

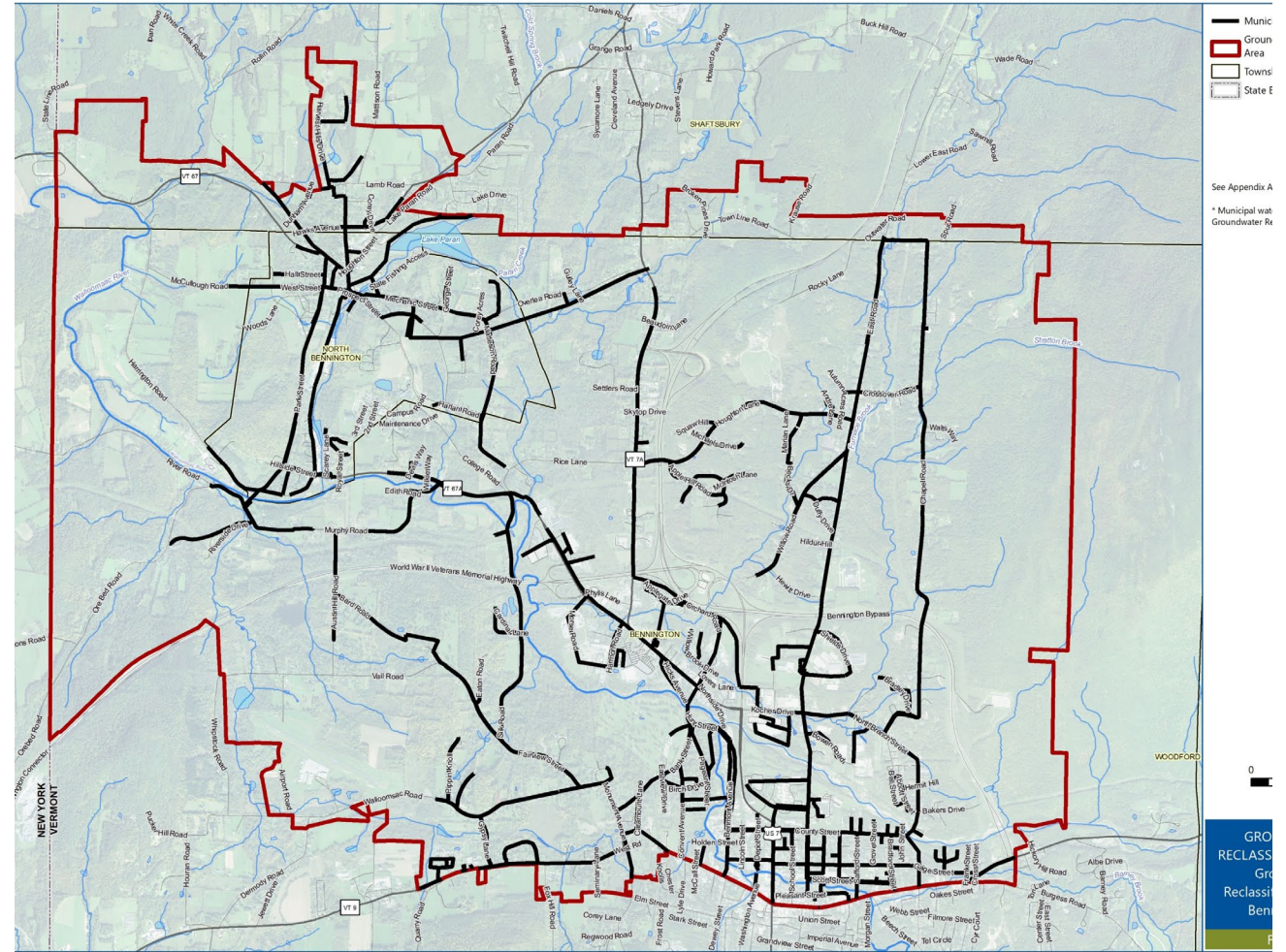
Groundwater Reclassification as an Institutional Control Bennington VT

