GROUND RULES
NOVEMBER 2014 RESTORATION ADVISORY BOARD (RAB)

NAVAL WEAPONS INDUSTRIAL
RESERVE PLANT BETHPAGE
LONG ISLAND, NEW YORK

11/05/2014

Naval Weapons Industrial Reserve Plant Bethpage RAB Ground Rules

- **Respect others:**
  - **One Speaker at a time**
  - **No interruptions**
  - **No side conversations**
  - **Ask questions**
- **Listen and stay open to all points of view.**
- **Stay focused on the topics; avoid digressions.**
- **Turn cell phones and /or pagers off, or on vibrate, and respond during breaks, except for emergencies.**

The Management Edge

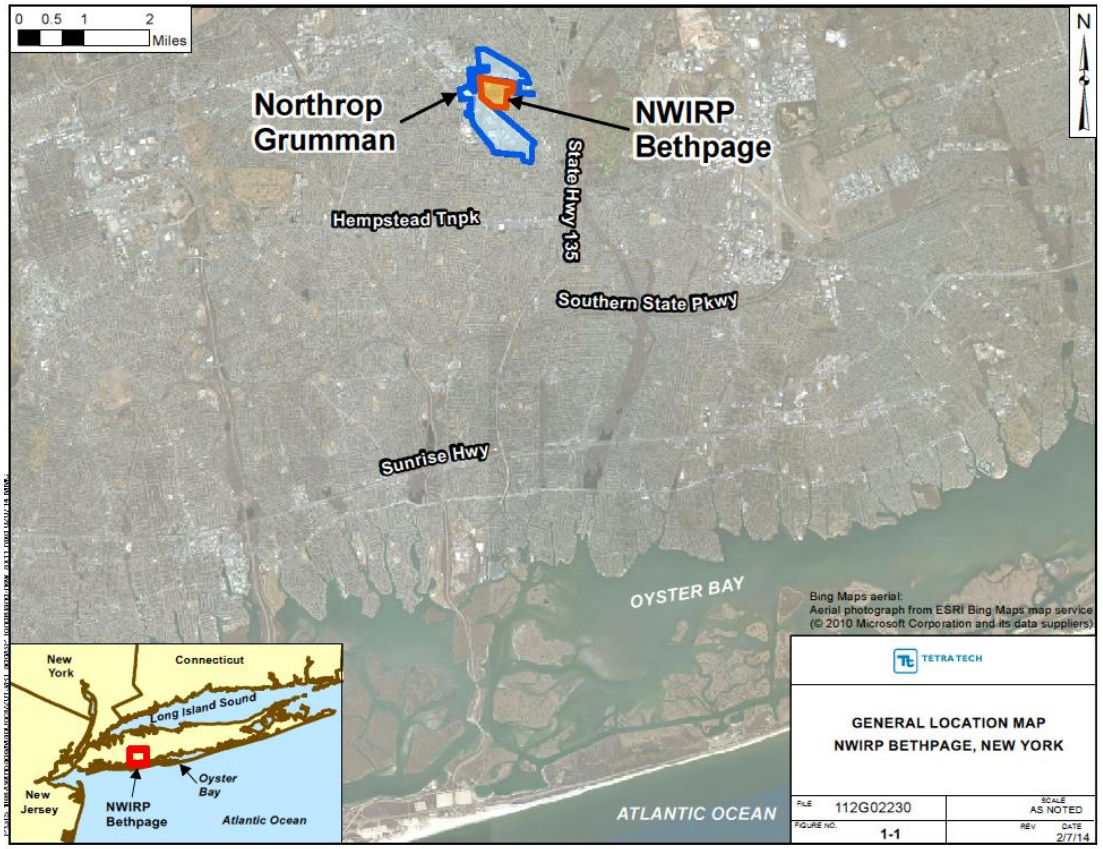
OVERVIEW
NOVEMBER 2014 RESTORATION ADVISORY BOARD (RAB)

NWIRP BETHPAGE
LONG ISLAND, NEW YORK

11/05/2014

Facility Background

- **1940s - Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage**
  - –established to build Navy aircraft (originally 109 acres)
  - –government-owned contractor-operated (GOCO) facility
- **Northrop Grumman (NG)**
  - –operated the NWIRP as contractor;
  - –also owned and operated its own facility adjacent to NWIRP (500 +/-acres)
- **1998**
  - –NG terminated activities
  - –NWIRP property owned by Navy

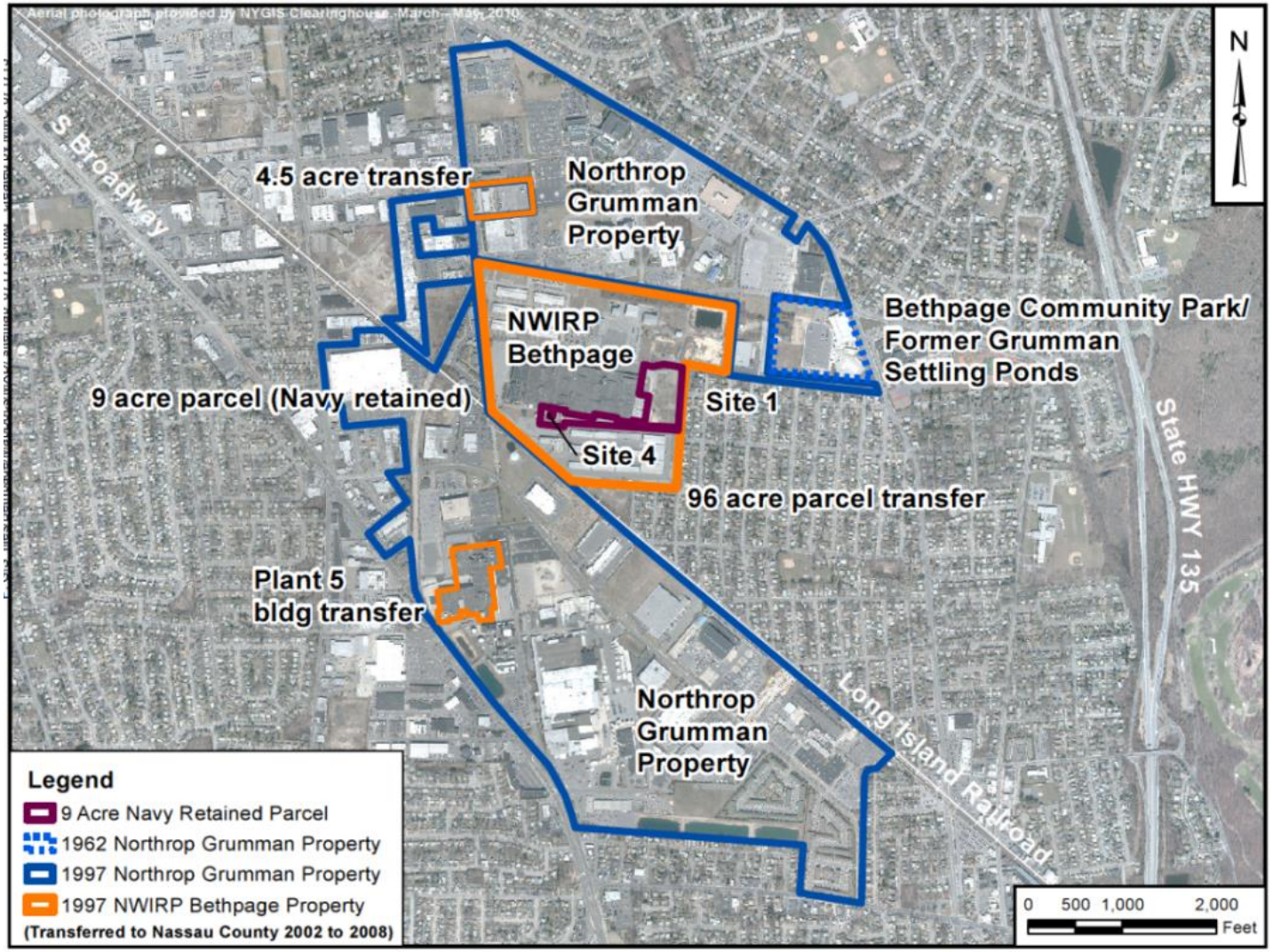


Facility Background (continued)

Property Transfer/Description:

- **1998 -** Special Legislation enacted to transfer facility to Nassau County for economic redevelopment
  - Prior to transfer – Environmental cleanup conducted as needed by **Naval Facilities Engineering Command (NAVFAC)** Mid-Atlantic under the **Environmental Restoration (ER)** Program
- **Feb 2008**
  - –transfer complete to Nassau County for most of the facility (100 acres)
  - –9 acres retained by Navy for environmental cleanup (ER Sites 1 and 4)
- **Current Navy property**
  - –500-foot boundary with a residential neighborhood along the east
  - –Remainder mostly bounded by Nassau County and Steel-Los III, LP properties (both former Navy property).
  - –Multiple businesses utilizing the Steel-Los III, LP property

Facility Background



Environmental Cleanup Program

- **Regulatory Compliance**
  - **Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)** – the legal mechanism for cleaning up abandoned or uncontrolled hazardous waste sites at DOD, Navy's Environmental Restoration (ER) Program
  - **Resource Conservation and Recovery Act (RCRA) Corrective Action** – a statutorily required cleanup program, similar to CERCLA, that addresses solid waste management units and contaminated media as a condition of RCRA permits, NWIRP Bethpage has a RCRA Permit with NYSDEC
  - **Title 6 of the New York Codes, Rules, and Regulations (NYCRR)**, Part 375 through the Applicable or Relevant and Appropriate Requirements (ARARs) process of CERCLA
- **The Navy is the lead federal agency for CERCLA**
  - the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300, and Executive Order 12580, as amended by Executive Order 13016, for CERCLA response activities at Bethpage.

Environmental Cleanup Program

- **Regulator Involvement CERCLA Sites**
  - **New York State Department of Environmental Conservation (NYSDEC)** provides regulatory review of Navy actions with assistance from the **New York State Department of Health (NYSDOH).**
  - **United States Environmental Protection Agency (USEPA)** has had limited involvement since NWIRP Bethpage is not a federal National Priorities List (NPL) site.
- **Regulator Involvement RCRA Sites**
  - NYSDEC is the lead regulatory agency in accordance with the requirements of the New York State RCRA Hazardous Waste Permit for the facility.

Investigation and Response

Soil and Shallow Groundwater:

- –Onsite Response Actions conducted:
  - Sites 2 and 3 (2002)
  - Site 1 Volatile Organic Compounds (VOC)-contaminated soil and shallow GW (2002)
  - Soil Vapor migration (2010)
- –Onsite Response Actions to be completed:
  - Site 1 - Polychlorinated biphenyls (PCBs) soil,
  - Site 4 – Former USTs contained No. 6 Fuel Oil

Site 1 – Former Drum Marshalling Area

Site 1 Issues:

- Site was used by Northrop Grumman for staging waste solvents, liquid plating wastes (metals), and autoclave (PCB fluid) wastes.
- PCB-contaminated soil original estimate: 1,400 cubic yards and less than 10 feet deep
- 1995 Record of Decision (ROD) Operable Unit (OU) 1 identified excavation and offsite disposal
- Additional testing found PCBs to 65 feet deep
- Current volume estimate increased to 60,000 cubic yards

Path Forward:

- 2014 Remedial Investigation Addendum
- 2014 Feasibility Study Addendum
- 2016 OU1 ROD Amendment or new ROD
- 2017 Start of Remedy

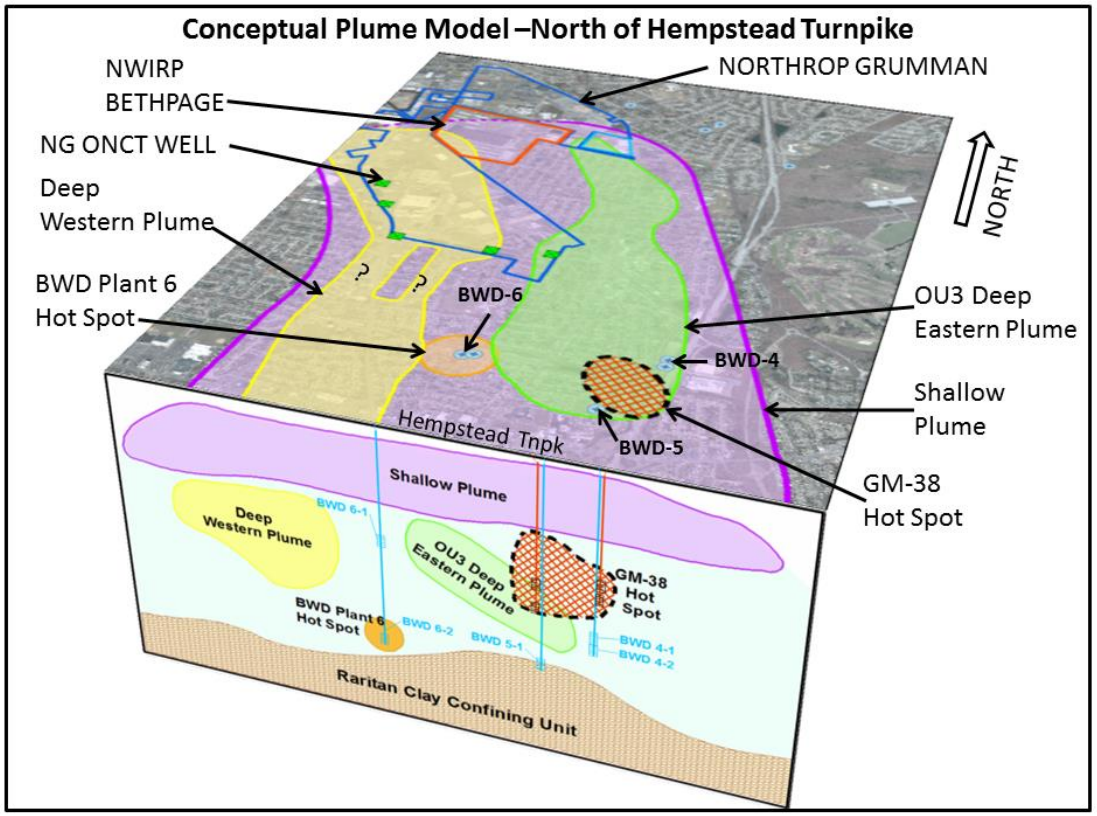
Site 4 – Former UST Site

- Former location of underground storage tanks for No. 6 Fuel Oil (tar).
  - Tanks were likely removed in the 1980s.
  - Groundwater sampling found minimal or no impact.
  - Site boundaries are constrained by 20-acre building, limits excavation
- In-situ bio pilot study attempted in 2004 to 2006, limited success
- Treatment options limited
- Navy has issued a Proposed Plan for public comment

OU2 Groundwater Investigation

Groundwater contamination that originated on NWIRP property and co-mingled with contamination that originated on Northrop Grumman property, such that the source of the contamination cannot be identified.

