

**RESTORATION ADVISORY BOARD MEETING
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT (NWIRP), BETHPAGE
VIRTUAL MEETING
WEDNESDAY, NOVEMBER 16, 2021**

The forty-seventh (48th) meeting of the Restoration Advisory Board (RAB) was held online as a virtual meeting hosted by WebEx. Meeting attendees included representatives from the Navy (Scott Sokolowski, Melissa Forest, and David Todd), New York State Department of Environmental Conservation (NYSDEC) (Don Hesler and Jason Pelton), New York State Department of Health (NYSDOH) (James Sullivan and Jacquelyn Nealon), Nassau County Representative Rose Walker (and representative Joane Foley), Massapequa Water District (MWD) (Stan Carey), South Farmingdale Water District (SFWD) (Gary Bosnan and Frank Koch), Tetra Tech (Jacqueline Boltz, David Brayack, Ernie Wu, Vin Varricchio, Beau Benfield, Will Yeung, and Lauren Donston), AGVIQ (Steve Matney), and APTIM (Arianne Reyes, Bill Hughes, and Megan Smith). RAB members in attendance were David Sobolow, Sandra D'Arcangelo, Edward Olmstead, Bill Pavone, and Ethan Irwin). There were approximately 20 additional attendees from Bethpage and neighboring communities in attendance. The meeting attendance sheet is provided in Appendix A. The Agenda and Definitions are provided in Appendix B.

WELCOME AND AGENDA REVIEW

The Tetra Tech representative Ms. Boltz began the meeting and reviewed the meeting rules and question and answer process. The Navy representative, Mr. Sokolowski welcomed everyone and introduced himself as the new Navy RPM. Mr. Sokolowski introduced himself to the RAB and facilitated RAB member introductions before reviewing the rest of the meeting agenda. Prior to the RAB meeting, the November 2020 and April 2021 RAB meeting minutes were sent to the RAB to review so they could be approved at this meeting. A vote to approve the outstanding meeting minutes could not be conducted because not enough RAB members were in attendance. The November 2020 and April 2021 RAB meeting minutes will be finalized by an e-mail vote before the next RAB meeting.

NWIRP BETHPAGE PROGRAM OVERVIEW

Mr. Sokolowski, the Navy RPM, provided a general program overview of the activities at NWIRP Bethpage. The presentation is provided in Appendix C. This presentation provided a general update on Site 1 and the tree planting, the Site 4 Biosparge System, the Explanation of Significant Differences document, the Phase I Advanced Oxidation Process and RW4 Operation, and summarized upcoming projects and property access updates. Questions and answers from the panelists regarding this presentation are described below.

Mr. Bill Pavone, asked what exactly the blockage is regarding making progress, TOH/TOB, access issues. Mr. Sokolowski replied that a lot of this is on the legal side now, but that the Navy is taking all actions necessary and possible. Mr. Pavone indicated that the RAB members can help facilitate through reaching out to their legislatures if possible. Ms. Rose Walker noted that she has not been contacted.

Ms. Effie Artizone asked what the issues are that are in the legal process. Mr. Sokolowski responded that the Navy cannot comment at this time, and offered to address in the meeting follow up after talking to attorney. Ms. Artizone stated that she has just purchased a house and is very interested in what is going on and what may hold up the process. Mr. Sokolowski stated that the Phase II plant is not being held up, but there are some components, such as monitoring wells, etc. that are being held up at this time.

Mr. Matt Russo, from the Town of Oyster Bay, commented that site access issues are mostly legal. There is disagreement on some language in site access agreements. The TOB has been working well with Navy technical people and just need to get the legal portions ironed out.

NOTE: Since the RAB meeting in November the Towns of Oyster Bay and Hempstead have complied with the Access Orders.

OU2 GROUNDWATER MONITORING RESULTS AND RE-137 INTERIM ACTION UPDATE

Mr. Dave Brayack, Tetra Tech, provided a presentation on the latest groundwater monitoring results and an update on the RE-137 Interim Action. The presentation is provided in Appendix C. Questions and answers from the panelists regarding this presentation are described below.

Mr. Stan Carey, Massapequa Water District, asked if it can be assumed that the capture zones for RW 8 & 9 will overlap. Mr. Brayack responded, yes, that they will be operated together to act as a barrier.

Ms. Sandra D'Arcangelo asked for clarification on the impact at the corner of Hempstead turnpike and Hicksville road and what was happening at that specific area. Mr. Brayack provided a brief overview Phase I, Phase II, Phase III. We are looking at another area as RE137 as well. Specific activities include 20-month pilot-scale test to remove chlorinated VOCs and 1,4-Dioxane so that drinking water standards are met. Ms. D'Arcangelo asked if this include both AOP and GAC treatment? Mr. Brayack replied that this is correct.

Mr. Pavone commented that he mentioned a meeting or two ago, about potentially doing a 3-D model, to help residents see and understand what is going on. He then asked if that is being considered. Mr. Brayack replied that slides 13 and 14, which show screen captures of the groundwater modeling using the 2014 data. We are working toward a 3 dimensional depiction of the plume.

PHASE II REMEDIAL ACTION UPDATE

Mr. Stephen Matney, AGVIQ, provided an update on the Phase II Remedial Action System. The presentation is provided in Appendix C. Questions and answers from the panelists regarding this presentation are described below.

Mr. Pavone stated that he went to see work being done at RW7. He noted that the team was very receptive and that he appreciates the work going on at this site.

PHASE III (RW8 AND 9) SOUTHERN INTERCEPT SYSTEM UPDATE

Mr. Brayack, Tetra Tech, provided an update on the Phase III Southern Intercept System activities. The presentation is provided in Appendix C. Questions and answers from the panelists regarding this presentation are described below.

Mr. Pavone inquired about potential discharge locations. Mr. Brayack responded that in the area south of the Southern State Parkway, there is a basin approximately 1,000 feet south of RW8 location. There is also a basin immediately adjacent to RW8 that is being considered. Both basins would be evaluated for potential for discharge. The target basin is near Twin Lane North, but the infiltration capacities of these basins need to be evaluated.

Mr. Stan Carey asked why we need to wait to start design of treatment plant until 2023 rather than sooner. Mr. Brayack replied, that we don't know at this time how big to make the equipment or how much water needs to be treated. Pumping tests will be conducted into the spring and early summer to gather information so that the design can be completed.

Mr. David Sobolow indicated that he is puzzled about the reason to know how many gallons need to pump, why don't we design for the worst case scenario? Mr. Brayack replied that if the treatment system is too big, it would have to be re-designed to scale it back once the pumping test results are received and evaluated. This would waste both time and money. Mr. Sobolow indicated his frustration over the timing, when the community has been waiting years. Mr. Sokolowski, Navy RPM, added that the Navy doesn't want to make too many decisions without complete data picture, but we are looking for the best way to optimize this process. When questioned about where the plume was, Mr. Brayack indicated that the current data indicates the plume is north of the Southern State Parkway, and that contamination may not get to this area for another 10 to 20 years. Mr. Sokolowski added that the Phase II plant operations may also have some impact on slowing the plume migration. Mr. Jason Pelton, NYSDEC, also indicated that while recovery wells RW8/9 are being installed. The RE108 Phase II system which will be operating by the end of next year.

GENERAL QUESTIONS FROM THE PUBLIC

Mr. David Sobolow asked if an overview about what Grumman is doing/ where they are in their process could be provided. Mr. Jason Pelton, NYSDEC, replied that Grumman work is focused on the area just to the south, southeast of Bethpage Community Park, the RW21 Area, where there are high volatile organic compound concentrations. At the former Grumman settling ponds, three extraction wells have been installed. Grumman

has been cooperating with the county to install double wall conveyance piping through residential areas. Over the last two months prior to this meeting, they have installed almost two miles of conveyance piping. They are almost done with piping and the extraction wells will be connected to the plant on Grumman property which is expected to be operating by mid-year 2022.

Mr. Sobolow asked if the documents that Grumman completes that go to TOB are public records. Mr. Pelton replied, yes and that most are with the state. Mr. Sobolow inquired if it is incongruent to say that the Navy can't talk about what Grumman is doing? Mr. Sokolowski replied that the Navy does not get all the Grumman information and cannot speak technically to all the Grumman work. Mr. Pelton added that Grumman holds community update meetings, the next one December 1, and they have been held regularly. They have lot of interaction with the community because of the nature of their work. DEC released a comprehensive remedy to address the Navy- Grumman plume, and a lot of that work is completed by both parties. DEC is working to develop a community participation working group, and will hold periodic meetings on implementation of both parties. It will be like a one stop shop. This will be potentially early 2022. Mr. Sobolow asked if the RAB members get the information on the Grumman meeting? The Navy provided this information, which they received from NYSDEC, to the RAB via e-mail the week of November 16.

Mr. Sobolow asked if work was completed at the community park? Mr. Pelton explained that this is being completed by Grumman and again invited all to attend December 1 meeting. He noted that a large portion of the work has been completed, and in August 2020 Grumman began operating a thermal remedy to about 100 degrees C to vaporize contaminants. The system was successful, and it operated until August 2021. Grumman is still removing contaminants through SVE system. Additional soil sampling identified additional contamination outside thermal treatment area, which Grumman is delineating and will address.

Mr. Pelton then commented that a lot of work has been done to address this plume, there is still a lot that has to be done. NG operates nine extraction wells on property, about six million gallons per day to prevent contamination from leaving the area and treats it to basically drinking water conditions before it is re-introduced. Grumman and Navy have commitments to implement even more in the future to help address the comprehensive remedy. All parties are attempting to expedite the cleanup and also to contain the plume and prevent it from migrating farther to the south. The agreement with NG is outlined in NYSDEC consent decree, including extraction wells in interior and exterior to help. Navy and Grumman have had a lot of cooperation in the past few years to continue to make progress.

After the RAB, Ms. Lila Factor, of Napoli Shkolnik PLLC Attorneys at Law, submitted the following questions via e-mail:

1. Grumman has entered into a proposed Consent Order with the DEC, which includes money for environmental resource damages and funds for the water districts. Is the Navy negotiating something similar with the State or discussing any other form of compensation? If not, is the Navy negotiating with Grumman to contribute its share?

This question is outside the scope of the Restoration Advisory Board (RAB) meetings.

2. How can I review the testing results (intake and effluent) from RW4 from the time it went online in April 2021 to the present? Are they available online? If not, please send them over in electronic form.

RW4 is part of the GM38 groundwater treatment system. RW4 went online in April 2021; influent and effluent sampling results for RW4 and the GM38 groundwater treatment system will be presented in the next RAB meeting. We are looking at ways to more easily provide data to the public through the Navy's Bethpage website. The website is currently going through an update with the update expected to be completed later this year.

3. The TCE Plume Maps created by the Navy differ from the DEC's map in the December 2019 Amended ROD in that they do not show the plume as crossing the Southern State Parkway. Please explain how you reached different results and whose sampling data is more recent.

Questions about DEC's maps should be directed to DEC. Navy plume maps are developed and updated based on quarterly, semi-annual, and annual sampling events.

4. Two of the slides showed the plume at concentrations greater than 100 µg/L as being reduced to a sliver by 2070, but the speaker said that removing the TCE at lower concentrations will take longer. What is the estimated timeframe for eliminating the plume and reducing all TCE levels to less than 5 µg/L?

The Navy is currently working on plume cleanup projections for the OU2 plume. Once this information is finalized (anticipated for mid 2022), it will be made available to the public.

5. How much TCE is estimated to travel south of the Southern State before the Southern Plume Intercept Treatment System starts operations in 2024?

The Phase III Treatment System and associated recovery wells are placed ahead of the plume. The plume is not expected to reach these recovery wells prior to the system

being operational. In addition, the recovery wells will extract groundwater from south (downgradient) of their location, and have the ability to pull the plume back.