April 5, 2022

PFAS Science Conference

VT Department of
Environmental Conservation

Within



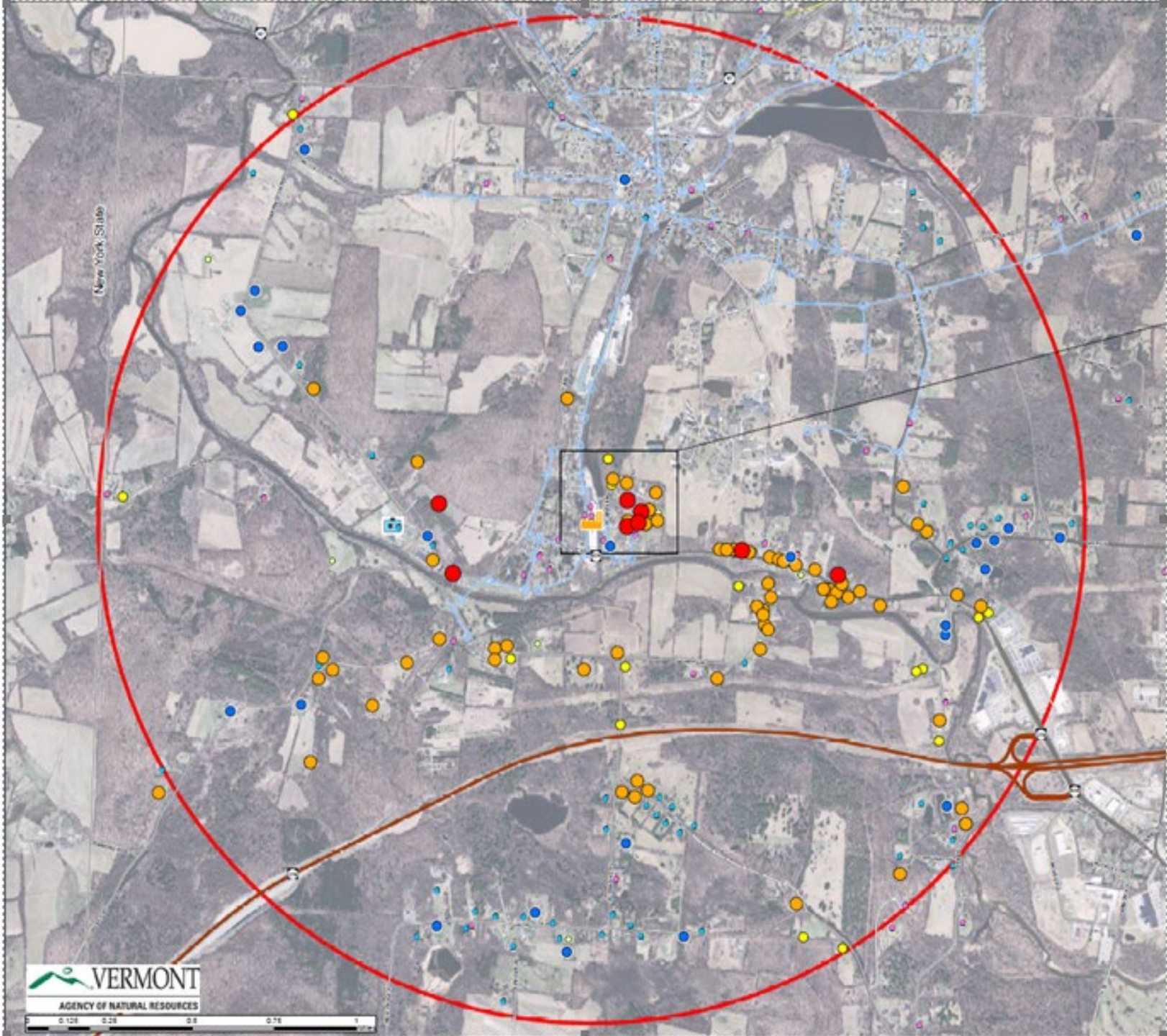
Presentation Outline

- Bennington-Area PFAS Response-**How we got here**
- Institutional Controls- Why Groundwater Reclassification?-**A Short History and overview**
- Groundwater Reclassification Process-Start, to Finish, and Beyond



