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A Siemens Healthineers Company

October 2023 Technical Advisory Group

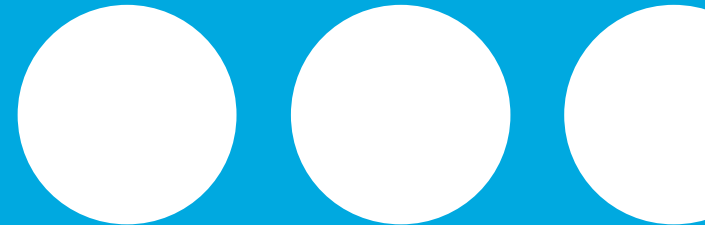
**Former Varian Facility (Site 3-0485)
150 Sohier Road
Beverly, Massachusetts**

**October 17, 2023
Beverly Middle School**



Agenda

- Greetings and Agenda Review
- Introductions
- Summary of Activities Since Last TAG Meeting and Upcoming Field Activities
- Status of Treatment Activities
- Upcoming Submittals and Events



Activities Since Last TAG Meeting

➤ Submittals

- Release Abatement Memorandum (RAM) Status Report
- Immediate Response Action (IRA) Completion Report
- Phase IV Part 2 Remedy Implementation Plan

➤ Completed Activities

- Sampling for per- and polyfluoroalkyl substances (PFAS)
- Building 3 supplemental investigation (soil borings)
- PSL 10 supplemental investigation

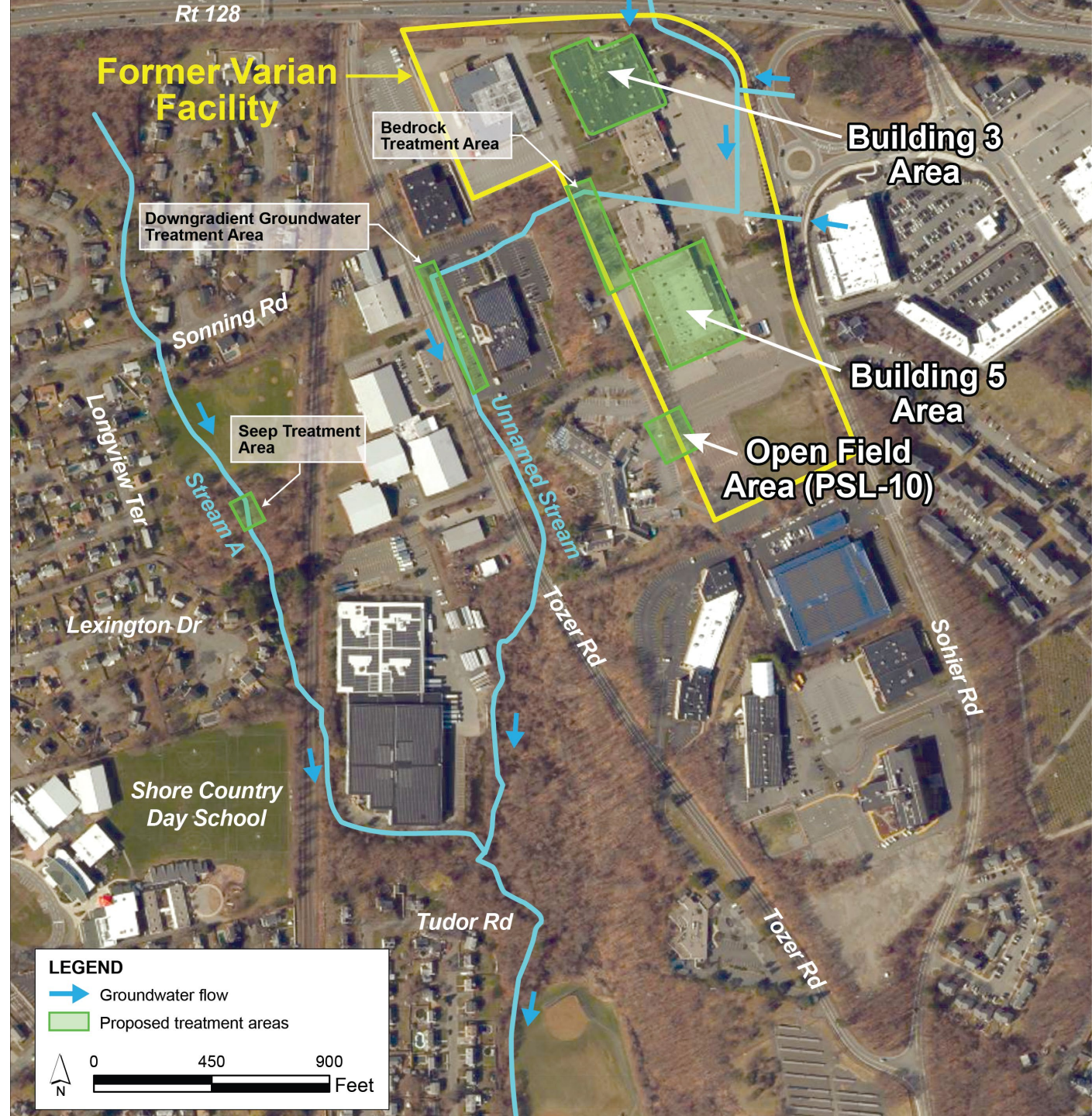
➤ Ongoing Activities

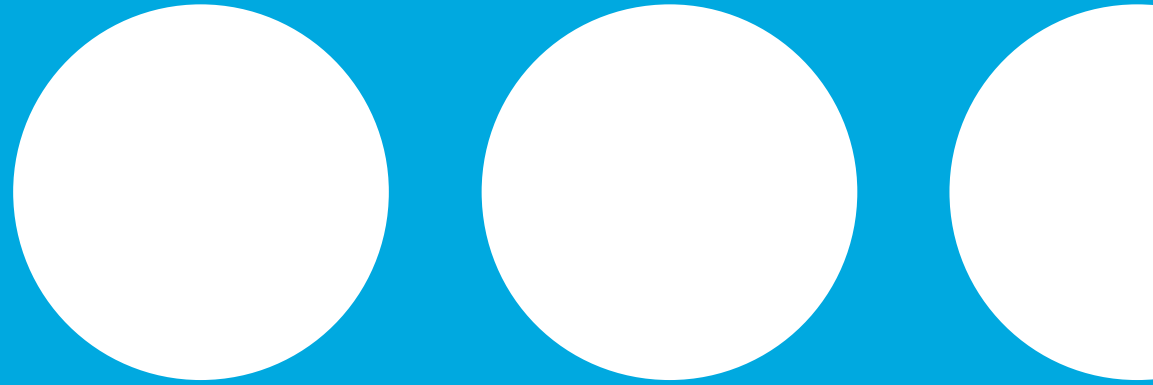
- Tozer Road investigation
- Seep barrier installation
- Coordination with CPI, TerraTherm and National Grid
- Continued operation and maintenance (O&M) soil vapor extraction (SVE) system
- Continued O&M of Longview Drive mitigation system



Treatment Areas

- Building 3 Area
- Building 5 Area
- PSL-10 (Open Field Area)
- Tozer Road
- Seep on Stream A
- Bedrock between Buildings 3 and 5