- **Shallow Plume**
  - 30 to 300 feet deep; less than 10 parts per billion (ppb) of each contaminant
- **GM-38 Hot Spot**
  - 250 to 500 feet; 50 to 1,500 ppb
- **Deep Eastern Plume, OU 3 groundwater**
  - 50 to 600 feet: 50 to 10,000 ppb
- **Deep Western Plume**
  - 300 to 750 feet; 50 to 400 ppb
- **Plant 6 Plume, source uncertain**
  - Screen interval 700 feet; 1,200 ppb

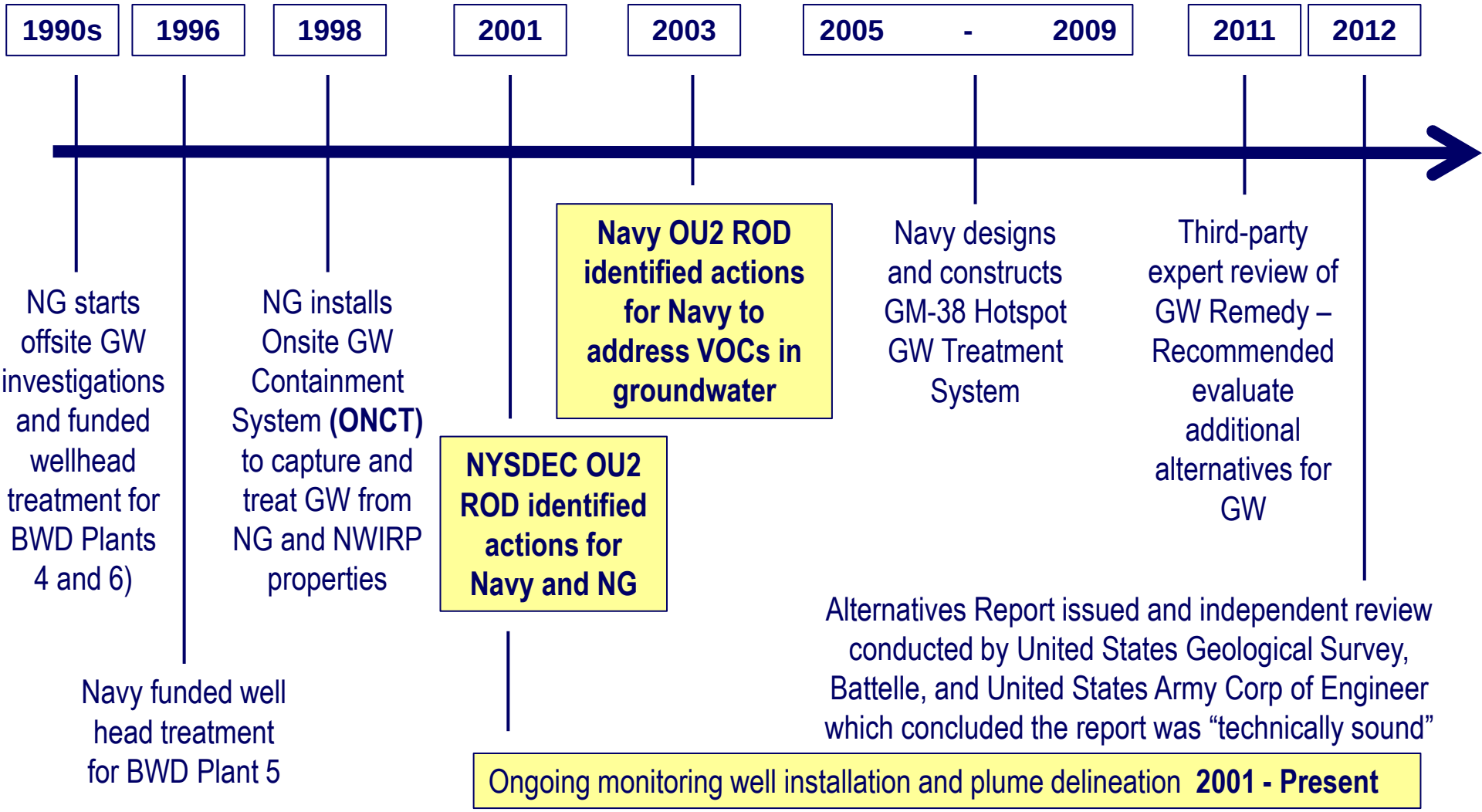


OU2 Groundwater ROD

2003 OU2 Groundwater ROD:

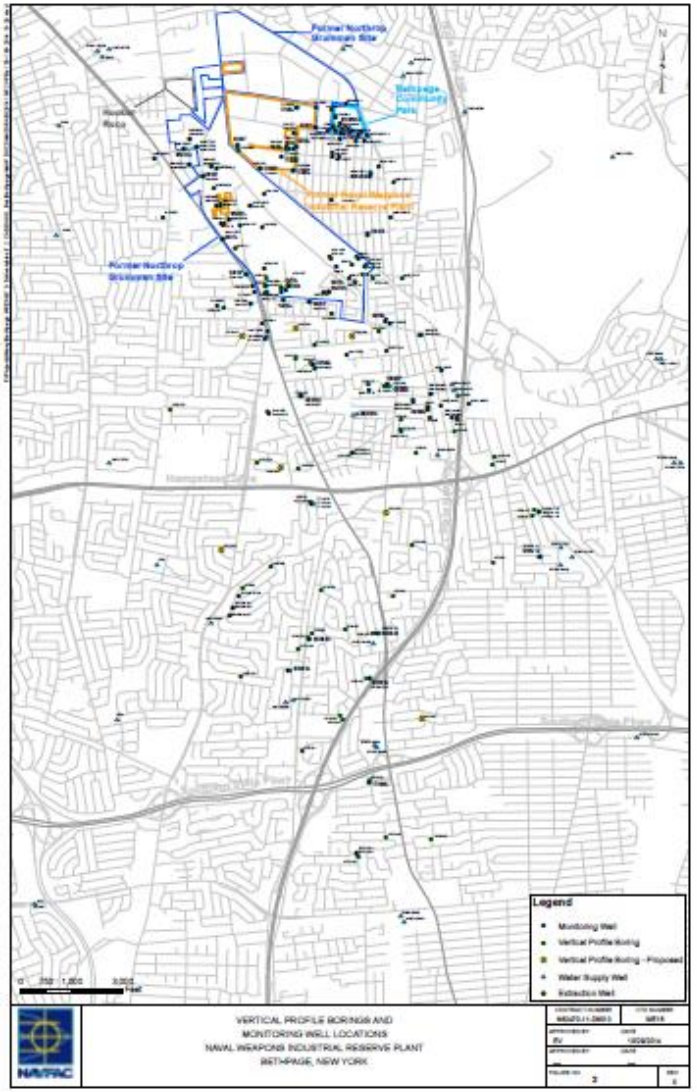
- –GM-38 Hot Spot treatment system
- –Public Water Supply Protection
- –Groundwater Monitoring

Groundwater Investigation Timeline



Groundwater

Groundwater remediation wells and public water supplies



SITE 1 SOIL VAPOR EXTRACTION CONTAINMENT SYSTEM (SVECS) OPERATION NOVEMBER 2014 RESTORATION ADVISORY BOARD (RAB)

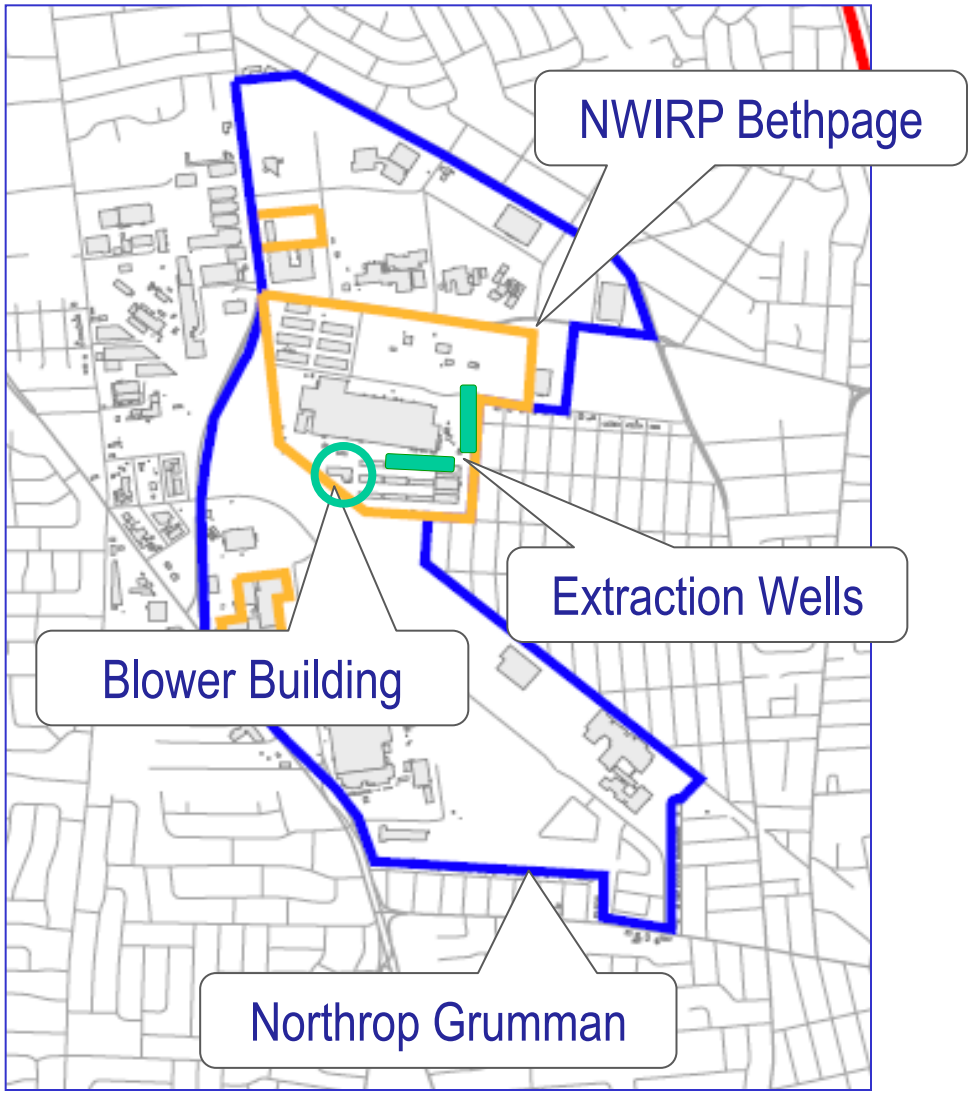
NWIRP BETHPAGE
LONG ISLAND, NEW YORK

11/05/2014

Introduction

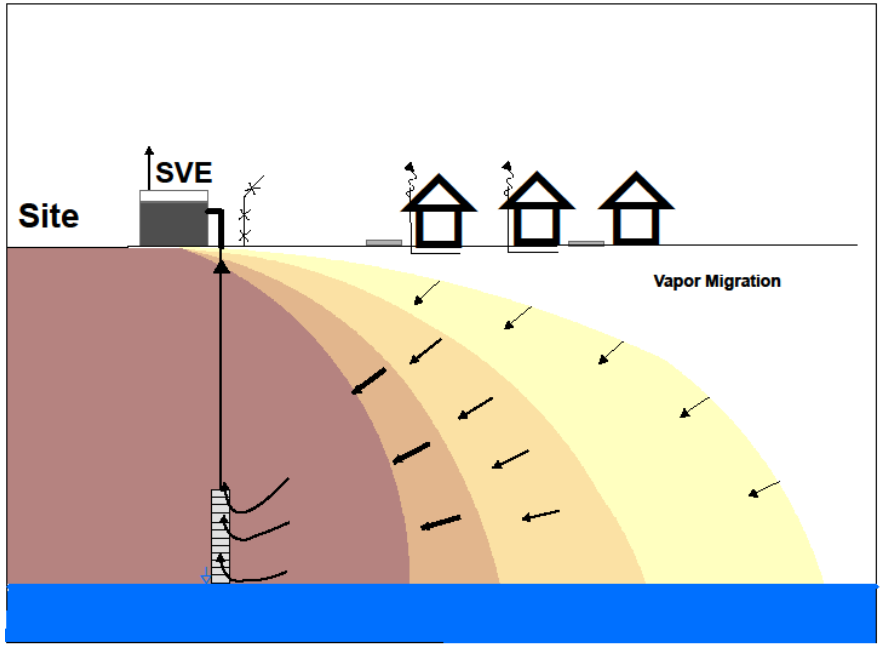
- Site 1 Soil Vapor Extraction Containment System (SVECS)
  - Overview
  - Operational Activities
  - System performance and future activities

Introduction



SITE 1 SVECS Project Overview

- Background: Chlorinated solvents (volatile organic compounds) in underlying soil migrate into overlying soil gas.
- Purpose of system is to contain soil vapor and prevent offsite migration of volatile organic compound (VOC) vapors.
  - Soil vapor – Air found in the space between soil particles.
  - Under certain conditions, vapors can migrate upward and into buildings.
  - Treatment system purges off-site vapors and creates a vacuum to control migration.

