



a passion for discovery

Annual Groundwater Update

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

*Presentation to CAC
November 13, 2014*

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

**Bill Dorsch, Manager
Groundwater Protection Group**



Agenda

- Treatment system status/plume update
- Completion of deep Volatile Organic Compounds (VOC) characterization on and off-site
- Modification to Industrial Park Treatment System
- Reactor surveillance and maintenance update

Groundwater Status Report (Volume 2 of Site Environmental Report)

- Presentation summarizes highlights of 2013 Report
- Web link for report:
http://www.bnl.gov/gp/g/files/Annual_Reports/2013pdf/Main_text.pdf

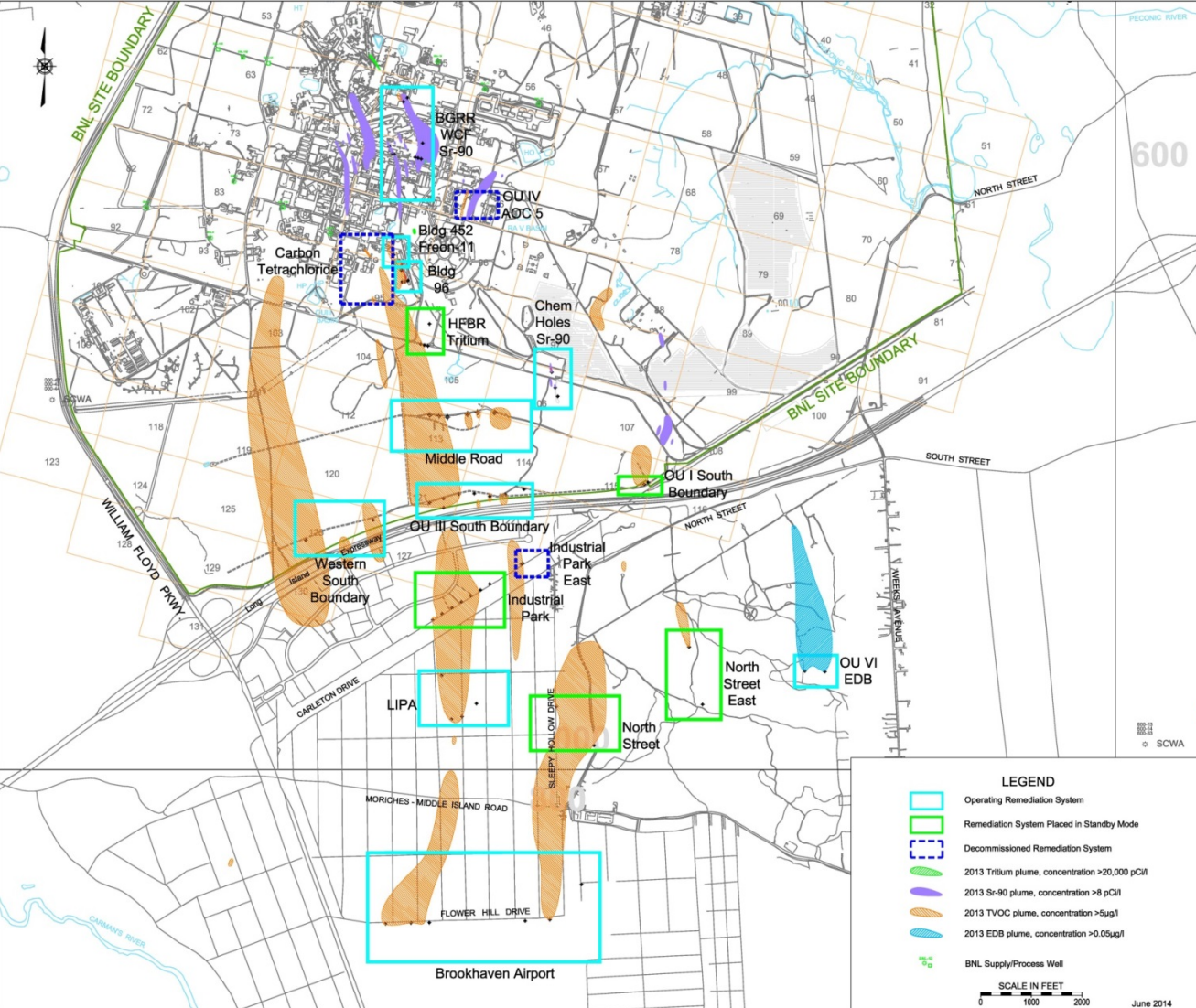


Groundwater Treatment Systems/Plumes Status

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

1996 - 2013:

- 22 billion gallons of contaminated groundwater treated and recharged to the aquifer
- 7,133 lbs VOCs removed
- 29 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)

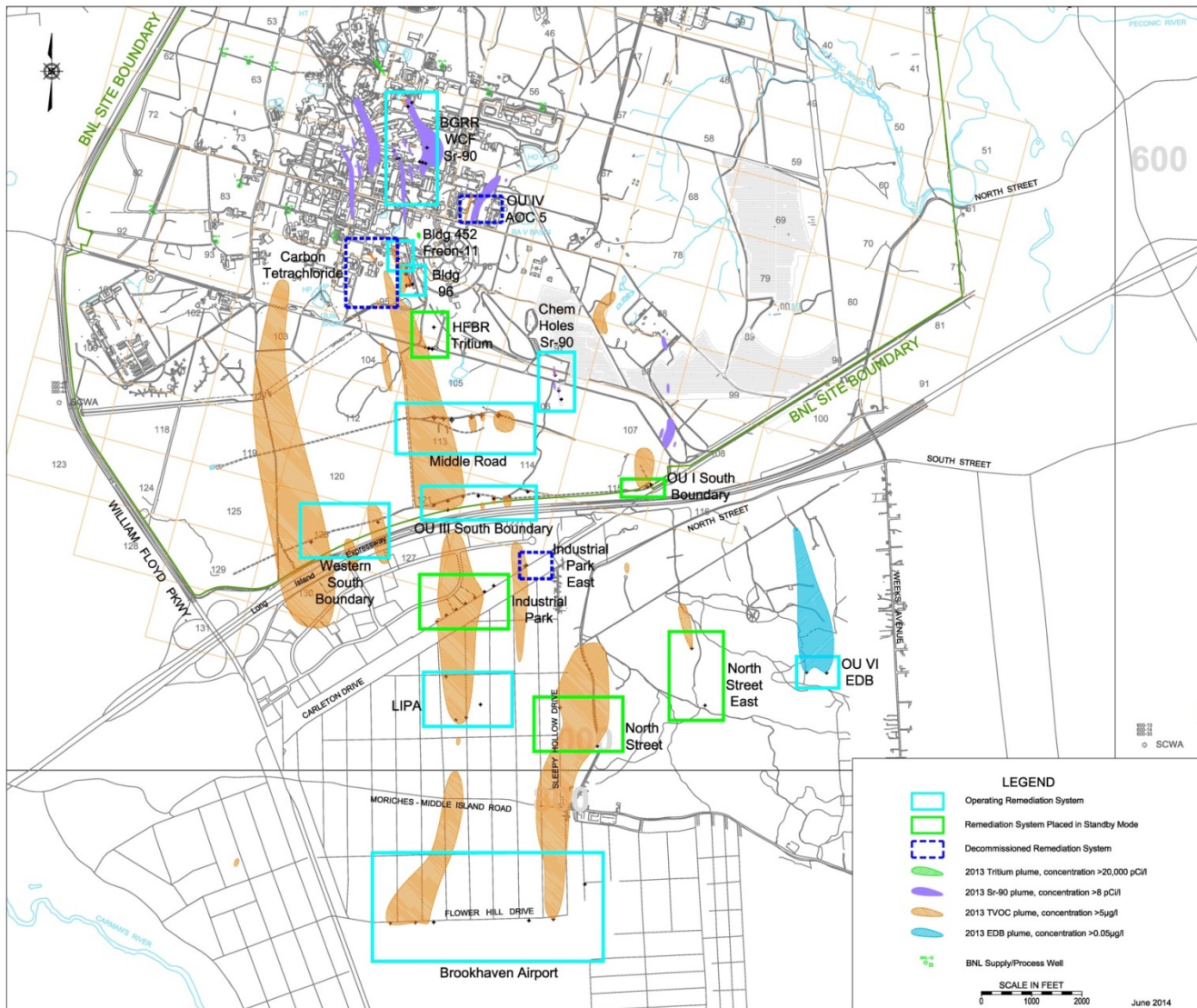
Groundwater Treatment Systems/Plumes Status