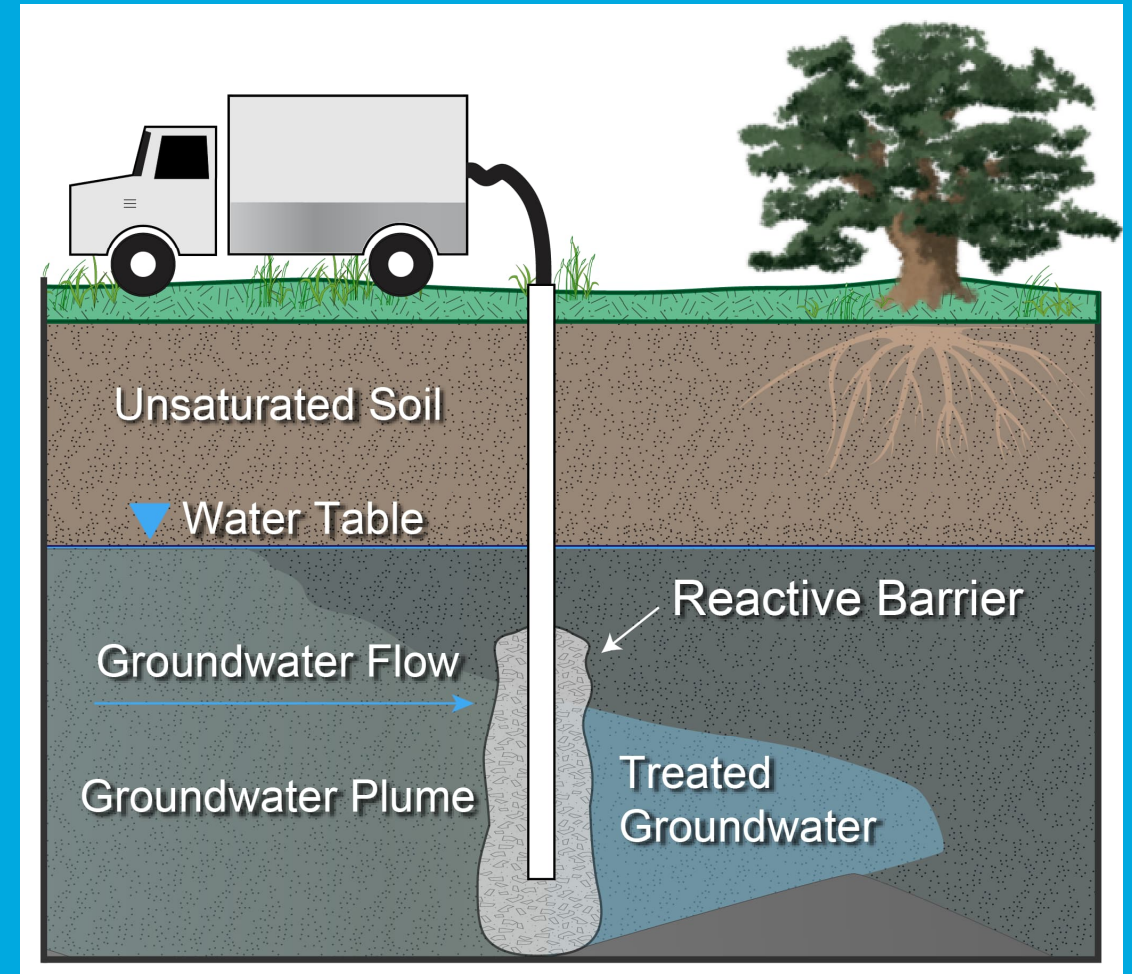




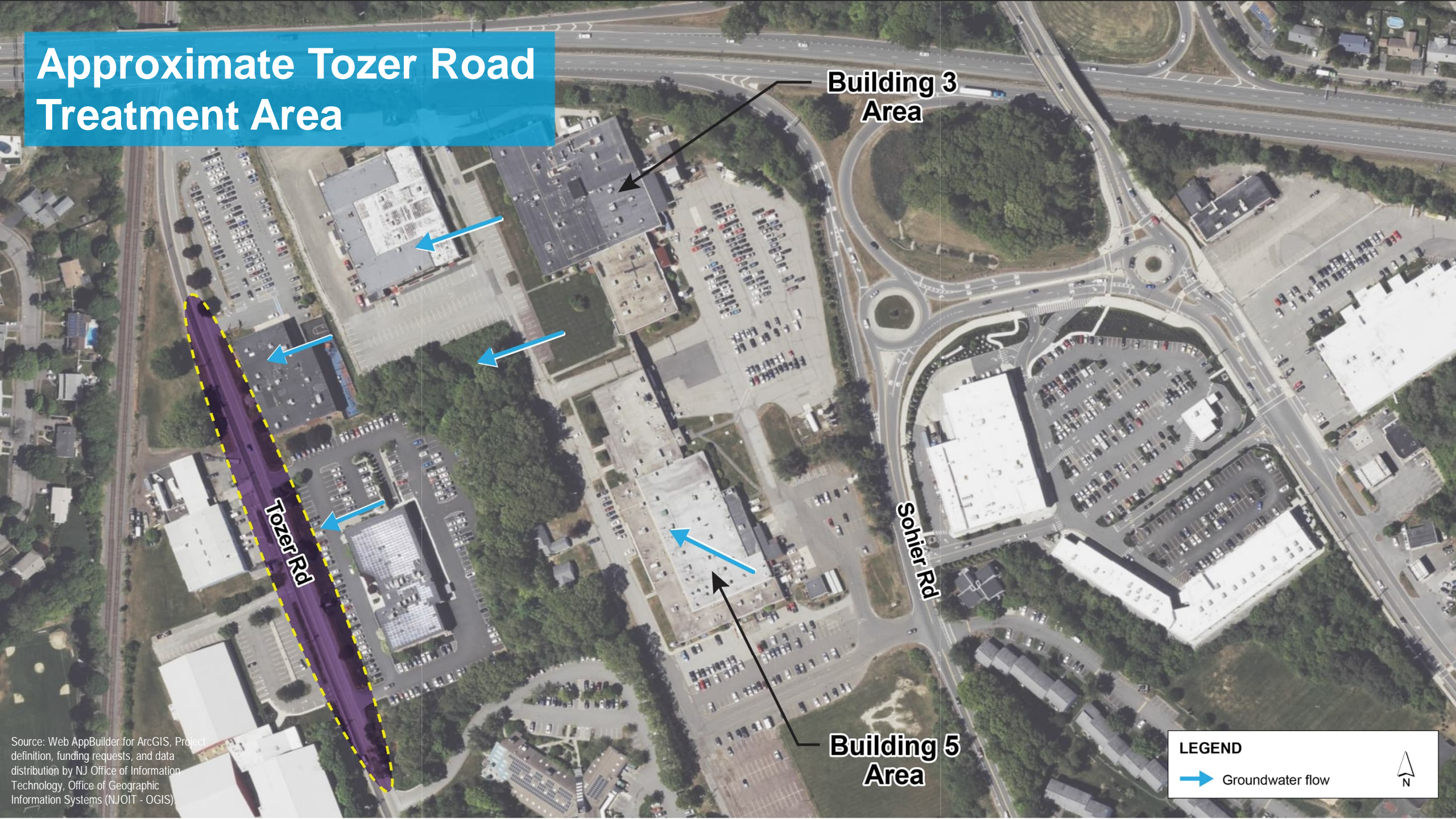
Status of Treatment Activities

Tozer Road Groundwater Treatment Barrier

- Installation of a permeable reactive and/or adsorptive barrier using sulfidated microscale zero-valent iron and colloidal activated carbon
- Remedial activities will include:
 - Investigation to provide additional high-resolution data and soil and groundwater data to help refine the design
 - Installation of new monitoring wells upgradient and downgradient of the treatment area
 - Baseline groundwater sampling
 - Injection of amendments to form a permeable treatment zone
 - Monitoring during injection
 - Post-remediation monitoring to assess performance



