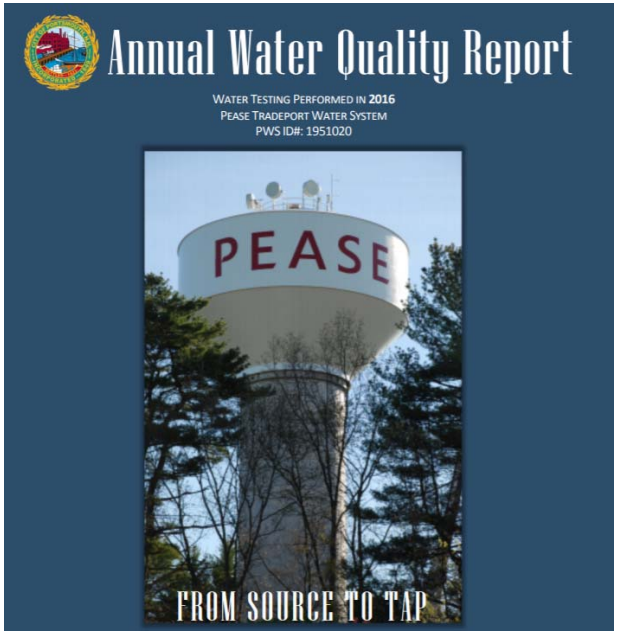
Water Quality | Supply Status | Water Efficiency | Billing

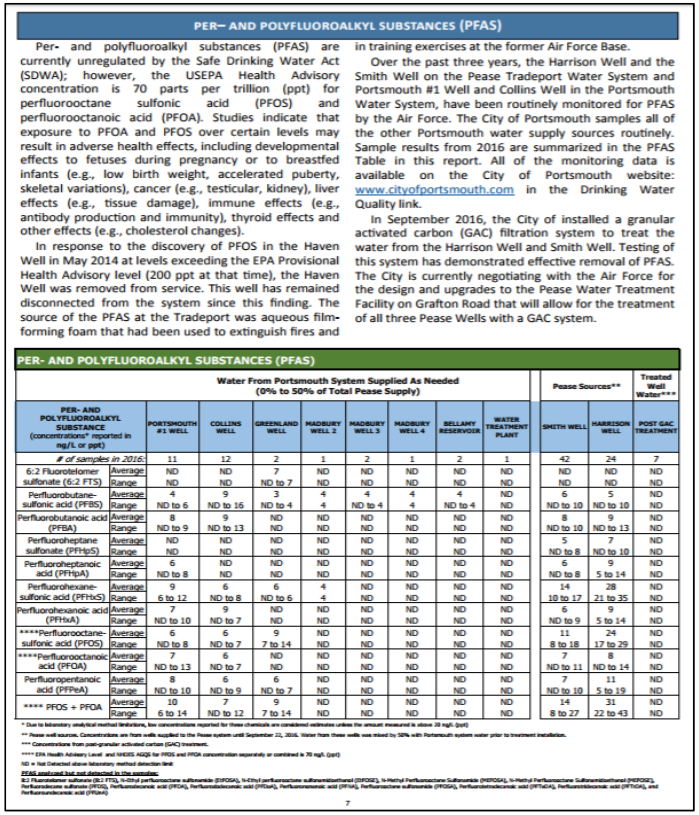
PEASE TRADEPORT WATER SYSTEM

Pease International Tradeport Water System Update

The City of Portsmouth's Water Division has been actively working with the United States Air Force (Air Force), the United States Environmental Protection Agency (EPA), and the New Hampshire Department of Environmental Services (DES) in response to the detection of elevated levels of the unregulated contaminant perfluorooctane sulfonic acid (PFOS) from the Haven Well, one of three wells that serves the Pease International Tradeport and the New Hampshire Air National Guard base at Pease. PFOS is one of a class of chemicals known as PFCs or perfluorochemicals. Because the level of PFOS exceeded the "provisional health advisory" set by the EPA, the well was shut down by the City of Portsmouth on May 12, 2014 and since that time it has been physically disconnected from the system. A number of actions have been taken by the project team. The following documents provide additional information:

- Pease Water Supply and PFC Demonstration Project 10.03.17
- Pease RAB Meeting 7.26.17 Drinking Water System Update
- Pease Water Supply and PFC Demonstration Project Update 05.16.17
- Pease RAB Meeting 3-22-17 Drinking Water System Update
- Pease Water Supply and PFC Demonstration Project Update 03.21.17
- Pease Water Supply and PFC Demonstration Project Update 02.06.17
- Pease Well Update to Pease CAP January 9 2017
- Pease Tradeport Water System Well Treatment Pilot Report Final
- Pease Water Supply and PFC Demonstration Project Update 12.06.16
- Drinking Water Health Advisories
- Portsmouth announces upgraded water filtration at Pease Tradeport
- Pease Water Supply Update 09_08_16
- Pease Water Treatment System and Piloting Overview RAB Tour 07.14.16
- Pease Water Supply Update 06_30_16
- Portsmouth Signs Agreement with Air Force to Proceed with Pease Tradeport Well Treatment System Project
- Haven Well Update to City Council March 12 2016





PER– AND POLYFLUOROALKYL SUBSTANCES (PFAS)

Per- and polyfluoroalkyl substances (PFAS) are currently unregulated by the Safe Drinking Water Act (SDWA); however, the USEPA Health Advisory concentration is 70 parts per trillion (ppt) for perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA). Studies indicate that exposure to PFOA and PFOS over certain levels may result in adverse health effects, including developmental effects to fetuses during pregnancy or to breastfed infants (e.g., low birth weight, accelerated puberty, skeletal variations), cancer (e.g., testicular, kidney), liver effects (e.g., tissue damage), immune effects (e.g., antibody production and immunity), thyroid effects and other effects (e.g., cholesterol changes).

In response to the discovery of PFOS in the Haven Well in May 2014 at levels exceeding the EPA Provisional Health Advisory level (200 ppt at that time), the Haven Well was removed from service. This well has remained disconnected from the system since this finding. The source of the PFAS at the Tradeport was aqueous film-forming foam that had been used to extinguish fires and in training exercises at the former Air Force Base.

Over the past three years, the Harrison Well and the Smith Well on the Pease Tradeport Water System and Portsmouth #1 Well and Collins Well in the Portsmouth Water System, have been routinely monitored for PFAS by the Air Force. The City of Portsmouth samples all of the other Portsmouth water supply sources routinely. Sample results from 2016 are summarized in the PFAS Table in this report. All of the monitoring data is available on the City of Portsmouth website: www.cityofportsmouth.com in the Drinking Water Quality link.

In September 2016, the City of installed a granular activated carbon (GAC) filtration system to treat the water from the Harrison Well and Smith Well. Testing of this system has demonstrated effective removal of PFAS. The City is currently negotiating with the Air Force for the design and upgrades to the Pease Water Treatment Facility on Grafton Road that will allow for the treatment of all three Pease Wells with a GAC system.

PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)

PER- AND POLYFLUOROALKYL SUBSTANCE (concentrations* reported in ng/L or ppt)		Water From Portsmouth System Supplied As Needed (0% to 50% of Total Pease Supply)								Pease Sources**		Treated Well Water***
		PORTSMOUTH #1 WELL	COLLINS WELL	GREENLAND WELL	MADBURY WELL 2	MADBURY WELL 3	MADBURY WELL 4	BELLAMY RESERVOIR	WATER TREATMENT PLANT	SMITH WELL	HARRISON WELL	POST GAC TREATMENT
# of samples in 2016:		11	12	2	1	2	1	2	1	42	24	7
6:2 Fluorotelomer sulfonate (6:2 FTS)	Average	ND	ND	7	ND	ND	ND	ND	ND	ND	ND	ND
	Range	ND	ND	ND to 7	ND	ND	ND	ND	ND	ND	ND	ND
Perfluorobutane-sulfonic acid (PFBS)	Average	4	9	3	4	4	4	4	ND	6	5	ND
	Range	ND to 6	ND to 16	ND to 4	4	ND to 4	4	ND to 4	ND	ND to 10	ND to 10	ND
Perfluorobutanoic acid (PFBA)	Average	8	9	ND	ND	ND	ND	ND	ND	8	9	ND
	Range	ND to 9	ND to 13	ND	ND	ND	ND	ND	ND	ND to 10	ND to 13	ND
Perfluoroheptane sulfonate (PFHpS)	Average	ND	ND	ND	ND	ND	ND	ND	ND	5	7	ND
	Range	ND	ND	ND	ND	ND	ND	ND	ND	ND to 8	ND to 10	ND
Perfluoroheptanoic acid (PFHpA)	Average	6	ND	ND	ND	ND	ND	ND	ND	6	9	ND
	Range	ND to 8	ND	ND	ND	ND	ND	ND	ND	ND to 8	5 to 14	ND
Perfluorohexane-sulfonic acid (PFHxS)	Average	9	6	6	4	ND	ND	ND	ND	14	28	ND
	Range	6 to 12	ND to 8	ND to 6	4	ND	ND	ND	ND	10 to 17	21 to 35	ND
Perfluorohexanoic acid (PFHxA)	Average	7	9	ND	ND	ND	ND	ND	ND	6	9	ND
	Range	ND to 10	ND to 7	ND	ND	ND	ND	ND	ND	ND to 9	5 to 14	ND
****Perfluorooctane-sulfonic acid (PFOS)	Average	6	6	9	ND	ND	ND	ND	ND	11	24	ND
	Range	ND to 8	ND to 7	7 to 14	ND	ND	ND	ND	ND	8 to 18	17 to 29	ND
****Perfluorooctanoic acid (PFOA)	Average	7	6	ND	ND	ND	ND	ND	ND	7	8	ND
	Range	ND to 13	ND to 7	ND	ND	ND	ND	ND	ND	ND to 11	ND to 14	ND
Perfluoropentanoic acid (PFPeA)	Average	8	6	6	ND	ND	ND	ND	ND	7	11	ND
	Range	ND to 10	ND to 9	ND to 7	ND	ND	ND	ND	ND	ND to 10	5 to 19	ND
**** PFOS + PFOA	Average	10	7	9	ND	ND	ND	ND	ND	14	31	ND
	Range	6 to 14	ND to 12	7 to 14	ND	ND	ND	ND	ND	8 to 27	22 to 43	ND