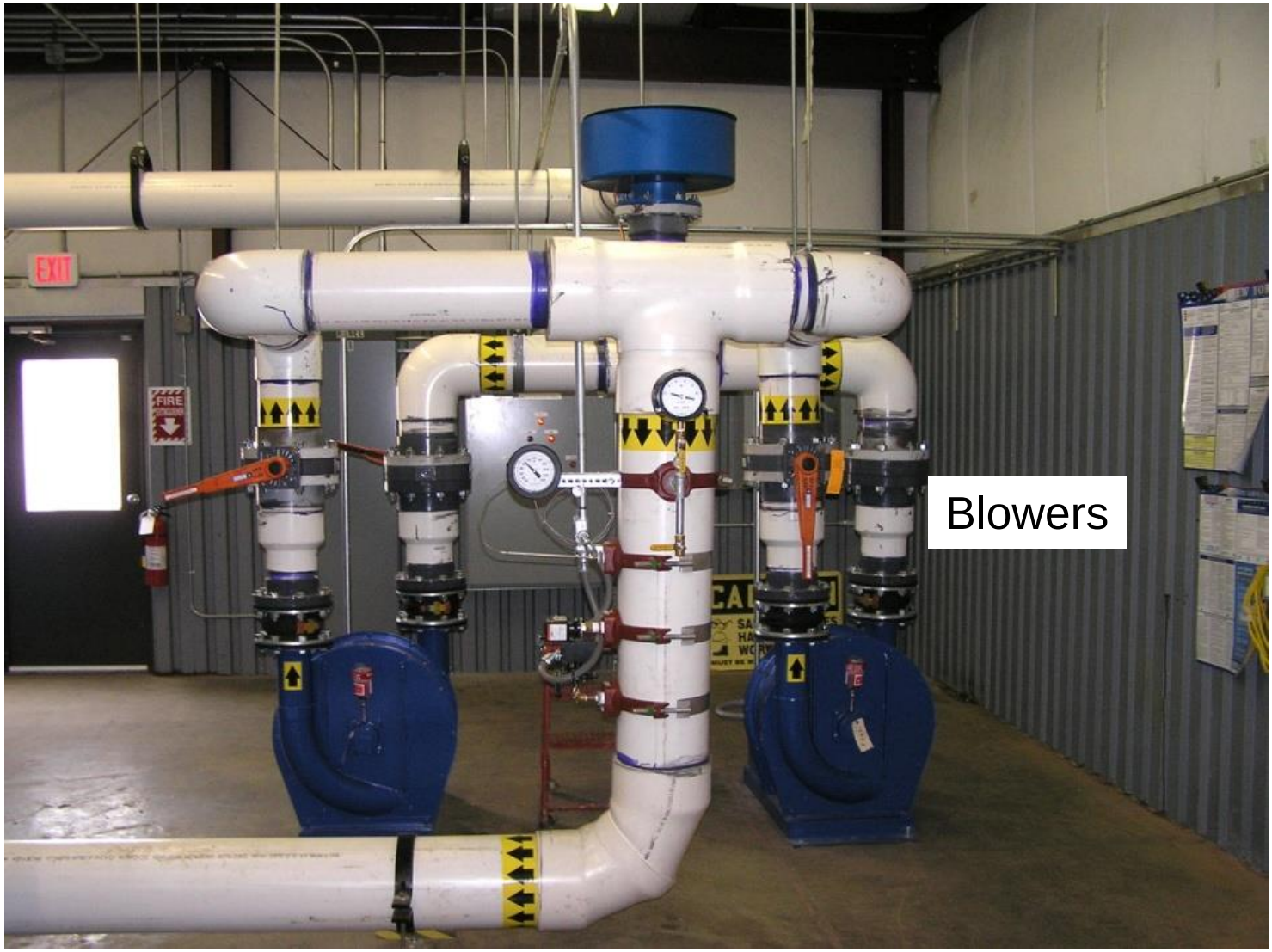


SITE 1 SVECS Project Overview

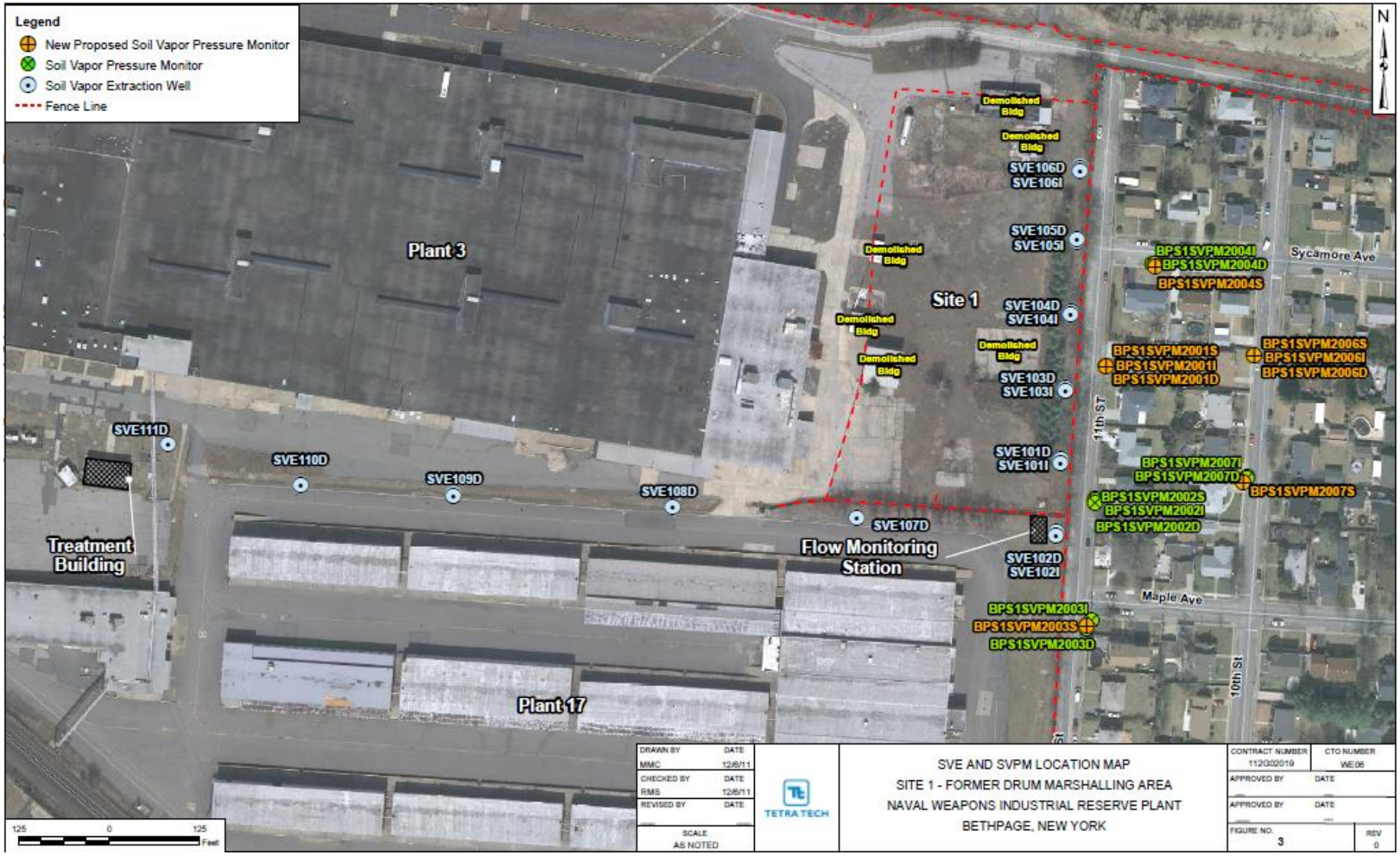
- System began operation in January 2010.
- Consists of soil vapor extraction, soil vapor monitoring, and soil vapor treatment.
- System extracts 300 to 400 cubic feet per minute of soil gas from 12 wells located along Site 1 fence line. Five additional extraction wells added in October 2011 to address potential on property sources.

SITE 1 SVECS Project Overview

SITE 1 SVECS Project Overview



SITE 1 SVECS Site Layout



SITE 1 SVECS Operational Activities

- Total of 17 soil vapor extraction (SVE) wells.
- Total of 18 soil vapor pressure monitor (SVPM) locations throughout neighborhood.
- Various sample collection and monitoring performed monthly, quarterly, and annually.
  - Process system samples - Ensure continued compliance with permit guidelines.
  - Soil vapor extraction wells (SVEWs) - Monitor system operations/operational efficiency.
  - Soil vapor pressure monitors (SVPMs) - Monitor vacuum field/potential for vapor intrusion.

SITE 1 SVECS Performance and Future Activities

- Since startup, 163.5 pounds of volatile organic compounds have been recovered.
- During 2014 calendar year (Jan 2014 – Sept 2014), 20.5 pounds of volatile organic compounds were recovered.
- Plant operates in compliance with air permit guidelines.
- Runtime is above 95% with minimal downtime due to power outages and scheduled maintenance.
- Continue to operate system and monitor system operations.
  - Submit quarterly/annual operations reports.

GM-38 GROUNDWATER TREATMENT PLANT OPERATION
NOVEMBER 2014 RESTORATION ADVISORY BOARD (RAB)

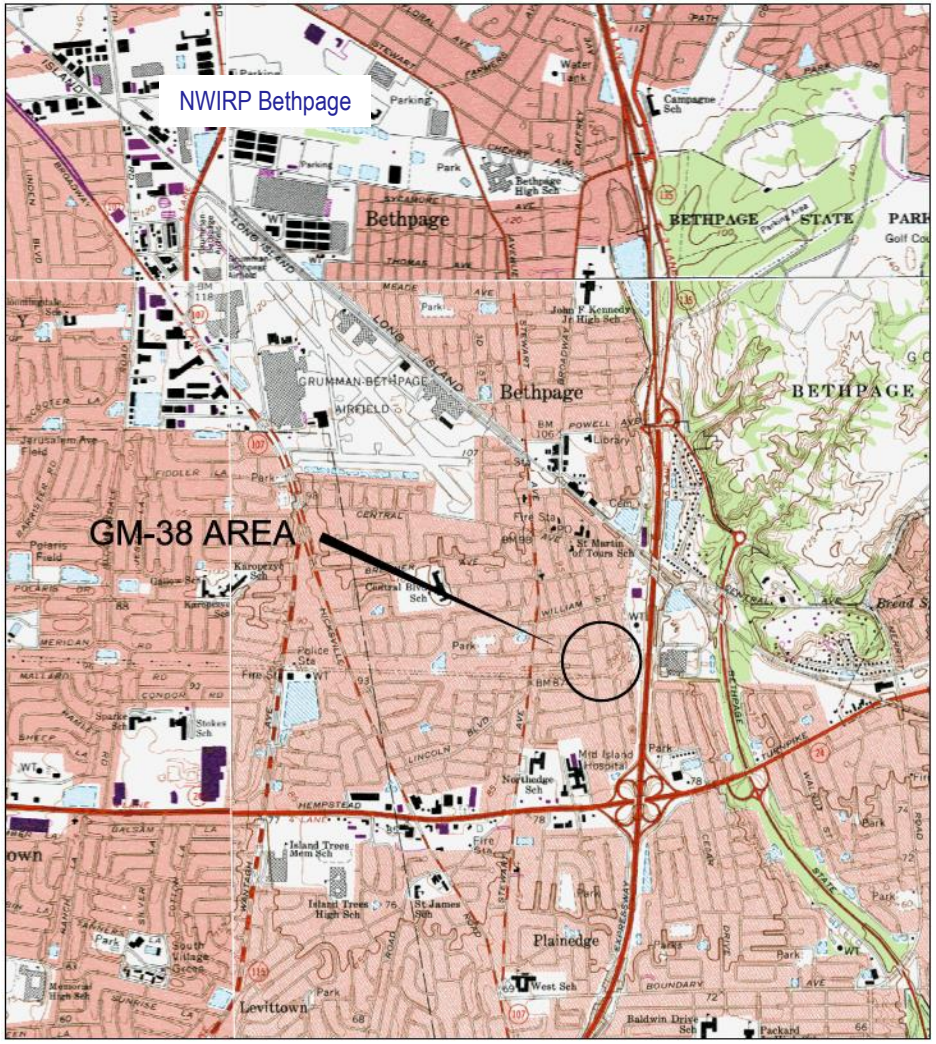
NWIRP BETHPAGE
LONG ISLAND, NEW YORK

11/05/2014

Introduction

GM-38 Groundwater Treatment System

- Objective
- Construction and Operation
- Operational Activities
- System Performance
- Future Activities / Path Forward



Construction and Operation

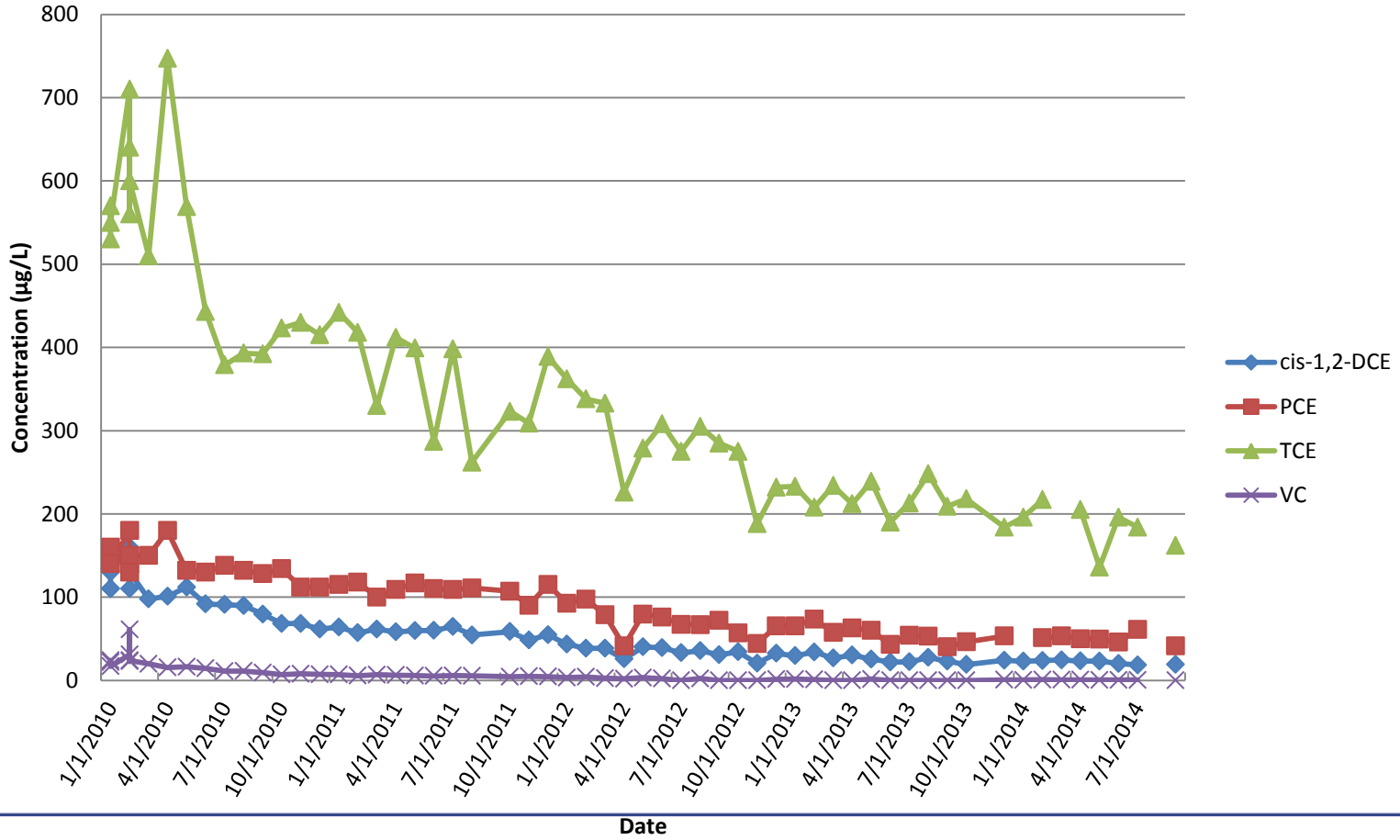
- Background: GM-38 Groundwater Treatment System – Hotspot treatment to remove contaminant mass and reduce volatile organic compound concentrations
- System consists of the following components:
  - Two groundwater recovery wells: RW01 and RW03
  - Equalization Tank
  - Air Stripping Tower
  - Particulate Filtration
  - Carbon Filtration - Liquid and Vapor
  - Discharge to a Recharge Basin
- System began operation in October 2009

Operation


2003 GM-38 Area
16-5
VPB-42
GM-36D
GM-36D2
BWD 4-1
BWD 4-2
Recharge Basin
GM-38D2
GM-38D
VPB-51
Treatment Plant
GM-38RW03
GM-38 RW2-MW2
VPB-48
GM-38RW02
VPB-38
Recovery Well RW03
GM-38RW01
GM-38 RW1-MW1
Miller Rd
MW-118-5
Recovery Well RW01
VPB-47
VPB-40
BWD 5-1

