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Annual Groundwater Update

**Review of Plumes, Treatment Systems,
Performance and Progress**

*Presentation to CAC
December 12, 2013*

Managed for the U.S. Department of Energy
by Brookhaven Science Associates

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Groundwater Protection Group**



Agenda

- Overall Groundwater Cleanup Status
- Regulatory Approval of System Shutdowns for 2013
- Current Volatile Organic Compound (VOC) Groundwater Issues
- Progress In Recent VOC Groundwater Remedies
- Status of Tritium/Strontium-90 Plumes

Groundwater Status Report (Volume 2 of Site Environmental Report)

- Presentation summarizes highlights of 2012 Report
- Web link for report:
http://www.bnl.gov/gp/g/files/Annual_Reports/2012pdf/Main_text.pdf

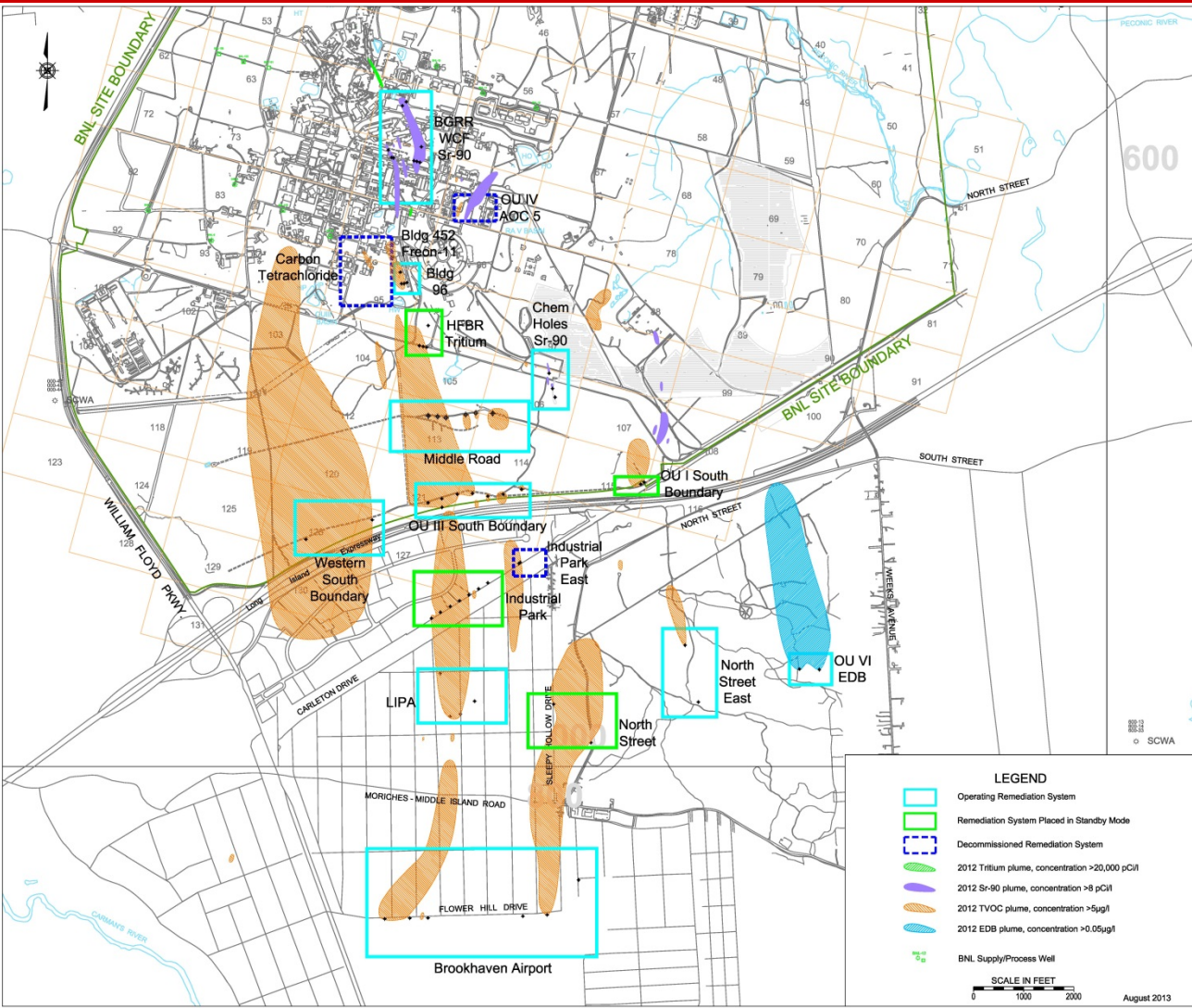


Groundwater Treatment Systems/Plumes Status

- 10 systems operating
- 4 systems in shut-down mode
- 3 systems decommissioned

1996 - 2012:

- 21 billion gallons of contaminated groundwater treated and recharged to the aquifer
- 6,950 lbs VOCs removed
- 27 mCi Sr-90 removed



Groundwater Treatment System Completion Process

Achieve plume capture goal for system (typically $< 50 \mu\text{g/L}$ Total VOC (TVOC) in monitoring and extraction wells)



Petition Regulators for system shutdown



Upon approval, turn extraction wells off and maintain in standby mode/sample wells for several years



If no rebound in VOC concentrations is observed, petition Regulators for system closure (Upon approval, decommission equipment, abandon wells, limited continued monitoring)

Groundwater Cleanup Completion

Systems Closed:

- OU IV Air Sparge/Soil Vapor Extraction (2003)
- Carbon Tetrachloride Pump and Treat (2010)
- Industrial Park East Pump and Treat (2013)

