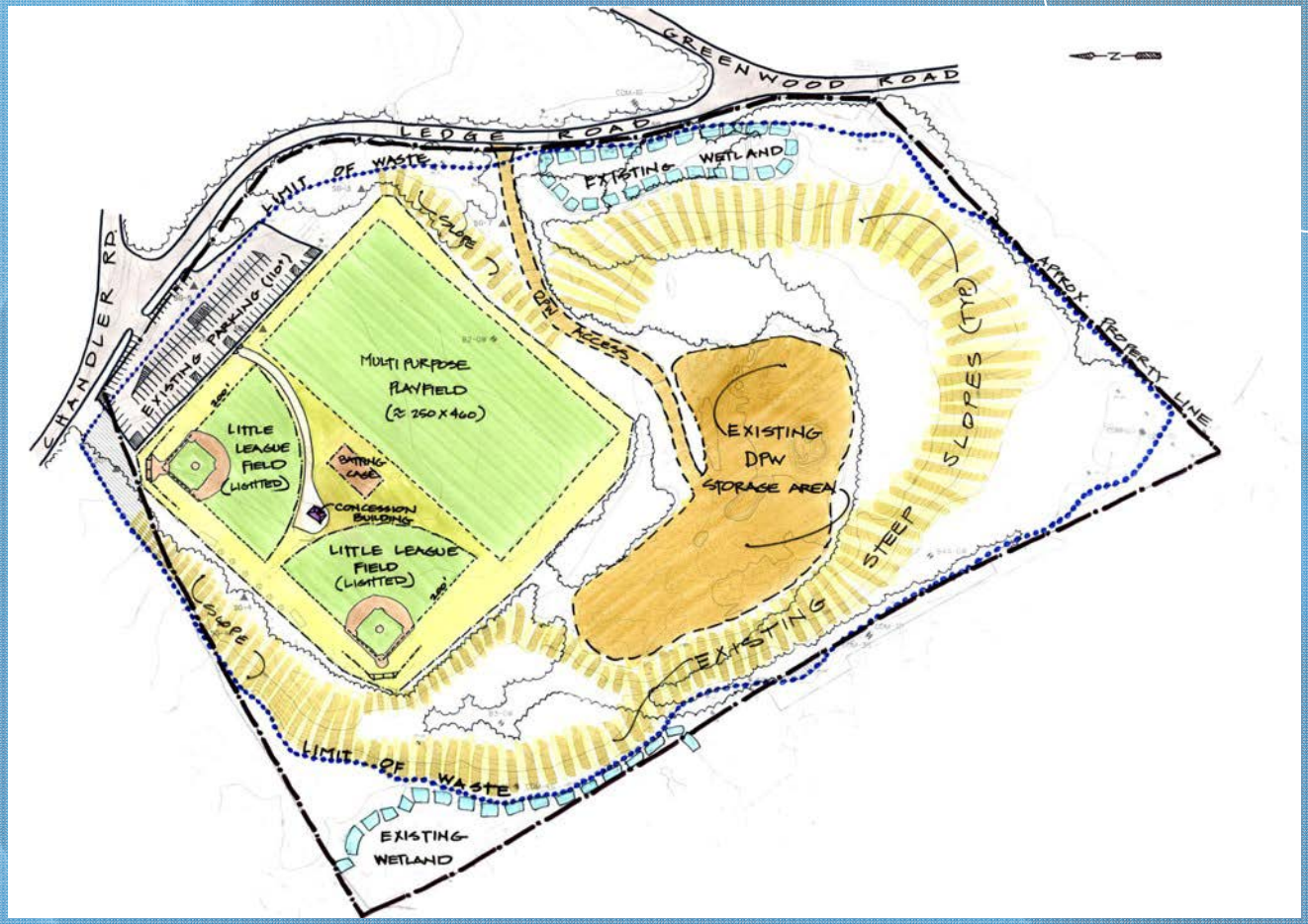
Ledge Road Landfill Closure

Project Status Update



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CDM Smith

Bruce Haskell, P.E.,
Langdon Environmental

January 21, 2015

CDM Smith®

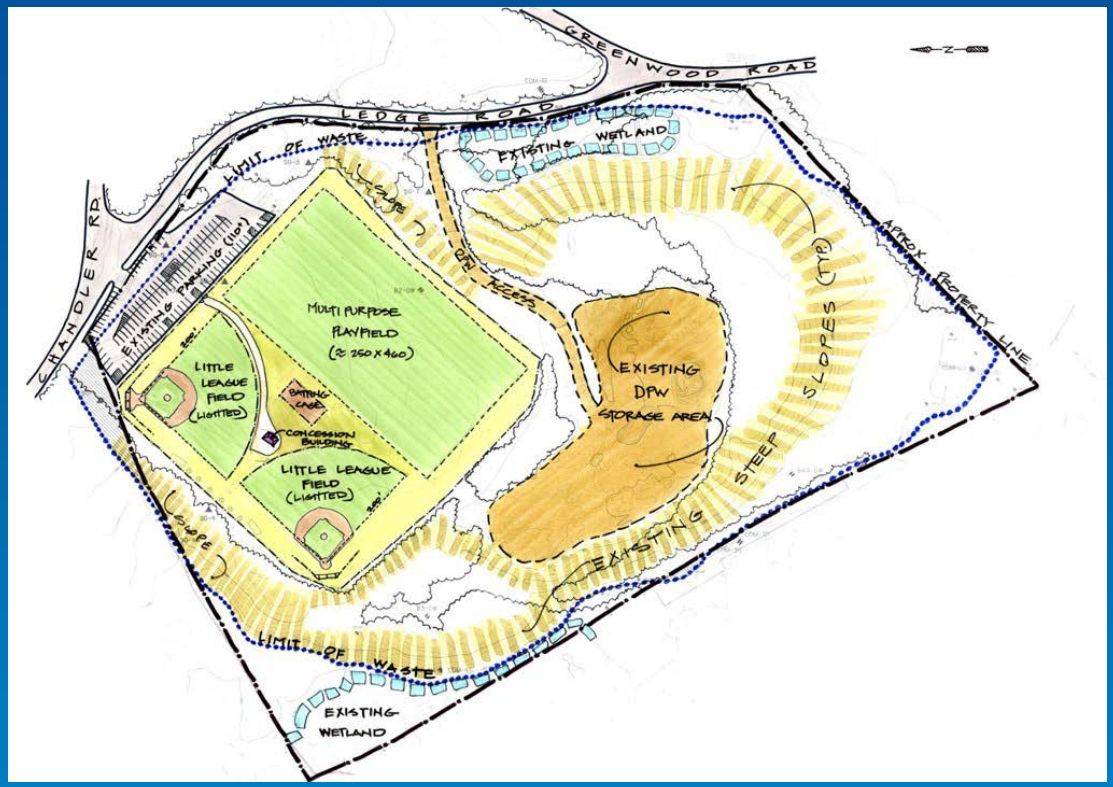
Presentation Overview

Closure of the former Ledge Road Landfill in accordance with MassDEP regulations is more complicated than typical municipal landfill sites. CDM Smith and the Town have now completed the MassDEP required assessments and evaluations to move the Landfill closure project forward.