Systems Closed:

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

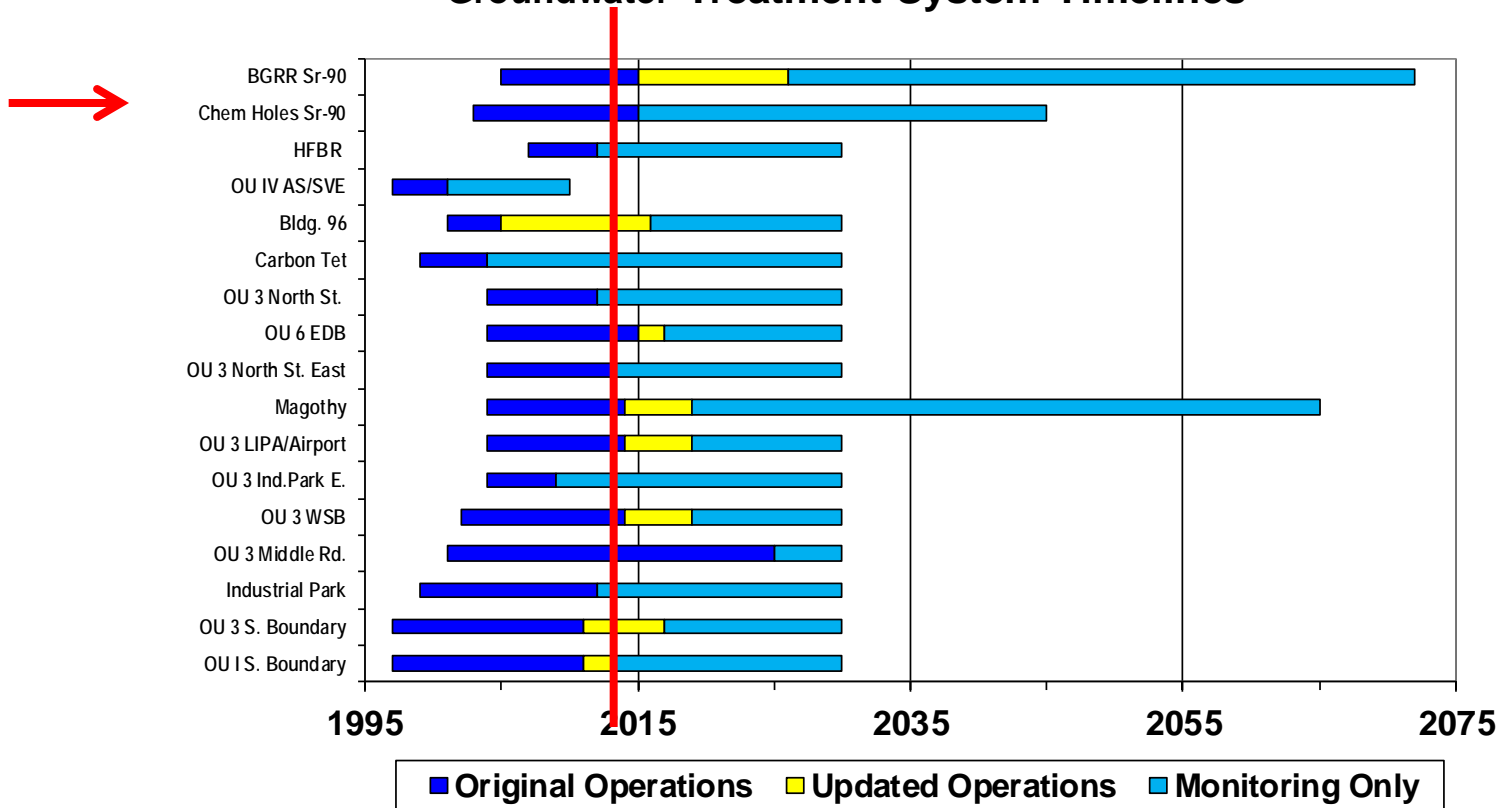
Systems Shut Down:

- OU I South Boundary (2013)
- Industrial Park (2013)
- North Street (2013)
- North Street East (2014)
- HFBR Tritium Pump and Recharge (2013)