* Due to laboratory analytical method limitations, low concentrations reported for these chemicals are considered estimates unless the amount measured is above 20 ng/L (ppt)

** Pease well sources. Concentrations are from wells supplied to the Pease system until September 22, 2016. Water from these wells was mixed by 50% with Portsmouth system water prior to treatment installation.

*** Concentrations from post-granular activated carbon (GAC) treatment.

**** EPA Health Advisory Level and MADES AGQS for PFOS and PFOA concentration separately or combined is 70 ng/L (ppt)

ND = Not Detected above laboratory method detection limit

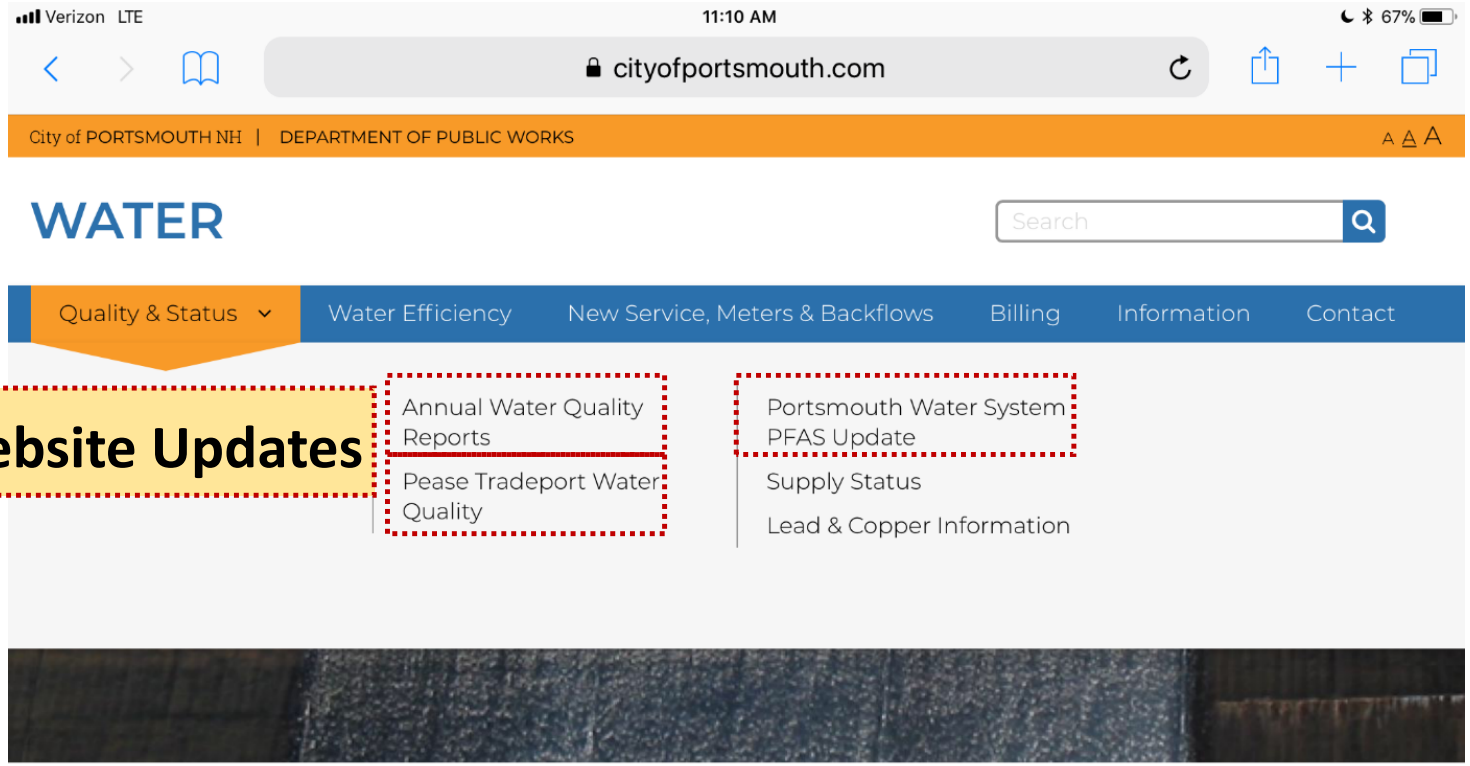
PFAS analyzed but not detected in the samples:
B2 Fluorotelomer sulfonate (8:2 FTS), N-Ethyl perfluorooctane sulfonamide (EtFOSA), N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE), N-Methyl Perfluorooctane Sulfonamide (MeFOSA), N-Methyl Perfluorooctane Sulfonamidoethanol (MeFOSE), Perfluorodecane sulfonate (PFDS), Perfluorodecanoic acid (PFDA), Perfluorododecanoic acid (PFDoA), Perfluoroheptanoic acid (PFHpA), Perfluorooctane sulfonamide (PFOSA), Perfluorotetradecanoic acid (PFTeDA), Perfluorotridecanoic acid (PFTrDA), and Perfluoroundecanoic acid (PFUnA)

7

August 26, 2015 - CAB meeting with U.S. Air Force to discuss Pease PFC contamination

Public Involvement:

- Presentations to Portsmouth City Council and Other Groups
- *Testing for Pease* Group
- Haven Well Community Advisory Board
  - 14 public meetings in 2014
- Blood Testing
  - March 31st, 2015 – Public Meeting where NHHS Announces Protocol for Pease Blood Testing
  - Three public meetings announcing blood test results
- ATSDR Community Assistance Panel (CAP)
