

Meeting Minutes – Groundwater Coordinating Committee Meeting Minutes of the Private Well Workgroup January 16, 2020

Attendees: *By Phone* – Kira Jacobs, Mary Alber, Marjie Gale, Rosa Mastrocola

In Person – Carl Fuller, Chrissy Miller, Kasey Kathan, Silje Larsen, Patti Casey, Craig Heindel, Mike Nahmias, Rodney Pingree, David Wilcox, Scott Stewart, Diana Butler, Laura Woodard, Julia Boyles, Mark Johnson

Upcoming Events: Vermont Groundwater Association (Well Drillers Association) Annual Meeting – February 28th

C. Miller – VDH Updates Since Last Private Well Workgroup, presentation attached, discussion items of note below:

- Updates have been made to the VDH website based on feedback from the last meeting – this includes a new Act 161 page, and an additional fact sheet on locating a well tag that will be included with test kits.
- Looking to complete more outreach events after successful Marshfield Library event – suggestion to coordinate with VT Library association
- EPA Citizen Science Work – looking for a high school to work with – share Silje’s contact info with any that might be interested – see email for description of this work
- Town meeting outreach – suggestion to email town clerks copies of the fact sheets developed by VDH regarding testing recommendations for distribution on info/pamphlet tables
- VRWA (D. Butler) will be focusing on reaching out to southern Vermont towns and can help distribute info as well

C. Fuller – Presentation on the Regional Offices Role and managing failed supplies, discussion items of note below:

- Exemption Procedure – well drillers must follow the procedure, but it is up to the homeowner to file the exemption form – suggestion that this process be presented at the Feb 28th well driller association meeting
- Recommendation for locating wells – if there is a wastewater permit for the property, the associated site plans (available digitally) often include the well location
- “failed supply” not legally failed until it is posted to an ANR list – no list currently exists
- ?-what is the process if a water supply is impacted by a failing wastewater system – legal recourse is rare, typically the repair of the wastewater system is the resolution

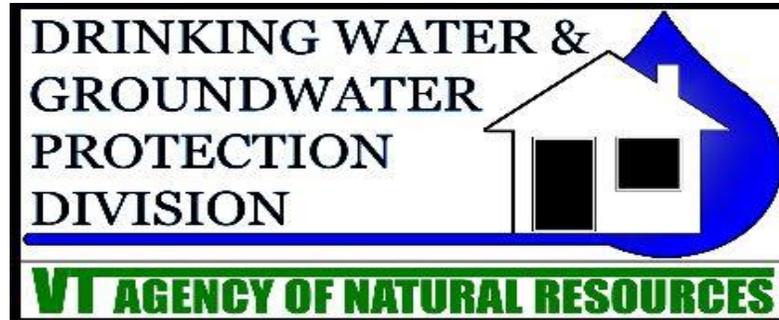
C. Heindel – Handout material on potential nitrate sources attached, discussion items of note below:

- Nitrate detection indicates some impact, even if not at the level of contamination
- K. Jacobs – recommended Karl Wenger to speak to nitrate impact attributed to forestry

S. Larsen – Presentation on Village Wastewater Solutions Work – Presentation attached, discussion items of note below:

- Is the contamination attributable to wastewater – using ‘tracers’ such as caffeine, prescription drugs, optical brighteners, field testing capability for screening of optical brighteners underway.
- For identification of vulnerable areas, suggest better utilization of surficial geology/till geochemistry available through VGS

Environmental Protection Rules Chapter 1 Wastewater System and Potable Water Supply Rules Effective April 12, 2019



Wastewater System and Potable Water Supply
Regions and Regional Office Locations

<http://dec.vermont.gov/water/ww-systems>



Environmental Protection Rules

Chapter 21 Water Supply Rule – revision date December 1, 2010

PUBLIC WATER SYSTEM means any system(s) or combination of systems owned or controlled by a person, that provides drinking water through pipes or other constructed conveyances to the public and that has at least fifteen (15) service connections or serves an average of at least twenty five (25) individuals daily for at least sixty (60) days out of the year.

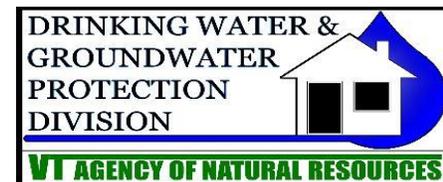
Environmental Protection Rules Chapter 1- Wastewater

System and Potable Water Supply Rules – effective April 12, 2019

Subchapter 2 – Definitions

(72) Potable Water Source – means a component of a potable water supply that withdraws or collects water from soil or bedrock. Potable water sources include springs; drilled, driven, or dug wells; and surface water.

(73) Potable Water Supply – means the source, treatment, and conveyance equipment used to provide water used or intended to be used for human consumption, including drinking, washing, bathing, the preparation of food, or laundering. This definition does not include any internal piping or plumbing except for mechanical systems, such as pump stations and storage tanks or lavatories, that are located inside a building or structure and that are integral to the operation of a potable water supply. This definition also does not include a potable water supply that is subject to regulation under 10 V.S.A. Chapter 56 (Public Water Systems). For the purposes of these Rules, water service lines are potable water supplies.



Subchapter 2 – Definitions (31)Failed Supply:

(A) a potable water supply:

(i) that has been tested for the following contaminants, in accordance with the protocols approved by the Secretary, and is found not to comply with the specified standard for one or more of the contaminants:

Arsenic 0.010 mg/L;

Escherichia coli (E.coli) None (absent or less than 1);

Total Coliform None (absent or less than 1);

Fluoride 4 mg/L;

Lead 0.015 mg/L;

Manganese 0.3 mg/L;

Nitrate 10 mg/L;

Nitrite 1 mg/L;

Uranium 20 ug/L (0.02 mg/L); and

Adjusted Gross Alpha Particle Activity (including radium 226 but excluding radon and uranium) 15 pCi/L

(31) Failed Supply – (A) Cont.

- (ii) that the Secretary affirmatively determines is not potable due to the presence of a contaminated site, a leaking underground storage tank, or other known sources of groundwater contamination or naturally occurring contaminants, and such determination has been posted on the Agency website; or
- (iii) that the Secretary affirmatively determines is providing an **insufficient quantity of water** to maintain the usual and customary uses of a building or structure or campground or to maintain its uses permitted in a wastewater system and potable water supply permit, and such determination has been posted on the Agency website.