Approximate Tozer Road Treatment Area



Building 3 Area


Building 5 Area

Tozer Rd

Sohier Rd

LEGEND

→ Groundwater flow



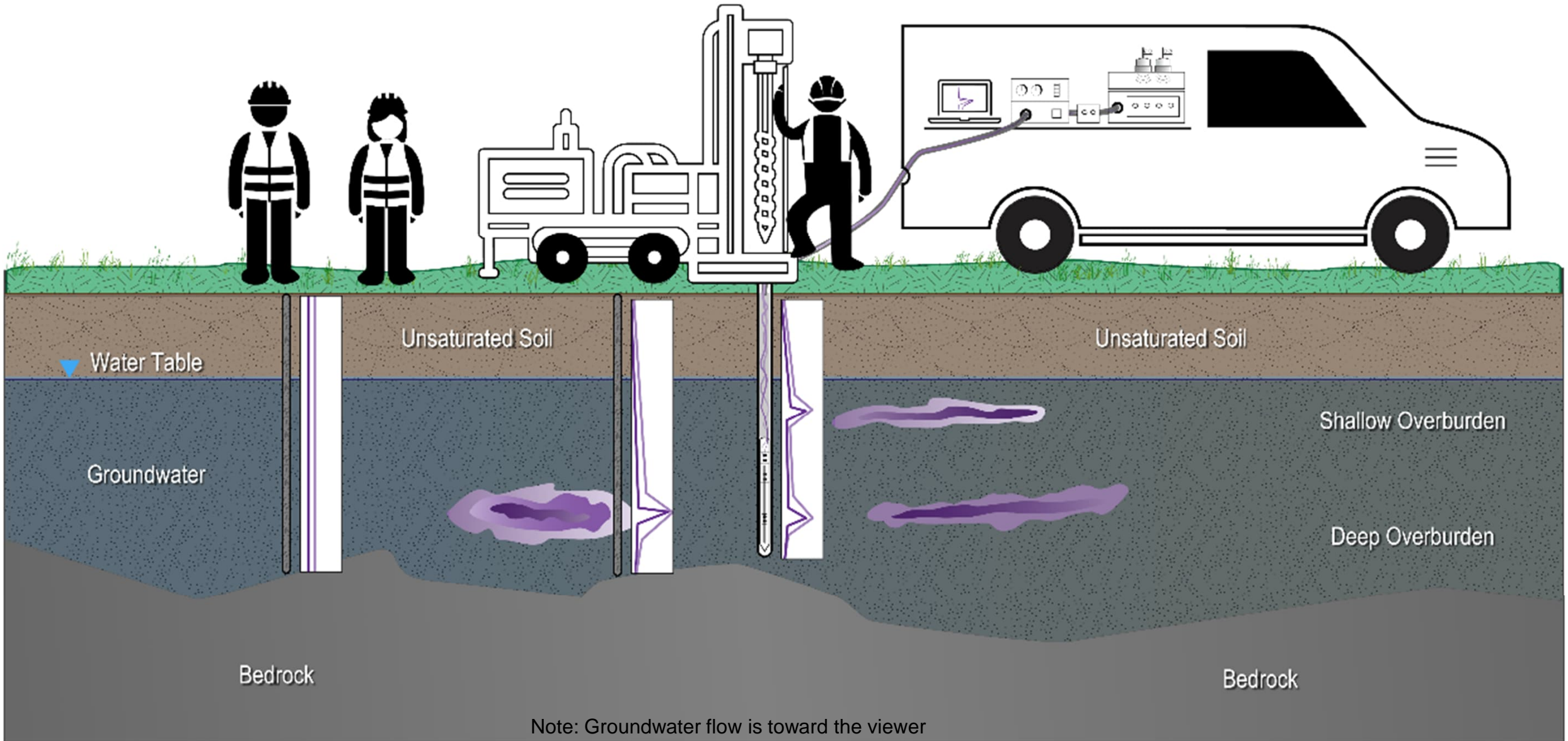
Source: Web AppBuilder for ArcGIS, Project definition, funding requests, and data distribution by NJ Office of Information Technology, Office of Geographic Information Systems (NJ OIT - OGIS)



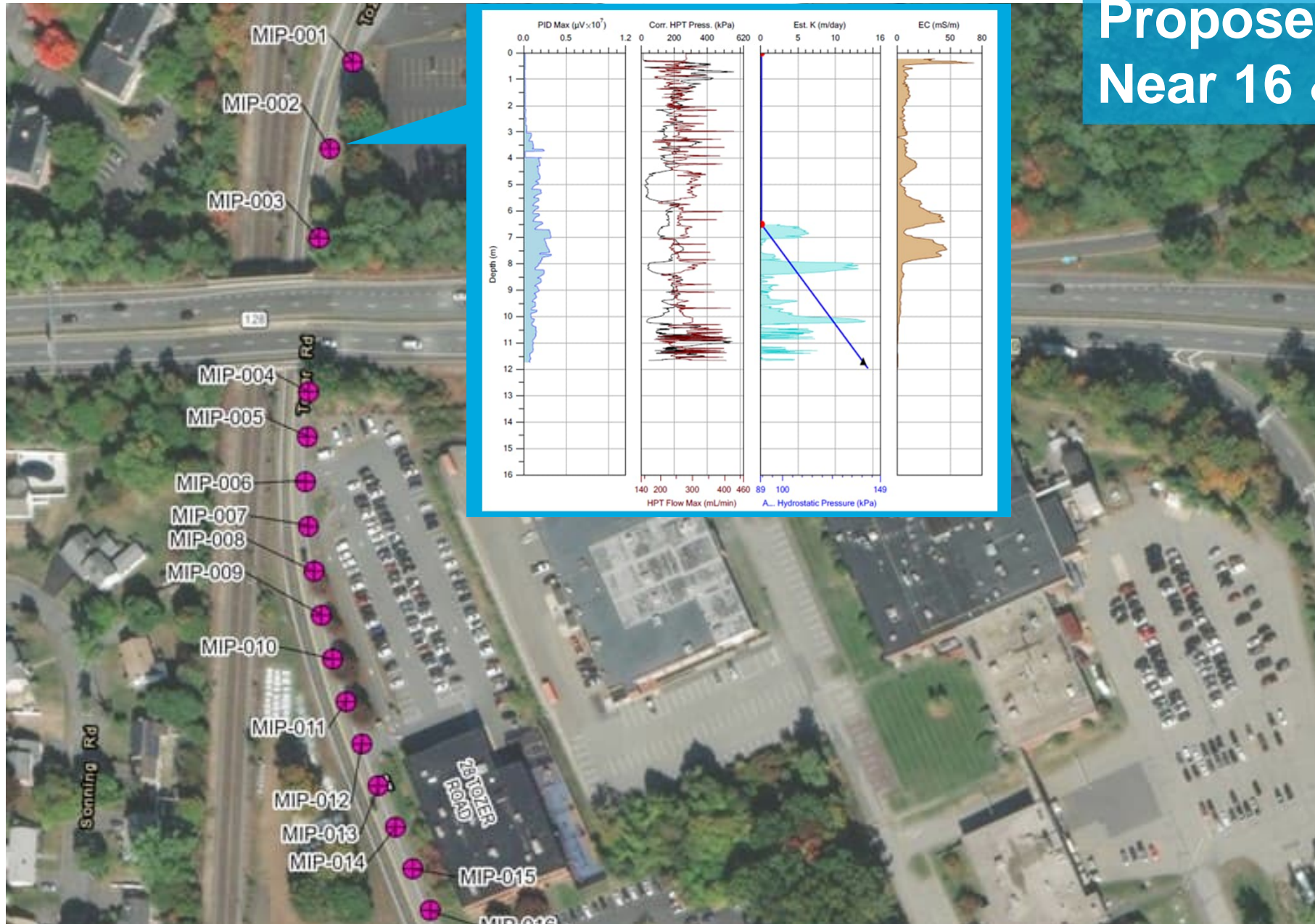
Membrane Interface Probe-Hydraulic Profiling Tool (MiHPT) Investigation