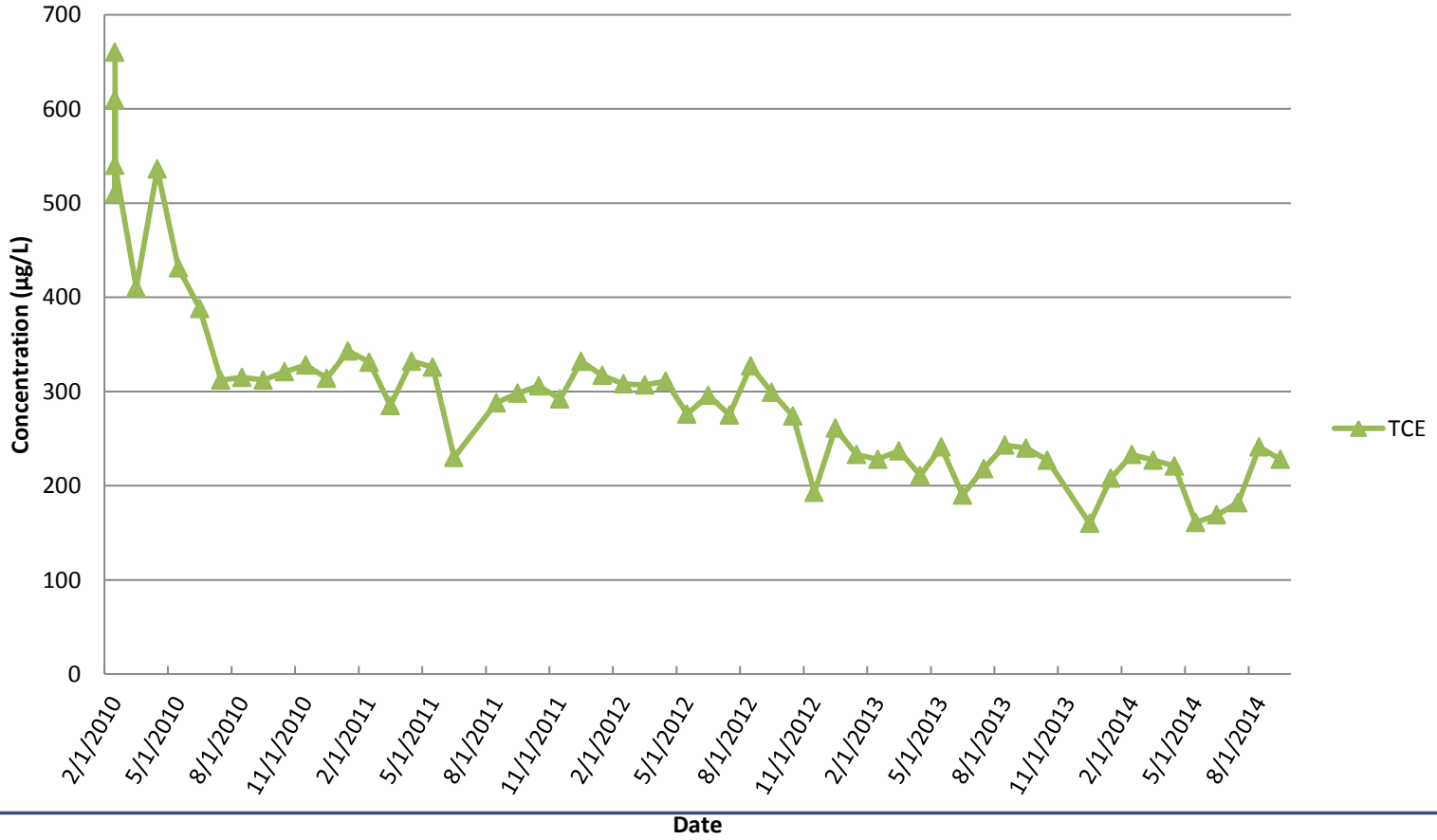
Operation – Recovery Well RW01

- Well extracts groundwater from upper and middle portion of hotspot – less than 435 feet deep (screened intervals: 335-395 feet deep, 410-435 feet deep)
- 75% reduction in volatile organics since system startup



Operation – Recovery Well RW03

- Well extracts groundwater from middle and lower portion of hotspot – 392 to 504 feet deep (screened intervals: 392-412 feet deep, 442-504 feet deep)
- 75% reduction in trichloroethene (TCE) since system startup



Operational Activities

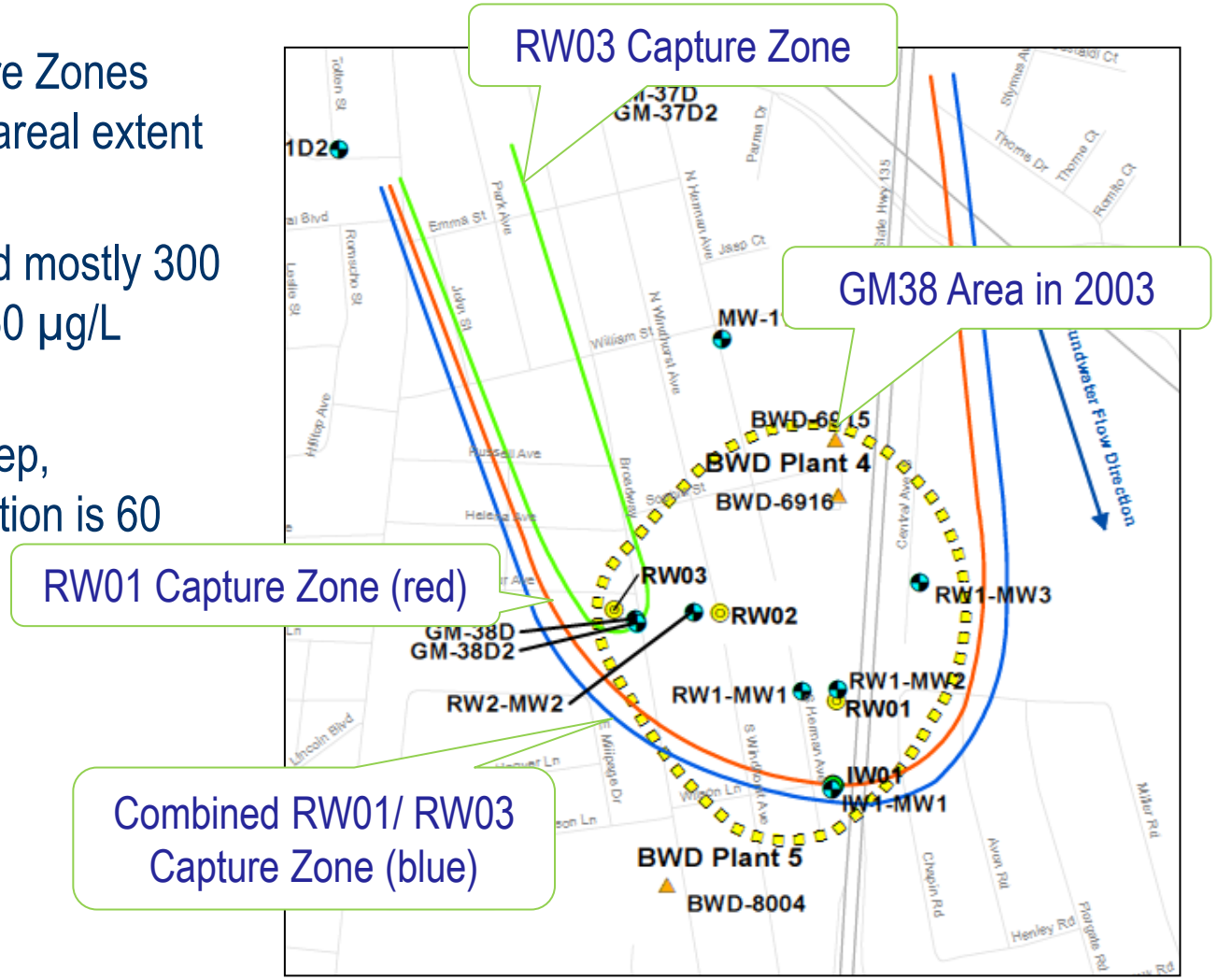
- Monthly compliance sampling of water and air
- Bi-annual sampling of groundwater monitoring wells
  - March 2014 and September 2014
  - Next event: March 2015
- Quarterly measurement of groundwater levels in surrounding monitoring wells
- Recent maintenance activities:
  - Late 2013 - Replaced existing duct work with stainless steel duct to allow optimization of air stripper performance
  - April 2014 – Repaired RW01 and RW03 piping
  - May 2014 - Repaired air stripper tower
  - July 2014 – Replaced RW01 pump and re-developed well
  - Sept / Oct 2014 – Air stripper effluent pump testing / maintenance

System Performance

- During 2014 calendar year (Jan 2014 – Sept 2014), system has treated:
  - 324 million gallons of water
    - Avg. 36 million gallons/month
  - 670 pounds volatile organic compounds
    - Avg. 74 lb/month
- Since start-up, system has treated:
  - 2.3 billion gallons of water
  - 7,500 pounds of volatile organic compounds
- Monthly compliance sampling of water and air
  - Consistently achieves requirements
- Normal runtime is 95%
  - Downtime due to power outages and maintenance activities
  - Runtime reduced recently due to major overhauls of treatment equipment

System Performance

- RW01 and RW03 Capture Zones based on original (2003) areal extent of hotspot
- Residual VOCs are found mostly 300 to 430 feet deep, up to 350 µg/L (parts per billion)
- Greater than 450 feet deep, maximum TCE concentration is 60 µg/L (parts per billion)



Future Activities / Path Forward

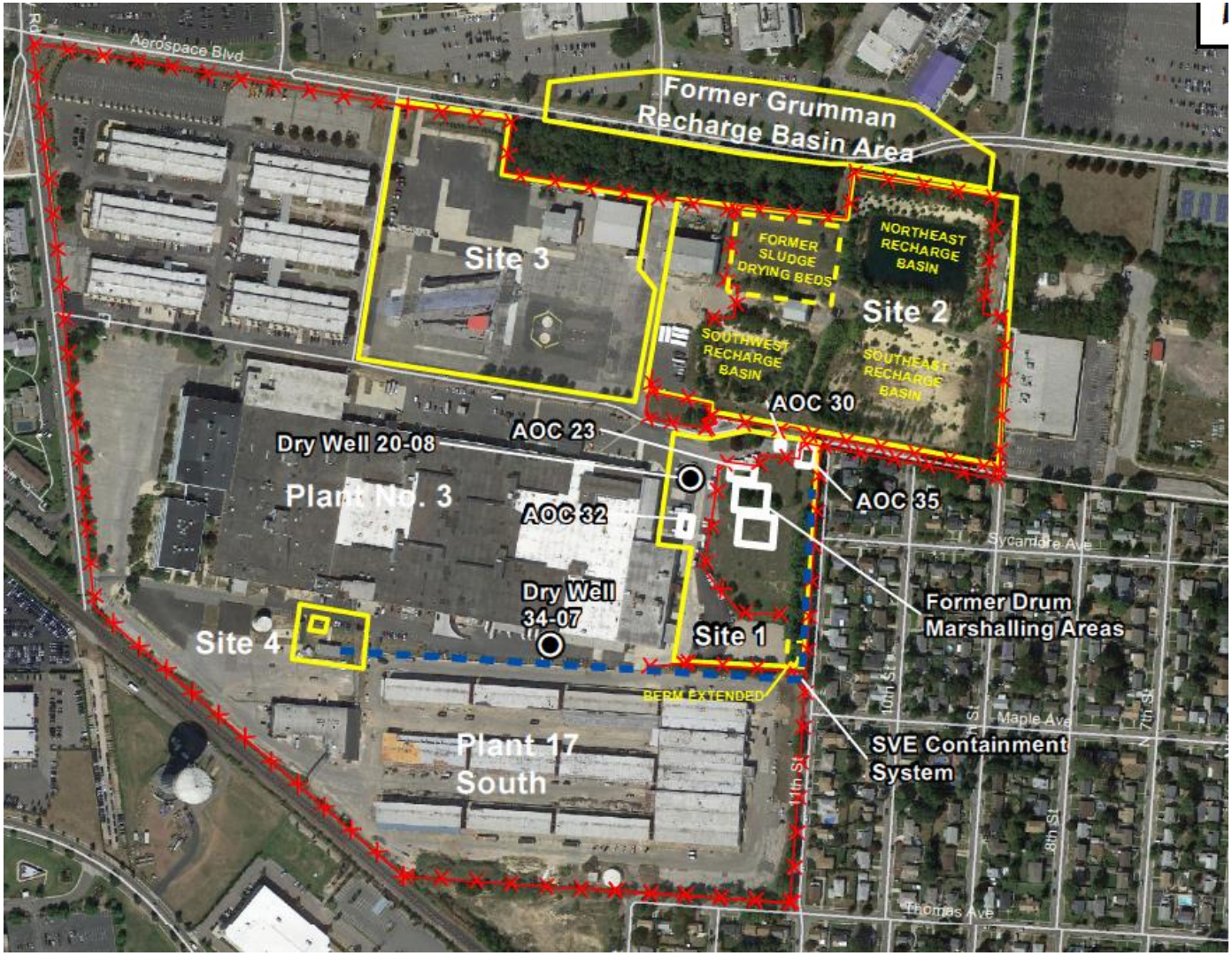
- Continue to collect monthly and semi-annual samples to monitor system performance
- Optimization activities currently in progress
  - Evaluate and improve system performance
  - Shut down RW03, increase flow at RW01

SITE 4 (AOC 22) PROPOSED PLAN
NOVEMBER 2014 RESTORATION ADVISORY BOARD (RAB)