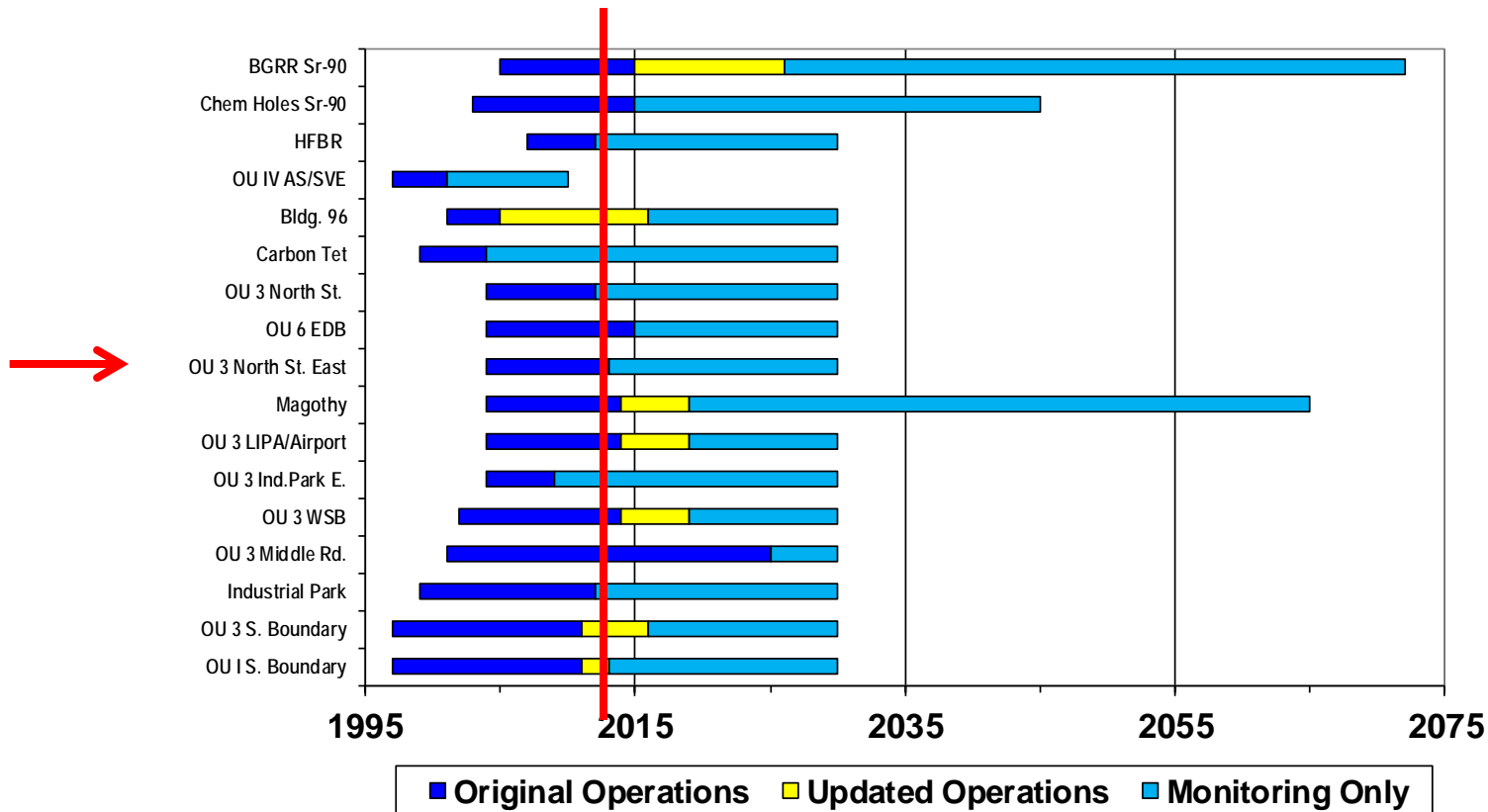
Systems Shutdown:

- OU I South Boundary
- Industrial Park
- North Street
- HFBR Tritium Pump and Recharge