- Collects detailed data to help refine the design of barrier
- Probe that continuously logs information about geology, hydrogeology, and contaminant type and distribution correlated to depth
- Combination of technologies in one probe
 - MIP – VOC concentrations and distribution
 - HPT – hydraulic conductivity (measure of how easily water can pass through soil)
 - EC – electrical conductivity (evaluate soil properties)
- Helps determine contaminant distribution and mobility and migration pathways

Conceptual Diagram of MiPHT



Proposed Drilling Points Near 16 & 28 Tozer Road



- Work to be completed in right of way
- Complete up to 40 MiHPT borings to top of bedrock (35 to 90 feet below ground surface)
- Borings will be spaced approximately every 100 feet
- Will span from near 16 Tozer Road to near 32 Tozer Road
- Property owners have been notified of work
- Work near Hopeful Journeys Educational Center will not be conducted at times when students are coming to or leaving the facility

Proposed Drilling Points Near 30 & 32 Tozer Road



- Wetland delineation conducted July 2023
- Activities are exempt under Beverly Wetlands Protection ordinance
- Beverly Conservation Commission has been notified of this work
- Work near 32 Tozer Road may require lane closure – City of Beverly has approved a traffic management plan

Grab Soil and Groundwater Sampling and Flux Meters

What is Mass Flux?

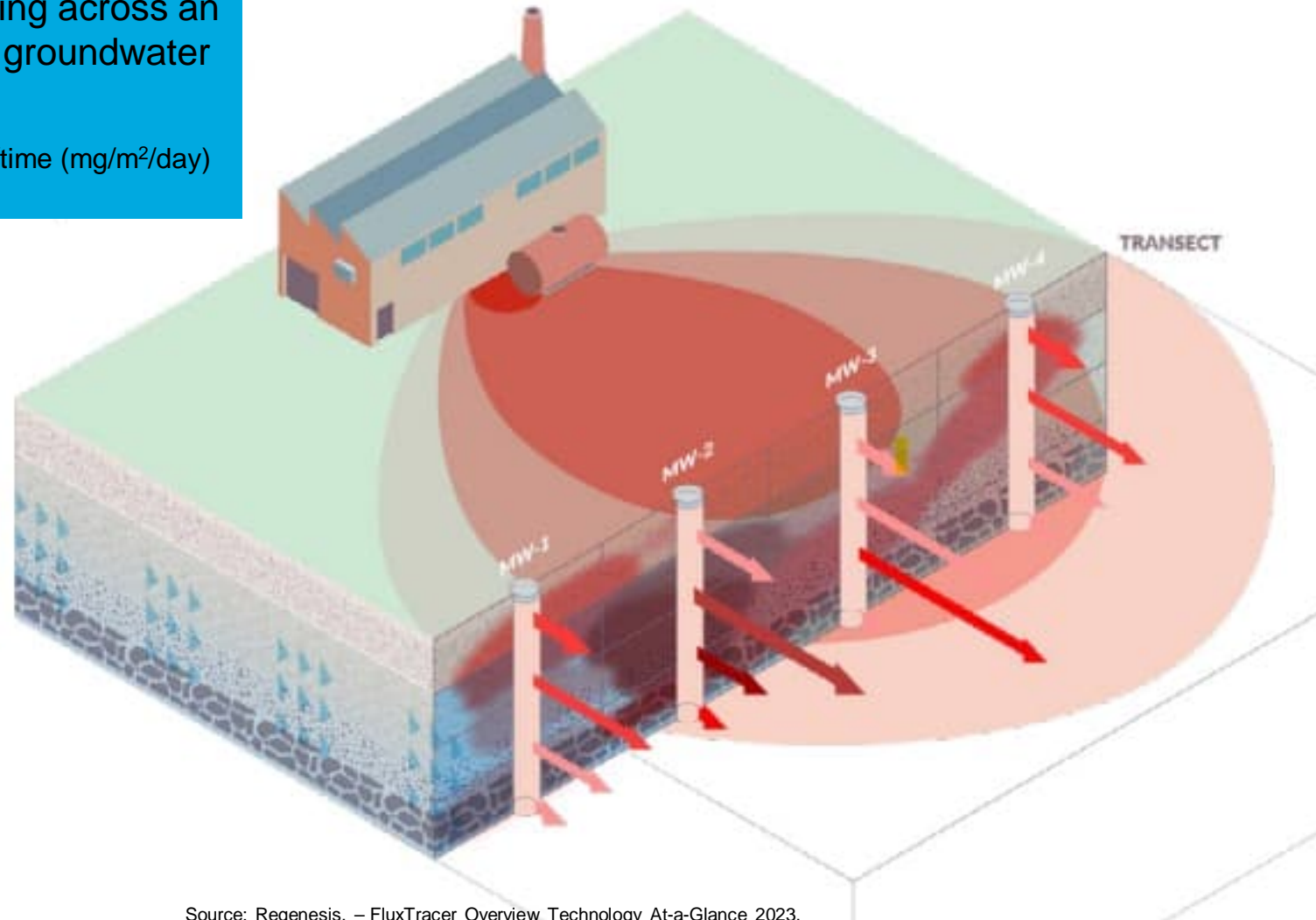
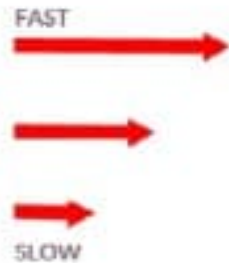
The contaminant mass moving across an aquifer perpendicular to the groundwater flow direction.

Mass flux is measured as mass/area/time ($\text{mg}/\text{m}^2/\text{day}$)

CONTAMINANT
CONCENTRATION



GROUNDWATER
VELOCITY



Source: Regenesis. – FluxTracer Overview Technology At-a-Glance 2023.
https://regenesis.com/wp-content/uploads/2019/12/FluxTracer-Data-Sheet-FINAL-031323.pdf?utm_source=website&utm_medium=landingpage&utm_id=fluxtracer