(31) Failed Supply – Cont'

(B) Notwithstanding the provisions above, a potable water supply shall not be a failed supply if:

(i) these effects can be and are remedied solely by a minor repair or minor replacement; or

(ii) these effects have lasted for only a brief period of time, the cause of the failure has been determined to be an unusual and non-recurring event, and the supply has recovered from the state of failure. Supplies which have recurring, continuing, or seasonal failures shall be considered to be failed supplies.

Subchapter 2 – Definitions

(74) Potable Water Supply Presumptive Isolation Zone – means an area delineated around a potable water source in which a component of a leachfield with a design flow of less than 2000 gallons per day is presumed to be unable to be located. It takes the size and shape identified in § 1-1105(a)

Table 11-1

Horizontal Isolation Distances, in Feet for Potential Sources of Contamination

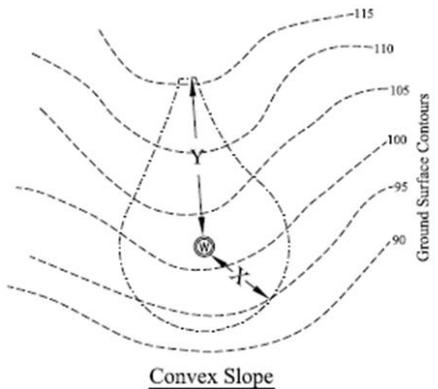
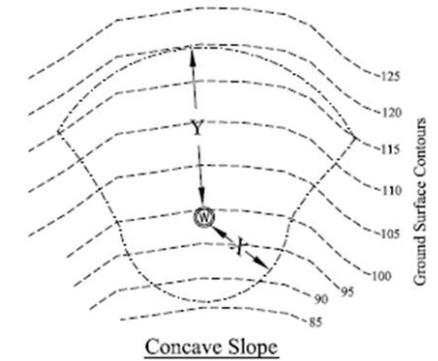
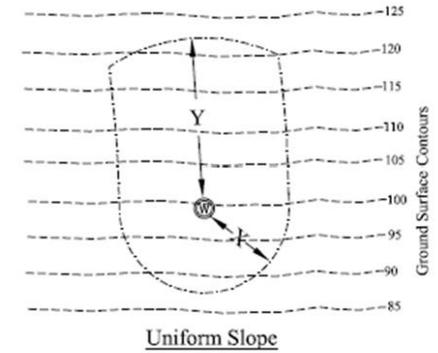
Potential Source of Contamination	Potable Water Sources in Bedrock or Confined Surficial Aquifer	Potable Water Sources in Unconfined Surficial Aquifer	Water Service Lines and Water Service Pipes (Pressure)	Water Service Lines and Water Service Pipes (Suction)	Water Storage Tanks (Atmospheric Below Ground Surface)
Agriculture cropland	100	200	25	100	50
Buildings or structures, porches, foundations of buildings or structures	5	5	N/A	N/A	N/A
Cemeteries	100	150	25	100	50
Composting sites (commercial or agricultural) ¹	200	300	25	300	50
Concentrated livestock holding areas barnyard ²	200	500	25	100	50
Driveways (fewer than 3 residences)	5	10	N/A	N/A	10
Driveways (3 or more residences), roadways, parking lots	25	25	N/A	N/A	25
Fertilizer or pesticide storage structures (buried tank of any size; above ground tank >1,500 gallons; dry or liquid; and piping serving a non-residential facility)	100	200	50	200	50
Fuel oil, gasoline & other petroleum tanks and piping (not including liquefied petroleum gas tank)	25	100	25	100	50
Herbicide or pesticide application on utility right of way where herbicides or pesticides either have been applied in the last 12 months or may be applied within the next 12 months ³	100	200	25	200	100

Leachfields (proposed, existing, or permitted)	Requires isolation zone (See Table 11-2)		25	100	100
	50	100	25	50	50
Manure storage systems, above ground ²	50	100	25	50	50
Manure storage systems, in-ground concrete or geosynthetic lined ²	100	200	25	200	100
Manure storage system, earthen lined ²	200	500	25	200	200
Salvage yards ⁴	300 ⁸	300 ⁸	25	300	100
Sanitary sewer collection lines and sanitary sewer service lines	50	75	Distances and requirements established in § 1-1204 apply in lieu of this Section		50
Silage storages	50	75	25	75	50
Solid waste transfer facilities ⁵	100	200	25	200	100
Stormwater conveyance/treatment/control practice (lined)	10	10	10	10	10
Stormwater conveyance/treatment/control practice (unlined and subsurface systems)	100	150	10	150	25
Storm sewers	10	50	Distances and requirements established in § 1-1204 apply in lieu of this Section		10
Surface water, normal high water elevation ⁶	10	25	N/A	N/A	25
Wastewater disposal spray area and lagoons	200	300	50	300	100
Wastewater tanks (proposed, existing, or permitted) ⁷	Requires isolation zone (See Table 11-2)		25	50	50
Wells that are not potable water sources (e.g., irrigation wells, geothermal wells)	100	100	N/A	N/A	N/A

Table 11-2
 Distances, in Feet,
 Used to Create
 Isolation Zones
 Around
 Components of
 Wastewater
 Systems and
 Replacement Areas

Drinking Water Sources (by gallons per minutes design rate)		Proposed, Existing, or Permitted Leachfields and Proposed or Permitted Replacement Areas (< 2000 gallons per day design flow)	Proposed, Existing, or Permitted Leachfields and Proposed or Permitted Replacement Areas (≥ 2000 to < 6500 gallons per day design flow)	Proposed, Existing, or Permitted Leachfields and Proposed or Permitted Replacement Areas (≥ 6500 gallons per day or more design flow)	Proposed, Existing, or Permitted Wastewater Tanks ¹
Potable water sources in bedrock or confined surficial aquifer	≤ 2.0	X = 100 Y = 200	X = 150 Y = 300	X = 200 Y = 1000	X = 50 Y = 50
	> 2.0 and ≤ 5.0	X = 150 Y = 300	X = 150 Y = 300	X = 200 Y = 1000	
	> 5.0 and ≤ 8.0	X = 200 Y = 400	X = 200 Y = 400	X = 200 Y = 1000	
	> 8.0	X = 200 Y = 1000			
Potable water sources in an unconfined surficial aquifer	≤ 8.0	X = 150 Y = 500	X = 150 Y = 1000	X = 200 Y = 1000	X = 75 Y = 75
	> 8.0	X = 200 Y = 1000			

