



Update on PFAS Water Supply Well Sampling and Site Investigations in Shaftsbury

(SMS #2023-5344)

SMS Project Manager:

Malayika Vincent

Public Meeting on April 14, 2025 at 6PM

Cole Hall

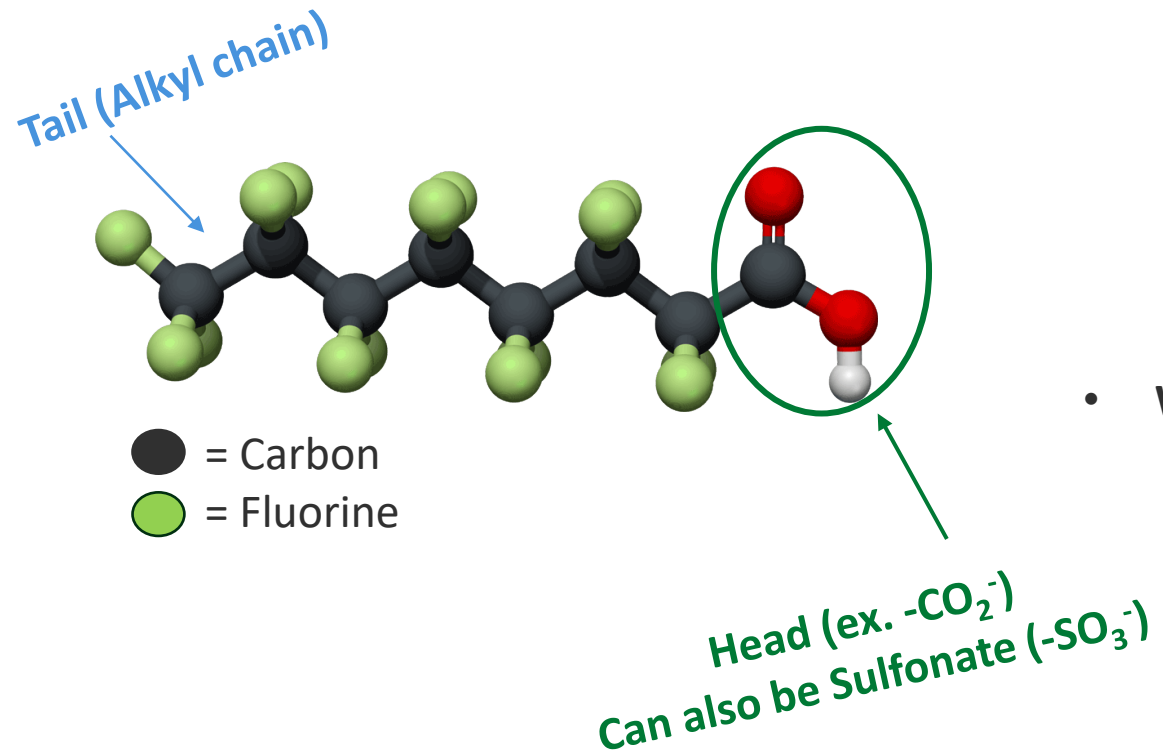
Outline

- **PFAS: A General Overview**
- **Extent of Previous work**
- **Recent Work Conducted**
- **Results**
- **Treatment Options**
- **Conclusions & Next Steps**
- **Questions**

PFAS: A General Overview



PFAS: A general overview



- **What are PFAS?**
 - PFAS = Per- and Poly-fluoroalkyl substances
 - Man-made compounds used in a wide range of industries since the 1950s
 - Persistent in the environment
 - Believed to be harmful to human health
- **What are PFAS in?**
 - Textile Coating (Chemfab) as Perfluorooctanoic Acid (PFOA)
 - Some fire-fighting foams (AFFF) as Perfluorooctane sulfonic acid (PFOS)
 - Teflon Production
 - Coatings for electronics
 - Scotchgard/GORE-TEX
 - Cosmetics

The Vermont legislature has banned many of these applications

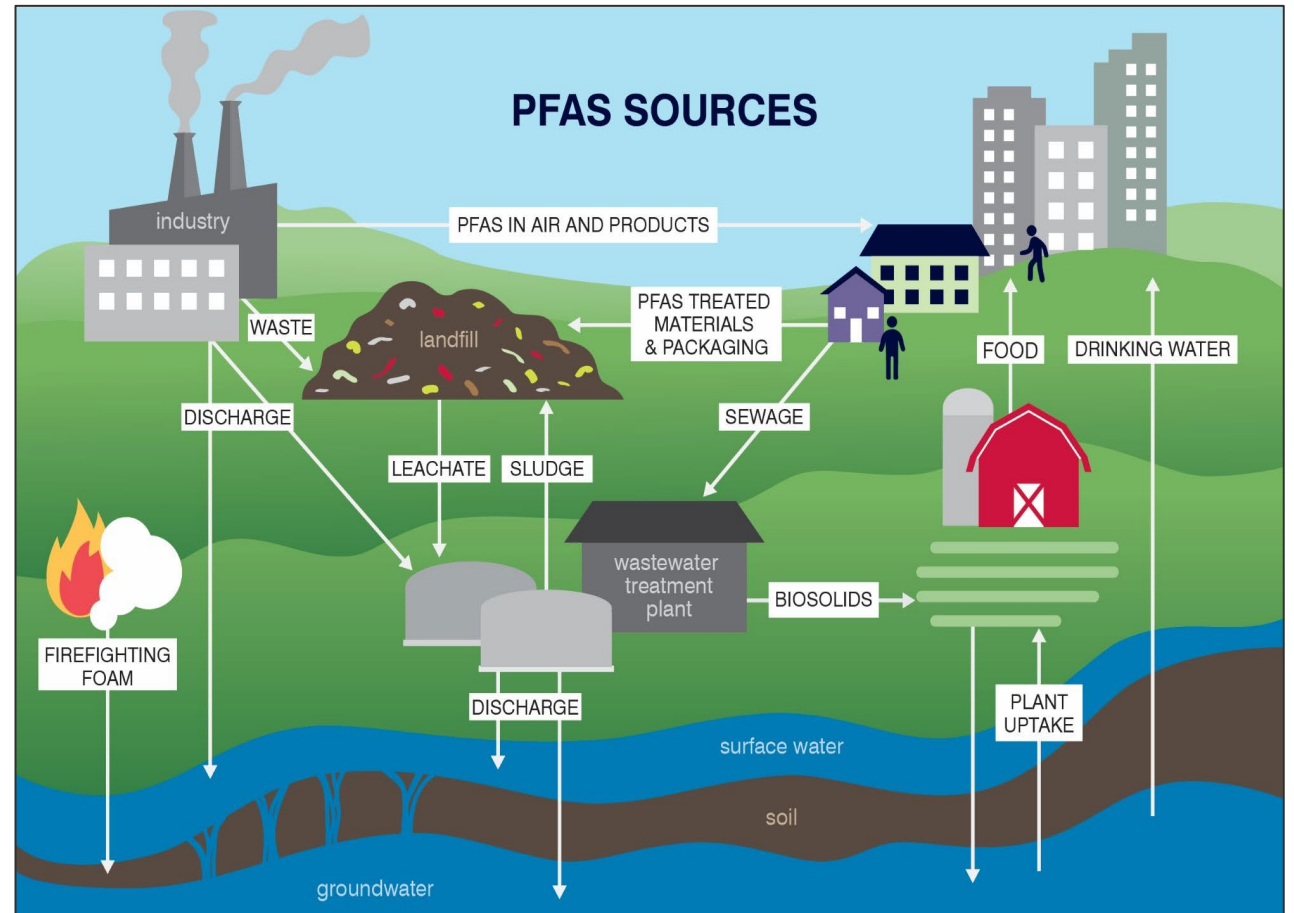
Image of PFAS molecule: <https://swana.org/initiatives/pfas>