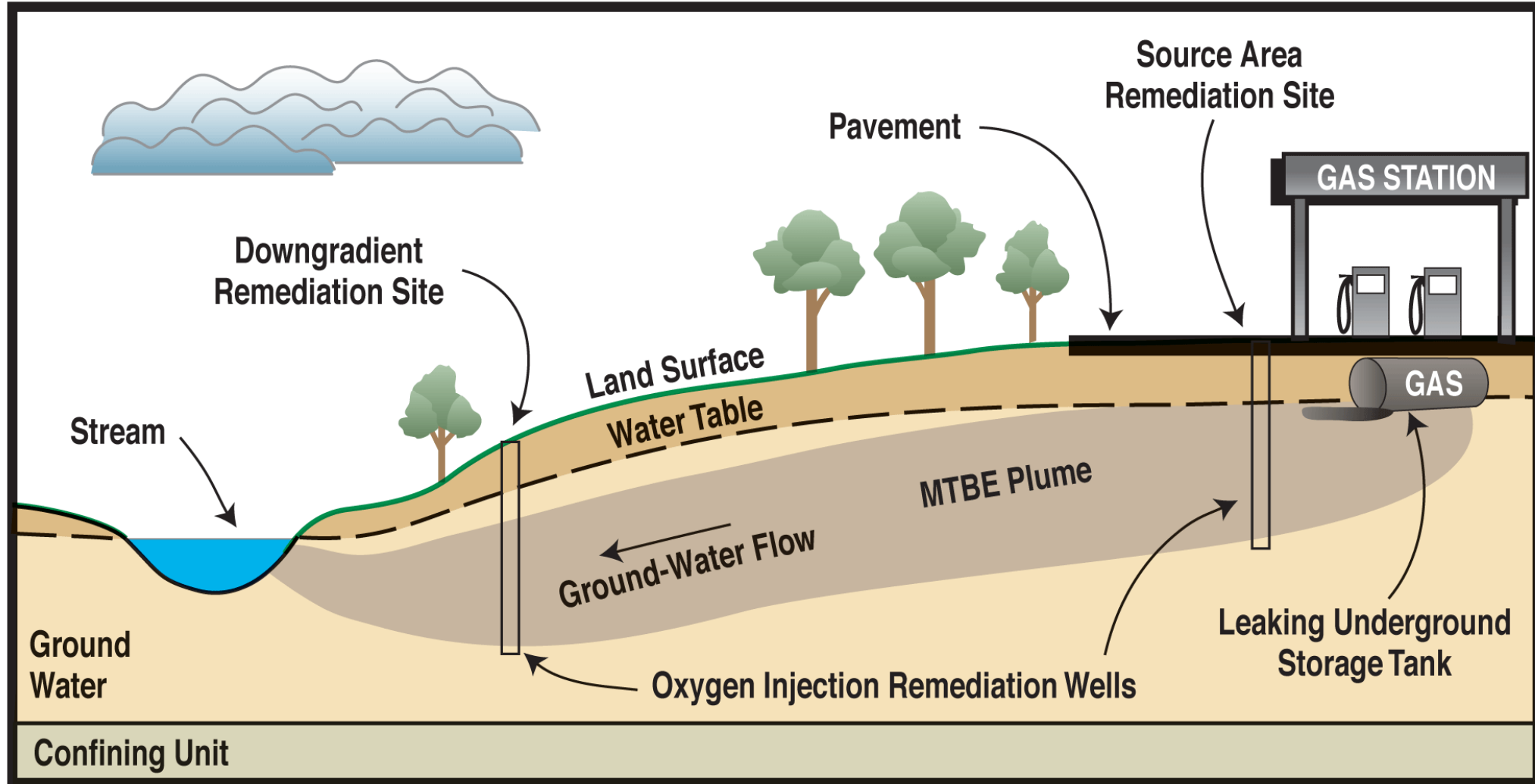
How we got here

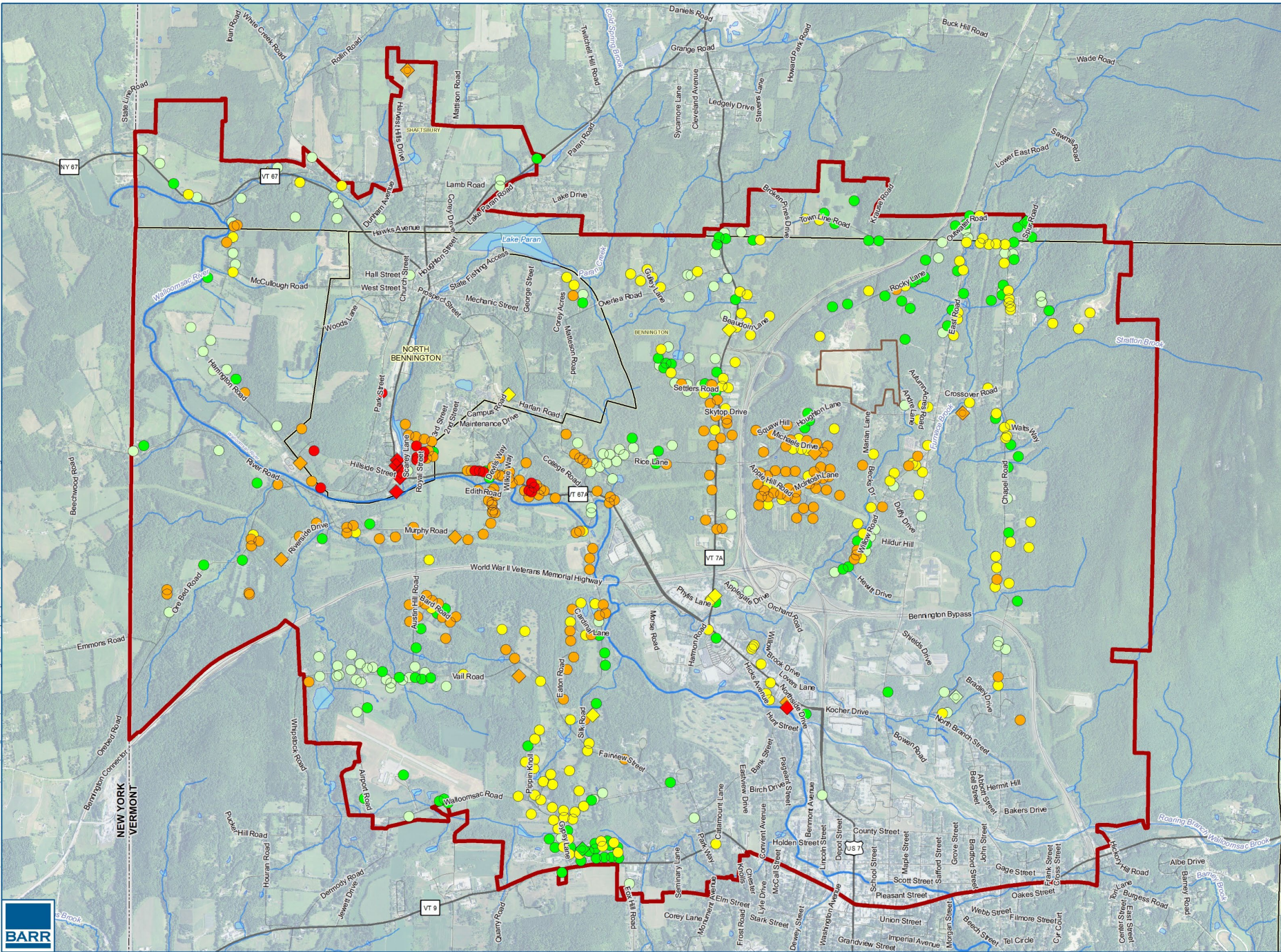
1. Began emergency response-sampling, bottled water, treatment system installation
2. Continued PFAS Response- site characterization, continued testing water supplies, and installing treatments systems where needed
3. 2017 and 2019 Settlement Agreements with Saint-Gobain
 - Outlined Obligations for areas getting Waterline extensions
 - Outlined Obligations for long-term monitoring and corrective action for areas not getting connected to municipal water



