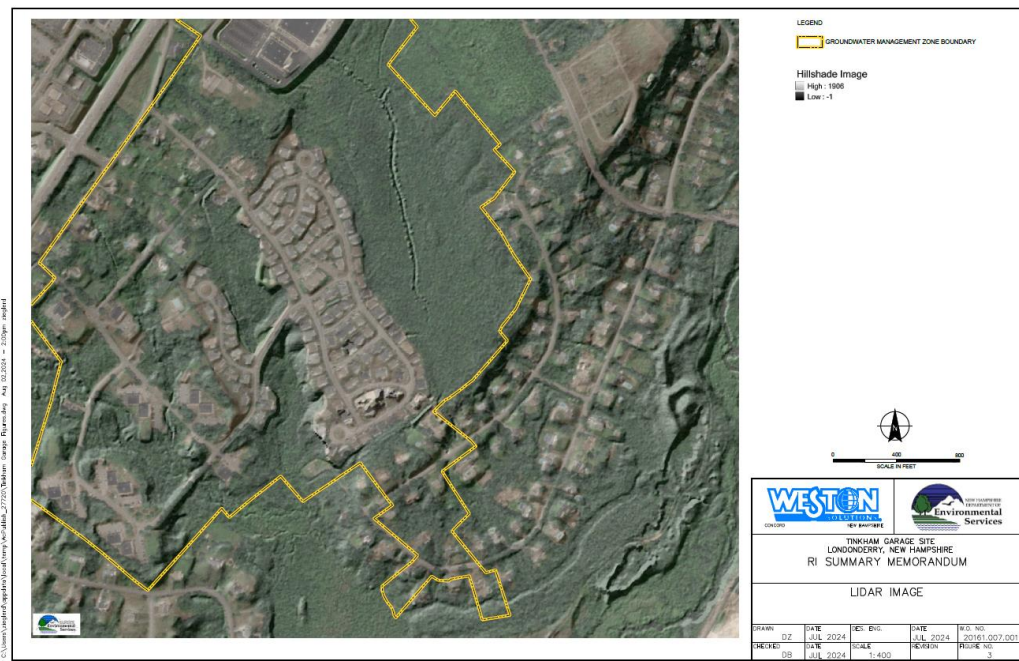




Tinkham Garage Superfund Site Proposed Plan for Alternative Water Supply

07/10/2025
Public Meeting



Introductions



▶ EPA- Lead Agency:

Cheryl Sprague, Project Manager

Aaron Shaheen, Community Relations



▶ NHDES- State Agency and Oversight

Rene Nahlik, Project Manager

Jim Soukup, Weston Solutions, Inc.



NHDES Environmental Health Program Representatives

Kelly Thrippleton-Hunter, Ph.D., Principal Investigator

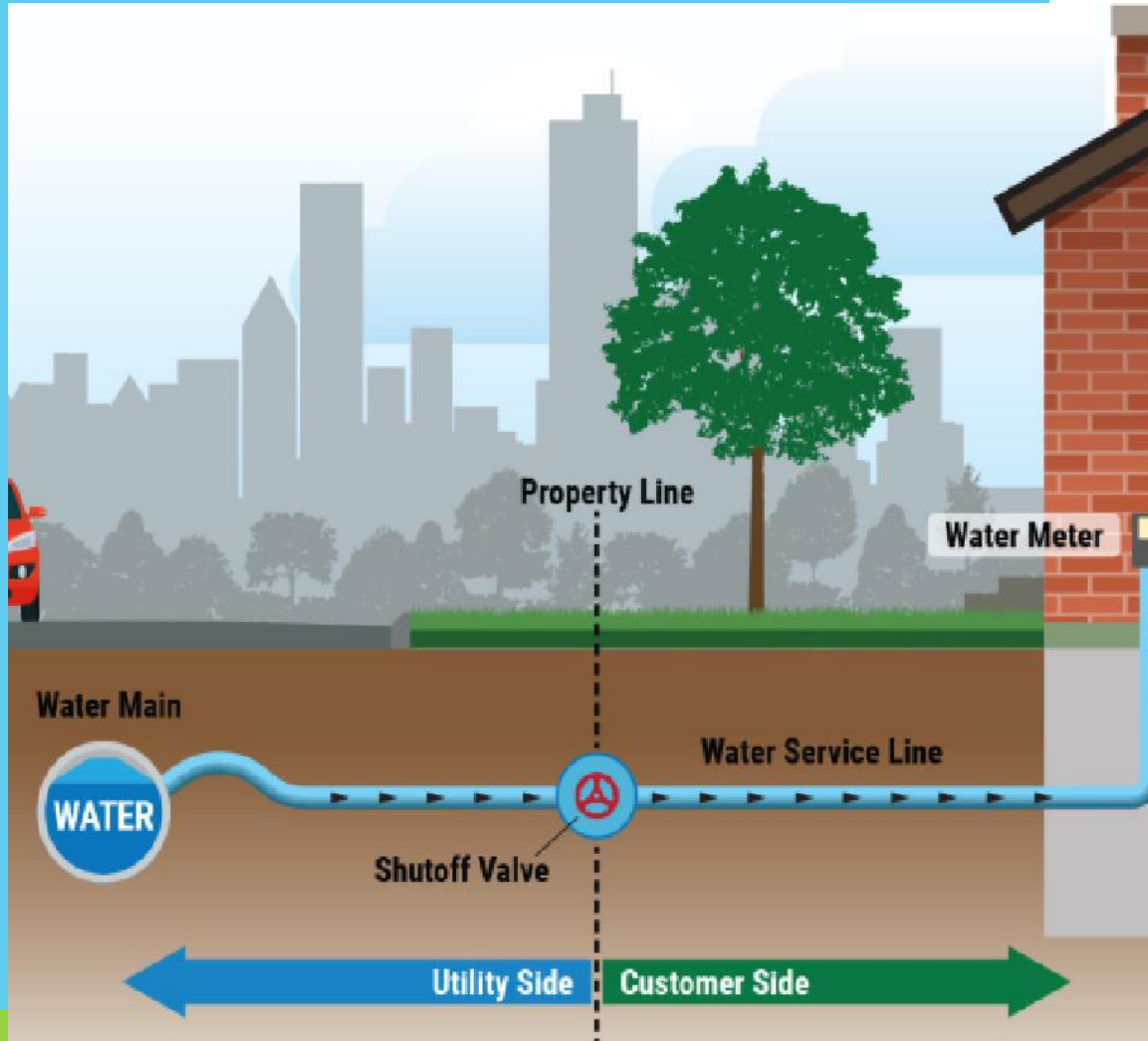
Sarah Boyle, Environmental Health Communications Specialist

Kimberly Aviado, Toxicologist



- Introductions
- Agenda
- Brief overview of Superfund and Community Involvement Process
- Tinkham Garage Site History and Timeline
- Presentation of Conceptual Site Model for Groundwater and recent investigation findings
- Risk
- Focused Feasibility Study
- Proposed Plan for Interim Action:
 - Waterline extension
- Questions

Meeting Summary



- ▶ This informational presentation is a summary of the 32-page Proposed Plan issued for an Alternative Water Supply.
- ▶ The Proposed Plan presents an Interim Action (waterline extension) to mitigate exposure (ingestion) from contaminated groundwater used as drinking water.
- ▶ EPA is seeking public comment on the Proposed Plan before finalizing the Interim Action.
- ▶ Currently, 66 residential properties have been offered bottled water, since monitoring began in 2018, as a temporary measure. This Proposed Plan presents a permanent waterline extension to residents living within the Ross/Tokanel and Boston/Albany and Charleston neighborhoods, who are not already connected to a waterline.
- ▶ Primary supporting documents are found in the Administrative Record and have been added to the Town website, including this presentation.
- ▶ Site Investigations are still on-going and additional cleanup actions at the Site may be warranted and would be presented at a later date.



National Priority Site Listing: The list identifies the nations worst hazardous waste sites that warrant cleanup.