Modified from: <https://pfas-1.itrcweb.org/wp-content/uploads/2023/12/Full-PFAS-Guidance-12.11.2023.pdf>

PFAS: A general overview

- **PFAS on the move**
 - Atmospheric Deposition (dry or wet)
 - Flushed through soil during rain events or snow melt
 - Move through cracks in the subsurface (fractures) that are preferential pathways
 - Surface water
 - Groundwater
- **Current standard* in Vermont: 20 ppt for the Sum of 5 PFAS compounds**
 - PFOA (perfluorooctanoic acid)
 - PFOS (perfluorooctane sulfonic acid)
 - PFHpA (perfluoroheptanoic acid)
 - PFHxS (perfluorohexane sulfonic acid)
 - PFNA (perfluoronanoic acid)

* Set by Vermont Drinking Water Health Advisory



<https://www.westonandsampson.com/services/environmental-consulting/pfas-emerging-contaminants/>

PFAS can affect our health in many ways



Cancer

- Kidney
- Testes
- Prostate

Noncancer

- Osteoporosis
- Body Weight
- Immune
- Endocrine

Vermont Department of Health and Environmental
Conservation

PFAS may harm people of all ages

Examples of Developmental effects:

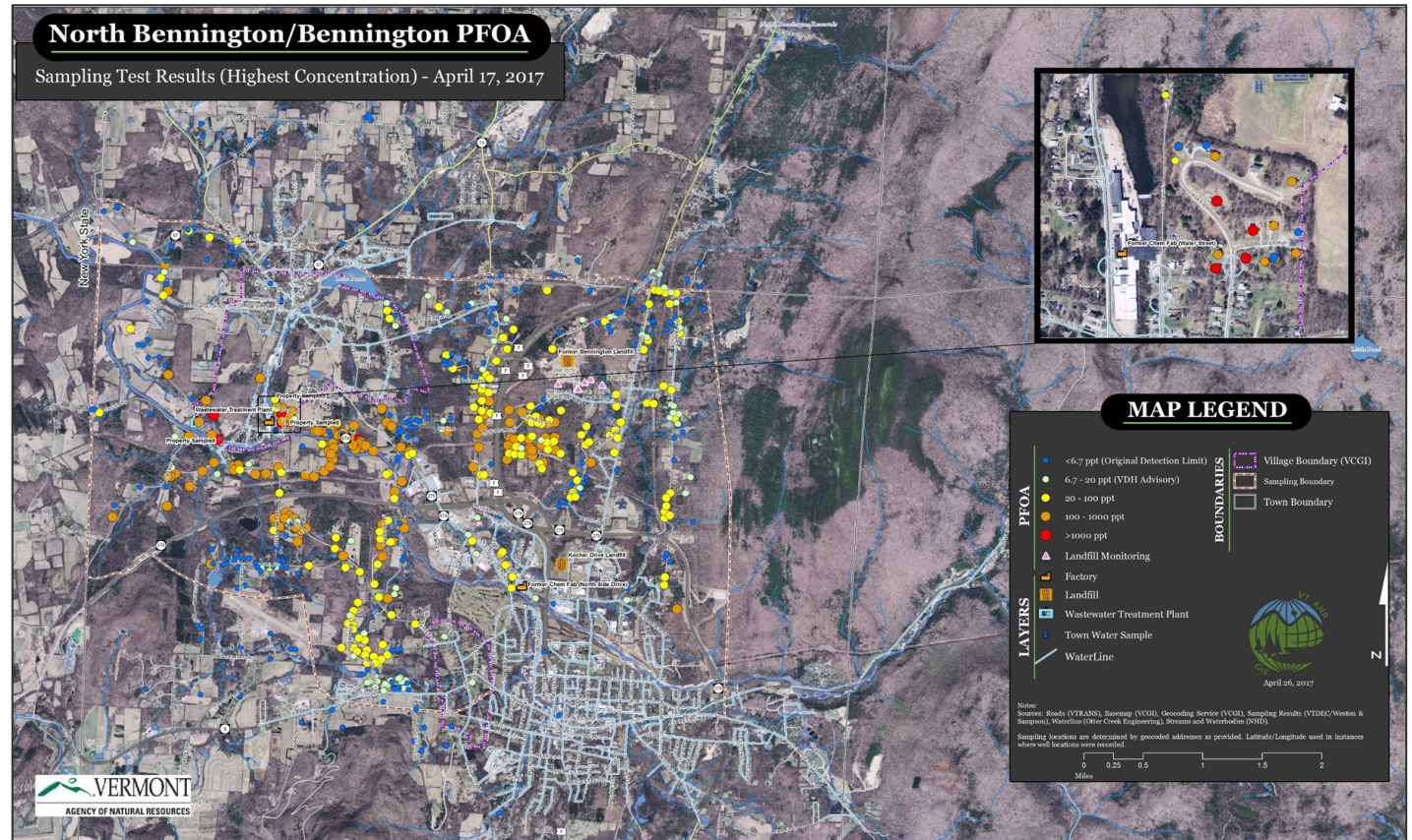
- Fetuses: exposure during pregnancy – decreased birth weight
- Infants: immune system
- Children: increased waist circumference, cognitive/behavioral effects
- Adolescents: changes in timing of puberty

Examples of concerns for Adults

- Cancer (for example, testicular, kidney)
- Liver effects
- Immune effects (decreased response to vaccination, decreased immune response)
- Thyroid effects
- Cholesterol increase