New York State

This is not your typical Site





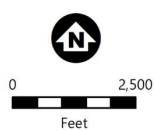
PFAS (ng/l), Max Value (as of 1/25/2021) *

- > 1000
- 100 - 1000
- 20 - 100
- < 20
- ND
- Water Well
- Compliance Point
- Current Class IV Groundwater
- Groundwater Reclassification Area
- Township/Village Boundary
- State Boundary

Notes:
PFAS: per- and poly-fluoroalkyl substances

* Includes the combined levels of perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), perfluorohexane sulfonic acid (PFHxS), perfluoroheptanoic acid (PFHpA), and perfluorononanoic acid (PFNA).

ng/l = parts per trillion (ppt)



PFAS CONCENTRATIONS IN GROUNDWATER
Groundwater
Reclassification Petition
Bennington, VT

FIGURE 4



Conceptual Site Model Fate and Transport

- Airborne transport and deposition a major pathway
- PFAS are stable and persistent
- PFAS movement are slowed through the vadose zone
- Studies vary about the degree of retention (sorption) in the soil.
- PFAS movement groundwater difficult to quantify given the complexity and uncertainty.



FINAL CORRECTIVE ACTION AND OPERABLE UNIT AREAS

0 1,000 2,000 3,000 4,000 Feet



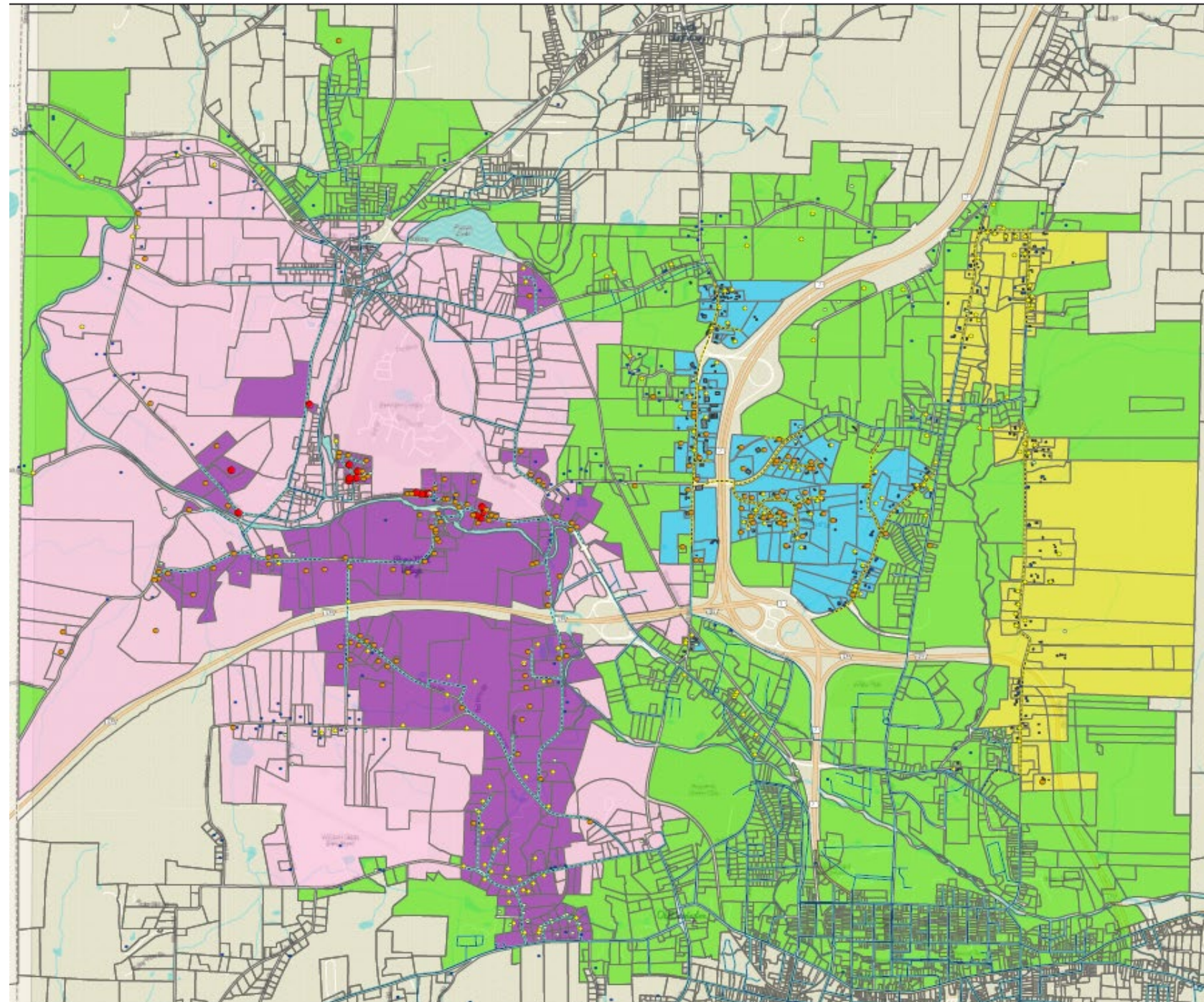
LEGEND

- | | |
|--|---|
| <p>Sampling Locations
