PFAS in Massachusetts: Waste Site Cleanup Program's Role in Identifying Sources and Pursuing Cleanup

Massachusetts Environmental Health Association

Yankee Conference

September 29, 2022

MassDEP-Boston and Southeast Regional
Paul Locke – Boston – Acting Deputy Commissioner of Operations
Liz Callahan – Boston – Acting Assistant Commissioner - BWSC
Angela Gallagher – Southeast Regional Office, PFAS Branch Chief

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Overview
MassDEP & PFAS

Massachusetts Environmental Health Association
Yankee Conference
September 29, 2022

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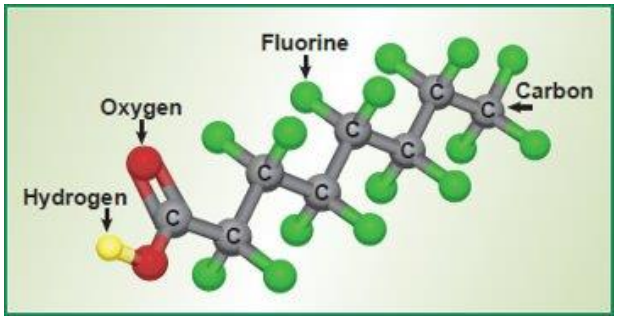
What Are PFAS?
Poly- and perfluoroalkyl Substances

A family of thousands of compounds with varying structure (e.g, carbon chain length)



- **Extremely stable** – Heat & Stain Resistant, Water repellant
- **"Forever chemicals"** - Very persistent, do not biodegrade
- **Water Soluble**

Some are very toxic

- Slowly excreted from the body – half lives of years (1-8+ for longer-chain)
- Developmental risks to fetus/infants
- Immune sytem effects
- Endocrine Disruption
- Cancers

PFAS in Massachusetts

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PFAS Problems in Brief

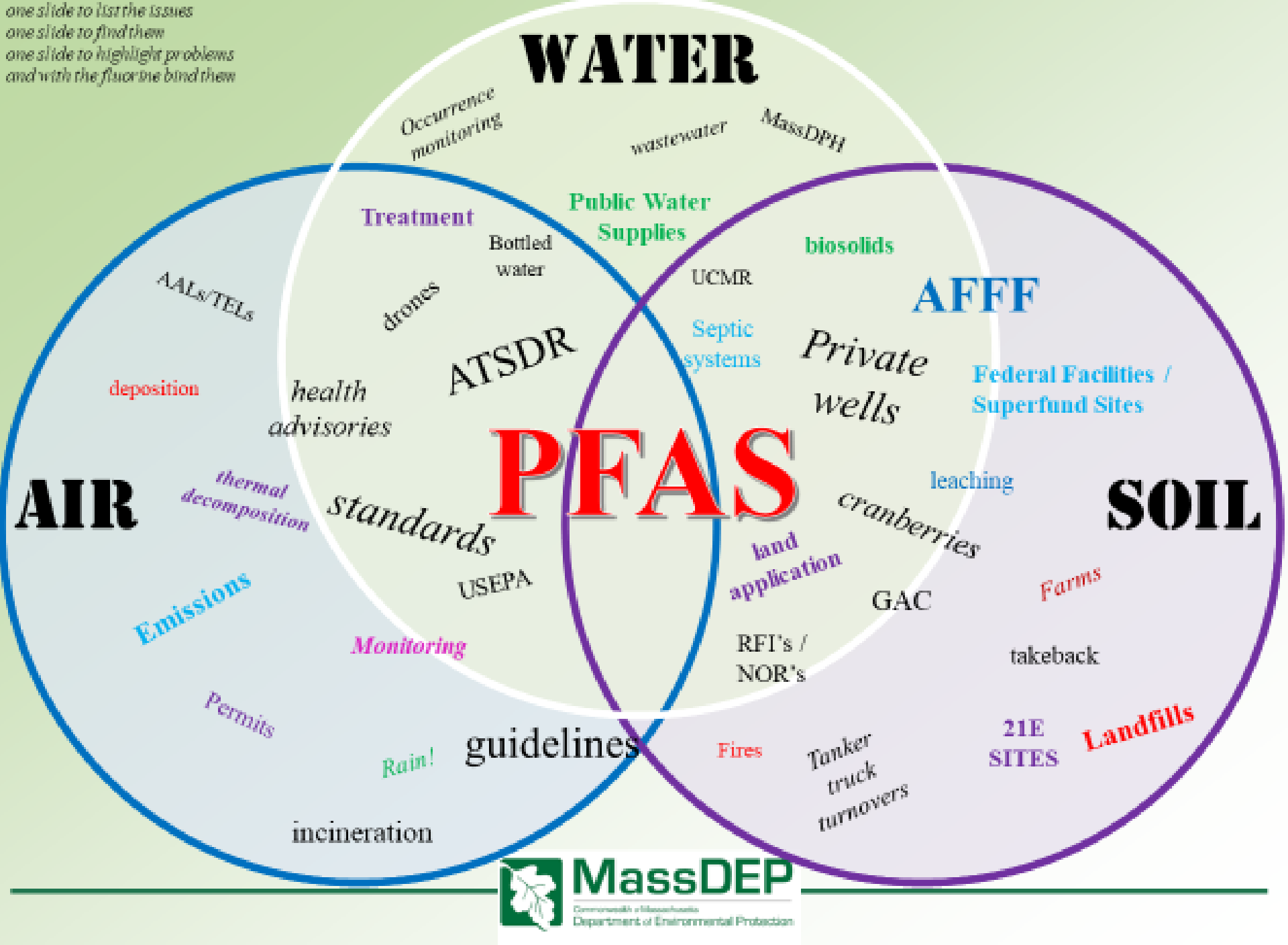
- Drinking Water Standard = 20 ng/L (ppt)
  *This is **LOW** and may be revised lower still*
  - 3-year review begins this fall
  - USEPA expects to issue a draft standard later this year

- ~5% of Public & Private Water Supplies tested are found to be contaminated above the current standard
  - A lower standard will greatly increase this percentage

- Widespread use means numerous & varied sources of environmental contamination

- Options for treatment, disposal and destruction are limited and expensive. ***There is no one solution to the problem.***

one slide to list the issues
one slide to find them
one slide to highlight problems
and with the fluorine bind them



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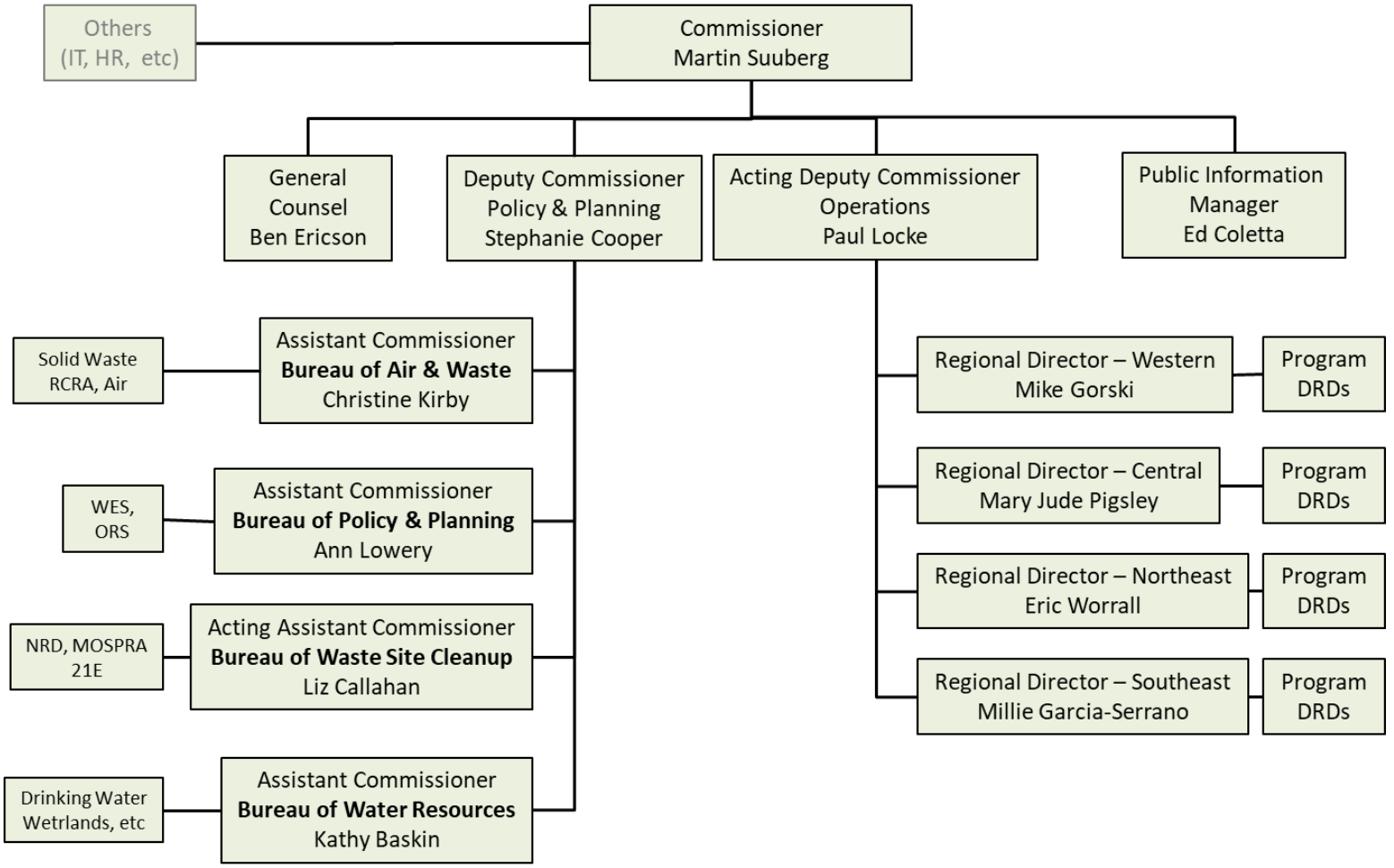
MassDEP At a Glance



