



Nonantum Groundwater Investigation

Massachusetts Department of
Environmental Protection

May 12, 2016



MassDEP



- State agency (aka “State EPA”) is responsible for:
 - Ensuring clean air and water
 - Safe management of solid and hazardous wastes
 - Preservation of wetlands and coastal resources
 - **Clean-up of oil & hazardous materials spills**



This presentation will cover:

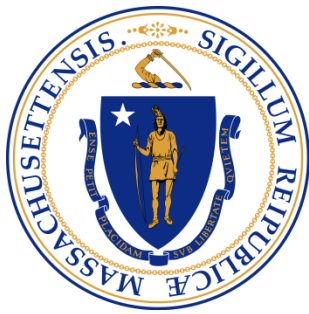


- Vapor Intrusion
- Trichloroethylene (TCE)
- MassDEP's General Site Evaluation Approach
- How the Newton project started
- 2014-2015 Work East of Adams Street
- 2016 Work on Adams Street, West and North
- Next Steps

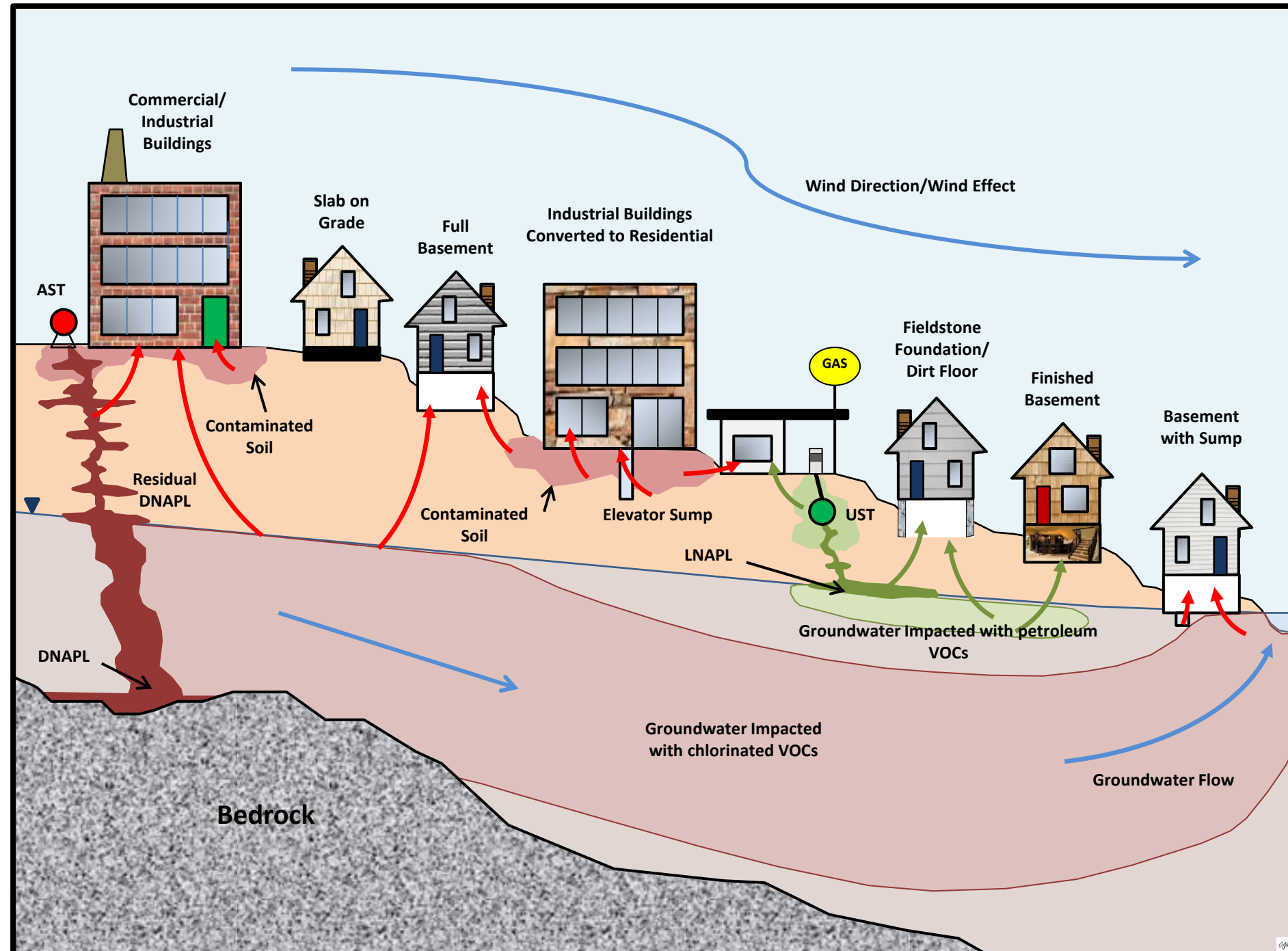


Vapor Intrusion

- Vapor Intrusion is gas entering a building from the subsurface
- Most well known example is radon
- For TCE, vapors are coming from contamination in soil or groundwater
- Groundwater in Newton IS NOT drinking water