Tonight's presentation focus:

- *Overview of the Landfill site and MassDEP requirements*
- *Results of the completed assessments*
- *Recommended closure alternative*
- *Next steps*

Site Overview



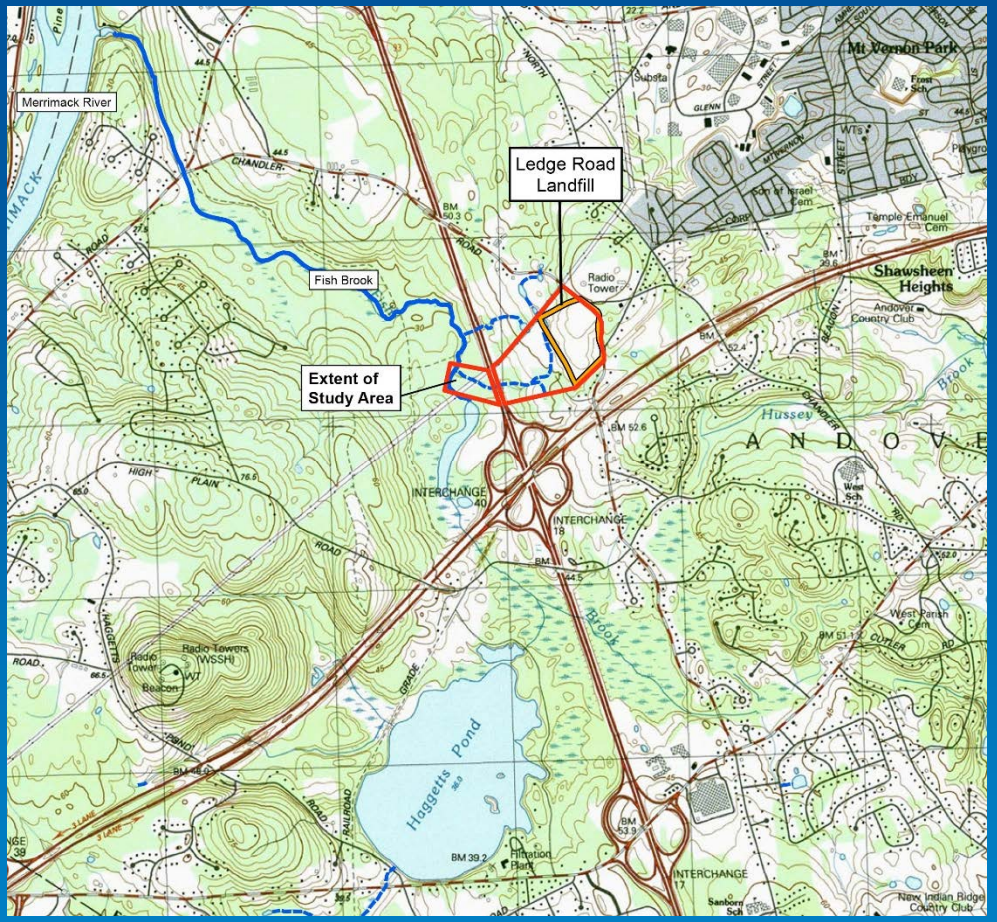
Existing site uses

- 22 acre landfill
- Municipal landfill from 1940s - 1970
- Current site uses:
  - recreational fields
  - public works material storage
- Site not capped as required by MassDEP regulations (310 CMR 19.000)