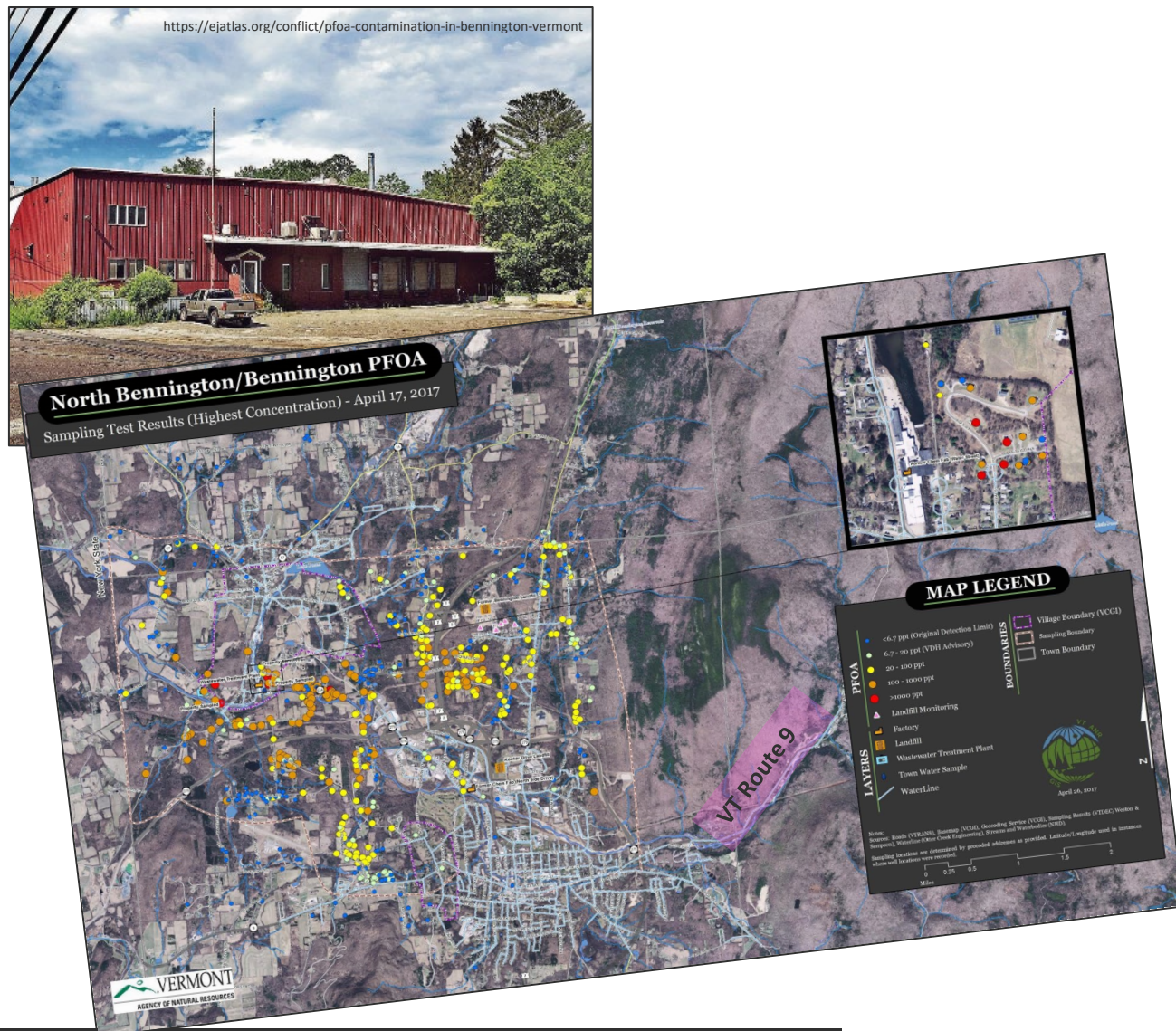
Vermont Department of Health

Extent of Previous Work



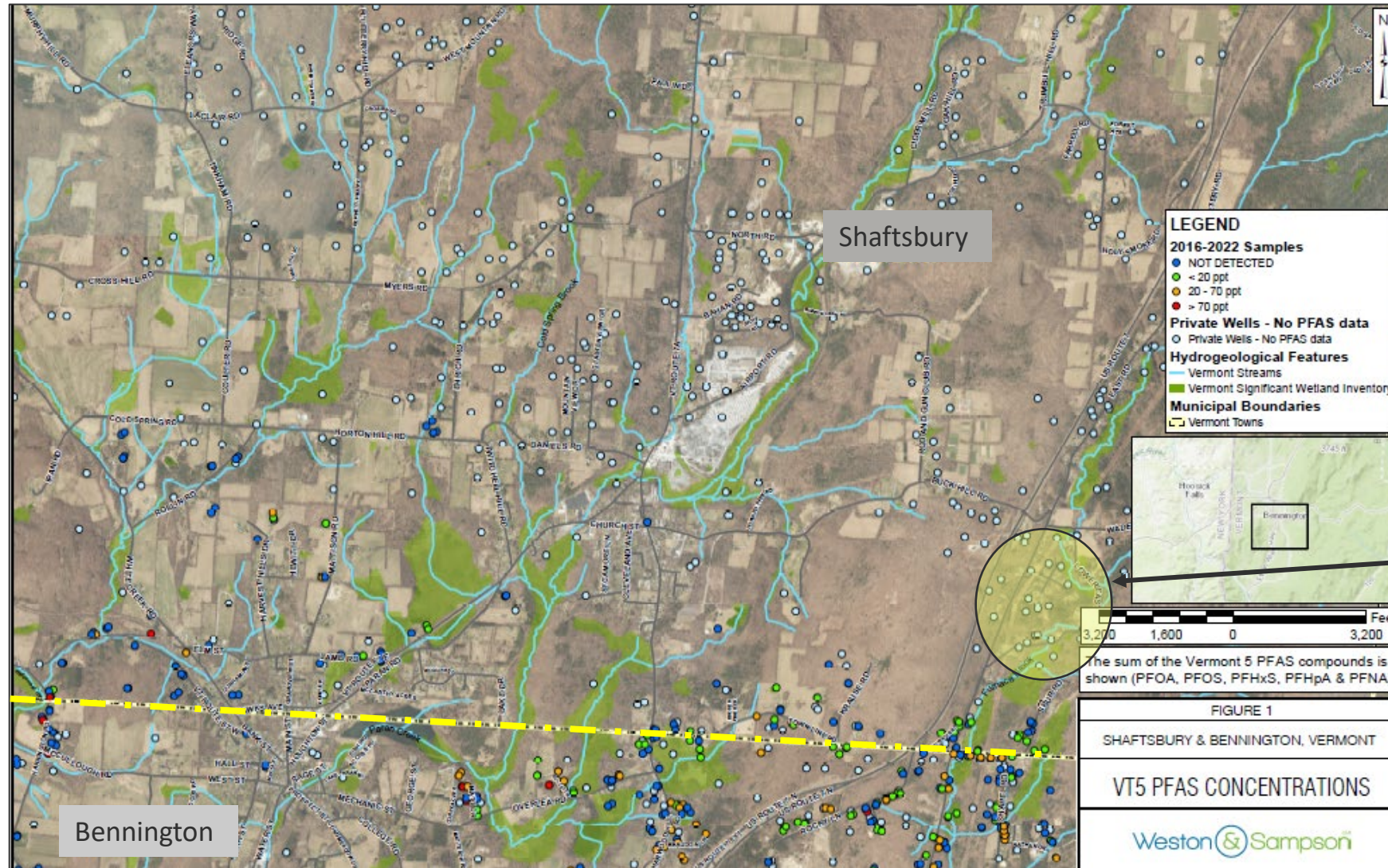
North of Route 9 (2016 – 2019)

North of Route 9 to just inside Shaftsbury (2016 – 2019)



