RESTORATION ADVISORY BOARD MEETING
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT (NWIRP), BETHPAGE
TOWN OF OYSTER BAY BETHPAGE COMMUNITY ROOM AT THE ICE SKATING CENTER
103 GRUMMAN ROAD WEST, BETHPAGE, NEW YORK
WEDNESDAY, APRIL 9, 2014

The Thirty-third (33rd) meeting of the Restoration Advisory Board (RAB) was held at the Bethpage Community Room at the Ice Skating Center in Bethpage, New York. Meeting attendees included representatives from the Navy (Lora Fly, Arun Gavaskar, Melissa Forrest), Management Edge (Gayle Waldron), New York State Department of Environmental Conservation (NYSDEC) (Steven Scharf, Jim Harrington, John Swartout, Walter Parish), New York State Department of Health (NYSDOH) (Steve Karpinski), Nassau County Department of Health (Joseph DeFranco), United States Environmental Protection Agency (USEPA) (Robert Alvey), Town of Oyster Bay (John Ellsworth), H&S Environmental (Jen Good, and Al Taormina), Bethpage Water District (Michael Boufis), H2M (Paul Grainger-MWD), United States Geological Survey (USGS) (Stephen Terracciano) David Brayack (Tetra Tech) and Resolution Consultants (Brian Caldwell, Robert McCarthy, Eleanor Vivaudou, Vin Varrichio, Gordon Hicks, and Michael Zobel). RAB members in attendance were Charles Bevilacqua, Sandra D'Arcangelo, Robert Horan, Ethan Irwin, Jeanne O'Conner, Rose Walker and David Sobolow. There were 23 residents from Bethpage and neighboring towns in attendance. The meeting sign-in sheet is provided as Appendix A.

WELCOME AND AGENDA REVIEW

The Navy representative, Ms. Lora Fly, welcomed everyone to the RAB meeting and presented the meeting agenda and the introduction of the new RAB members. Ms. Fly also introduced Gayle Waldron (Management Edge, serving the role of facilitator in support of the RAB), who then went over the Rules of Conduct. The Rules of Conduct are provided in Appendix A. The agenda for the meeting is included in Appendix B. The Navy presentations for the meeting are included in Appendix C. Ms. Fly informed the attendees about navigation of the public website for NWIRP Bethpage (http://go.usa.gov/DyXF).

Ms. Waldron discussed the rules of conduct to ensure that the meeting follows the agenda, and that everyone is allowed the opportunity to comment.

COMMUNITY UPDATE AND REVIEW AND APPROVAL OF MEETING MINUTES

Ms. Fly asked if there was a quorum of RAB members so that the prior meeting minutes (November 6, 2013) could be approved. The meeting minutes were said to be finalized.

ENVIRONMENTAL RESTORATION PROGRAM REVIEW

Ms. Fly (Navy), provided a presentation introducing NWIRP Bethpage including: facility background, the environmental clean-up program, investigation and response, Site 1-Former Drum Marshalling Area, Site 4-Former UST site, and the OU-2 Groundwater Investigation. Ms. Fly also outlined the path forward for each of the sites. The presentation is included in Appendix C.

Discussion during the presentation is as follows:

1. Are test results available to the public? Results are posted to the Bethpage website at http://go.usa.gov/DyXF, and in the Bethpage Public Library.
2. How long does it take to get the test results after sampling? Once the samples are submitted to the laboratory, it takes a total of approximately three months for the results to be available to the public. Preliminary test results are received in approximately 3 weeks. The preliminary lab results are then validated to ensure they have been properly analyzed. The validated results are then geospatially linked to the sample locations and then the data is compiled for graphical presentation to be made available to the public.
3. Are there other hot spots? The Navy is evaluating that possibility as drilling progresses. There is some evidence that there may be a potential hot spot near VPB 139. The Navy is collecting groundwater samples from wells in this area to determine if a hot spot exists.
4. Is the water discharged into the nearby basin from the GM-38 plant potable? The water is treated to remove VOCs that meet drinking water standards; however, the water is not chlorinated as is typical for public water supply districts prior to distribution.

SITE 4 Area of Concern (AOC 22) UPDATE – APRIL 2014

David Brayack with Tetra Tech provided an update presentation on Site 4-Former UST for No.6 Fuel Oil. The presentation is included in Appendix C.

Tetra Tech reviewed Site 4 activities and site history indicating that the UST's were removed between 1980 to 1984. There is an estimated 47 tons of petroleum present in the soil. Petroleum was found in soils 30 to 71 feet below ground surface (bgs) and there is evidence of groundwater effects. All groundwater from this area is ultimately captured by the onsite Containment System located at the southern boundary for the facility.

In 2013, the Navy prepared a Feasibility Study to develop and evaluate potential remedial alternatives. The alternatives included: Land Use Controls (LUC), groundwater monitoring, steam injection/free product recovery, solvent extraction and biosparging.

A Proposed Plan is in preparation that will be released for public comment. Tetra Tech noted the proposed alternative for remediation is: In-situ Biodegradation via aeration (in saturated soils greater than 1,000mg/kg of Total Petroleum Hydrocarbons (TPH)) and Steam Injection and Free Product Recovery (in unsaturated soils greater than 10,000 mg/kg).

The path forward includes: Proposed Plan (expected summer 2014), Record of Decision (ROD) (expected fall 2014), remedial design to start in 2015, clean-up to begin in 2015/2016 with anticipated operation for 2 to 4 years.

Discussion during the presentation is as follows:

5. When was the material discovered? During an investigation conducted by the Navy in 1990, the petroleum product was discovered.
6. Is the material restricted to the site, and were there any other contaminants identified? Based on the groundwater data, the petroleum contamination is restricted to the site. The only other contaminants detected at the site are associated with the groundwater for Operable Unit 2.
7. Will steam heat treatment cause contamination to move around? How will the material be handled after it is treated? Yes, the steam heat will cause the material to be mobile so that it can be captured, brought to the surface and containerized for offsite disposal.

SITE 1 SOIL VAPOR EXTRACTION CONTAINMENT SYSTEM (SVECS) OPERATION

Jen Good with H&S provided a presentation on Site 1 Soil Vapor Extraction Containment System (SVECS) operation that included an overview, operational activities and system performance and future activities. The presentation is included in Appendix C.

In the Site 1 project overview, Ms. Good noted that the chlorinated volatile organic compounds (VOCs) in soil vapor can migrate and that the purpose of the SVECS system is to contain soil vapor to and prevent offsite migration of VOC vapors. Under certain conditions, vapors can migrate upward and into buildings; however, the SVECS contains the vapors by creating a vacuum in the deep soil to control migration.

The SVECS began operation in January 2010 and consists of soil vapor extraction, soil vapor monitoring, and soil vapor treatment. It extracts approximately 400 cubic feet (cf) per minute of soil gas from 12 wells located along the Site 1 fence line. Five additional extraction wells were added in October 2011 to address potential on property sources for a total of 17 soil vapor extraction (SVE) wells. Eighteen soil vapor pressure monitors (SVPM) are located throughout the neighborhood. Various air sample collection occurs monthly, quarterly and annually.

Site 1 performance and future activities include: runtime above 95% with minimal downtime due to power outages and scheduled maintenance, quarterly/annual operation reports and maintain compliance with air permit guidelines. The SVECS is expected to operate as is for approximately two more years and the path forward is to be identified in a future Decision Document.

Discussion during the presentation is as follows:

1 **Is the performance of the system operation being electronically monitored?** Operation of the system is monitored continuously, and an auto-dialer will contact an inspector if the system malfunctions.
2. **When was the last time the adjacent homes were tested?** The homes were last tested in 2012. In addition, vapor probes in the right-of-ways in the neighborhood are sampled annually (with the latest sampling event being conducted in January 2014) and the subsurface pressure is monitored quarterly to verify the effectiveness of the SVE system on Navy property.
3. **Is there a phase out plan for the fence-line SVE system?** The Navy and NYSDEC are still evaluating the performance data to evaluate options for continued operation or phase out. Once a decision is made, it will be documented in a ROD amendment or an Explanation of Significant Differences.
4. **Are there any concerns about radium at the site?** There is no evidence of radium usage at NWIRP based on historical reviews by Northrup Grumman and the Navy. Low level radium detections in area groundwater have been identified, but NYSDOH is evaluating these results to determine if these detections are consistent with natural background concentrations.

GM-38 GROUNDWATER TREATMENT PLANT OPERATION AND CAPTURE ZONE EVALUATION

Mr. Brayack of Tetra Tech provided a presentation identifying the objective, overview construction and operation, capture zone evaluation and path forward for GM-38 Hotspot Groundwater Treatment Plant and Capture Zone Evaluation. The presentation is included in Appendix C.

Mr. Brayack noted that the main objective of the GM-38 well area remedy is additional protection of human health by reducing the future elevated mass contamination load to the down gradient public water supplies, and to reduce hotspot concentrations to those in the surrounding lower concentration plume. The remedy would also enhance the long-term natural process of aquifer restoration.

GM-38 Treatment System consists of the following components: two groundwater recovery wells (RW-1 and RW-3), equalization tank, air stripping tower, liquid phase granular activated carbon polishing, discharge to a recharge basin, and vapor phase treatment using granular activated carbon a permanganate-based resin.

Since startup, the system has treated 2 billion gallons of water and has removed 7,500 pounds of volatile organics. Normal runtime is 95% with most downtimes associated with power outages and schedule maintenance. Monitoring requirements are consistently achieved with monthly sampling of water and air. Sampling of groundwater wells occurred in December 2013, March 2014, and is scheduled for September 2014. A two month shut down occurred in October 2013 to replace duct work and for carbon change outs (liquid and vapor phase).

Recovery well RW-1 extracts from the upper and middle portions of the GM-38 Hotspot (less than 435 feet deep) and has seen a 75% reduction in VOCs since start up. Recovery well RW-3 extracts from middle and lower portion of GM-38 Hotspot (392-504 feet deep) and has seen a 75% reduction in trichloroethene (TCE) since startup.

The groundwater monitoring summary shows TCE concentrations in deeper groundwater currently at concentrations less than 50µg/L; this is a significant decrease when compared to TCE concentrations that were originally 1,200µg/L. In shallower groundwater (320-435 feet), TCE concentrations decreased shortly after startup of the GM-38 system and have remained relatively steady since startup. The sustained concentration of TCE in up-gradient wells suggests a continuing source of VOCs from the north.

The Capture Zone Analysis objective is to evaluate whether the system is capturing the hotspot groundwater as designed. As part of this, four pumping tests were conducted at the GM-38 Area in April

2013. Eighteen wells were monitored with screen depths of 200 to 757 feet bgs and water levels were recorded over a two-week period. The USGS supported the capture zone evaluation and recently issued its own evaluation report. In addition, a year-long, area-wide investigation is ongoing. The Capture Zone Evaluation indicates 98 to 100 percent capture of the GM-38 Area groundwater.

The conclusions and path forward for the GM-38 Area indicate that well RW-1 provides the majority of mass removal because of its central location, its high pumping rate and a screen depth that is better matched to GM-38 Area groundwater. Well RW-3 is not optimally located in the northwest corner of the GM-38 Hotspot, the shallow screen zone is redundant with RW-1, and the deeper screen zone is no longer located within significant contaminant mass. It is recommended to discontinue operations of RW-3. It is suggested that the Navy consider investigation of shallower groundwater quality north of the GM-38 Area to identify the potential for another source of continuing contaminant flux.

Discussion during the presentation is as follows:

1. **Is the Navy trying to determine where the contamination is coming from?** Yes, the Navy is investigating potential sources of this contamination. Currently it is believed to be coming from the former aircraft manufacturing operations performed at the Northrup Grumman and Navy facilities.
2. **What is the Maximum Contaminant Level (MCL) for TCE?** The MCL is 5 micrograms/liter (5 ppb).
3. **Is RW2 not used because it is not installed at the best location?** Yes, it is screened deeper than was needed.
4. **Are there any other hotspots? Or has the contamination level stabilized?** Contamination levels within the GM-38 hotspot are now lower than when treatment first began and appears to be continuing to decrease. Other potential sources of hotspots are being evaluated.
5. **How is the groundwater treated?** The extracted groundwater is treated with air stripping and activated carbon. The water is initially treated down to 1 to 3 μg/L using air stripping technology, and then further treated down to less than 1μg/L using activated carbon. The Maximum Contaminant Level (MCL) is 5μg/L.
6. **Is there testing done on tap water?** Yes, the water districts and NCDOH continue regular testing.

OU-2 OFFSITE GROUNDWATER INVESTIGATION-INSTALLLATION of VERTICAL PROFILE BORINGS (VPBs)

Brian Caldwell with Resolution Consultants provided a presentation addressing the description and purpose of the offsite investigation program, conceptual site model and applicability to Bethpage plume, maps of existing vertical profile borings and wells, description of work performed since last restoration advisory board, description of future work, recent reports and, plume extent. The presentation is included in Appendix C.

The purpose of the OU-2 offsite groundwater investigation is to delineate groundwater contamination in areas south of NWIRP Bethpage. The program consists of: vertical profile borings, permanent monitoring wells and data logging of water levels to support the USGS modeling and capture zone analysis for wells.

Work performed since the last Restoration Advisory Board (November 2013) includes mobilization of 2 drilling rigs, installation of Vertical Profile Borings (142 and 144 north of Hempstead Turnpike, 148 located north of Southern State Parkway Area, and 146 located south of Southern State Parkway Area) Future work includes: mobilization of 3 drilling rigs, installation of additional Vertical Profile Borings (7 north of Hempstead Turnpike, 5 north of Southern State Parkway Area, and 2 south of Southern State Parkway Area), and installation of 6 monitoring wells south of Southern State Parkway Area.

Discussion during the presentation is as follows:

1. Is VPB 139 considered a hotspot? The potential for the VPB 139 area being a hotspot is currently being evaluated.
2. What is the screen interval of the deep well at VPB 139 that has the highest contamination? The deep well is screened at 730-750 feet.
3. What is the data review and path forward process for the offsite investigation? After drilling, results are validated and sent to the state. Based on a review of the data, the next VPB is collaboratively located and a work plan is submitted to the state. The state then comments on the work plan. The Navy and NYSDEC communicate on a weekly basis to maintain progress. Work Plans and data summary reports (after NYSDEC reviews and comments) are contained on the Administrative Record website.
4. What if this plume was left as is? What would be the after effects? Will it keep growing? The source of the plume is finite, and has been treated through onsite activities. Since groundwater moves slowly, less than one foot per year, it would take many years to attenuate. In addition to source area treatment, the ONCT system treats groundwater from the Navy and NG property. Groundwater that migrated off-site will be addressed as stated in the OU 2 ROD. An aggressive offsite investigation is being conducted to find the full extent of the plume. As part of this offsite investigation, sentry wells were or are being installed to determine the potential for impacts to water supply wells. If groundwater is predicted to impact these wells, the Navy will work with the affected Water District to protect their drinking water wells.