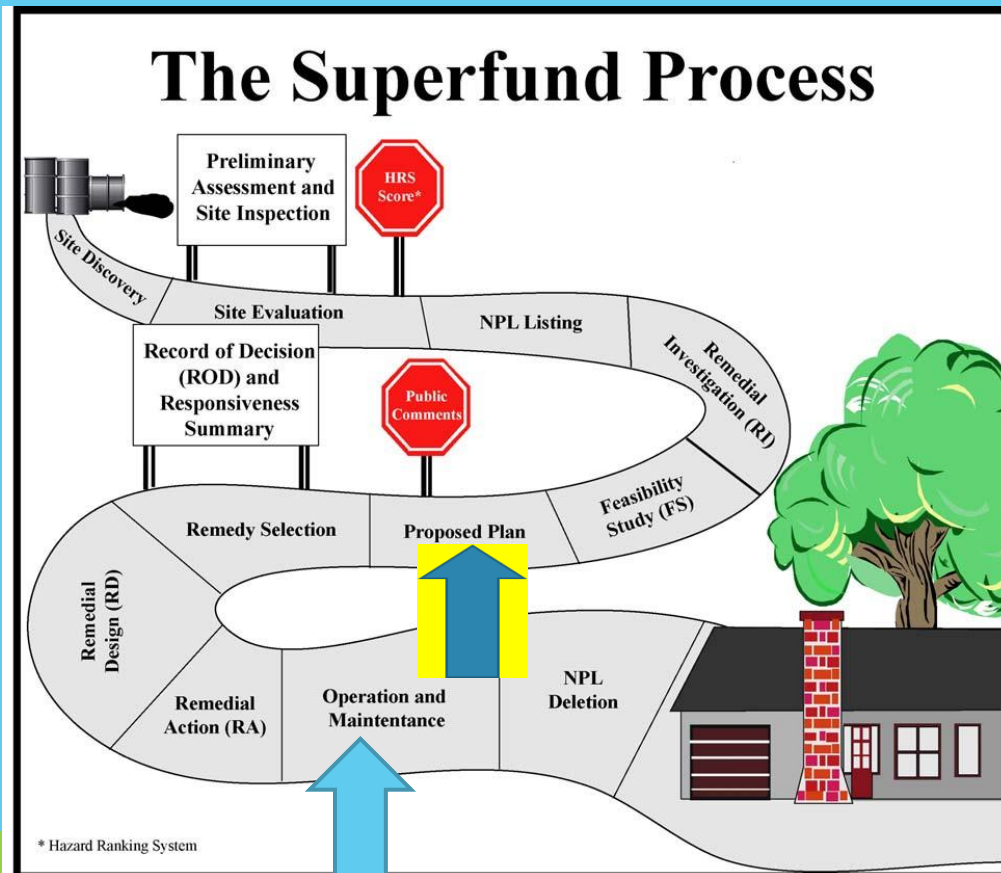
▶ **Remedial Investigation/Feasibility Study/Proposed Plan and Remedy Selection:** The process of investigating the conditions at the Site, the potential threats to human health and the environment, the evaluation and comparison of cleanup options, the solicitation of public comment and the selection of the remedy.

▶ **Remedial Design:** Development of detailed cleanup plans to attain cleanup standards.

▶ **Remedial Action:** Construction and implementation of the plans developed in the remedial design.

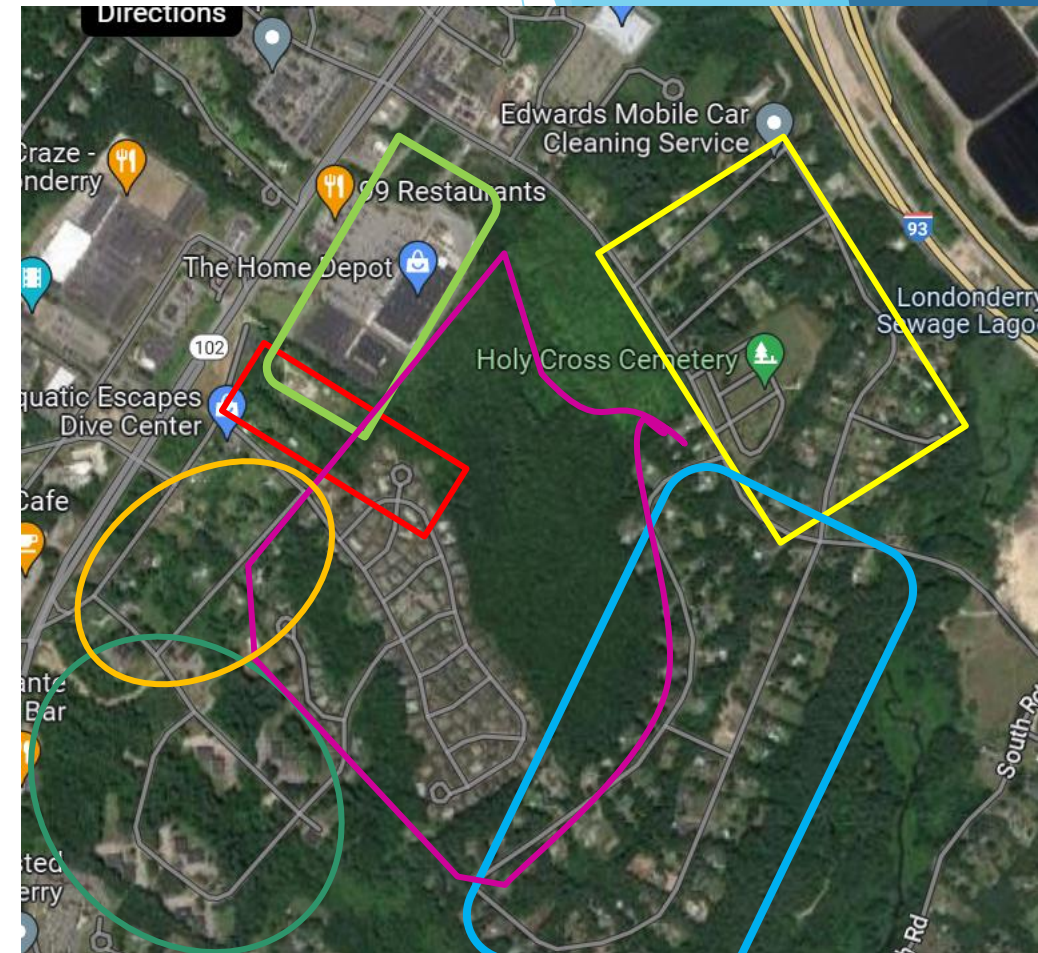
▶ **Operation and Maintenance and Long-term monitoring:** Activities taken to ensure that cleanup work at a site continues to protect human health or attain cleanup standards; includes treatment operations, monitoring and enforcement of site restrictions. **Remedy changes may be considered based on new information, chemicals, and exposure.**

▶ **NPL deletion:** Cleanup goals have been achieved, and site is fully protective of human health and the environment.



Properties At and Abutting Site

- **Tinkham Garage Property during time of releases** ———
- **1970's Woodland Village Condominiums, Mercury and McAllister Drive:** ——— ———
 - Residential housing – 1981 impacts to water supply wells and 1983 waterline.
- **2001 Home Depot Complex:** ———
 - Development constructed between 2001 and 2003;
 - parking lot constructed over some of current “source” area.
- **2003-2013 Nevins:** ———
 - Senior housing – 168 individual condos covering central 100 acres of Site; remaining land conservation.
- **1978+Boston and Charleston Avenue** ———
 - Residences east of Tinkham Garage – 5 placed on waterline in 2016
- **1978+Ross/Tokanel Drive** ———
 - Residences – south of Tinkham Garage Site



Site History

- ▶ 1960's - Agricultural and sand/gravel
- ▶ 1970's - Development of condominiums and neighborhoods
- ▶ Initial disposal of septic waste and industrial waste tanker washings into:
 - leach fields
 - solvent swale
 - dug trenches
 - and to the ground
- ▶ 1978 - initial complaint- Ross Drive
- ▶ 1980's - Volatile organic Compounds (VOCs) associated with industrial wastes are found in Condominium water supply well and residential water supply wells along Mercury and McAllister
- ▶ 1983- Site is listed on the National Priorities List (NPL)
- ▶ 1983 - Water line extension



LEGEND

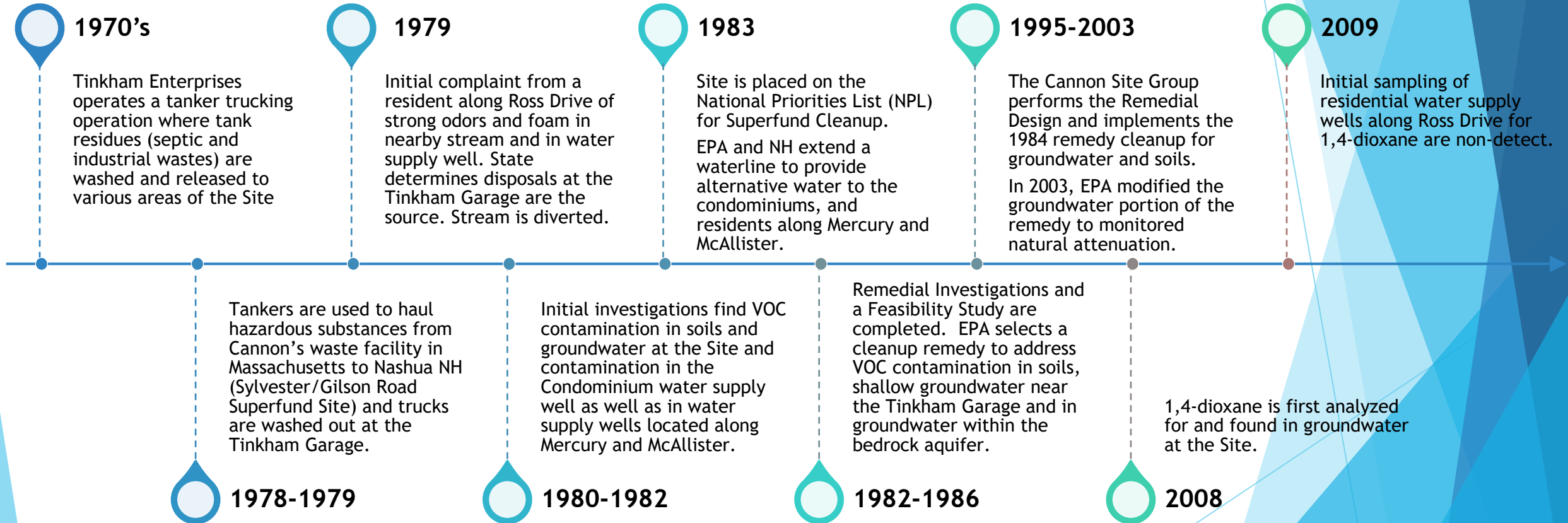
CL	-Cleared Area D
-Drum	
DA	-Disturbed Area IX
-Dark-Toned	
GS	-Groilld Scar
GSI	-Groilld Stain
MM	-Mollded Material
SL	-Standing Liquid TR-
Trench	
TS	-Trench Scars
V	-Vehicle
<"")	- Edge of Fill/Excavation
--	- Feature Outline
---	- Fence
----	- Historical Oolldary
- - - -	- Intermittent/Suspected Drainage
//	-near Groilld Scars
- - - -	- Perennial Drainage
- - - -	- Site Oolldary
- - - -	- Trail/Vehicle Tracks