Sample Results (ODL - 04/11/2019)</p> <ul style="list-style-type: none"> • Highest Concentration • <4.7 ppt (Original Detection Limit) • 4.7 - 20 ppt (VDH Advisory) • 20 - 100 ppt • 100 - 1000 ppt • >1000 ppt ■ Building Footprints | <p>Waterlines
Municipal Waterlines</p> <ul style="list-style-type: none"> — Status — Bailing — Installed 2017-2018 --- Proposed Waterlines |
|--|---|

- Parcels**
- Parcel Boundary
 - OU Boundary (March 28, 2019)**
 - CAAL OUA - Waterlines Connected Per Corrective Action
 - CAAL OUB - Includes Bailing Connectors AND Parcels Without Connectors
 - CAAL OUA - Proposed Waterline Connectors
 - CAAL OUB - Includes Bailing Connectors AND Parcels Without Connectors
 - CAAL OUC - Proposed Waterline Connectors
 - Outside CAA Boundary



Map Author: Erik Engstrom (VTANRGIS)
Map Date: 4/12/2019



Water Supply Well Sampling

- Just over 700 water supplies sampled
 - Over 500 wells had detections of the five targeted PFAS (PFOA, PFOS, PFHpA, PFNA, and PFHxS)
 - About 380 Wells above Vermont Health Advisory (VHA)/Vermont Groundwater Enforcement Standard (VGES) of 20 ppt for the five targeted PFAS
 - At one time treatment systems on most wells about Standards



Areas getting Waterlines

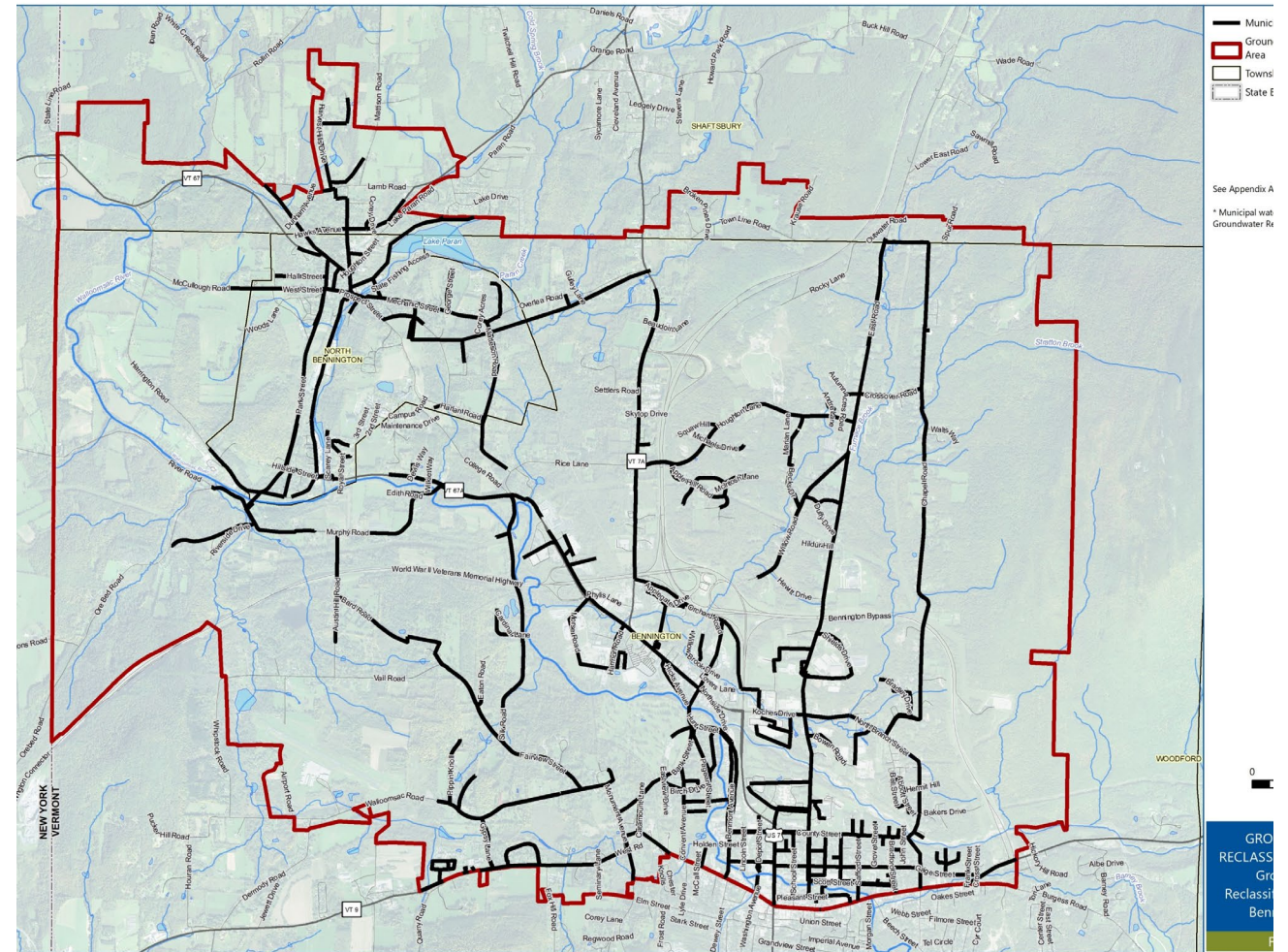
- About 480 residences or businesses eligible for connection-waterlines began late 2017
- 444 connected
- Waterline work completed in Fall 2021