Anticipated Tozer Road Schedule

MiHPT Investigation



Nov – Dec 2023

Design Permeable Barrier



Dec 2023 – Jan 2024

Install Monitoring Wells



Jan – Feb 2024

Install Permeable Barrier



Mar – May 2024

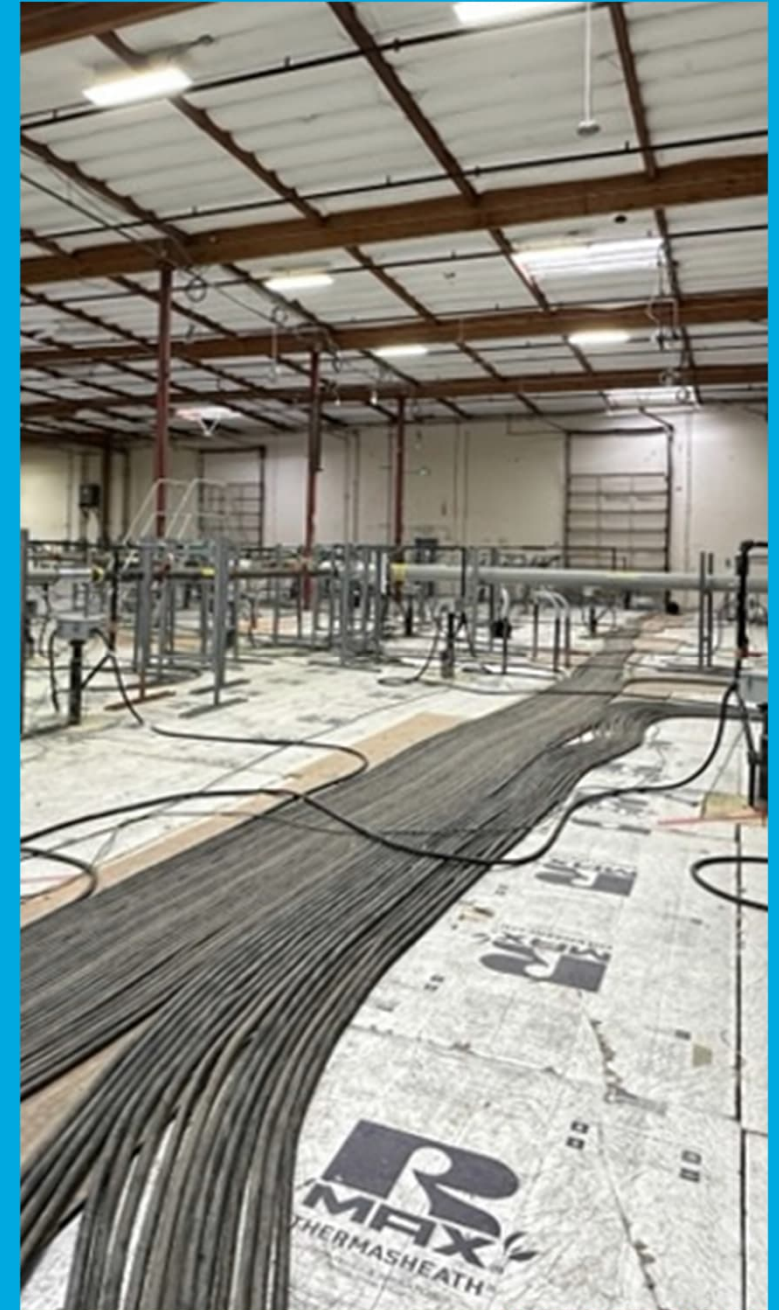
Ongoing Monitoring



Year 1 – Quarterly
Years 2-3 – Semi-Annual
Years 4-5 – Annual

Building 3 Thermal Treatment

- Design and planning efforts are underway on multiple aspects of the thermal treatment system
 1. Completed final agreement and issued contract to TerraTherm for thermal remediation services
 2. Completed CPI personnel briefing
 3. Advanced supplemental soil borings north of Building 3
 4. Sampled soil to refine treatment zone boundaries
 5. Developed primary power service installation approach
 6. Continued coordination with CPI for stockroom access





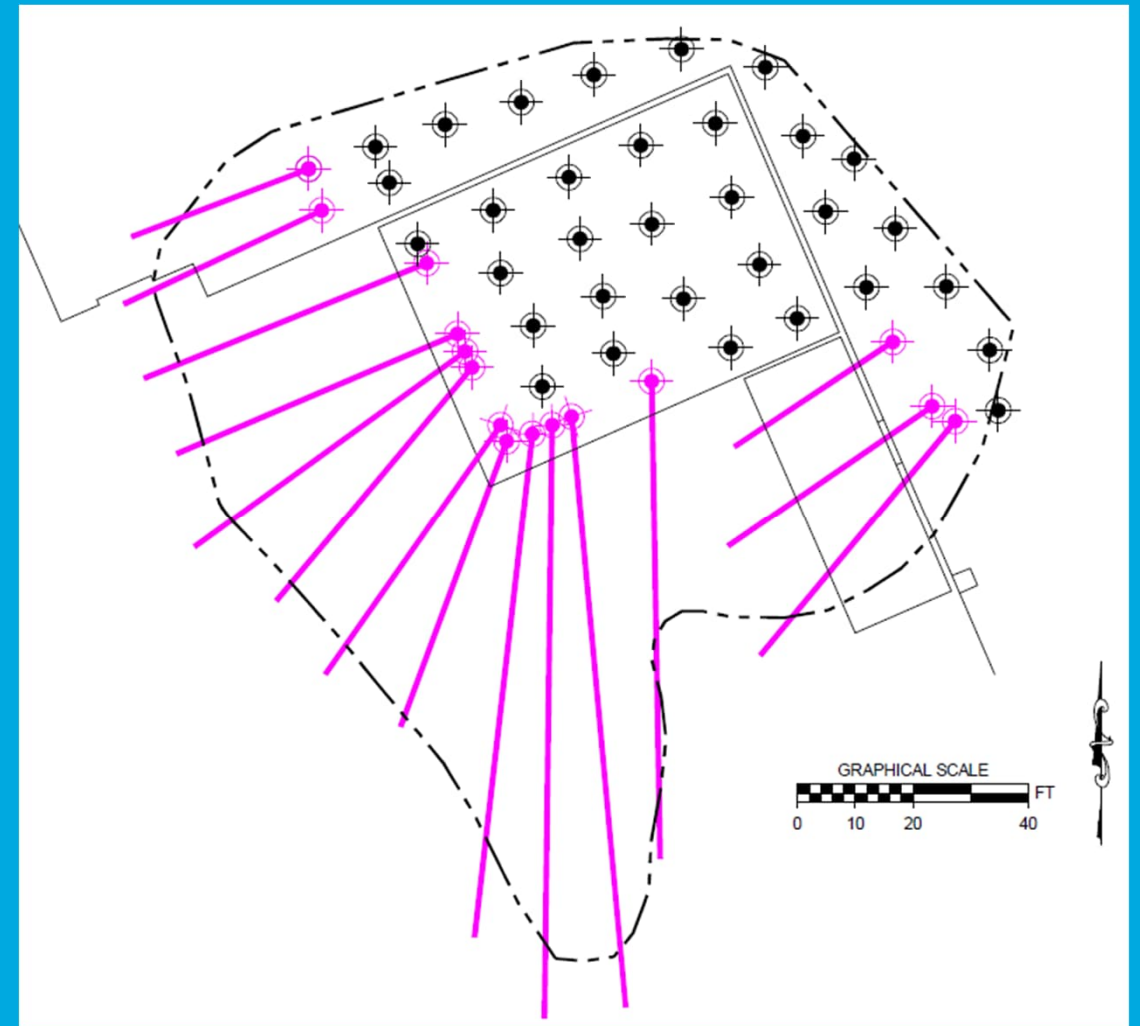
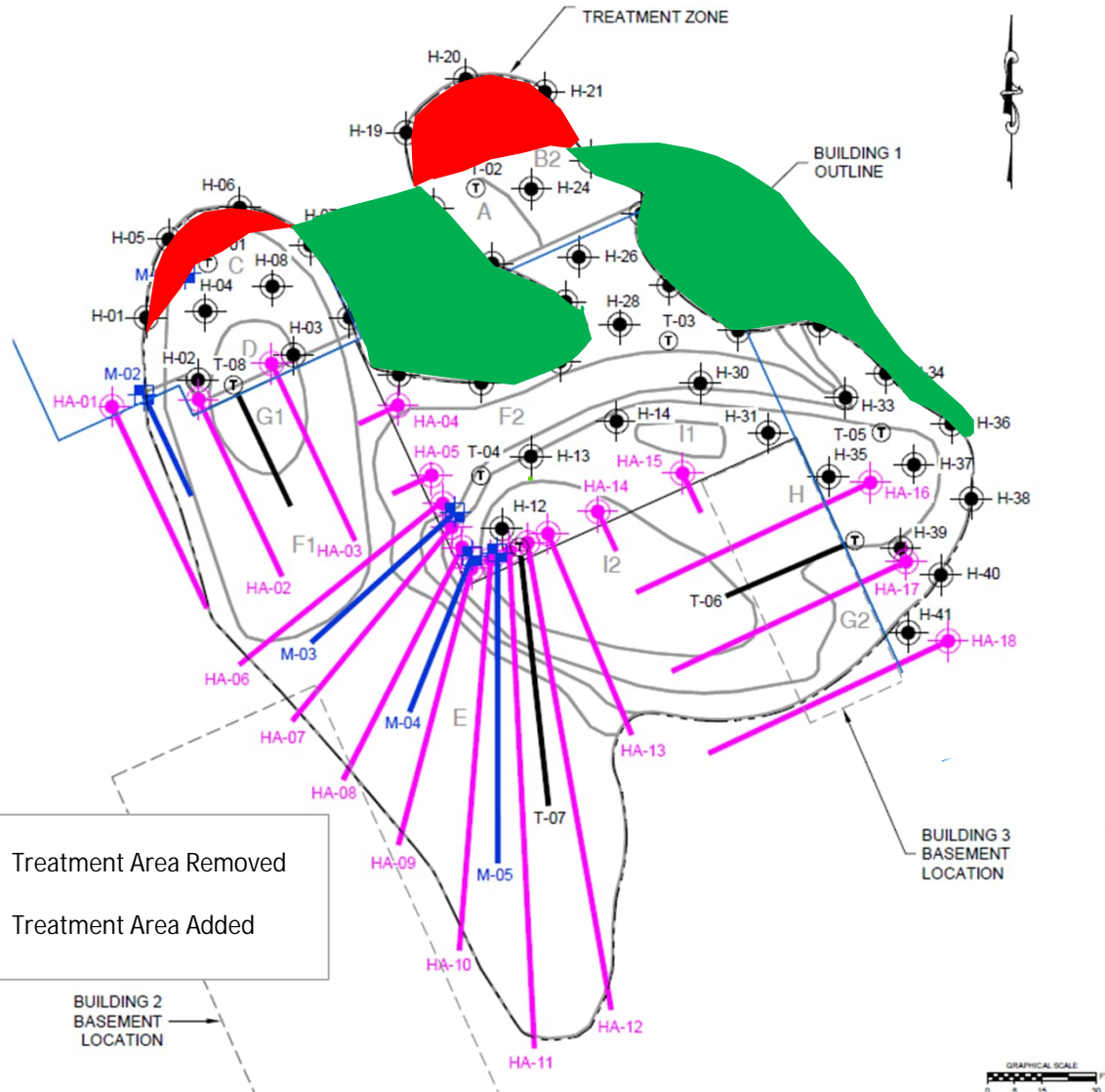
Supplemental Soil Borings