Site Challenges

Environmental Sensitivities:

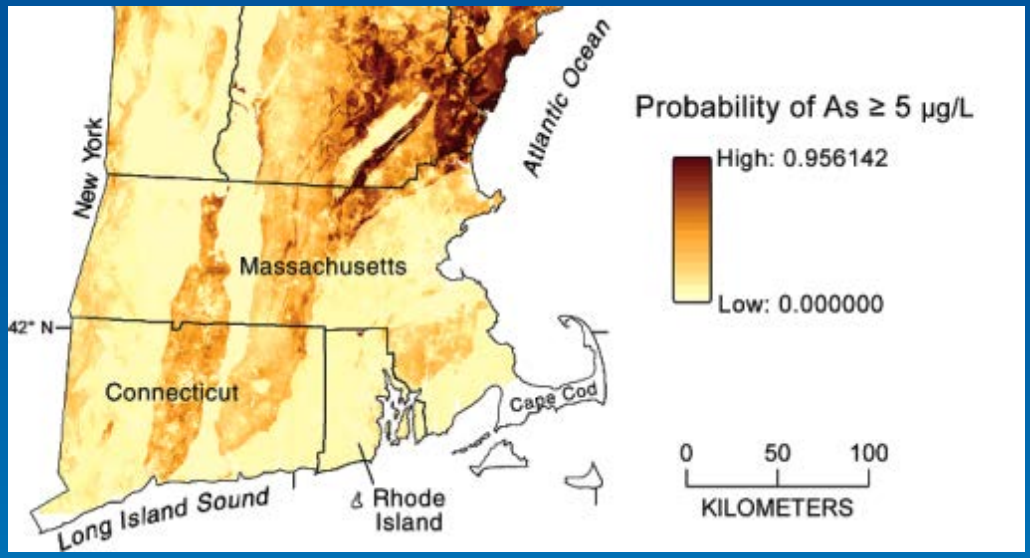
- Site is located within watershed of Fish Brook
- Fish Brook is a part of the Town's water supply
- Extensive wetland system downgradient of landfill
- Outstanding Resource Water (ORW)



Site Challenges (continued)

Technical Considerations:

- Underlying regional geologic formation with arsenic
- Resulting arsenic and iron concentrations in groundwater, surface water and sediment
- Presence of 1,4-dioxane in groundwater and surface water
- Landfill gas adjacent to ball field parking lot

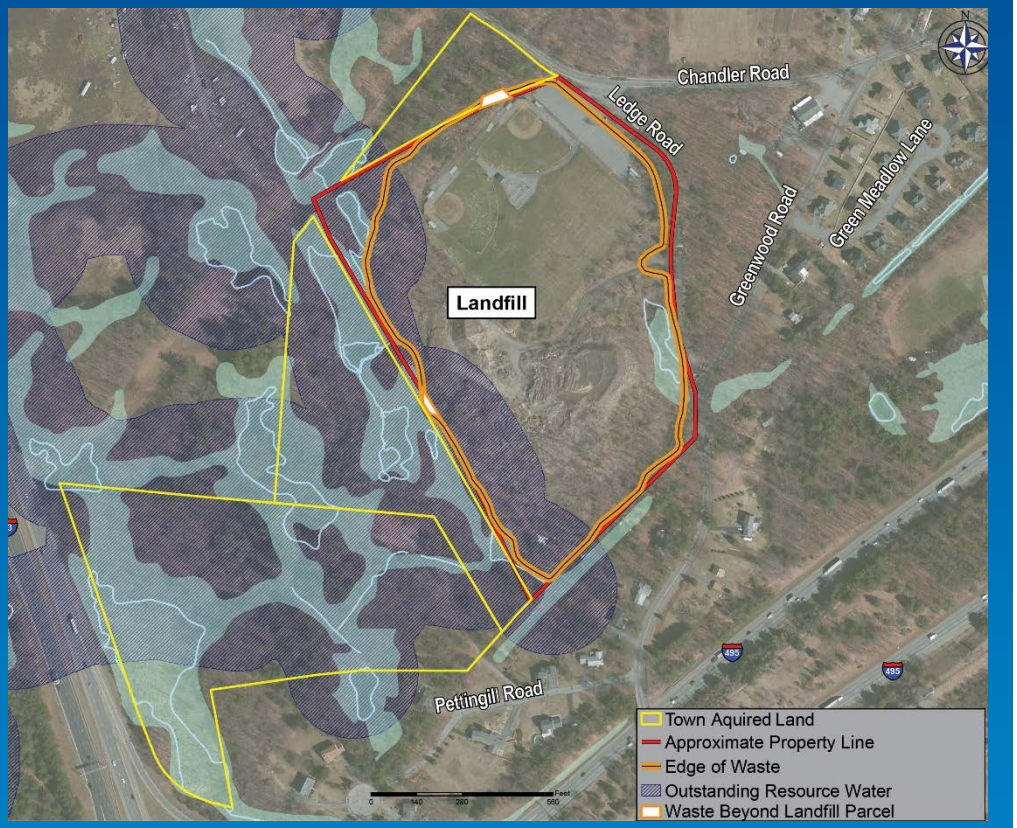


Geologic formations with high arsenic content are located throughout New England (Source: USGS)

Site Challenges (continued)