Example for Drawing Isolation Zone Around a Drinking Water Source



§ 1-1113 Water Quality

- (a) When a permit authorizes **the construction** of a groundwater potable water source, the **physical modification** of an existing groundwater potable water source, or an action that **increases the design flow** of, or **modifies other operational requirements** of, a groundwater potable water source, the potable water source **shall be sampled** for the following substances, and any water treatment system required pursuant to Subsection (d) installed, prior to any water use authorized in the permit:
- (1) each primary and secondary contaminant listed in Tables 11-5 and 11-6; and
 - (2) any substance with a groundwater enforcement standard in the Groundwater Protection Rule and Strategy that the Secretary determines may be present in the source.

Subsections (b) and (c) describe when and who can do the sampling

PERMIT CONDITION - POTABLE WATER SUPPLY

- Prior to the use of the potable water supply, the permittee shall test the water for Arsenic, Escherichia coli (E. coli), Fluoride, Lead, Manganese, Nitrate as N, Nitrite as N, Total Coliform Bacteria, Uranium, Adjusted Gross Alpha Particle Activity, Chloride, Sodium, Iron, Odor and pH. All water quality tests shall be conducted at a laboratory certified by the Vermont Department of Health (a list of which can be found on the VDH website). Results of the water tests shall be submitted to the Drinking Water and Groundwater Protection Division and the Vermont Department of Health prior to use

1-1113 Water Quality – subsection (d)

- If the results of water sampling conducted at any time on a proposed , existing or permitted groundwater potable water source, **except those serving only one single-family residence**, identify the presence of a primary contaminant at a concentration that exceeds the standard for the contaminant identified in Table 11-5 or identify the presence of a substance at a level exceeding the groundwater enforcement standards in the Groundwater Protection Rule and Strategy:

1-1113 Water Quality – subsection (d)

(1) The potable water supply may be re-tested and determined not to require water treatment pursuant to the following process:

(A) Protocol prepared by a designer for re-testing the potable water source shall be submitted to the Secretary.

(B) The potable water source shall be retested pursuant to a Secretary approved protocol and information shall be provided to the Secretary that is sufficient for the Secretary to reach a determination under Subsection (d)(1)(C).

(C) Water treatment shall not be required if the Secretary determines that the concentration of the contaminant has lasted for only a brief period of time, the cause of the exceedance has been determined to be an unusual and non-recurring event, and the contaminant is unlikely to exist in the potable water source at a concentration that exceeds the standard.

1-1113 Water Quality – subsection (d)

- (2) Except where the Secretary has reached a determination pursuant to Subsection (d)(1) that no water treatment is necessary, the person who owns the lot on which is located the building or structure or campground that is served by the potable water supply shall:
- (A) obtain a permit or permit amendment for the installation of, unless subject to a permit exemption in § 1-304, a water treatment system that eliminates or reduces the concentration of the contaminant in the potable water source to below the standard; or
 - (B) obtain a permit or permit amendment for a new potable water source.

1-1113 Water quality – subsection (d)

- Note: The presence of a primary contaminant in a potable water supply at a concentration that exceeds the standard for the contaminant identified in Table 11-5, or the presence of a substance at a level exceeding the groundwater enforcement standards in the Groundwater Protection Rule and Strategy, is a health concern for those drinking or otherwise consuming the water. While the Secretary does not require a landowner with a groundwater potable water source serving only one single-family residence to install a water treatment system or to seek a new potable water source when contamination is identified, the Secretary recommends the landowner do so.

Water Quality § 1-1113

Table 11-5

Primary Contaminant Standards for Potable
Water Supplies

Primary Contaminants	Standards
Arsenic	0.010 mg/L
Escherichia coli (E.coli)	0 (absent or less than 1)
Fluoride	4 mg/L
Lead	0.015 mg/L
Manganese	0.3 mg/L
Nitrate as N	10 mg/L
Nitrite as N	1.0 mg/L
Total Coliform Bacteria	0 (absent or less than 1)
Uranium	0.020 ug/L
Adjusted Gross Alpha Particle Activity (including radium 226 but excluding radon and uranium)	15 pCi/L

Water Quality § 1-1113

Table 11-6

Secondary Contaminant Standards for Potable
Water Supplies

Secondary Contaminants	Standards
Chloride	250 mg/L
Sodium	250 mg/L
Iron	0.3 mg/L
Odor	3 threshold odor number
pH	6.5 to 8.5

1-304 Permit Exemptions

- (15) The construction of a replacement supply serving **only one single-family residence on a lot** with no other buildings or structures and with no campground, provided:
- (A) the replacement supply will not be located in an area classified by the Secretary as a Class IV groundwater area;
 - (B) the replacement supply does not utilize surface water as the potable water source;
 - (C) there is not a change in use of the single-family residence to also be a childcare facility;
 - (D) if the replacement supply is a water service line and a booster pump will be installed in the single-family residence, the technical standards for the booster pump design in § 1-1111(d) are met (Secretary approval for the installation of the booster pump is not required);
 - (E) a form provided by the Secretary that corresponds to the type of replacement supply is recorded and indexed in the land records of the municipality where the single-family residence is located, and, if different, where the replacement supply will be located; and
 - (F) water sampling that complies with § 1-1113(b) and (c) is conducted prior to any consumptive use of the water from the replacement supply.

Replacement Supply Exemption Form

- <https://dec.vermont.gov/sites/dec/files/dwgwp/ro/pdf/2019.04.18%20Replacement%20Supply%20Exemption%20Form.pdf>

Also review section 1-802 Variances.

**POTENTIAL SOURCES OF NITRATE
From Non-Agricultural Sources**

**Private Well Workgroup
Groundwater Coordinating Committee**

Jan. 16, 2020

Typical Nitrate Concentrations in Non-Impacted Groundwater:

In the northeast, nitrate [NO₃] concentrations in groundwater that is not impacted by significant nitrate sources [natural or otherwise] range from “non-detected” [typically, 0.020 mg/L reporting or detection level by testing laboratories] to about 1.5 mg/L to 2.0 mg/L. I consider NO₃ concentrations greater than about 2.0 mg/L as indicating some sort of impact.