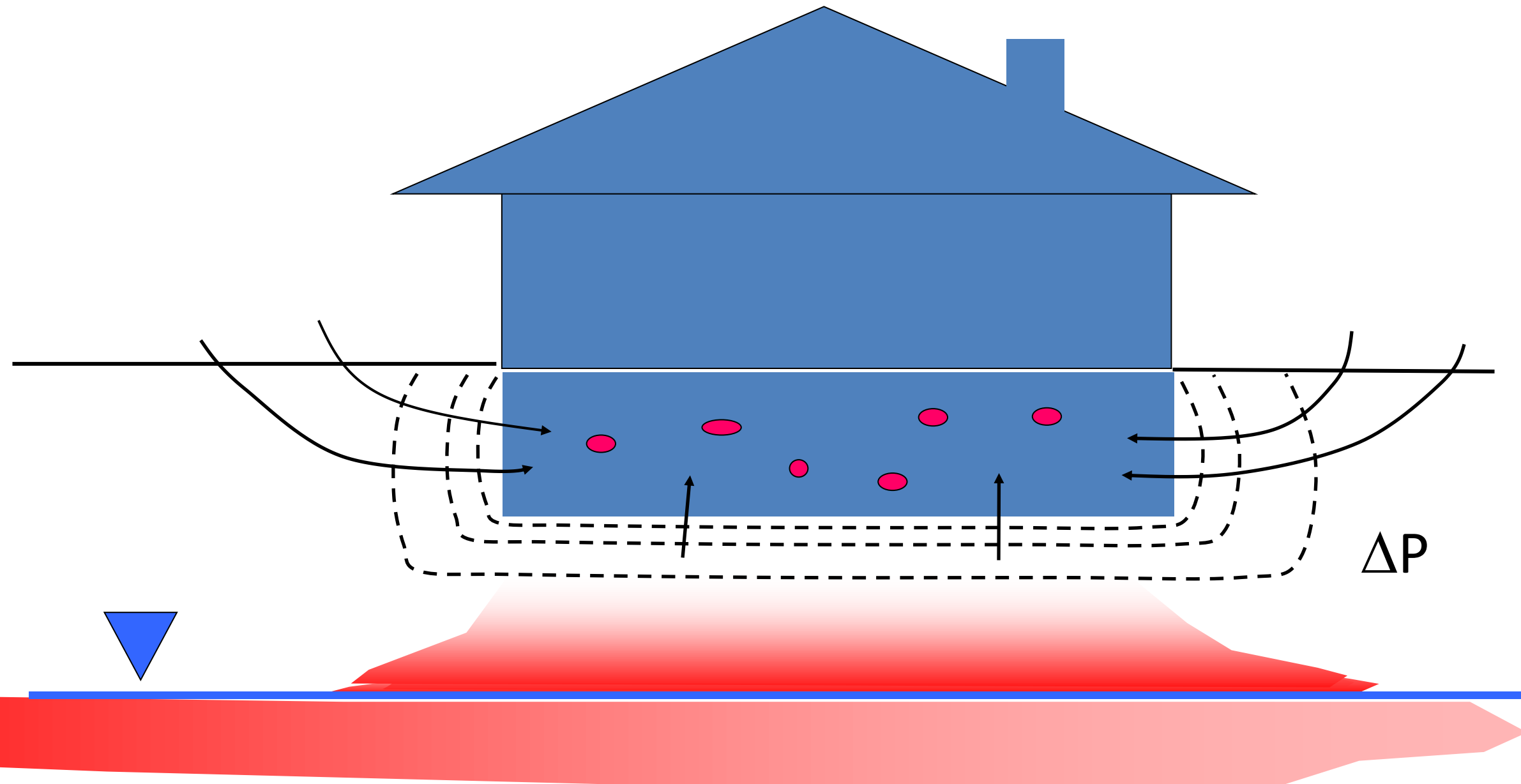


Vapor Intrusion into Buildings





Vapor Intrusion Phenomenon





Factors that Affect Vapor Intrusion

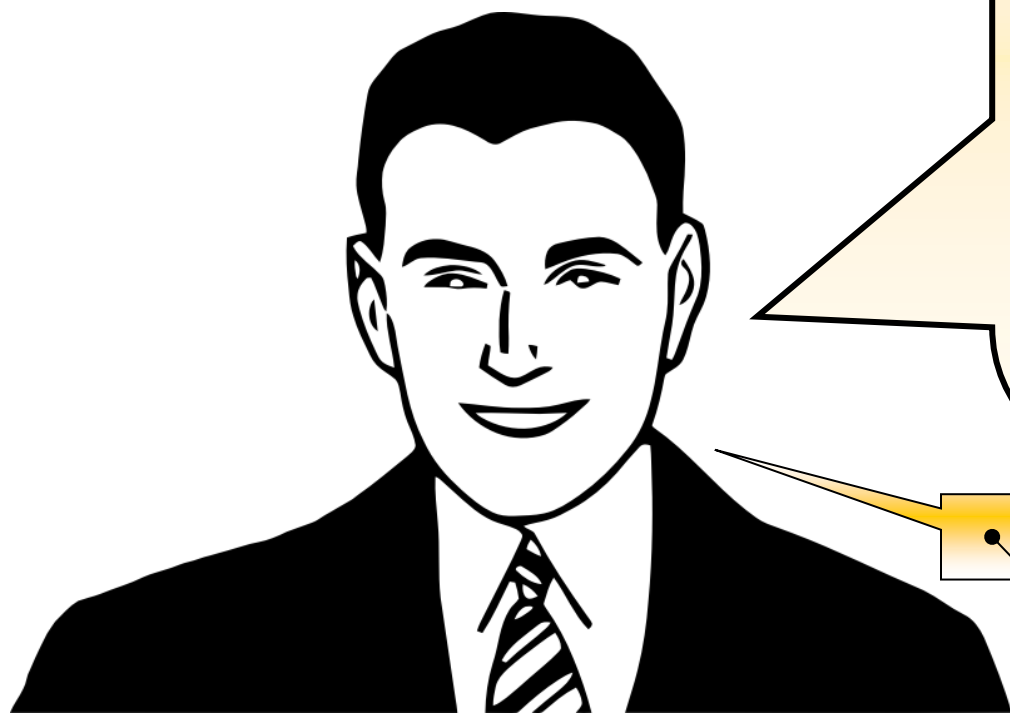


- Contaminant concentration in groundwater
- Depth to groundwater
- Integrity of Basement floor



Exposure Pathways

Breathing: 20,000
Liters/Day



Drinking: 2 Liters/Day



Trichlorethylene (TCE)



- Man-made, colorless liquid
- Main uses:
 - 1920s-1950s—dry cleaning
 - Degreaser for metal parts
 - Less commonly used as ingredient in glues and paint removers



TCE – Action Levels in Indoor Air



- Increased emphasis on TCE sites due to lower EPA standard
- 6 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) is Action Level for women who are pregnant or may become pregnant due to risk to developing fetus
- 20 $\mu\text{g}/\text{m}^3$ is Action Level for everyone else
- 2 $\mu\text{g}/\text{m}^3$ is US Environmental Protection Agency long-term guideline for indoor air in a residence



TCE - Possible Health Effects

- During the first 8 weeks of pregnancy, can affect the fetal heart development
- Immune System effects – reduces the ability to prevent illness
- Long-term exposures may increase an individual's risk of cancers to the kidney, liver and non-Hodgkin's lymphoma



Investigation General Approach



- Identify Groundwater with level of TCE that could result in vapor intrusion
- Determine potentially impacted homes
- Identify address and homeowner
- Send letter requesting access
- Test indoor air in home—"grab" sample
- Notify homeowner of results