6. How many years ahead do your current cost estimates cover? What is the projected total expenditure for the Navy?

Through FY27, the Navy anticipates spending approximately \$66M. Estimates beyond five years become increasingly speculative the further the costs are projected. With that caveat, broadly speaking, the Navy estimates spending more than \$450M in total.

7. Your presentation did not address radium or PFAS in the groundwater. Have you done any additional sampling after 2018? If yes, please provide the results.

The Preliminary Assessment and Supplemental Investigation of PFAS is currently in process, with final reports estimated for later this year.

8. Is there any pending litigation between the Navy and Northrop Grumman relating to this site? If yes, please provide the case number and court name.

This question is outside the scope of the RAB meetings.

CLOSING REMARKS

Mr. Sokolowski thanked everyone for attendance and participation in the meeting. The next RAB meeting will be held in April 2022, hopefully in person. Ms. Boltz then reviewed ways in which questions can be submitted post RAB and provided the Navy website and public affairs e-mail address. The meeting was the adjourned.

Appendix A
Attendance Sheet- November 16, 2021 RAB Meeting
Naval Weapons Industrial Resrve Plant Bethapge

	Name
1	Aaron
2	Arianne Reyes
3	Beau Benfield
4	Bill Hughes
5	Bill Pavone
6	Call-in User_12 (516249****)
7	Call-in User_14 (516220****)
8	Call-in User_2 (518396****)
9	Call-in User_5 (516351****)
10	Call-in User_7 (516754****)
11	Call-in User_8 (516622****)
12	Cindy Rogers
13	Dave
14	David Brayack
15	David Sobolow
16	David Todd - NAVFAC ML PAO
17	Donald Hesler
18	Edward Olmstead
19	Effie Ardizzone
20	Elayne
21	Ethan Irwin
22	Frank Koch
23	Gary
24	Jacqueline Boltz
25	Jacquelyn Nealon
26	James Sullivan
27	Jason Pelton NYSDEC
28	Joanne Foley
29	Julie Reuther
30	Lauren Donston
31	Lilia Factor
32	Mary Anne Taylor
33	Matthew Russo, TOB-DPW
34	Meghan Smith
35	Melissa Forrest
36	Mike Weber
37	Richard Castle
38	Rose Walker
39	Sandra D'Arcangelo
40	Scott Sokolowski
41	Stan Carey
42	Stephen Matney, AGVIQ
43	Sunny Xu
44	Vin Varricchio
45	William Yeung



Agenda for Restoration Advisory Board Naval Weapons Industrial Reserve Plant Bethpage

Date: November 16, 2021

By Internet: <https://tinyurl.com/16NOVRAB>; meeting password: RABNOV16

By Telephone: +1-408-418-9388, Password: 72266816

Access Code: 132 403 3727

Time: 7:00 PM

Location: Virtual

RAB Presentations: 7:00 PM to approximately

- Webinar Information and Ground Rules – Tetra Tech (Jackie Boltz)
- Introduction of RAB members, regulators and presentations – Navy (Scott Sokolowski) and Community (David Sobolow)
 - Review and approval of previous RAB meeting minutes (November 2020 and April 2021)
- NWIRP Bethpage Program Overview- Navy (Scott Sokolowski)
 - Site 1 General Update and Tree Planting
 - Site 4 Biosparge System Update
 - Explanation of Significant Differences Update
 - Phase I AOP and RW4 Operation
 - Upcoming Projects and Property Access
- Groundwater Monitoring Results- Tetra Tech (Dave Brayack)
- RE 137 Interim Action Update- Tetra Tech (Dave Brayack)
- Phase II Remedial Action- Agviq (Steve Matney)
- Phase III (RW8 and RW9) – Southern Plume Intercept Treatment System Update – Tetra Tech (Dave Brayack)

RAB questions following presentations: 8:30 PM to approximately 9:30 PM

- Questions – Community Co-Chair (David Sobolow)
- Closing remarks – Navy (Scott Sokolowski)

Copies of information can be found at the document repository located at the Bethpage Public Library, 47 Powell Avenue, Bethpage NY 11714 (516-931-9307) or online at

<https://go.usa.gov/DyXF>

Definitions and Clarification of Terms, Acronyms and Abbreviations For the Bethpage Restoration Advisory Board (RAB)

- **Basic:**
 - Aquifer
 - an underground layer of water-bearing permeable rock or unconsolidated materials
 - BGS - Below Ground Surface
 - BWD Plants- Bethpage Water District Plants
 - Capture Zone
 - Area of water whose flow direction is influenced by pumping
 - Down gradient
 - The direction of groundwater flow
 - Effluent
 - Is an outflow of water from a treatment source
 - Free Product
 - Substance (usually oil or gasoline) that exists in its own state-it is not dissolved in water.
 - gpm- gallons per minute
 - Ground Water
 - Water flows through open pore spaces of soil
 - HDPE - high density polyethylene (HDPE) pipe with
 - Hot spot
 - Area where trichloroethylene is at a concentration greater than 1000 parts per billion
 - MWD- Massapequa Water District
 - NC- Nassau County
 - NG- Northrop Grumman
 - No. 6 Fuel Oil- tar
 - NWIRP- Naval Weapons Industrial Reserve Plant
 - NYAW- New York American Water
 - OU- Operable Unit
 - PAH- polynuclear aromatic hydrocarbons
 - PCB- Polychlorinated Biphenols (used as transformer cooling fluid)
 - Plume
 - An area that impacts from chemicals are detected in
 - Raritan Clay Layer
 - A geologic horizon - Clay that is approximately 800-100 feet below ground surface— accepted to be the bottom of the Magothy aquifer
 - RCP – reinforced concrete pipe
 - Soil Vapors
 - Gases contained in the pore spaces of soil
 - SFWD- South Farmingdale Water District
 - Trichloroethylene (TCE)-
 - Volatile organic compound of concern (used as a degreaser in manufacturing)
 - VOC--Volatile Organic Compounds:
 - Chlorinated solvents (typically used as degreasers in manufacturing)

- **Data Gathering:**

- Delineate- define boundaries
- Gauging- measurement of ground water levels from top of ground surface
- In-situ – in place
- Monitoring Well- (typically 2-6 inches in diameter) a well used to provide a “snapshot” of water quality when sampled
- ppm – parts per million
- VPB- Vertical Profile Boring
- µg/L- micrograms per liter

- **Treatment Technologies:**

- Advanced Oxidation Process (AOP)
 - AOP system is based on the combination of hydrogen peroxide and ultraviolet (UV) light, which forms a very local and short-lived oxidizer (hydrogen radical)
- Air Stripping
 - Removal of dissolved volatile organic compounds from water by transferring it into air
- Biodegradation
 - Reduce a chemical by changing conditions so that bacteria can break down the chemical
- Biosparging
 - Removal of chemicals by breaking them down with bacteria
- Equalization Tank
 - Tank for mixing
- EX- NYSDEC Mass flux extraction wells
- GAC- Granular Activated Carbon
- GCL – geosynthetic clay liner
- HC- NYSDEC Hydraulic Containment
- Land Use Controls
 - Action that restricts what land can be used for
- Liquid Phase Granular Activated Carbon Polishing
 - Removal of remnants of a volatile chemical by passing liquid through carbon; used to remove trichloroethylene
- Operations, Monitoring and Maintenance (OM&M)
- On-site Containment Treatment System (ONCT)
 - Series of wells that remove and treat groundwater at the southern edge of the former Northrop Grumman property
- Recharge basin
 - Sandy basin that receives storm water and allows water to filter down into the ground
- Recovery Well (RW)
 - (Typically larger diameter 12 to 36 inches) a well used to recover oil or water containing chemicals
- Steam Injection/Free Product Recovery
 - Heating of oil that has a tar like consistency with steam to make it flowable (syrup like consistency) so that it may be removed
- SVECS—Soil Vapor Extraction Containment System
 - Vacuum for volatile chemicals trapped in the air between soil particles; used to remove trichloroethylene
- Vapor Phase treatment-
 - Removal of a chemical from gas; used to remove trichloroethylene from air vapor

- **Regulatory:**

- AROD- Amended Record of Decision
- Compliance sampling- collection of samples to demonstrate that chemicals are below regulatory levels
- CCR- Construction Completion Report
- CERCLA- **Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)** – the legal mechanism for cleaning up inactive hazardous waste sites at DOD (Department of Defense) facilities, this is the defining regulation for the Navy's Environmental Restoration (ER) Program at NWIRP Bethpage under NYSDEC authority.
- ESD- Explanation of Significant Differences
- Feasibility Study- collection of data used to determine if a remedy will work
- Five-Year Review (FYR)- required by CERCLA and is prepared in accordance with USEPA guidance. To evaluate the effectiveness of the remedies to determine if they continue to protect human health and the environment in accordance with the requirements set forth in the Record of Decision (ROD).
- NYSDEC- New York State Department of Environmental Conservation(NYSDEC)
provides regulatory review and approval of Navy actions at NWIRP Bethpage
- NYSDOH- **New York State Department of Health (NYSDOH)** assists NYSDEC.
- PDI- Pre-Design Investigation
- Proposed Plan- Plan of action that is sent to the state for approval prior to the Final Record of Decision
- RCRA- **Resource Conservation and Recovery Act (RCRA) Corrective Action** – a statutorily required cleanup program, similar to CERCLA, that addresses active solid waste management units and contaminated media as a condition of RCRA permits - NWIRP Bethpage has a RCRA Permit with NYSDEC
- ROD –Record of Decision
- SR- selected remedy
- USEPA- **United States Environmental Protection Agency (USEPA)** Provides federal review of the Navy actions.



Department of Navy Naval Weapons Industrial Reserve Plant Restoration Advisory Board Meeting

NWIRP Bethpage Program Overview

Presented by:
Scott Sokolowski, Remedial Project Manager
NAVFAC Mid-Atlantic
16 November 2021

New Remedial Project Manager Introduction



- Jim Watts-Gravette took a new job with the Army Corps of Engineers in New Mexico
- Scott Sokolowski assumed the RPM role in October.
 - With NAVFAC Midlant since 2020
 - Been involved with Bethpage in various aspects since 2018
 - Geologist in the field of water resources and environmental remediation since 2005
 - Experience in private consulting and as an Environmental Project Manager for state superfund sites for the State of Montana
 - Worked on environmental projects in 12 different states from east coast to west coast
 - Served in the U.S. Army for over 9 years, enlisting in 1995 and separating from the Army as a Captain in 2005

Presentation Topics – NWIRP Bethpage Program Overview



- Site 1 General Update and Tree Planting
- Site 4 Biosparge System
- Operable Unit 2 (Offsite Groundwater) Explanation of Significant Differences Update
- Phase I Advanced Oxidation Process (1,4 Dioxane Treatment) and Remedial Well 4 Operation Update
- Upcoming Remedial Construction Projects, Data Collection, and Property Access

Site 1

Slide 1/2



- General Update

- Remedial Action for Contaminated Soil is in its post construction Operation & Maintenance phase with quarterly inspections and site maintenance until February 2023
- Soil Vapor Extraction System Expansion project will mobilize in late November 2021 with completion in February 2022

Site 1

Slide 2/2



- Tree Planting – Eastern Boundary Parallel to 11th Street
 - Previously planted trees had died due to poor drainage and large volumes of rain
 - Sixteen new evergreen trees were planted on top of the berm between established deciduous trees
 - In spring 2022 we will reevaluate if additional trees are needed to provide a complete screen along the eastern boundary



Site 4 Biosparge System

- A steam injection pilot study was run from April 2019 to May 2020
- An evaluation of the steam injection system was completed by the Navy in June 2020 and it was determined that: 1) the system was no longer recovering free product; 2) that it should be shut down
- The steam injection system was converted to the biosparge system and has been operating since July 2021
- Biosparging consists of injecting air or oxygen into the subsurface to increase the dissolved oxygen concentration in groundwater to promote aerobic biological degradation of the organic contaminant.
- The system will operate for the next four years.