5. What is the southernmost test well that has been sampled? TT102D and TT102D2, approximately 2000 feet north of MWD wells 6442 and 6443; results for these wells are non-detect for VOCs.
6. What is the southernmost well that has had detects? Wells BPOW 3-4 and BPOW 2-3.
7. Is there something that can be done to stop the plume from continuing to migrate? Stopping the overall plume hydraulically, because of its size, depth, and the geology of the aquifer, as noted by a panel of national experts in the Remedy Optimization Report, is not technically feasible. However, hotspot areas can be reduced in concentration through capture by recovery wells.
8. How common is something like this plume? Unfortunately chlorinated solvent plumes are common. What makes the Bethpage plume less common is the depth of the aquifer. There are no confining units until 800 to 1000 feet below ground surface, so the downward movement of contamination is not inhibited.
9. Are there other hot spots that you know of? Is there an overall plan? Well sampling is being performed to confirm if there is a hotspot near VPB 139. The overall plan includes hotspot identification and local groundwater treatment and wellhead treatment. The ROD has three components: determine if there are any other hotspots; work with the water districts to put treatment on their systems when necessary; and work with NG to make sure the onsite containment system is operating properly as a curtain to intercept contamination that could migrate offsite. In addition, the Navy has installed outpost monitoring wells near water district supply wells, which are situated to provide a 5 year warning to those supply wells. If trigger values for these outpost wells are reached, then the Navy would work with the water districts to protect their water supply.
10. Has there been any testing by the Navy or Northrup Grumman for radionuclides? Can the public get that data? It has not been determined that a source of radionuclides was used by either the Navy or Northrup Grumman. The water districts have been sampling for radium since 2006, and the 2006 to 2014 data is still being processed by the State and County Health Departments. It was requested that radionuclide analyses be performed to below MCL for a minimum detection limit. Requests for information for the radionuclide data will be fulfilled when those calculations are completed by the State and County Health Departments.
11. There are a number of offsite wells that have detected radium. There should be discussion with the State Department of Health and NYSDEC about getting a fact sheet and/or a separate meeting to discuss radium. This can be planned with the state once all calculations of the radionuclide data is complete.

NWIRP BETHPAGE RESTORATION ADVISORY BOARD (RAB) MEMBERSHIP DRIVE

Ms. Fly introduced Ms. Forrest who proceeded to explain the purpose of the RAB and the current status at Bethpage. A RAB is a public forum for the discussion and exchange of environmental cleanup information between the Department of Defense (DoD), State, Federal Regulatory Agencies and the local community. Ms. Forest stated that the RAB member's responsibility is to provide advice to the installation, regulators and other government agencies on environmental cleanup activities and community involvement by reviewing and commenting on documents, attending RAB meetings and serving as a liaison with the community and providing them with information discussed at the meeting.

A RAB has two co-chairs, one from the Navy and one selected by the community. RAB chairs are responsible for jointly determining meeting agendas, and serve as a focal point for community outreach as wells as performing various administrative duties. RABs are dissolved if all work is complete, if the property is transferred out of the DoD, or if 75 percent of the members agree in writing there is no longer sufficient interest to maintain a meeting.

The Bethpage RAB meeting was established in the late 1990's to address the cleanup activities associated with the former NWIRP at Bethpage. Meetings are held twice a year in November and May. The Navy is updating the community involvement plan in 2014. The membership drive will be closing in a few months. Currently the community co-chair is vacant. There are five new RAB members since the last meeting. The members are as follows: Sandra D'Arcangelo, Robert Horan, Ethan Irwin, Jeanne O'Conner, and David Sobolow. A co-chair will be elected prior to the next RAB meeting.

CLOSING REMARKS

Ms. Fly asked whether there were any other questions or comments. There were no other questions or comments. Ms. Fly indicated that the next RAB meeting would be held in November 2014. Ms. Fly thanked everyone for coming to the meeting and the meeting was adjourned.

APPENDIX A

April 6, 2014 RAB MEETING SIGN-IN SHEET and RULES OF CONDUCT

33rd RAB Meeting for NWIRP Bethpage
April 9, 2014
Sign-in List

Name (Print)	Address and/or email if interested in being on mailing list	Affiliation	How did you hear about the meeting?
Vin Vacchio			
John Ellsworth			
DAVID SOBOLOW			
Maryann McMahon			
Anthony Sabino			
James Nolly			
Lawette Nolly			
James McCabe			
Anne Hartman			
ED KENNEDY			
[illegible]			

33rd RAB Meeting for NWIRP Bethpage
April 9, 2014
Sign-in List

Name (Print)	Address and/or email if interested in being on mailing list	Affiliation	How did you hear about the meeting?
Kaitlin Hubbard			
Mike Zobel			
Ethan Irwin			
Pat Marino			
Irene Shapiro			

33rd RAB Meeting for NWIRP Bethpage
April 9, 2014
Sign-in List

Name (Print)	Address and/or email if interested in being on mailing list	Affiliation	How did you hear about the meeting?
RUSSELL HAGGERTY			
JOYCE HAGGERTY			
JIM HARRINGTON			
Joe DeFranco			
John Swartwout			
Arun Gavaskar			
Barbara Holahan			
Robert Wilson			
CHARLES A. BEVILACQUA			
SANDRA D'ARCANGELO			
Steven Scharf			
ROSEMARY STYNE			
GENE MAZZARA			
ROB Alvey			
Rose Walker			
Gordon Hicks			

33rd RAB Meeting for NWIRP Bethpage
April 9, 2014
Sign-in List

Name (Print)	Address and/or email if interested in being on mailing list	Affiliation	How did you hear about the meeting?
AL TAORMINA			
PAUL GRATTGEN			
Mike Boufis			
STEPHEN TERRACCIANO			
Michael & Joan martin			
Steve Karpinski			
Tim Cook			
WALTER PARISH			
Sal J. Greco			
Dan Grindstaff			
Paul Marterano			
Carol Zito			
Ann Steiger			
John FRANK			
Joanne Perico			
Jeanne O'Connor			

Bethpage Rules of Conduct

1. Respect others:
   - One Speaker at a time
   - No interruptions
   - No side conversations
   - Ask questions

2. Listen and stay open to all points of view

3. Stay focused on the topics; avoid digressions

4. Turn cell phones and/or pagers off, or on vibrate, and respond during breaks, except for emergencies.

5. Hold all questions until end of each presentation.

6. All Navy documents are at
   - http://go.usa.gov/DyXF
   - Bethpage Public Library
     47 Powell Avenue
     Bethpage, NY 11714

APPENDIX B

April 6, 2014 RAB MEETING AGENDA

Resolution Consultants
A Joint Venture of AECOM & EnSafe
1500 Wells Fargo Building
440 Monticello Avenue
Norfolk, Virginia 23510

Agenda for Restoration Advisory Board

Naval Weapons Industrial Reserve Plant Bethpage

Date: April 9, 2014

Time: 7:00 PM

Location: Community Room at the Ice Skating Center

- Welcome and Introduction of New RAB Members – *Navy*
- Distribution of minutes – *All members*
- Environmental Restoration Program Overview – *Navy* (15 minutes)
- Site 4 - Update – *Tetra Tech* (10 minutes)
- Site 1– Soil Vapor Containment System - *H & S* (15 minutes)
- GM-38 Hot Spot - Operations and Capture Zone Analysis – *Tetra Tech* (20 minutes)
- OU-2 Offsite Groundwater Investigation - Installation of VPBs – *Resolution* (30 minutes)
- RAB Membership Drive – *Navy*
- Closing remarks – *Navy*

RESOLUTION CONSULTANTS

APPENDIX C

PRESENTATIONS

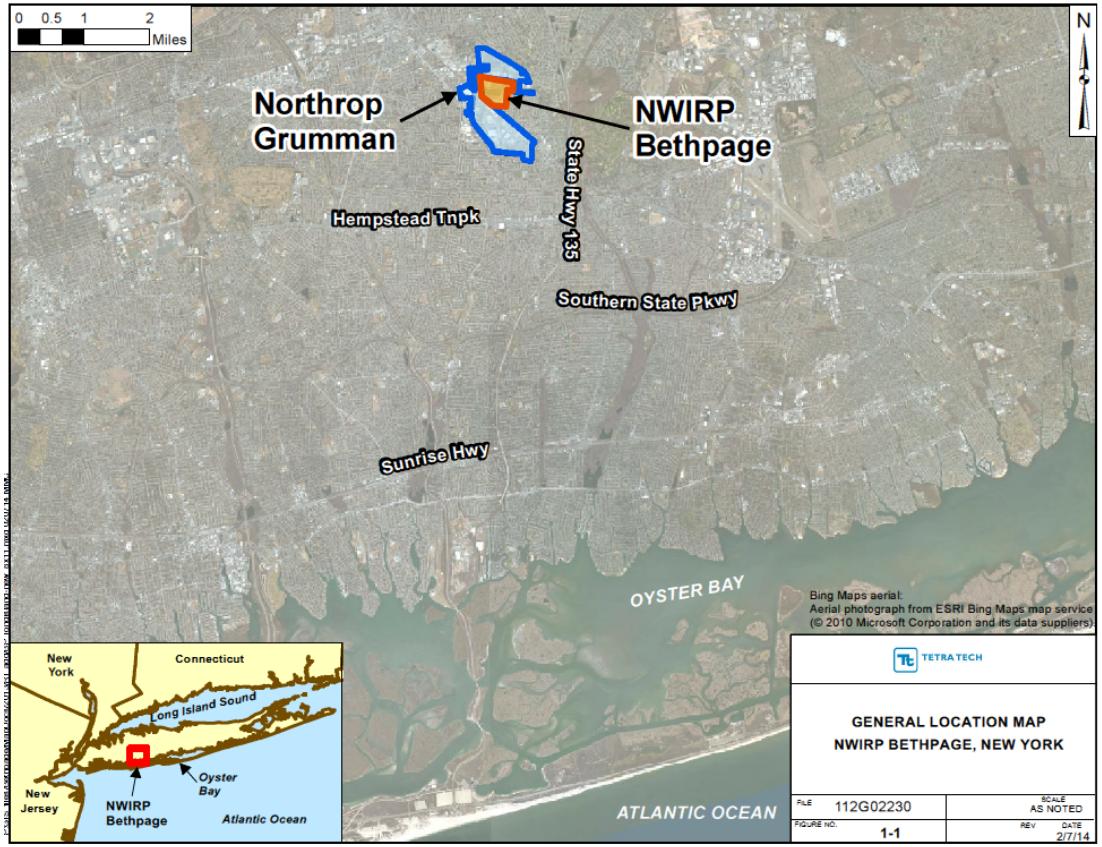
OVERVIEW
APRIL 2014 RESTORATION ADVISORY BOARD (RAB)

NWIRP BETHPAGE
LONG ISLAND, NEW YORK

04/09/2014

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

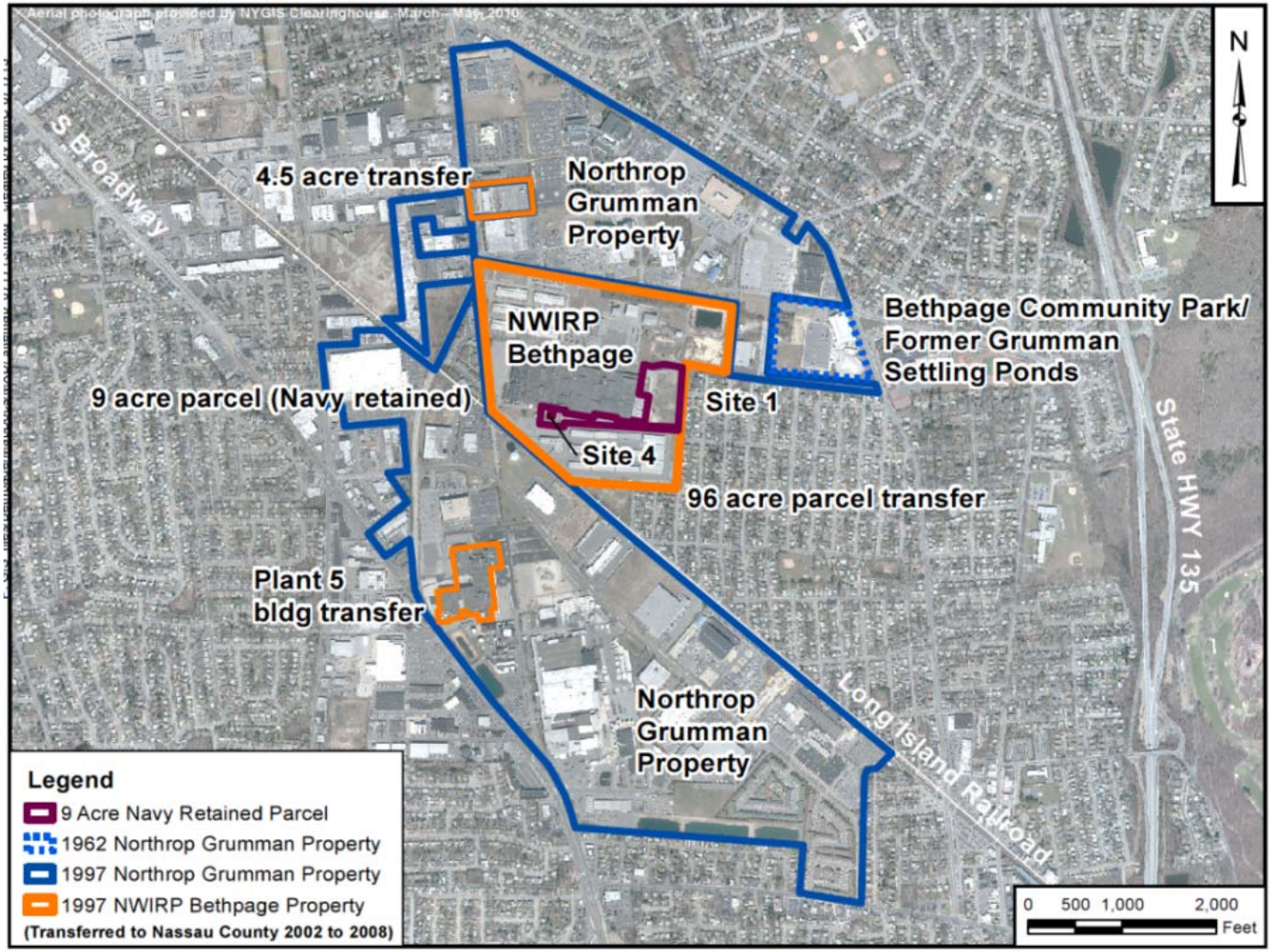


Facility Background (continued)

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.