- Two additional soil borings advanced to bedrock north of Building 3
 - 12 soil samples obtained for lab analysis
 - Bedrock reached between 52 and 63 feet below ground surface as expected
- Active utilities presented significant constraints for outdoor area access
 - Strategies to reach outdoor treatment areas from inside the stockroom are in development
- Observations used to confirm northern boundary of thermal treatment zone

Treatment Zone Revisions

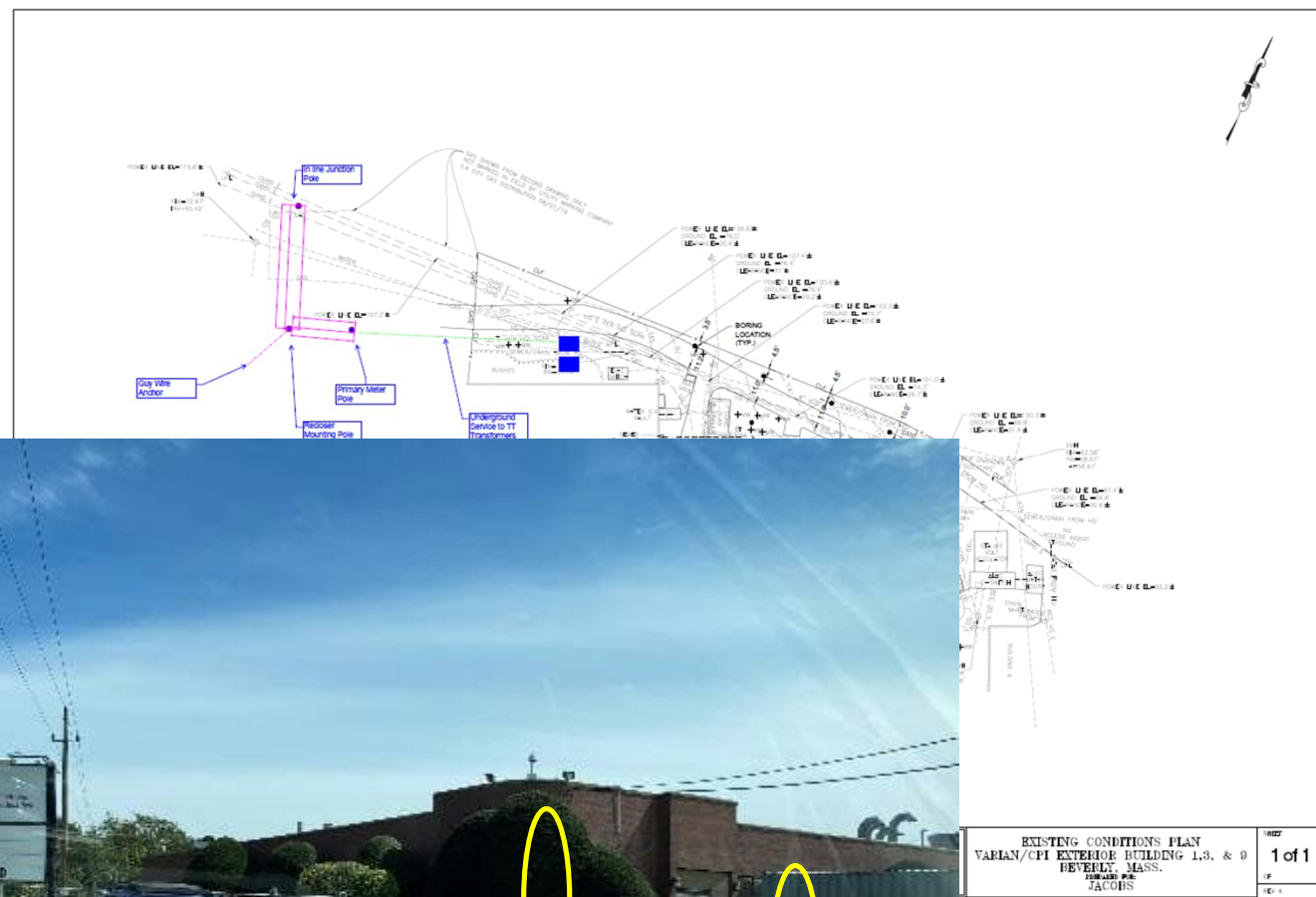
Draft Concept

Revised Approach



Primary Power Service

- National Grid representatives engaged for on-site meeting
- Three new poles installed outside work area are required
- Subsurface utility clearance survey underway
- Updated mapping under development to support final design by National Grid