Groundwater Treatment System Status

Groundwater Treatment System Timelines

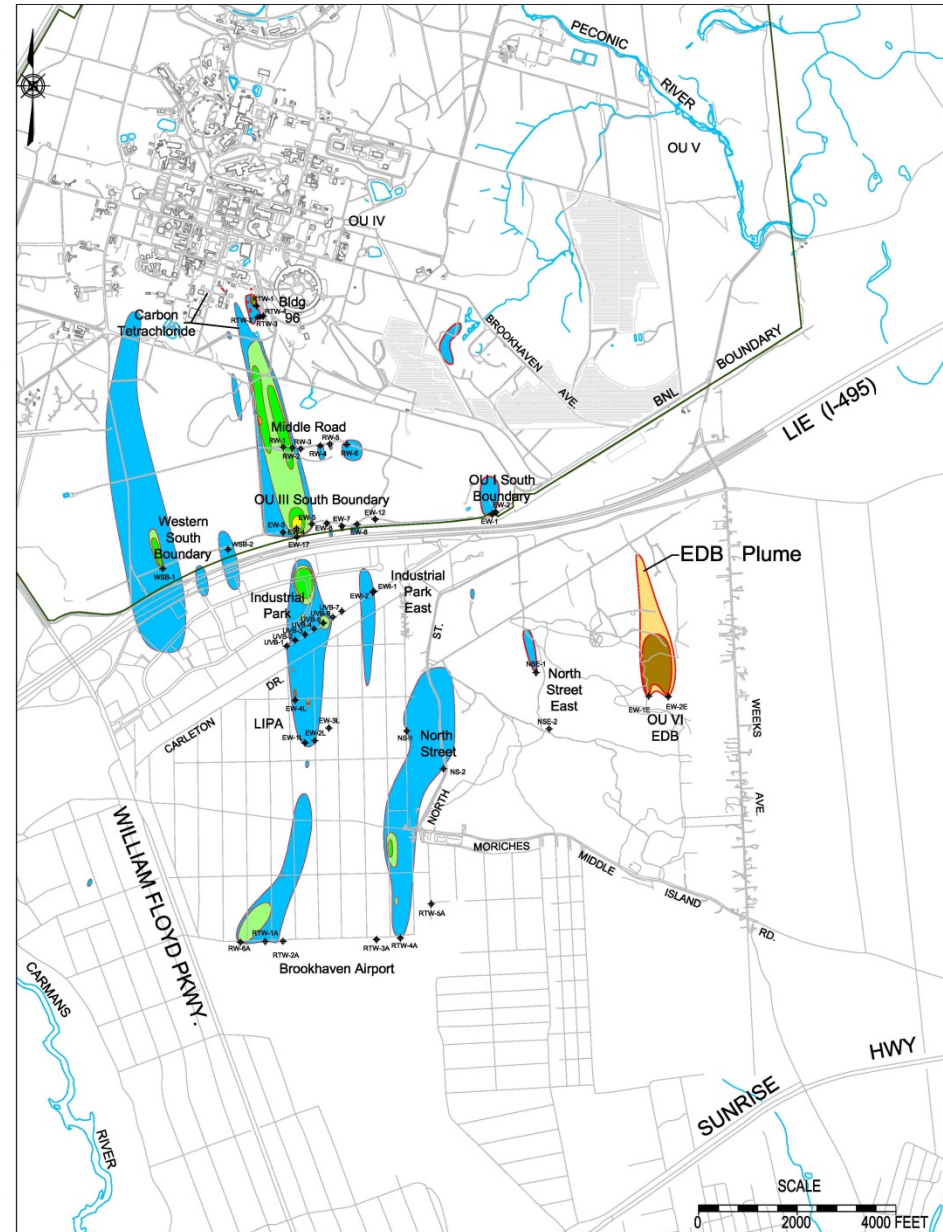
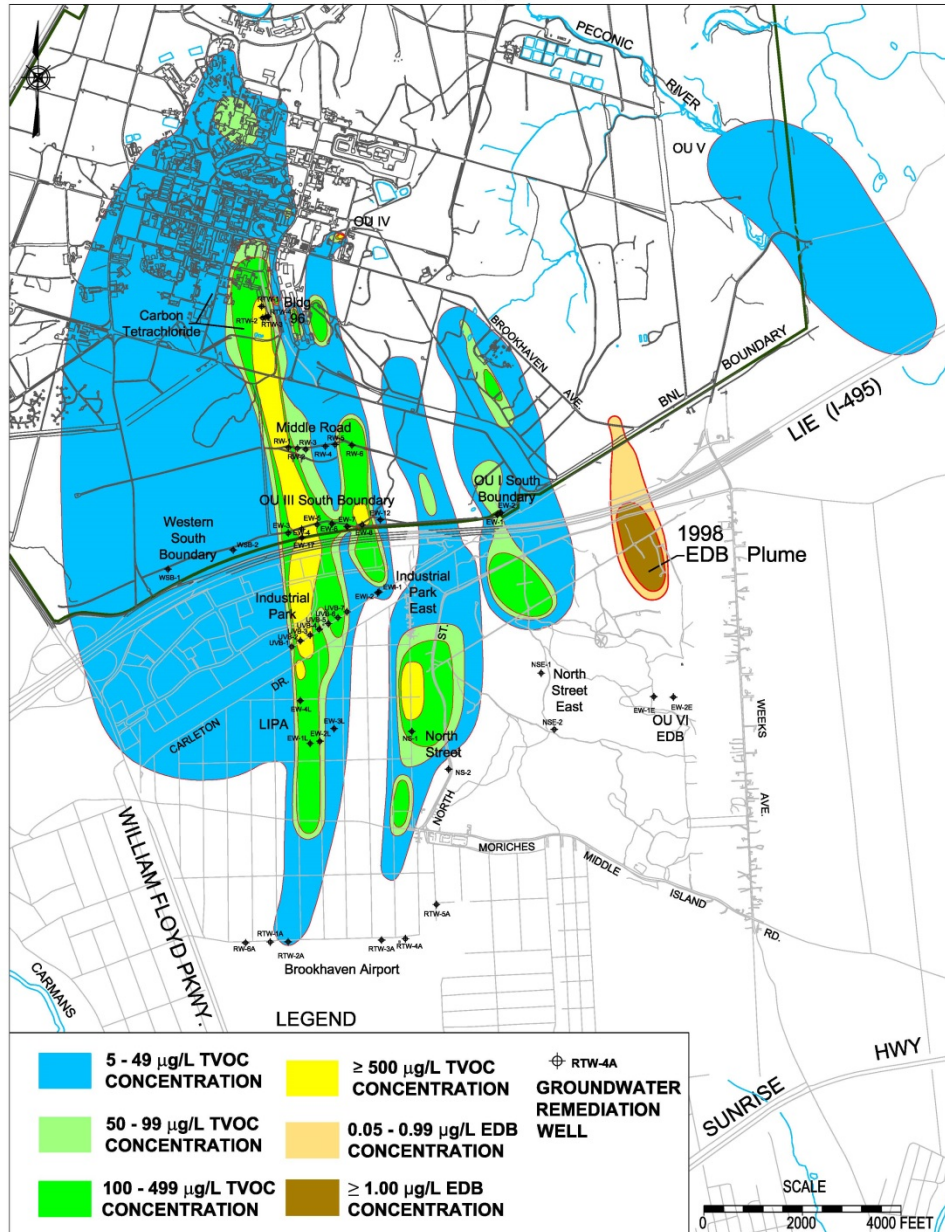