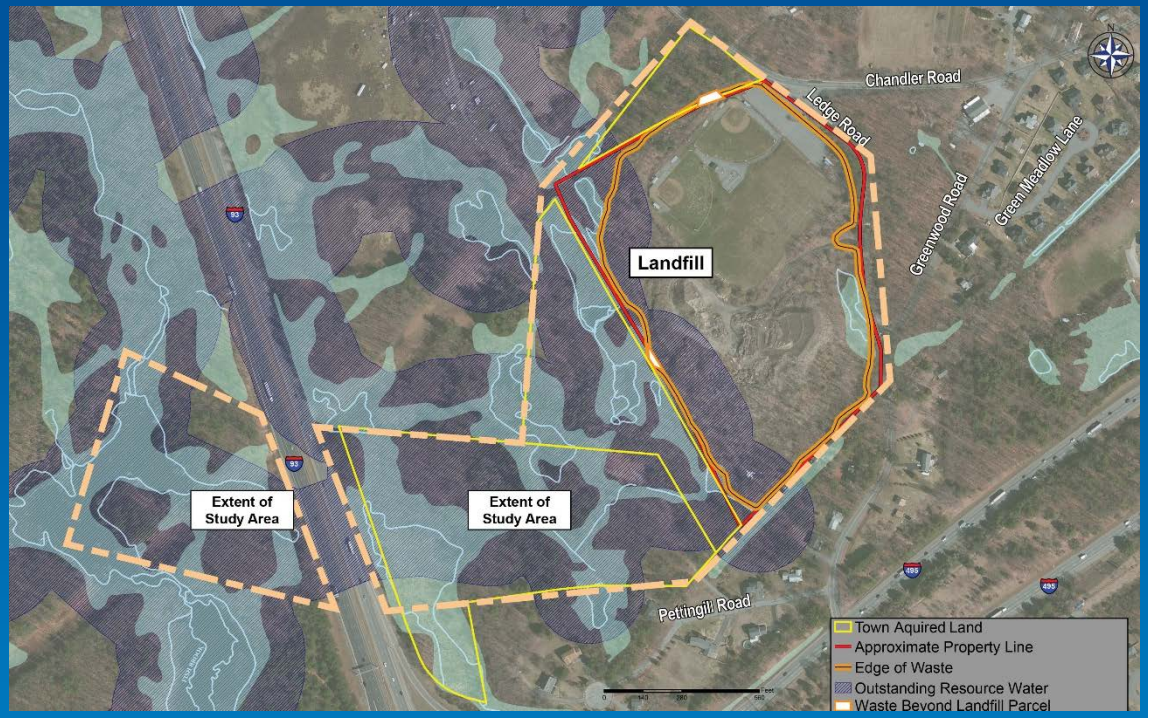
Other Closure Considerations:

- Landfilled waste extended beyond property lines
- Adjacent properties previously owned by others
- Closure project has accommodated continued use of playing fields
- Public participation requirements
  - Public Involvement Plan
  - Information Repository



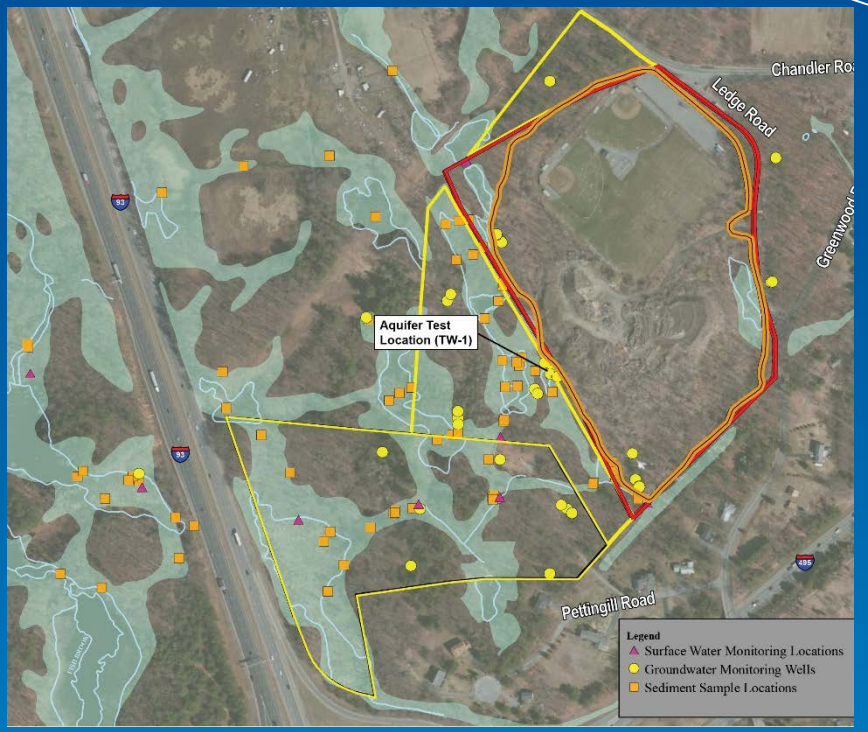
MassDEP Landfill Closure Requirements

- Cap to the limits of landfilled waste
- Include landfill gas controls to prevent offsite gas migration
- Environmental assessments to identify contamination that has migrated beyond landfill limits
- Risk assessments to determine if any identified contamination requires corrective actions