Operable Unit 2 (Offsite Groundwater) Explanation of Significant Differences Update



- OU2 ESD was finalized and signed on 20 September 2021
- A Public Notice was published in five newspapers in the Bethpage area with a hard copy provided to Bethpage Public Library
- The ESD specifically identifies the following three additions to the ROD for OU2:
 - 1) Extension of hotspot treatment systems to allow capture and treatment of lower concentrations of contamination in groundwater;
 - 2) Capture of the OU2 plume near its leading edge; and
 - 3) Addition of 1,4-Dioxane as a chemical of concern and associated treatment

Drilling Program

Shallow and Intermediate Data Gaps

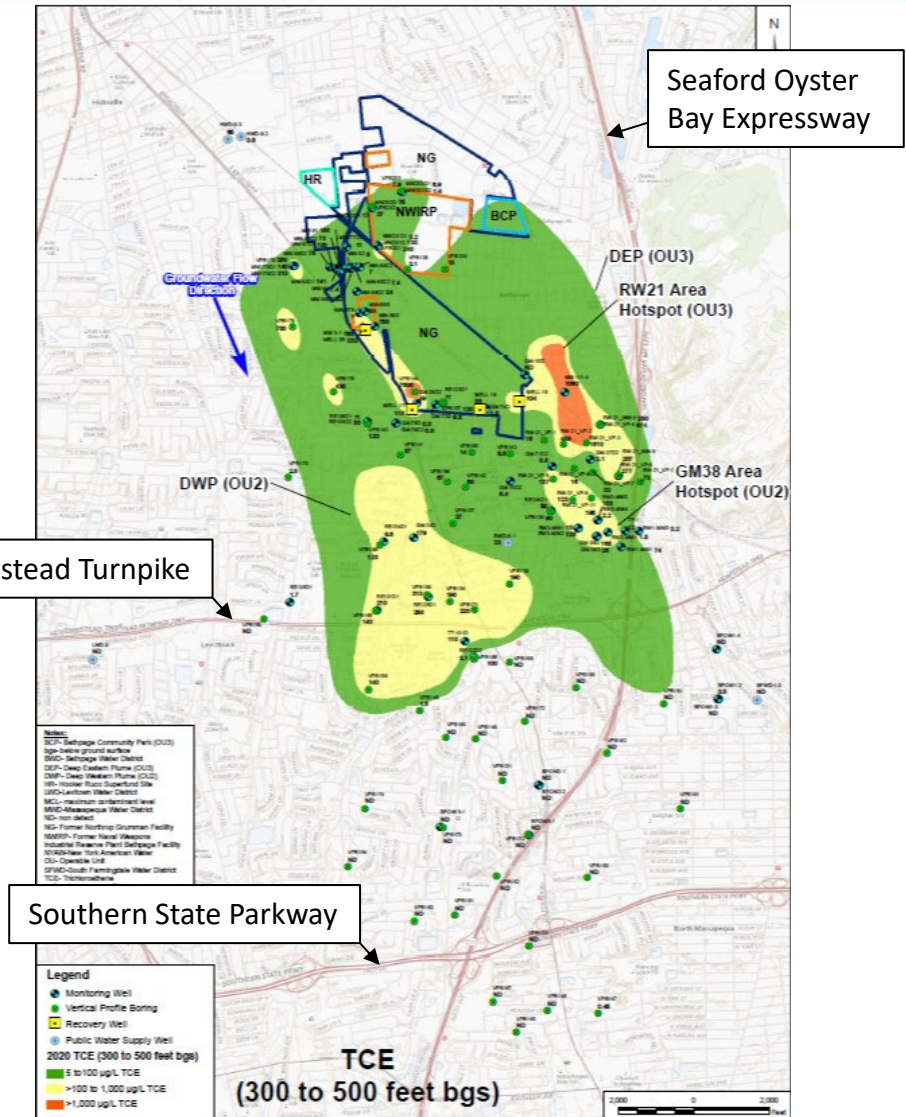
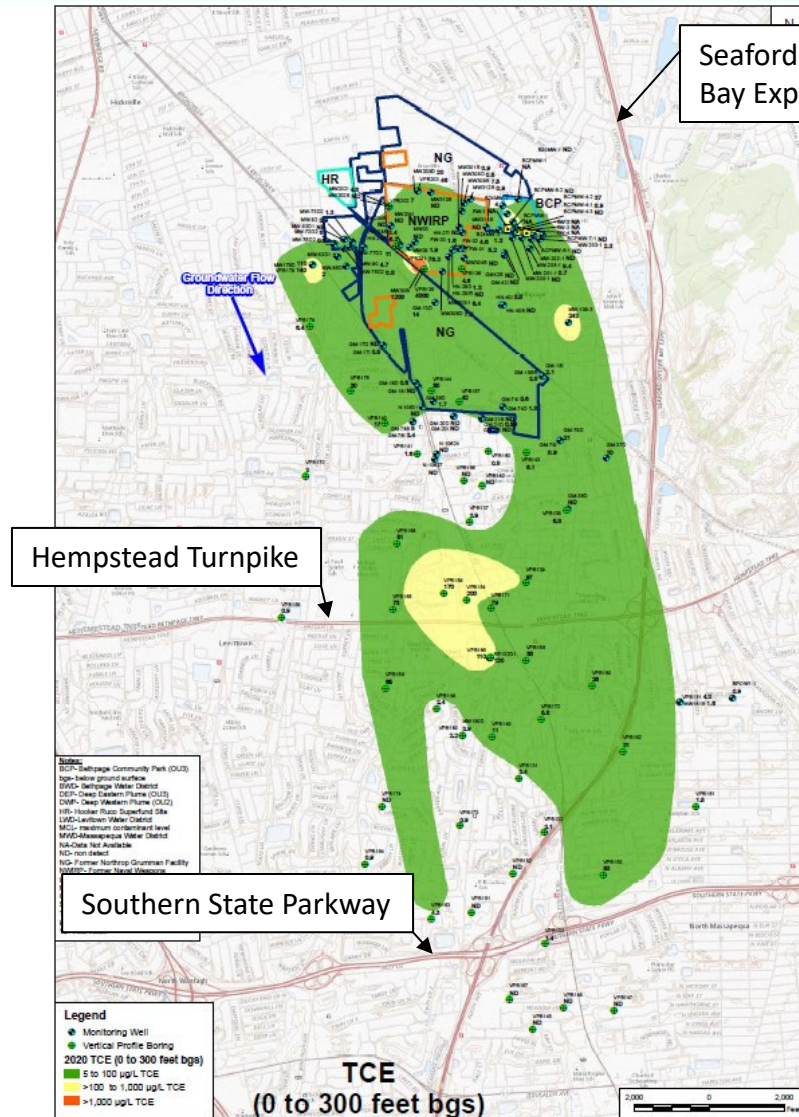


- To date, Navy's vertical profile boring and monitoring well installation program has focused on determining the extent of the deeper areas of OU2 plume
- Using data from monitoring well samples of groundwater, the plume is 'mapped' at four separate intervals:
 - ~50 to 300 feet below ground surface (termed shallow interval)
 - 300 to 500 feet below ground surface (intermediate interval)
 - 500 to 700 feet below ground surface (deep interval)
 - greater than 700 ft. below ground surface (deepest interval)
- Navy will undertake a drilling program to fill the data gaps in the shallow and intermediate intervals of the plume
- This data will also be used to determine locations for two recovery wells, RW10 and RW11, for Phase III Plant 2.