PSL 10 Investigation

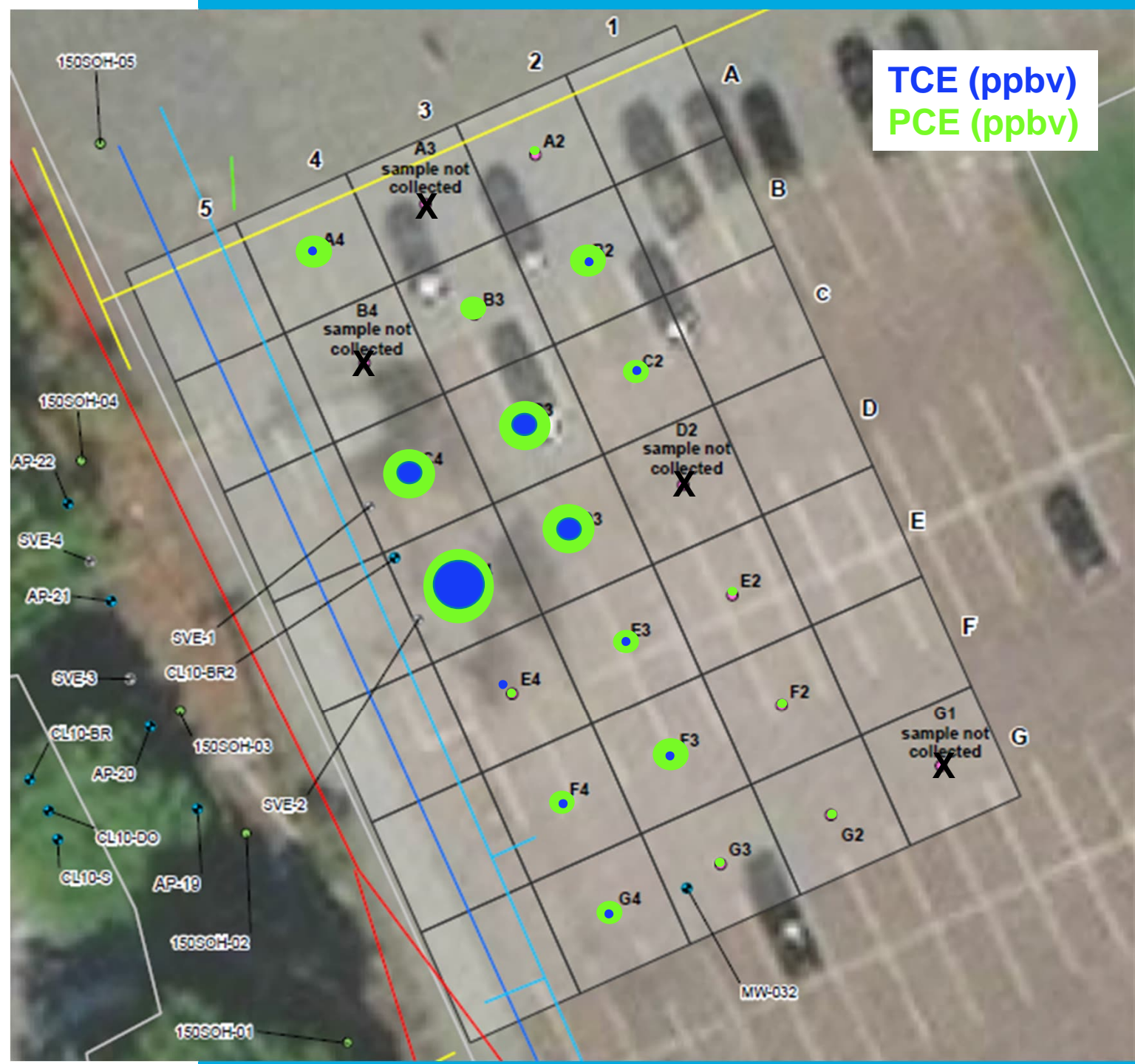
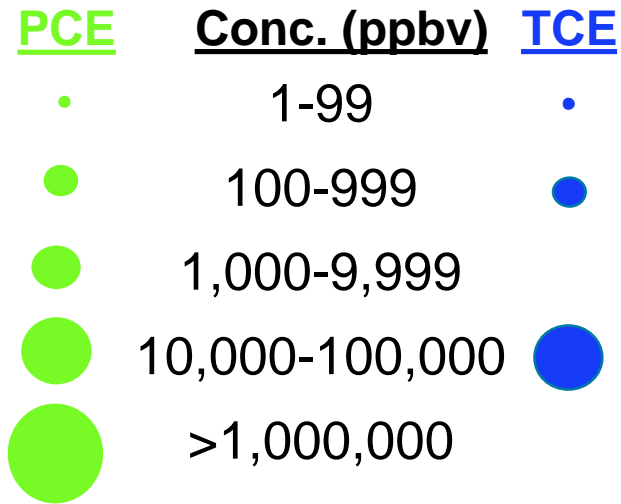


- August 2023 – soil gas survey
 - Grid based approach
 - ~160 feet x 60 ft
 - Active (vs. passive) samples
 - 2 to 5 feet below ground surface
 - 18 locations/samples; limitations due to utilities and tight soils/refusal
- September 2023 – soil borings and monitoring well installation (5 wells)

PSL 10 Investigation

Soil Gas Results (ppbv)