FIGURE 6
TINKHAM'S GARAGE

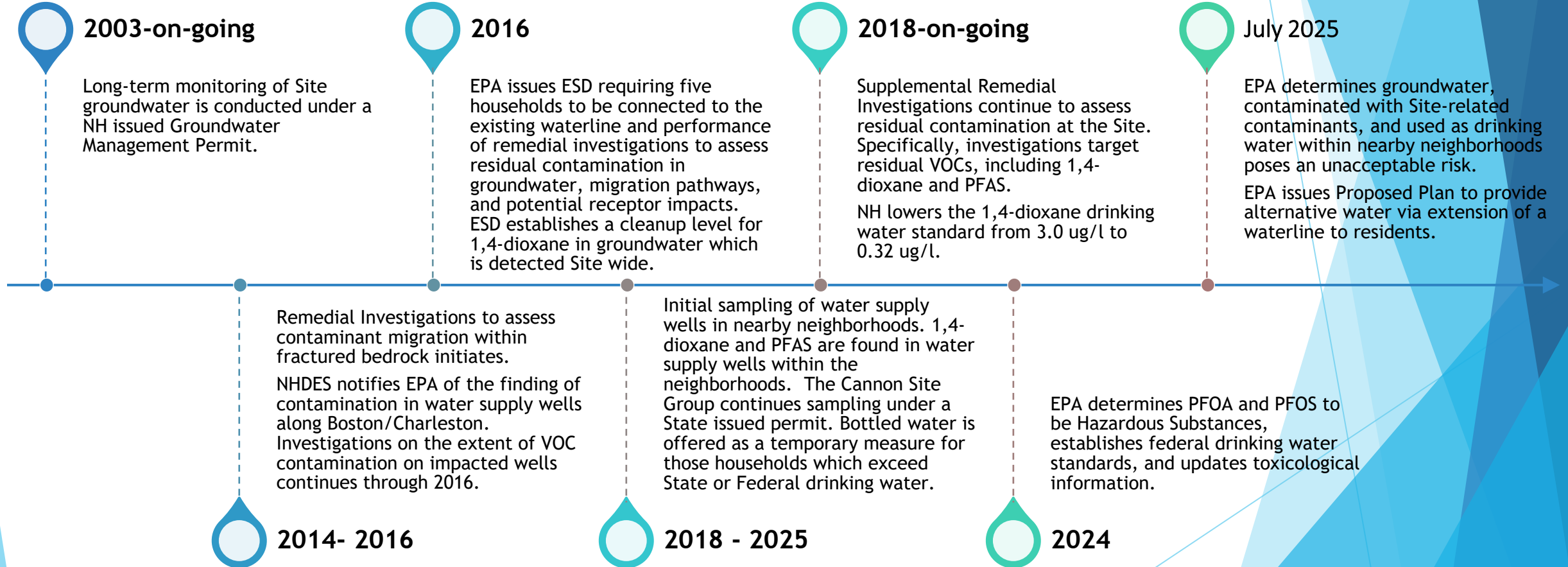
SEPTEMBER 12,1984

APPROX SCALE 1: 3,200

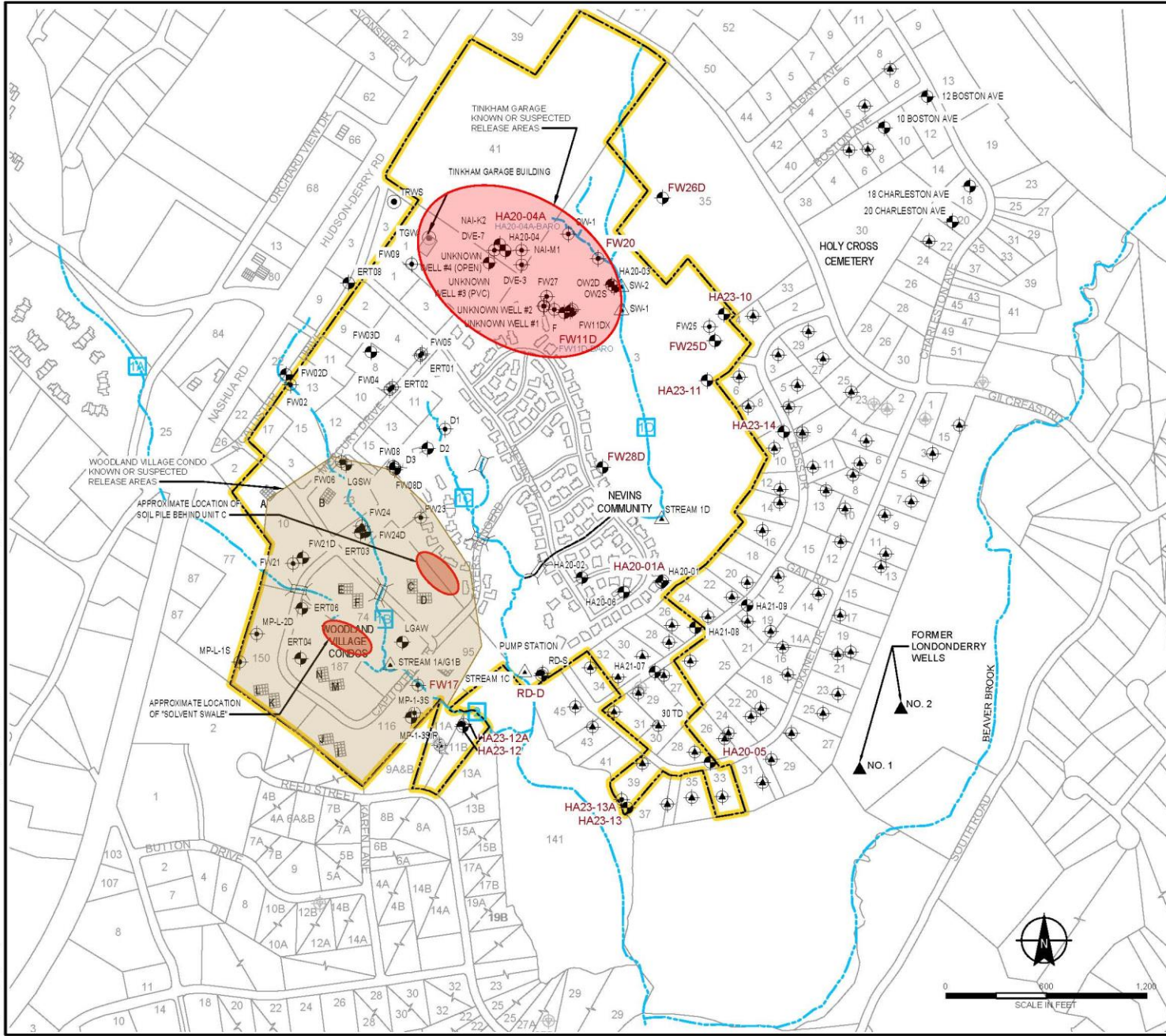
Tinkham Garage Timeline of Past Response Actions



Tinkham Garage Timeline of Past Response Actions



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- LEGEND**
- EXISTING RESIDENTIAL WELL
 - RESIDENTIAL WELL NO LONGER IN USE
 - IRRIGATION WELL
 - OVERBURDEN/SHALLOW BEDROCK MONITORING WELL
 - BEDROCK MONITORING WELL
 - SURFACE WATER SAMPLE
 - TAP SAMPLE
 - STREAM
 - APPROXIMATE LOCATION OF STREAM 1D CULVERT
 - STREAM DESIGNATION
 - GROUNDWATER MANAGEMENT ZONE (GMZ)
 - NAI-M1 LOCATION ID
 - FW20 MONITORING WELL WITH PRESSURE TRANSDUCER LOCATION ID
 - BARO DISCRETE WELL TIER WITH BAROLOGGER LOCATION ID
 - TINKHAM GARAGE SOURCE AREA
 - WOODLAND CONDO POTENTIAL SOURCE AREA