Navy-Northrop Grumman TCE Plume Maps

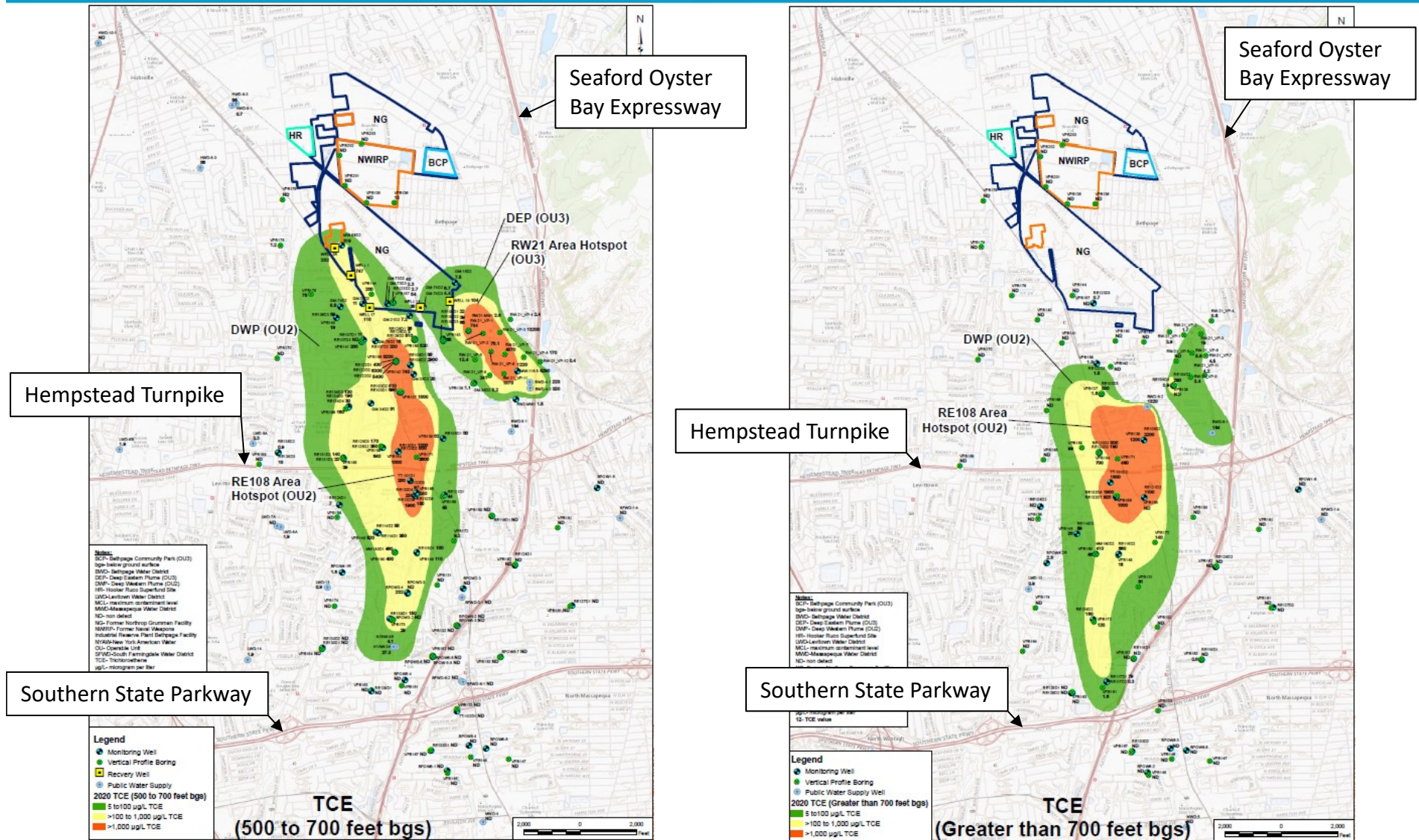
Shallow

Intermediate

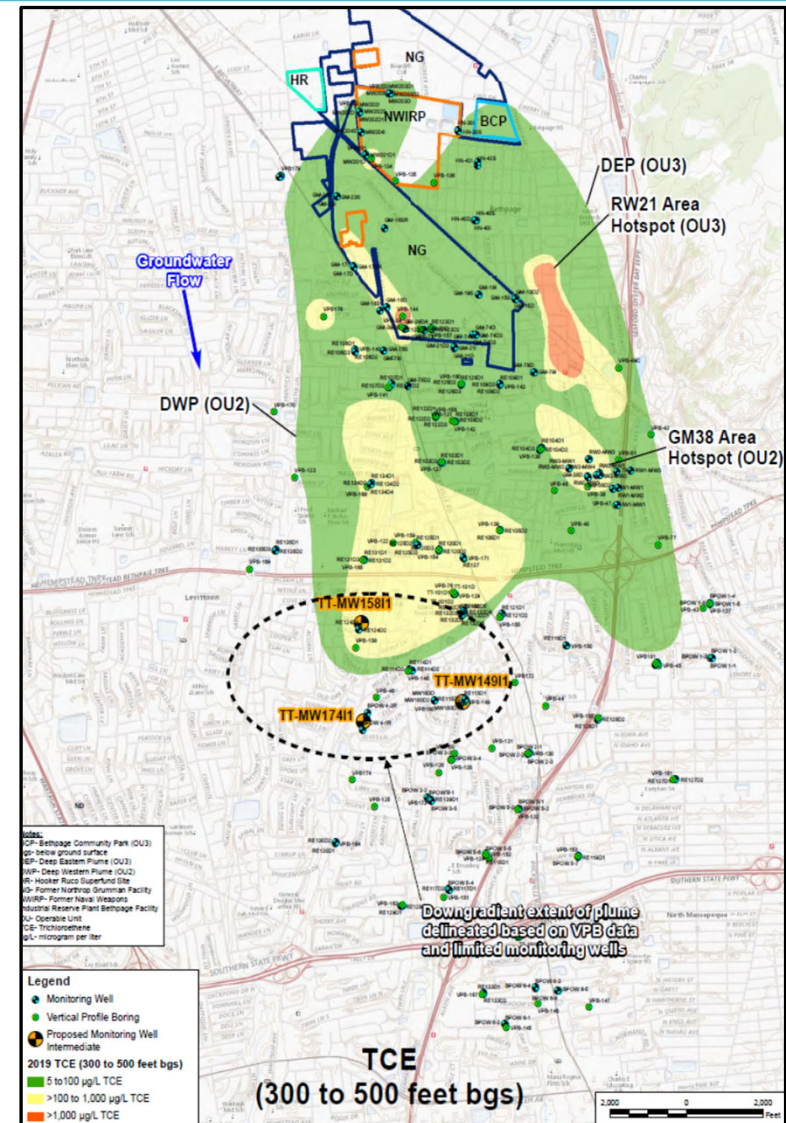
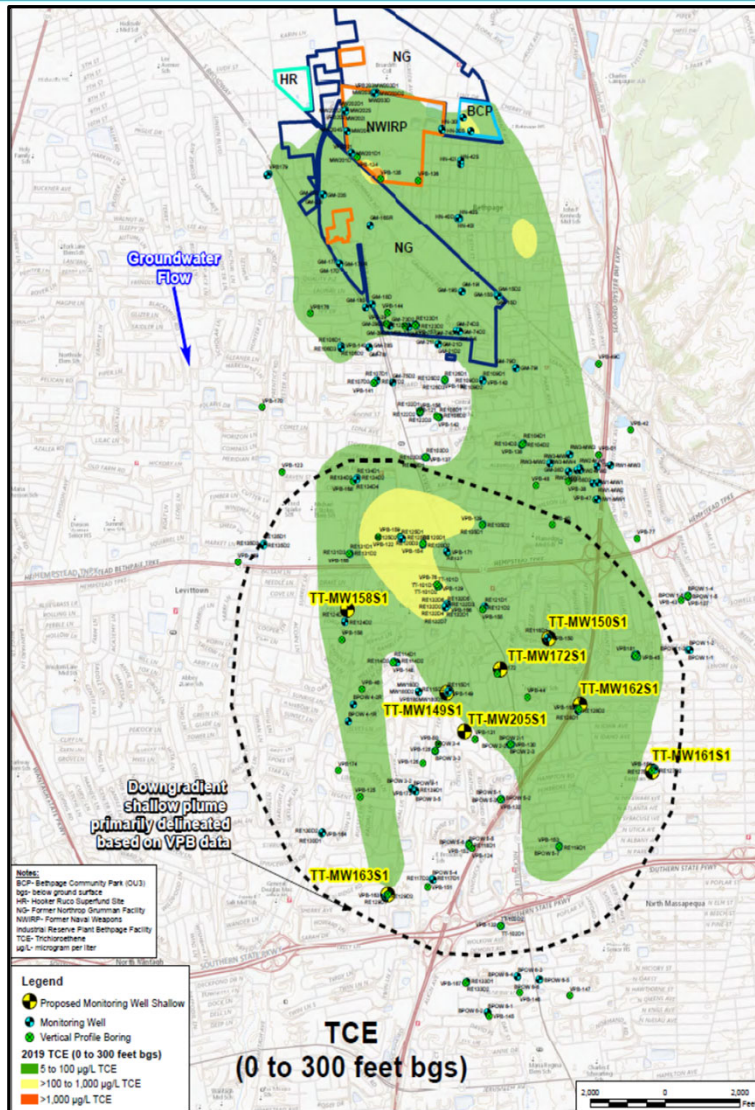


Navy-Northrop Grumman TCE Plume Maps

Deep



Planned Shallow and Intermediate Data Gap Wells



Phase I – RE108 Area Hotspot AOP (1,4 Dioxane Treatment) and RW4 Operation



- The RW4 pipeline to the GM38 groundwater treatment plant was completed summer 2021.
- The advanced oxidation process unit, AOP, started operation in April 2021
- The GM38 groundwater treatment plant is operating as expected, water testing of the system is taking place biweekly and 1,4 dioxane and TCE are non-detect in the effluent



Upcoming Remedial Construction Projects, Data Collection, and Property Access



- Remedial Construction Projects
 - Recovery Wells 6a and 6b were completed in September 2021
 - Recovery Wells 7 and 8 will be completed early 2022
 - RE137 temporary treatment system (near the on-ramp from Hicksville Road onto Hempstead Turnpike heading south) online in December 2021
 - Phase II Groundwater Treatment Plant construction will be starting soon and is projected to be commissioned by December 2022
- Data Collection
 - Regular groundwater monitoring activities
 - Data gap study projected to start spring 2022
- Property Access
 - Access to Town of Oyster Bay and Town of Hempstead properties was sought in early 2021 but the Navy was unable to obtain access
 - The Navy is exploring its options under CERCLA to gain access to keep all construction projects on schedule



NEXT: Groundwater Monitoring Results Dave Brayack, Tetra Tech



Department of Navy Naval Weapons Industrial Reserve Plant Restoration Advisory Board Meeting

Operable Unit 2 Groundwater Monitoring and RE137 Interim Action Update

Presented by:
David Brayack, Project Manager
Tetra Tech
16 Nov 2021

Operable Unit 2 Groundwater Monitoring, Treatment, and Interim Action Update Outline

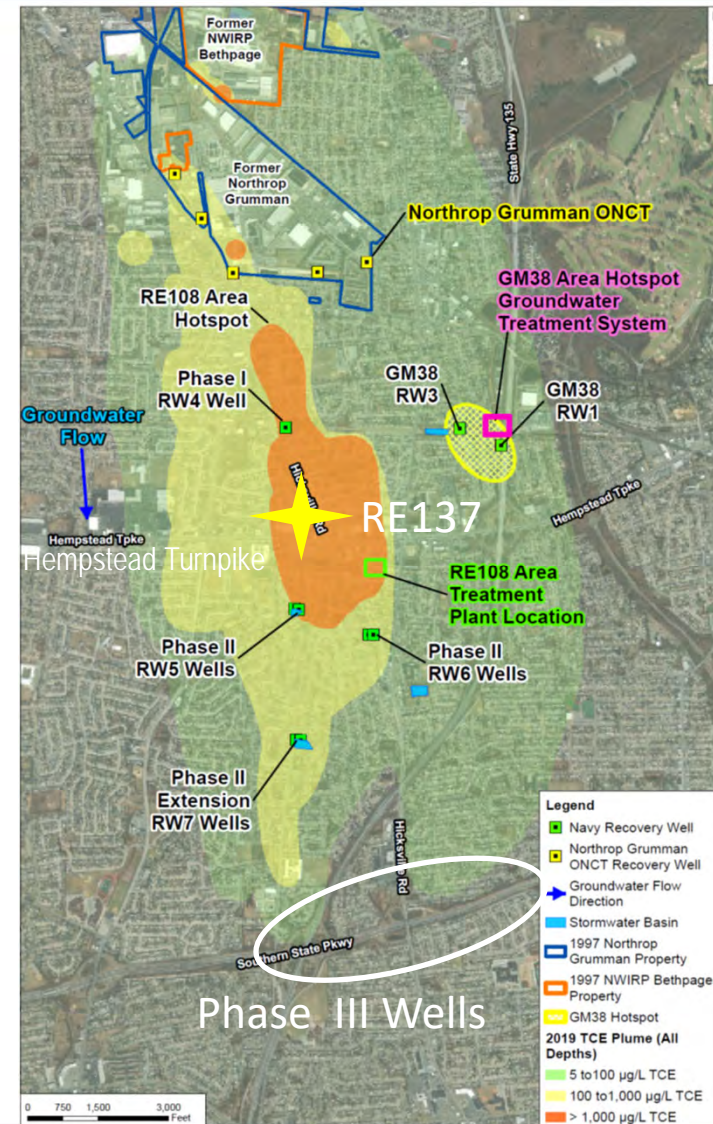


- OU2 Groundwater Remediation Overview
- OU2 Groundwater Monitoring
- OU2 Groundwater Fate and Transport Modeling
- RE137 Interim Action Update



OU 2 Groundwater Remediation Overview

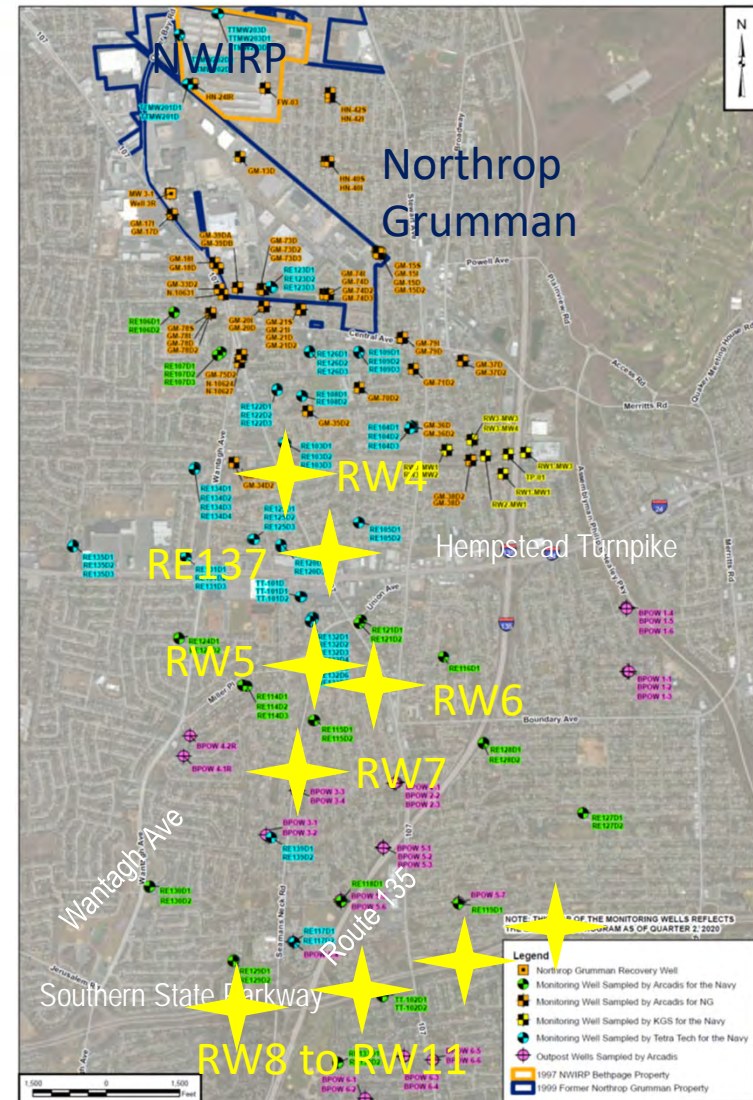
- Groundwater monitoring is used to track OU2 plume migration, attenuation, and cleanup
- Some monitoring wells are located outside of OU2 plume to evaluate potential impacts from other plumes in the area, in particular along the western edge
- Groundwater flow is the south southeast
- Northrop Grumman Onsite Containment System operating since 1998
- Navy GM38 Area Hotspot Treatment System operating since 2009
- Navy Phase I Recovery Well RW4 started operation in April 2021
- Navy RE137 Interim Treatment System is under construction
- Navy Phase II and Phase III systems are under construction