My suggested “impacted” threshold should be considered in comparison to the federal MCL of 10 mg/L [Maximum Contaminant Level], which is a health impact value. It has nothing to do with potential impacts, or comparisons of NO₃ concentrations relative to non-impacted background concentrations.

So: groundwater can be impacted by NO₃ without that impact being as high as the MCL. I also consider that the federal MCL value of 10 mg/L should not be considered as a threshold to evaluate “impact”. Also, the concept of “contaminated” versus “impacted” is worth considering – are they the same thing?

Investigation: An investigation of nitrate impacts from non-agricultural sources would include consideration of potential activities that could potentially release nitrates, or any form of nitrogen, to soils or groundwater.

1. Human wastewater
2. Land-applied septage [solids from septic tanks]
3. Land-applied biosolids from WW treatment plant sludge
4. Other land-applied commercial / industrial wastes, such as from dairy processing plants, breweries, etc.
5. Blasting or explosives residue [explosives are “ANFO” – ammonium nitrate + fuel oil”. There can be some nitrogen residue from incomplete destruction by the explosion, which can oxidize to NO₃]
6. Agricultural petrochemical manufacturers and dealers [fertilizer]
7. Composting facilities [if not considered “agricultural”]
8. Landfill leachate
9. Waste from wild animals, if in very high concentrations [gatherings of geese, etc.]
10. Waste from domestic animals, if in very high concentrations [dog parks?]
11. Fish hatchery wastewater
12. Major areas of ongoing soil disturbance, such as gravel pits, quarries

Craig Heindel, Sr. Hydrogeologist
Waite-Heindel Environmental Management
Burlington, VT
cheindel@gmavt.net; 802-860-9400 x102

[U:\ADMIN - WHEM\Groundwater Coordinating Committee\Private Well Workgroup 2020\
]Potential Non-Ag NO₃ Sources - C.Heindel, 01.16.2020.docx

Multi-objective partnership - an example from Vermont

Harrisburg, May 2019



VERMONT

DEPARTMENT OF HEALTH

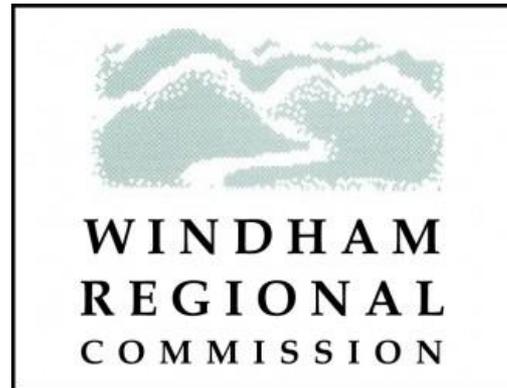
What?

Vermont Village Wastewater Solutions

- Supporting communities with water infrastructure planning and financing**



Committed to the future of rural communities.



Why?

- ✓ Support community planning and economic development
- ✓ Protect public health
- ✓ Protect the environment
- ✓ Make Villages climate change resilient



What are Your Community Goals?



- Revitalize village businesses
- Redevelop and reuse existing buildings
- Improve housing options
- Enable new development on vacant sites
- Retain value of existing homes and businesses
- Protect existing drinking water supplies
- ...

What do we know?

- ✓ 63% of Vermont's Villages rely on septic systems
- ✓ 54% of Vermont's Villages rely on private wells
- ✓ Working with rural villages with no centralized water or wastewater infrastructure