VOC Remediation Progress 1997 to 2013



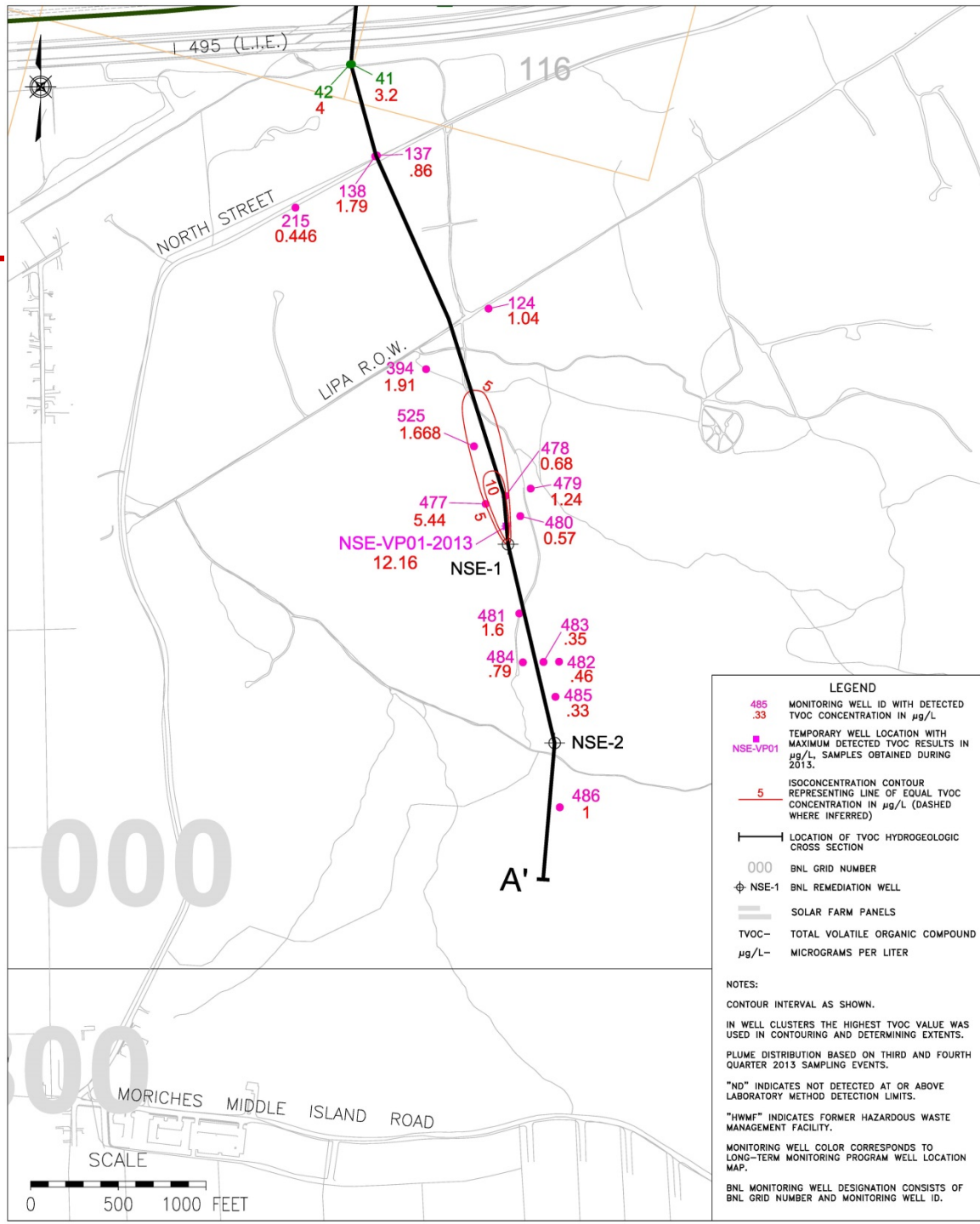
1997

2013



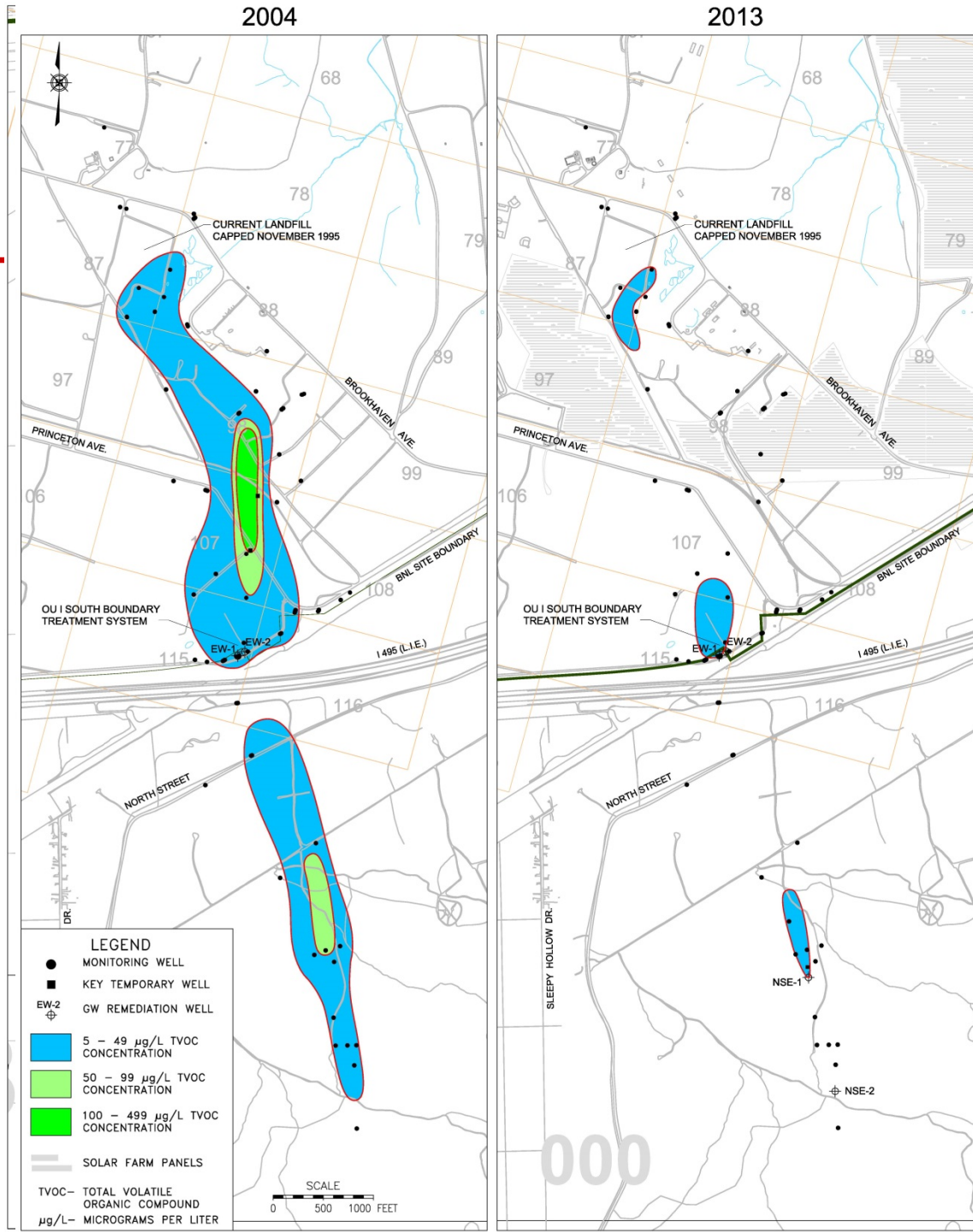
North Street East Plume/System Shutdown

- System shut down June 2014
- Historical high TVOC concentration in this area 490 ug/L in 1998
- Maximum TVOC concentration in 2014 was 7 ug/L (individual VOCs < Drinking Water Standards)
- No significant VOC concentration rebound observed