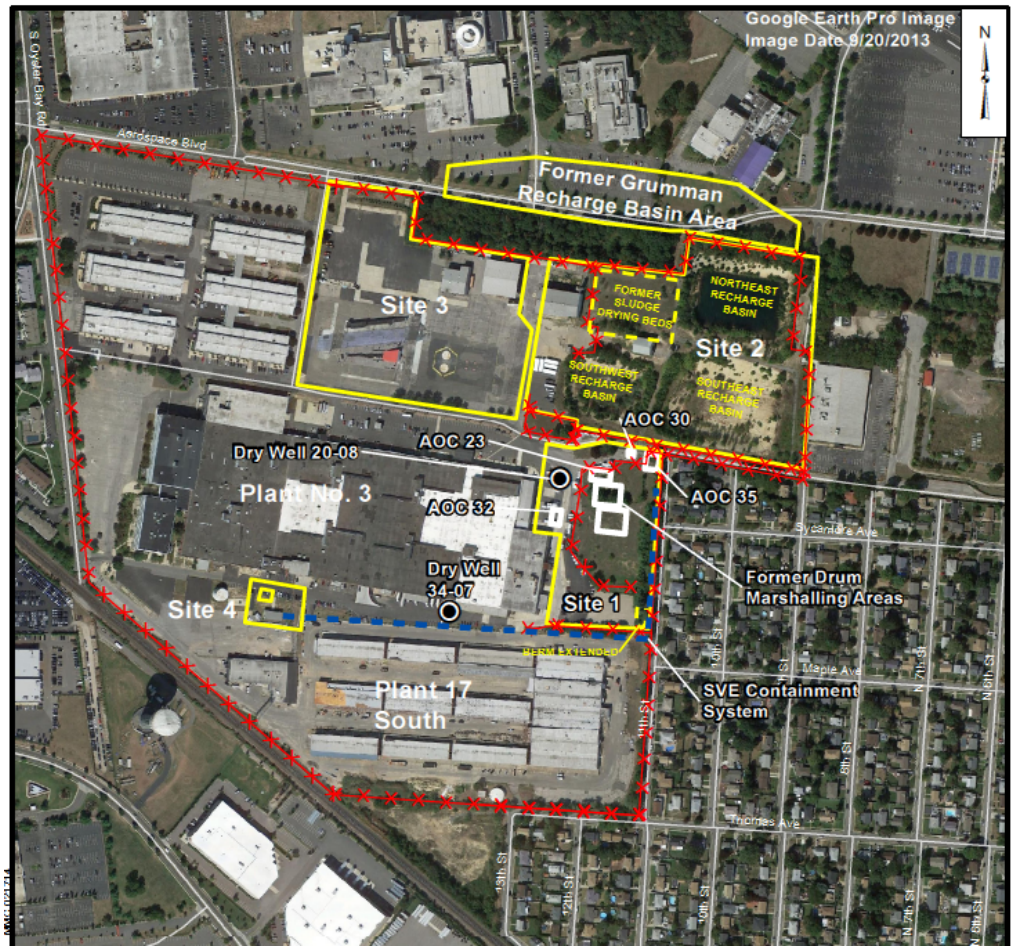
Environmental Cleanup Program

- 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).
  - 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 GW:

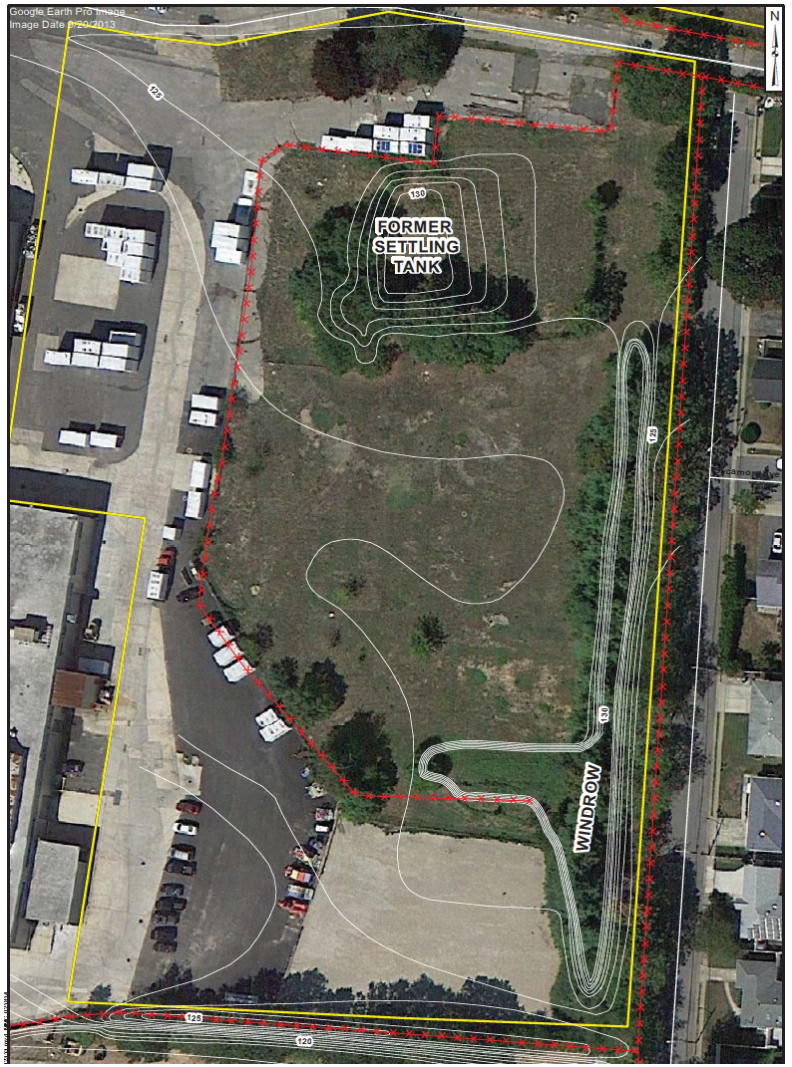
- –Onsite Response Actions conducted:
  - Sites 2 and 3 (2002)
  - Site 1 (VOC)-contaminated soil and shallow GW (2002)
  - Soil Vapor migration (2010)
- –Onsite Response Actions to be completed:
  - Site 1 - Polychlorinated biphenyls (PCBs) soil,
  - Site 4 – Former USTs contained No. 6 Fuel Oil



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 ROD (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

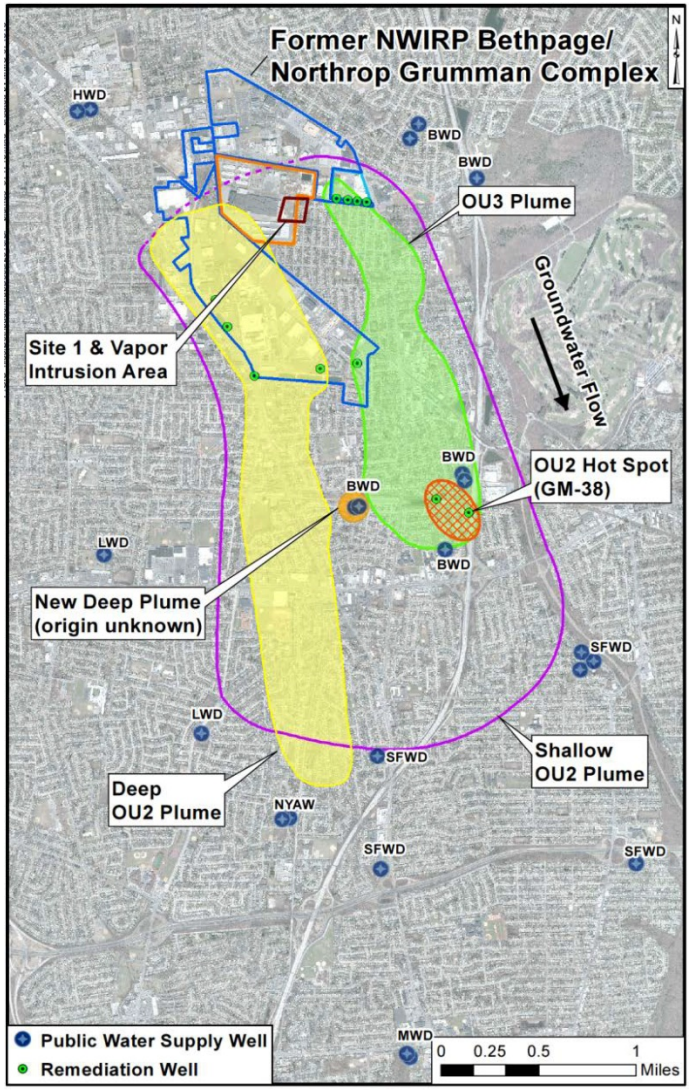
Site 4 – Former UST Site

- 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 is proceeding with a Proposed Plan in 2014

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
- BWD Plant 6 Plume, source uncertain
  - Screen interval 700 feet; 1,200 ppb

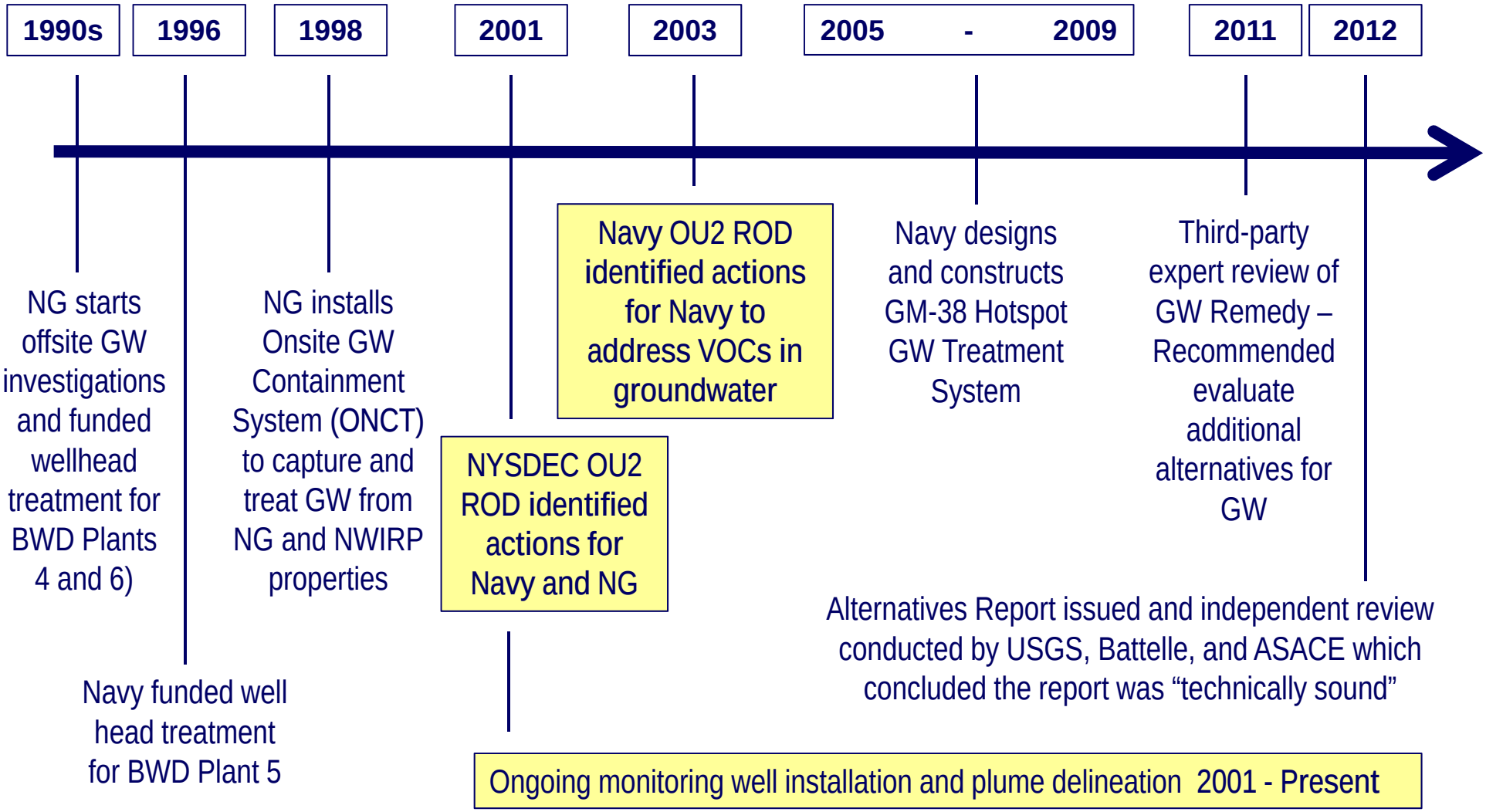


OU2 Groundwater ROD

2003 OU2 Groundwater ROD:

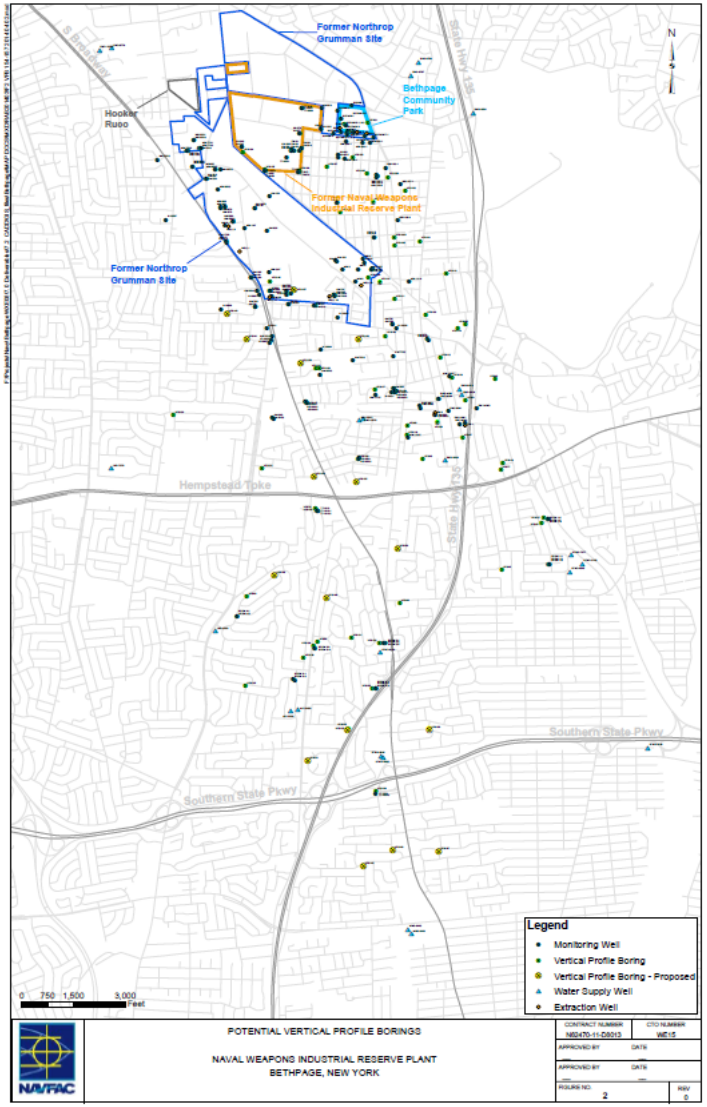
- –GM-38 Hot Spot treatment system
- –Public Water Supply Protection
- –Groundwater Monitoring