NWIRP BETHPAGE
LONG ISLAND, NEW YORK

11/05/2014

Site 4 - Location Map



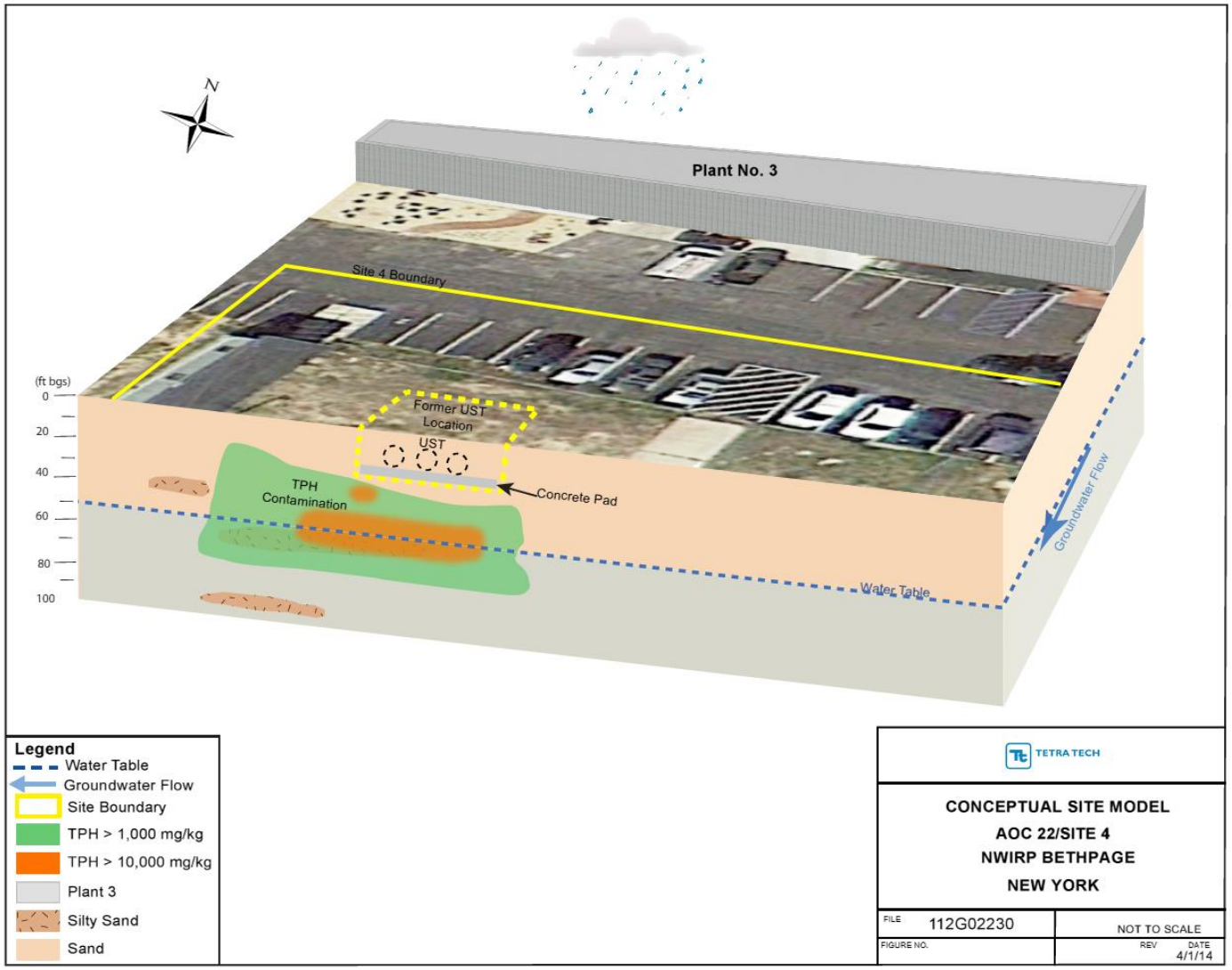
SITE 4 (AOC 22) ACTIVITIES

- Former Underground Storage Tanks (USTs) for No. 6 Fuel Oil – Tar-like material
- Tanks were removed around 1980 to 1984
- Approximately 6,800 cubic yards and 47 tons of petroleum present
- Petroleum found in the soils 30 to 71 feet deep
- Impacted soil covers an area of approximately 0.14 acre
- Some evidence of groundwater effects
- Groundwater ultimately captured by Containment System to south

SITE 4 (AOC 22) ACTIVITIES

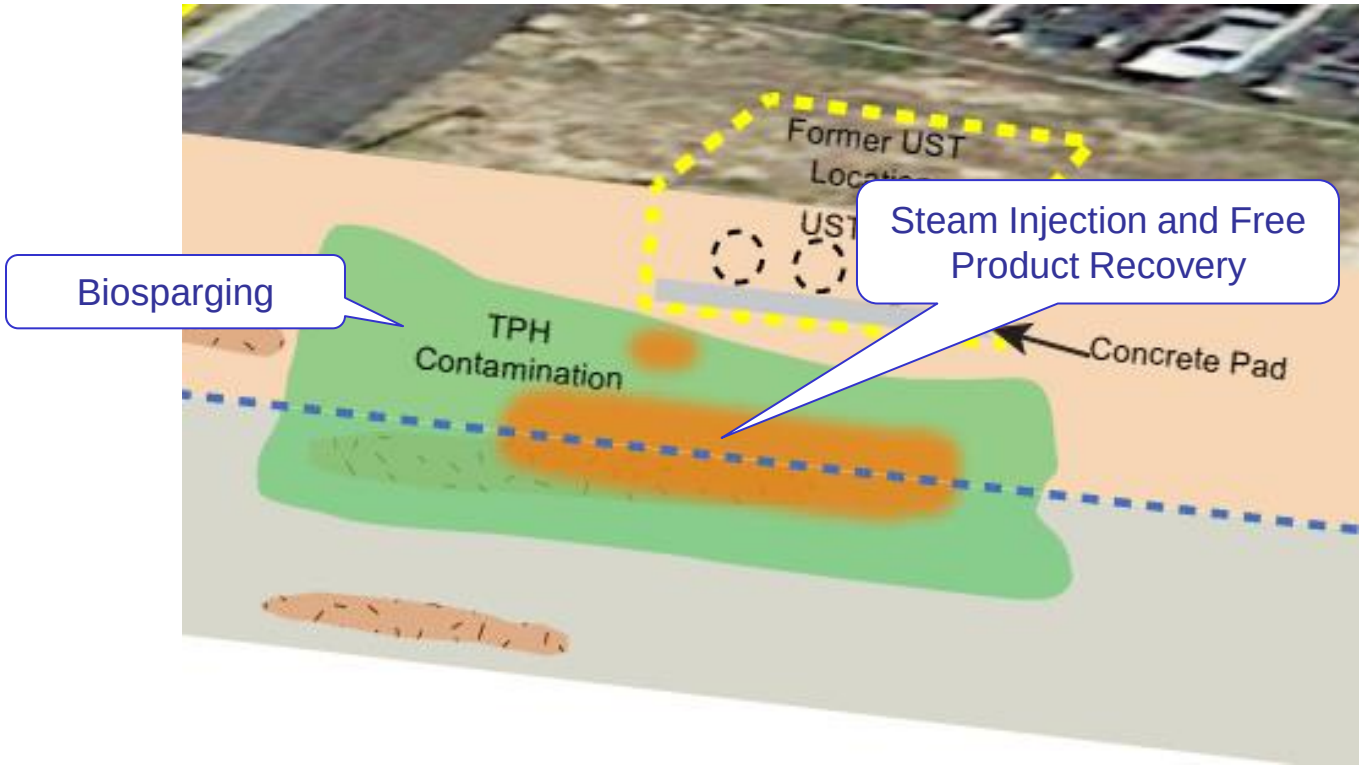
- Navy prepared a Feasibility Study to develop and evaluate potential remedial alternatives (2013)
- Alternatives included:
  - Land Use Controls – Admin. steps to control contact with wastes
  - Groundwater Monitoring – Evaluate impacts to the aquifer
  - Steam Injection/Free Product Recovery – Injection of steam to heat up the soil and mobilize the petroleum to allow its recovery
  - Solvent Extraction – Use of solvents to remove the petroleum from the soil
  - Biosparging – Injection of air to promote natural biodegradation of petroleum products

SITE 4 (AOC 22) – CONCEPTUAL SITE MODEL

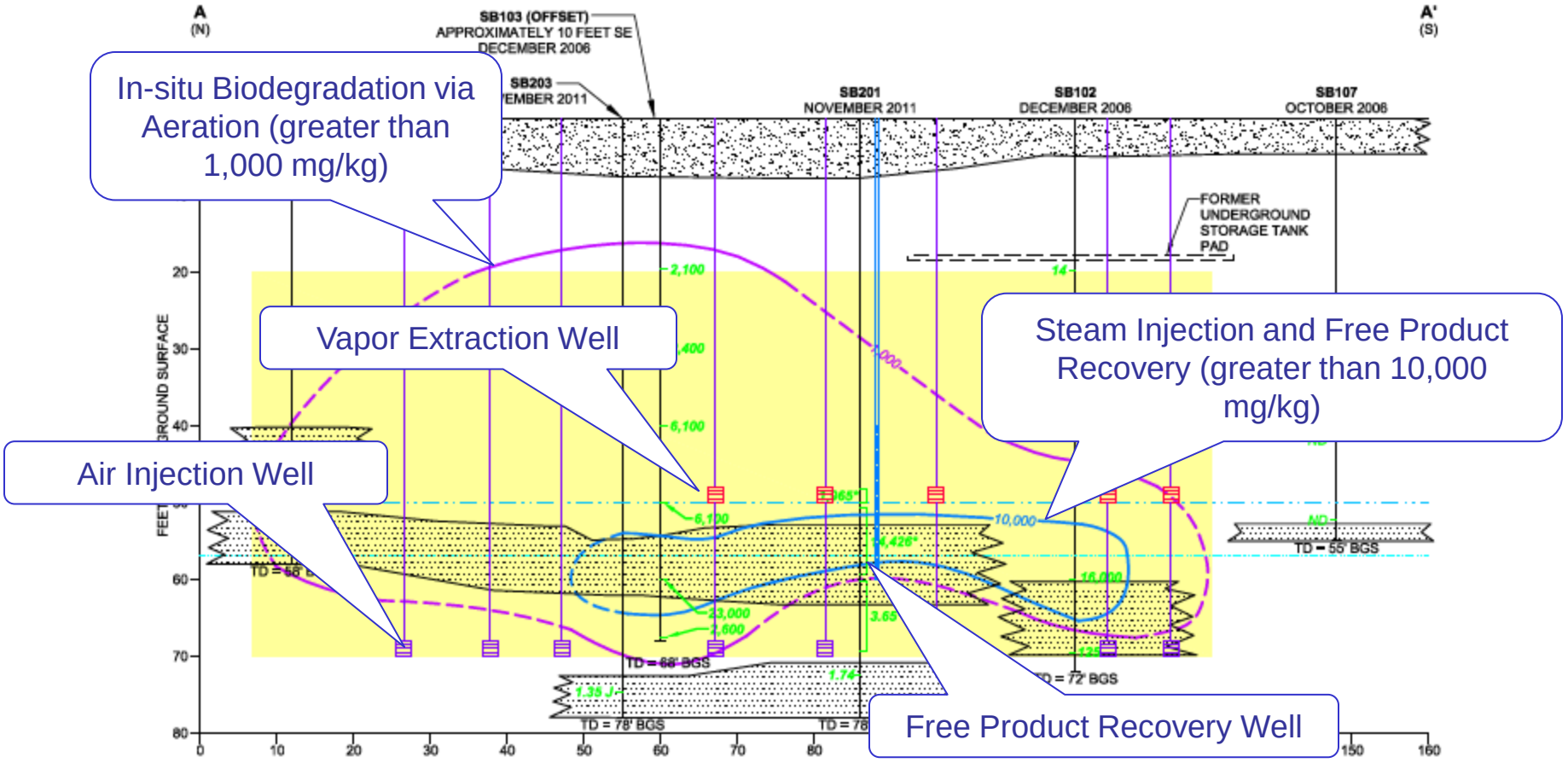


SITE 4 (AOC 22) – PROPOSED REMEDIAL ACTION PLAN

- Proposed Alternative includes treatment:
  - –Steam Injection/Free Product Recovery
  - –Biosparging
  - –Monitoring



SITE 4 (AOC 22) PROPOSED ALTERNATIVE



SITE 4 (AOC 22) PROPOSED PLAN

- Public comment period started on October 24, 2014 and will end on December 10, 2014
- Proposed Plan identifies the preferred remedial alternative for cleaning up soil and groundwater at the Site
- Submit written comments to Public Affairs Officer – See Proposed Plan
- Administrative Record can be accessed at

http://go.usa.gov/DyXF

SITE 4 (AOC 22) ACTIVITIES

- Path forward
  - –Record of Decision (early 2015)
  - –Design to start in 2015
  - –Cleanup to start in 2015/2016
  - –Anticipated to operate for 2 to 4 years
  - –Groundwater Monitoring to continue for more than 10 years

OPERABLE UNIT 2 - OFFSITE GROUNDWATER INVESTIGATION

NOVEMBER 2014 RESTORATION ADVISORY BOARD

NAVAL WEAPONS INDUSTRIAL
RESERVE PLANT BETHPAGE
LONG ISLAND, NEW YORK

11/05/2014

OFFSITE INVESTIGATION PROGRAM PRESENTATION

1 - Description of Purpose and Program

2 - Conceptual Site Geology Model and Applicability to Bethpage Plume

3 - Maps of Existing and Planned Vertical Profile Borings and Wells

4 - Description of Work Performed since last Restoration Advisory Board

5 - Description of Future Work

6 - Recent Reports and Findings

OPERABLE UNIT 2 GROUNDWATER INVESTIGATION - PURPOSE

- Delineate groundwater contamination in areas south of Naval Weapons Industrial Reserve Plant Bethpage
- Program consists of:
  - Vertical profile borings - used to quickly screen areas for the presence, depth, and concentration of contamination; drilling can take 4-8 weeks to complete
  - Permanent monitoring wells - to confirm presence/absence of contamination and develop trends; drilling can take 2-6 weeks to complete
  - Data logging of water levels to support United States Geological Survey modeling and capture zone analysis for wells

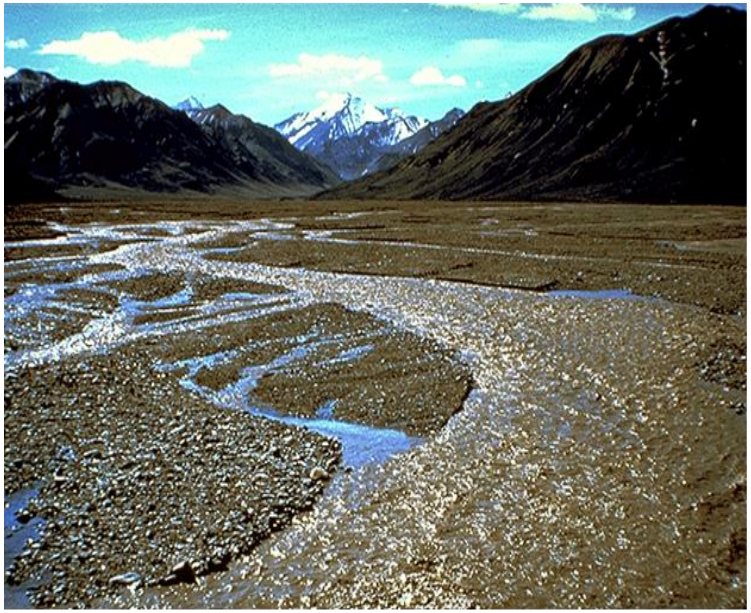
OPERABLE UNIT 2 INVESTIGATION - VERTICAL PROFILE BORING PROGRAM