PFAS in Massachusetts

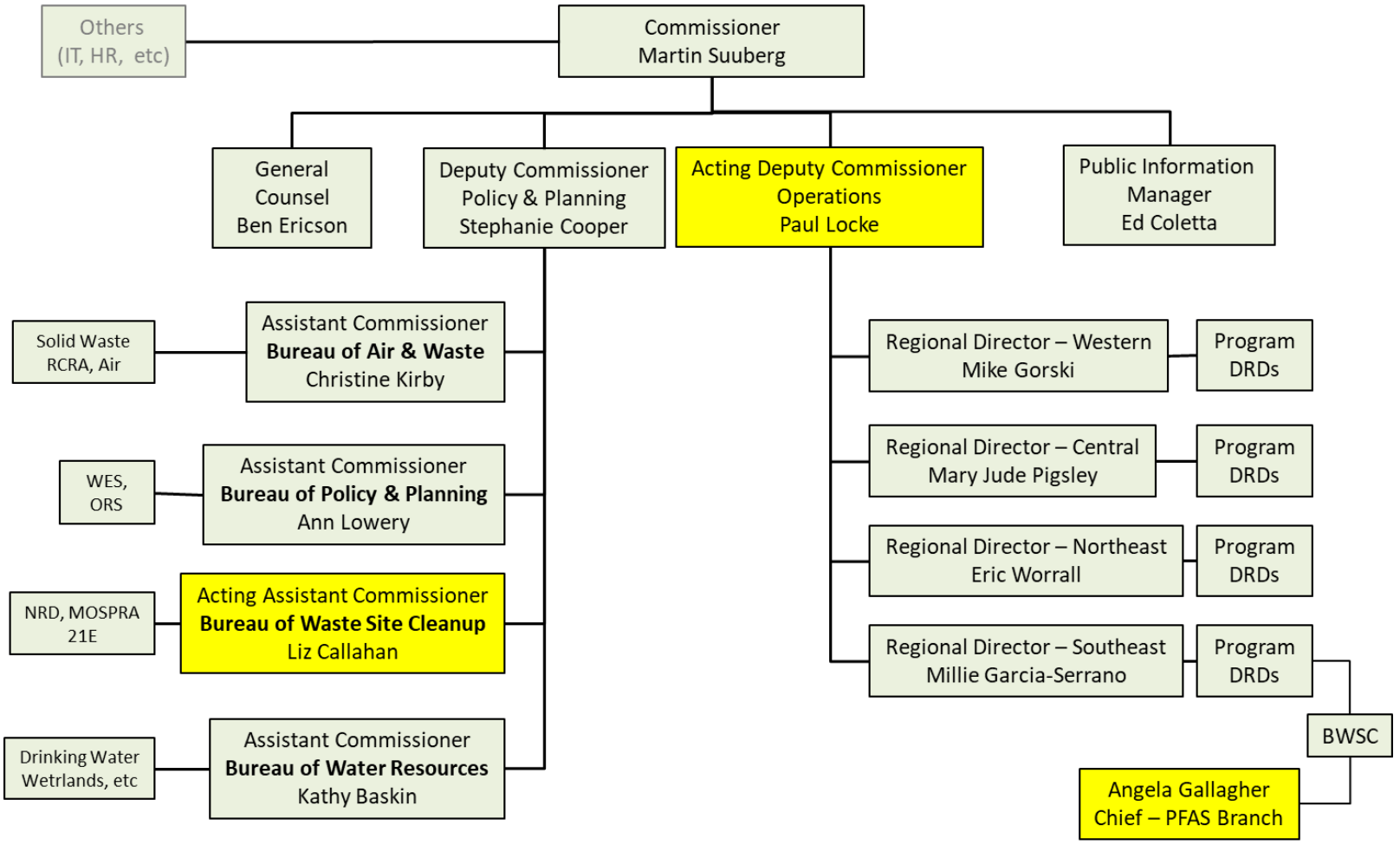
Today's Focus:

Addressing PFAS contamination through the Waste Site Cleanup Program

What happens when we find contaminated drinking water?

- *Regulations & policies*
- *Site discovery and Response Actions*

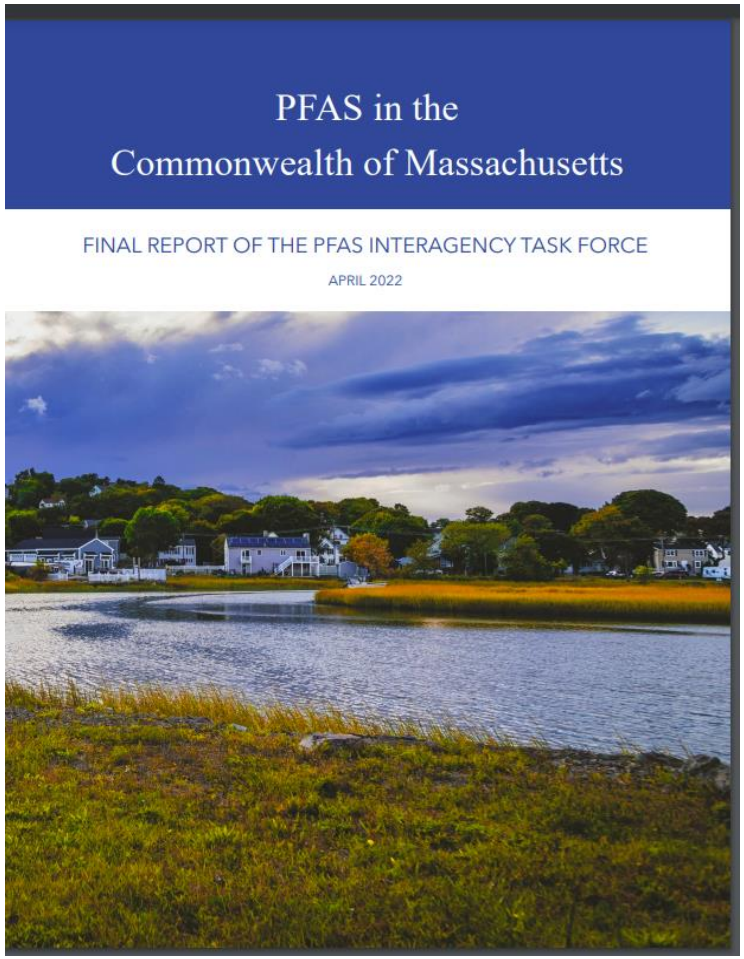
MassDEP At a Glance



But first…

PFAS Interagency Task Force

https://malegislature.gov/Reports/13424/PFAS%20Interagency%20Task%20Force%20Report%20(3).pdf



- Fund PFAS Detection & Remediation
- Support Environmental Justice Communities
- Phase Out PFAS In Consumer Products
- Expand PFAS Regulation
- Encourage Private Well PFAS Testing & Remediation
- Support Firefighters and Local Fire Departments
- Address PFAS Accountability
- Enhance Public Awareness of PFAS

Massachusetts Attorney General Sues AFFF Manufacturers

https://www.mass.gov/news/ag-healey-sues-manufacturers-of-toxic-forever-chemicals-for-contaminating-massachusetts-drinking-water-and-damaging-natural-resources

The manufacturers at varying times engaged in the design, manufacture, marketing, and/or selling of PFAS-containing Aqueous Film-Forming Foam ("AFFF") used in Massachusetts for firefighting.

The lawsuit seeks costs to clean up and remove, restore, treat, and monitor PFAS contamination and an order requiring the manufacturers to reimburse the state for the damages its products caused. It also demands that the manufacturers remediate and restore the state's natural resources and pay investigation fees and costs.

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Managing PFAS Sites in the MA Waste Site Cleanup Program

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MassDEP's Authority

- State Law - MGL Chapter 21E Massachusetts Oil & Hazardous Material Release **Prevention** & **Response** Act
  - Who is responsible for notification, assessment and cleanup?
  - MassDEP's responsibilities

- Regulations – Massachusetts Contingency Plan or MCP, 310 CMR 40.0000
  - Semi-privatized cleanup program
  - Rules for **notification** of releases of oil or hazardous materials to the environment, **response**, **assessment, cleanup**

Licensed Site Professionals

(LSPs)

- Licensed by the state Hazardous Waste Site Cleanup Professionals Board of Registration; qualified to oversee assessment and cleanup actions in accordance with the Massachusetts Contingency Plan
- Hired by the responsible party (e.g., property owner or operator) to conduct work, make submittals to MassDEP
- Work overseen by LSPs is subject to MassDEP review/audit, and in specific instances, approvals

Federal Sites

- CERCLA ("Superfund") sites
- Department of Defense sites

Some Key Terms

"Release" of oil or hazardous material (such as PFAS)

- can be a sudden release (e.g., spill) or
- historic release found as the result of an investigation & comparing analytical results for soil or groundwater samples to MCP "Reportable Concentrations"
- Releases are subject to notification to MassDEP

"Disposal Site" -- where contamination (oil or hazardous materials) resulting from a release has "come to be located."