Groundwater Investigation Timeline



Groundwater

Groundwater remediation wells and public water supplies

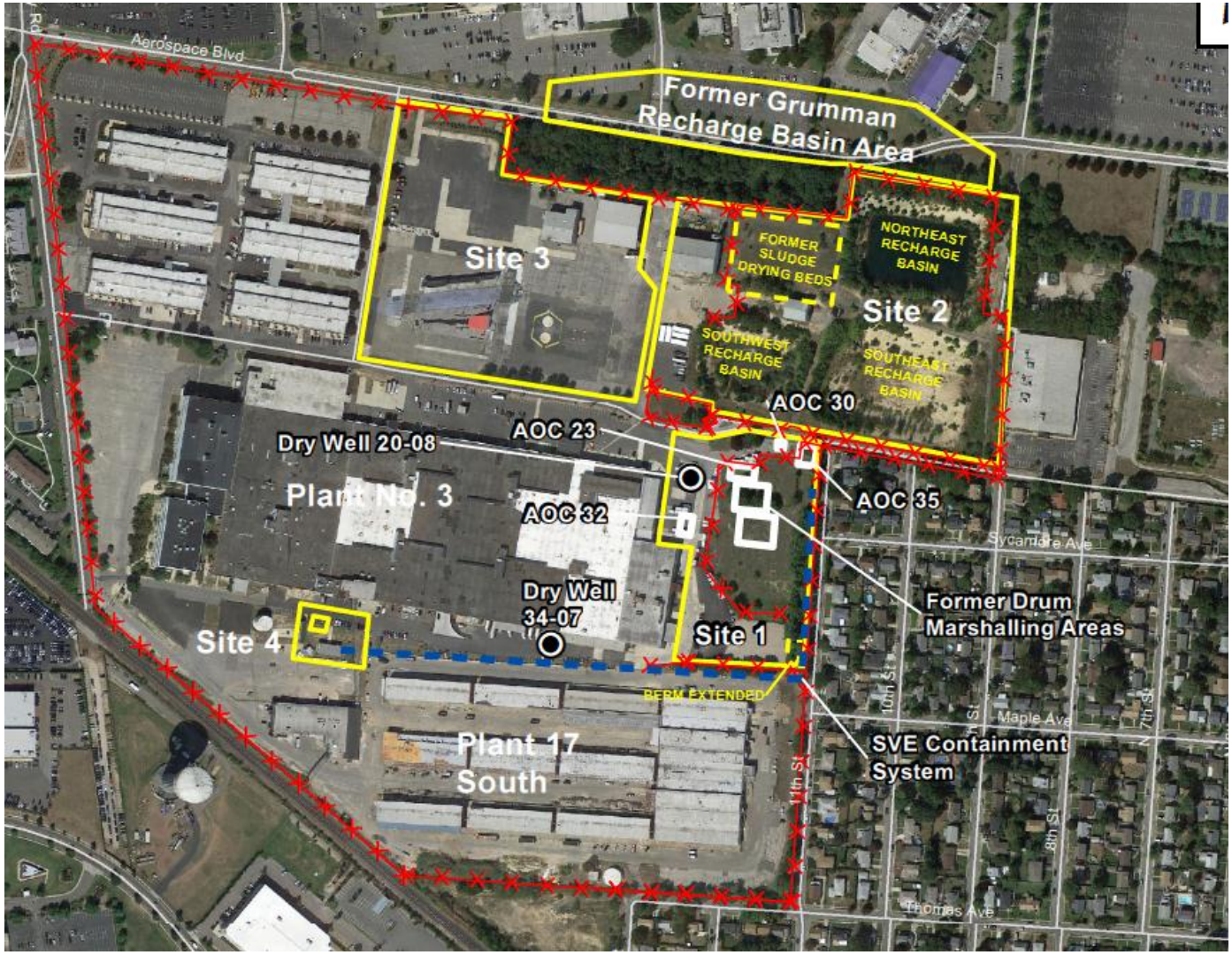


SITE 4 (AOC 22) UPDATE
APRIL 2014 RESTORATION ADVISORY BOARD (RAB)

NWIRP BETHPAGE
LONG ISLAND, NEW YORK

04/09/2014

Site Location Map



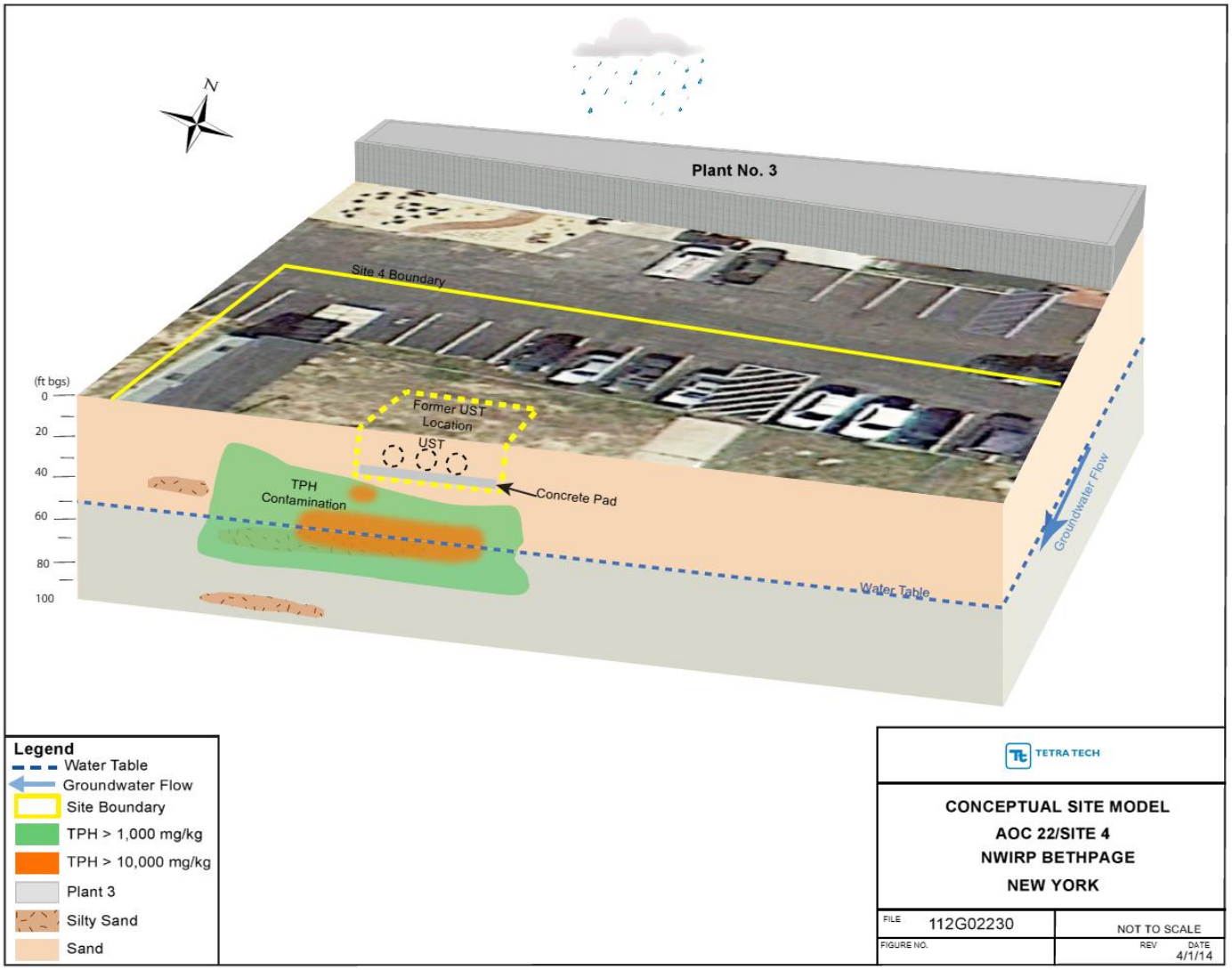
SITE 4 (AOC 22) ACTIVITIES

- Former Underground Storage Tanks (USTs) for No. 6 Fuel Oil – Tar-like material
- Tanks were removed approximately 1980 to 1984
- Approximately 6,800 cubic yards and 47 tons of petroleum
- Petroleum found in the soils 30 to 71 feet below ground surface, near the water table
- 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
  - Groundwater Monitoring
  - Steam Injection/Free Product Recovery
  - Solvent Extraction
  - Biosparging

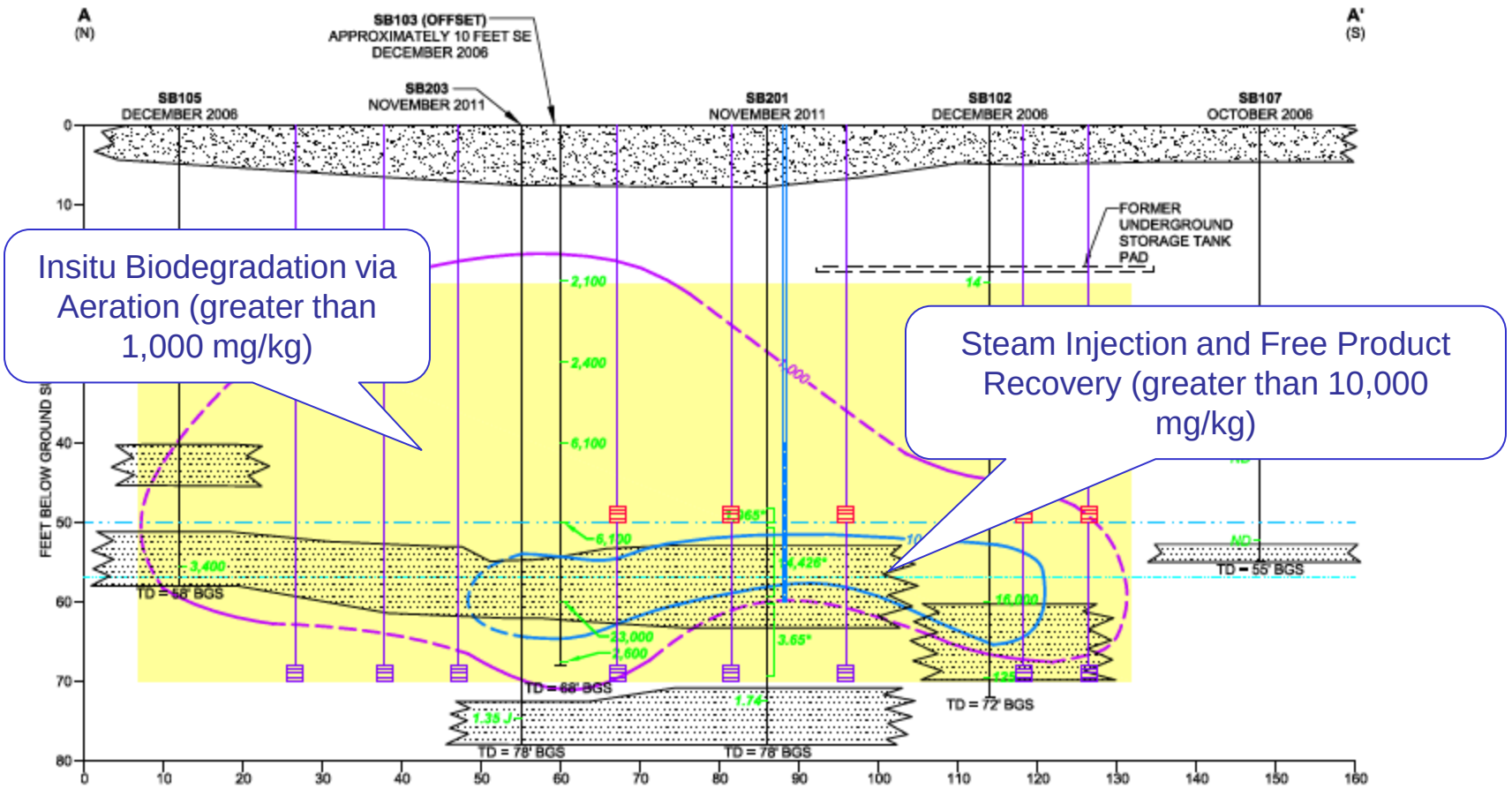
SITE 4 (AOC 22) – CONCEPTUAL SITE MODEL



SITE 4 (AOC 22) – PROPOSED REMEDIAL ACTION PLAN

- Navy is currently preparing a Proposed Remedial Action Plan for public comment – Spring 2014
- Proposed Alternative includes treatment:
  - –Steam Injection/Free Product Recovery
  - –Biosparging
- Monitoring

SITE 4 (AOC 22) PROPOSED ALTERNATIVE



SITE 4 (AOC 22) ACTIVITIES

- Path forward
  - –Proposed Remedial Action Plan (Spring 2014) – public comment
  - –Record of Decision (Fall 2014)
  - –Design to start in 2015
  - –Cleanup to start in 2015/2016
  - –Anticipated to operate for 2 to 4 years