If TCE is Present in Indoor Air

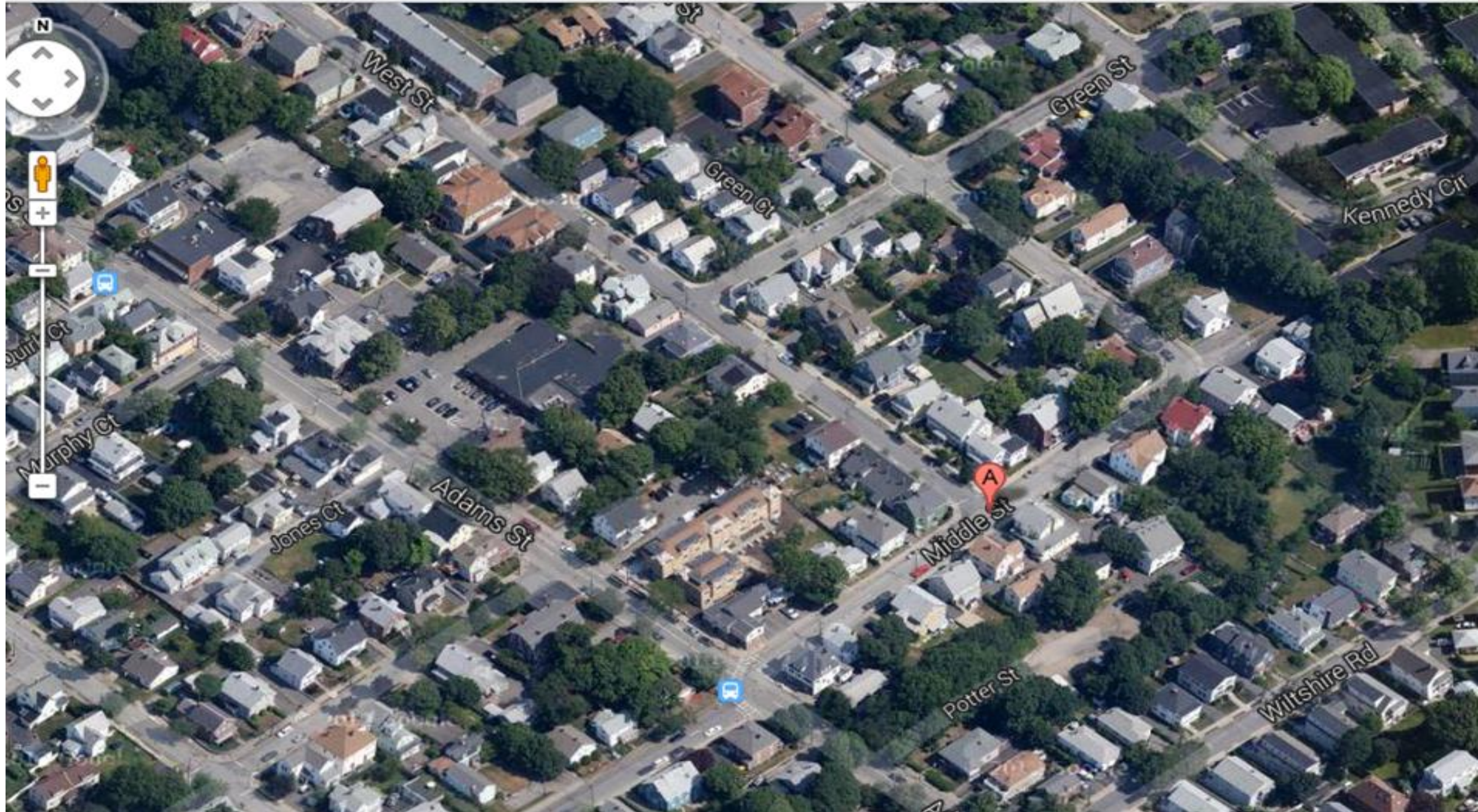


- 24-hour time-weighted test
- Air Purifying Unit
- Sub-Slab Depressurization System (Radon System)



Google

Middle Street, Newton, MA





Field Investigation 2014-2015



- Report submitted by developer for former auto salvage yard and auto parts reseller
- MassDEP audit of report identified high levels of TCE in groundwater
- Re-sampling of groundwater monitoring wells confirmed presence of TCE
- Installation of 41 additional groundwater monitoring wells