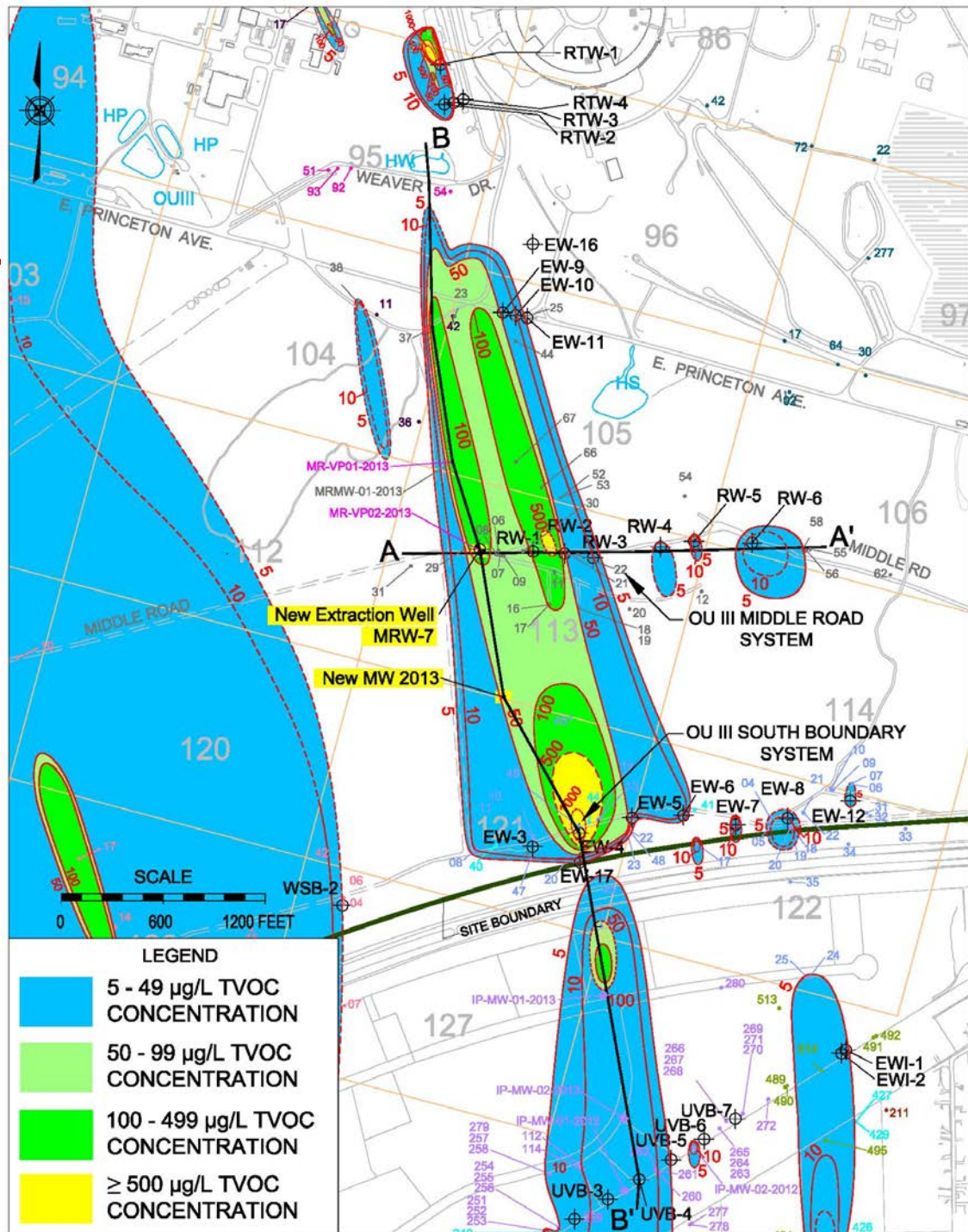


Groundwater Treatment System Status

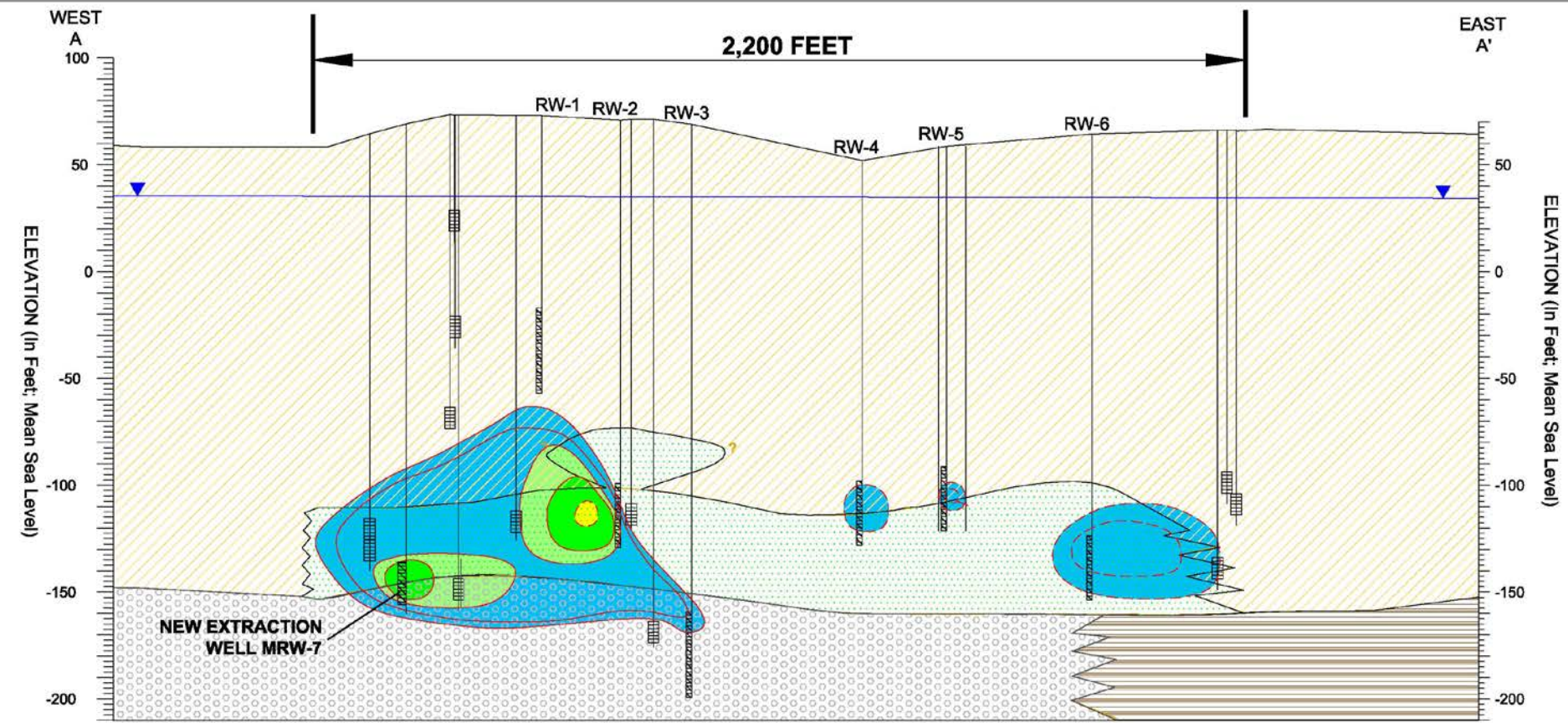
Groundwater Treatment System Timelines



Current Issue: OU III Deep VOCs



East-West Cross-Section of OU 3 Deep VOCs

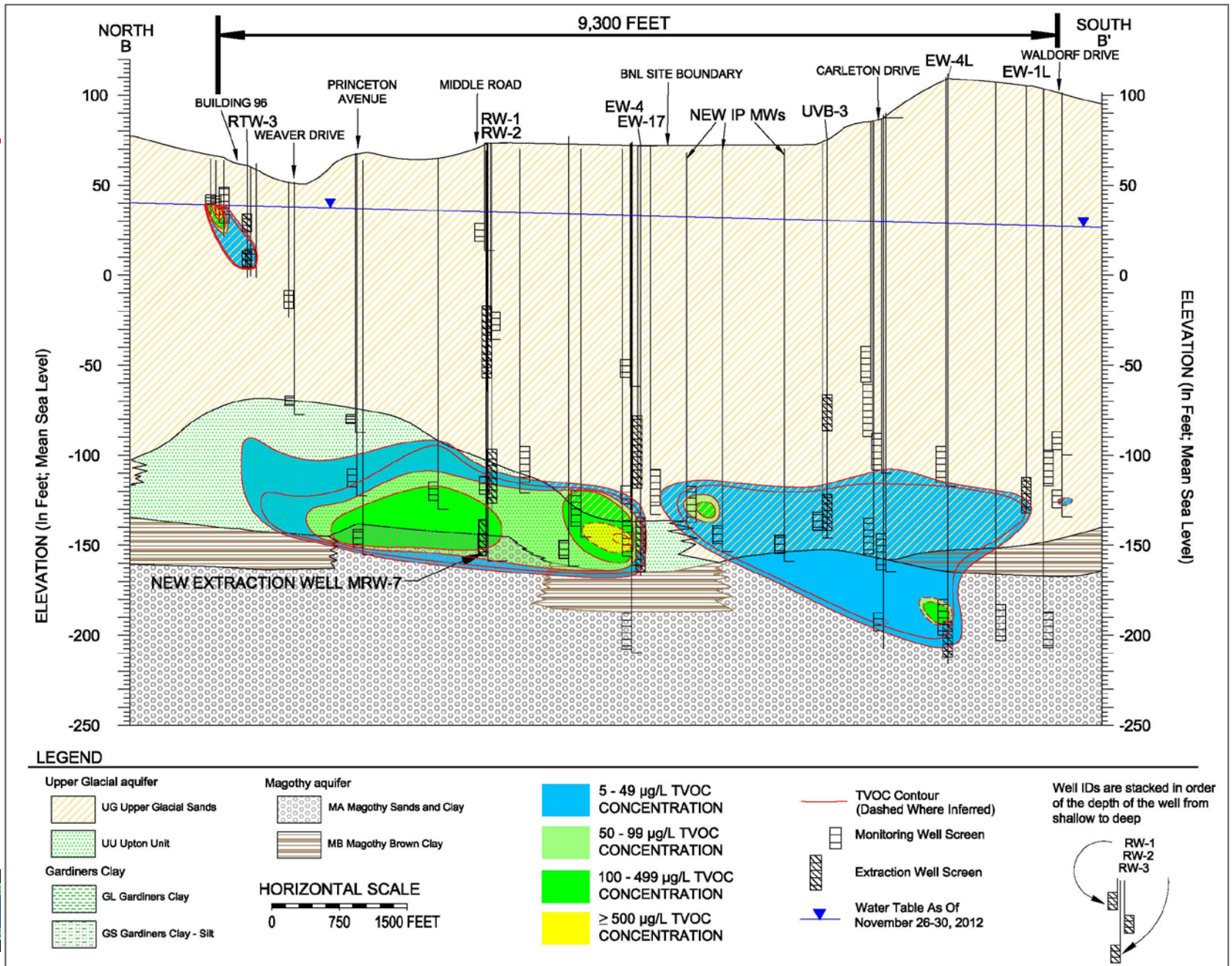


LEGEND

<p>Upper Glacial aquifer</p> <ul style="list-style-type: none"> UG Upper Glacial Sands UU Upton Unit 	<p>Magothy aquifer</p> <ul style="list-style-type: none"> MA Magothy Sands and Clay MB Magothy Brown Clay 	<ul style="list-style-type: none"> 5 - 49 µg/L TVOC CONCENTRATION 50 - 99 µg/L TVOC CONCENTRATION 100 - 499 µg/L