- GENERAL NOTES**
1. ALL DIMENSIONS AND LOCATIONS ARE APPROXIMATE.
 2. WELL LOCATIONS SURVEYED IN 2016, 2021, AND 2023. SOME OLDER WELLS WERE DIGITIZED FROM A DRAWING TITLED "MONITORING LOCATIONS AND TOTAL VOLATILE ORGANIC CONCENTRATIONS, MAY 2006" BY CANNON'S ENGINEERING, ROUX ASSOCIATES, INC.
 3. PRIVATE WELL LOCATIONS WERE SURVEYED WITH A TRIMBLE GEO 7X AND COLLECTED BY HALEY & ALDRICH, INC. IN AUGUST 2020, NOVEMBER 2020, AND JULY 2021 AND NOVEMBER 2022. RESIDENTIAL WELLS TO BE SURVEYED AT A LATER DATE EITHER COULD NOT BE LOCATED (15 TOKANEL) OR THE HOMEOWNERS COULD NOT BE CONTACTED (15 ROSS) OR DENIED ACCESS TO SURVEY THEIR WELL (18 ROSS, 41 TOKANEL). THE WELL AT 31 TOKANEL REPRESENTS A POTENTIAL WELL LOCATION SINCE THE HOMEOWNER DID NOT KNOW THE LOCATION OF THE WELL AND A TYPICAL WELLEDGE WAS NOT OBSERVED.
 4. RESIDENTIAL WELLS NO LONGER IN USE ARE ONLY SHOWN IF THEIR EXISTENCE HAS BEEN CONFIRMED AND SURVEYED.
 5. PARCEL ADDRESS SOURCE: TOWN OF LONDONDERRY GIS.
 6. TAX ID SOURCE: NH GRANIT GIS.
 7. THE GMZ BOUNDARY SHOWN IS BASED ON GMP NO. GWP-199004008-L-005 ISSUED ON OCTOBER 4, 2024. IT IS ANTICIPATED THAT THE GMZ BOUNDARY WILL BE UPDATED AND FURTHER EXPANDED BY NHDES UPON EPA DESIGNATION OF PFAS AS A SITE CONTAMINANT OF CONCERN (COC).

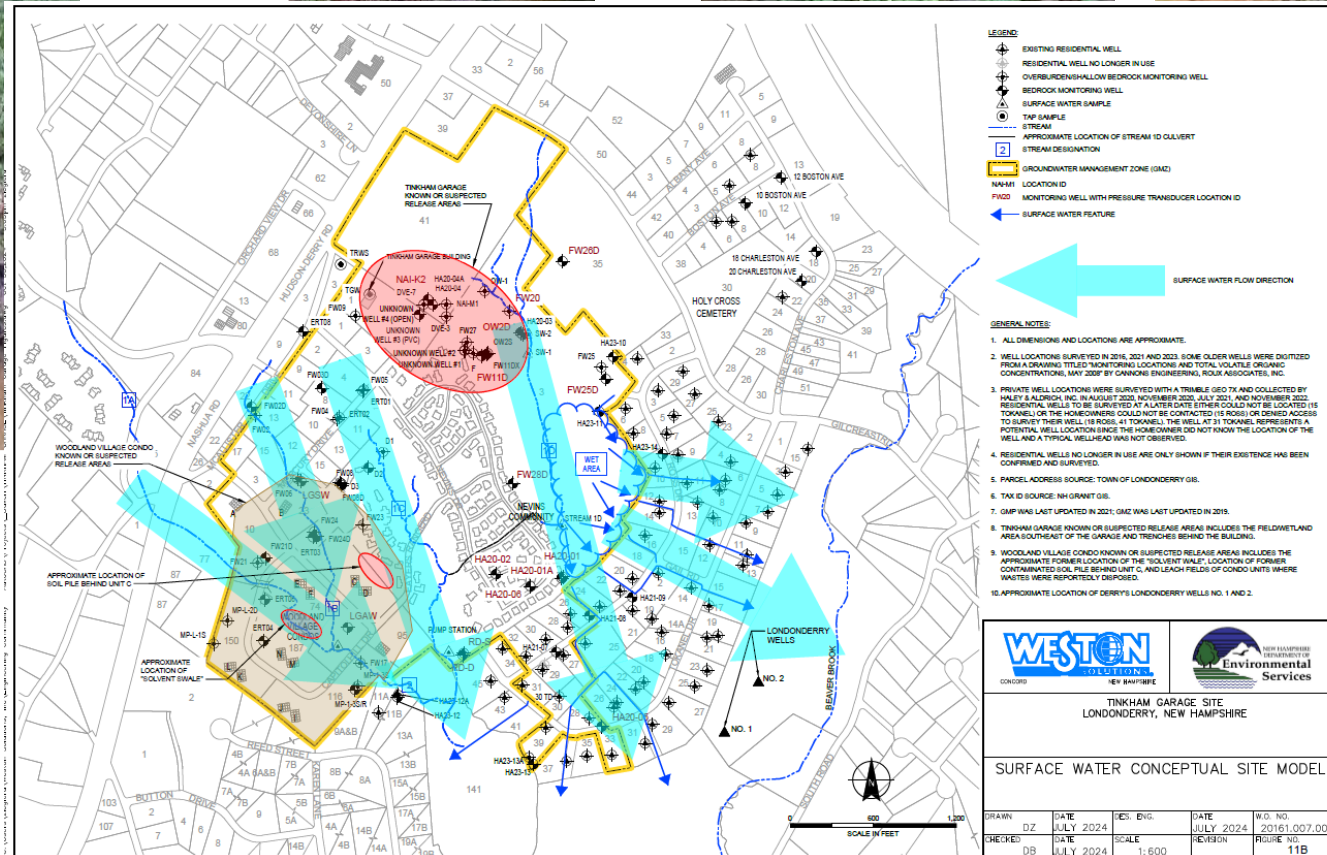
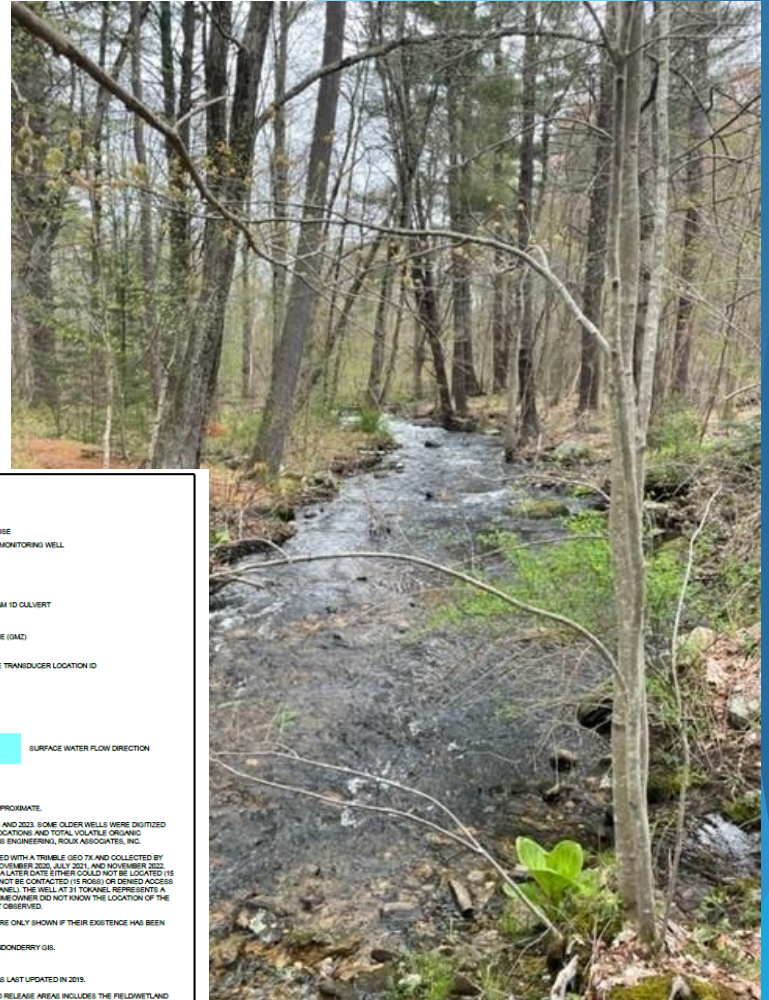
Site Plan

TINKHAM GARAGE SITE LONDONDERRY, NEW HAMPSHIRE FOCUSED FEASIBILITY STUDY				
SITE PLAN				
DRAWN	DATE	DES. ENG.	DATE	W.O. NO.
DZ	JUL 2024		JUL 2024	20161.007.001
CHECKED	DATE	SCALE	REVISION	FIGURE NO.
DB	JUL 2024	1:600		2