Areas Not getting Waterlines

1. Ongoing Long-term Monitoring of wells 130 plus-currently twice a year-areas
2. Ongoing maintenance of POETs in areas not getting waterlines-
Thirty-three (33)
3. Installation and operation of five replacement wells-so far
4. Implement Institutional controls (Groundwater Reclassification) to reduce potential of new wells from being adversely affected by PFAS
5. Ongoing assessment and feasibility of potential long-term remedies

Why the Groundwater is Being Reclassified to a Class IV?

1. To Protect Human Health due to unacceptable levels of Per- and Polyfluoroalkyl substances (PFAS) in groundwater
2. Required by Regulations given PFAS above standard is expected to be in some parts of groundwater for 5+ years, likely decades
3. To address future groundwater use from new water supply wells
4. State Permits new water supply Wells. Reclassification give State Authority to prohibit, restrict or include conditions
5. Over 20 square miles of groundwater impacted-Other ICs-easements or municipal ordinances not practical



Groundwater Reclassification A Short History and Overview

- A Class IV designation means that the underlying groundwater, or at least a portion of it, is non-potable
- Groundwater by default is Class **III-suitable for most uses including, individual water supply, irrigation, agriculture and general industrial and commercial use**
- In 2017, Statute was changed so the Secretary had the authority to allow drinking wells in Class IV areas (if appropriate). Bennington is the first Class IV that allows Wells
- Groundwater Rule requires reclassification to a Class IV is contamination expected to persist over 5 plus years (mostly).
- **The Class IV designation protects public health, providing a notification to landowners, well drillers, and permitting agencies that groundwater (or at least a portion of the groundwater) is non-potable**

Groundwater Reclassification -A Short History and Overview (continued)

- There are currently 17 Class IV reclassifications in Vermont
- Bennington-area Reclassification first to allow new wells
- Anticipate future reclassification will allow new wells, if warranted. However, expect other reclassifications to not allow new drinking water wells depending on site conditions.
- The Reclassification of Groundwater must go through a robust public process, including notification to all property owners within and adjacent to the reclassification boundary

The Class IV Groundwater in Bennington Area accounted for the following:

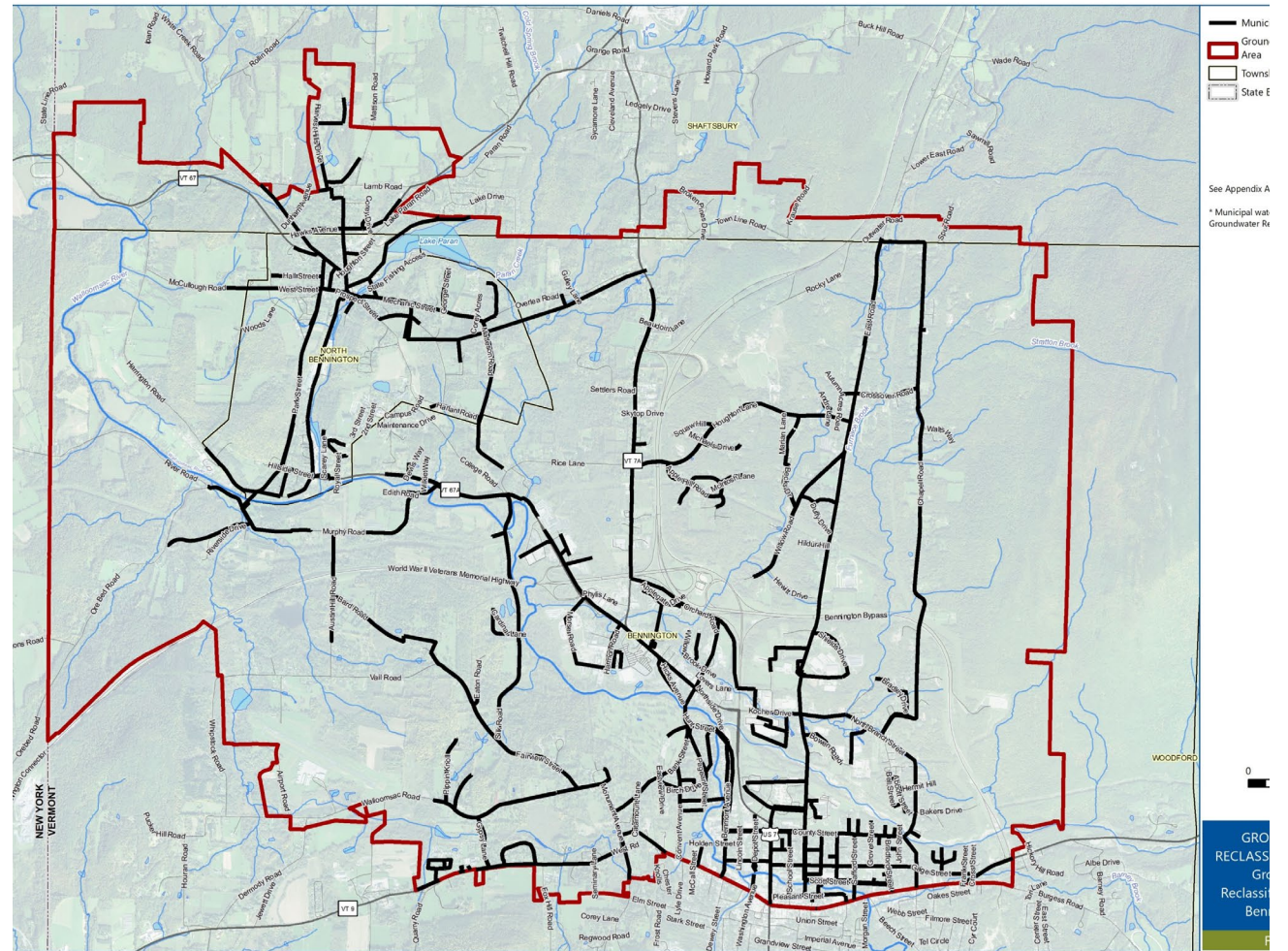
- Major source of PFAS-the leaching of PFAS through the soils, into groundwater from past air emissions.
- A high likelihood that PFAS is in the aquifer (particularly in the shallow groundwater) at levels above the standard.
- PFAS is predicted to persist for more than five years or longer in groundwater.
- Potable water can be found within reclassification as evidenced by the 130 plus wells that are non-detect for PFAS or below the standards.
- Installation of a well is the only feasible option for a water supply in some areas within the Class IV
- **Ensuring measures in place for future water supply wells**

Bennington Reclassification- Timeline

- Jan 2021 Petition determined administratively complete by VT DEC-submitted by Saint-Gobain's consultant
- Feb 2021 Draft Reclassification Order and petition released for public comment (Many Comments) including Groundwater Coordinating Committee
- March-May 2021-public outreach, multiple virtual meetings and even met with one citizen groups (outside of someone's backyard)
- May Meeting proposed changes to address concerns. Feedback from citizen groups and public officials that changes addressed their major concerns
- November 2021 Finalized Reclassification Order
- Placed reclassification area on ANR Atlas(GIS layers) and provided formal notification to:
 - All residences with the reclassification
 - Well Drillers
 - Local Town Officials, Realtors, attorneys, and Regional engineers (permitters for new wells)
 - Dedicated Website to Bennington Reclassification, including fact sheet and FAQ

How were the Boundaries Determined?

- Consistent with Corrective Action Boundaries, with one addition
- Collection and Analysis of data and Information summarized in 2018 Barr report, entitled, Conceptual Site Model Site Investigation Report: Bennington, Vermont
- Independent Analysis by Agency and their experts
- PFAS results of over 700 water supply wells



Public
Comments
focused
primarily on:

1. Re-sale values
2. Status of existing wells with PFAS below standards-Potable?
3. Status of wells in the future once PFAS levels diminish to below the standards
4. Clarification on when owner is responsible to install a new well following the well construction requirements proposed in the reclassification- (*new development or if need a new well other than due to PFAS contamination, such as the existing well goes dry*)

Formal
Reclassification
Order revised
in response to
Public
Comment

1. Clarified that the Class IV designation does not apply to existing water supplies with potable water and continue to test below the regulatory standard for PFAS
2. Specified the criteria on which a water supply that has or has had PFAS will be considered potable in the future, meaning that the Class IV designation would no longer apply to this water supply.
3. Clarified the conditions on which newly permitted wells are considered a potable water supply, meaning the Class IV designation does not apply.