Groundwater Monitoring Well





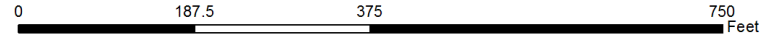
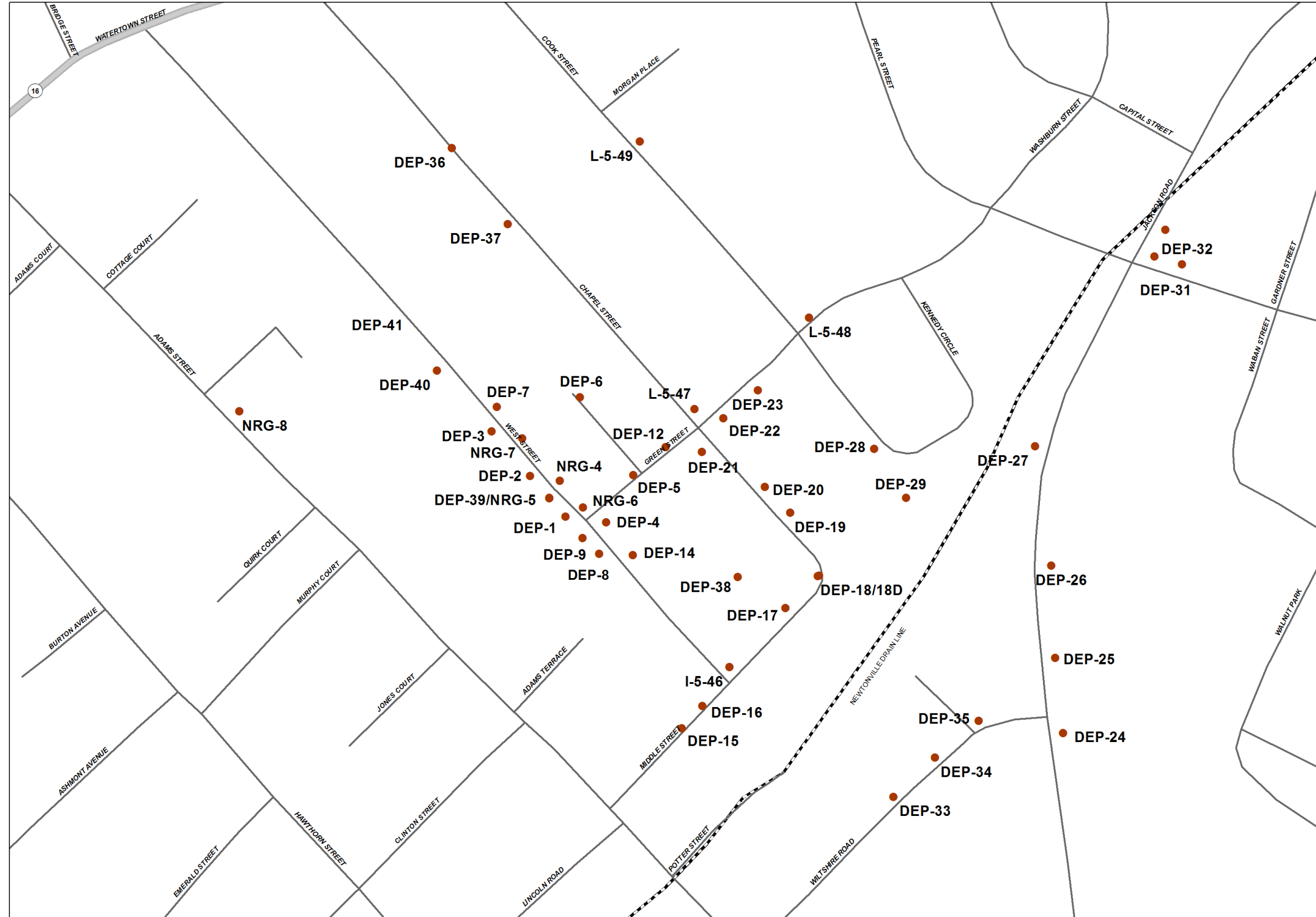
Field Investigation 2014-2015



- New monitoring well locations based on groundwater testing results
- Groundwater criteria for vapor intrusion = 5 micrograms per liter ($\mu\text{g}/\text{l}$)
- Highest groundwater level measured at corner of Middle Street and Chapel Street, 3700 $\mu\text{g}/\text{l}$



Nonantum Field Investigation 2014 - 2015



● Monitoring Well



Field Investigation 2014-2015

Based on Groundwater Results...