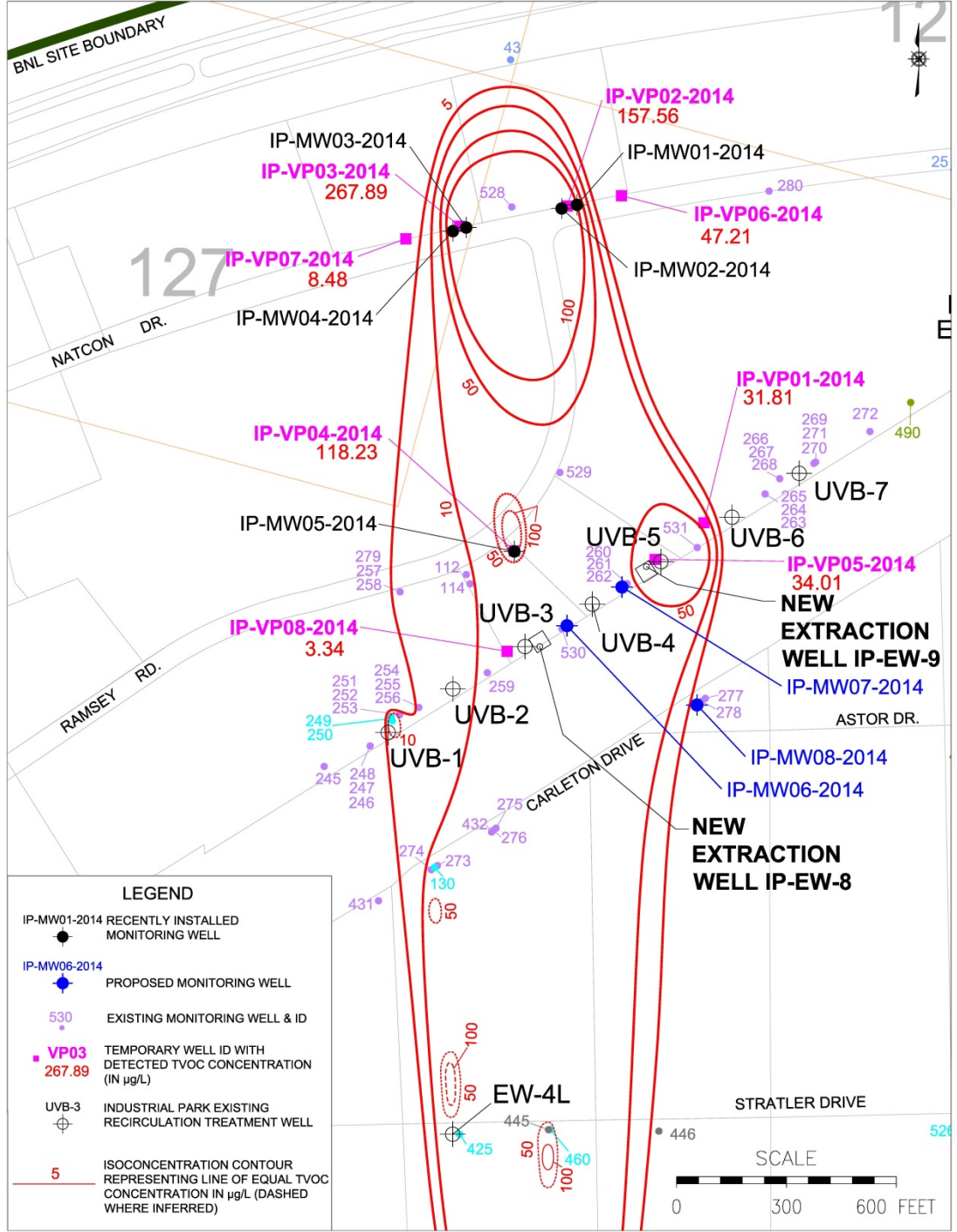
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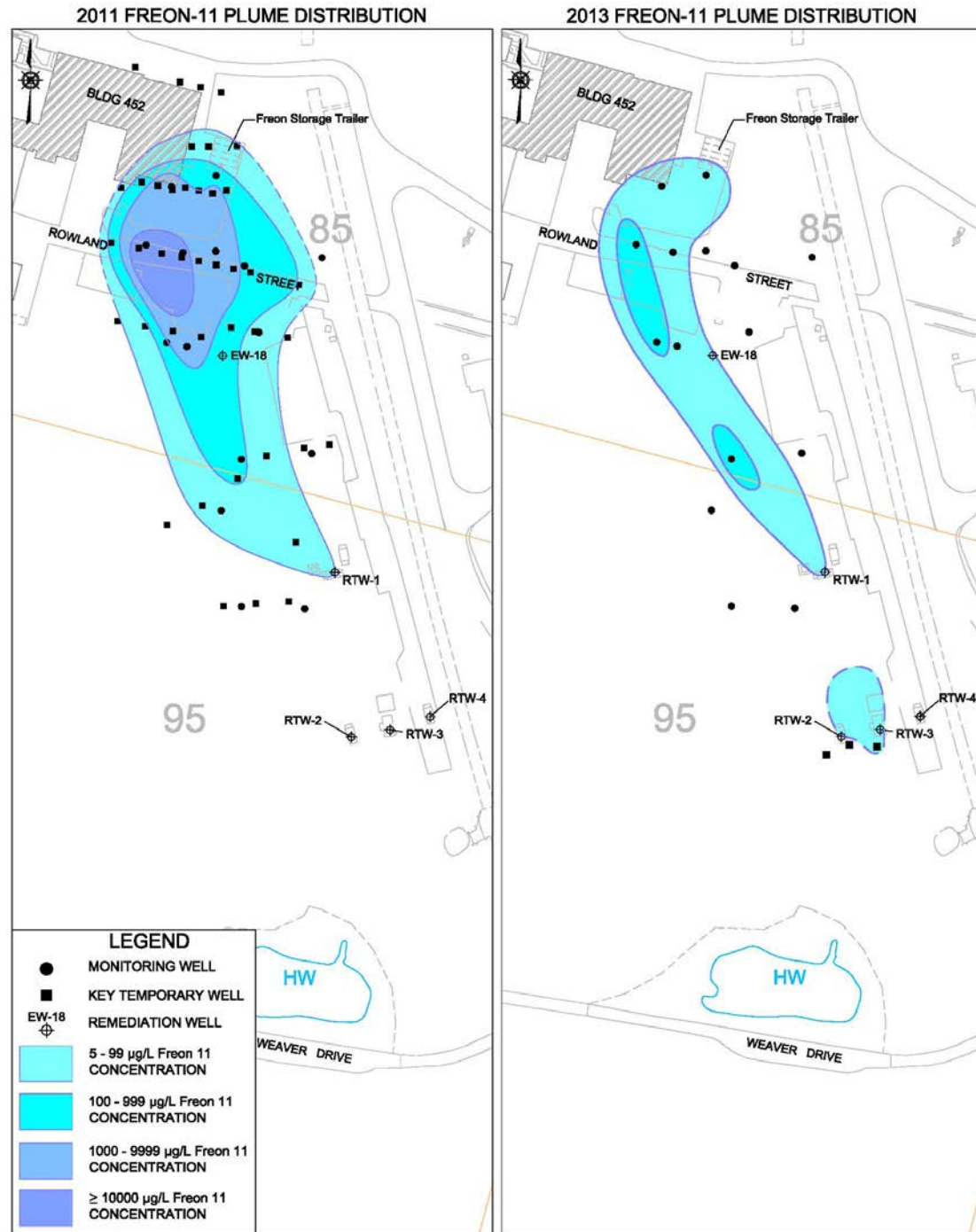
Deep VOC Characterization/New Extraction Wells