TVOC CONCENTRATION ≥ 500 µg/L TVOC CONCENTRATION 	<ul style="list-style-type: none"> TVOC Contour (Dashed Where Inferred) Monitoring Well Screen Extraction Well Screen Water Table As Of November 26-30, 2012
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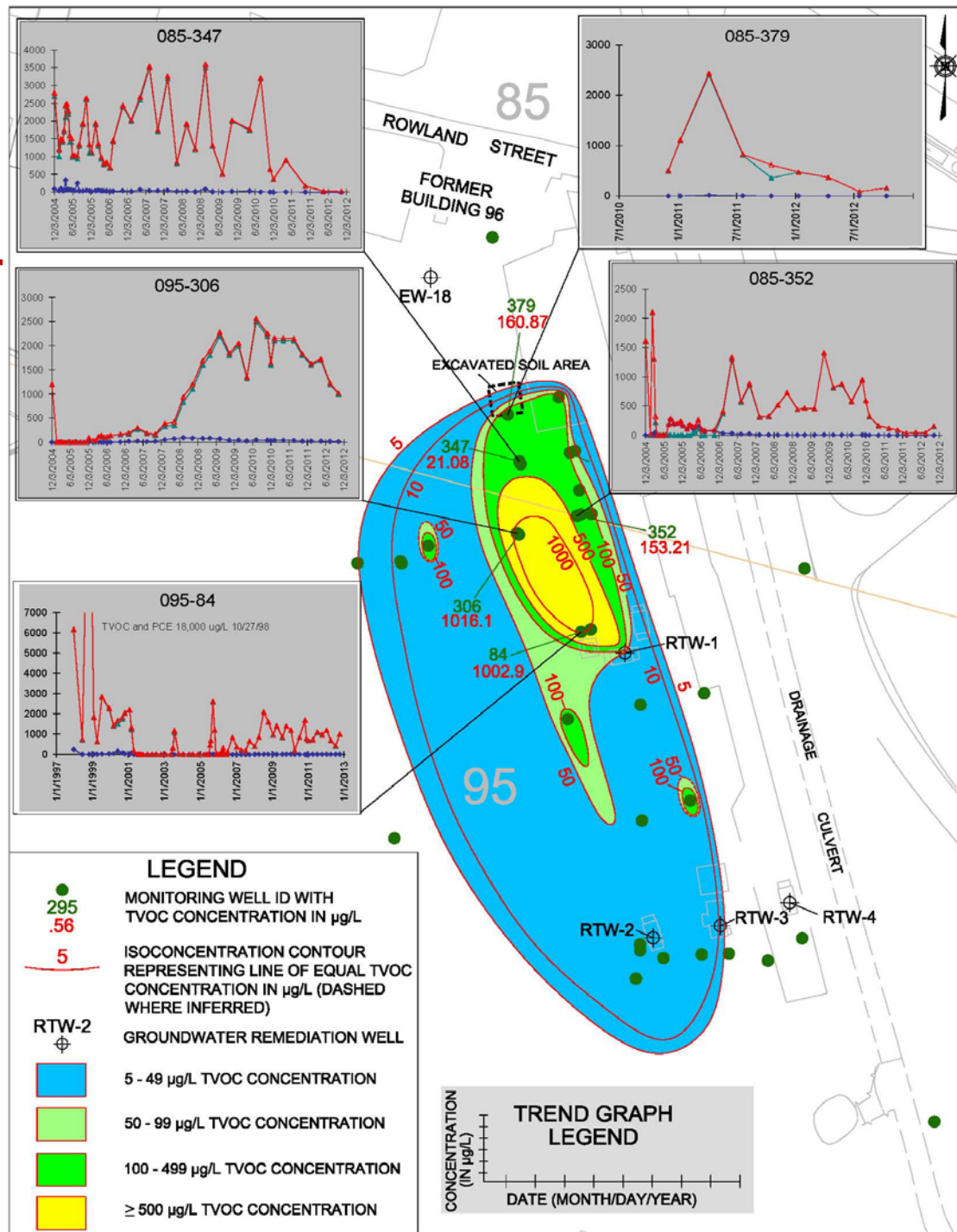


North-South Cross-Section of OU 3 Deep VOCs



Status Update: Building 96 VOC Plume Source Area

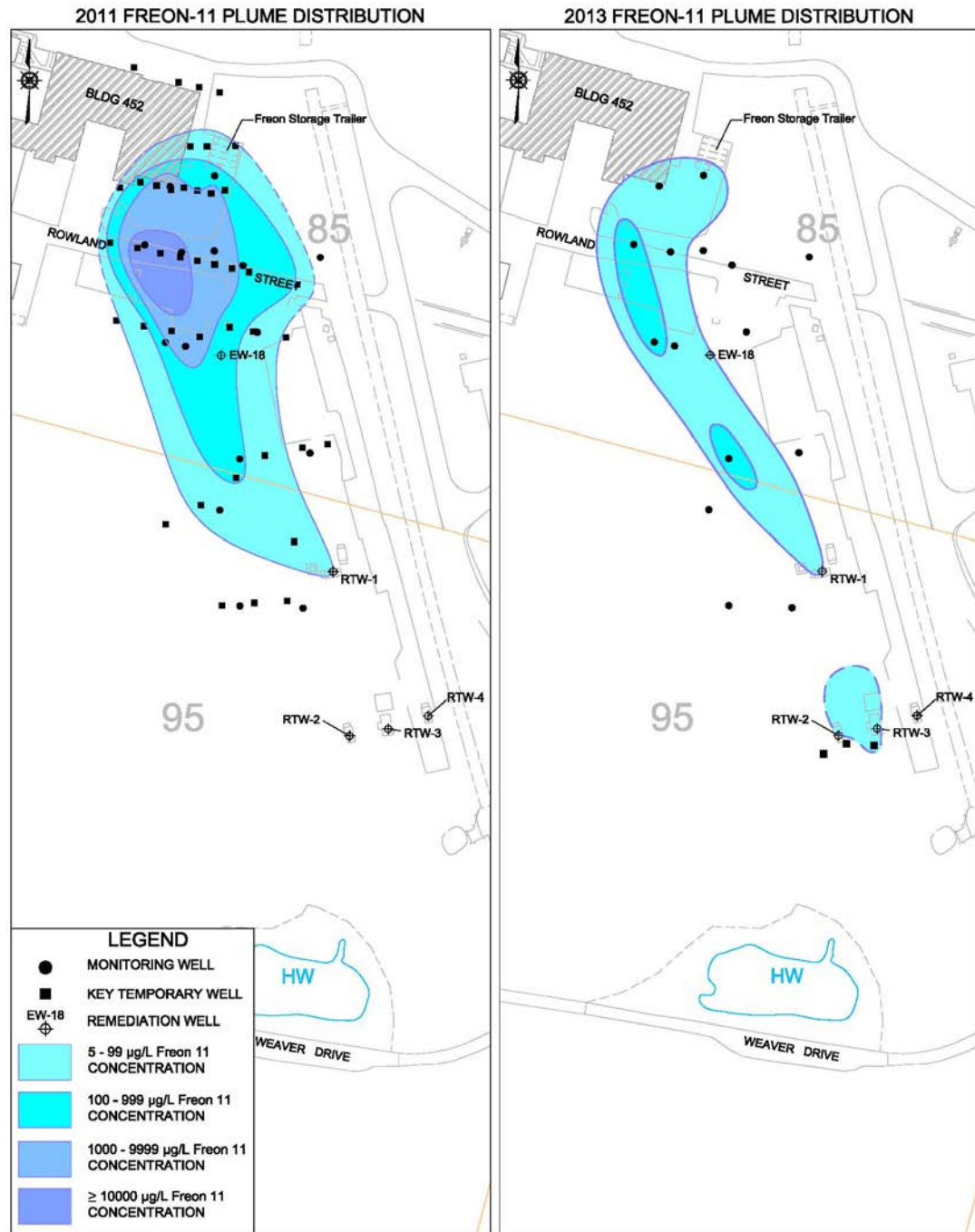
- Source area soil removal performed Sept. 2010
- VOC concentrations in groundwater displaying decreasing trends
- Characterizing area of elevated VOCs west of main plume