- **Former Chemfab facilities located on Northside Drive and Water Street (North of Route 9)**
- **PFOA emitted through stacks during the drying and curing process**
 - Atmospheric deposition of PFAS in surrounding area
- **Well sampling data**
- **Settlement**
 - Short-term mitigation measures:
 - Impacted homes provided with Bottled water
 - Whole-home water treatment systems
 - Long-term measures:
 - Monitoring
 - Connection to Town Water
 - Well Replacements
 - Whole-home water treatment systems
- **Continued monitoring**

Shaftsbury Wells Sampled 2016-2022



SMS #2023-5344
(sampled starting
July 2023)

July 2023 – July 2024

Recent Work Conducted & Results



https://www.mlive.com/news/2018/05/politico_pfas_atcdr_epa_levels.html

Expanded Sampling Area: Southern Vermont

Summer
2023

- **500-well State-wide sampling effort:** Homes randomly selected around the state of Vermont to be sampled for PFAS
- **Shaftsbury:** 1 home with detections (Slightly north of the Bennington-Shaftsbury Town line)

Winter
2023

- **Site Investigation:**
 - Atlas conducted Site Investigation (n = 16)
 - Impacted residences received Bottled Water and Point-of-Entry Treatments (POETs)

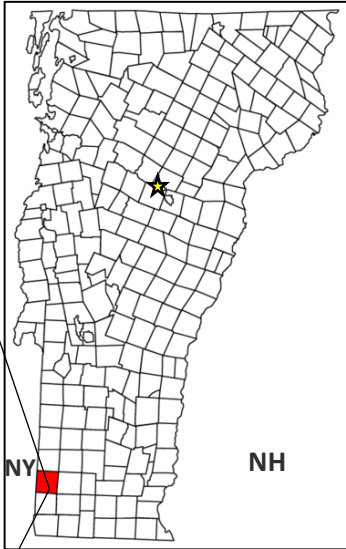
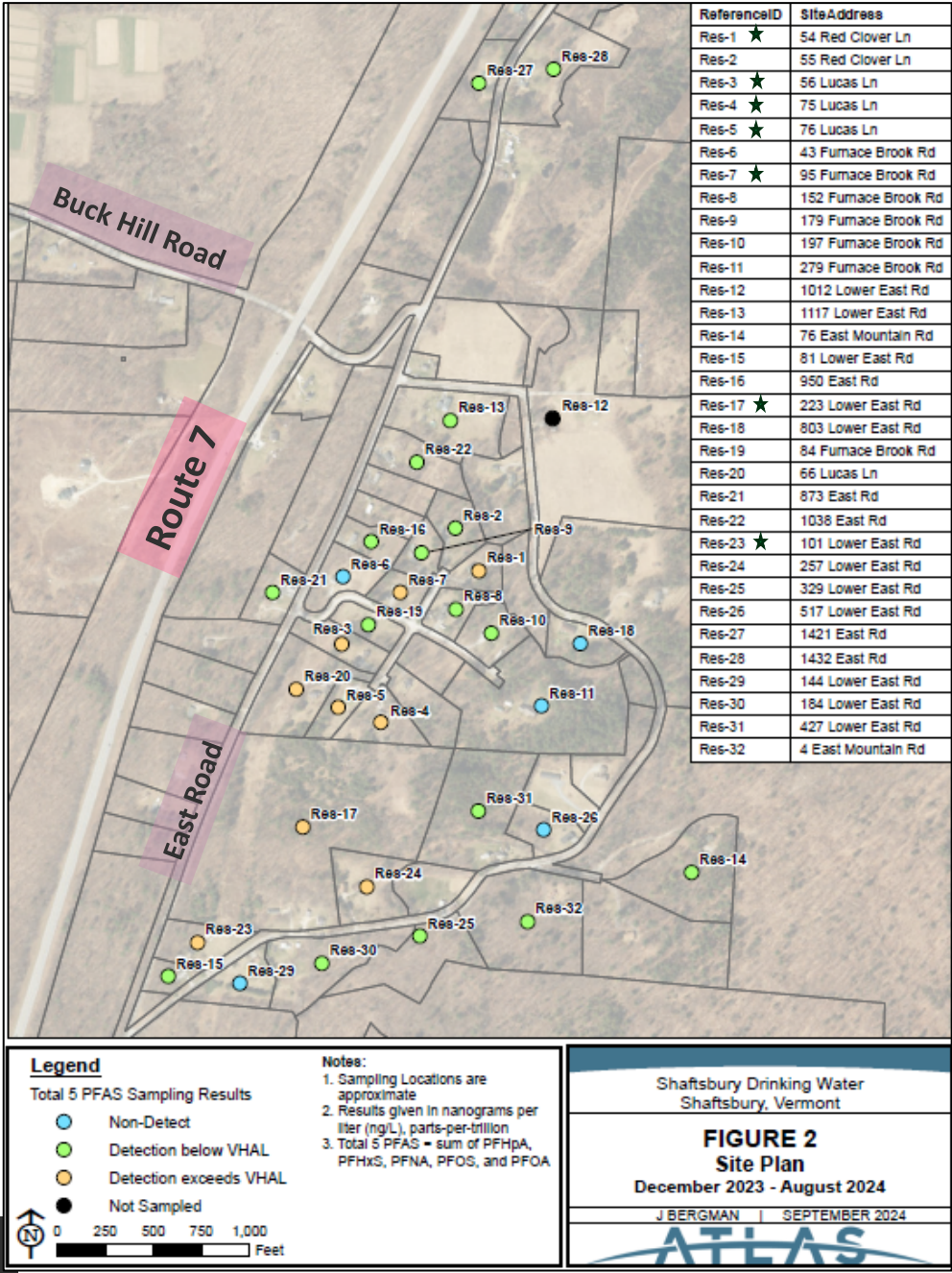
Spring/
Summer
2024

- **Quarterly Monitoring (n = 24)**
 - Sampling by Tetrattech
 - Reporting by Atlas