- In 2015, Access letters sent to homeowners
- Sent letters to 59 homeowners/70 addresses
- 56 addresses had indoor air tested
- Testing done on basement and first floor

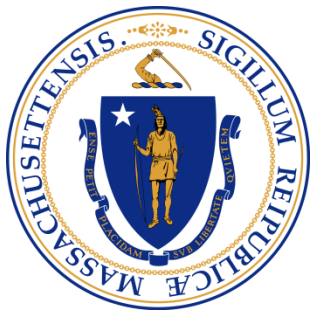


Field Investigation 2014-2015

Vapor Intrusion Results



- 21 addresses had evidence of vapor intrusion
- 6 addresses had TCE vapor intrusion levels greater than MassDEP's action levels
- Air purifying units installed to reduce indoor air concentrations
- 5 remediation systems (sub-slab depressurization systems/Radon systems) installed at six addresses





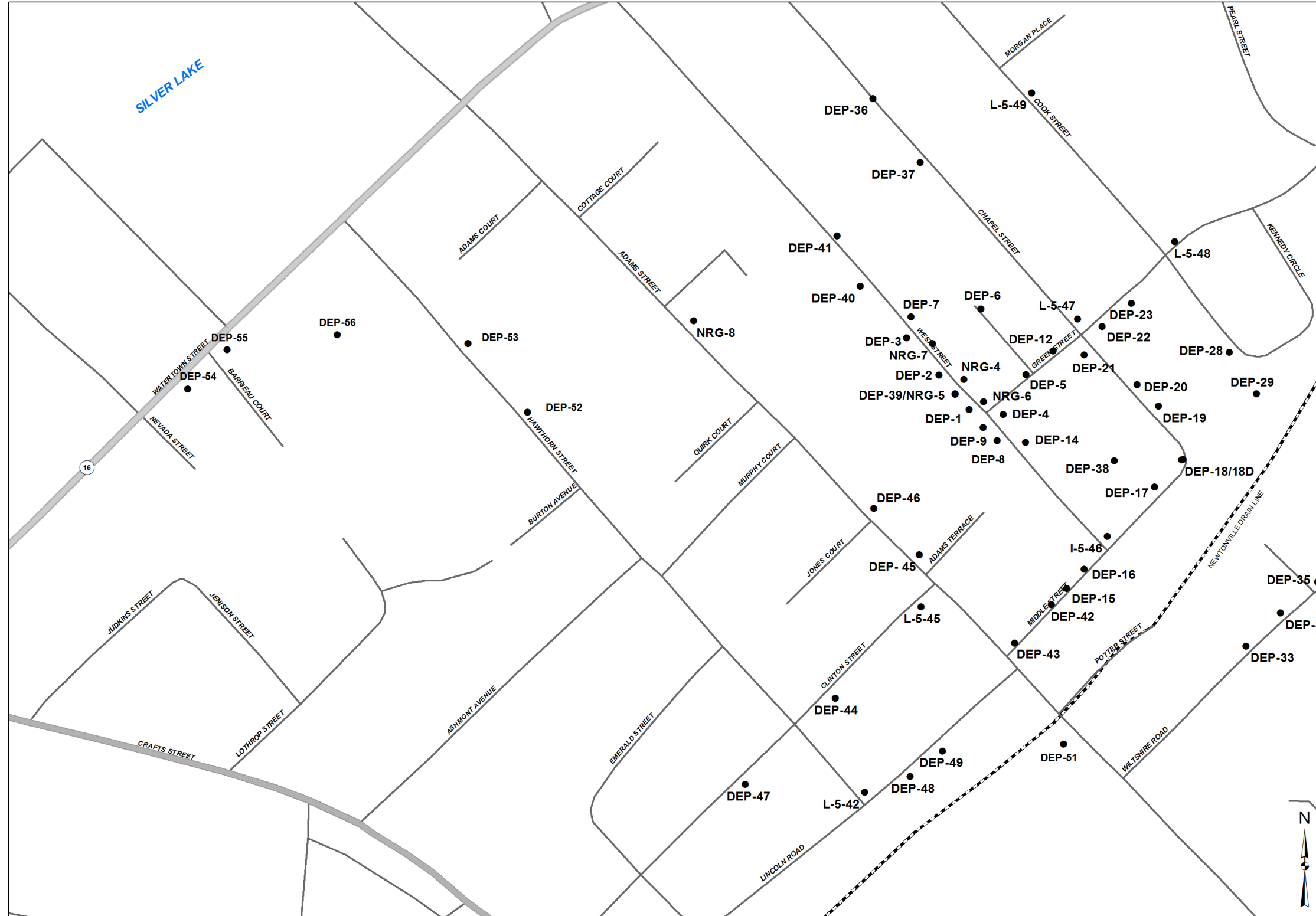
Field Investigation 2016



- In 2016, MassDEP tested City's existing groundwater wells
- Found TCE levels in groundwater as high as 3,000 $\mu\text{g}/\text{L}$ at Clinton/Adams Street intersection
- The groundwater investigation then extended to west of Adams Street