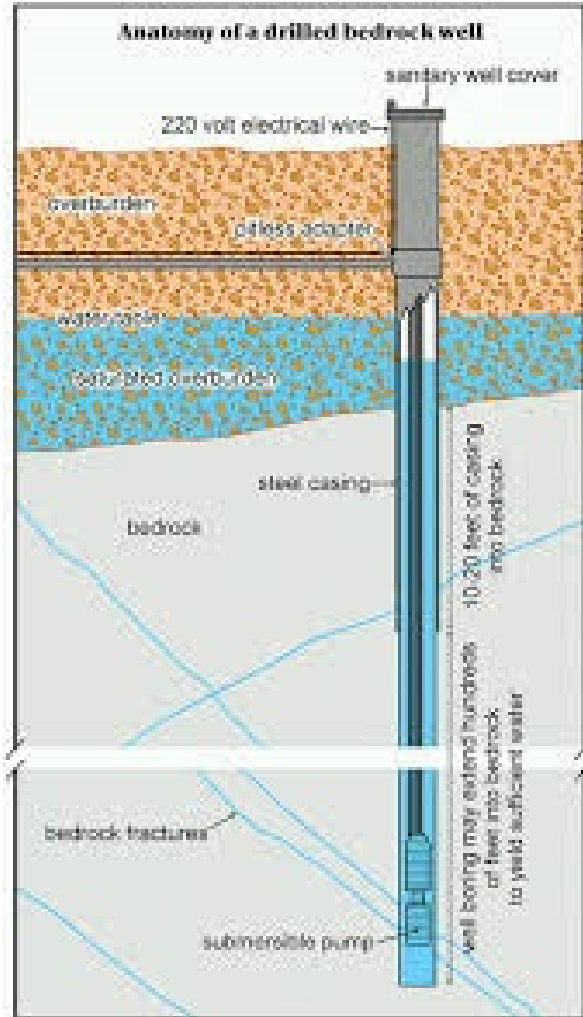
Other Highlights of Reclassification Order

- Provides criteria and restrictions in Permits for drilling new drinking water wells in the reclassification area
 - Prohibits drilling wells within 200' of an existing water line (some exceptions)
 - Well construction, monitoring and treatment requirements (if needed)
- Exemption in Wastewater system and Potable Water Supply Rules, for replacement wells does NOT Apply within a Class IV
- **New** overburden wells, springs, or shallow dug wells for drinking water wells are prohibited.
- Notifications requirements for non-potable wells (Agency of Agriculture, Food, and Market for agricultural wells and VT DEC Waste Management for all other types of non-potable wells)

What Does NOT Change with Reclassification

- Does NOT affect the use of existing wells
- Does NOT affect the ability for a new property owner to use an existing well
- Does NOT affect Saint-Gobain's obligation under the Settlement Agreements for Operational Unit B

Well Construction Requirements



- Casing Depth at least 50 feet below competent bedrock
- For properties with existing wells completed in bedrock, recommend replacement well casing be installed 30 feet below casing.
- Borehole diameter be such that it is 4 inches greater in diameter than the casing, e.g., 10-inch diameter borehole for a six-inch casing
- Grout casing
- Variance
It is known” that in some areas in Bennington installing casing into competent bedrock as described above is not possible. There is flexibility in the order to take in account extenuating circumstances.

Image-state of Maine

Best Management Practices Drilling and Well Development within Bennington Class IV

- Extracted groundwater or drilling fluids must be managed in a manner such that it does not migrate offsite (that, is the property where the well is located) as overland flow:
- Extracted groundwater or drilling fluids must be managed in a manner that it does NOT directly discharge into a surface water of the State; and.
- The construction of a shallow infiltration gallery, or an equivalent measure, if determined necessary, to prevent extracted groundwater water from discharge offsite as overland flow or directly into a water of the state.

If these best management practices are followed, then extracted groundwater and drilling fluids do not need to be managed as a hazardous waste

Closing

- Reclassification at this scale never anticipated
- Communication and Public Outreach Critical-Need a Plan
- Time and Labor intensive
- For this scale, Reclassification probable best Institutional Control to protect future **Use-restrictions ties to well permit**
- More Reclassifications Coming-stay tuned
- Do other States have similar processes?

More Information

- For more information about the Bennington reclassification go to our website <https://dec.vermont.gov/bennington-groundwater-reclassification>
 - The Petition and other supporting documentation
 - The Reclassification Order

General Reclassification Questions

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Permitting Questions within Reclassification Areas

DEC Regional Offices

ERT List of All Class IV Sites

<https://anrweb.vt.gov/DEC/ERT/GWReclassification.aspx>