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

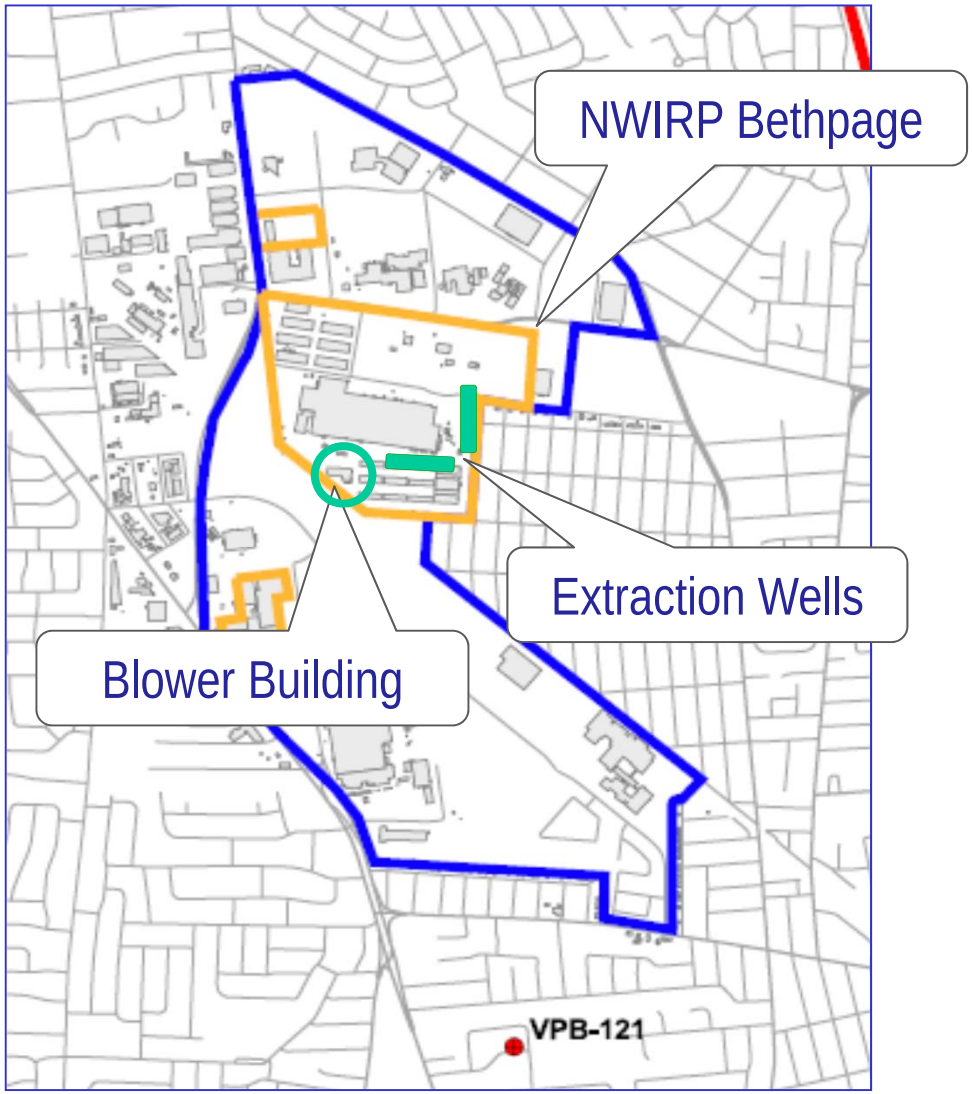
NWIRP BETHPAGE
LONG ISLAND, NEW YORK

04/09/2014

Introduction

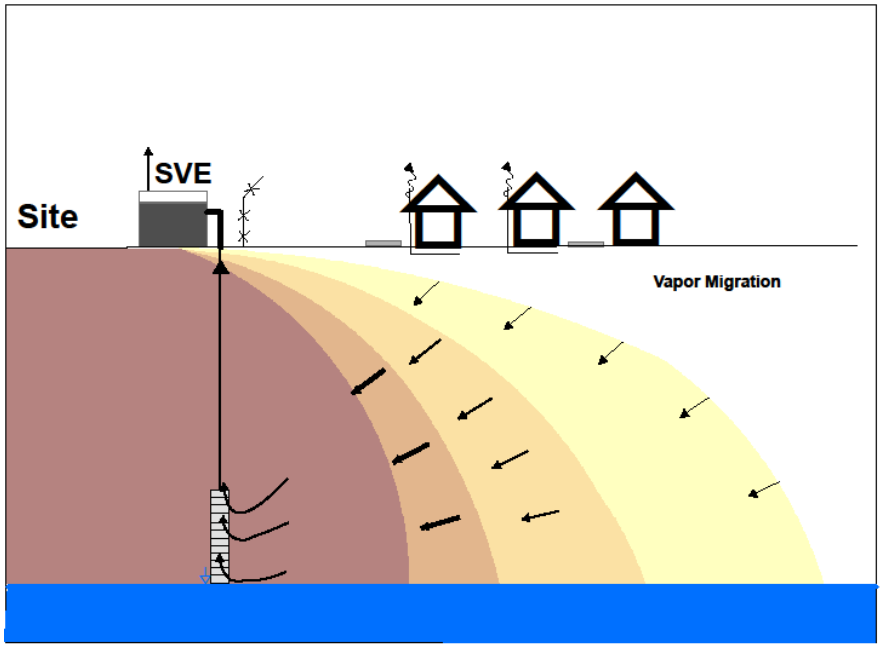
- Site 1 Soil Vapor Extraction Containment System (SVECS)
  - Overview
  - Operational Activities
  - System performance and future activities

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.



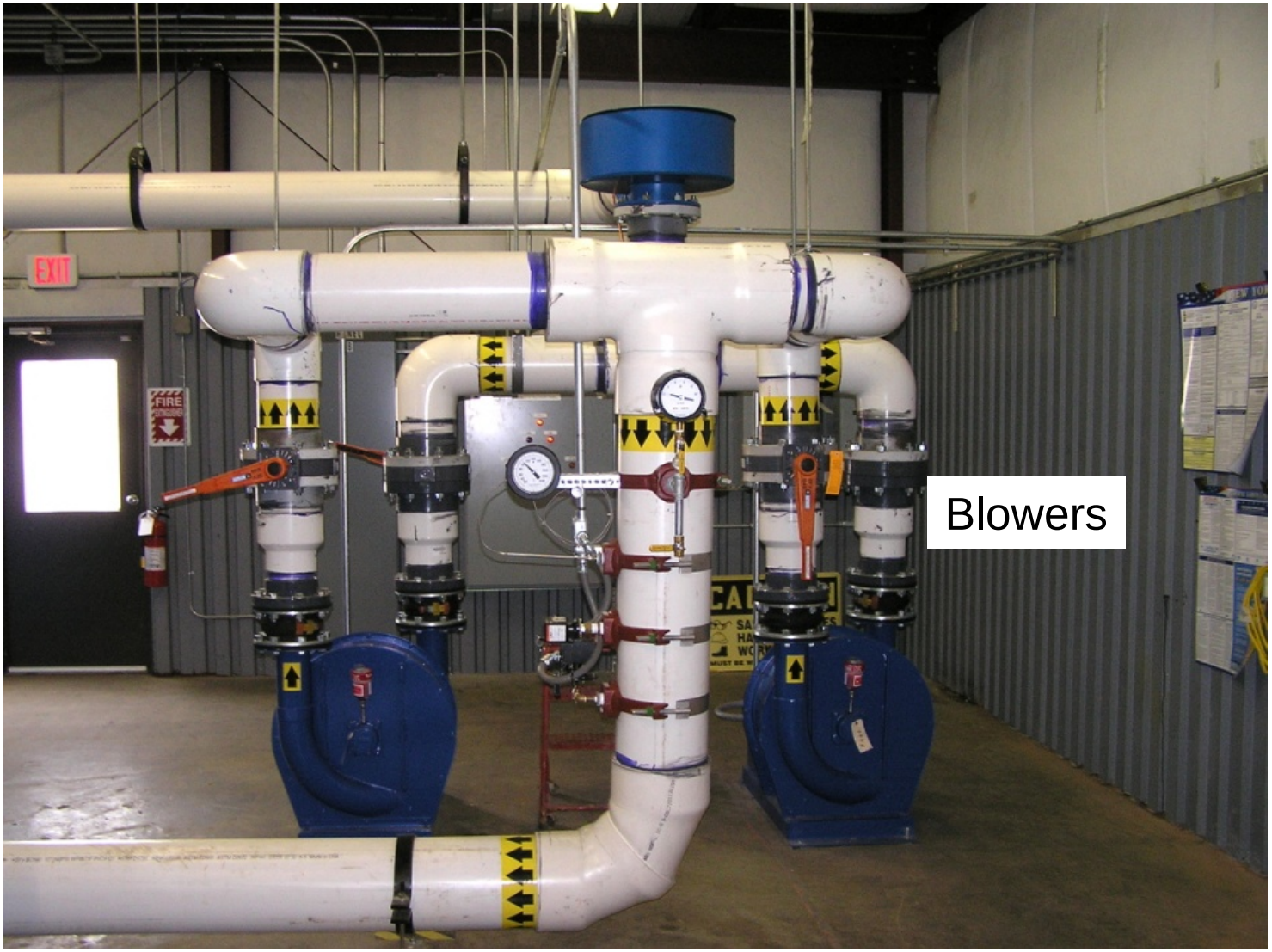
SITE 1 SVECS Project Overview

- System began operation in January 2010.
- Consists of soil vapor extraction, soil vapor monitoring, and soil vapor treatment.
- System extracts approximately 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.

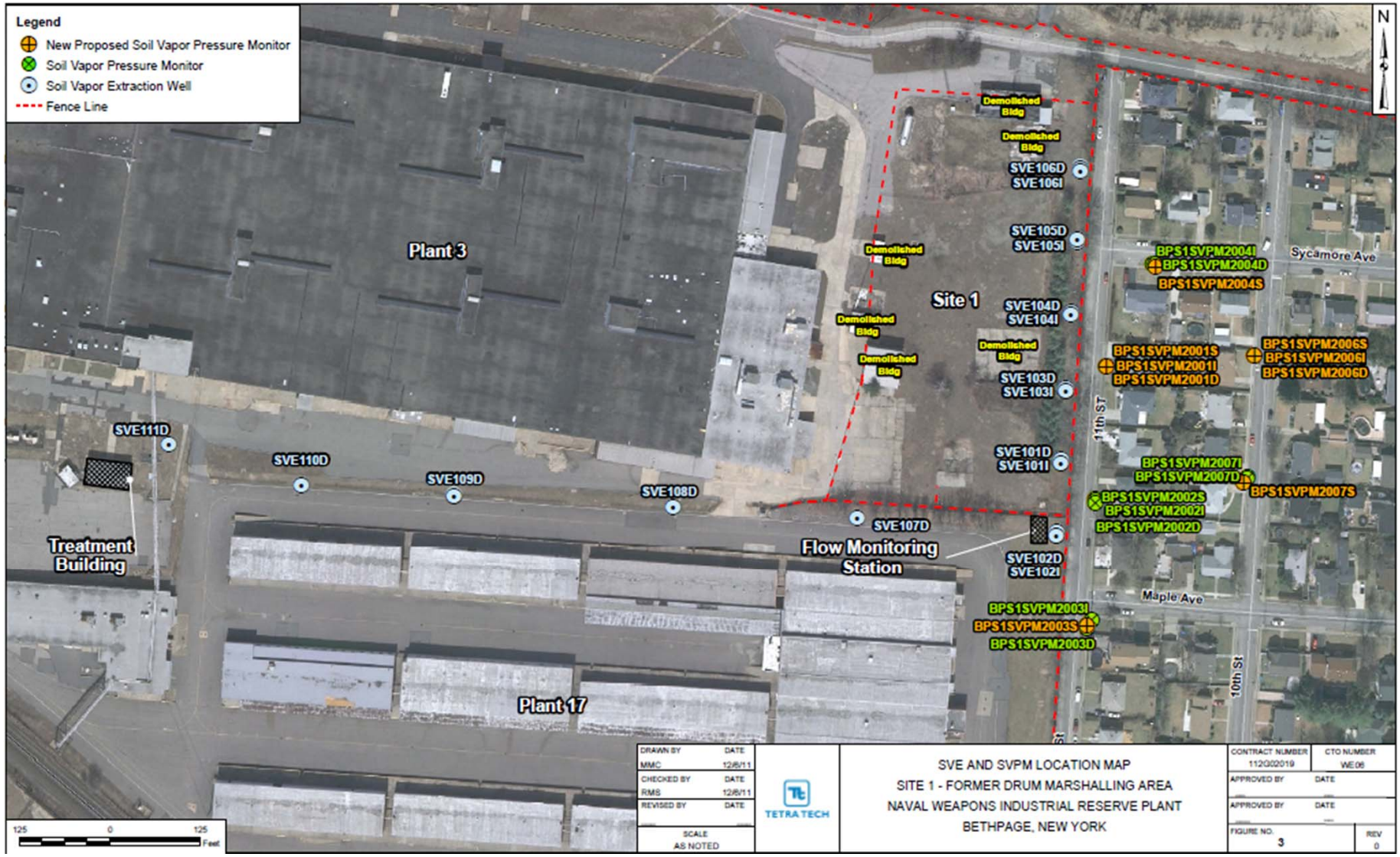
SITE 1 SVECS Project Overview

Blower Building

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

- 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.
- System is expected to operate as is for approximately 2 years.
- Path forward to be identified in a future Decision Document.

GM-38 GROUNDWATER TREATMENT PLANT OPERATION AND CAPTURE ZONE EVALUATION APRIL 2014 RESTORATION ADVISORY BOARD (RAB)

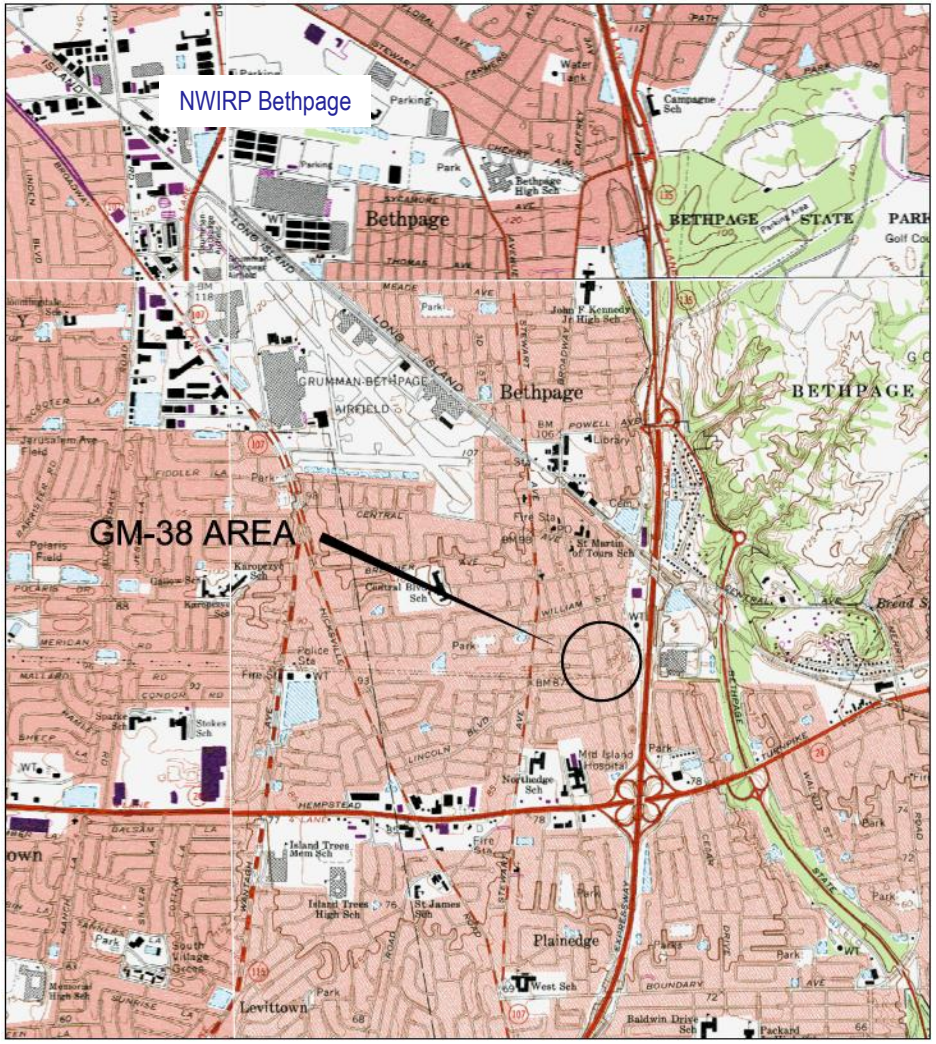
NWIRP BETHPAGE
LONG ISLAND, NEW YORK

04/09/2014

Introduction

GM-38 Groundwater Treatment System

- Objective
- Construction and Operation
- Capture Zone Evaluation
- Path Forward



Objective

From the Operable Unit 2 Record of Decision (April 2003):

- "The main objective of the GM-38 well area remedy would be additional protection of human health by reducing the future elevated mass contaminant load to the down gradient public water supplies. The remedy would also enhance the long-term natural process of aquifer restoration."