PFAS & Waste Sites

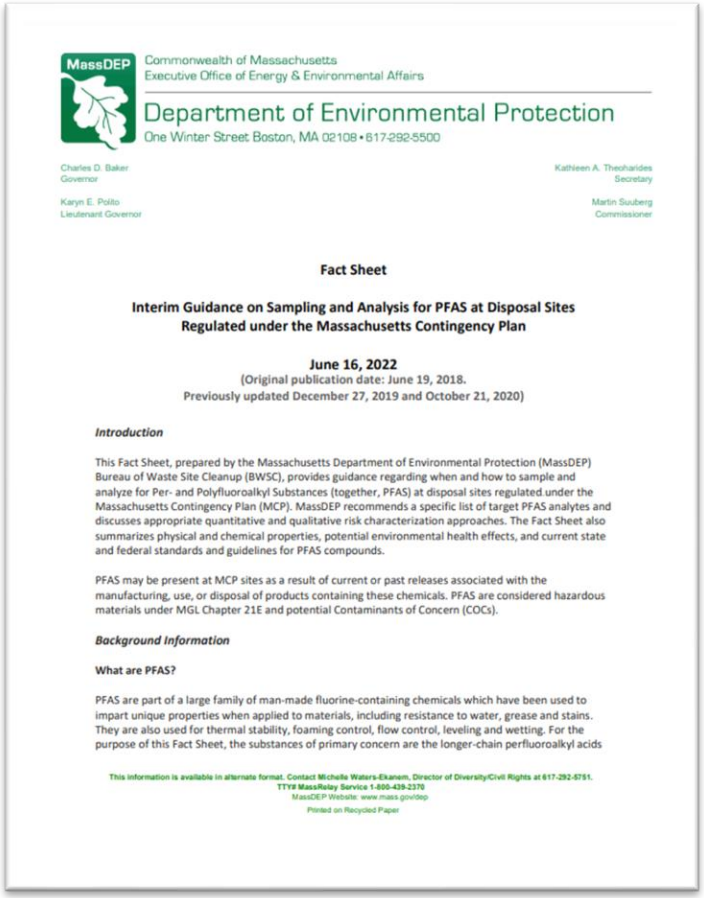
https://www.mass.gov/info-details/per-and-polyfluoroalkyl-substances-pfas#pfas-and-waste-sites-

2018 BWSC issued Interim Guidance on Sampling and Analysis for PFAS at Disposal Sites Regulated under the Massachusetts Contingency Plan (most recently revised 6/22)

2019 MCP PFAS soil and groundwater Reportable Concentrations and cleanup standards **for PFAS6** and Reportable Quantity for sudden releases

2020 Maximum Contaminant Level for PFAS6 promulgated for Public Water Supplies

2021-2022 Public and Private Well Sampling Programs - Free sampling programs **ran through June 30, 2022**



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Commissioner

Fact Sheet

Interim Guidance on Sampling and Analysis for PFAS at Disposal Sites Regulated under the Massachusetts Contingency Plan

June 16, 2022
(Original publication date: June 19, 2018.
Previously updated December 27, 2019 and October 21, 2020)

Introduction

This Fact Sheet, prepared by the Massachusetts Department of Environmental Protection (MassDEP) Bureau of Waste Site Cleanup (BWSC), provides guidance regarding when and how to sample and analyze for Per- and Polyfluoroalkyl Substances (together, PFAS) at disposal sites regulated under the Massachusetts Contingency Plan (MCP). MassDEP recommends a specific list of target PFAS analytes and discusses appropriate quantitative and qualitative risk characterization approaches. The Fact Sheet also summarizes physical and chemical properties, potential environmental health effects, and current state and federal standards and guidelines for PFAS compounds.

PFAS may be present at MCP sites as a result of current or past releases associated with the manufacturing, use, or disposal of products containing these chemicals. PFAS are considered hazardous materials under MGL Chapter 21E and potential Contaminants of Concern (COCs).

Background Information

What are PFAS?

PFAS are part of a large family of man-made fluorine-containing chemicals which have been used to impart unique properties when applied to materials, including resistance to water, grease and stains. They are also used for thermal stability, foaming control, flow control, leveling and wetting. For the purpose of this Fact Sheet, the substances of primary concern are the longer-chain perfluoroalkyl acids

This information is available in alternate format. Contact Michelle Waters-Ekanem, Director of Diversity/Civil Rights at 617-292-5751.
TTY# MassRelay Service 1-800-439-2370
MassDEP Website: www.mass.gov/dep
Printed on Recycled Paper

MCP PFAS Notification – Groundwater Reportable Concentrations (RCs)

	RCGW-1	RCGW-2 mg/l
PERFLUORODECANOIC ACID (PFDA)	*	40
PERFLUOROHEPTANOIC ACID (PFHpA)	*	40
PERFLUOROHEXANESULFONIC ACID (PFHxS)	*	0.5
PERFLUORONONANOIC ACID (PFNA)	*	40
PERFLUOROOCTANESULFONIC ACID (PFOS)	*	0.5
PERFLUOROOCTANOIC ACID (PFOA)	*	40
* Sum of PFAS6	20 ng/l	

- RCGW-1: drinking water resource areas
- RCGW-2: all other areas, PFAS-specific

MCP Notification – Soil Reportable Concentrations

	RCS-1 mg/kg	RCS-2 mg/kg
PERFLUORODECANOIC ACID (PFDA)	3E-04 (300 ng/kg)	0.4
PERFLUOROHEPTANOIC ACID (PFHpA)	5E-04 (500 ng/kg)	0.4
PERFLUOROHEXANESULFONIC ACID (PFHxS)	3E-04 (300 ng/kg)	0.4
PERFLUORONONANOIC ACID (PFNA)	3.2E-04 (320 ng/kg)	0.4
PERFLUOROOCTANESULFONIC ACID (PFOS)	2E-03 (2,000 ng/kg)	0.4
PERFLUOROOCTANOIC ACID (PFOA)	7.2E-04 (720 ng/kg)	0.4

Other MCP Notification Criteria relevant to PFAS

2-Hour Notification

- PFAS6 equal to or greater than 20 ng/l in a private well
- PFAS that poses an imminent hazard → **90 ng/l or more**
- PFAS sudden release 1 pound or more (Reportable Quantity)

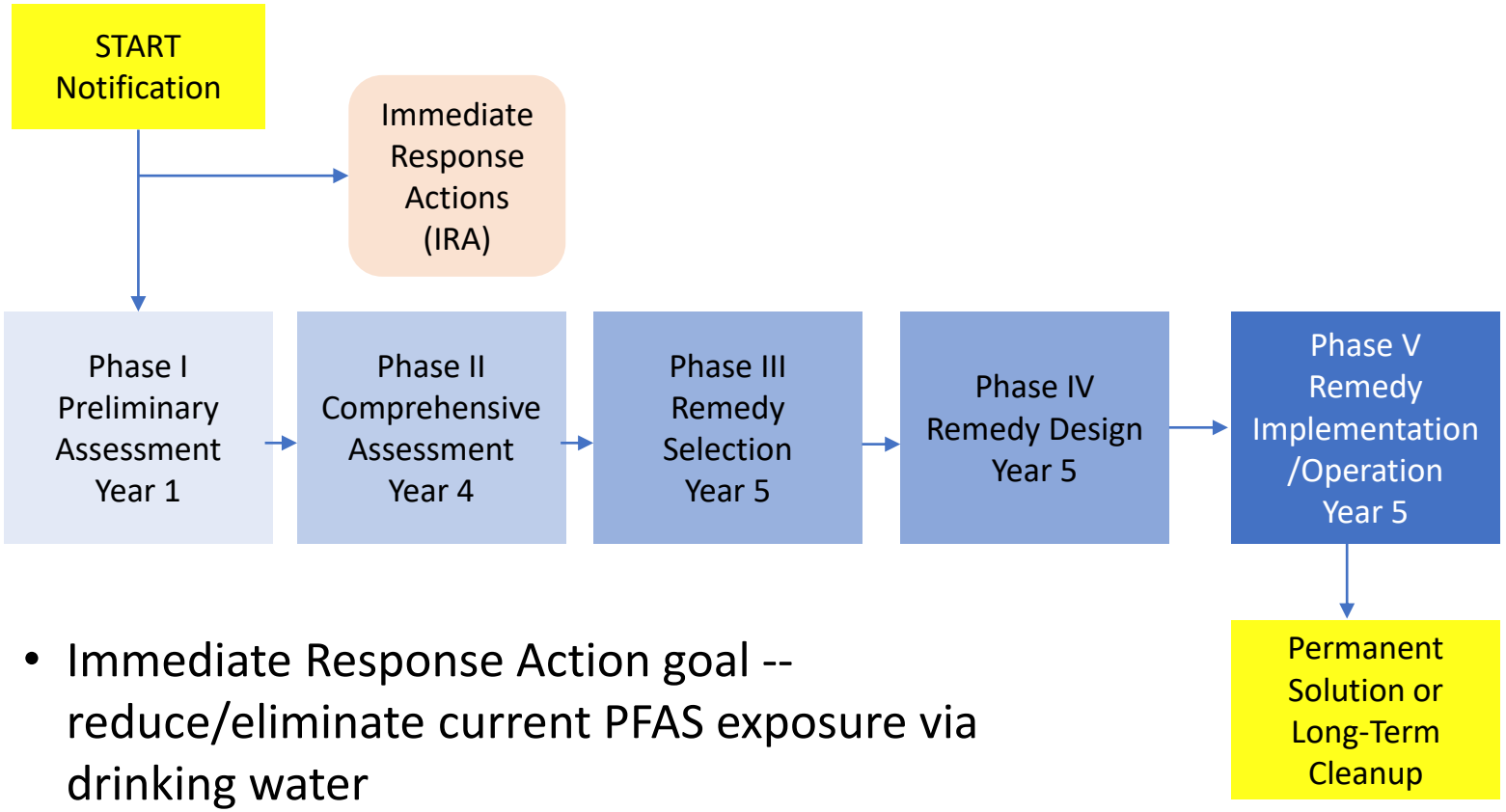
72-Hour Notification

- PFAS at concentrations equal to or greater than 20 ng/L within the Zone 1 of a public water supply well, or within 500 feet of a private water supply well.
- releases to the groundwater that have been or are within one year likely to be detected in a public or private water supply well