Surface Drainage

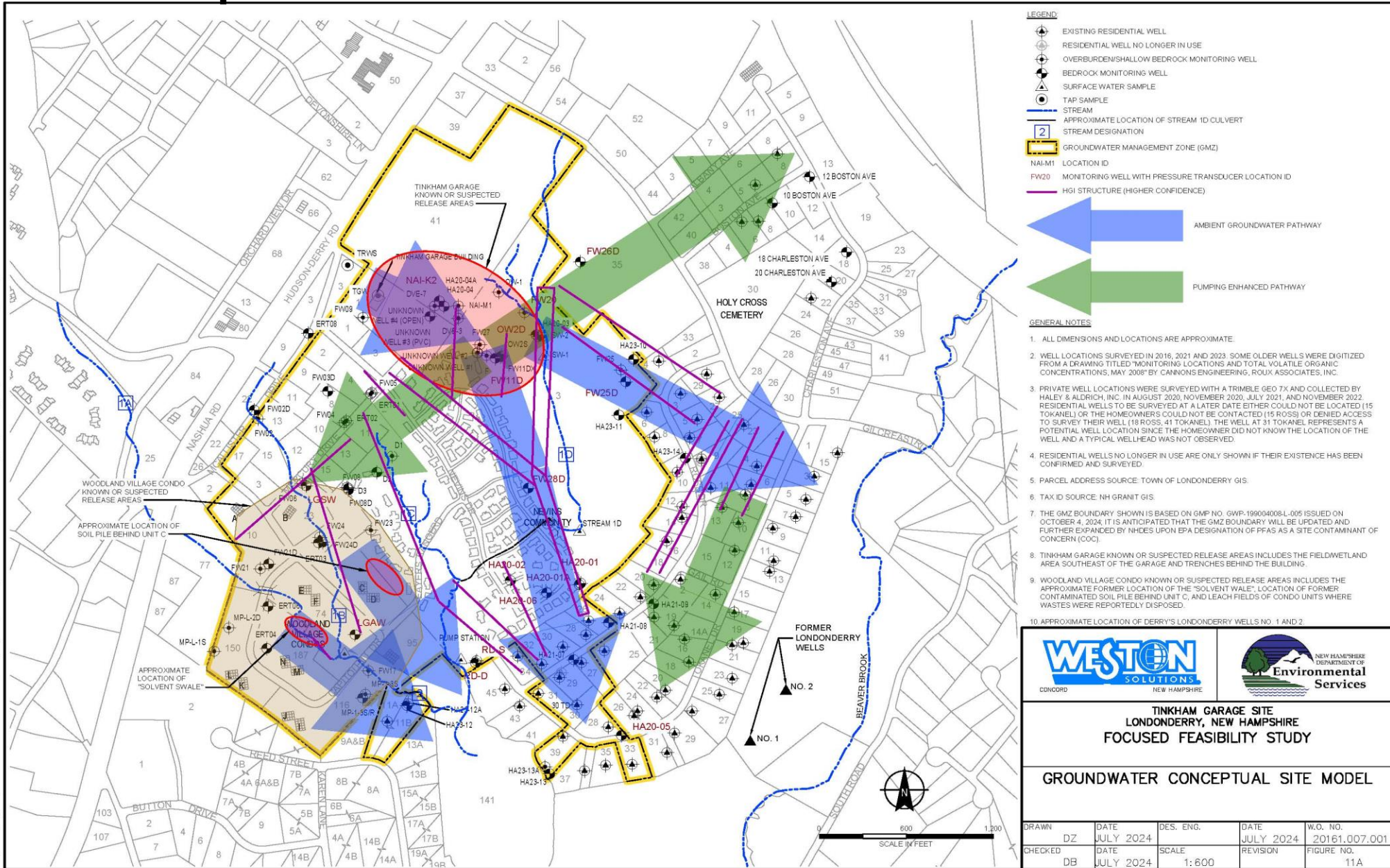
Stream 1D



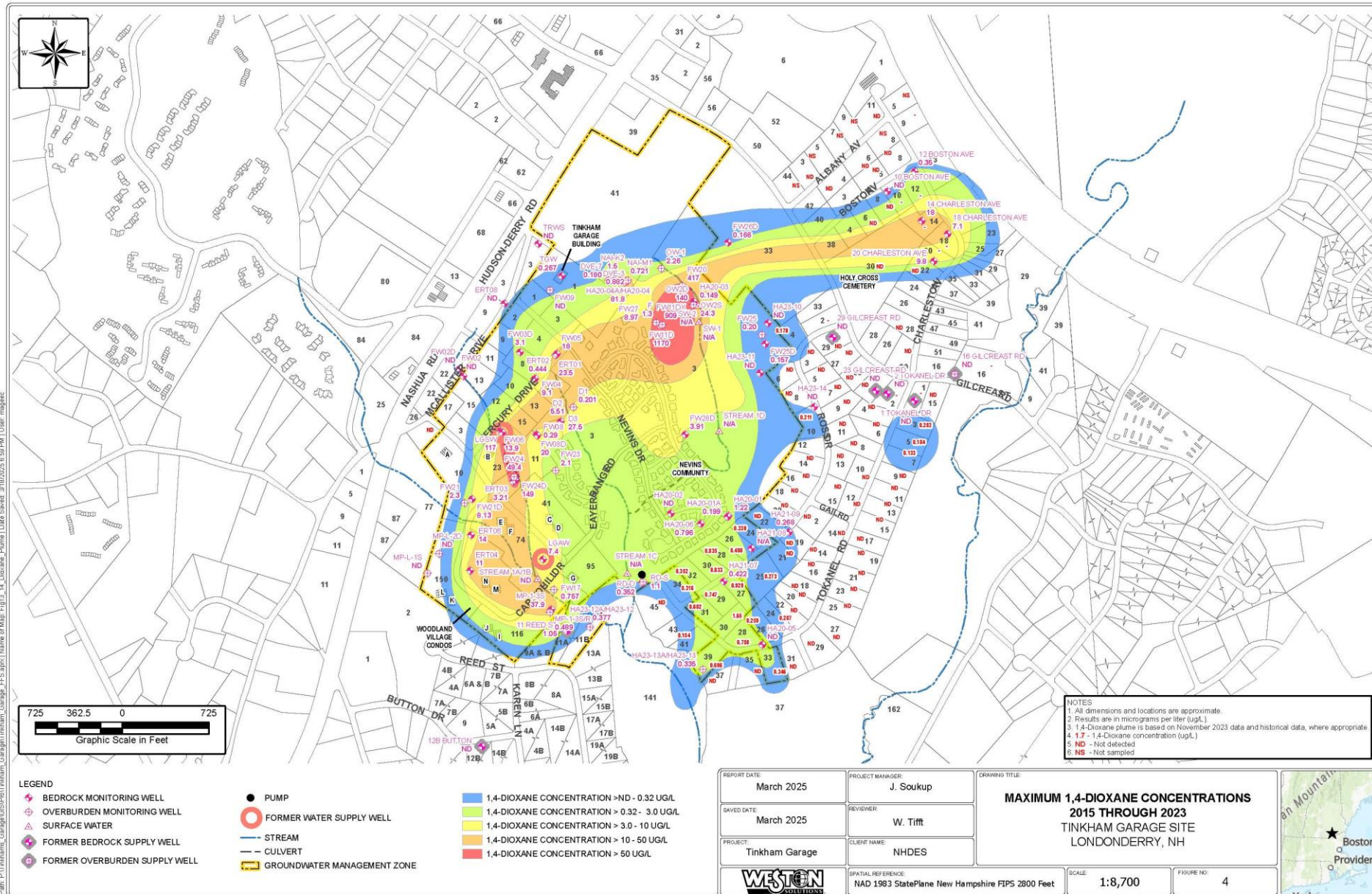
Stream 1A - Condo Area

Conceptual Site Model - Groundwater

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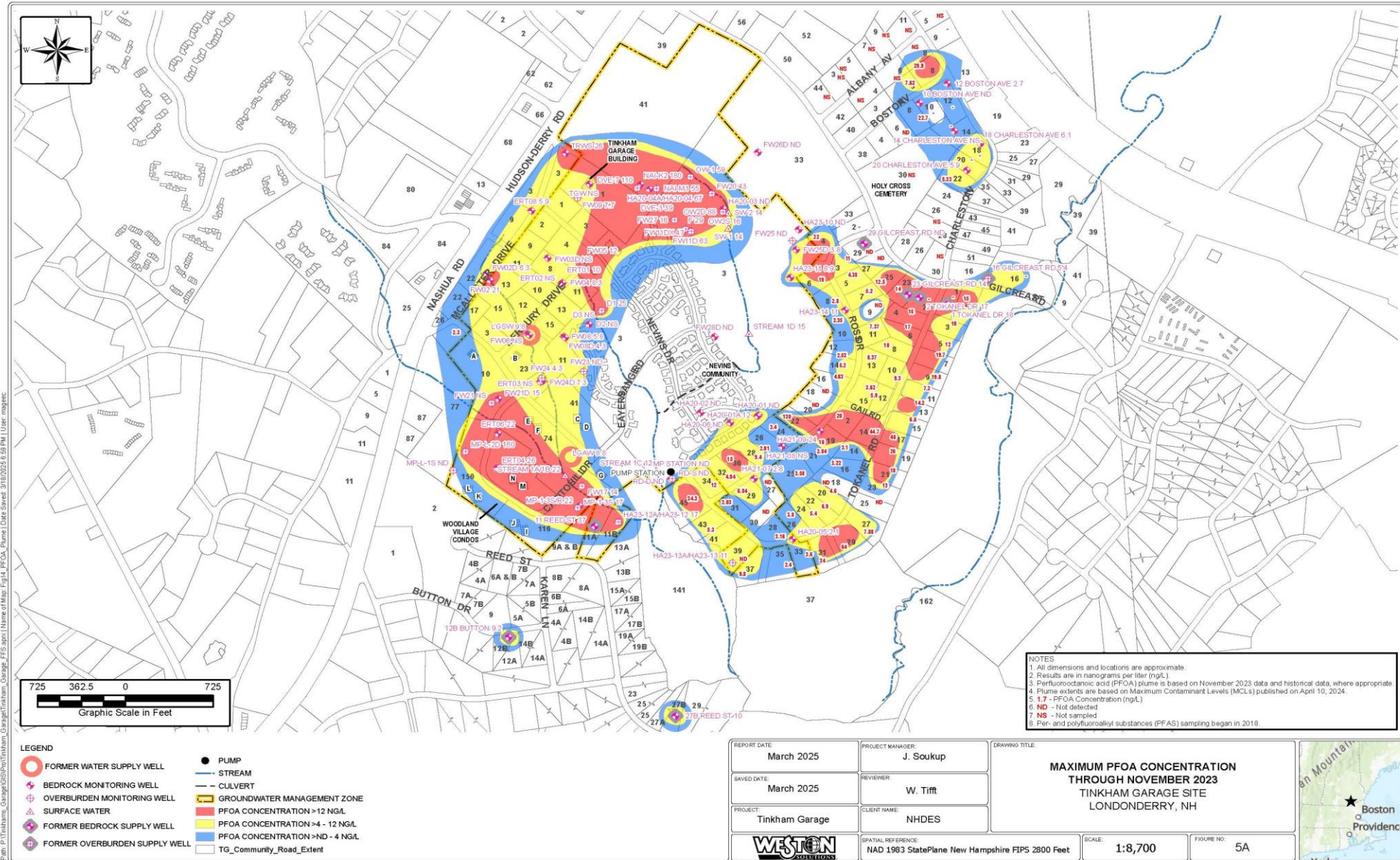


1,4-Dioxane

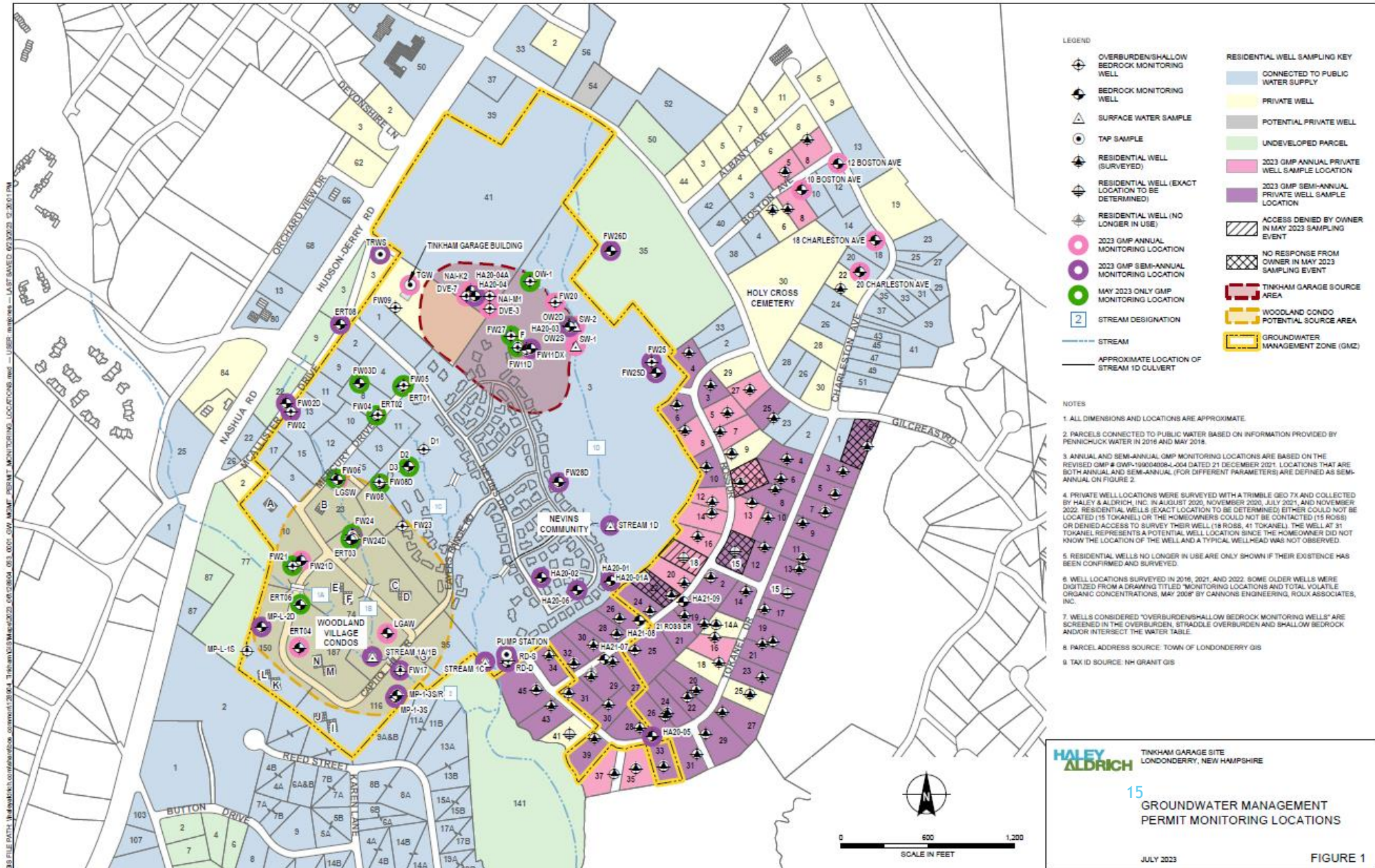