Fall 2024

- **Report submission by consultants:**
 - Atlas: PFAS Data Analysis Report

Southeastern Shaftsbury: Well Monitoring

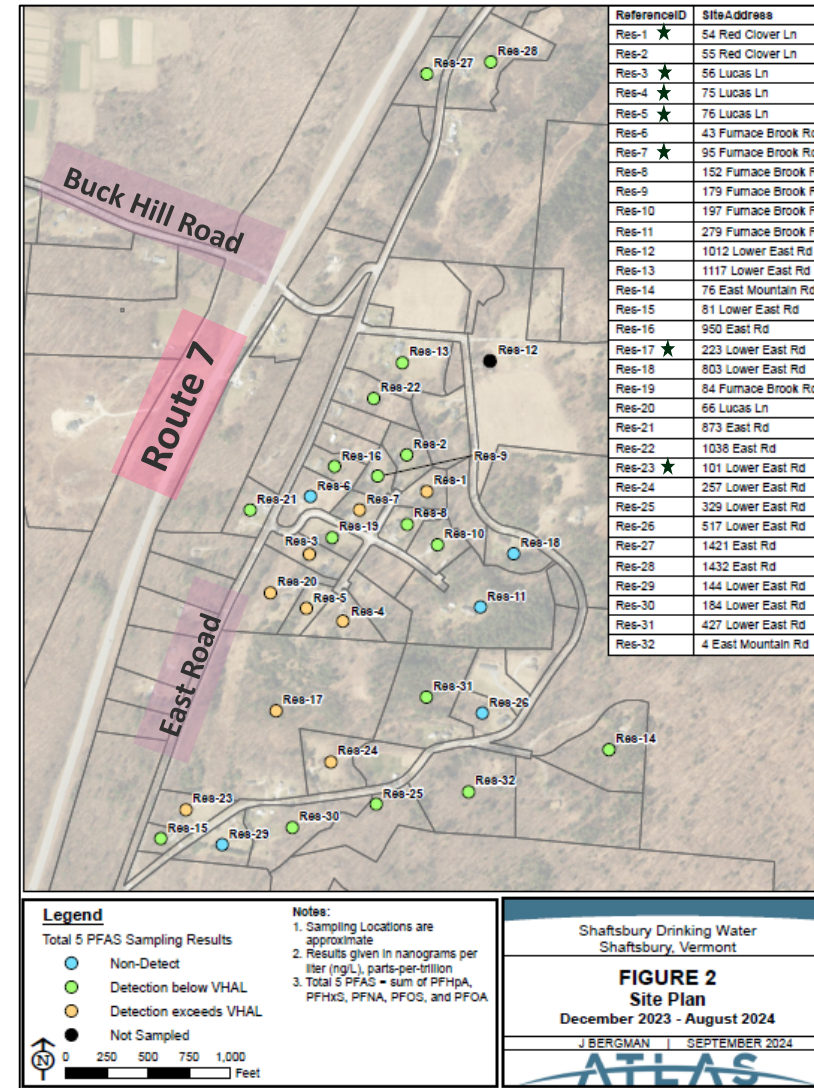


https://en.wikipedia.org/wiki/Shaftsbury,_Vermont

★ = POET

PFAS Sampling: Potential sources identified in Shaftsbury

- Former Chemfab facility
- Private Septic
- Shaftsbury Landfill
- Former Bennington Landfill
- Kocher Drive Landfill
- “Shaftsbury dump”



★ = POET

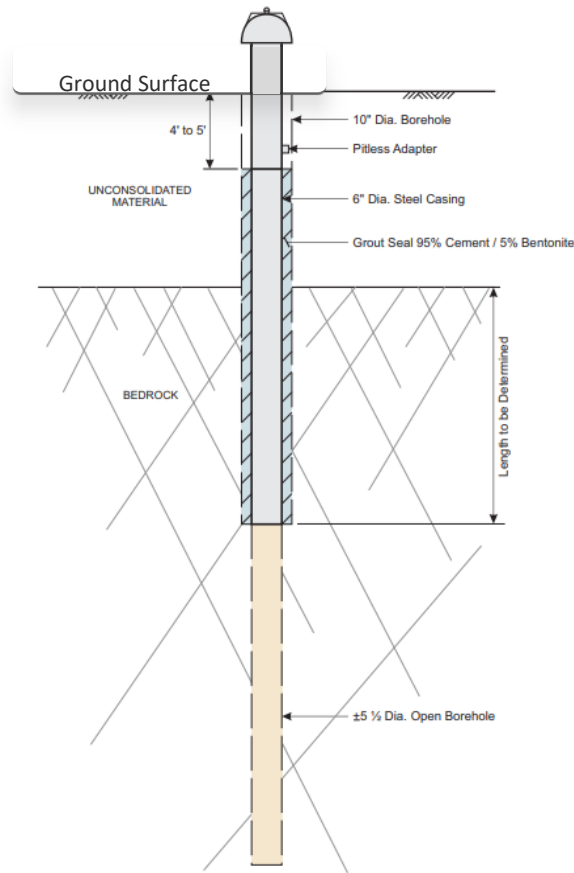
VTDEC Hierarchy of Clean Water Options:

- Connection to Public Water System
- Drilling a replacement well with clean water
- Providing and maintaining a POET
- Bottled Water (per DEC Policy)

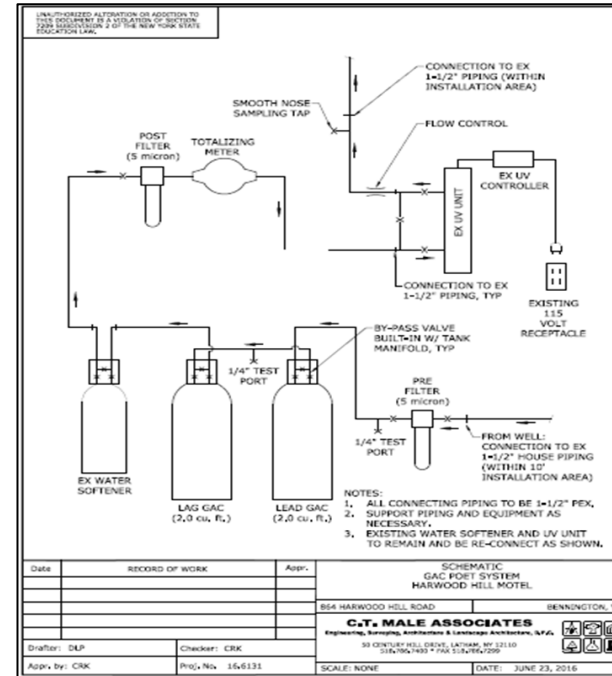


<https://www.horseheads.org/code/page/7-simple-steps-clean-water>

Drilling a replacement well with clean water



Point-Of-Entry-Treatment (POET) System



Water sample 1 above
current standard

- Resident(s) notified
- Bottled Water Delivery

Water Sample 2 above
current standard

- Bottled Water delivery
- Confirms presence of PFAS

POET Installation

- Discontinue bottled water
- Quarterly Monitoring
- Annual Maintenance

More information at:

<https://www.healthvermont.gov/environment/drinking-water/treating-pfas-drinking-water>