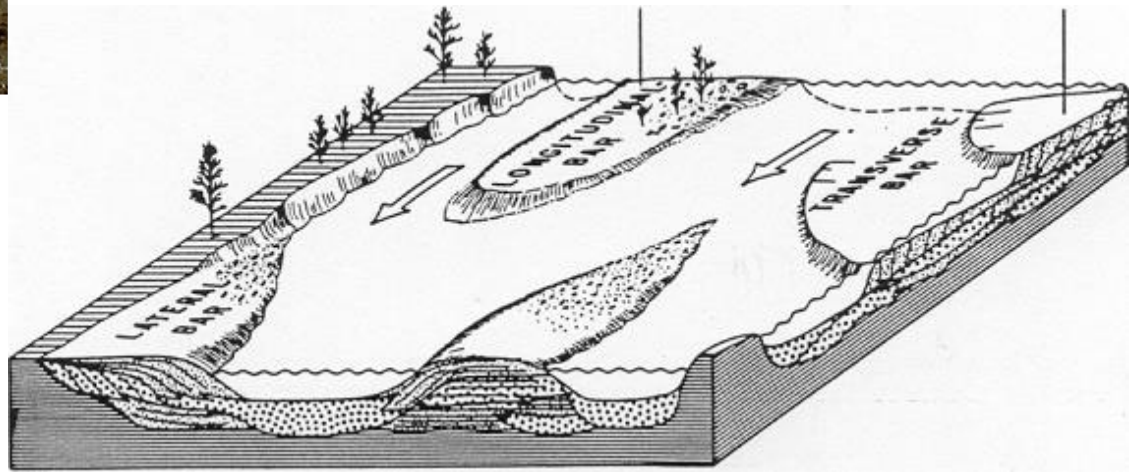
- A vertical profile boring is a 12-inch diameter hole drilled into the ground. At select depths, the drilling is stopped, a device is lowered to depth, and a sample of the water is collected;
- The borings will extend to the Raritan Clay Layer at a depth up to 860 to 1000 feet below ground surface.
- 36 groundwater samples are collected per boring and analyzed for Volatile Organic Compounds
- Generally it takes 4 to 8 weeks to complete a boring/well

VPB and WELL INSTALLATION PROCESS

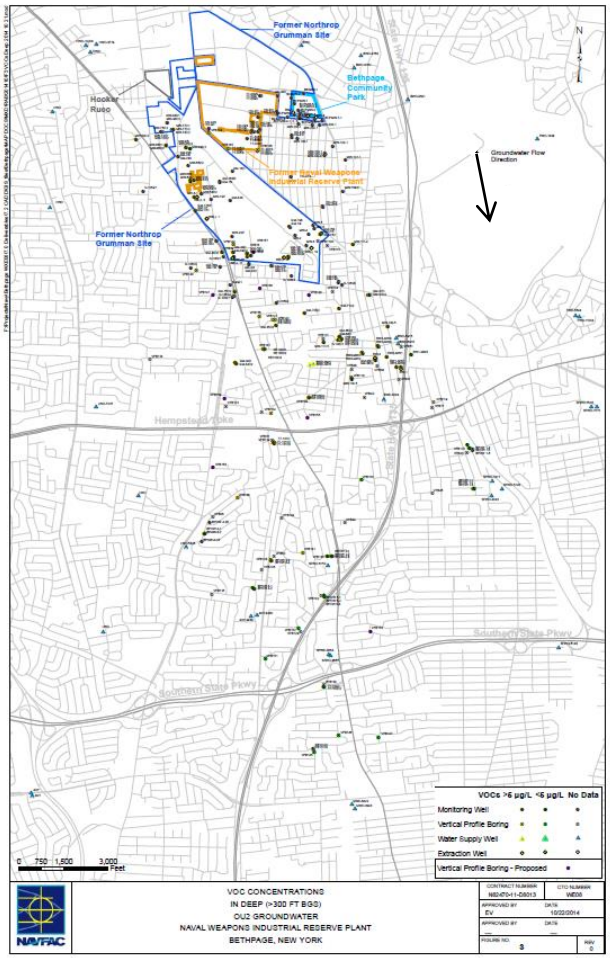
- **Process:**
  - –Ideal map location selected by Navy; concurrence given by State;
  - –Location is then ground-proofed by the Navy;
  - –Drilling rig requires minimum of 100 feet with no overhead obstructions;
  - –Generally on township right-of-ways;
  - –Considerations to minimize inconvenience to residents nearby:
    - Health and Safety of Public and Navy contractors
    - Ingress and egress
    - Noise