Immediate Response Actions – Must Initiate Right Away

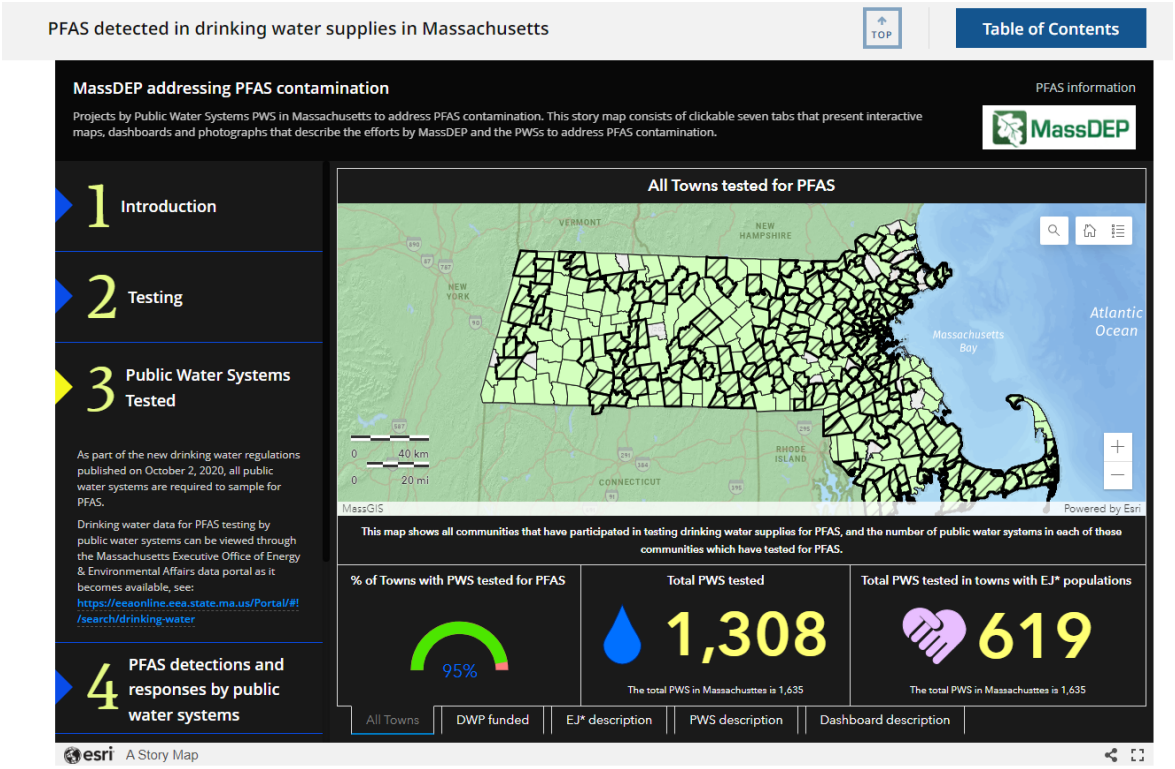
- Triggered by 2- and 72-hour notifications
- Requires that Imminent Hazards be addressed -
  - MassDEP has a statutory responsibility to address IH if the responsible party is unable or unwilling
- Measurable concentrations must be addressed to the extent feasible by responsible party

MCP Process



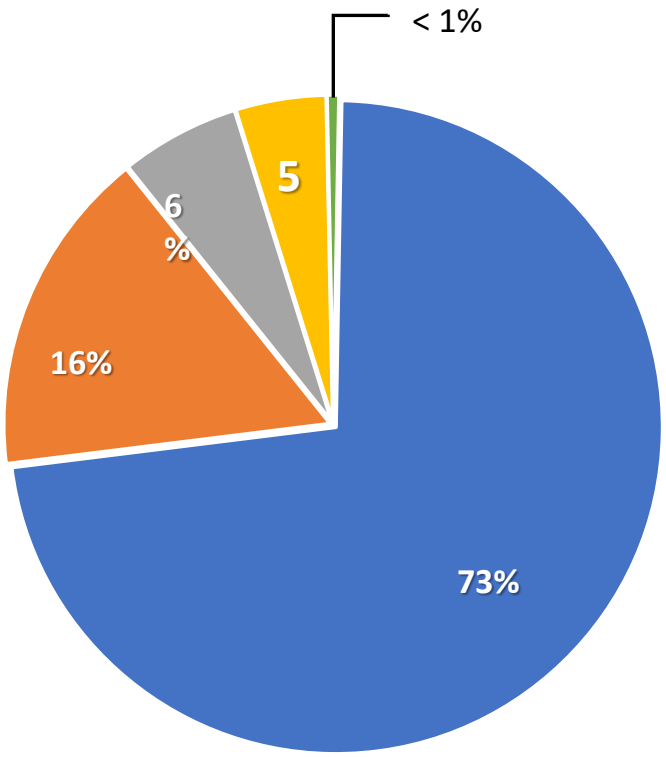
- Immediate Response Action goal -- reduce/eliminate current PFAS exposure via drinking water
- Long term cleanup goal - achieve PFAS6 20 ng/l level in drinking water resource

Public Water Supply PFAS Testing



- 95% of the pop. served by PWS are drinking water that meets the PFAS6 20 ng/l drinking water standard.
- 158 PWS detected one or more finished water sources above the PFAS6 MCL of 20 ppt.
- 431 PWS had their most recent sampling result over the minimum reporting level of 2 ng/l for PFOS and/or PFOA.
- PWS PFAS testing results are available to the public on the web in the EEA data portal.

Private Water Supply Testing

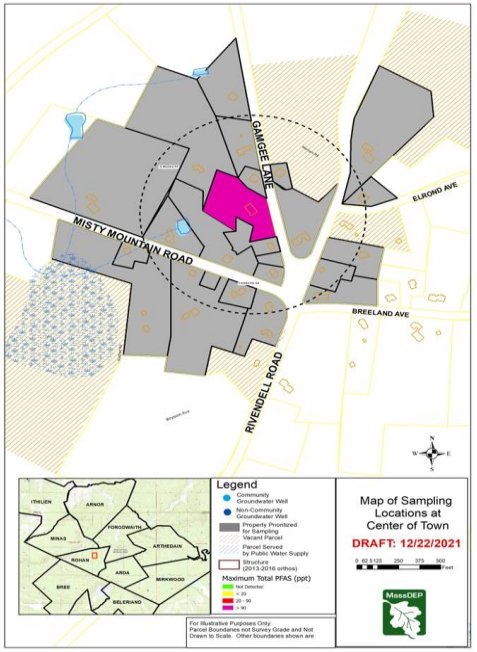


- 1,668 private wells sampled
- 95% below the 20 ng/l MCL.
- 10 private wells sampled through UMASS program had results above 90 ng/l Imminent Hazard level

ND ND to 10 ng/l 10 - 20 ng/l 20 - 90 ng/l > 90 ng/l

PFAS – Site Discovery & Cleanup

- PFAS sites generally identified:
  - PWS or Private Well sampling results
  - Known sites start sampling for PFAS and find it
  - Property use indicates it is a potential source, *due diligence* sampling identifies PFAS problem



- Predominant Sources:
  - AFFF Firefighting Foam (DOD sites, State/Municipal Fire Training & Incident Response, Airports)
  - Commercial/Industrial Sources
  - Landfill leachate
  - Unknown

- BWSC Response:
  - Use state contractors to provide bottled water, install POETS (IH conditions), provide O&M on POETs
  - Source discovery activities (look for nearby sources, RFIs, access agreement, NORs) to find responsible party (ies)

PFAS – AFFF Take Back Program

https://www.mass.gov/info-details/per-and-polyfluoroalkyl-substances-pfas#pfas-in-fire-fighting-foam-

- AFFF legacy foam collection & destruction program started in 2018
- Over 220,000 pounds (>25,600 gallons) of foam has been collected from 120 fire depts/fire training facilities statewide
- Program is continuing for legacy and modern foam (low levels of PFAS compounds)
- August 2021 MassDEP & MA Dept. Fire Service Advisory on use of foams

SERO BWSC PFAS Branch

- Formed in 2021
- Acting Deputy Regional Director – John Handrahan
- Angela Gallagher – Branch Chief
  - Navpreet Brolowski – Environmental Analyst
  - Jennifer Wharff – Environmental Analyst

PFAS – Southeast Regional Office

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What we do

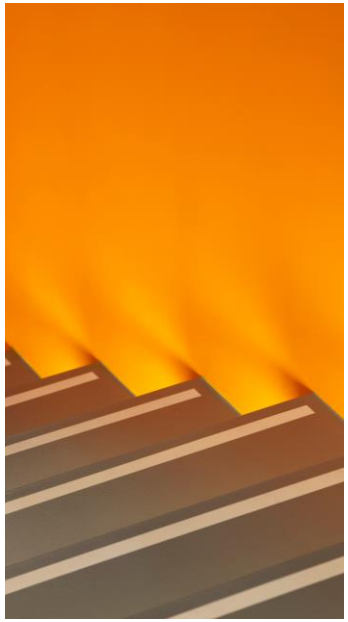
PFAS Site Discovery

- PFAS Branch/BWSC takes info from BWR and BAW and notifications to BWSC and initiates site discovery:
  - COMM Public Water Supply >20 ng/l
    - BWSC-SERO has 7 PWS Site Discovery projects
  - Private Well >90 ng/l (IH Level)
    - BWSC-SERO has 6 private well Site Discovery projects.
      - 3 IH conditions at private wells

PFAS Sampling in Public Water Supplies

- PWSs required to sample for PFAS by specific dates based on population served and type of PWS
- MassDEP offered free PFAS sampling to PWSs
  - Not all PWSs took advantage of this

PFAS Site Discovery Steps – Public Water Supplies



- Desktop review of potential sources in area of affected dw sources
- Initial meeting with Municipal officials
- Negotiate Access
- Sampling surface water, drinking water, and/or groundwater
- Data review and interpretation

Potential Sources

- We don't always know
- Several sources likely
  - Septic systems
  - Groundwater discharges
  - Landfills
  - Industrial/Mfrg.
  - Fire Stations using AFFF
  - Airports with FAA Certifications
  - Fire Training areas (airports, county and municipal properties)