Path: P:\Tinkham_Garage\GIS\Tinkham_Garage\Tinkham_Garage_FES.aprx | Name of Map: Fig13_14_Dioxane_Plane [Date Saved: 3/10/2025 5:59 PM] | User: maprac

PFOA



Site Monitoring - Groundwater Management Permit



Disparate Concentrations of Contaminants in Neighborhood Wells

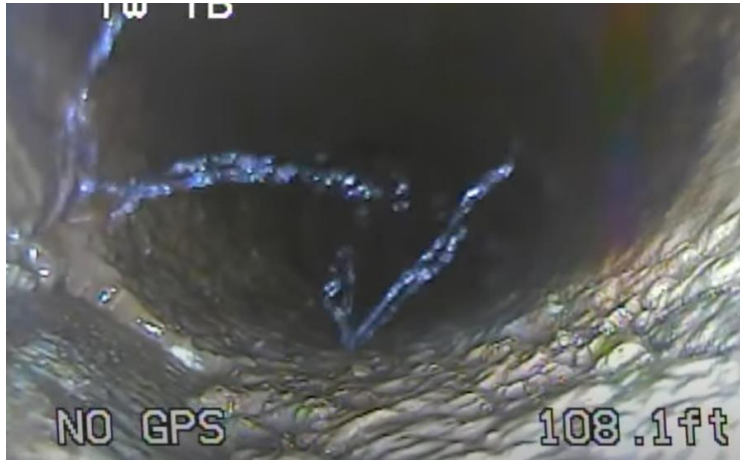


Photo from Youtube Video posted by Ohio EPA:
https://www.youtube.com/watch?v=Y_4aTJlcGul