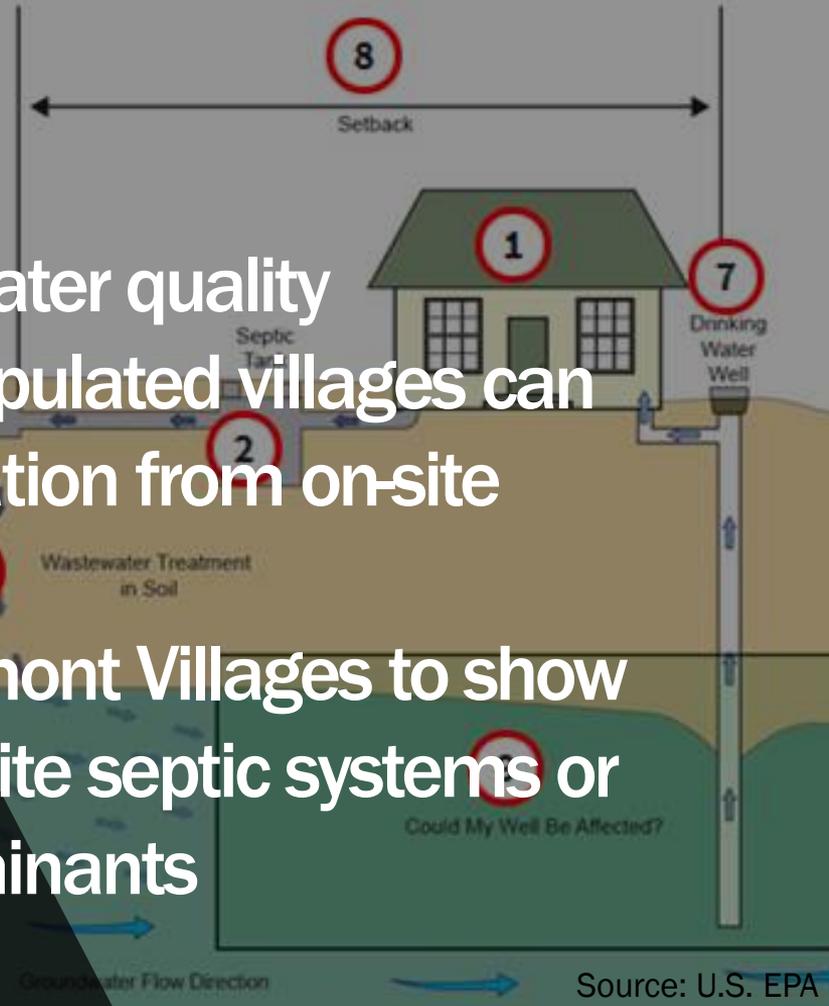
Legend

State Overview

- None - 167
- Sewer Only - 15
- Water Only - 52
- Water and Sewer - 101

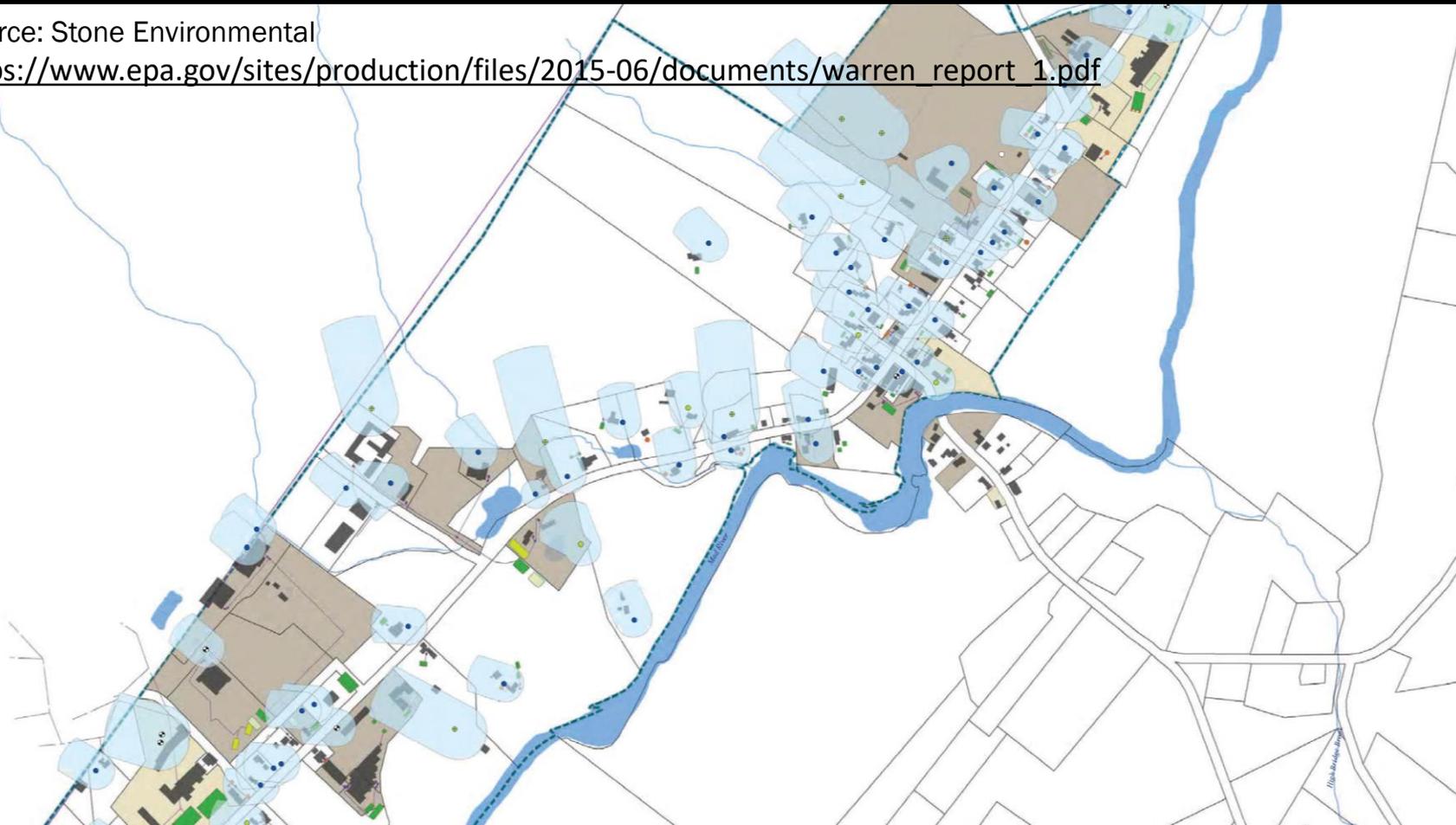
Why water testing?

- ✓ Understand local drinking water quality
- ✓ Private wells in “densely” populated villages can be susceptible to contamination from on-site septic systems
- ✓ Lack of data from rural Vermont Villages to show the risk associated with on-site septic systems or other drinking water contaminants



Source: Stone Environmental

https://www.epa.gov/sites/production/files/2015-06/documents/warren_report_1.pdf



Why water testing?

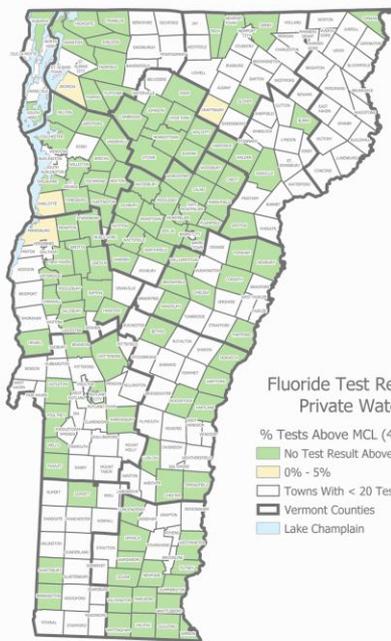


- ✓ Help village residents think about the safety of their private well in general



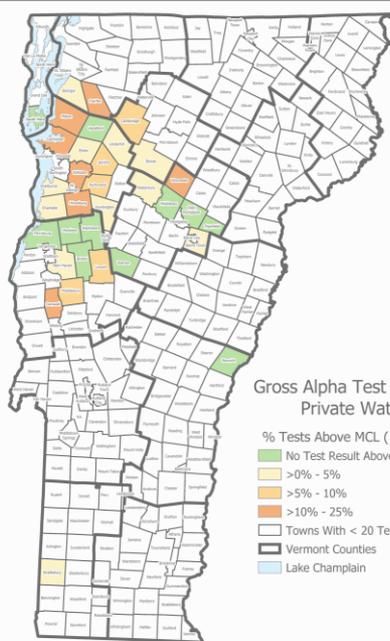
Additional benefits

Fluoride in Private Water by Town:
Percent of Tests Above the MCL
(Maximum Contaminant Level = 4 mg/L)