OU 2 Groundwater Monitoring Program

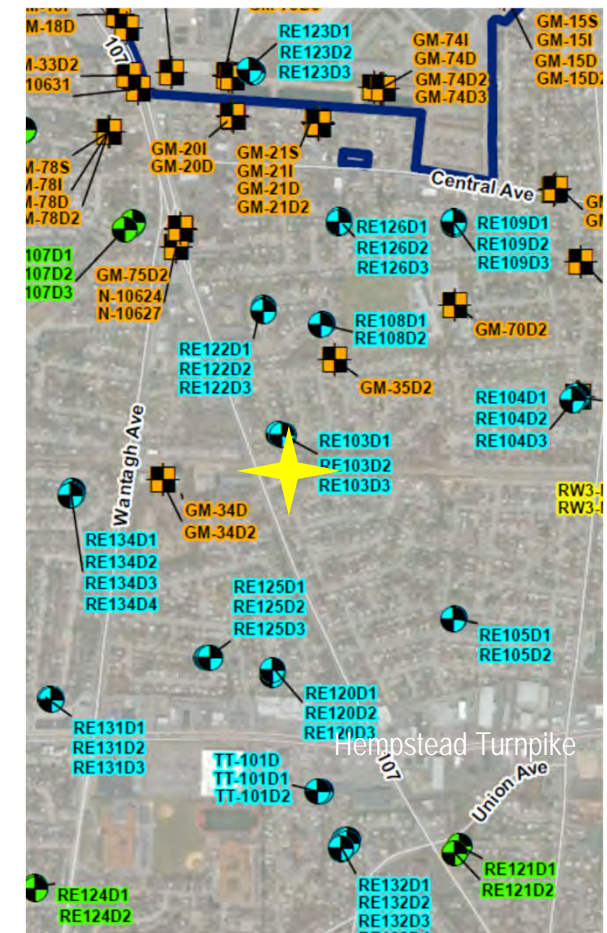
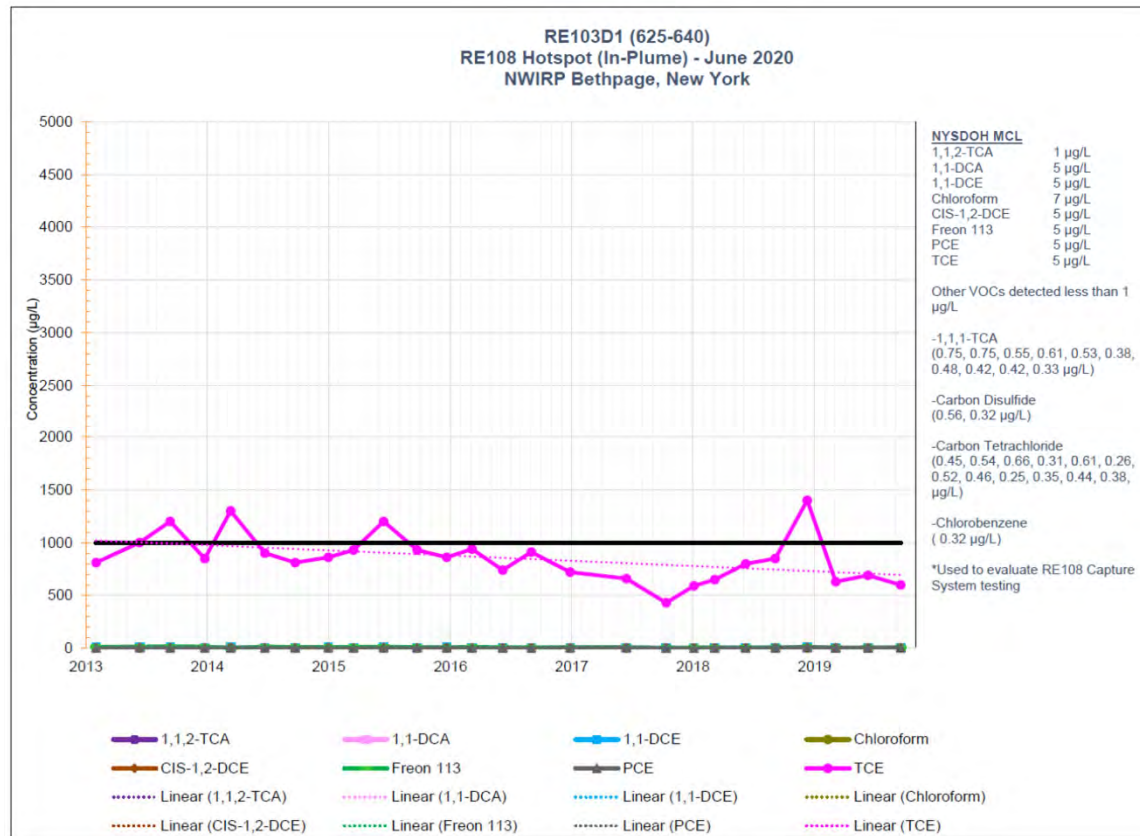
- Groundwater samples from approximately 180 wells are collected on a quarterly, semi-annual, or annual basis and analyzed for Volatile Organic Compounds (VOC) and 1,4-dioxane
- Navy is optimizing this program and will continue to collect data that is needed and modify sampling frequency as appropriate
- New monitoring wells are continuing to be added as needed:
 - Shallow groundwater (200 to 300 feet below ground surface)
 - Near recovery wells to support well capture zone analysis





OU 2 Groundwater Monitoring – Recovery Wells RW4

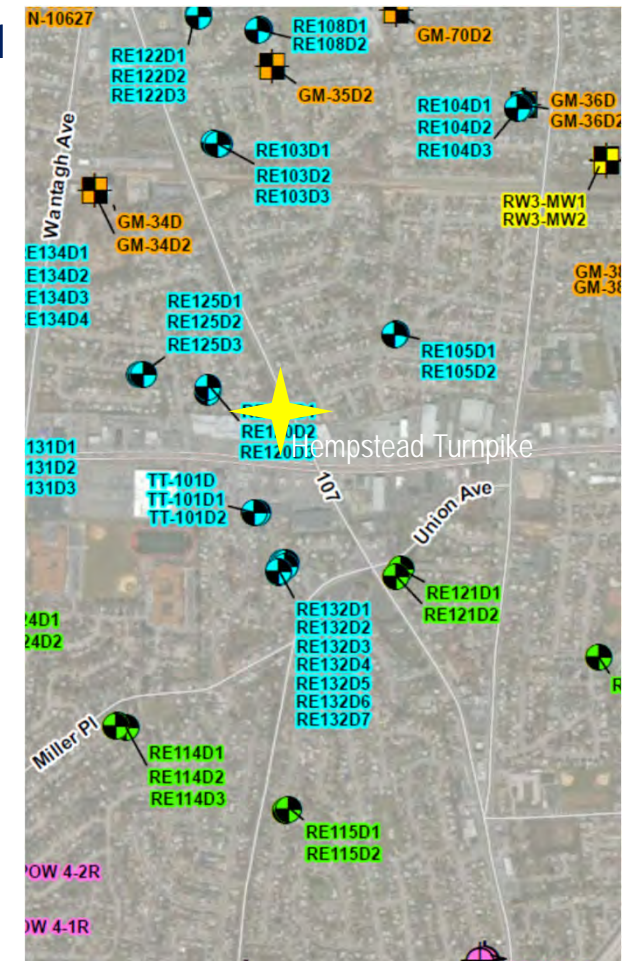
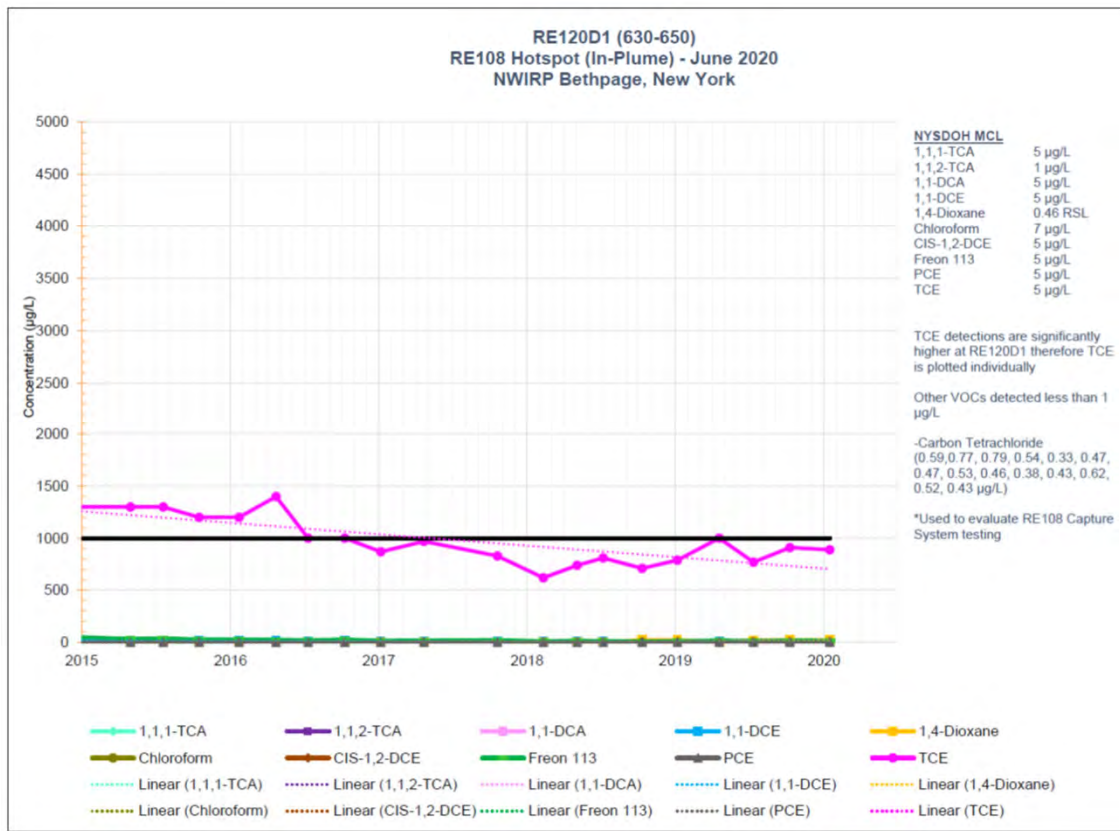
- Phase I Recovery Well RW4 is targeting groundwater near monitoring well RE103
- Note Trichloroethene (TCE) concentrations near 1,000 micrograms per liter (ug/L)
- Well and pipeline are installed and started operation in 2021