X Data not collected



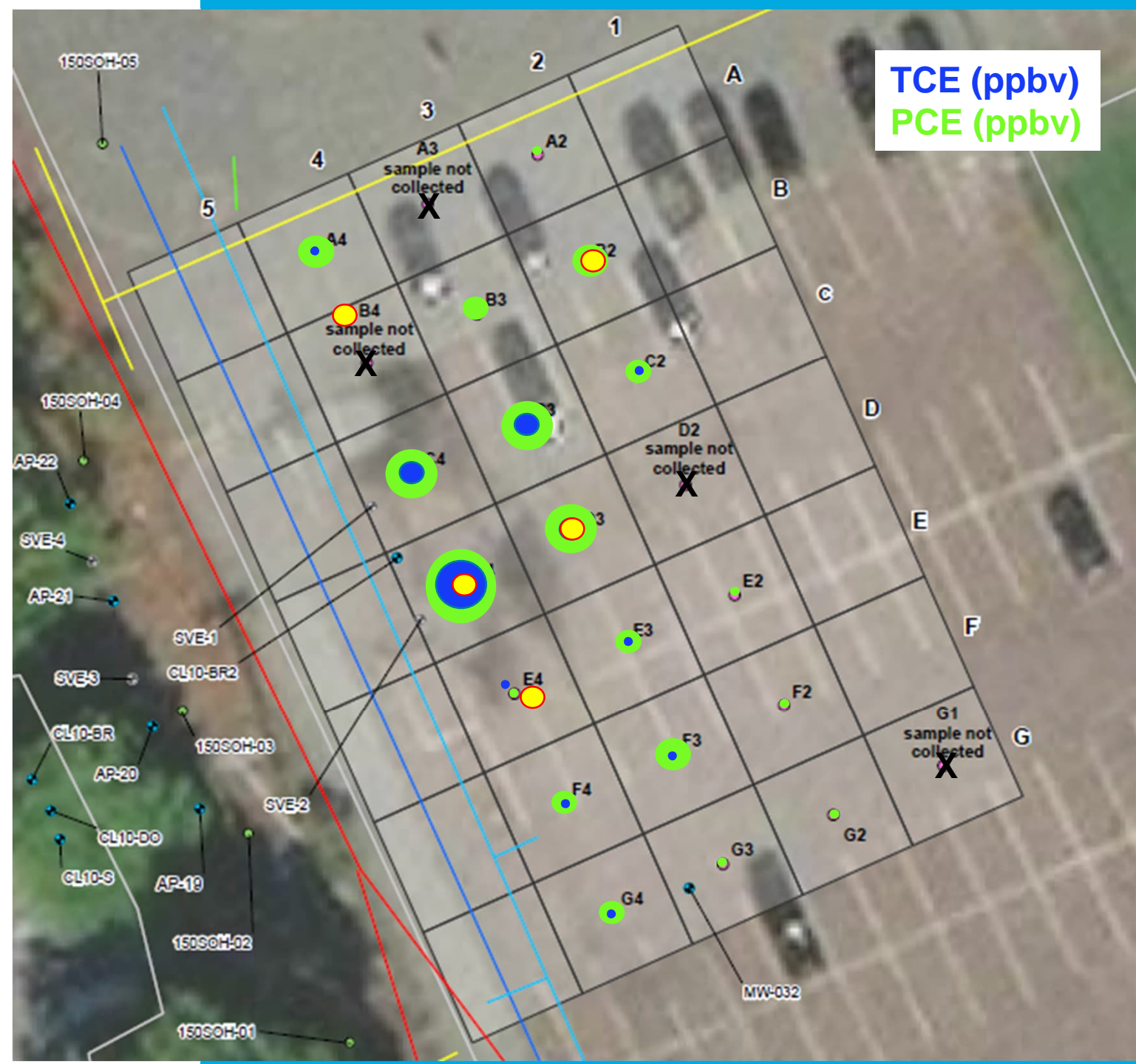
PSL 10 Investigation

Monitoring Well Installation

X Data not collected

<u>PCE</u>	<u>Conc. (ppbv)</u>	<u>TCE</u>
●	1-99	●
●	100-999	●
●	1,000-9,999	●
●	10,000-100,000	●
●	>1,000,000	●

● Soil boring/monitoring well (installed September 2023)



PSL 10 Investigation

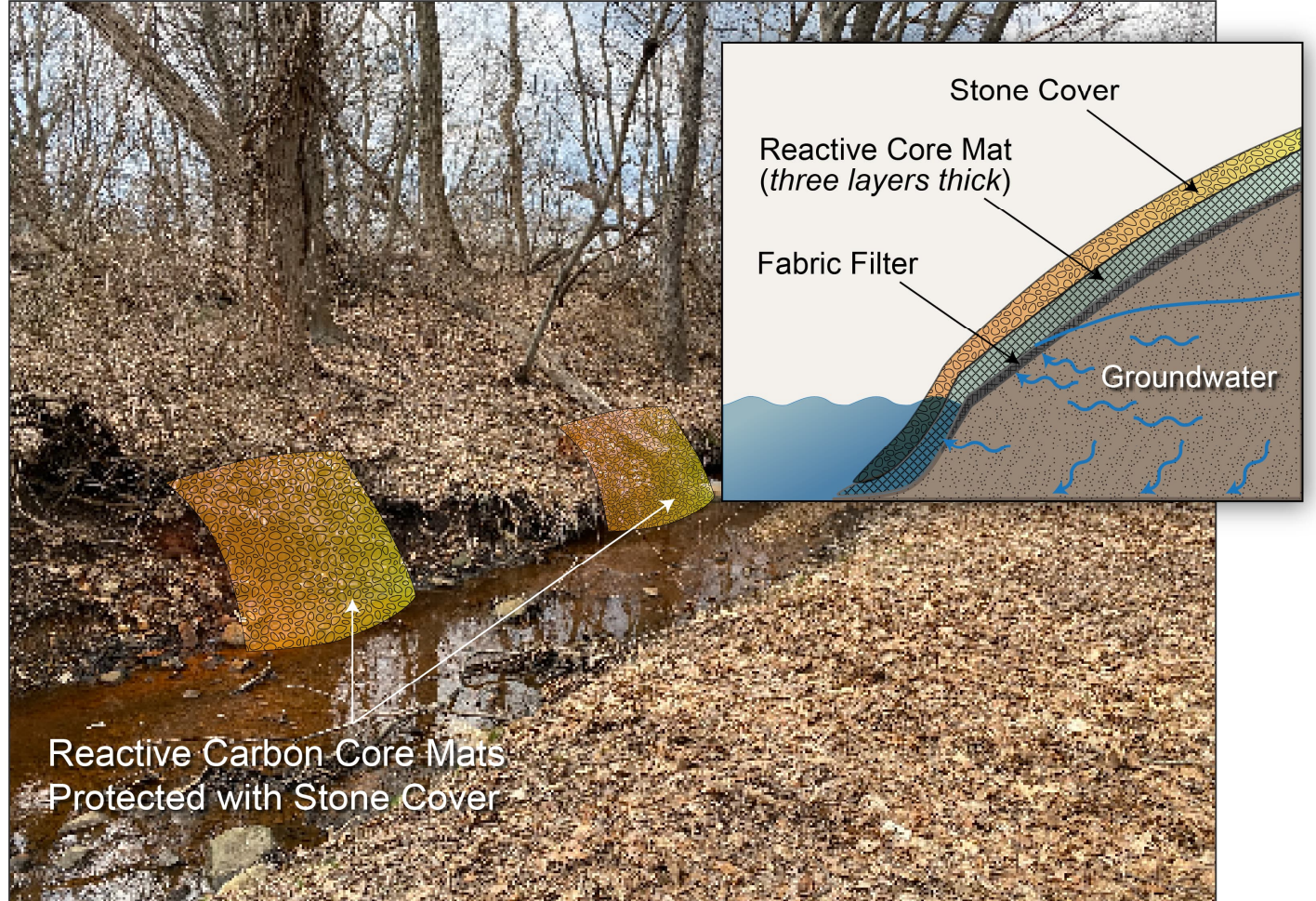
Monitoring Well Installation

- Soil borings/shallow monitoring wells
 - 5 locations
 - Soil sampled for VOCs (8 samples)
 - Groundwater sampled for VOCs
- Identify size of residual source in the vadose zone
- Refine remedial approach – Phase IV, Part 3 submittal



Stream A Mat Installation

- Granular activated carbon permeable adsorptive barrier
 - Designed to intercept and capture contaminants before water discharges to the stream
 - Designed to limit access to the groundwater seep



Stream A Mat Installation



- Installation started yesterday
 - Installation includes erosion controls to protect the stream during construction
 - Mats will be covered to limit washout and tampering
 - Also installing shallow test wells in the stream bank up slope from the mats
 - Work will be complete by Friday
 - New shallow test wells and stream will be monitored
 - Regular inspections will be completed

Upcoming Submittals and Events

➤ Events

- November – annual groundwater sampling

➤ Submittals

- Phase IV Remedy Implementation Plan Part 3 (Nov 7)

➤ Nov 14: PIP Meeting - Phase IV Remedy Implementation Plan, Parts 2 & 3

- Nov 15 – Dec 4: 20-day public comment period
- Jan 3: Responses to Comments Due to MassDEP

➤ Upcoming TAG Meetings

- Dec 19 (virtual if needed)
- Jan 16, 17, or 18 (proposed)



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