Status Update: Bldg. 452 Freon-11

Groundwater Treatment System

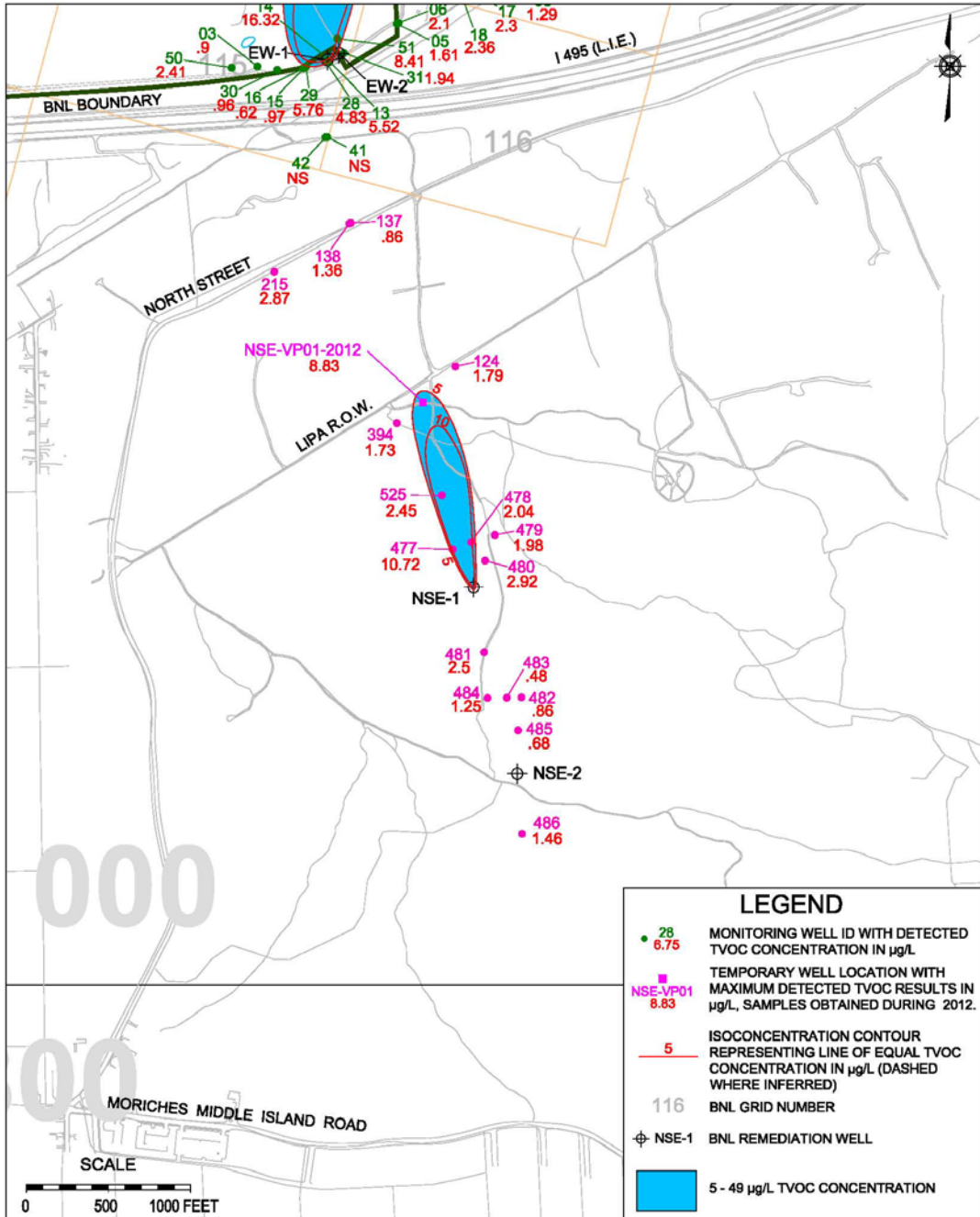
- New extraction well (EW-18) has been in continuous operation since March 2012, ~ 85 lbs. Freon removed
- Highly effective in remediating plume
- Freon-11 concentrations in source area wells are now < 415 µg/L
 - Significant reduction from 37,000 µg/L detected in 2011



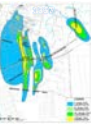
Planned Action: North Street East System Shutdown Petition

- System began operation in 2004
- Historical high VOC concentration in this area 490 ug/L in 1998
- Extraction well NSE-2 in standby since 2010
- Plans to submit petition for shutdown to regulators in 2014