OU 2 Groundwater Monitoring – Recovery Well RE137

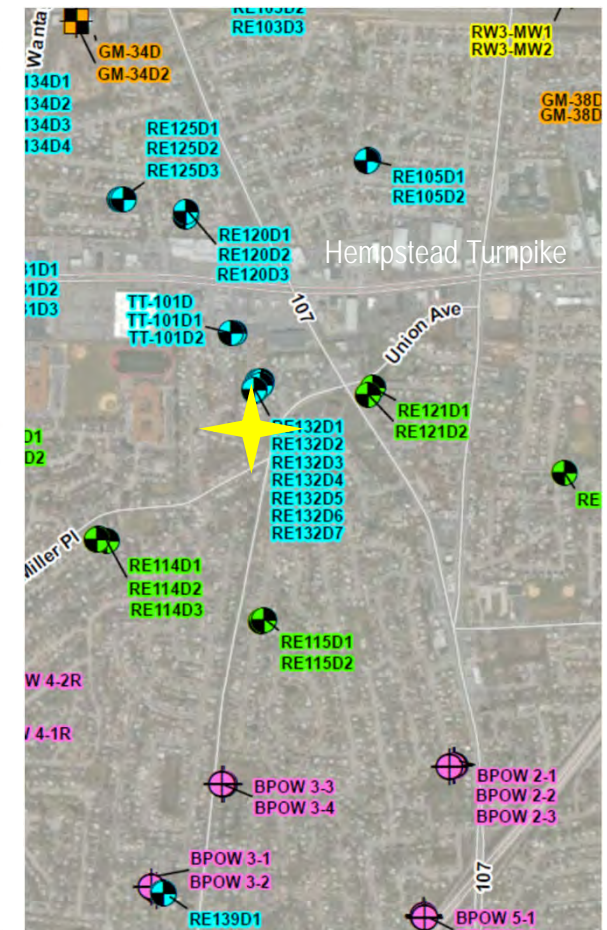
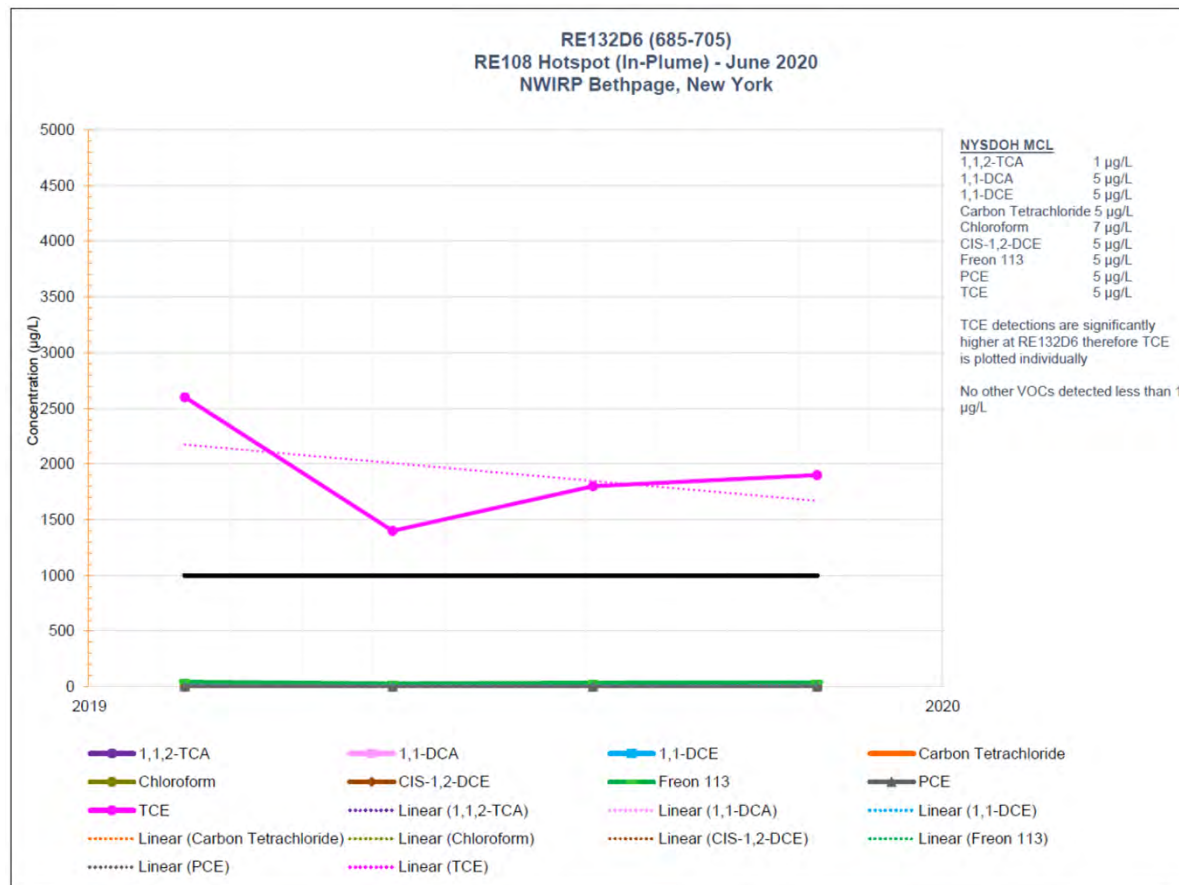
- Interim Treatment Recovery Well RE137 is targeting groundwater near monitoring well RE103
- Pilot testing is being conducted to determine potential benefits of groundwater extraction
- Well is installed and expected to be operating by the end of 2021





OU 2 Groundwater Monitoring – Recovery Well RW5

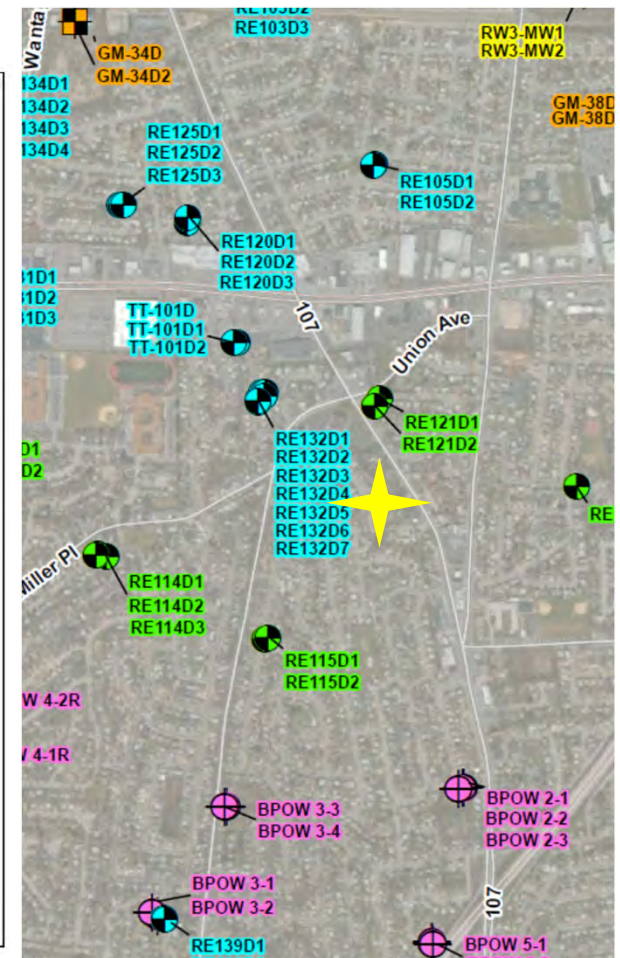
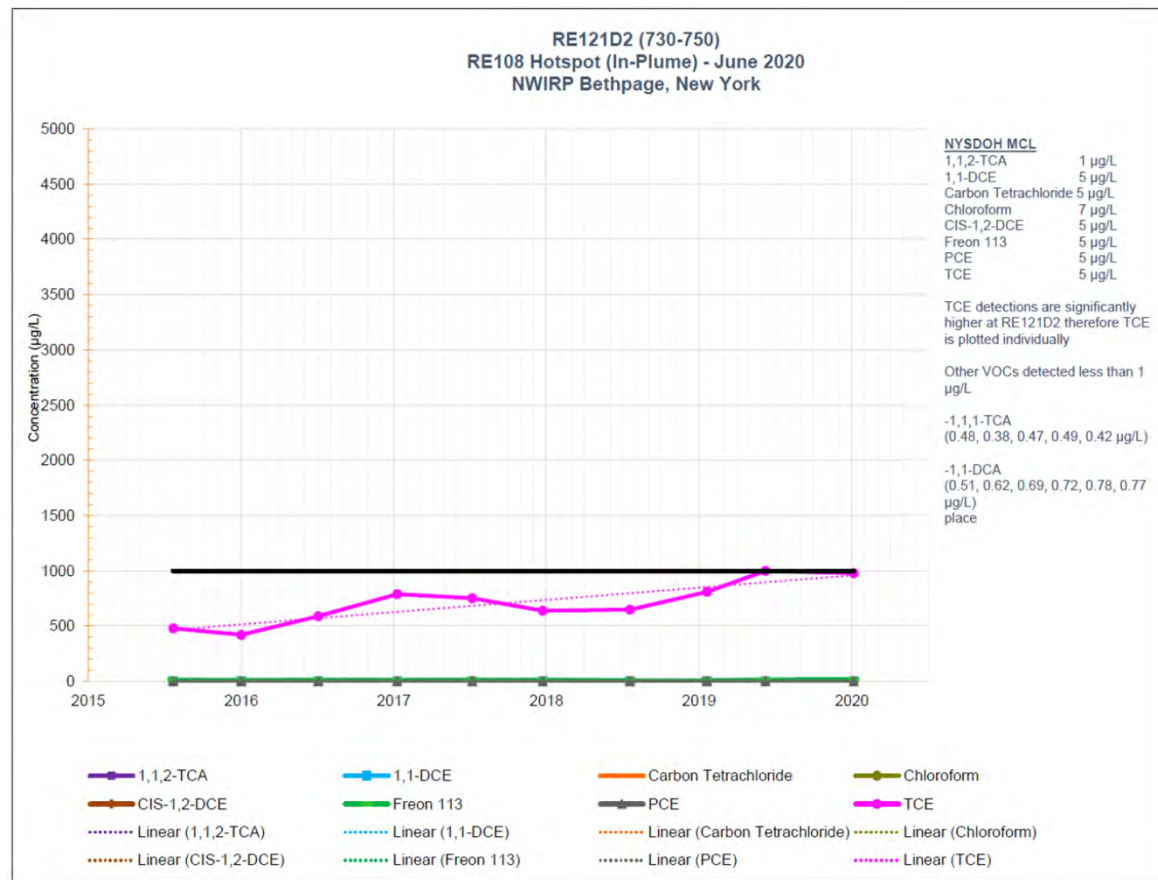
- Recovery Well RW5 is targeting groundwater near monitoring well RE132
- Well is planned for installation and operation in 2022