PFAS Case Studies – Public Water Impacts

Site Discovery of Public Drinking Water Sources with PFAS

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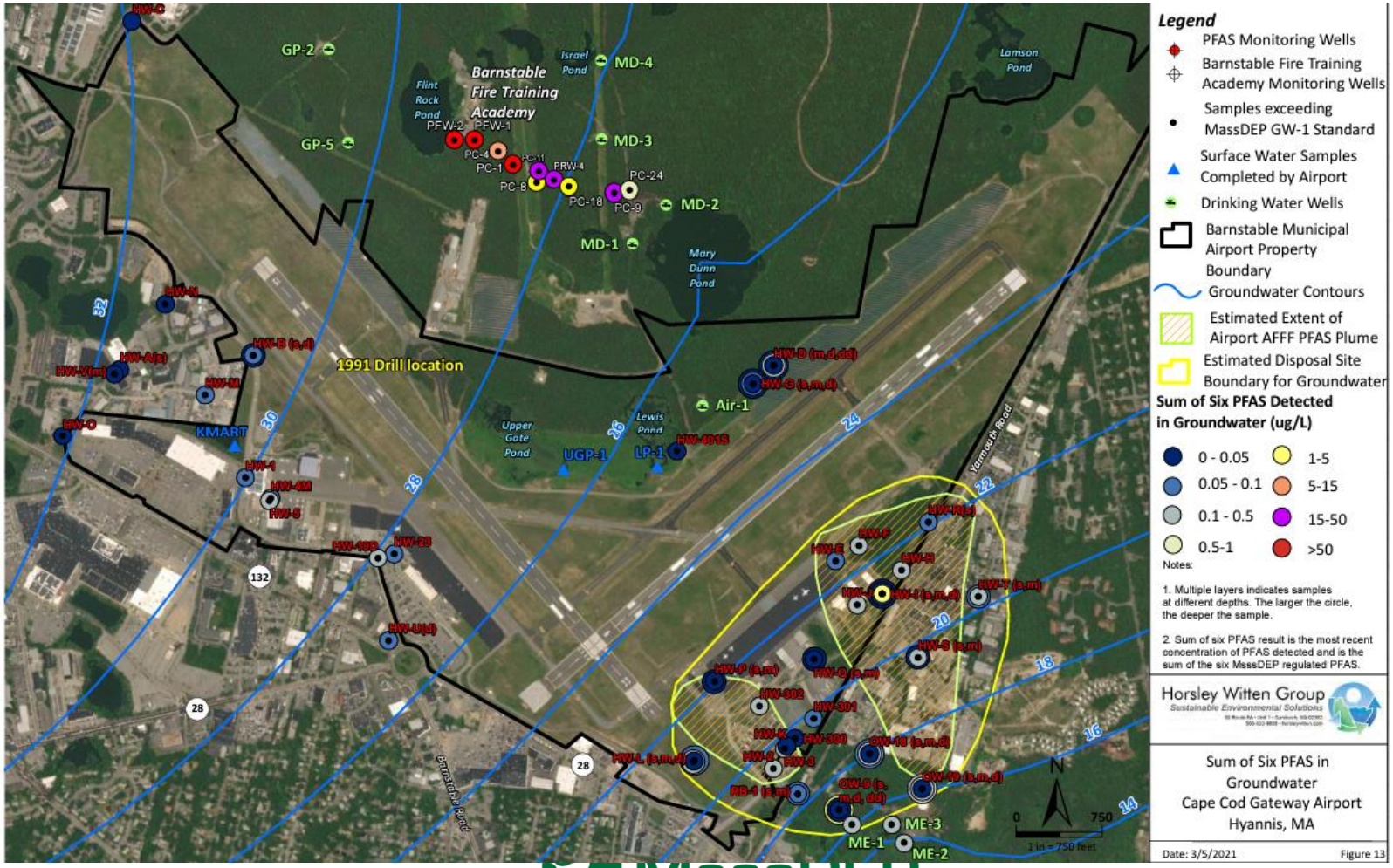
PFAS Case Study – Cape Cod Gateway Airport



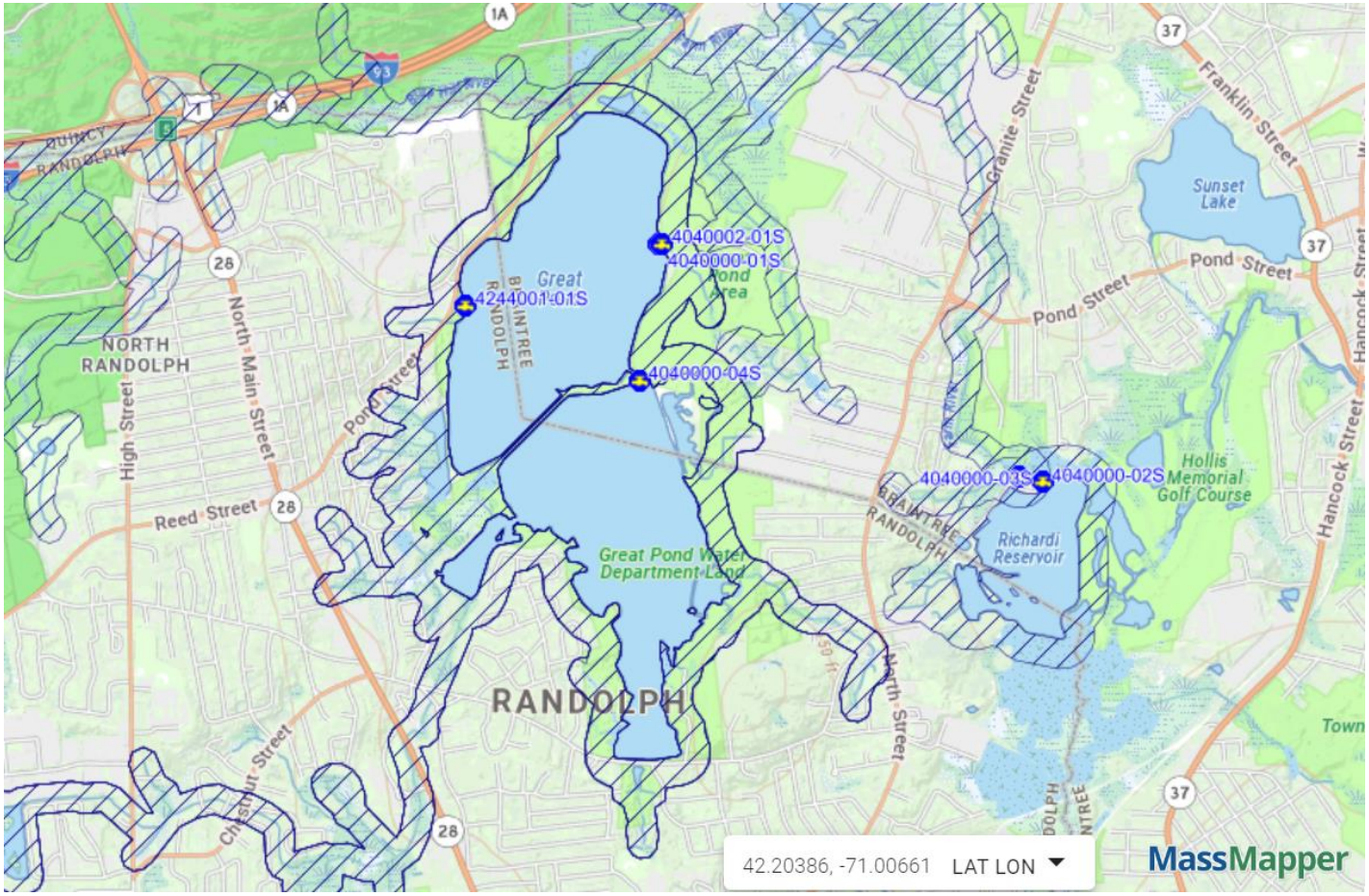
Cape Cod Gateway Airport Background

- UCMR-3 data collected in 2013-2015 for certain public drinking water systems
  - Maher Wells in Barnstable found to contain PFAS
- Information showed Airport to use/store AFFF for FAA certification
- BWSC issued a Notice of Responsibility to the Airport in November 2016 to evaluate potential source areas for PFAS

Cape Cod Gateway Airport - Status

- Site became a Public Involvement Plan (PIP) site
- Airport has completed capping of soil source areas
- Airport concluded that PFAS is also entering their property from other off-site sources
- Airport has concluded that at this time, they haven't affected the Maher Wellfield but it's imminent
- Limited in what can be done to remediate the PFAS