  - Formed in 2016 to address long-term health concerns
- Pease Restoration Advisory Board (RAB)
  - Reestablished in 2016 – Meets every quarter



Website Updates

THE WATER DIVISION

The Water Division performs the following functions for the communities served by the Portsmouth regional water system that include Portsmouth, Pease Tradeport, Newington, New Castle, Greenland and portions of Rye and Madbury:

CONTACT

For general inquiries, service or emergency requests, please contact (603) 427-1530.

Visit our Contact page for a

Looking Ahead:

- Work with the Air Force and regulators to monitor PFAS compounds in the water sources in and around the Haven Well.
- Design and construct drinking water treatment system to treat and remove PFAS compounds in the Pease Tradeport Drinking water system wells.
- Develop a long-term water quality monitoring plan (to include not only PFAS compounds but other water quality parameters) for the reactivation of the Haven Well.
- Continue twice-a-year monitoring of all other Portsmouth water supply sources for PFAS compounds and respond appropriately should contaminant levels appear to be approaching HA levels.
- Work with regulators and waterworks professionals to track and respond to the evolving water quality information, regulations and treatment technologies.
- Provide public information on this and all other water quality parameters in our water systems.

Additional Information:

- https://www.cityofportsmouth.com/publicworks/water/pease-tradeport-water-system
- https://www.dhhs.nh.gov/dphs/investigation-pease.htm
- https://www.atsdr.cdc.gov/sites/pease/index.html
- http://www.afcec.af.mil/Home/BRAC/Pease/
- www.testingforpease.com