Construction and Operation

- GM-38 Treatment System consists of the following components:
  - –Two groundwater recovery wells RW-1 and RW-3
  - –Equalization Tank
  - –Air Stripping Tower
  - –Liquid Phase Granular Activated Carbon Polishing
  - –Discharge to a Recharge Basin
  - –Vapor Phase Treatment using Granular Activated Carbon and Permanganate-Based Resin

Operation

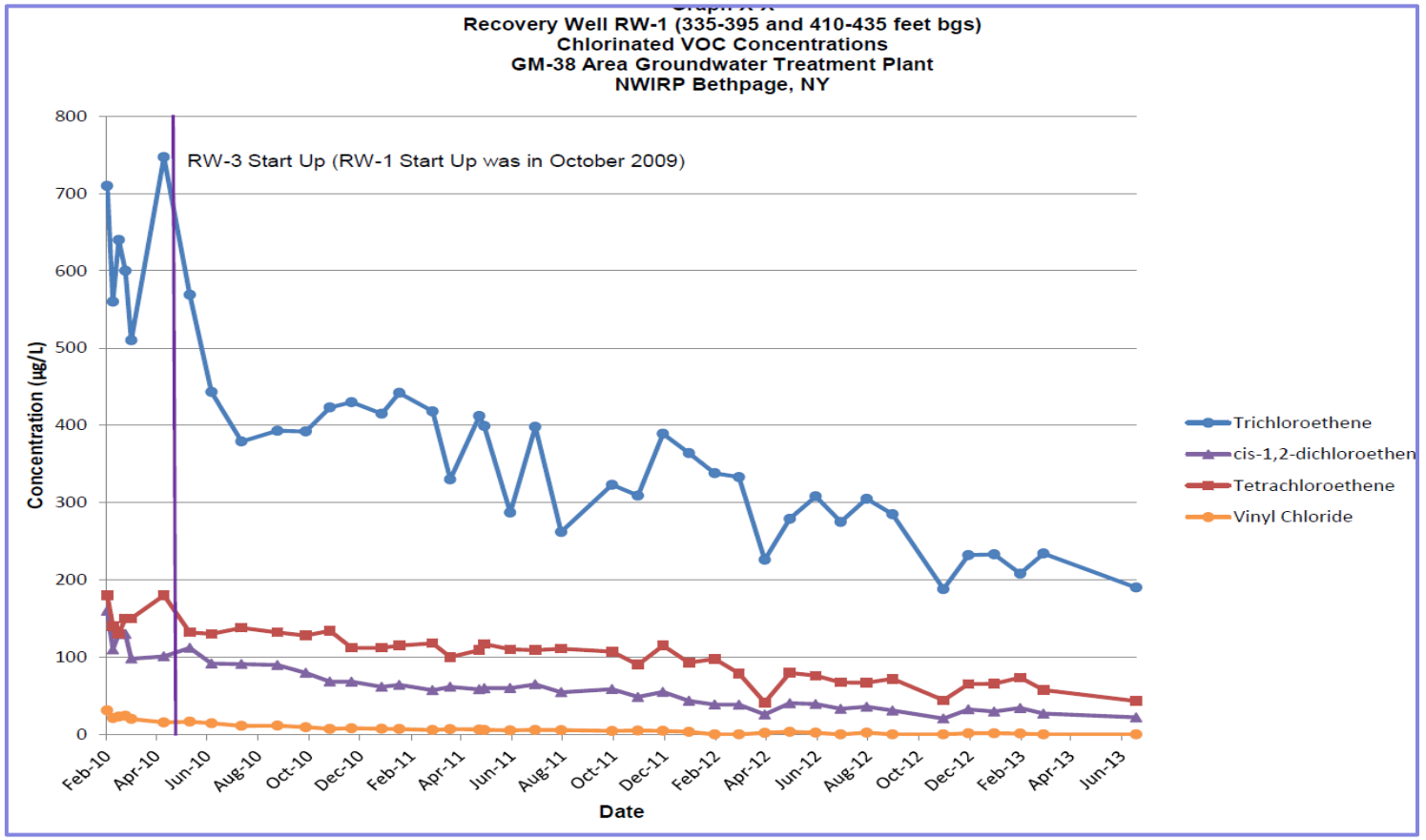

MW-116-5
VPB-42
GM-36D
GM-36D2
BWD 4-1
BWD 4-2
Recharge Basin
GM-38D2
GM-38D
VPB-51
Treatment Plant
GM-38RW03
GM-38 RW2-MW2
VPB-48
GM-38RW02
VPB-38
Recovery Well RW03
GM-38RW01
GM-38 RW1-MW1
Miller Rd
MW-118-5
Recovery Well RW01
VPB-47
VPB-40
BWD 5-1

Operation

- Since Startup, System has treated:
  - 2 Billion gallons of water (2.2 times the Hotspot Volume), and
  - 7,500 pounds of volatile organics
- Monthly compliance sampling of water and air – Consistently achieves requirements
- Quarterly to bi-annual sampling of groundwater monitoring wells
  - December 2013
  - March 2014
  - September 2014
- Two month shutdown in October 2013 for maintenance:
  - Replace duct work
  - Carbon Change outs – liquid and vapor phase
- Normal runtime is 95% - power outages and schedule maintenance

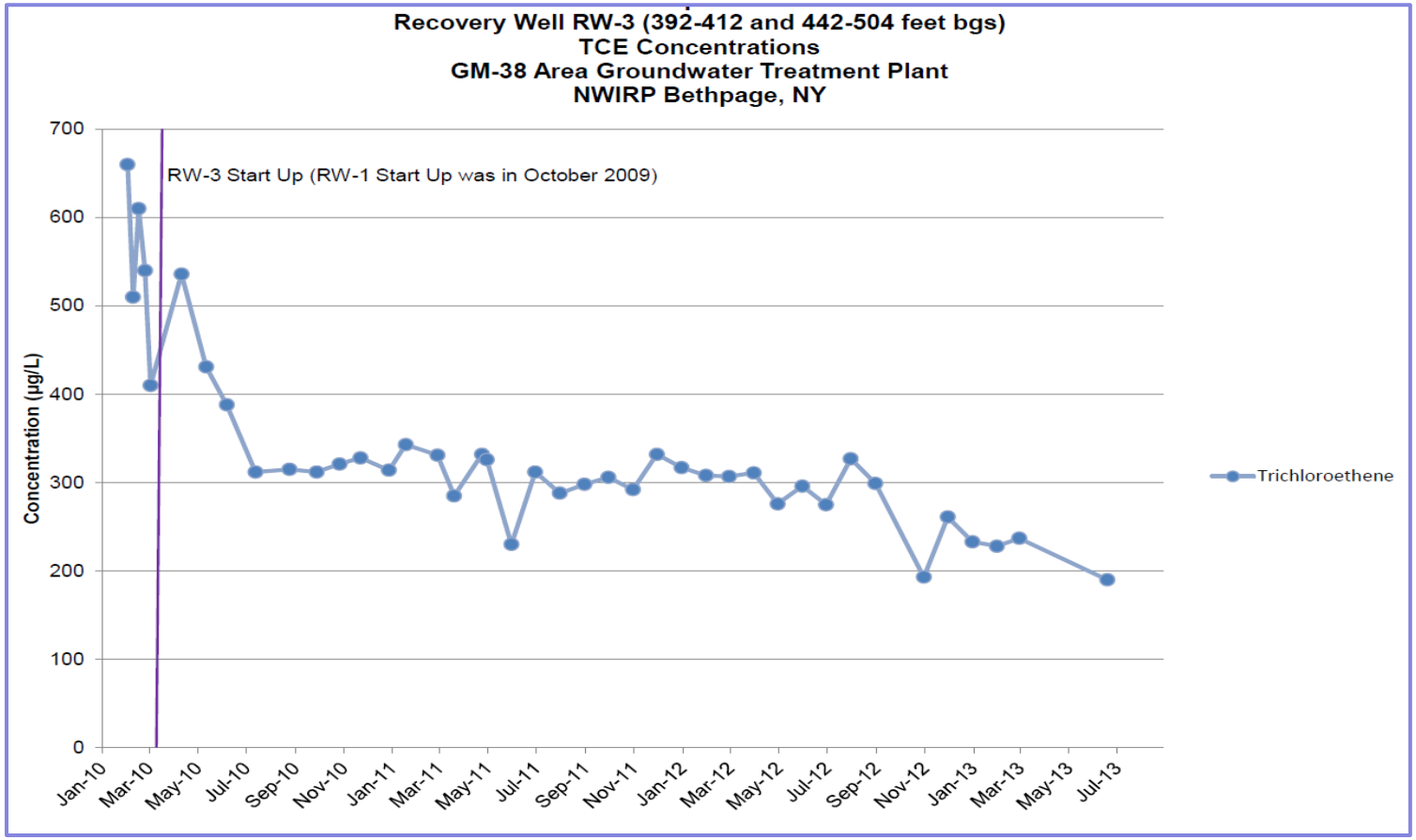
Operation – Recovery Well RW01

- Well extracts from upper and middle portion of Hotspot – less than 435 feet
- 75% Reduction in volatile organics since startup



Operation – Recovery Well RW03

- Well extracts from middle and lower portion of Hotspot – 392 to 504 feet
- 75% Reduction in Trichloroethene (TCE) since startup



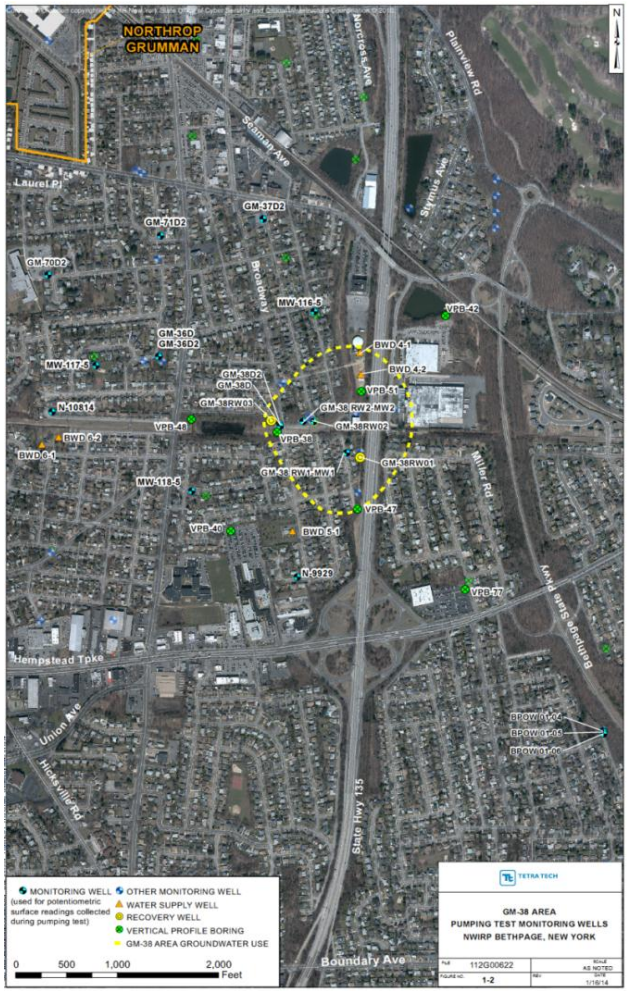
Monitoring Well Results Summary

- Deeper groundwater (greater than 450 feet)
  - –TCE concentrations were originally greater 1,200 micrograms per liter (µg/L) (GM-38D2)
  - –TCE concentrations are currently less than 50 µg/L

- Shallower groundwater (320 to 435 feet)
  - –TCE concentrations decrease shortly after startup of the GM-38 System
  - –TCE concentrations have remained relatively steady since startup (GM-38D2)
  - –Sustained concentration in up-gradient wells suggest continuing source of volatile organics to the north