PFAS Case Study – Great Pond Reservoir



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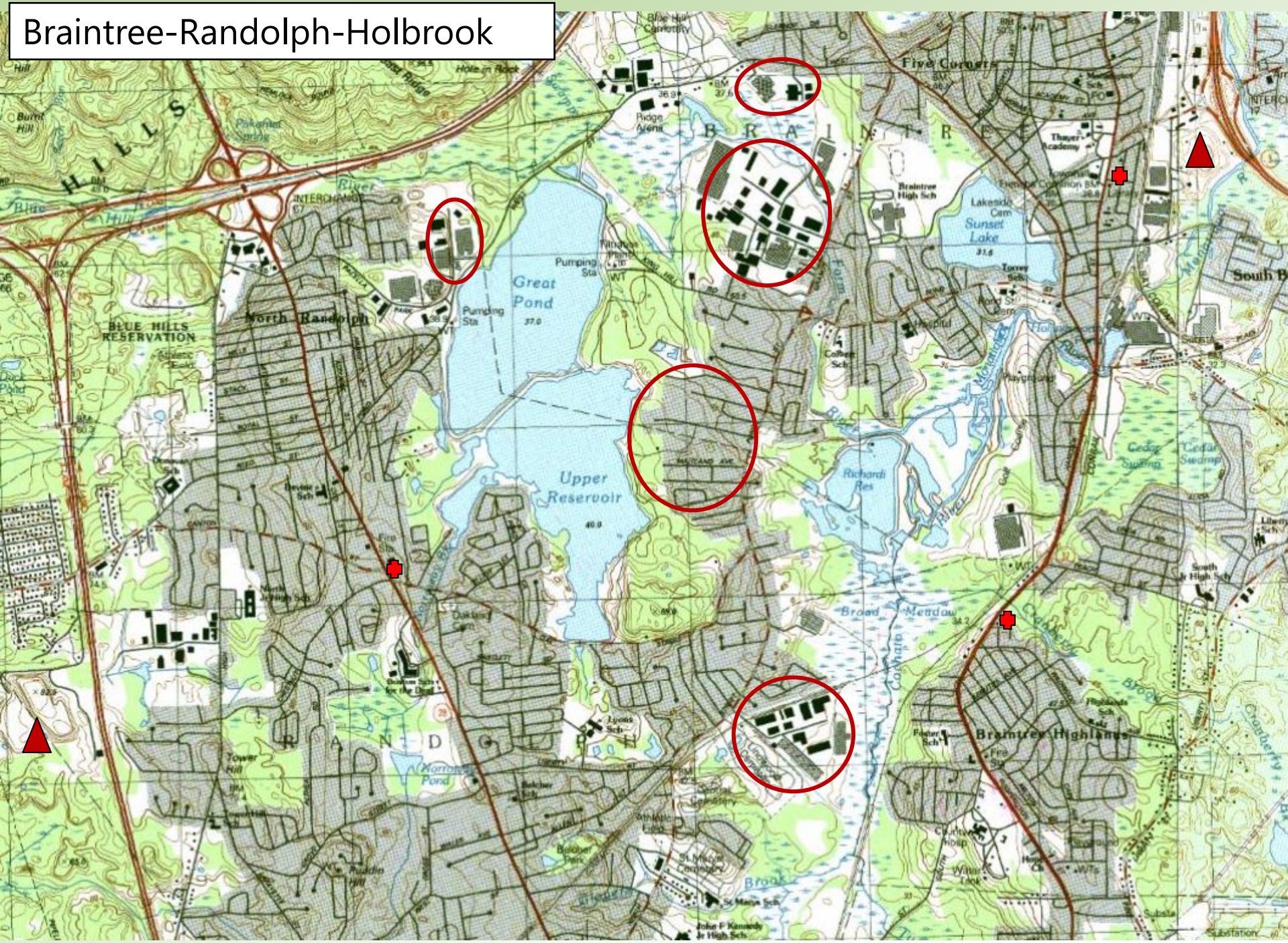
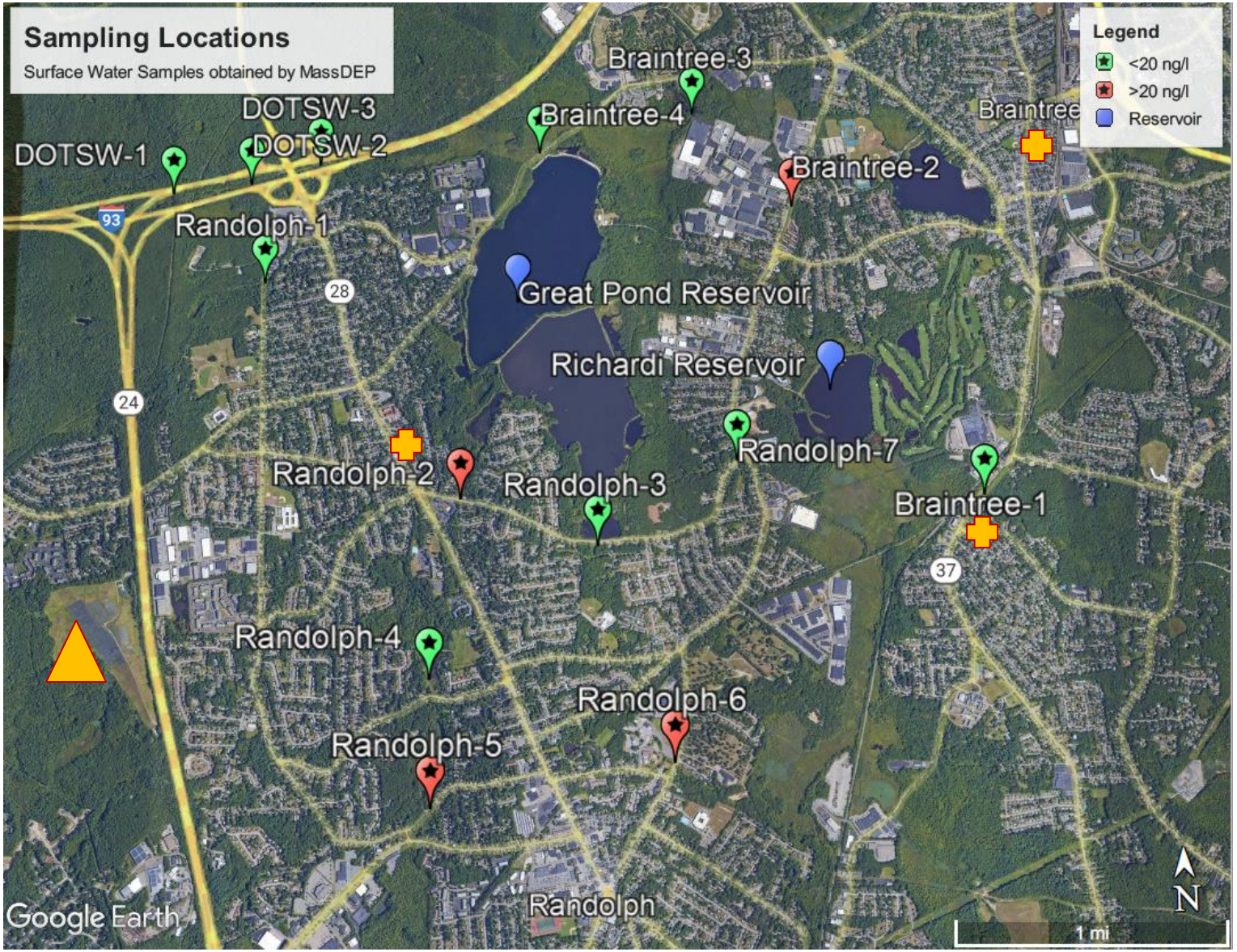
Great Pond Reservoir Background

- 2019 – Braintree Water Department and Randolph/Holbrook Joint Water Board test for PFAS – Great Pond Reservoir
- Results – Just above 20 ng/L for PFAS6
- BWSC staff contacted Town to discuss potential sampling locations and access agreements

Braintree-Randolph-Holbrook





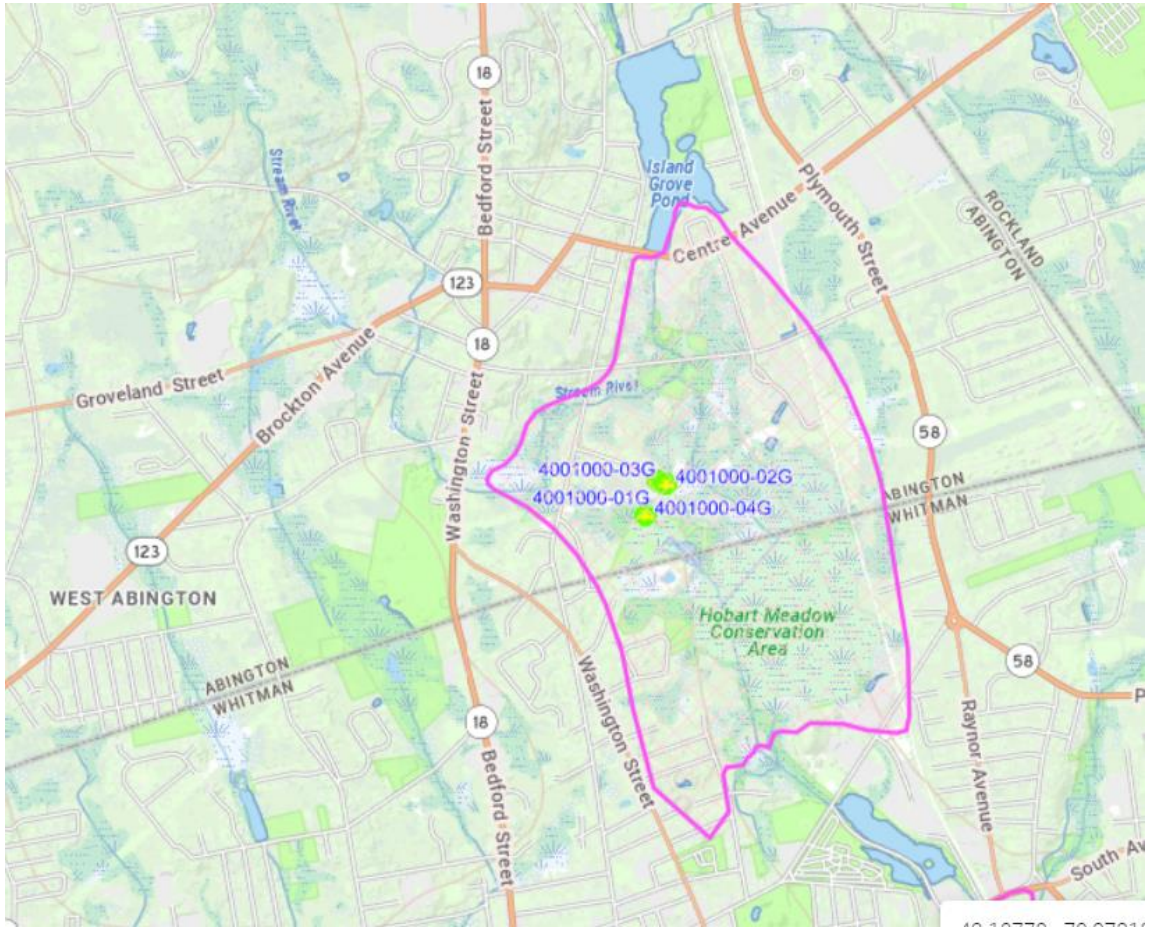
Fire Stations

Landfill

"Interim" Outcome of Site Discovery

- All but ONE sample contained PFAS6 above detection limits
  - Not all above 20 ng/L (note that no standards for surface water)
  - Initial investigations led to issuance of a Request for Sampling - PFAS detected in gw above 20 ng/L
  - Monitoring wells may yield information for more definitive conclusions and/or other sites