Assessment through Field Programs & Analysis

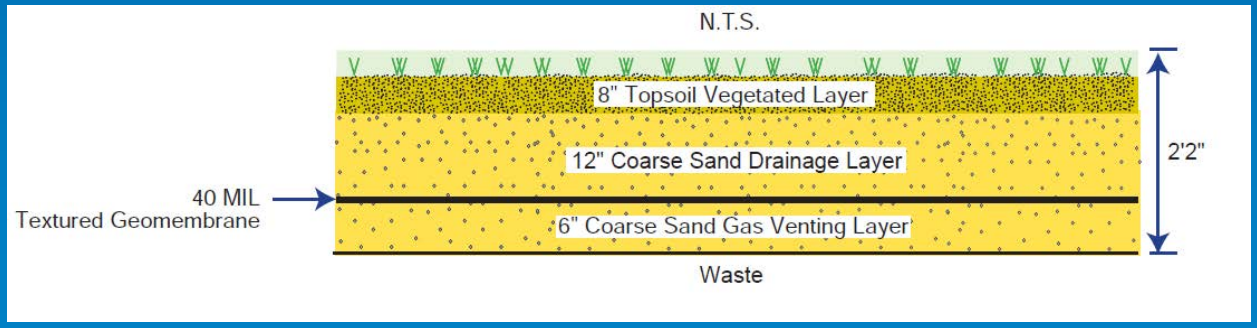
- Monitoring well installations
- Groundwater, surface water, sediment sampling
- Groundwater flow direction
- Pumping test to assess aquifer properties, water quality and treatability
- Landfill gas and air quality monitoring



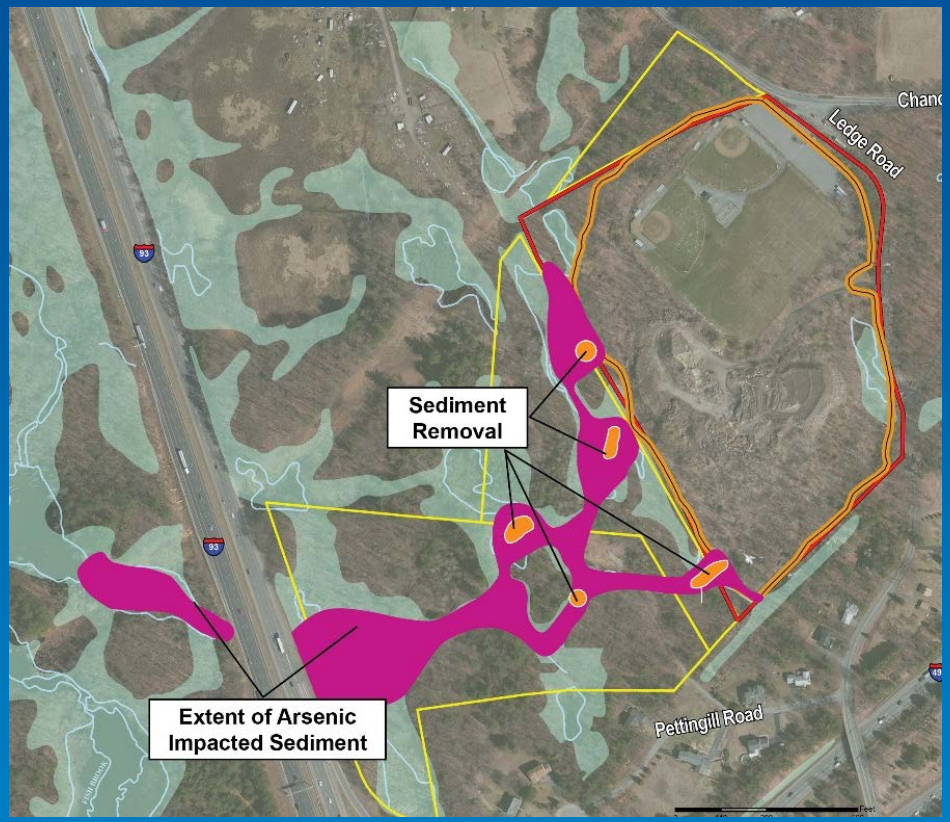
Conclusions of Environmental Assessments

Based on environmental assessment results, closure of the Ledge Road Landfill will need to include:

- Installation of a cap over all historically landfilled waste
- Remediation of arsenic and iron impacted sediment in downgradient wetland areas
- Possibility of addressing 1,4-dioxane in downgradient groundwater
- Mitigation of potential landfill gas migration beyond property line



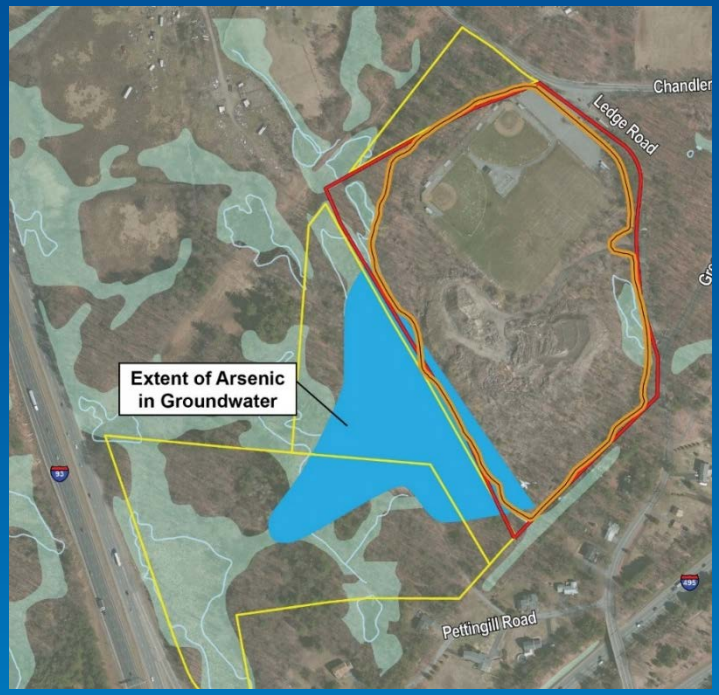
Results of Assessment - Arsenic in Sediment