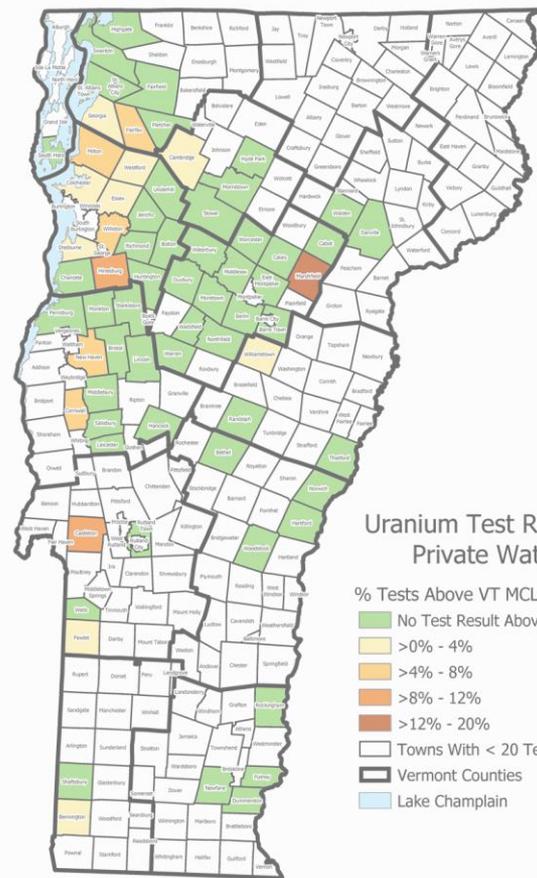
Data Source: Vermont Department of Health Laboratory 2012-2018

Gross Alpha in Private Water by Town:
Percent of Tests Above the MCL
(Maximum Contaminant Level = 15 pCi/L)



Data Source: Vermont Department of Health Laboratory 2011-2018

Uranium in Private Water by Town:
Percent of Tests Above the VT MCL
(Vermont Maximum Contaminant Level = 20 µg/L)



Data Source: Vermont Department of Health Laboratory 2011-2018

Additional benefits

VERMONT OFFICIAL STATE WEBSITE



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VILLAGE WASTEWATER SOLUTIONS



Organizing Village Wastewater Solutions - A Workbook for Community Leaders

This [workbook](#) is designed to help in organizing a village wastewater committee and initiating solutions for your village.

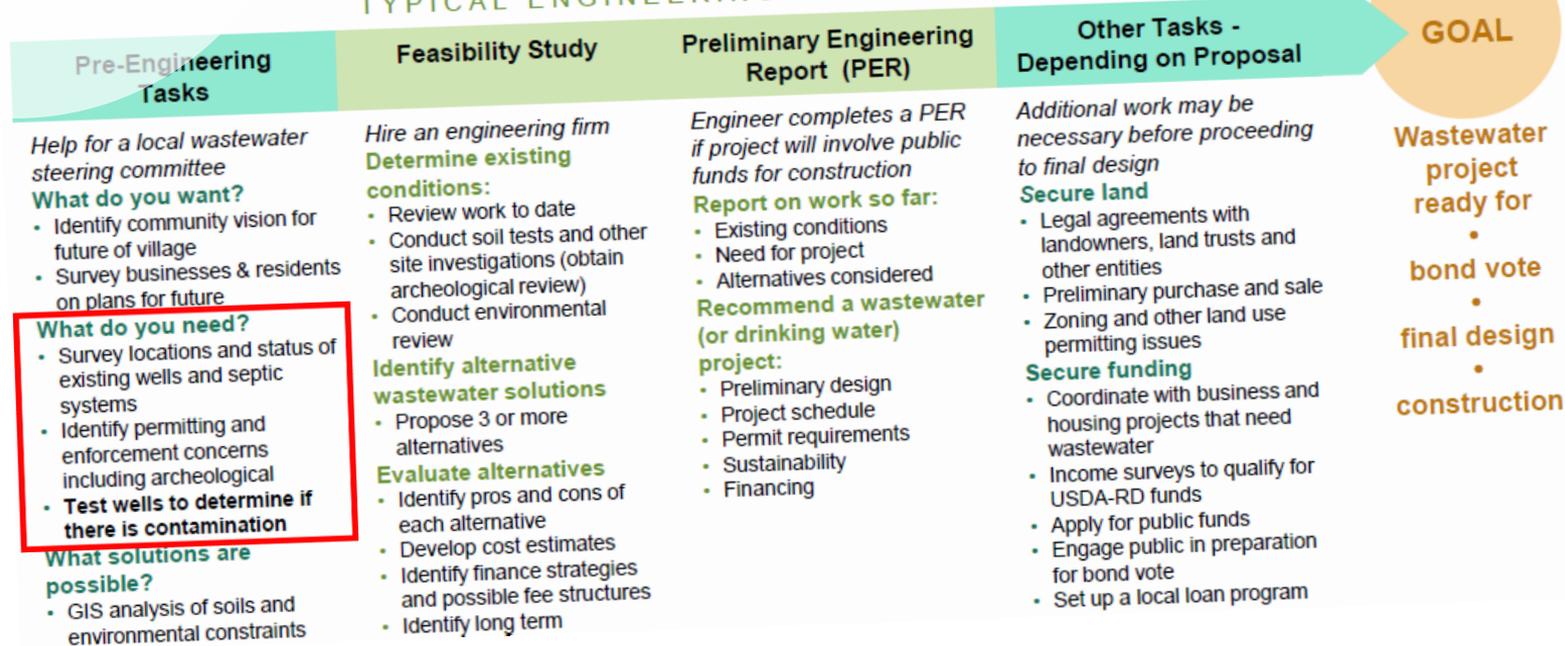
Wastewater Solutions for Burke and Wolcott - Northern Border Regional Commission

Villages form the heart of Vermont's rural communities, but more than 150 villages lack sewer systems, hampering revitalization. To overcome this challenge, a Northern Border Regional Commission (NBRC) grant to the Vermont Department of Environmental Conservation (DEC) will help identify cost effective wastewater solutions for the villages of Wolcott, East Burke, and West Burke, providing models for other villages throughout Vermont. An [NBRC flyer](#) provides further information about this initiative.

How?