Nonantum Field Investigation May, 2016



0 220 440 880 Feet



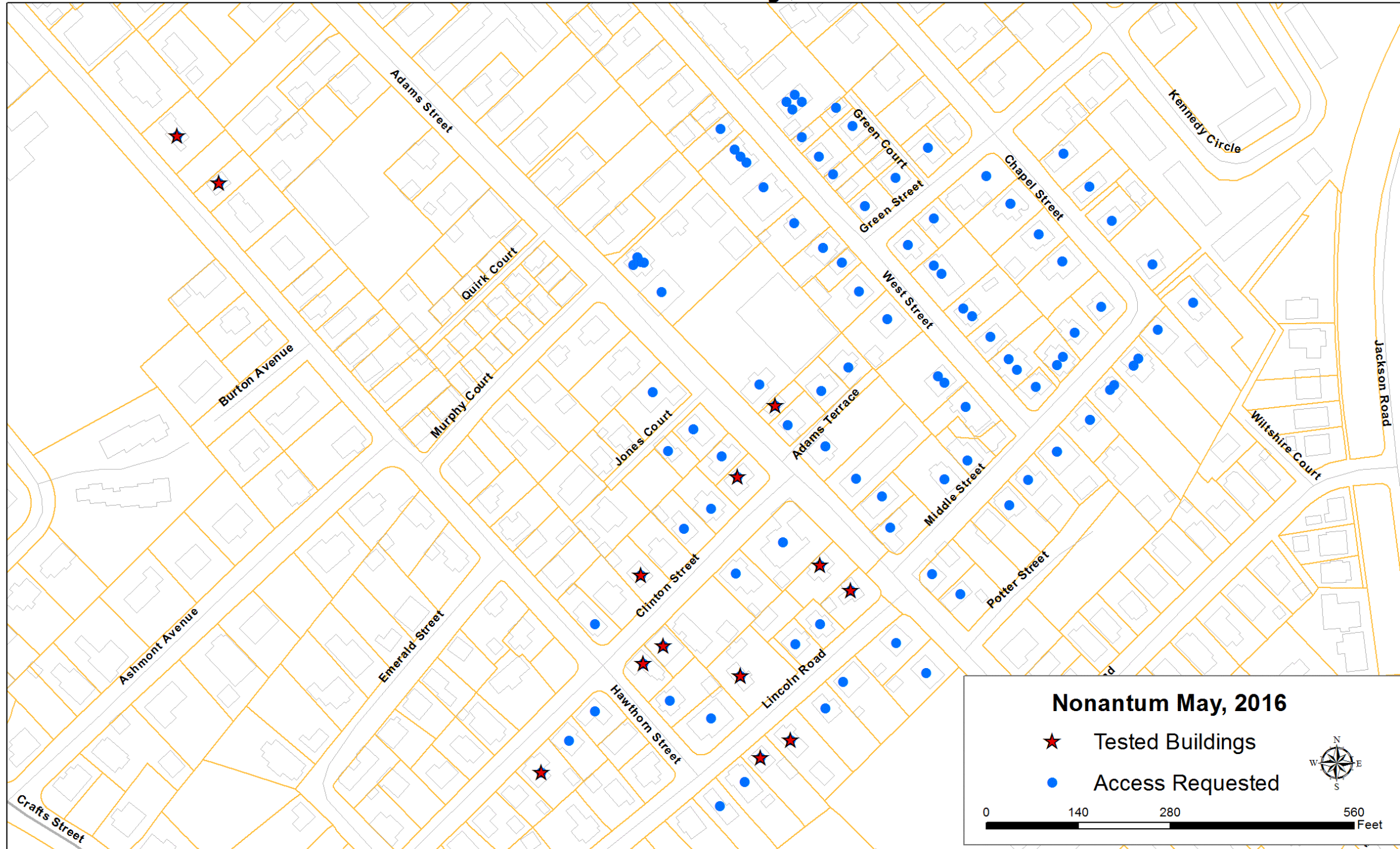
Field Investigation 2016



- 15 additional groundwater monitoring wells installed so far
- 76 addresses/52 owners of buildings in locations with elevated TCE in groundwater
- 20 addresses tested to date
 - 18 - no TCE measured
 - 2 with very low TCE levels in basement, not on first floor