- Groundwater impacted by landfilled waste mobilizes naturally-occurring arsenic and iron
- Mobilized arsenic and iron discharges into wetlands and precipitates onto sediments
- Some physical transport of sediments downstream with stream flow

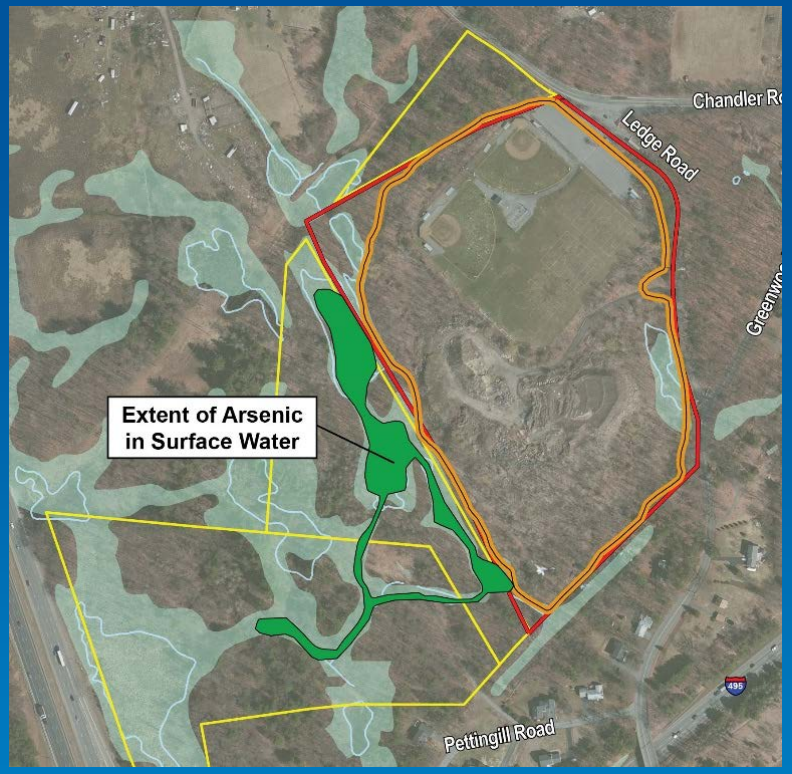
Results of Assessment – Arsenic (continued)

- MassDEP required evaluation of alternatives
  - Lower groundwater table with different cap types
  - Intercept impacted groundwater with:
    - On-site treatment
    - Sewer discharge

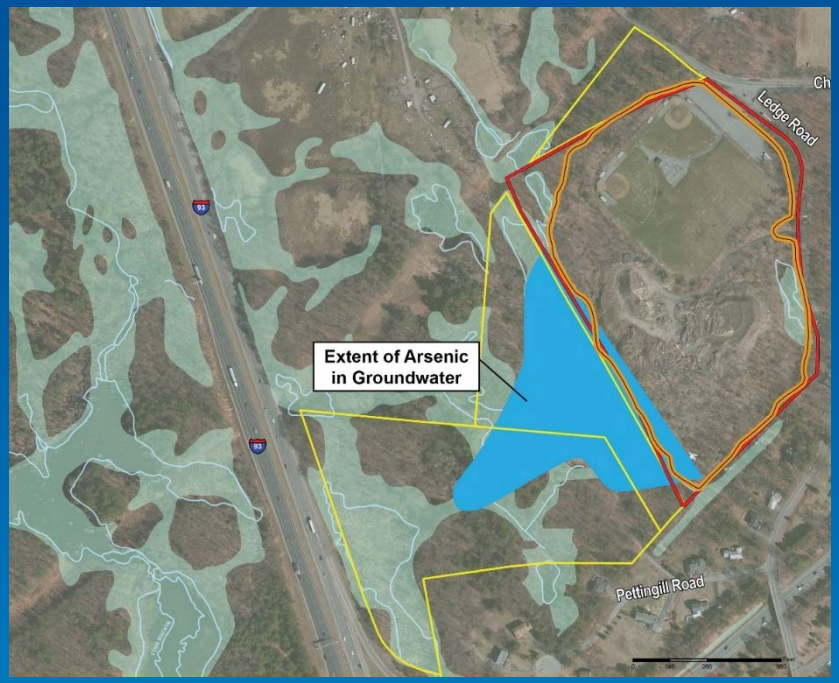


Results of Assessment – Arsenic (continued)