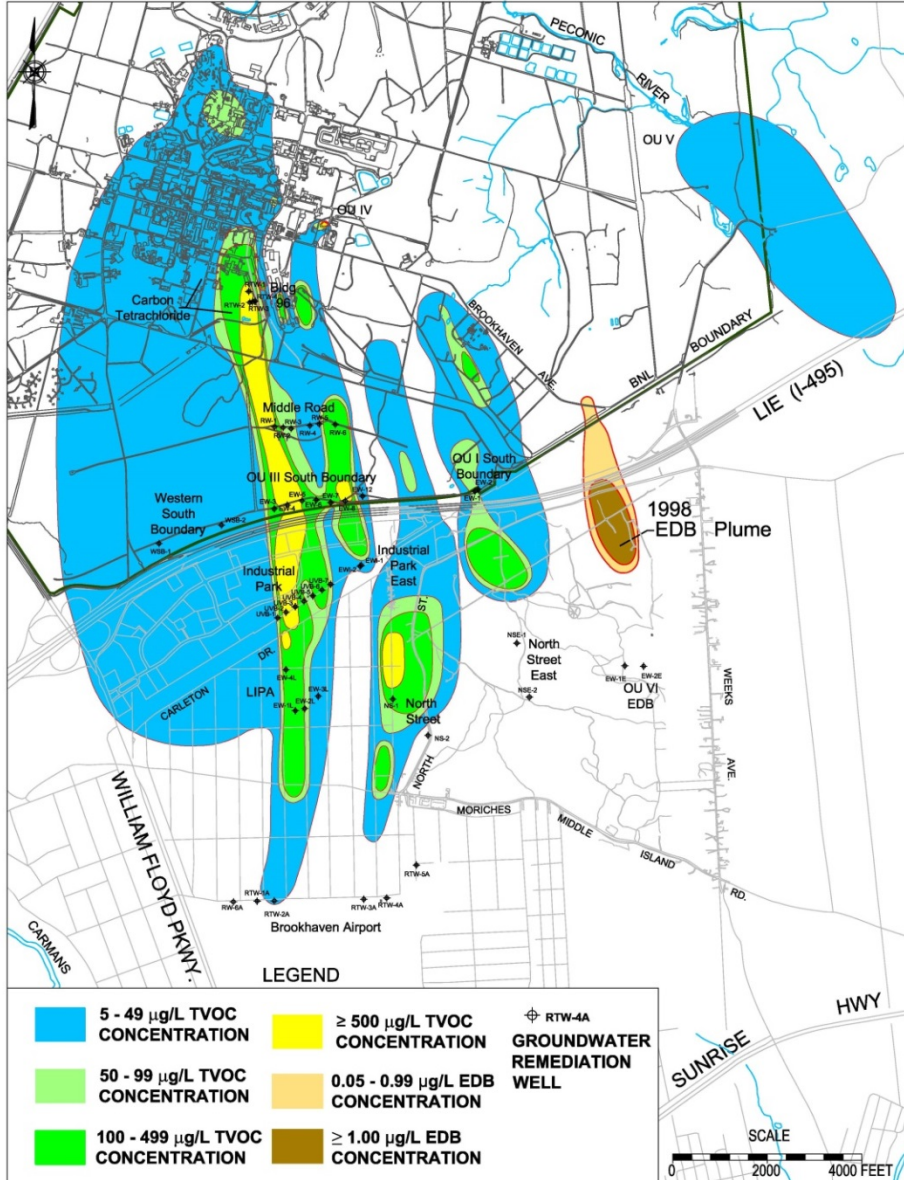
2012 NSE Plume Distribution



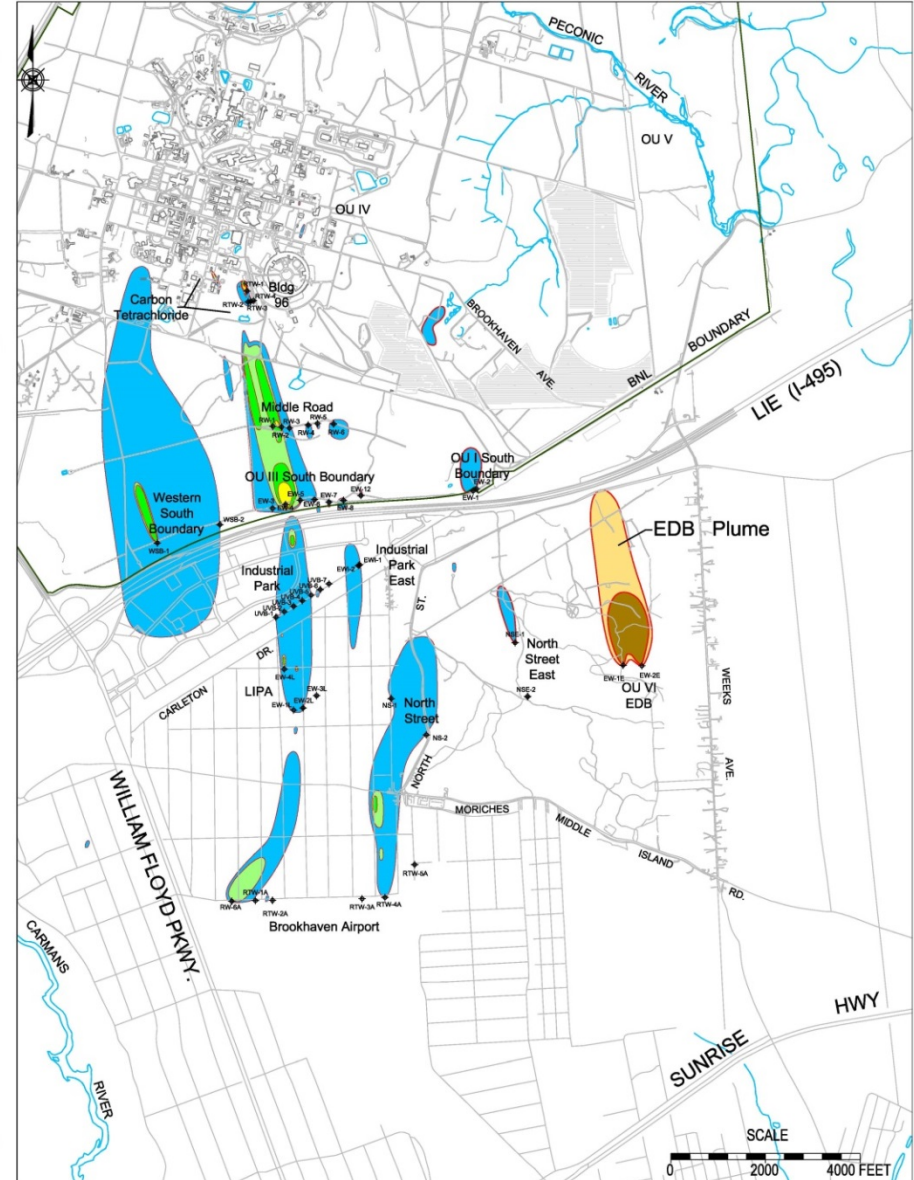
VOC Plume Cleanup Progress



1997

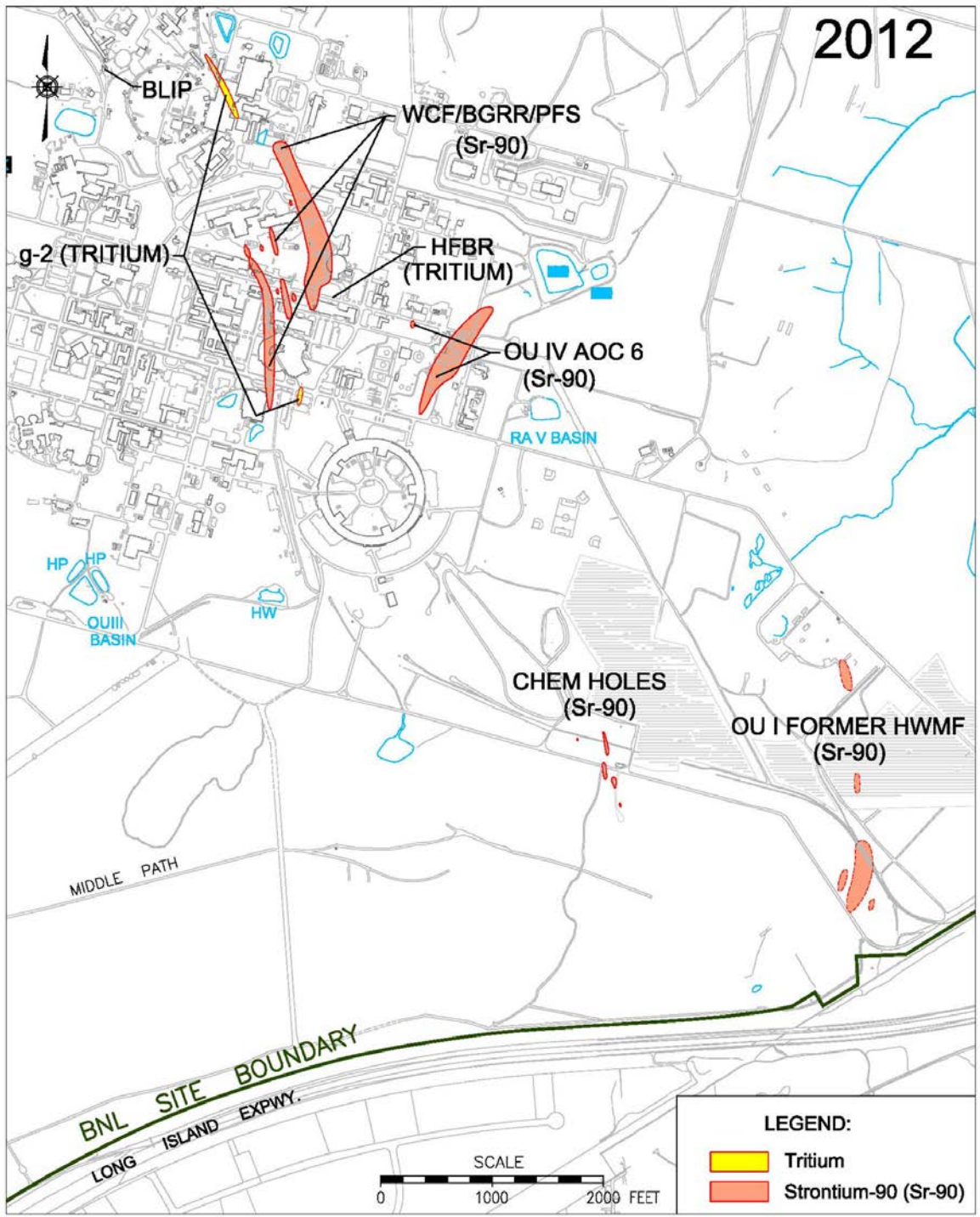


2012



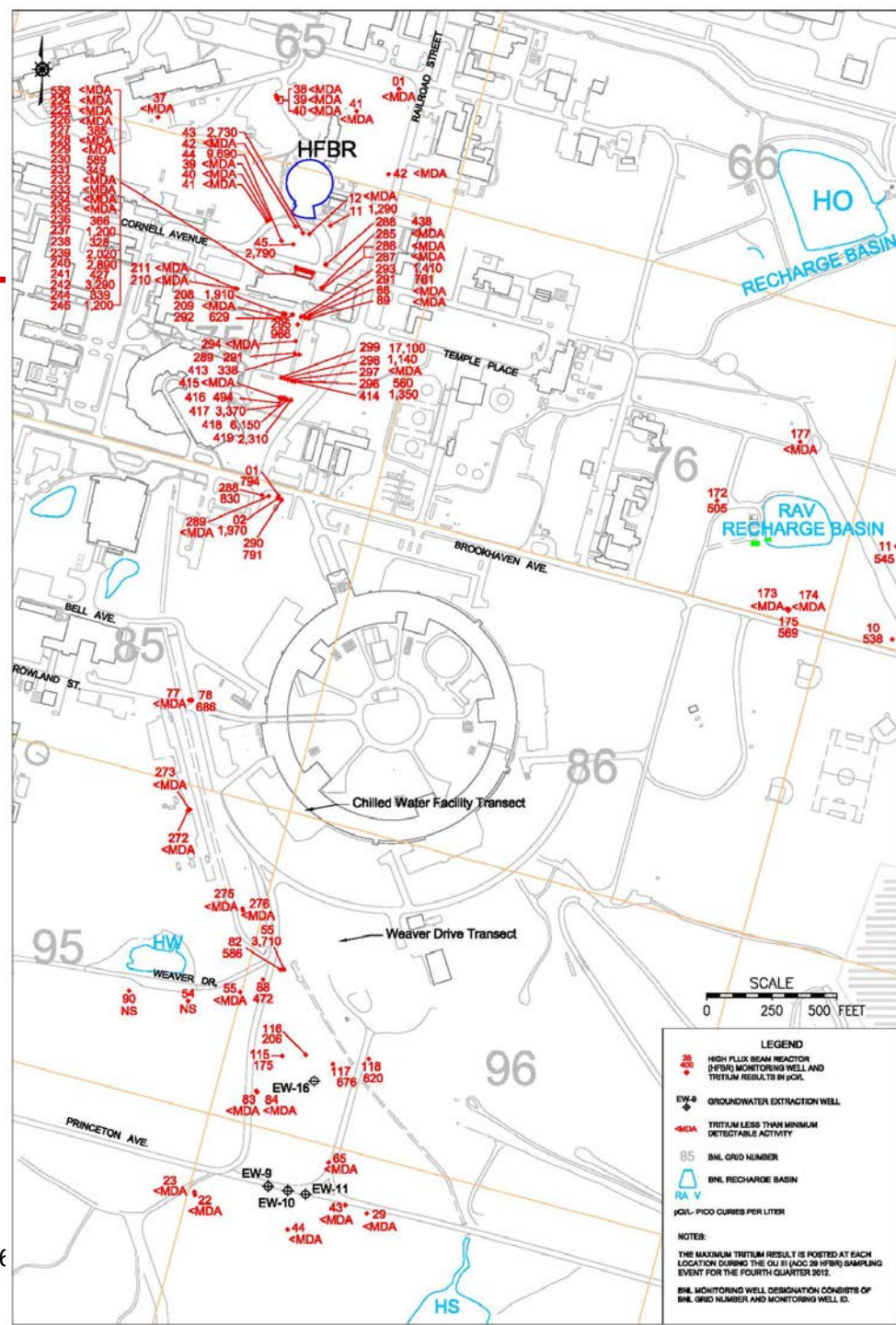
2012

Status: Tritium/Strontium-90 Plumes

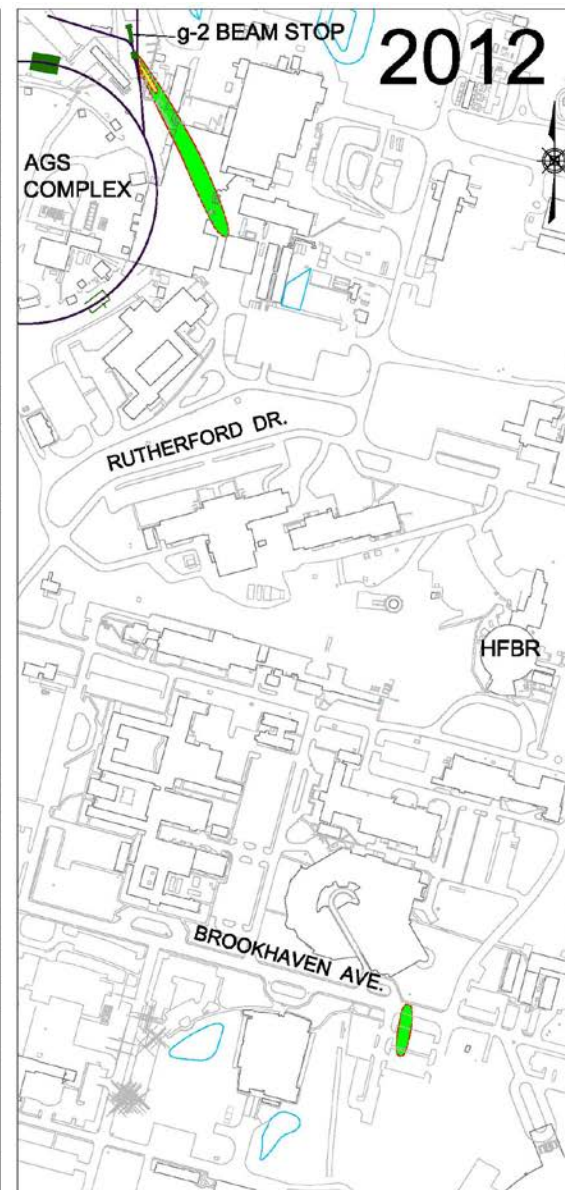
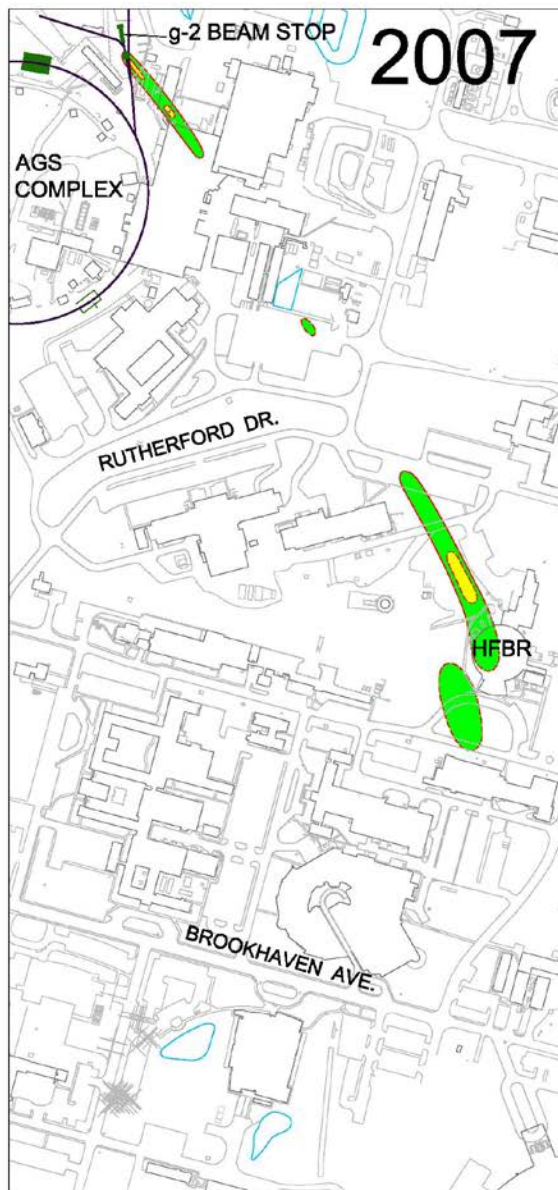
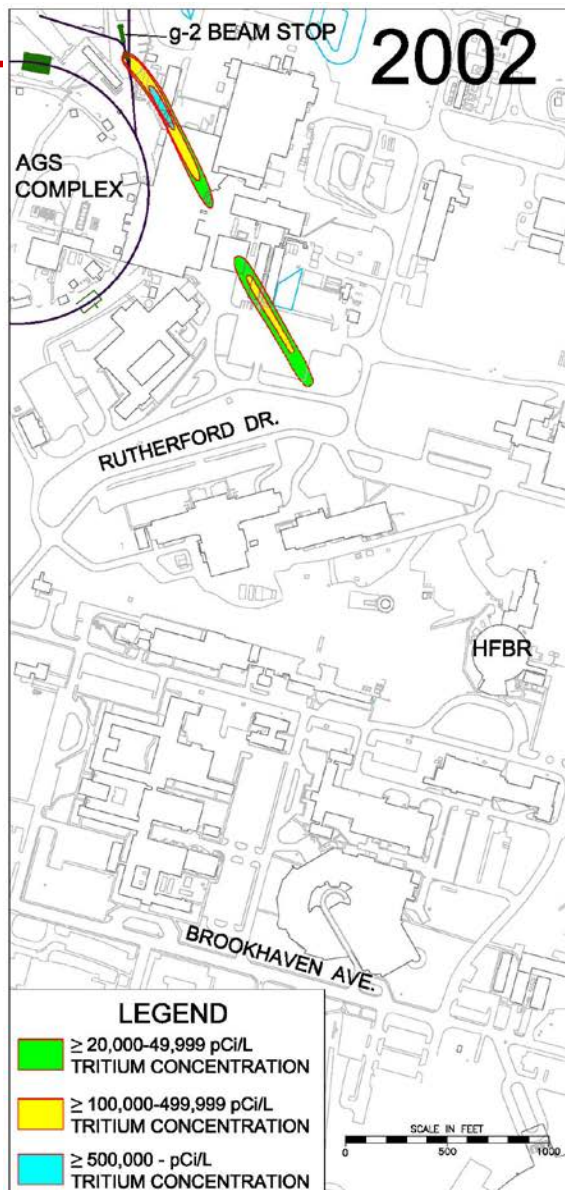


Cleanup Progress: HFBR Tritium Pump and Recharge

- Pump and Recharge System restarted November 2007
- System placed in shutdown mode in June 2013 following regulatory approval
- Downgradient segment of plume below 20,000 pCi/L since 2010



Status Update: g-2 Tritium Plume



Summary

- Achieved important milestones in 2013 with regulatory approval of shutdown for four remediation systems and the decommissioning of a fifth
- Installed new extraction well for OU 3 Middle Road Treatment System
 - Currently characterizing northern extent of OU 3 deeper VOCs
- Planned shutdown of North Street East Treatment System in 2014
- Continue to keep regulators and community stakeholders informed about cleanup progress, issues and results of 2014 planned activities



Questions and Answers