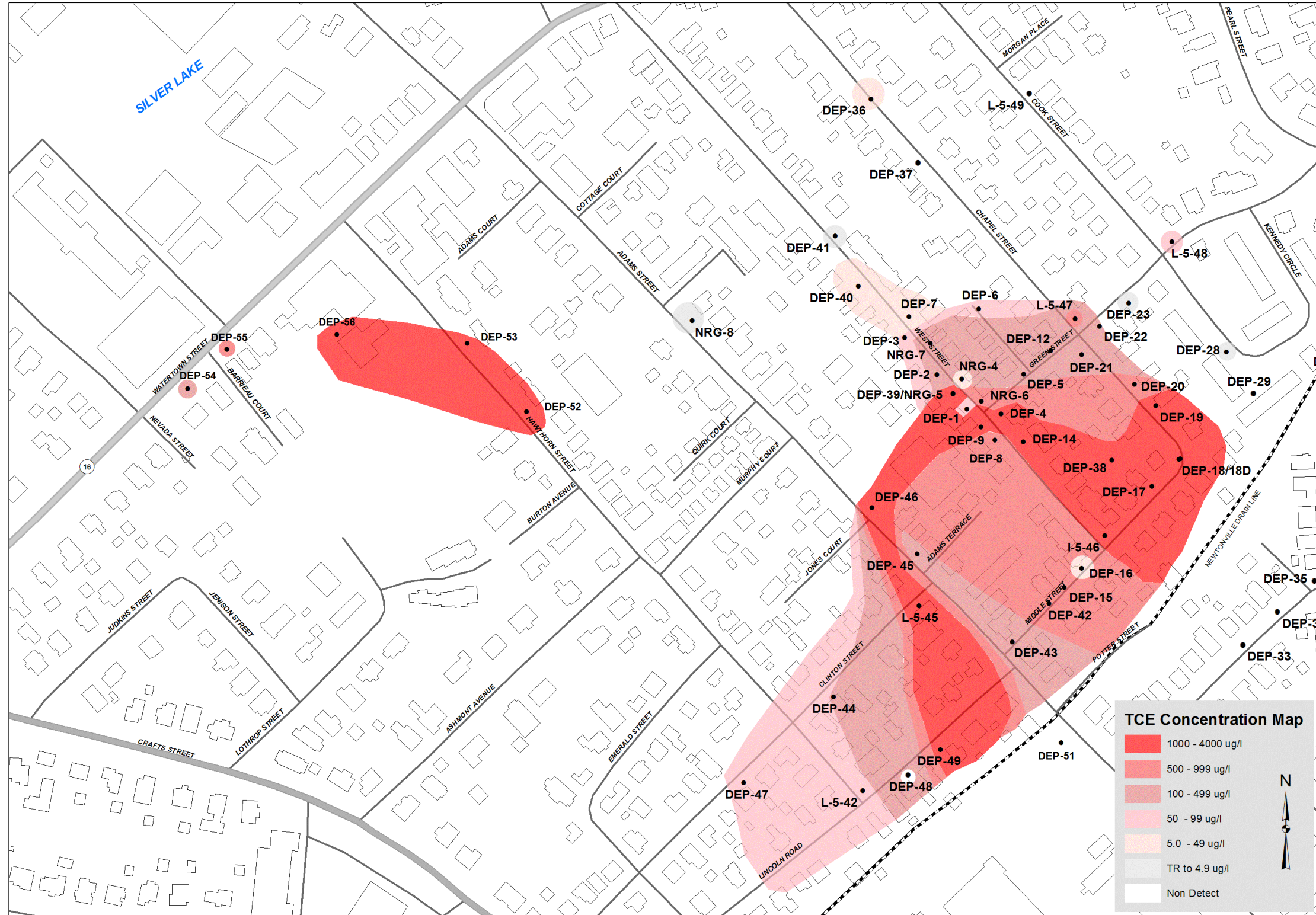


Nonantum May, 2016





Nonantum Field Investigation



0 220 440 880 Feet



Next Steps--Groundwater

- Installation of additional groundwater monitoring wells using contractor drilling assistance
- Identify all potentially affected properties
- Identify source/Potentially Responsible Party



Next Steps—Indoor Air



- Test homes as access granted
- Send out letters to additional properties with potential vapor intrusion as identified



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Questions ???