OU 2 Groundwater Monitoring – Recovery Well RW6

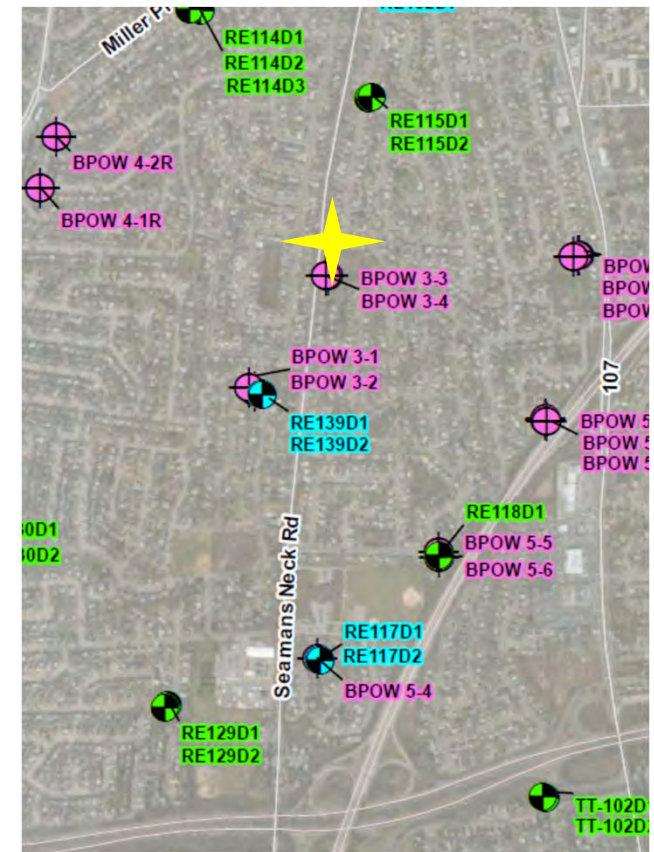
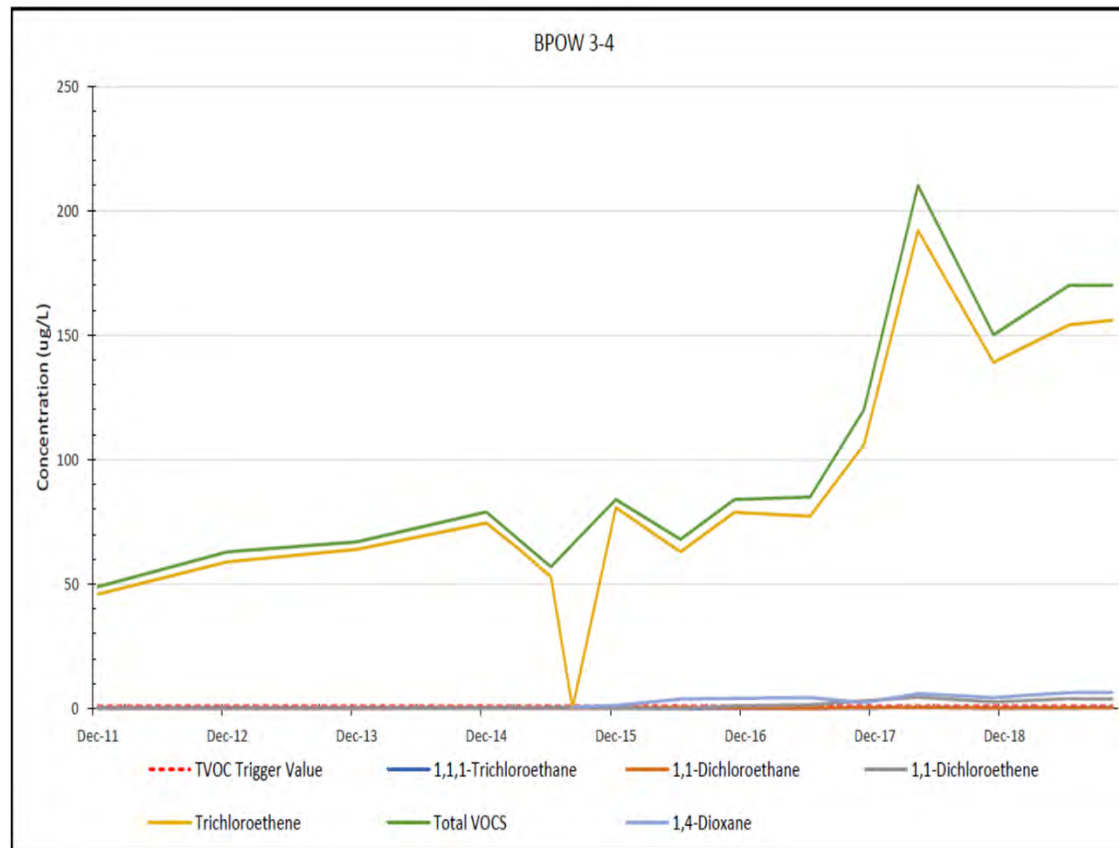
- Recovery Well RW6 is targeting groundwater near monitoring well RE121
- Increase TCE trend is evidence of plume moving into this area
- Well is installed and planned for operation in 2022





OU 2 Groundwater Monitoring – Recovery Well RW7

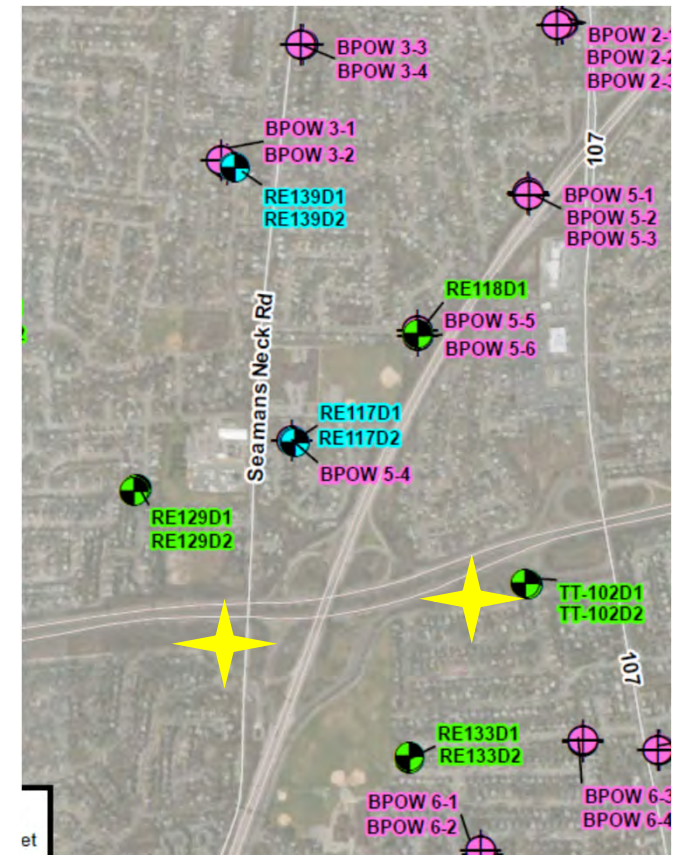
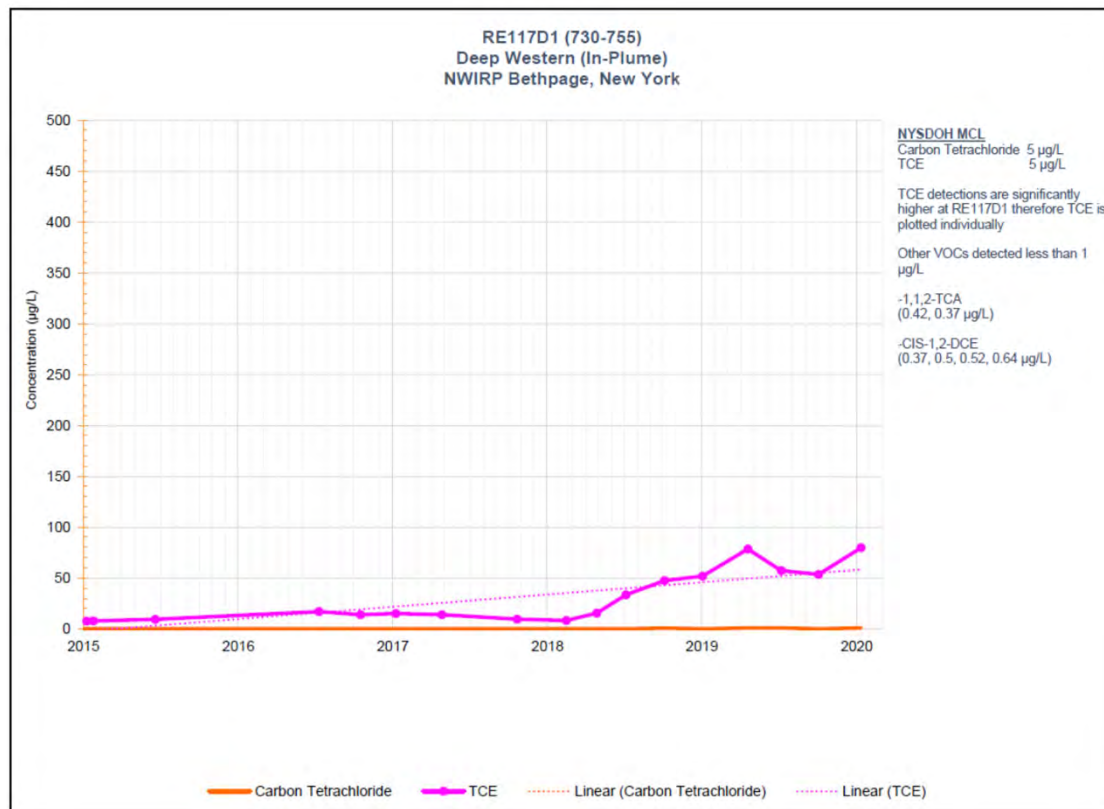
- Recovery Well RW7 is targeting groundwater near monitoring well BPOW 3-4
- Note increasing trend – Led to the Phase II Extension
- Well is being installed in late 2021/early 2022 and be in operation in 2022





OU 2 Groundwater Monitoring – Recovery Well RW8 and RW9

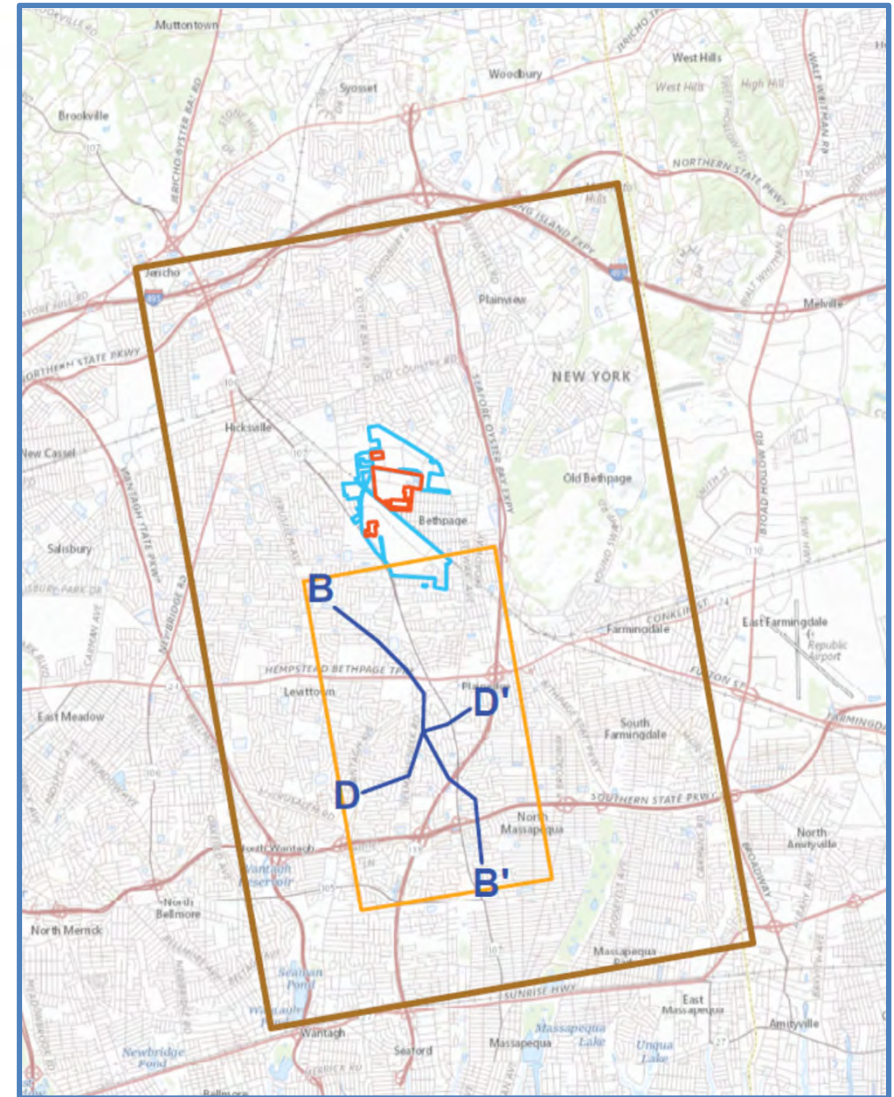
- Phase III Recovery Wells RW8 and RW9 are targeting groundwater near monitoring well RE117
- Note increasing trend – Led to the Phase III recovery wells
- Wells are to be installed in 2022 and be operation in 2024