- Conclusions of arsenic evaluation
  - Standard MassDEP cap adequately effective in lowering water table under landfilled waste
  - Treatment of groundwater for arsenic removal requires chemical addition and ongoing operations – very expensive
  - Removal of sediments around “hot spots” will meet MassDEP risk-based standards



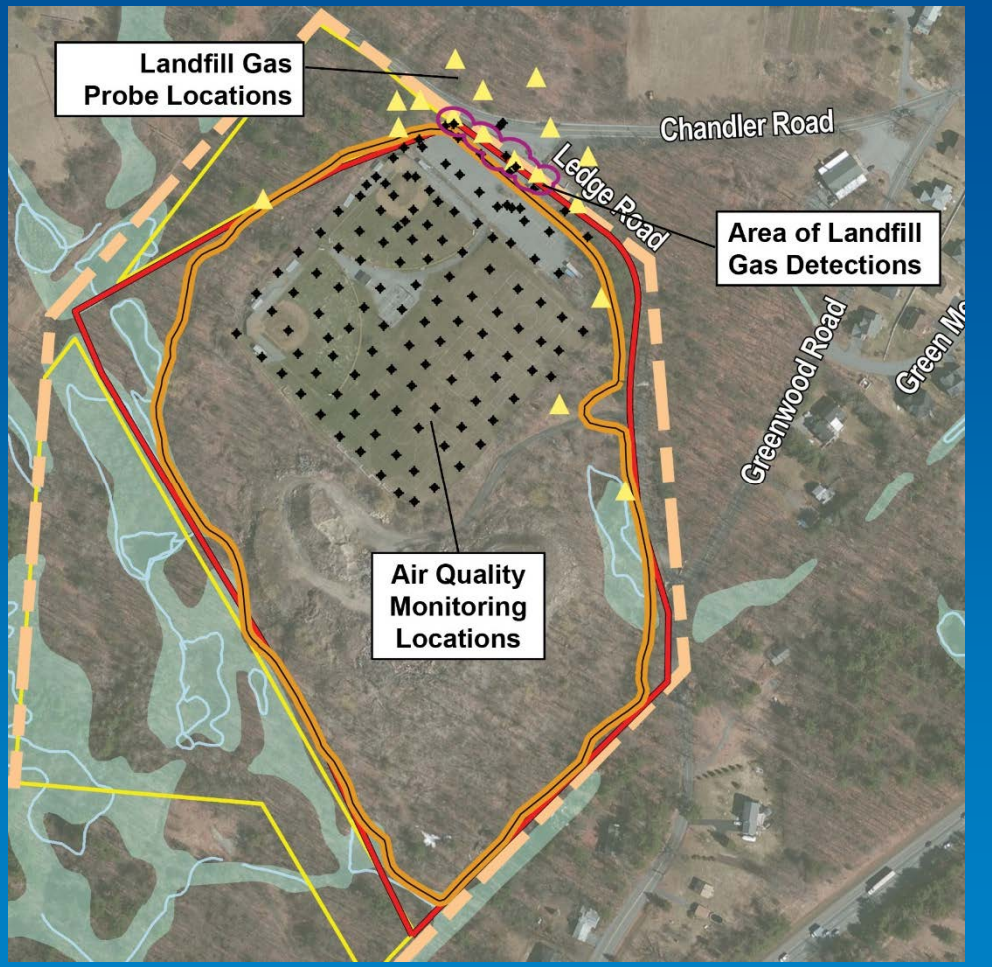
Results of Assessment – 1,4-Dioxane in Groundwater



- MassDEP has identified 1,4-dioxane as an "emerging contaminant" (2013)
  - Ubiquitous in environment – personal care products, household cleaning products, detergents, plastics
  - MassDEP required testing at landfills – numerous detections including at Ledge Road Landfill
- MassDEP developing policies to address
- Requires continued monitoring and assessment

Results of Assessment – Landfill Gas Migration

- Landfill gas generated by anaerobic decomposition of landfilled organic wastes
- Gas migrates laterally from waste if preferential pathway exists
  - Common occurrence at old unlined sites like Ledge Road Landfill
  - Sampling indicates gas does not migrate beyond the ball field parking lot

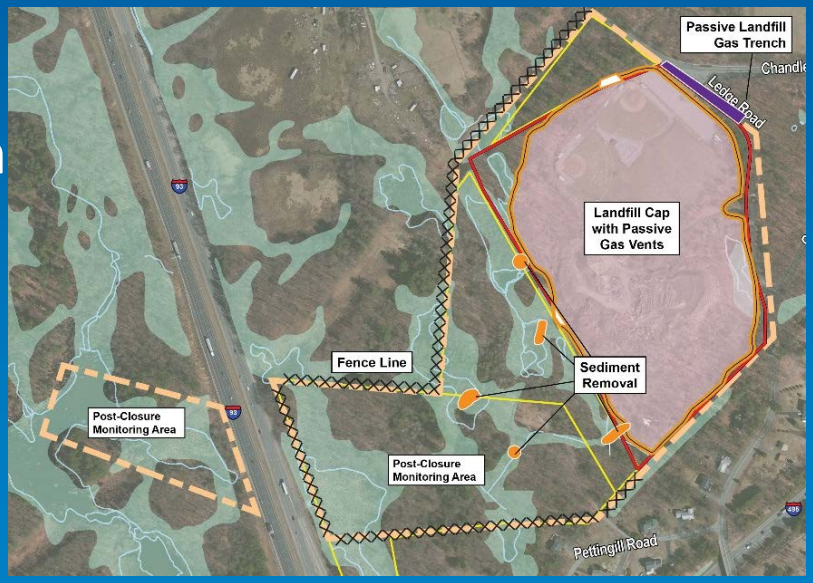


Results of Assessment – Landfill Gas Migration (continued)