CONCEPTUAL SITE MODEL
MAGOTHY AQUIFER





OU2 - OFFSITE ASSESSMENT AREAS



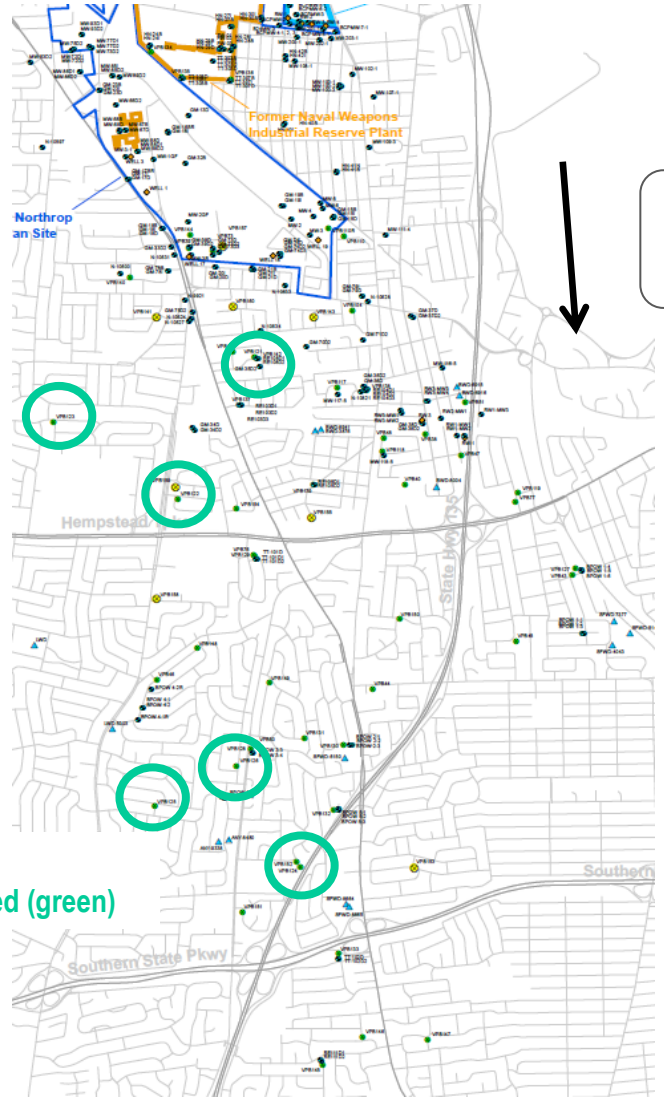
North of Hempstead Turnpike Area

North of Southern State Parkway Area

South of Southern State Parkway Area

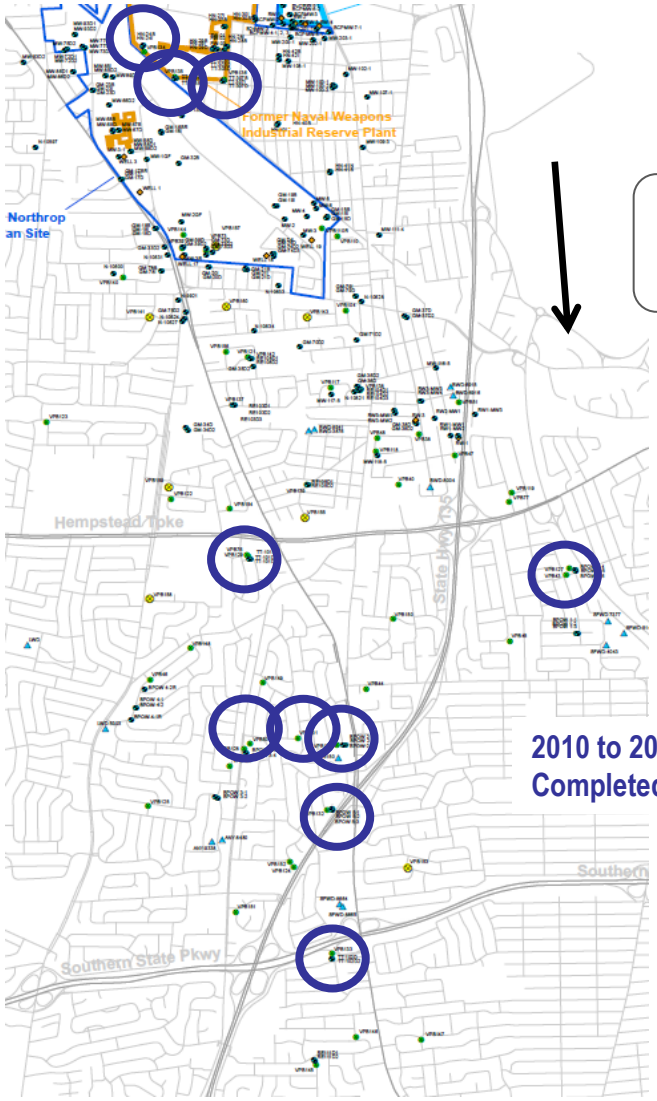
OU2 – OFFSITE VPBs COMPLETED

2009 Vertical Profile Borings and Monitoring Wells



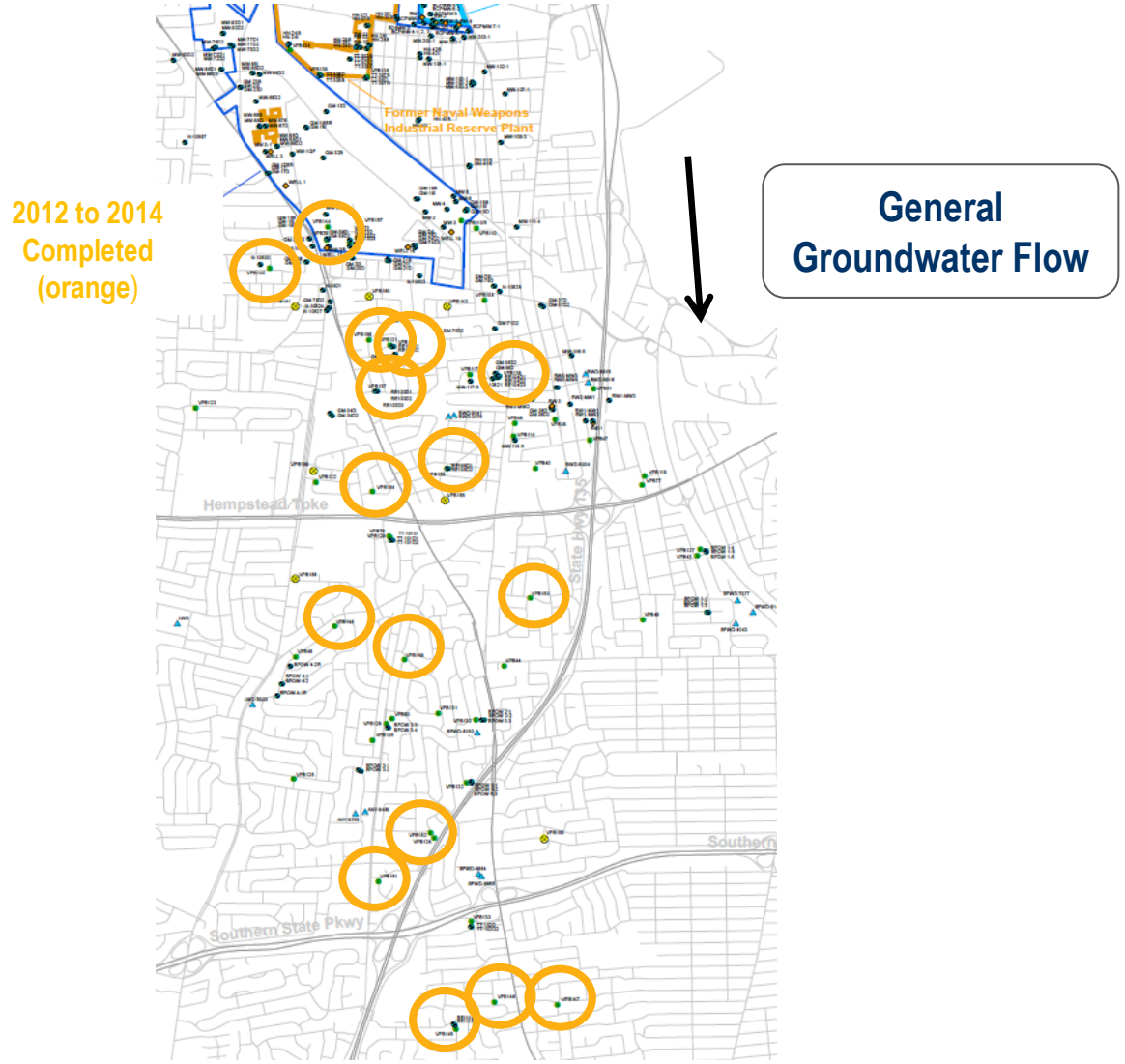
OU2 – OFFSITE VPBs COMPLETED

2010 to 2012 Vertical Profile Borings and Monitoring Wells



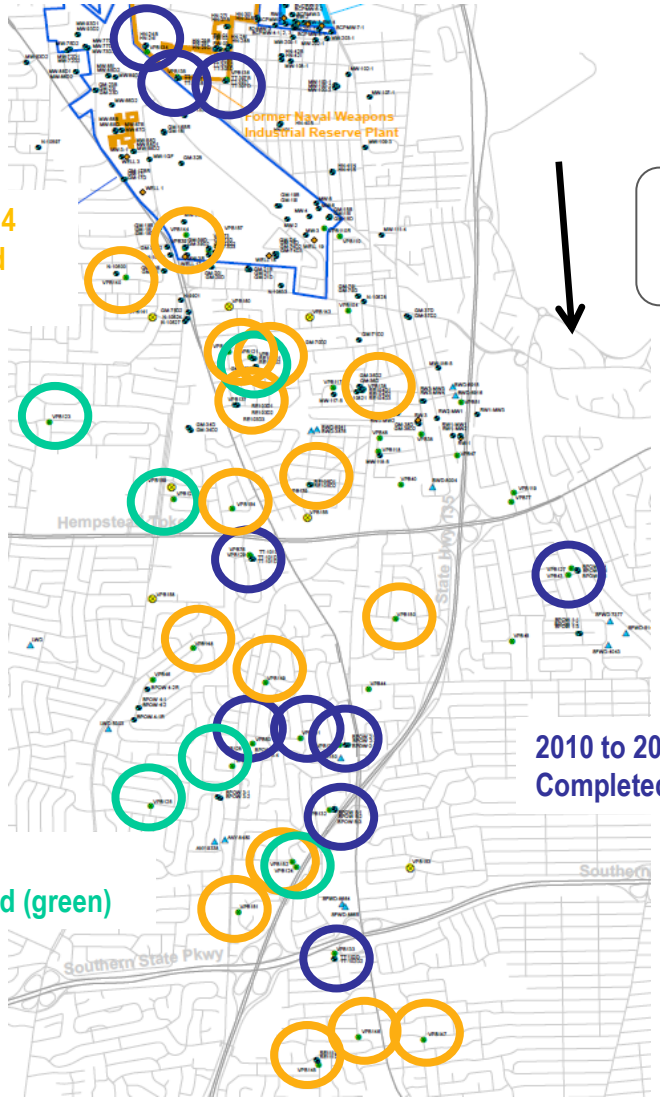
OU2 – OFFSITE VPBs COMPLETED

2012 to 2014 Vertical Profile Borings and Monitoring Wells



2009 – 2014 BORING PROGRAM – COMPILED VPB LOCATIONS

2009 to 2014 Vertical Profile Borings and Monitoring Wells



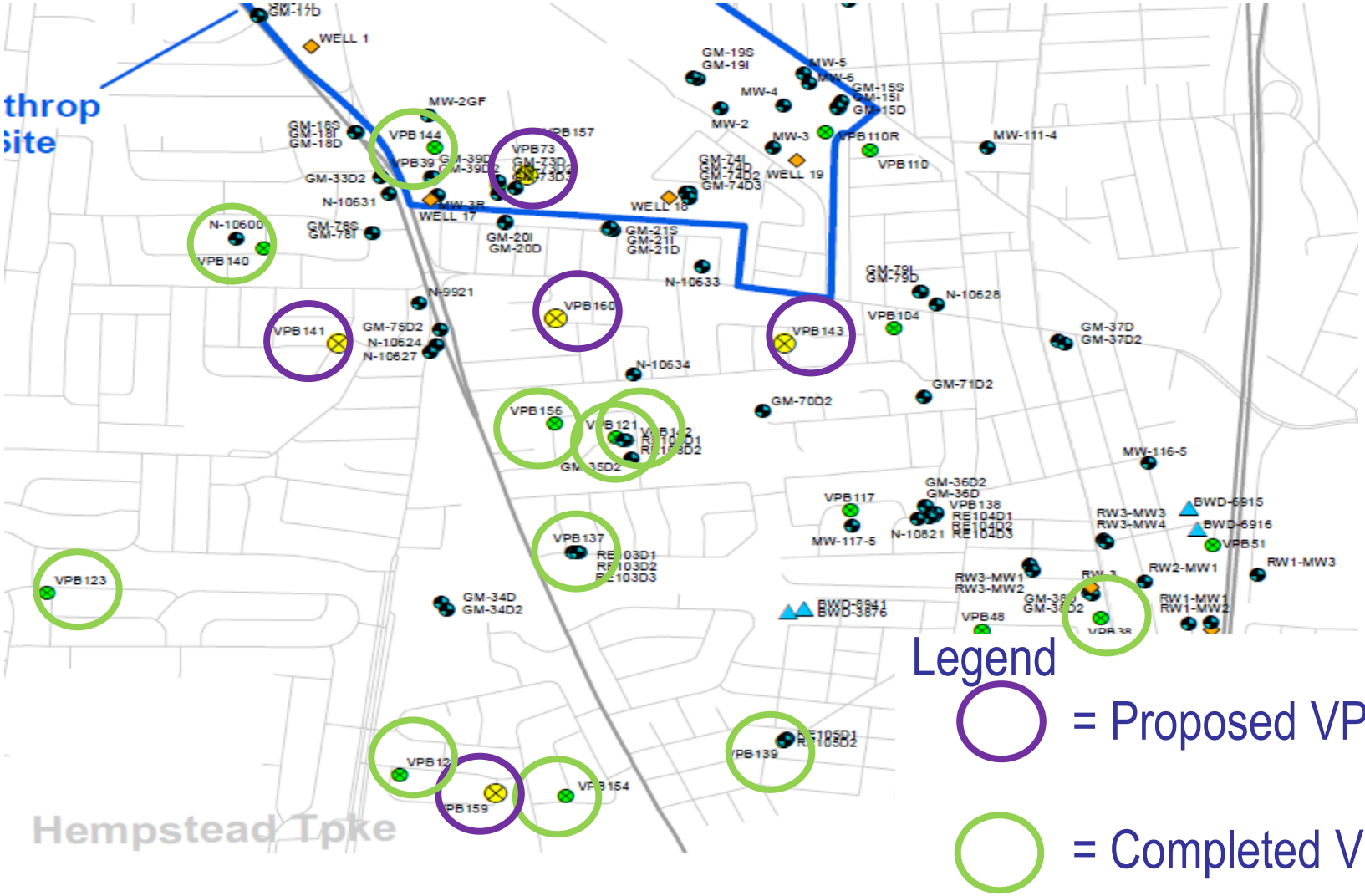
OPERABLE UNIT 2 – CURRENT AND FUTURE VERTICAL PROFILE BORINGS AND MONITORING WELLS

- Work performed since last Restoration Advisory Board (April 2014)
  - Operation of 4 drilling rigs
  - Installation of Vertical Profile Borings:
    - Three located North of Hempstead Turnpike Area
    - Three located North of Southern State Parkway Area
    - Two located South of Southern State Parkway Area
  - Installation of Monitoring Wells:
    - Two located South of Southern State Parkway Area
    - Two located North of Southern State Parkway Area
  - Completion of 3 rounds of groundwater sampling of 13 wells

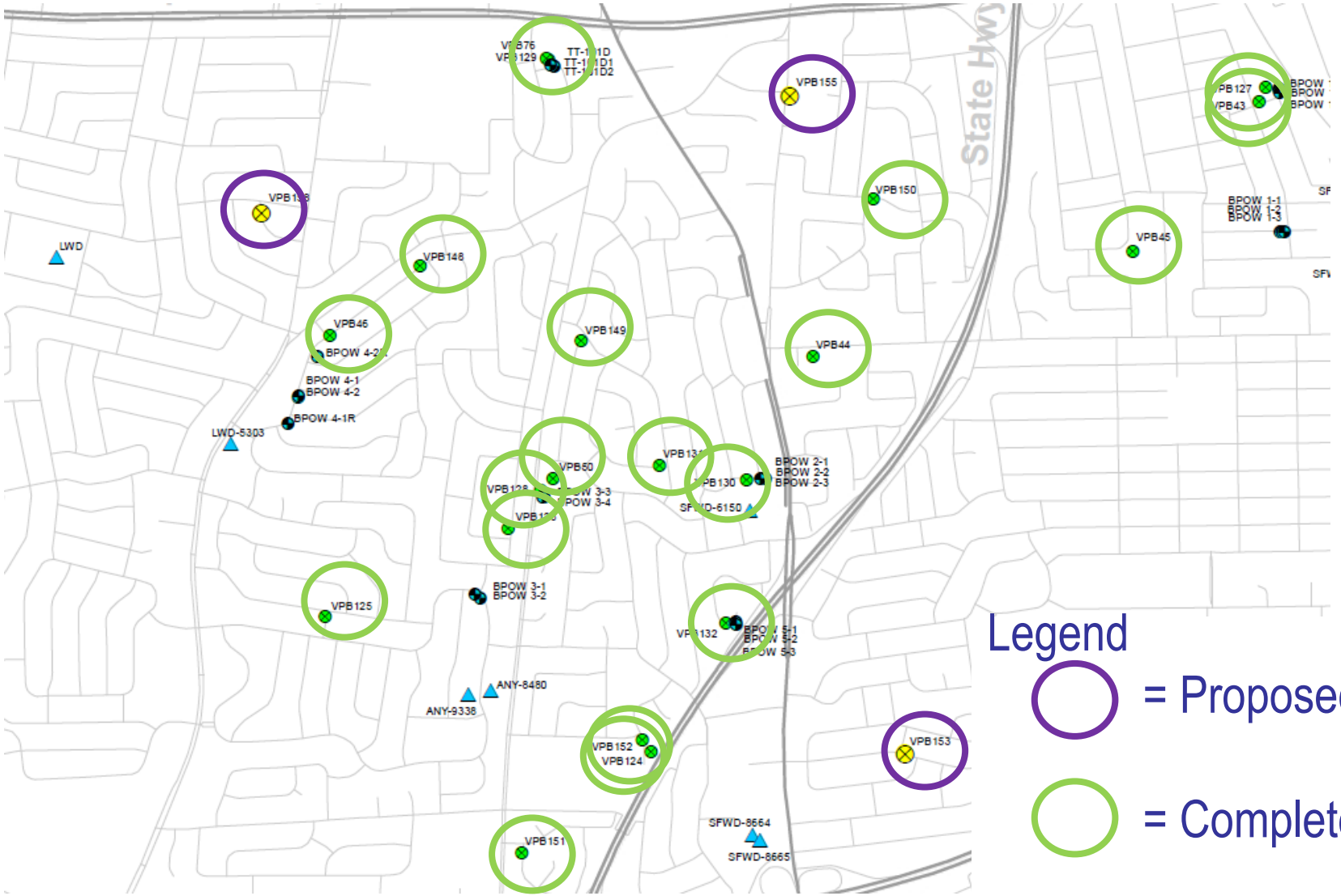
OPERABLE UNIT 2 – CURRENT AND FUTURE VERTICAL PROFILE BORINGS AND MONITORING WELLS

- **Future work:**
  - Operation of 3 drilling rigs
  - Installation of Vertical Profile Borings
    - 6 North of Hempstead Turnpike Area
    - 2 North of Southern State Parkway Area
  - Installation of 4 monitoring wells South of Southern State Parkway Area
  - Installation of 10 monitoring wells North of Southern State Parkway Area
  - Installation of 18 monitoring wells North of Hempstead Turnpike Area
  - Continue regular groundwater sampling

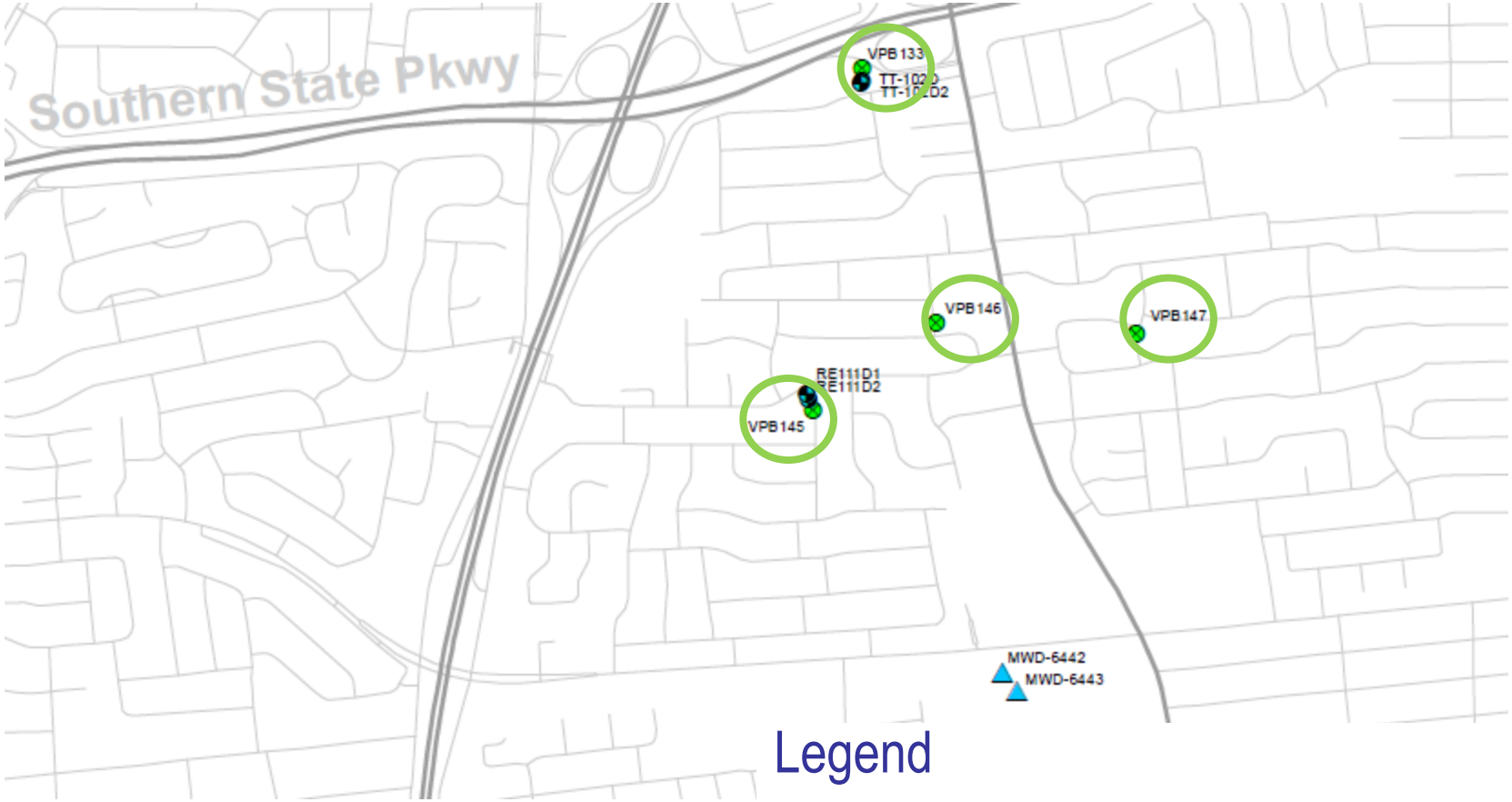
CURRENT AND PLANNED VERTICAL PROFILE BORINGS – NORTH OF HEMPSTEAD TURNPIKE AREA



CURRENT AND PLANNED VERTICAL PROFILE BORINGS – NORTH OF SOUTHERN STATE PARKWAY AREA



CURRENT AND PLANNED VERTICAL PROFILE BORINGS – SOUTH OF SOUTHERN STATE PARKWAY AREA



QUESTIONS?

OU2 OFFSITE GROUNDWATER INVESTIGATION

- **How do we assess results?**
  - The primary chemical being investigated is trichloroethylene (TCE), a volatile organic compound commonly used as a degreaser in manufacturing
  - Acceptable Maximum Contaminant Limit is a health-based regulatory limit established by the NYSDOH
  - The Maximum Contaminant Limit for TCE is 5 parts per billion
  - As defined in the OU 2 Record of Decision, a “Hotspot” is >1000 parts per billion

RECENT REPORTS

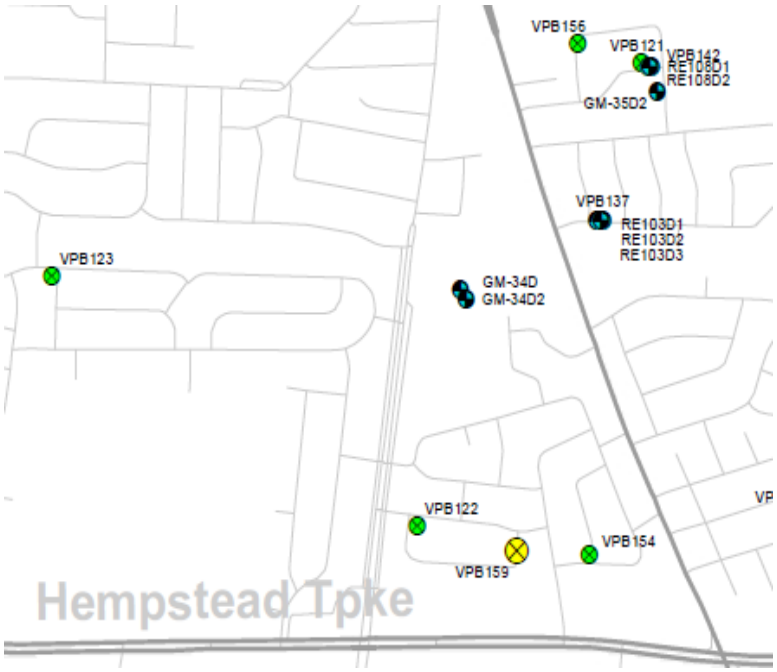
2013 – 2014 OU2 Groundwater Investigation VPB 142 (North of Hempstead Turnpike Area) submitted August 24, 2014

Objective -

- Installation of VPB and two associated monitoring wells to address data gaps south of the On-site Containment Treatment system (ONCT)and north of Hempstead Turnpike.