- Installed 8 temporary vertical profile wells and 2 permanent monitoring wells (Weaver Dr.)
- Installed 8 temporary vertical profile wells and 8 permanent monitoring wells in Industrial Park
- Performed capture zone analysis (groundwater model) using new data to optimally locate extraction wells
- Installed 2 new deeper extraction wells in Industrial Park
- Re-using building and equipment from decommissioned Industrial Park East Treatment System



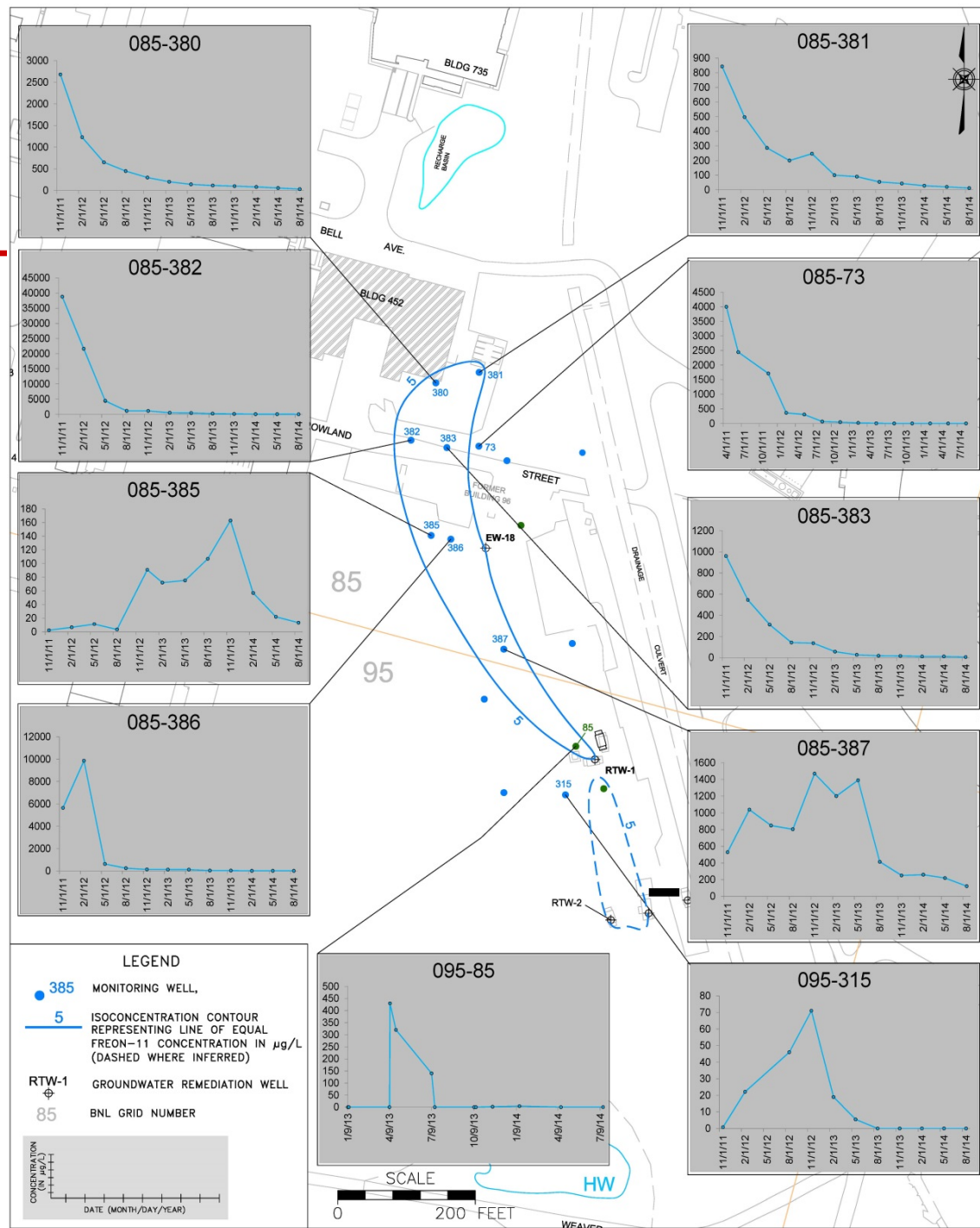
Bldg. 452 Freon-11 Groundwater Treatment System Update

- New extraction well (EW-18) has been in operation since March 2012, ~ 90 lbs. Freon removed
- Maximum Freon-11 concentrations in source area currently <50 ug/L
- Planning follow up characterization of source area
- Evaluating system shutdown in 2015