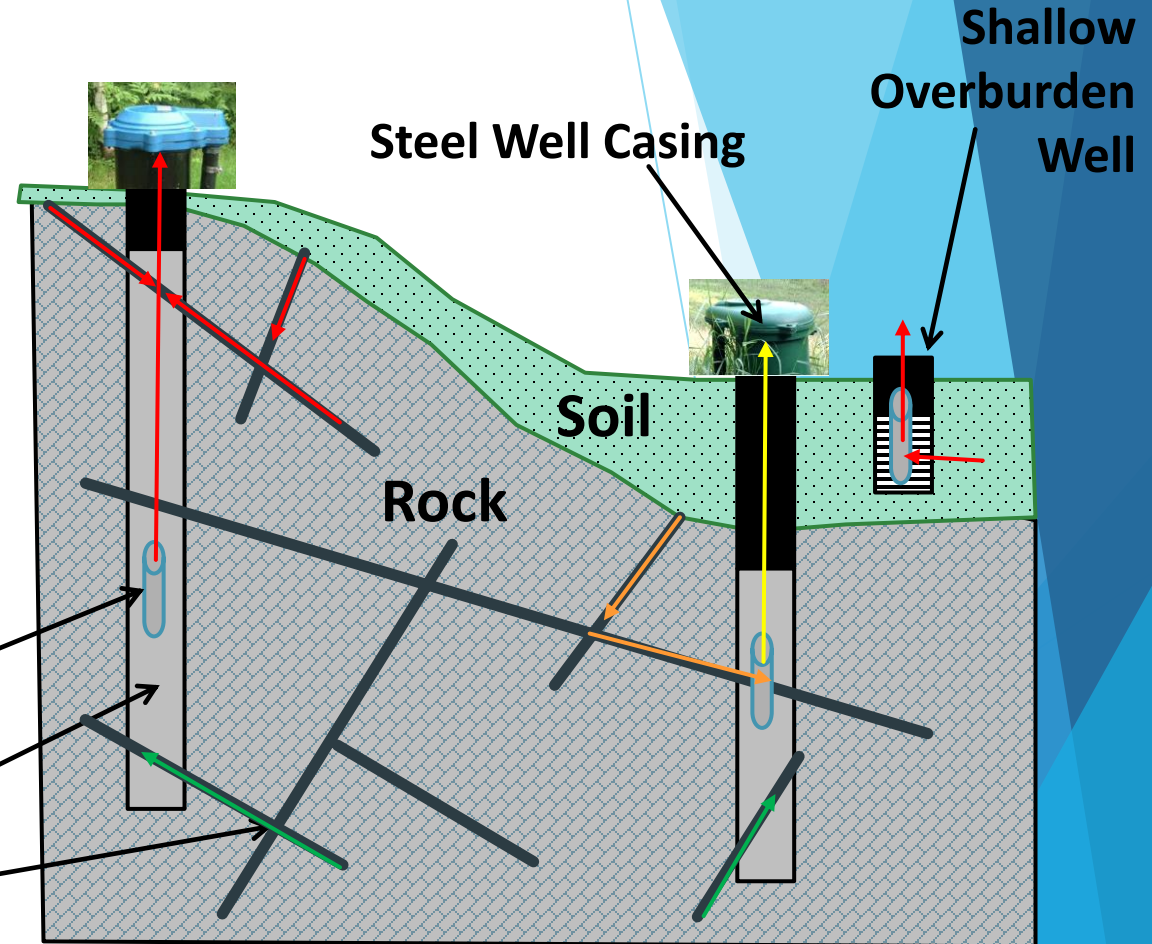
Water entering a well from fractures (cracks) in the rock

Water-bearing Fracture

Pump

Well Bore

Water-bearing Fracture



RISK

EPA considers risk to be the chance of harmful effects to human health or to ecological systems

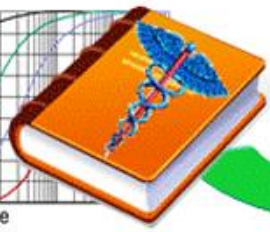
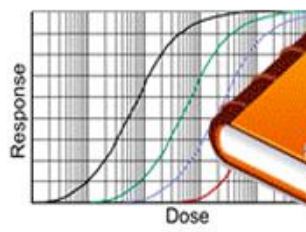
EPA uses risk assessment to characterize the nature and magnitude of risks to human health for various populations such as current and future residents, recreational visitors, and workers and assesses risk for both children and adults as well as risks to ecological receptors, including plants, birds, other wildlife, and aquatic life.

Risk depends on the following three factors:

1. **Contaminant Concentrations present** in an environmental medium (e.g., soil, water, air) over a geographic area,
2. **How much contact (exposure)** a person or ecological receptor has or potentially could have with the contaminated environmental medium (exposure scenarios), and
3. **How it affects** the health of humans (e.g., toxicity) or ecological receptors.

Contaminants





Toxicity Values

Screening Level Calculation



Screening Level Equations

Exposure Routes



Residential



Construction Worker



Outdoor Worker



Indoor Worker



Recreational

Soil
ingestion
inhalation
dermal

Tap Water
ingestion
inhalation
dermal

Fish
ingestion

Ambient Air
inhalation

Soil to Groundwater
for protection of gw

Soil
ingestion
inhalation
dermal

Soil
ingestion
inhalation
dermal

Air
inhalation

Soil
ingestion
inhalation

Air
inhalation

Soil/Sediment
ingestion
inhalation
dermal

Surface Water
ingestion
dermal

Risk from Ingestion of Groundwater used as Tap water

Risk Calculations

- ▶ Utilized approximately 80 household water supply well results, collected since 2018, to develop an exposure point (average) concentration across the neighborhoods for each contaminant.

EPA RISK ASSESSMENT

- ▶ **Incremental Cancer risk:** 1 in one million to 1 in 1 ten thousand
 - ▶ 1×10^{-4} to 1×10^{-6}
- ▶ **Incremental Non-cancer risk:**
 - ▶ Hazard Index of 1
- ▶ Risk is typically deemed unacceptable outside of those parameters and actions are recommended to reduce risk.

- ▶ Tinkham Garage Risk from a lifetime exposure via ingestion of groundwater used as tap water within the target neighborhoods:
- ▶ **Cancer: 4.93×10^{-3}**
 - ▶ PFOA, PFOS, and 1,4-dioxane
- ▶ **Non-Cancer: 24.2**
 - ▶ PFOA, PFOS, other PFAS
- ▶ Risks exceed EPA acceptable risk for both cancer and non-cancer assessments.
- ▶ EPA determined ingestion of groundwater as a drinking water source poses an unacceptable health risk.
- ▶ This forms the basis for taking an action to mitigate or reduce risk to receptors and protect public health.

Focused Feasibility Study: June 2025 -

Evaluation of both temporary and permanent options to protect human health by mitigating unacceptable risk from exposure (ingestion) of Site related contaminants found in groundwater used as drinking water.

Remedial Action Objectives for the Interim Action

- ▶ Prevent current and potential future exposure to Site contaminants in groundwater (including 1,4-dioxane and PFAS) via ingestion of groundwater from individual supply wells at levels that pose an unacceptable risk.
- ▶ Reduce or minimize migration of contaminated groundwater from the Site by reducing the hydraulic stresses on the bedrock aquifer via removal from service of those residential water supply wells that continue to draw groundwater for household use.

Development of Remedial Alternatives

Alternative Water

GW-1	No Action	Required to be evaluated and used as a baseline comparison to other alternatives.	No additional actions would be taken to minimize risk.
GW-2	Risk Mitigation- Bottled Water	<p>Provision of Bottled Water to residents within the target neighborhoods, not already connected to a waterline.</p> <p>Would mitigate exposure but would not remove stresses on the bedrock aquifer as pumping of water supply wells would continue. Considered a temporary measure to mitigate risks to human health resulting from ingestion of contaminated groundwater until groundwater attains drinking water quality and provision of bottled water is no longer needed or a permanent alternative water supply is provided.</p>	<p>For cost estimate: The 89 households within the target neighborhoods would receive monthly shipments of bottled water over 30 years.</p> <p>Five-year Reviews to assess protectiveness and monitoring would continue at the Site.</p>

Development of Remedial Alternatives continued

<p>GW-3</p>	<p>Risk Mitigation- Point of Entry Treatment Systems (POETs)</p>	<p>Installation and use of treatment systems at residences to remove contaminants from groundwater. Provides effective treatment from exposure to low levels of 1,4-dioxane and PFAS. Water is treated as it enters the household and is custom designed. Typical treatment uses filters and granular activated carbon to remove or absorbs contaminants.</p> <p>Would mitigate exposure but would not remove stresses on the bedrock aquifer as pumping of water supply wells would continue. Considered a temporary measure to mitigate risks to human health resulting from ingestion of contaminated groundwater until groundwater attains drinking water quality and treatment is no longer needed or a permanent alternative water supply is provided.</p>	<p>For cost estimate: 89 households would be provided with a POET. Monitoring of water supply wells would continue to document concentrations in wells and to assess treatment effectiveness for 30 years. Scheduled maintenance would be required.</p> <p>Five-year Reviews to assess protectiveness and monitoring would continue at the Site.</p>
<p>GW-4 - Preferred Alternative</p>	<p>Risk Mitigation - Waterline Extension/Connections</p>	<p>Extension of and connection of households to a nearby waterline. Design and installation would be coordinated with local water supplier- Pennichuck Corporation.</p> <p>Permanent provision of alternative water would mitigate risks to human health resulting from ingestion of contaminated groundwater.</p>	<p>For cost estimate: extension of nearby waterline and connection of 89 households.</p> <p>Five-year Reviews to assess protectiveness and monitoring would continue at the Site.</p>

Comparative Analysis of Alternatives

Alternative Description		Threshold Criteria		Balancing Criteria				Total Net Present Value*
		Protection of Human Health & Env.	Compliance with ARARs	Long-Term Effectiveness	Reduction through Treatment	Short-Term Effectiveness	Implementability	
GW-1	No Action	N	N	●	N/A	N/A	●●●	\$0
GW-2	Bottled Water	Y	Y	●●	N/A	●●●	●●●	\$2,800,000
GW-3	Point of Entry Treatment Systems (POETS)	Y	Y	●●	●●	●●	●●	\$8,000,000
GW-4 Preferred Alternative	Waterline Extension	Y	Y	●●●	N/A	●●	●●●	\$6,800,000

Please refer to the Focused Feasibility Study Report for further discussion regarding comparison of various alternative.