Bottled Water



<https://www.usgs.gov/media/images/bottled-water>



<https://distillata.com/blog/the-life-of-a-five-gallon-water-bottle/>

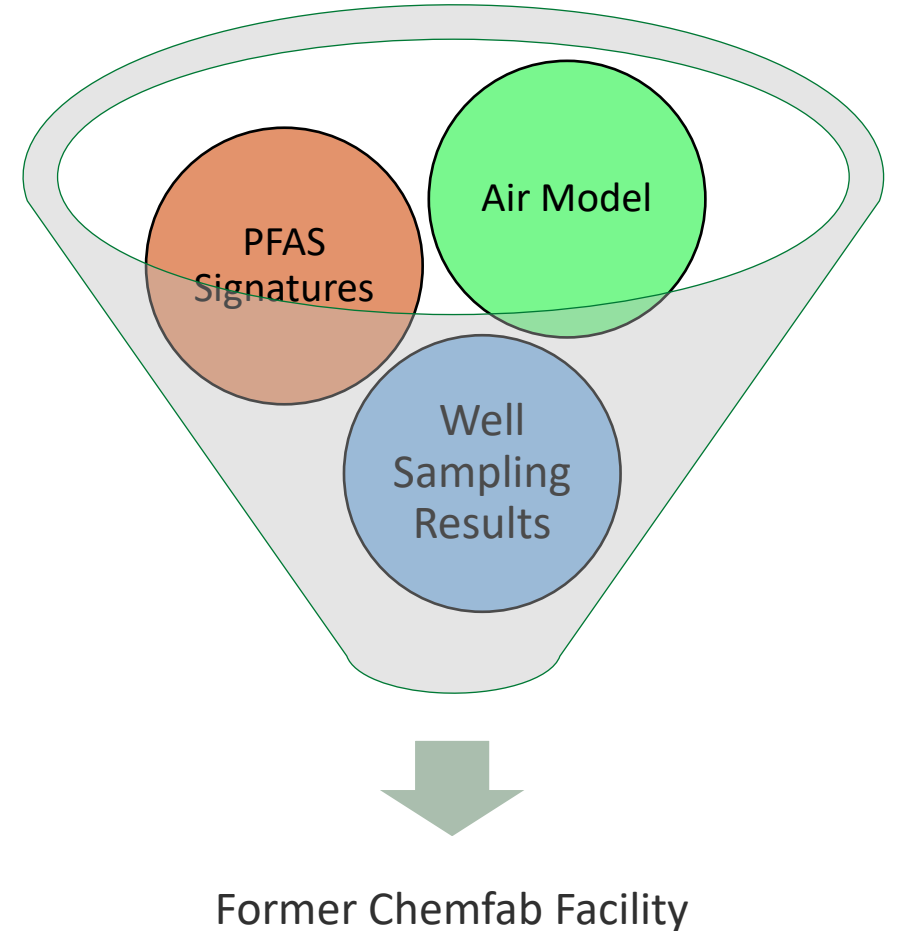
VT-5 Sum of PFAS = 15 ppt or greater ➡ Bottled Water offered per DEC policy