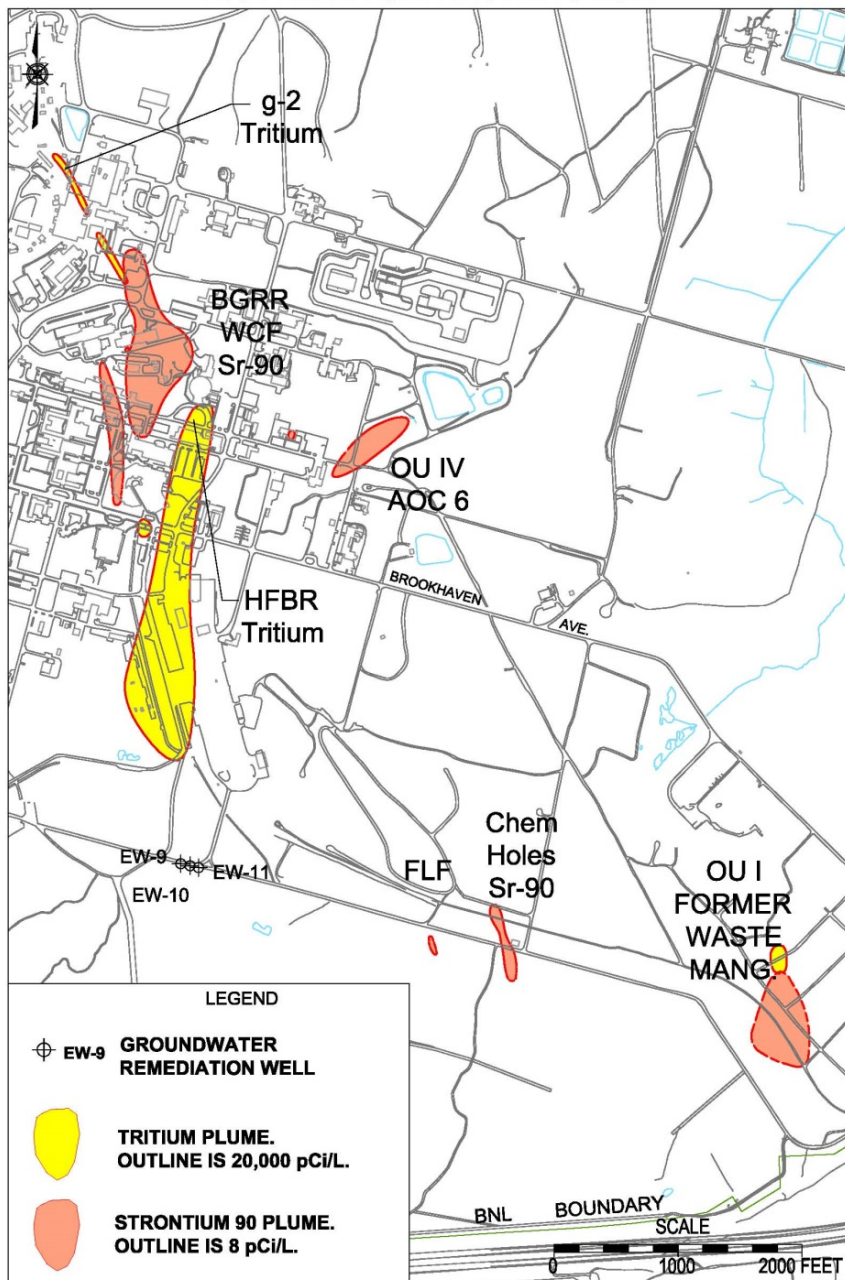
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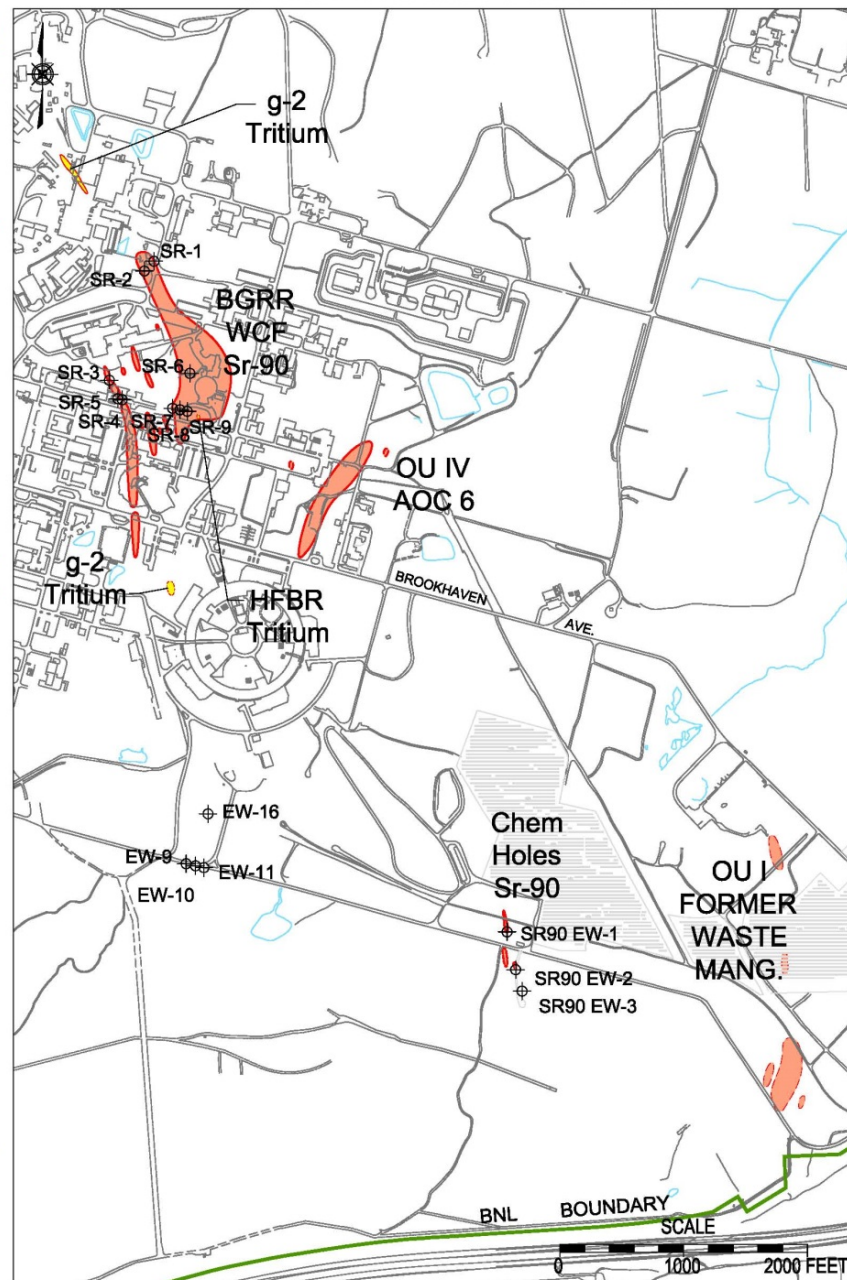