Path to Wastewater Solutions for Villages

TYPICAL ENGINEERING STUDIES



How?

- ✓ Coordinate with partners involved in water testing
RCAP Solutions, regional partner/village
representative, Health Department Laboratory
- ✓ Schedule day and time to sample water with
Villagers





Village Drinking Water/Wastewater Project

Free Drinking Water Testing Request Form

Please fill out the following information and mail this form to the address below.

Today's date: _____

First and Last Name: _____

Phone Number: _____ Email Address: _____

Physical Address of Property Being Tested

Street _____

Town _____ State _____ Zip code _____

Mailing Address (if different than physical address)

Street _____

Town _____ State _____ Zip code _____

My drinking water comes from (please check one option below):

a dug well a drilled well a spring I do not know

Well tag identification Number (if applicable): _____

Well depth (if known?): _____

Do you treat your water? If so, how? (Examples include RO, softener, UV, particle filter, other?)



Agency of Human Services
Department of Health
Environmental Health
108 Cherry Street - PO Box 70
Burlington, VT 05402-0070
HealthVermont.gov
toll-free: 800-439-9629

Dear Village Resident:

The Vermont Department of Health is offering free drinking water test kits to private well owners in your village. This offer is provided through the Vermont Village Wastewater Solutions Initiative, which assists villages without community wastewater systems.

In Vermont, 55% of households rely on septic systems and over 200 villages do not have sewer systems. This can affect a village's economic development, public health and environmental benefits. To overcome this challenge, the Vermont Department of Environmental Conservation (DEC) and initiative partners are looking to help identify cost-effective water and wastewater solutions for your village.

As part of the overall initiative, it is important to understand local drinking water quality. Drinking water in villages served by private wells can be susceptible to contamination from historic land use and development. If a septic system is located close to a drinking water well, the water quality could be compromised. Other sources of contamination could be related to bedrock geology, which means the contaminants are naturally occurring.

To determine whether nearby septic systems or other naturally occurring contaminants are affecting your well, the Health Department is offering you a **free** drinking water test kit. This test kit normally costs \$159.

The drinking water test kit include tests for:

1. Bacteria (total coliform/E. coli)
2. Inorganic chemicals (arsenic, chloride, copper, fluoride, hardness, iron, lead, manganese, nitrate, nitrite, sodium and uranium)
3. Gross alpha radiation

Testing is the only way of knowing whether contaminants are in your drinking water and if they are affecting the village as a whole. The results will help inform you of your drinking water quality, help identify your village's needs, and help inform state policy and rulemaking to support solutions for community wastewater issues.

We will be scheduling the water sampling at your house Wednesday, February 13 or

Thursday, February 14

Please fill out this online document with your name, address and phone number to reach you. If the time slot is taken, you will need to pick another time for the water sampling: go.vt.gov/2/DIV4W

Please have the document filled out by Thursday, February 7.



HOME WELL WATER TESTING FAQ:



1. Who is conducting these well tests, and why do they matter to the Town of Grafton?

As part of efforts in the village to continue looking at all available options for water and wastewater infrastructure, the Water and Wastewater Study Committee has partnered with the Windham Regional Commission, Vermont Department of Health, and RCAP Solutions to conduct well water tests for free. The tests normally cost a well owner \$159.

These well tests can give both the project partners and homeowners important information about the status of village water systems. Results from these well tests will help the Health Department get a better understanding of the quality of well water throughout the State, especially in compact village centers where septic systems may be close to drinking water wells and affect the water quality. This testing effort may be the beginning of more regular testing that would be recommended in the village to monitor well water quality as septic systems continue to age.

2. Will information about my drinking water well be shared?

All Vermont certified drinking water laboratories, including the Health Department Laboratory, are required to submit drinking water test results to the Health Department, where it becomes public information. You can call the laboratory and request your test results at any time, but the information is not publicly searchable.

After testing, you will receive your results via email or hard copy. A summary of all the testing conducted will also be created and will include collective data on the overall status of well water, rather than identifying specific properties that may have

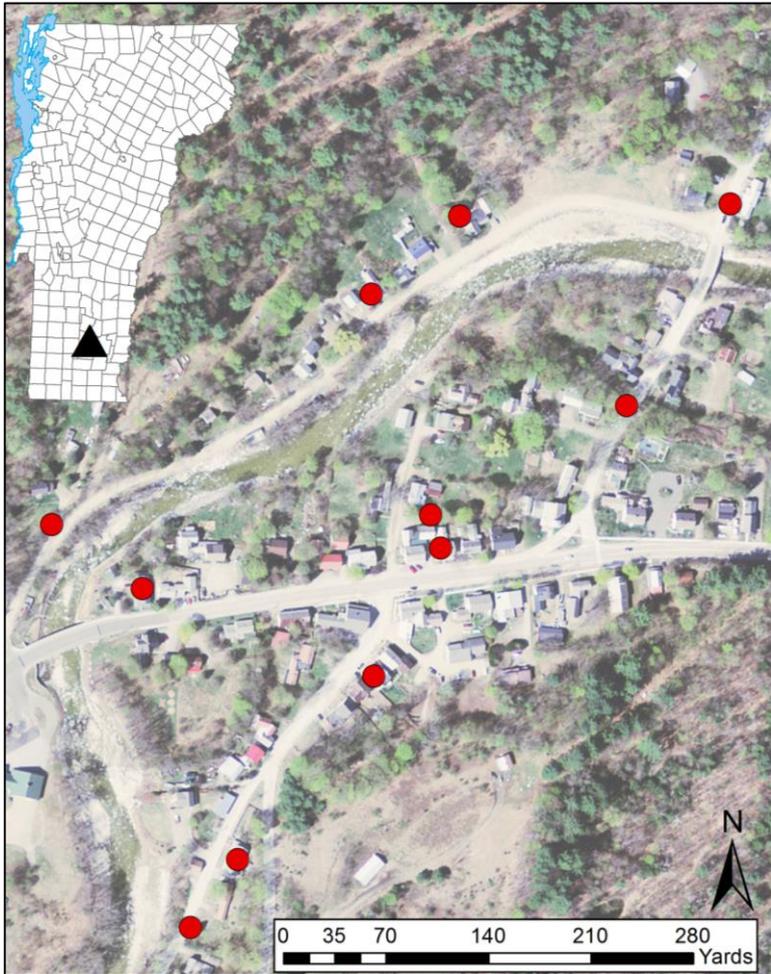
Recommended test:

- Bacteria (total coliform/E. coli)
- Gross alpha radiation
- Inorganic chemicals (arsenic, chloride, copper, fluoride, hardness, iron, lead, manganese, nitrate, nitrite, sodium and uranium)



An example from Jamaica:

- ✓ **11 homes**
- ✓ **Mark Johnson, RCAP Solutions scheduled water sampling, sampled water and brought it back to the lab**



Test	Comments
#1	Do they have a softener?
#2	No comment
#3	Radium, Iron, (manganese is close to VHA)
#4	No comment
#5	Total coliform
#6	Radium, Septic/Roadsalt? (chloride, nitrate and TC), lead (do a first draw)
#7	Total coliform
#8	Lead (do a first draw), Roadsalt??
#9	No comment
#10	No comment
#11	Total coliform, Iron, Manganese

General results:

Town	Total Coliform		E.coli		90%	95%	max	% > RL	% > SMCL	n	
	Detected	n	Detected	n							
Grafton	18%	60	0%	60							
Jamaica	36%	11	0%	11							
Marlboro	22%	9	0%	9							
Westminster West	30%	10	0%	10							
West Burke	45%	20	0%	20							
West Dummerston	0%	6	0%	6							
Vermont	32%	23940	4%	23940							
Chloride											
Town	min	5%	25%	50%	75%	90%	95%	max	% > RL	% > SMCL	n
Grafton	0	0	0	5.00	41.75	122.20	150.20	172.00	52%	0%	60
Jamaica	0	0	0	0.00	19.00	53.00	93.50	134.00	45%	0%	11
Marlboro	0	0	0	0.00	0.00	144.60	343.80	543.00	22%	11%	9
Westminster West	0	0	0	3.00	28.25	35.50	51.25	67.00	50%	0%	10
West Burke	0	0	8	15.50	41.25	53.80	73.00	130.00	85%	0%	20
West Dummerston	0	0	0	7.00	30.50	82.00	105.00	128.00	50%	0%	6
Vermont	0	0	0	0.00	15.00	59.30	120.00	3262.00	42%	2%	7388
Nitrate											
Town	min	5%	Q1	median	Q3	90%	95%	max	% > RL	% > MCL	n
Grafton	0	0	0	0	0.00	1.00	1.56	1.98	17%	0%	60
Jamaica	0	0	0	0	0.00	0.00	1.95	3.90	9%	0%	11
Marlboro	0	0	0	0	0.00	1.28	1.73	2.18	22%	0%	9
Westminster West	0	0	0	0	0.43	1.06	2.80	4.54	30%	0%	10
West Burke	0	0	0	0	0.00	0.84	0.91	1.51	15%	0%	20
West Dummerston	0	0	0	0	1.63	2.59	2.80	3.01	33%	0%	6
Vermont	0	0	0	0	0.00	1.30	2.50	36.40	21%	0.4%	8993

Moving forward

- ✓ **Can we improve the testing to gain more insight?**
 - Dye tracers
 - Optical brightener detection
 - Bromide (Cl/Br ratio)
- ✓ **What does the data tell us?**
 - Can we draw any generalized conclusions
- ✓ **What to look for when identifying vulnerable villages?**
 - What data is available

Example: Results from a private well



<u>Test</u>	<u>Anions</u>	<u>Date/Time of Analysis</u>	01/07/2020 11:45	
		<u>Test Method</u>	EPA 300.0	
<u>Analyte</u>	<u>Final Result</u>	<u>Units</u>	<u>Limit</u>	
Fluoride	<0.10	mg/L	4.0	MCL
Nitrate as N	2.82	mg/L	10.0	MCL
Nitrite as N	<0.10	mg/L	1.0	MCL

Test Anions Date/Time of Analysis 01/08/2020 14:42
Test Method EPA 300.0

<u>Analyte</u>	<u>Final Result</u>	<u>Units</u>	<u>Limit</u>	
Chloride	467	mg/L	250	SMCL

The result for Chloride is greater than the Secondary Maximum Contaminant Level of 250 mg/L. Chloride may indicate that other contaminants are present in the water.

For guidance and treatment recommendations, please visit www.healthvermont.gov/water-contaminants. If you have any further questions, please call 802-863-7220 or 800-439-8550 (toll-free in Vermont).

Test Hardness (EDTA) Date/Time of Analysis 01/07/2020
Test Method SM 2340 C

<u>Analyte</u>	<u>Final Result</u>	<u>Units</u>	<u>Limit</u>
Total Hardness by	259	mg/L	*

* 151 mg/L to 300 mg/L = Hard Water

Test Iron by Flame AA Date/Time of Analysis 01/08/2020 2:00:
Test Method SM 3111 (B)

<u>Analyte</u>	<u>Final Result</u>	<u>Units</u>	<u>Limit</u>
Iron	<0.10	mg/L	0.3 SMCL

Test Metals by ICPMS Date/Time of Analysis 01/08/2020 12:02
Test Method EPA 200.8

<u>Analyte</u>	<u>Final Result</u>	<u>Units</u>	<u>Limit</u>
Arsenic	<0.001	mg/L	0.010 MCL
Copper	<0.02	mg/L	1.3 AL
Lead	<0.001	mg/L	0.015 AL and 0.001 VHA
Manganese	<0.005	mg/L	0.05 SMCL and 0.300 VHA
Uranium	0.001	mg/L	0.020 VMCL

Test Sodium by Flame AA Date/Time of Analysis 01/08/2020 2:53:
Test Method SM 3500-Na B

<u>Analyte</u>	<u>Final Result</u>	<u>Units</u>	<u>Limit</u>
Sodium	282	mg/L	250 SMCL

The result for Sodium is greater than the Secondary Maximum Contaminant Level of 250 mg/L. If you are on a low-salt diet, you should talk with your doctor about it.

For guidance and treatment recommendations, please visit www.healthvermont.gov/water-contaminants. If you have any further questions, please call 802-863-7220 or 800-439-8550 (toll-free in Vermont).

Question?

Thank you

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Senior Water Resources Engineer



VERMONT

DEPARTMENT OF HEALTH