Y = Alternative passes this criterion

N = Alternative fails this criterion

● = Least favorable

●● = Moderately favorable

●●● = Most favorable

*= Costs represent total net present value (discounted with an annual rate of 4.5%) and are generally rounded to significant figures. The total net present value is the complete costs including capital, and annual operation and maintenance over 30 years. The remedial cost estimates present a feasibility level estimate and are intended to provide an accuracy of +50% to -30%.

GW-4 Waterline Extension - Preferred Alternative Main Components

Extension of the existing waterline into the neighborhoods will prevent exposure and provide a permanent alternative water source for residents that are currently relying on groundwater as their drinking water source.

The target neighborhoods include Ross and Tokanel Drive, Gail Road and Gilcreast Avenue, as well as Albany, Boston and Charleston Avenue residents who are not already connected to the waterline.

Use of a waterline would reduce or remove the continuous pumping from water supply wells that draw contaminants along bedrock fractures into and within the neighborhood.

- ▶ GW-4 includes the disconnection of private water supply wells to prevent future exposure to contaminated groundwater. This will reduce stresses and minimize migration of contaminants influenced from pumping which over time may reduce the overall extent of groundwater contamination.

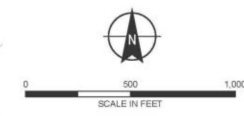
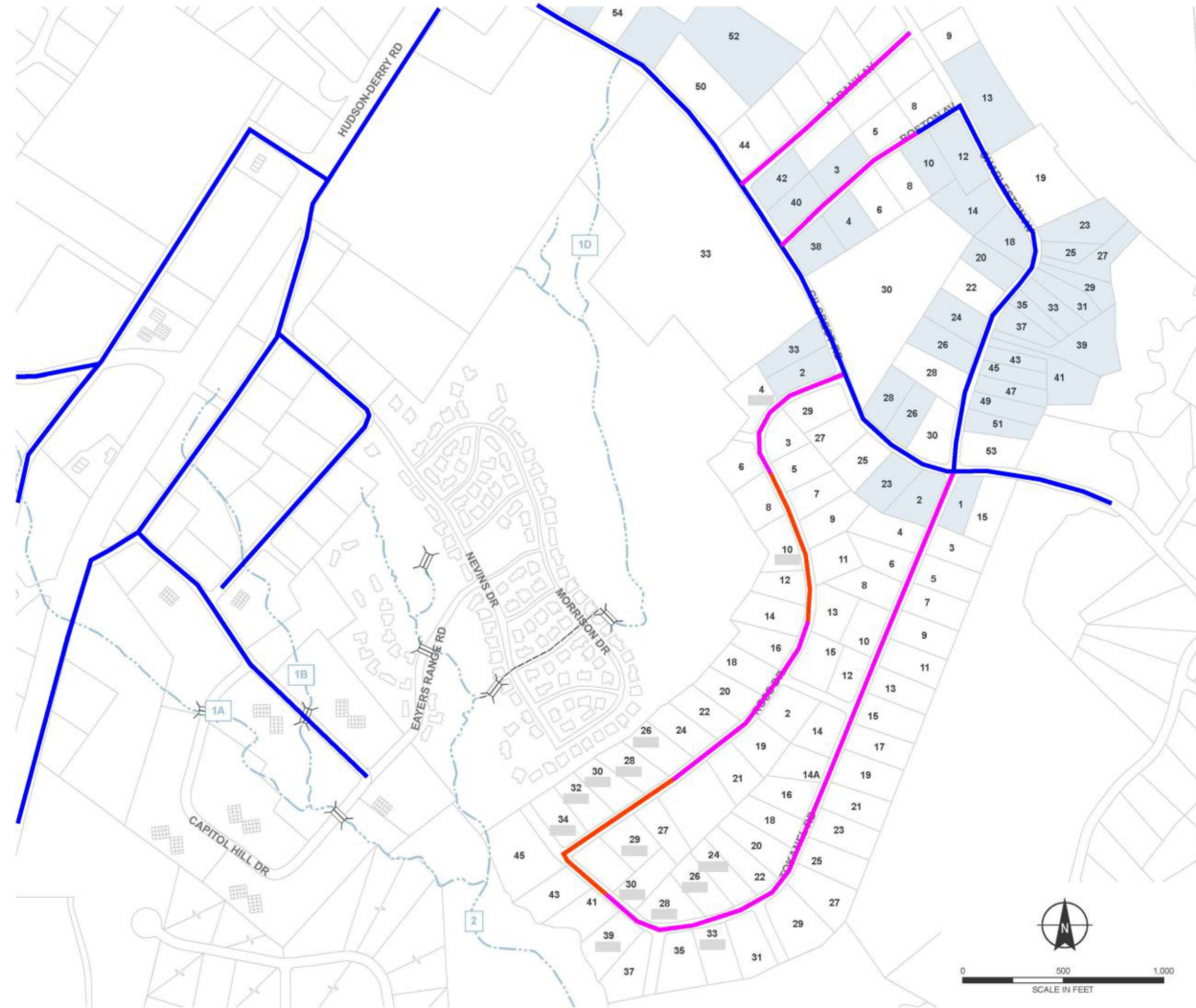
- ▶ With a resident's permission, some water supply wells may be modified and used as long-term groundwater monitoring wells for the Site.
- ▶ Long-term monitoring of groundwater to assess the progress and effectiveness of remedial actions would continue.

Pennichuck Corporation is the municipal water provider in the local area.

- ▶ Five-Year reviews on the protectiveness of the remedial actions would continue.
- ▶ Provision of bottled water to residents would continue as a temporary measure until connected to the waterline.

GW-4 Waterline Extension- Preferred Alternative

- ▶ Estimated length of the waterline extension is 8,300 linear feet.
- ▶ Design and installation of the waterline is coordinated with local water provider- Pennichuck Corporation and local plumbers for household connections and may span 2-3 years.
- ▶ Waterline extension consists of road opening and trenching to depths below the frost line, installation, connections and testing as well as backfill and road restoration.
- ▶ Removal of shallow bedrock may be required (estimated for 2,500 linear feet).
- ▶ Upon completion of the waterline extension, connection to households and removal/modification of water supply wells there will be immediate and long-term risk mitigation to human health.
- ▶ The connection of each household to the waterline will require individual plans discussed with each resident. This will include discussion on the connection and restoration of the property. Access agreements will be required.
- ▶ The costs for the waterline extension are estimated at \$6.8 Million. This includes design and construction of the waterline and connections to each household within the neighborhood.
- ▶ Consistent with EPA Policy, following the connection and property restoration, the on-going costs for the supply of water utilized at each household will be the responsibility of each resident.
- ▶ Pennichuck Corporation has indicated that the average cost per month would be about \$60. This is an average cost per month over five years, noting that costs in the summer may be higher than in the winter months and dependent on each household use.



LEGEND

- EXISTING WATER LINE
- NEW WATER LINE
- NEW WATER LINE REQUIRING BEDROCK BLASTING



CONCORD NEW HAMPSHIRE

TINKHAM GARAGE SITE
LONDONDERRY, NEW HAMPSHIRE

PROPOSED WATER LINE

DRAWN DCH	DATE JAN 2023	DES. ENG.	DATE	W.O. NO. 20139.007.002
CHECKED NW	DATE JAN 2023	SCALE AS SHOWN	REVISION	FIGURE NO. 5

Why is this the preferred alternative?

- ▶ Provides the highest level of protection and long-term effectiveness through a permanent alternative water source.
- ▶ Utilizes connection to a nearby, existing waterline.
- ▶ Meets substantive requirements of action and location specific regulations.
- ▶ Will reduce stresses on the aquifer, reducing plume mobility and volume although it does not satisfy the preference for treatment.
- ▶ No significant implementability issues. Construction services are available.
- ▶ Is cost-effective at mitigating both current and potential future exposure to groundwater used as drinking water where the existing groundwater source is considered to present an unacceptable risk via ingestion.

How to Get Involved

- Public Comment Period: Starts July 11, 2025 - Ends August 12, 2025

How to Comment

- Public Hearing (oral comments): July 29, 2025, at 6:00 p.m.
 - Location: 268 Mammoth Rd B, Londonderry, NH 03053

Or

1. Online via <https://www.regulations.gov/docket/EPA-R01-SFUND-2025-0117>
 2. Email to sprague.cheryl@epa.gov
 3. Mail to Cheryl Sprague; 5 Post Office Square, Boston, MA 02191; Mail Code: 07-1
- Site-related documents are available at:
 - www.epa.gov/superfund/tinkham
 - <https://www.londonderrynh.gov/617/Tinkham-Garage-Superfund-Site>



Questions?