Radiological Plumes

2002 RAD PLUME DISTRIBUTION

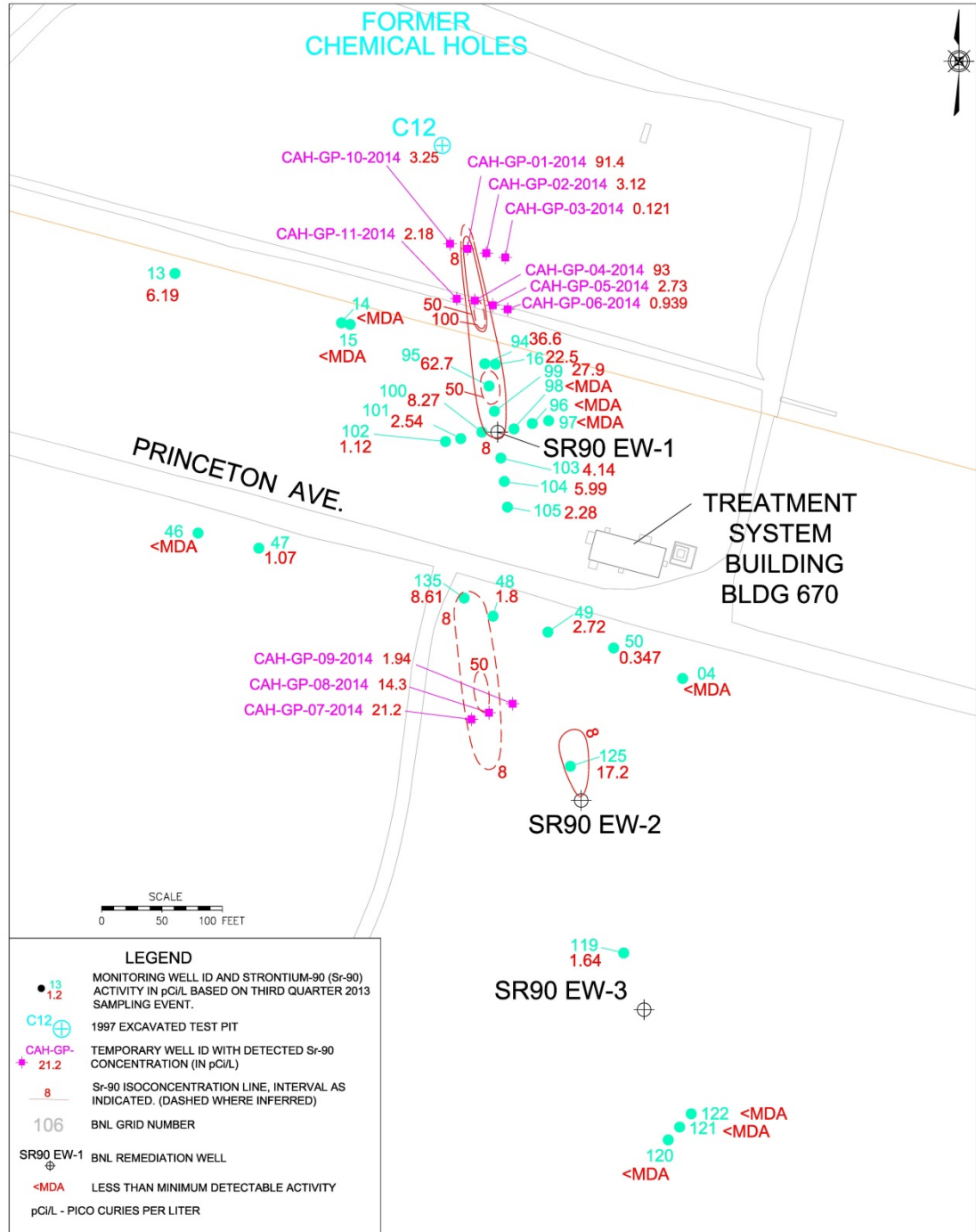


2013 RAD PLUME DISTRIBUTION



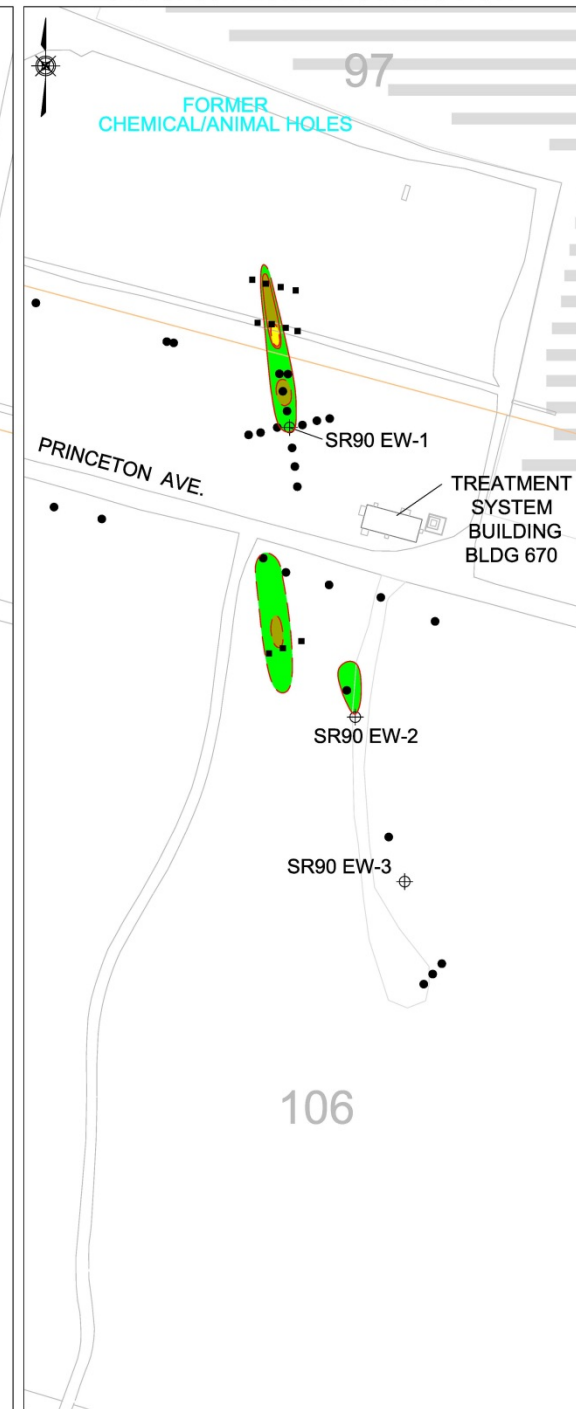
Chemical Holes Sr-90 Plume Progress

- Buried waste excavated in 1997
- Extraction Well EW-1 began operating in 2003
- EW-2 and EW-3 added in 2007
- Historical high Sr-90 concentration of 4,720 pCi/L in 2005, highest in 2014 was 129 pCi/L
- Extraction wells currently pulse pumping
- Petition for Shutdown planned in 2015



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Reactor Surveillance and Maintenance Update

- Completed upgrade to HFBR security system
- Completed BGRR roof repairs
- BGRR former office window replacement in progress



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Questions and Answers



OU 3 Deep VOC Cross-Section