Findings –

- TCE in groundwater grab samples <1000 parts per billion
- Groundwater sampling from monitoring wells performed as part of quarterly sampling



RECENT REPORTS

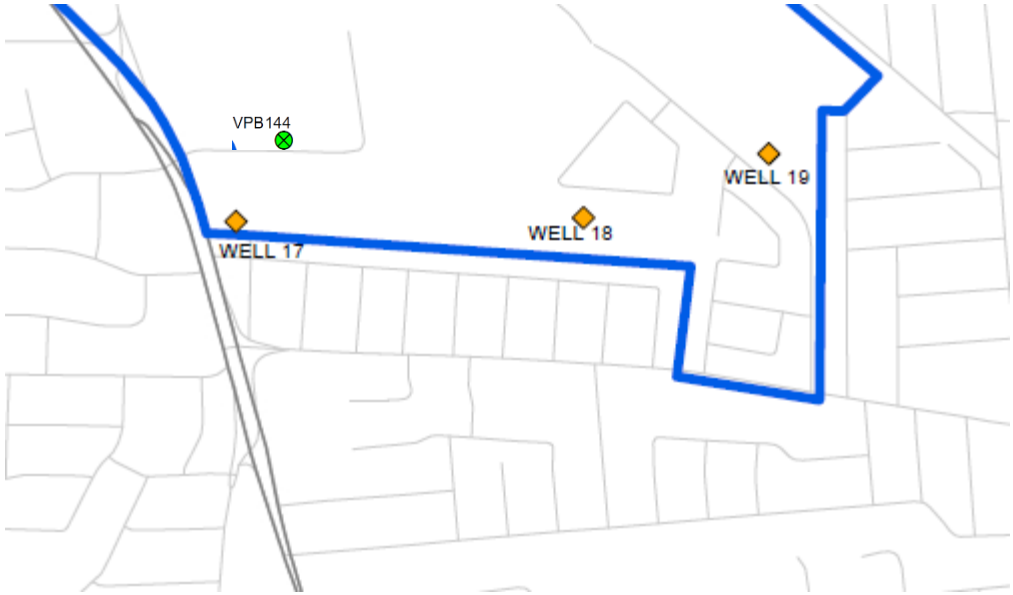
2013 – 2014 OU2 Groundwater Investigation VPB 144 (North of Hempstead Turnpike Area) submitted September 10, 2014

Objective –

- Installation of one VPB to ascertain contaminant levels and depths immediately upgradient of the On-site Containment Treatment (ONCT) system.

Findings –

- TCE in groundwater grab sample >1000 parts per billion at 600 feet
- TCE is in the capture zone of the On-Site Containment Treatment System



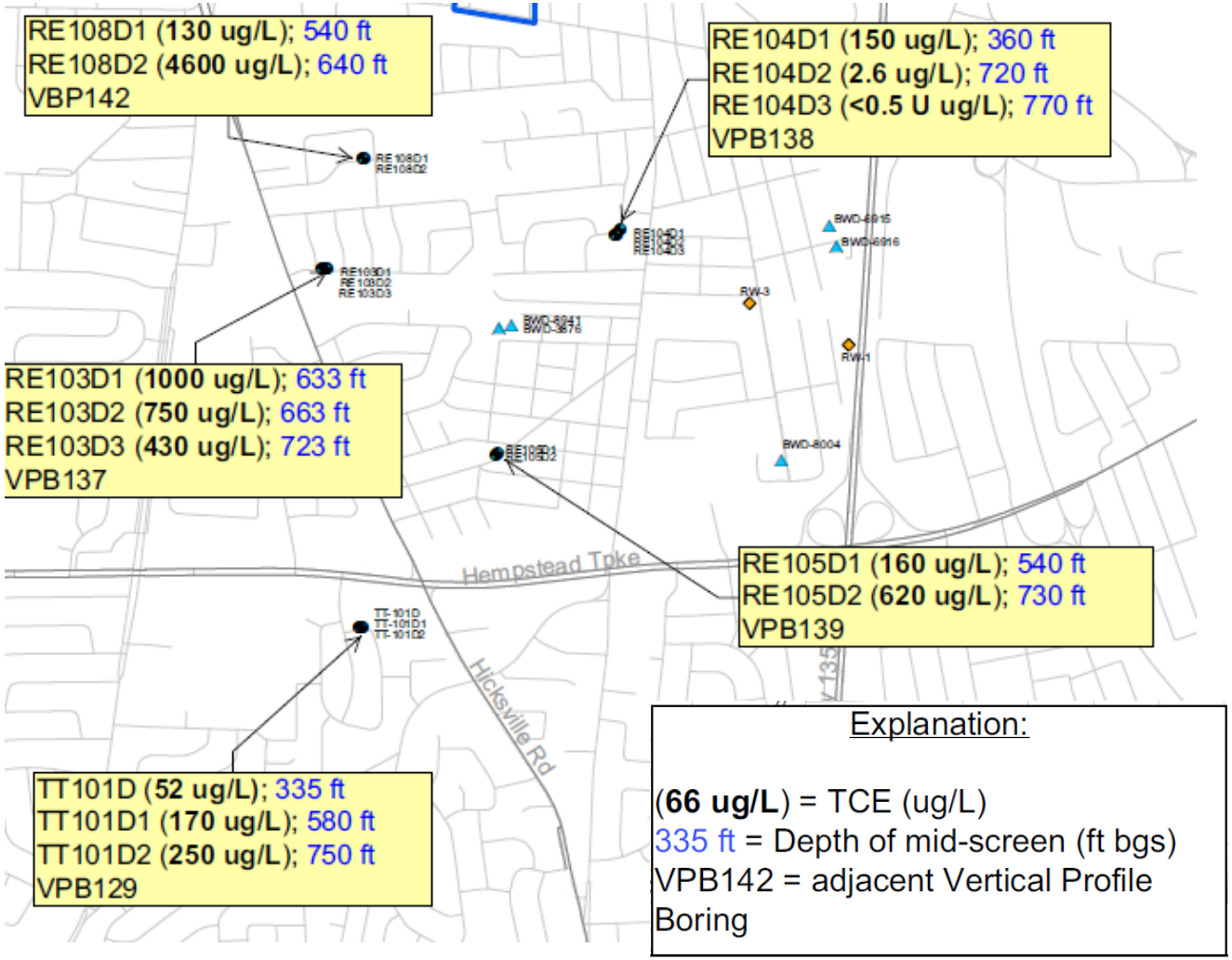
RECENT REPORTS – GROUNDWATER SAMPLING

March 2014 Groundwater Sampling Data Summary Report –submitted to NYSDEC August 18, 2014

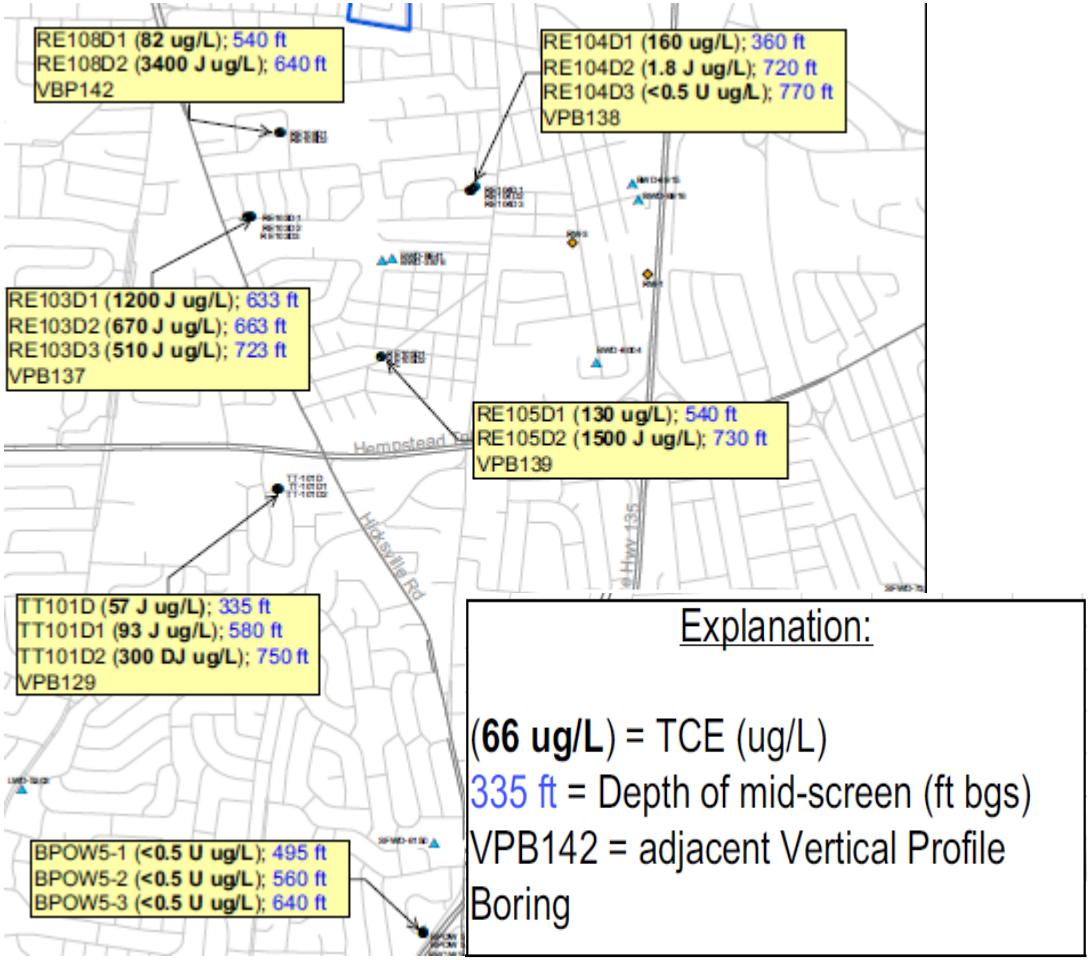
June 2014 Groundwater Sampling Data Summary Report – submitted to NYSDEC October 24, 2014

September 2014 Groundwater Sampling Data Summary Report – (Pending validation)

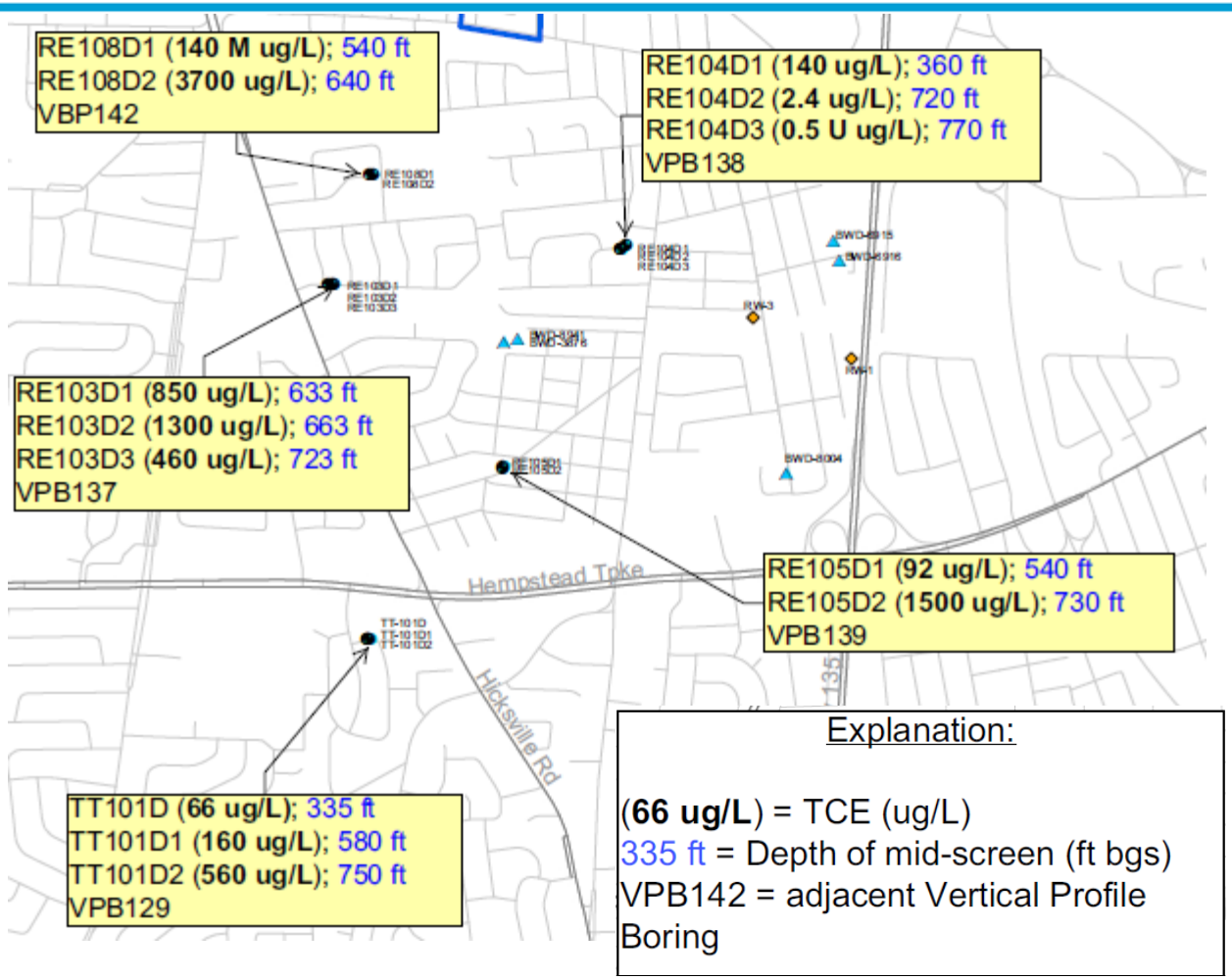
MARCH 2014-TCE RESULTS



JUNE 2014-TCE RESULTS



SEPTEMBER 2014- DRAFT TCE RESULTS



RECENT RESULTS – GROUNDWATER SAMPLING

- **CONCLUSIONS:**
  - –TCE above 1000 parts per billion in the “North of Hempstead Turnpike Area”
  - –OU 2 Record of Decision defines a “Hotspot” as >1000 parts per billion
  - –The hotspot area defined to the south and east
  - – Additional drilling planned to the north and west
  - – Navy currently evaluating this area
  - – Continue groundwater monitoring to assess concentration trends over time

QUESTIONS?