Conclusions & Next Steps

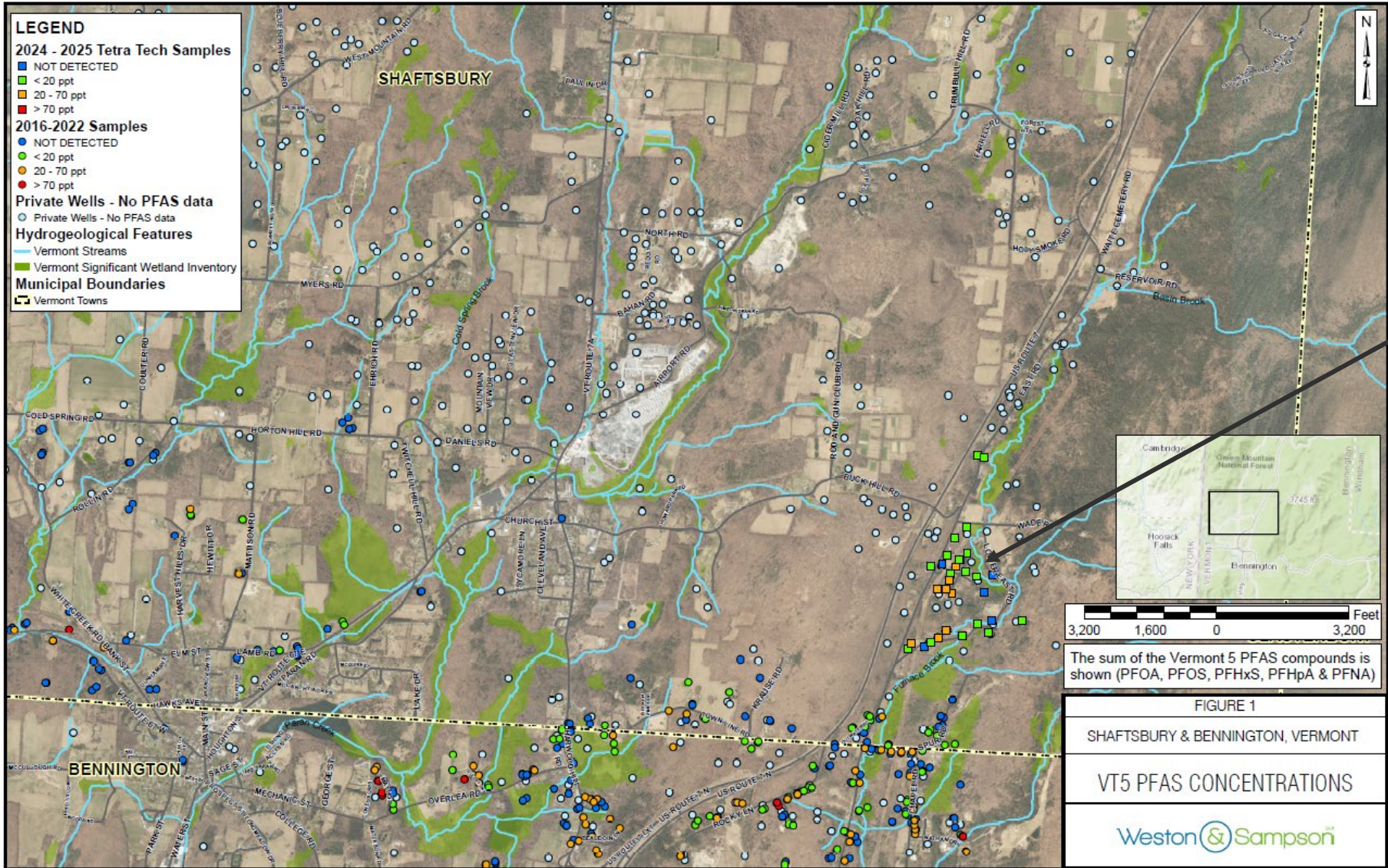


Conclusions & VT DEC Next Steps

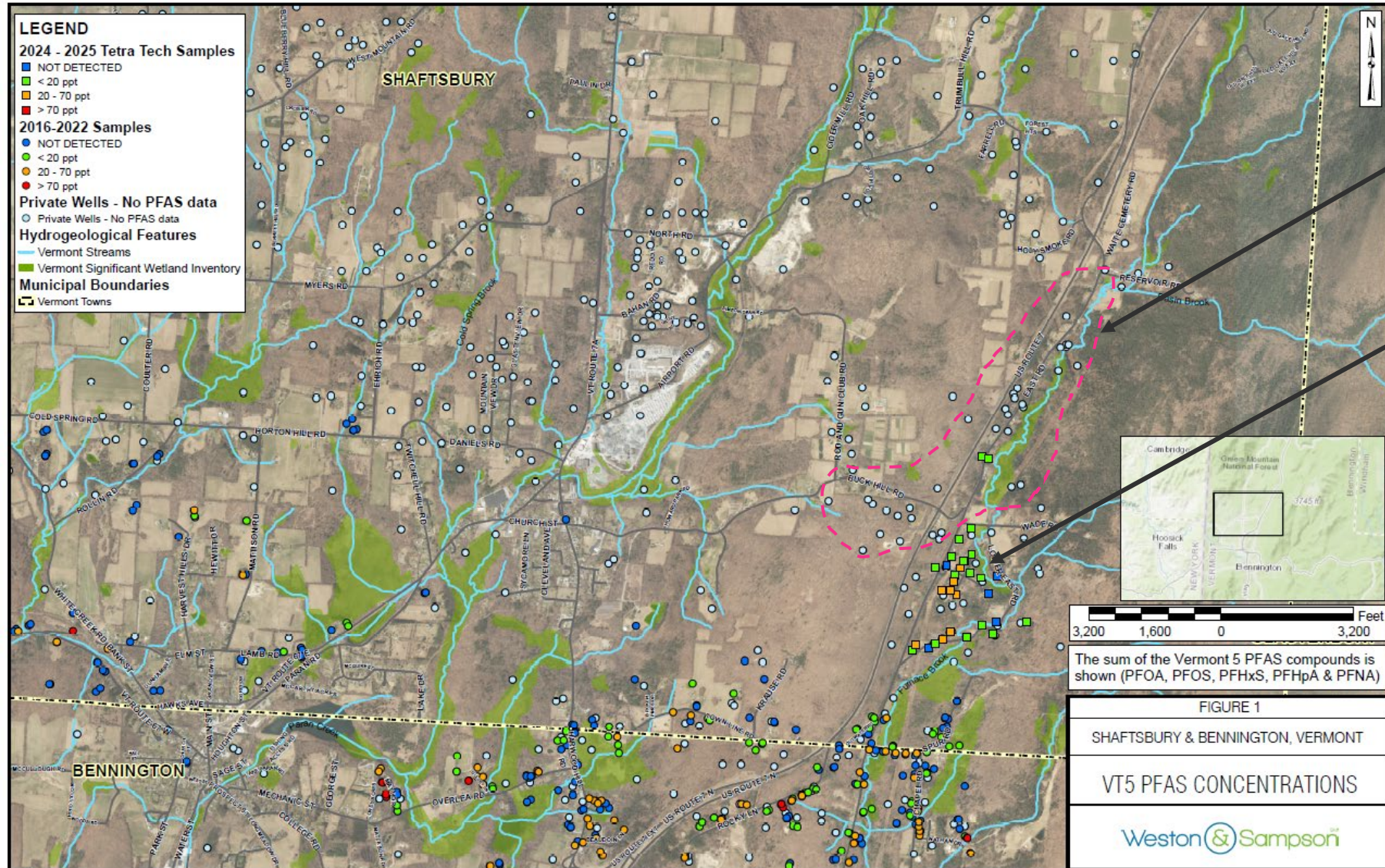
- **Conclusions:**
 - Using a few different mechanisms, we believe some of the impacts we're seeing are from the Former Chemfab facilities.
- **VT DEC In-Progress:**
 - Notified Saint-Gobain Performance Plastics
- **VT DEC Next steps:**
 - Continued Monitoring
 - Resample + Add new homes



Shaftsbury Wells Sampled 2016-2022 + 2023 - 2024



Future work:



Extent of
2025
sampling

SMS #2023-5344
(sampled starting
July 2023)

Questions?

Contact Information and Helpful Links

Name	Phone Number	Email
Richard Spiese (Site Manager – VT DEC)	(802) 249-5083	Richard.Spiese@vermont.gov
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Patricia Coppolino (Senior Program Manager - VT DEC)	(802) 249-5822	Patricia.Coppolino@vermont.gov
Vermont Dept of Health Helpline	(802) 693-0206	ANR.DWPFASInfo@vermont.gov

Looking for more information? Go here for updates and reports:

<https://dec.vermont.gov/pfas/vermont-pfoa-contamination-response/information-impacted-communities>

DEC Factsheet:

<https://dec.vermont.gov/sites/dec/files/documents/anr-dec-pfas-mcl-facatsheet-041024.pdf>

Extra Slides

Expanded Sampling Area: Southern Vermont

Summer
2023

- **500-well State-wide sampling effort:** Homes randomly selected around the state of Vermont to be sampled for PFAS
- **South of Route 9:** 2 homes with detections and 1 privately sampled
- **Shaftsbury:** 1 home with detections (Slightly north of the Bennington-Shaftsbury Town line)

Fall/Winter
2023

- **Site Investigations:**
 - South of Route 9: Weston & Sampson conducted Site Investigations (n = 70)
 - Shaftsbury: Atlas conducted Site Investigation (n = 16)
 - Impacted residences received Bottled Water and Point-of-Entry Treatments (POETs)

Spring/
Summer
2024

- **South of Route 9:** Additional Site Investigation (n = 131)
 - Sampling and reporting by Weston & Sampson
- **Shaftsbury:** Quarterly Monitoring (n = 24)
 - Sampling by Tetrattech
 - Reporting by Atlas

Fall 2024

- **Report submission by consultants:**
 - South of Route 9 - Weston & Sampson: Additional Site Investigation 2024
 - Shaftsbury – Atlas: PFAS Data Analysis Report

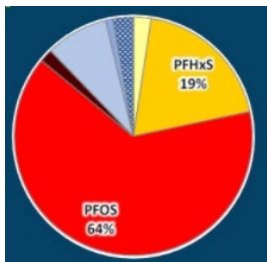
EPA Maximum Contaminant Levels (MCLs): Hazard Index

Chemical Compound	MCL (ppt = ng/L)
PFOA	4
PFOS	4
PFHxS	10
PFNA	10
HFPO-DA (aka GenX Chemicals)	10
Mixture (PFHxS, PFNA, HFPO-DA, PFBS)	1 Hazard Index

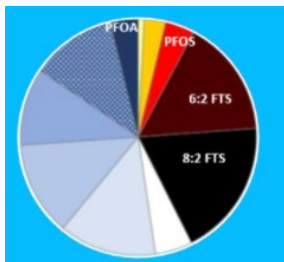
$$\text{Hazard Index} = \left(\frac{[\text{GenX}_{\text{water}}]}{[10 \text{ ppt}]} \right) + \left(\frac{[\text{PFBS}_{\text{water}}]}{[2000 \text{ ppt}]} \right) + \left(\frac{[\text{PFNA}_{\text{water}}]}{[10 \text{ ppt}]} \right) + \left(\frac{[\text{PFHxS}_{\text{water}}]}{[9.0 \text{ ppt}]} \right)$$