- Gas generation decreases significantly with time
  - Current quantities of landfill gas not viable for flaring or energy generation
- Passive landfill gas vents installed throughout capped areas
- Passive gas migration vent trench or barrier trench typical to address migration

Recommended Corrective Actions for Ledge Road Landfill Site

- Construction of a standard solid waste cap over all areas of landfilled waste
  - Include stormwater controls and passive gas venting
- Construction of landfill gas venting trench to control migration of any future gases
- Removal of arsenic “hot spots” in wetland sediments and consolidation of material under the landfill cap
- Wetland restoration



Recommended Corrective Actions (continued)

- Installation of a fence to restrict access to wetland areas with arsenic
- Long-term monitoring for water quality, landfill gas and arsenic in wetland sediments
  - May require further action related to wetland sediments based on monitoring program
- Potential further actions for 1,4-dioxane

Closure Cost Summary

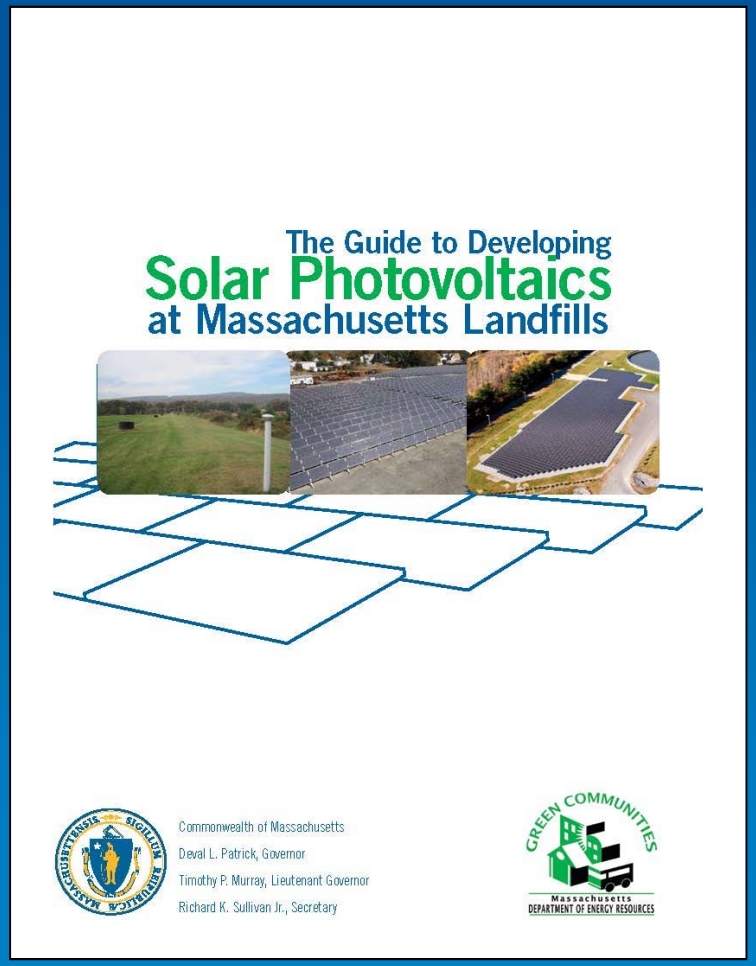
- $8.4 million (includes construction, contingency, engineering and implementation)
- Option of State Revolving Fund (SRF) Loan for construction
  - low interest loan
  - requires application to MassDEP
- Annual post-closure maintenance & monitoring: estimated at $100,000 /year [will decline with time]

Appropriation and Budget Status

- Town has appropriated $12.07 million
- Expended do to date approximately $2.33 million
  - 15 years of environmental monitoring
  - Environmental assessments of landfill and surrounding wetland
  - MCP compliance
  - Solid waste closure submittals
- Approximately $9.75 million remains
- Adequate funding available for recommended corrective action

Next Steps

- Submit final assessment report to MassDEP for review and approval – January 2015
- Determine preferred post-closure uses for capped landfill, if any (2015):
  - Solar Photovoltaic (~8.0 acres)
  - Public works material storage (~6.0 acres)
  - Other?



Next Steps (continued)

Landfill cap installation
Haverhill Landfill Southern Mound (2013)

- Once approved, begin final permitting process for recommended corrective action (late 2015 to 2016):
  - Cap design and permits
  - Wetland permits
    - Conservation Commission
    - MassDEP, ACOE
    - MEPA requirement?
  - SRF funding application
- Corrective action construction (2016 or 2017)

For Additional Information

Public Involvement Plan (PIP)

- PIP Group Mailing List - added upon request

- Information Repository – all project documents available to public for review
  - Andover Memorial Hall Library
  - Health Division, Town Offices
  - eRoom – access upon request
- Contact:

  Marc Fournier, Deputy Director of Public Works/Highway Sptd.

  Tel: 978-623-8350 ext. 518

  Email: marc.fournier@andoverma.gov