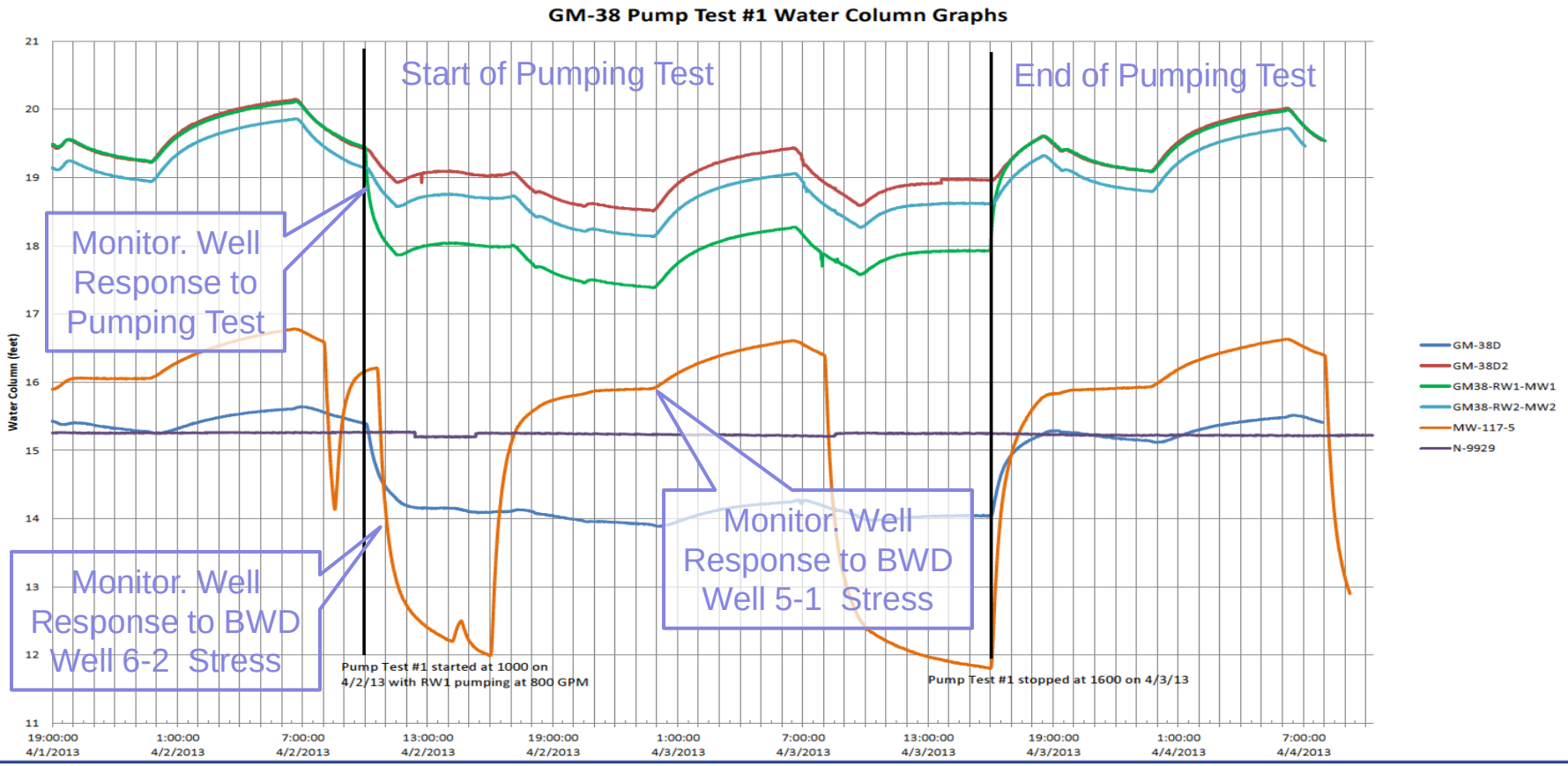
Capture Zone Analysis

- Objective is to evaluate whether the system is capturing the hotspot groundwater as designed
- Conducted four pumping tests at the GM-38 Area in April 2013 – coordinated with Water District (BWD)
- Monitored 18 wells with screen depths of 50 to 757 feet below ground surface
- Water levels were recorded over a two-week period
- United States Geological Survey (USGS) is supporting evaluation – and recently issued it own evaluation report
- Also, a year-long area-wide evaluation is ongoing



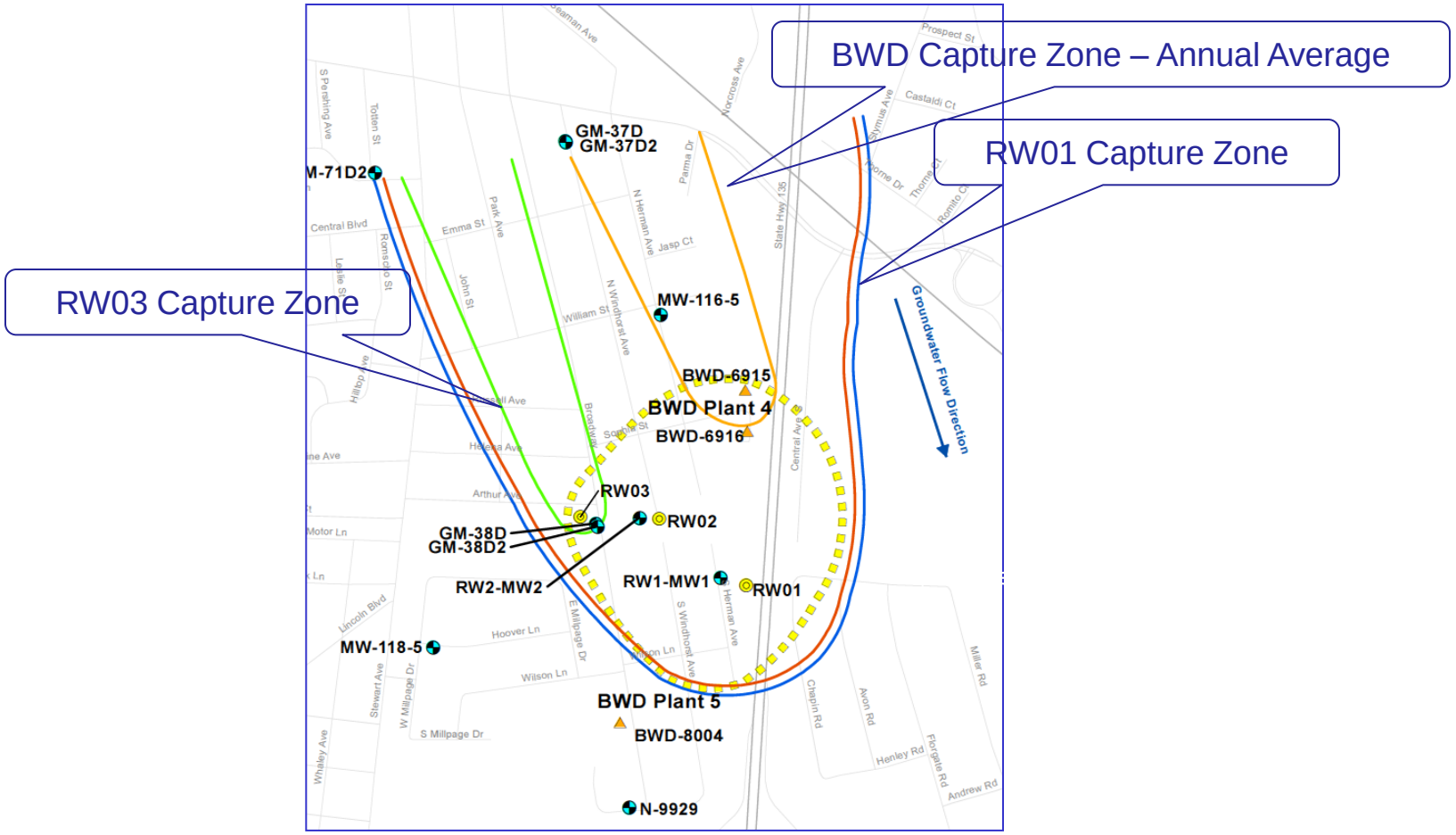
Capture Zone Analysis

- Example of Water Level Readings
- Recovery Well RW01 running at 800 gallons per minute (420 million gallons per year)
- Note response of some wells to BWD Wells 5-1 and 6-2



Capture Zone Analysis

- Evaluation indicates 98 to 100 percent capture of GM-38 Area Groundwater



Conclusions and Path Forward

- RW01 provides the vast majority of mass removal
  - Central location, high pumping rate, and screen depth is better matched to GM-38 Area Groundwater
  - Continue operation, but discuss future operation with New York State Department of Environmental Conservation
- RW03 is not optimally located
  - Located near northwest corner of GM-38 Area Groundwater
  - Shallow screen zone is redundant with RW01 and deeper screen zone is no longer located within significant organic mass
  - Discontinue operation
- Navy to consider investigation of shallower groundwater quality north of the GM-38 Area to identify source of continuing organics

OPERABLE UNIT 2 - OFFSITE GROUNDWATER INVESTIGATION

APRIL 2014 RESTORATION ADVISORY BOARD

NAVAL WEAPONS INDUSTRIAL
RESERVE PLANT BETHPAGE
LONG ISLAND, NEW YORK

04/09/2014

OFFSITE INVESTIGATION PROGRAM PRESENTATION

1 - Description of Purpose and Program

2 - Conceptual Site Model and Applicability to Bethpage Plume

3 - Maps of Existing Vertical Profile Borings and Wells

4 - Description of Work Performed since last Restoration Advisory Board

5 - Description of Future Work

6 - Recent Reports

7 - Plume extent

OPERABLE UNIT 2 GROUNDWATER INVESTIGATION - PURPOSE

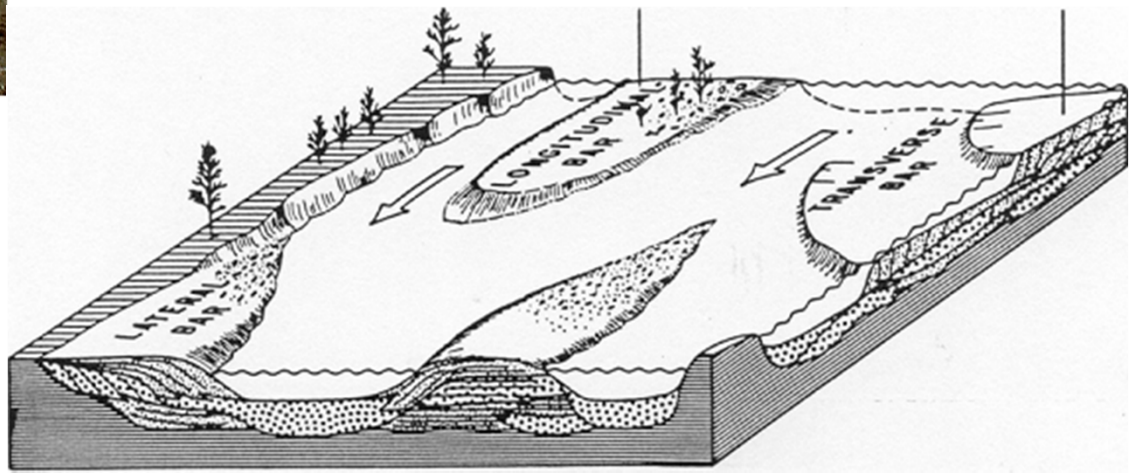
- Delineate groundwater contamination in areas south of Naval Weapons Industrial Reserve Plant Bethpage
- Program consists of:
  - Vertical profile borings - used to quickly screen areas for the presence, depth, and concentration of contamination
  - Permanent monitoring wells - to confirm presence/absence of contamination and develop trends
  - 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

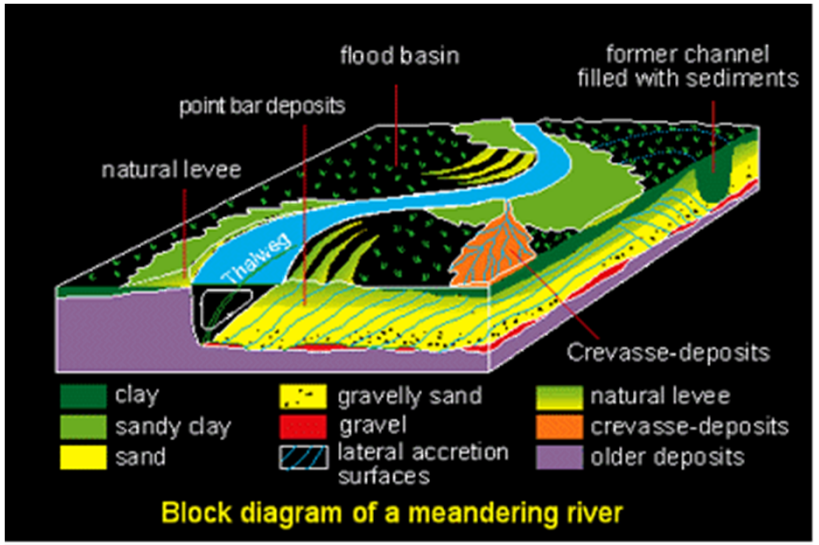
CONCEPTUAL SITE MODEL
BASAL MAGOTHY AQUIFER

Results in interbedded sands and gravels

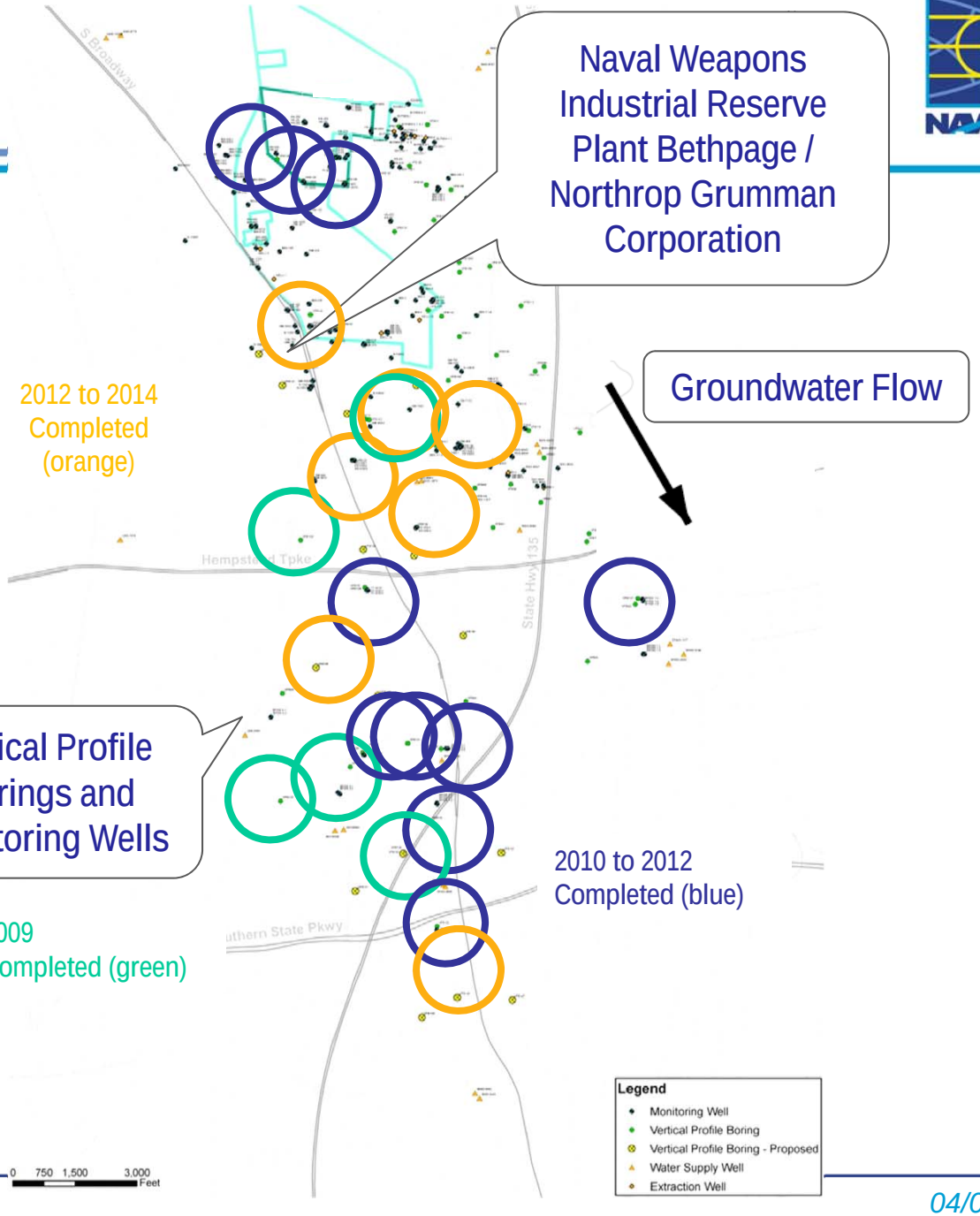


CONCEPTUAL SITE MODEL
MIDDLE TO UPPER MAGOTHY AQUIFER

Results in interbedded sands and clays



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 (November 2013)
  - Mobilization of 2 drilling rigs
  - Installation of Vertical Profile Borings:
    - 142 and 144 located North of Hempstead Turnpike Area
    - 148 located North of Southern State Parkway Area
    - 146 located South of Southern State Parkway Area
- Future work:
  - Mobilization of 3 drilling rigs
  - Installation of Vertical Profile Borings
    - 7 North of Hempstead Turnpike Area
    - 5 North of Southern State Parkway Area
    - 2 South of Southern State Parkway Area
  - Installation of 6 monitoring wells South of Southern State Parkway Area