Examples of PFAS Forensic Signatures

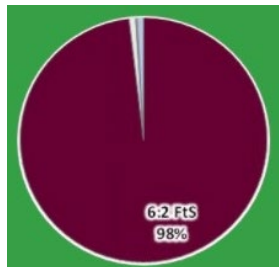
Legacy PFOS-based AFFF



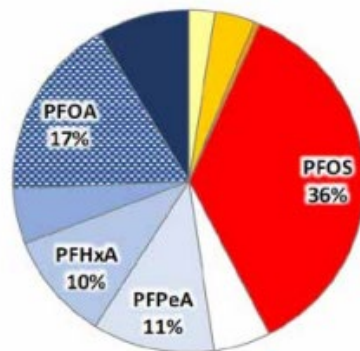
Legacy Fluorotelomer-based AFFF



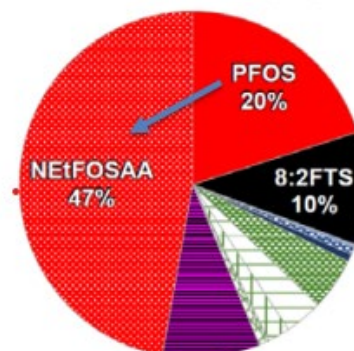
Modern Fluorotelomer AFFF



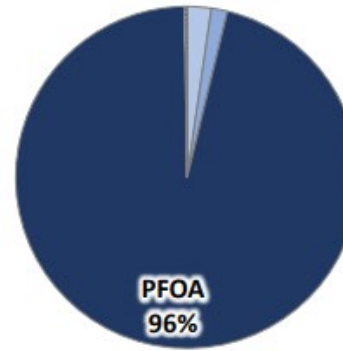
Car Detailing GW



Paper Mill Soil
Total = 572.04 ug/kg

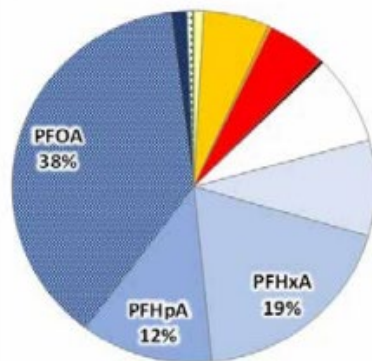


Plastic Manufacturing

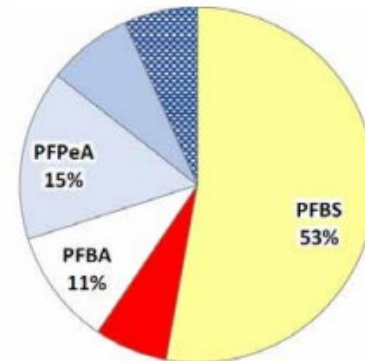


- PFBS - ND
- PFHxS - ND
- PFHpS - N/A
- PFOS - ND
- 6:2 FTS - N/A
- PFBA - N/A
- PFPeA - N/A
- PFHxA - 09
- PFHpA - 06
- PFOA - 380
- PFNA - 01

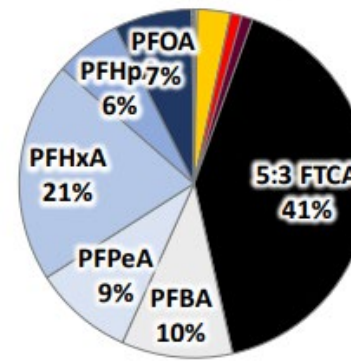
Landfill Groundwater



Private Septic GW



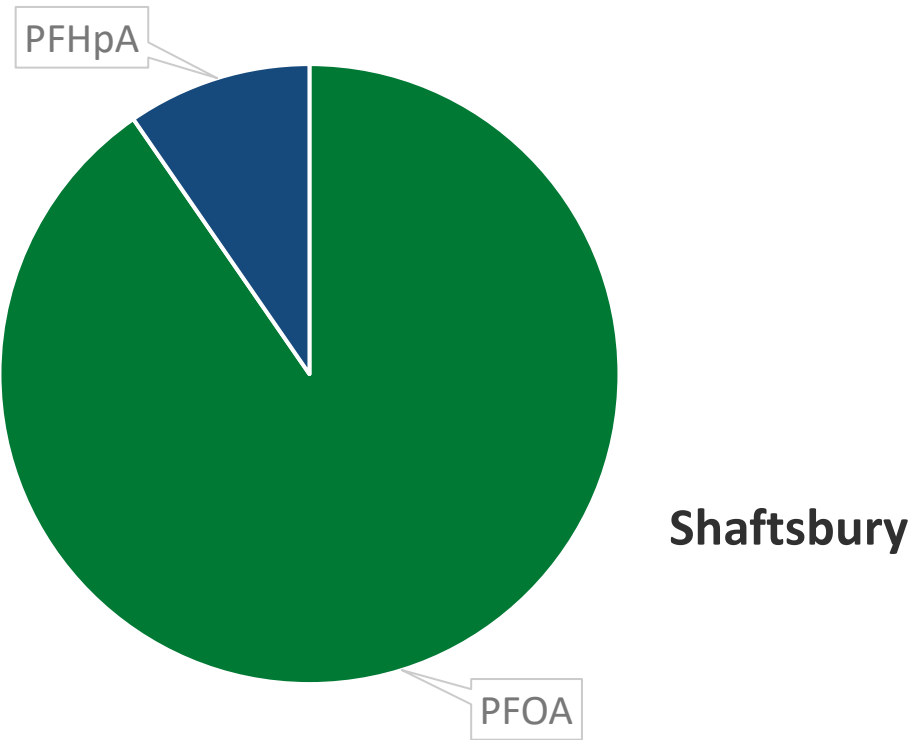
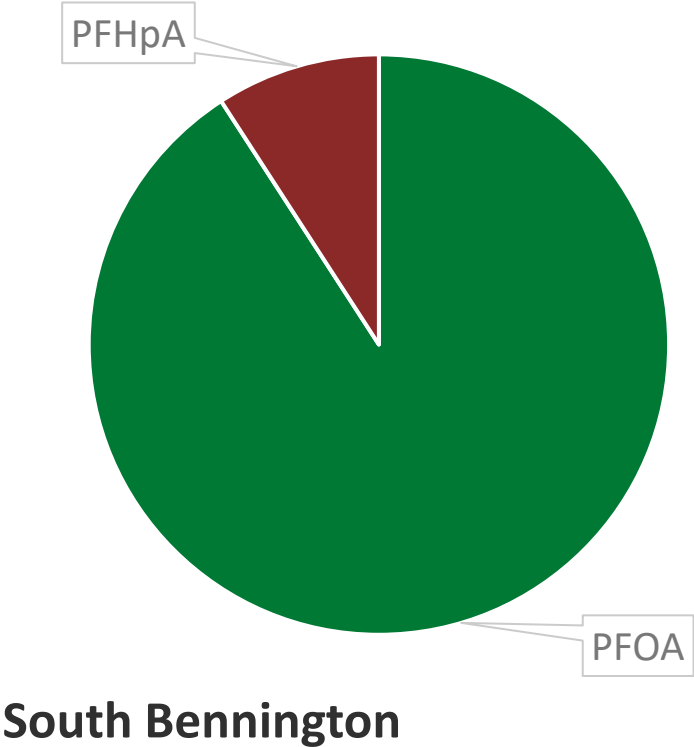
Landfill Leachate



- PFBS - 30
- PFHxS - 300
- PFOS - 100
- 6:2 FTS - 100
- 5:3 FTCA - 4,000
- PFBA - 1,000
- PFPeA - 900
- PFHxA - 2,000
- PFHpA - 600
- PFOA - 700
- PFNA - 20

<https://www.newmoa.org/wp-content/uploads/2024/07/EberleForensicsAugust2024.pdf>

Well Sampling: PFAS Results and Ratio Comparison



Location	% PFOA	% PFHpA
Southern Bennington	90.8	9.2
Shaftsbury	90.4	9.6