PFAS Case Study – Abington-Rockland



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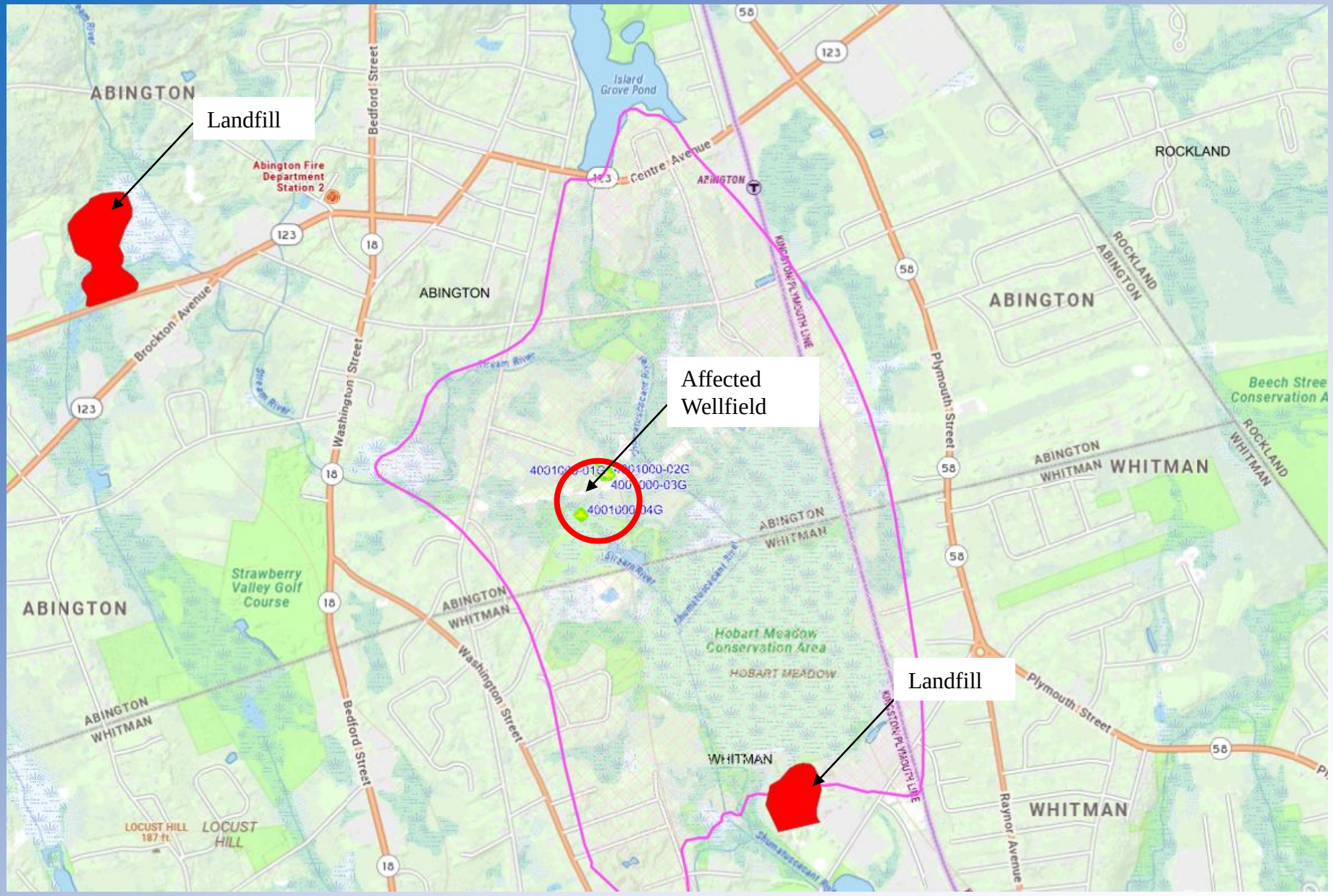
Abington-Rockland Background

- 2019 – PFAS6 detected up to 33 ng/L in groundwater wells used for drinking water
  - Water System completed their own surface water sampling in area
- BWSC initiated site discovery program



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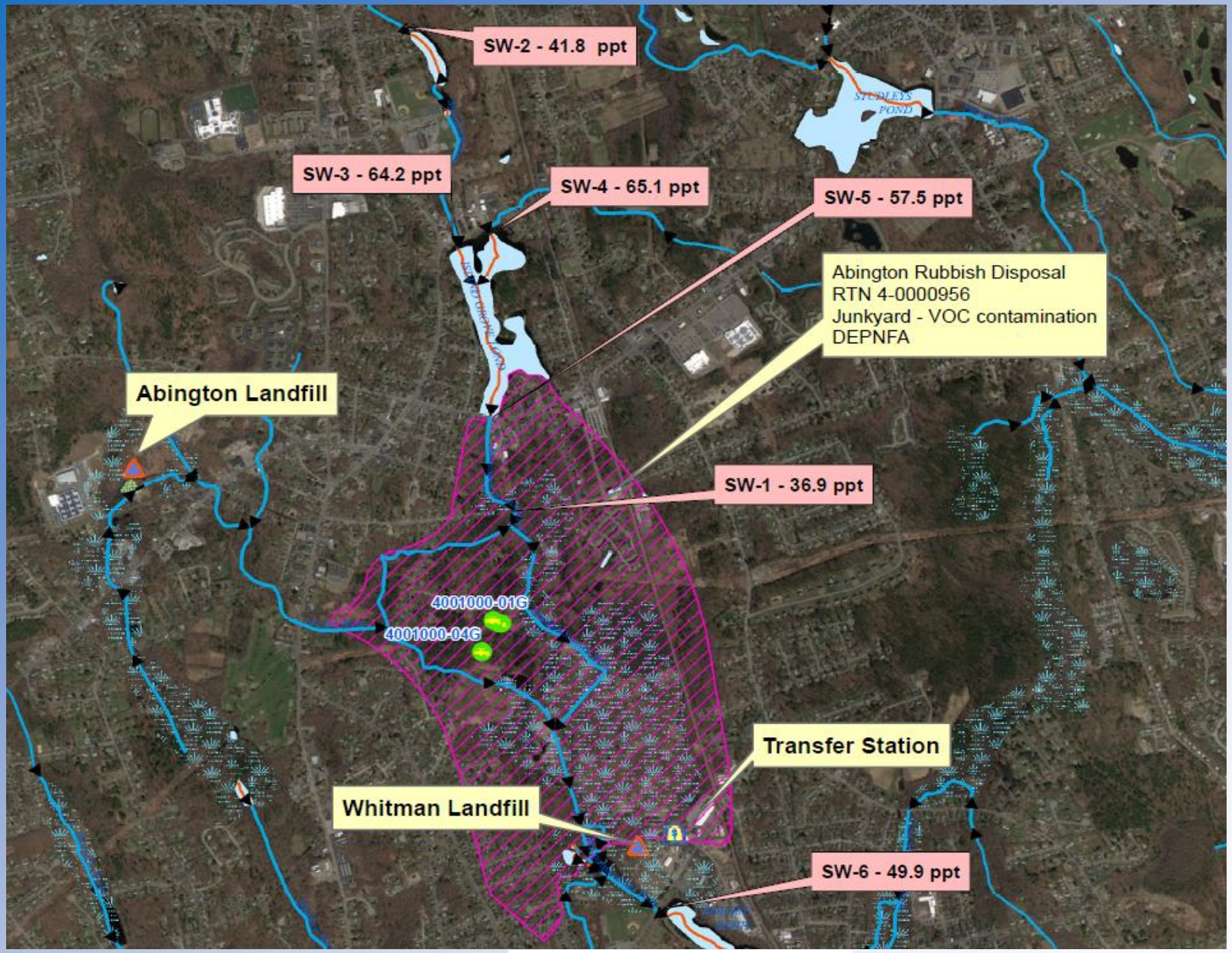

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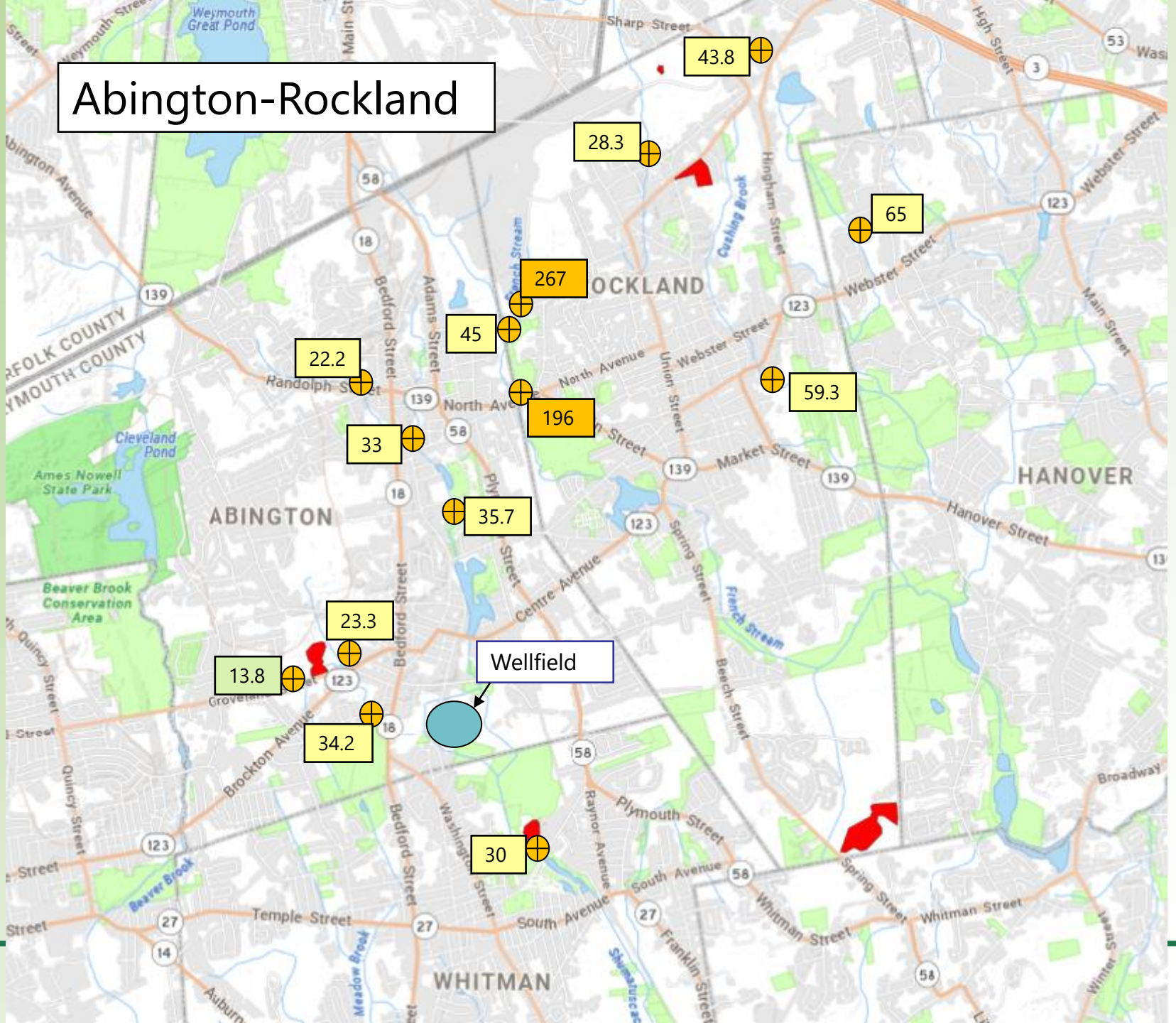
Abington-Rockland
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30
Wellfield
ABINGTON
HANOVER
WHITMAN
Weymouth Great Pond
Cleveland Pond
Ames Nowell State Park
Beaver Brook Conservation Area
Sharp Street
Webster Street
North Avenue
Market Street
Hanover Street
Centre Avenue
Brockton Avenue
Plymouth Street
South Avenue
Temple Street
Whitman Street
Bedford Street
Adams Street
Union Street
Spring Street
Beech Street
Broadway
Main Street
Hingham Street
Cushing Brook
French Stream
Beaver Brook
Meadow Brook