CURRENT AND PLANNED VERTICAL PROFILE BORING LOCATIONS

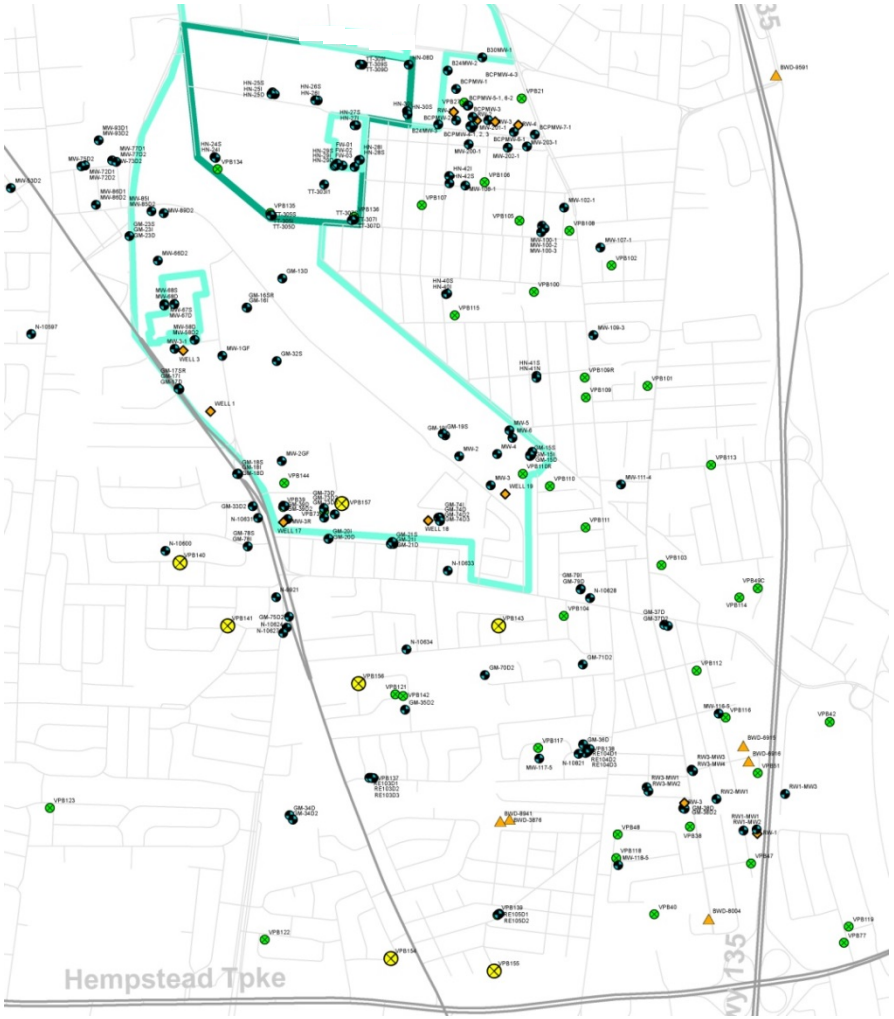
Please refer to the posters provided for detail

North of Hempstead Turnpike Area: 140-144; 154-157

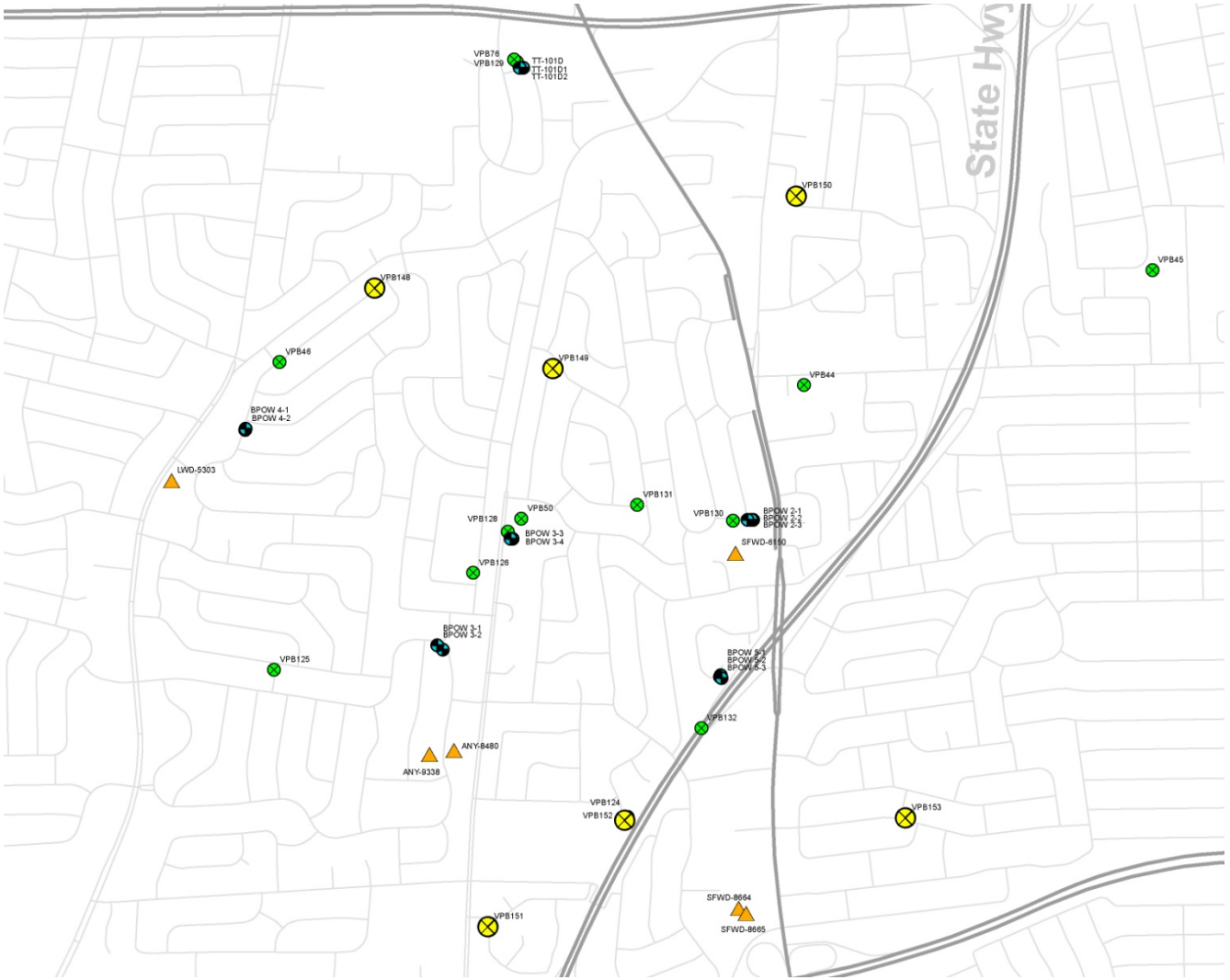
North of Southern State Parkway Area: 148-153

South of Southern State Parkway Area: 145-147

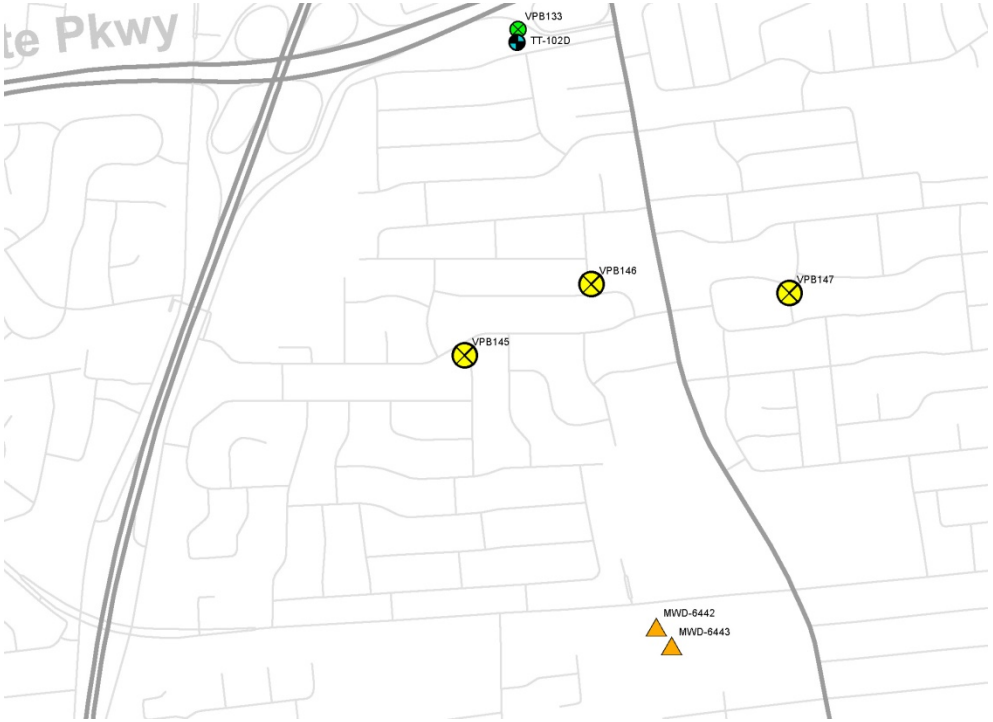
CURRENT AND PLANNED VERTICAL PROFILE BORINGS – NORTH OF HEMPSTEAD TURNPIKE AREA



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



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



RECENT VERTICAL PROFILE BORING/WELL REPORTS

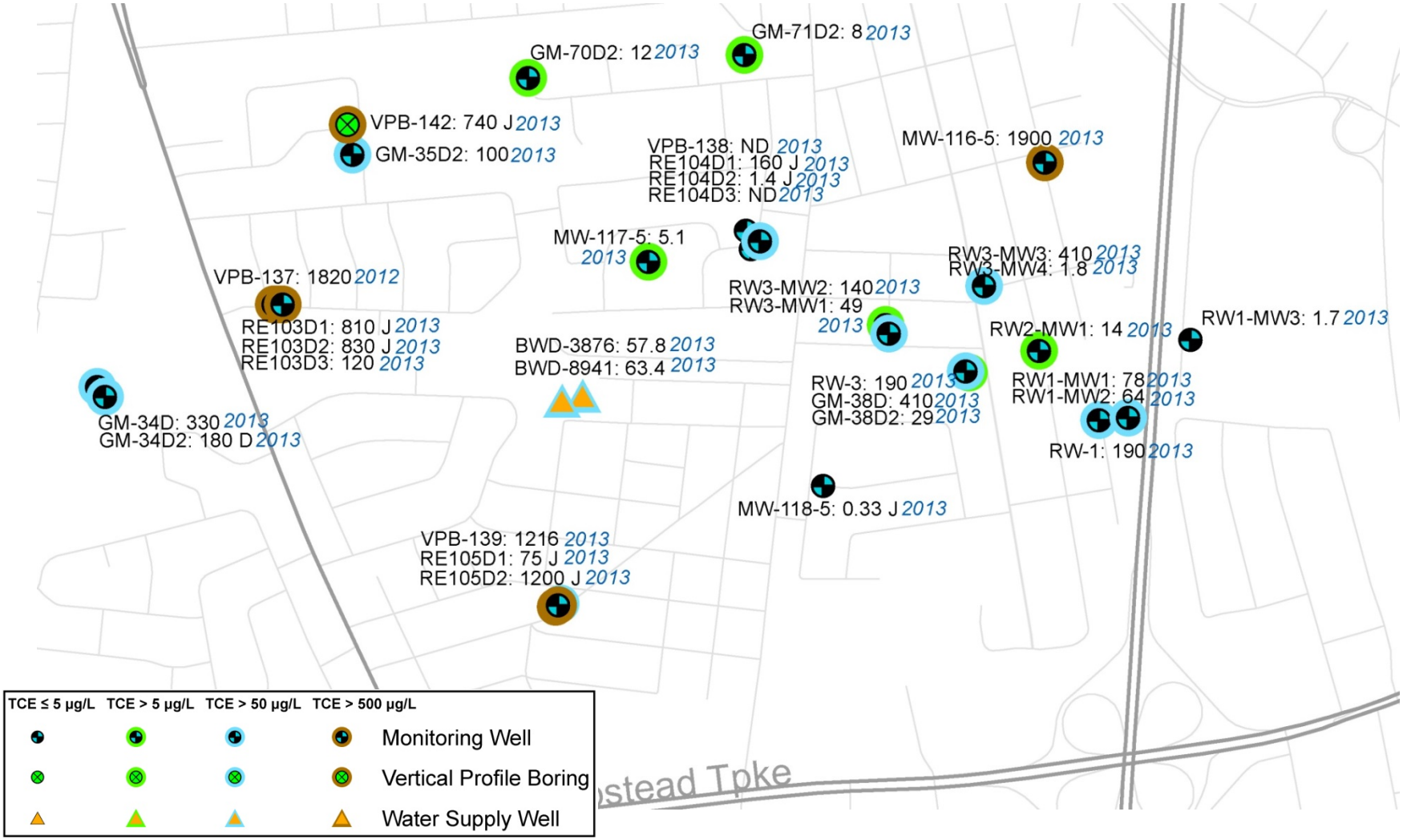
Data Summary Report Vertical Profile Borings 137-139 with 8 wells (North of Hempstead Turnpike Area) submitted March 10, 2014

Uploaded to the Administrative Record

Significant findings –

Elevated Trichloroethylene (>1000 parts per billion) in the vicinity of Vertical Profile Boring 139; this is being evaluated with additional groundwater sampling

RECENT RESULTS – VERTICAL PROFILE BORINGS 137-139 AND SURROUNDING VERTICAL PROFILE BORINGS/WELLS



OFFSITE DETECTIONS (>300 FEET) BASED ON RECENT DATA

Note that all public water supply wells are shown;
Please refer to the large poster for greater detail.