"Interim" Outcome of Site Discovery

- 20 surface water samples obtained
  - All samples contained PFAS
  - Only one sample below 20 ng/L
  - Monitoring wells may yield more definitive conclusions and/or other sites

PFAS Case Studies – Private Well Impacts

Site Discovery of PFAS sources in Private Drinking Water Wells

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MassDEP Private Well PFAS Sampling Program

- Massachusetts Legislature passed funding to sample private wells for PFAS.
- Sampling program administered by UMASS and MassDEP.
- Towns where >60% are serviced by private wells were chosen.
- Up to 40 homes per town were either randomly chosen or targeted based on location near potential PFAS sources.
- Homeowner obtained sample and shipped to lab
- Data provided to owner, BWSC and BWR.

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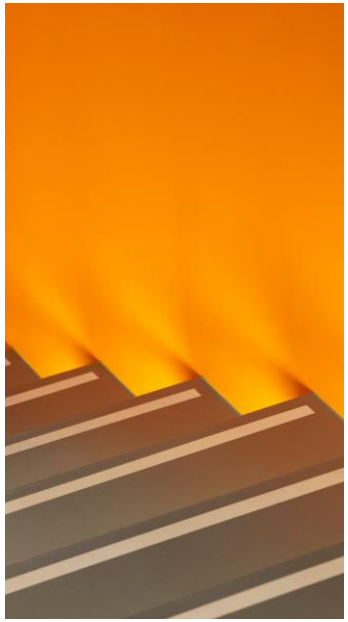
PFAS Site Discovery Steps – Private Water Supplies

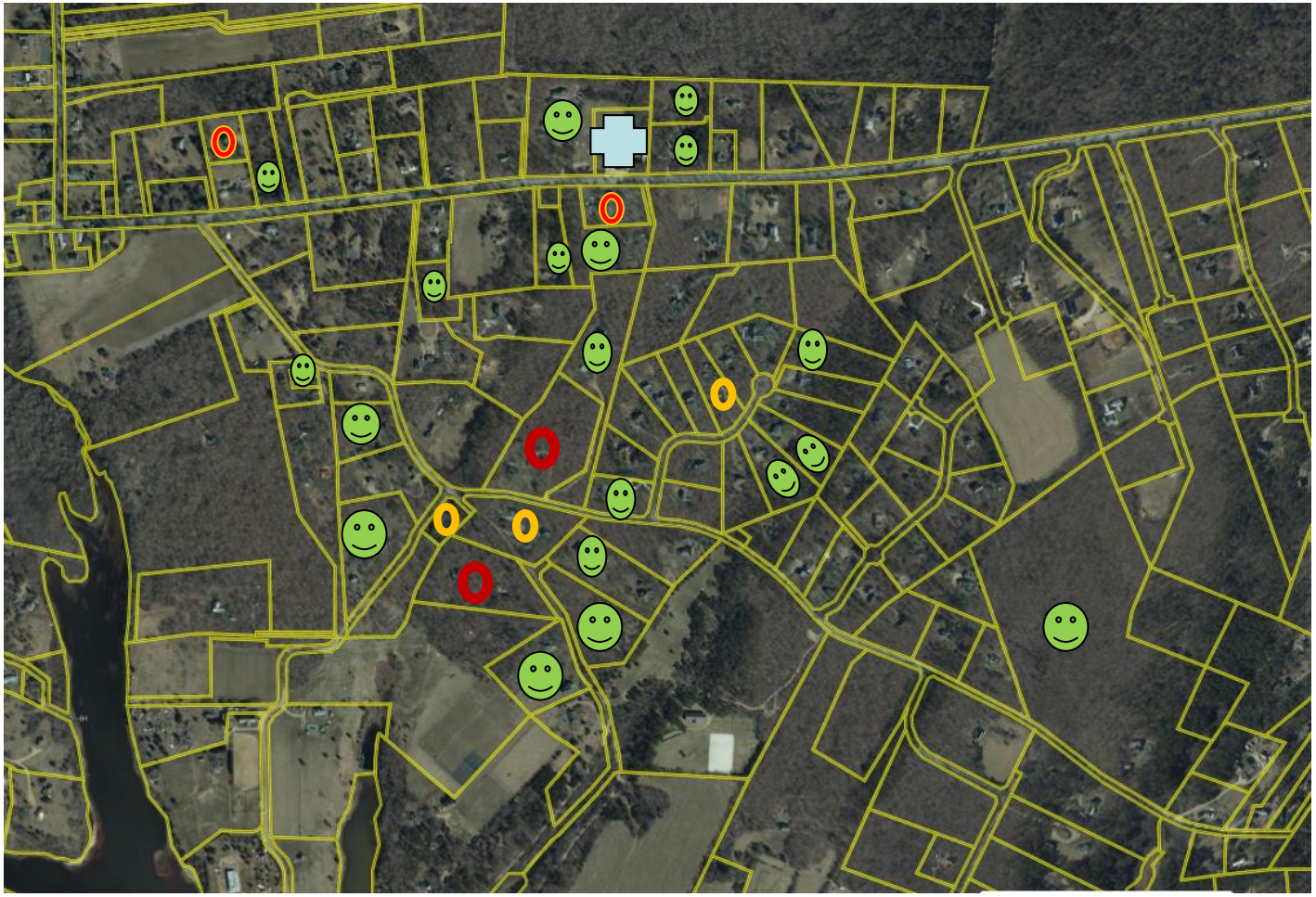


- MassDEP Initially notified via UMASS sampling program
- Desktop review of potential sources in area of affected private wells
- Courtesy call to Health Agent regarding the sampling
- Negotiate Access with homeowners
- Sample wells, obtain well construction details
- Data review and interpretation

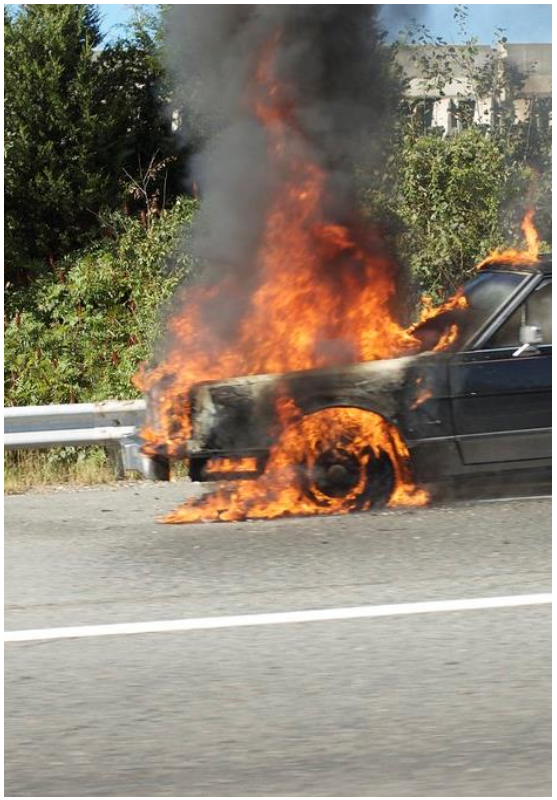
PFAS Case Study – Martha's Vineyard

- MassDEP notified of an Imminent Hazard at a residence in West Tisbury
  - MassDEP resampled private well – confirmed IH
  - MassDEP provided bottled water
- MassDEP contracted with water company to install Point of Entry Treatment System (POET) to remove PFAS
- MassDEP began site discovery program
  - MassDEP reached out to BOH
    - West Tisbury BOH joined MassDEP during sampling
  - Focus is initially on evaluating nearby residences
  - Iterative process
  - Data used to aide in source identification
  - Additional IH discovered

PFAS Case Study – Martha's Vineyard



PFAS Case Study – Martha's Vineyard



- Anecdotal evidence of nearby car fire
- AFFF discharges at fire station
- Next steps?
  - Continue with sampling
  - Possibly install MWs

Private Drinking Water Well Sampling and Risk Communication Issues

- Private Wells are regulated by the Board of Health
- MassDEP is statutorily required to protect human health from Imminent Hazards
- When >90 ppt, we offer bottled water and a (POET at state expense
  - MassDEP monitors system for 2 years
  - Homeowner then responsible for POET
- When a property has >20 ppt < 90 ppt
  - Homeowner responsible

Private Drinking Water Well Sampling and Risk Communication Issues

- Bathing
  - Adverse affects occur at much higher concentrations than what we are seeing in SERO
- Washing dishes
  - PFAS remains in solution (i.e., water) – droplets are not likely to be significant
- Pets, chickens, plants, other livestock risk
  - Not much science on this
- Blood testing
  - MassDEP recommends speaking to DPH
  - Best to limit various exposures

Links

- **DPH:** 617-624-5757 and ask for Environmental Toxicology Program or email to dphtoxicology@mass.gov
- **Westminster, MA Presentation:**

  Westminster, Massachusetts Public Meeting on PFAS Contamination (June 2022) – YouTube
- **MassDEP:** https://www.mass.gov/info-details/per-and-polyfluoroalkyl-substances-pfas

MassDEP Speakers

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- Elizabeth Callahan – elizabeth.j.callahan@mass.gov
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THANK YOU

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