OU2 Groundwater Fate and Transport Modeling

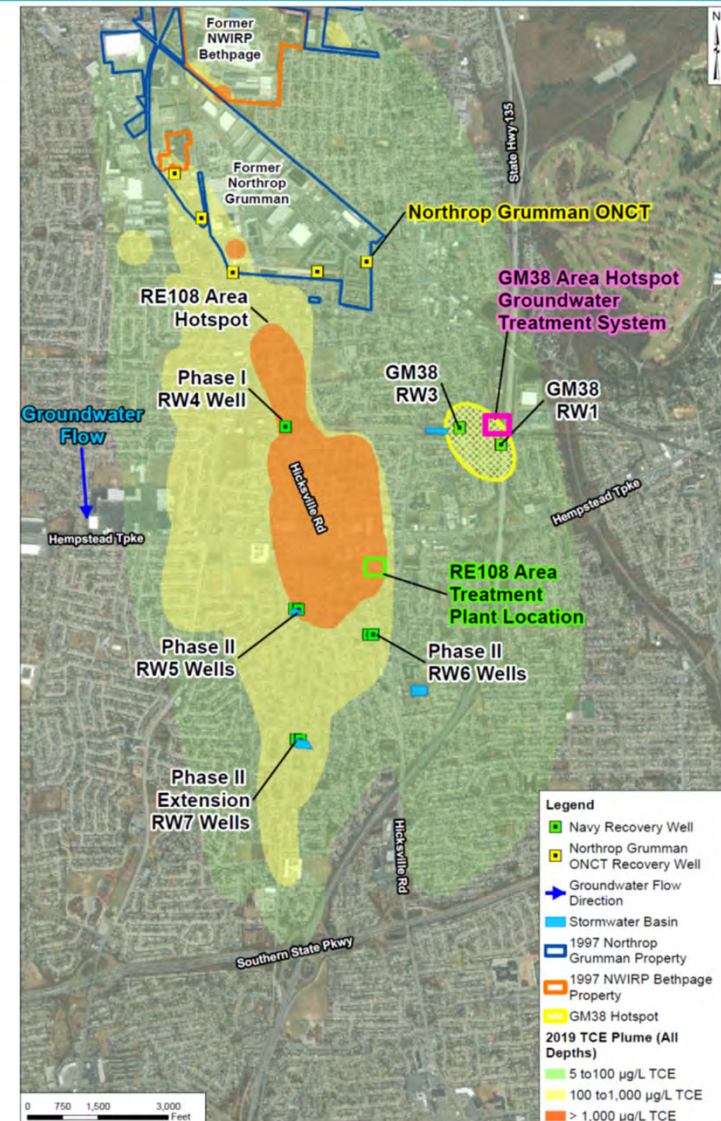
- Navy has constructed a groundwater flow model to use as a tool to understand and predict the OU2 plume behavior
- Primary goals are to support the design and evaluate the effectiveness of Navy OU2 groundwater remediation systems.
- Model will also be used to provide guidance on any operation changes that may be required over time, including:
 - Pumping rates in individual wells
 - Need for new wells
- Model is approximately 42 square miles and 2 million cells.
- Note that the model is rotated 10 degrees to match groundwater flow to the south southeast





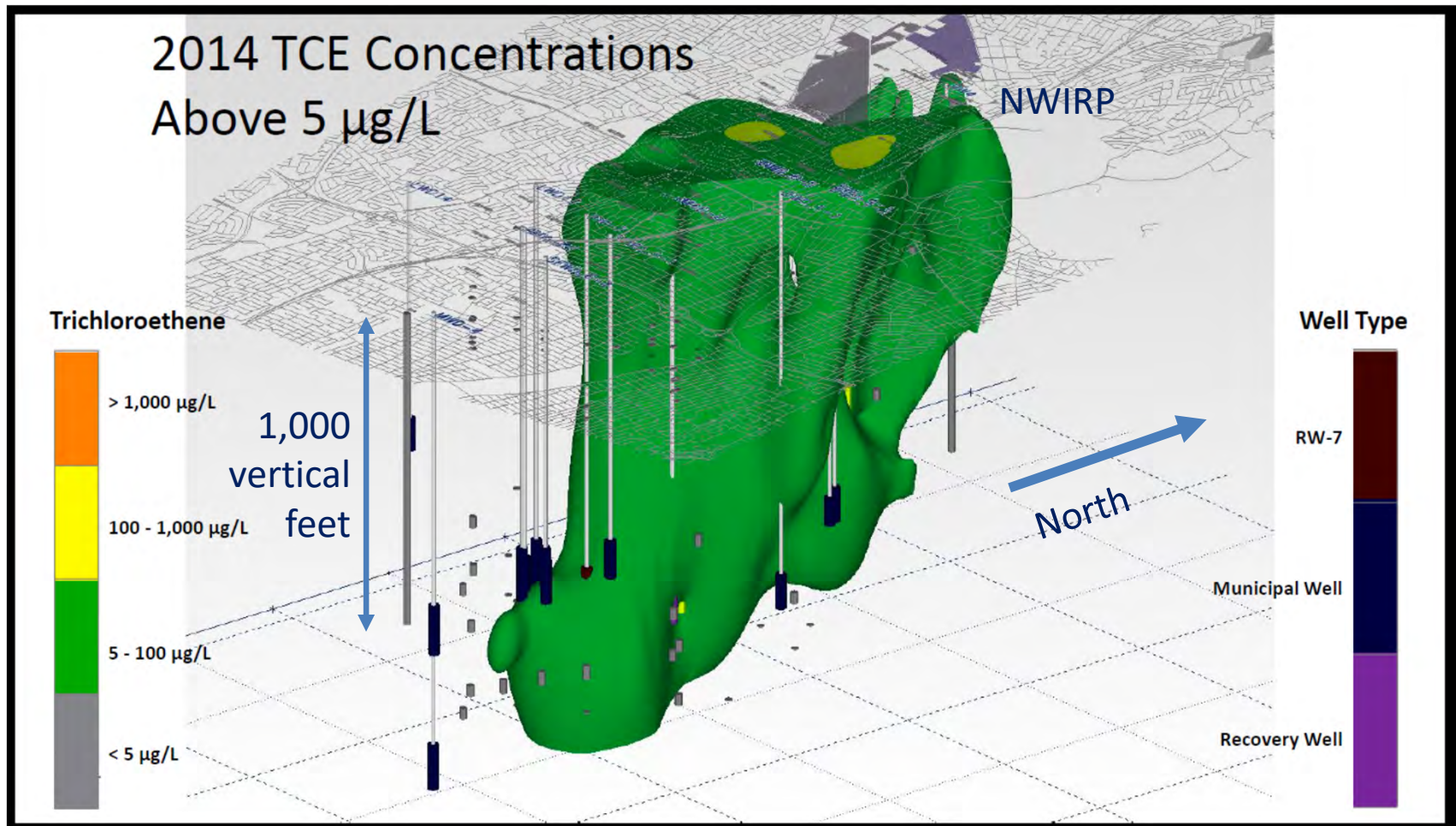
OU2 Groundwater Fate and Transport Modeling

- Plume boundaries are shown using trichloroethene (TCE) as:
 - Green - 5 to 100 micrograms per liter (ug/L)
 - Yellow - 100 to 1,000 ug/L
 - Orange - greater than 1,000 ug/L
- Plumes are estimated using groundwater data from monitoring wells and vertical profile borings
- Plume shown may include groundwater contamination not associated with the OU2 Plume
- Three dimensional plumes are being developed to aid to remedial decisions



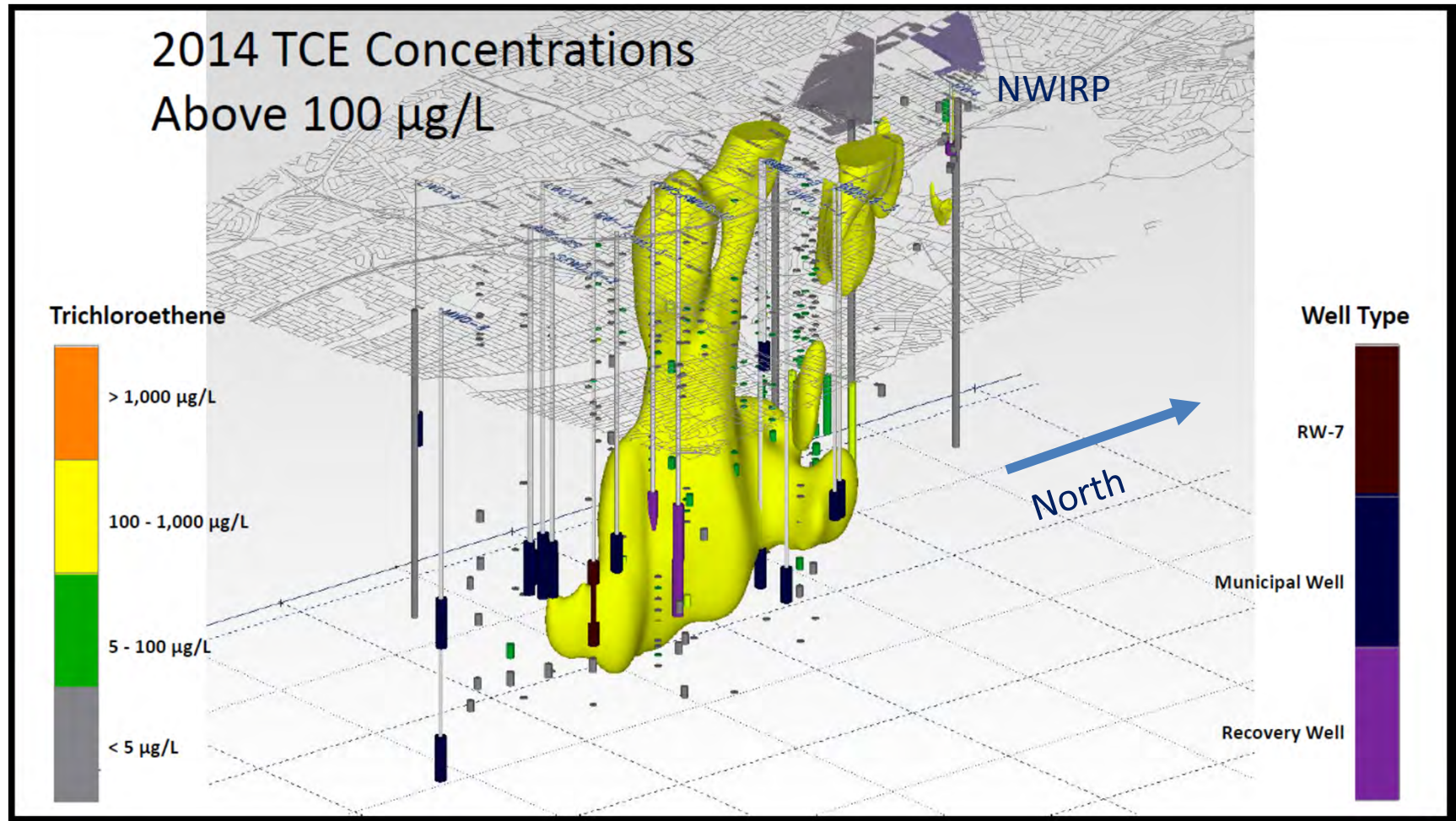


OU2 Groundwater Fate and Transport Modeling – 3D TCE Plume



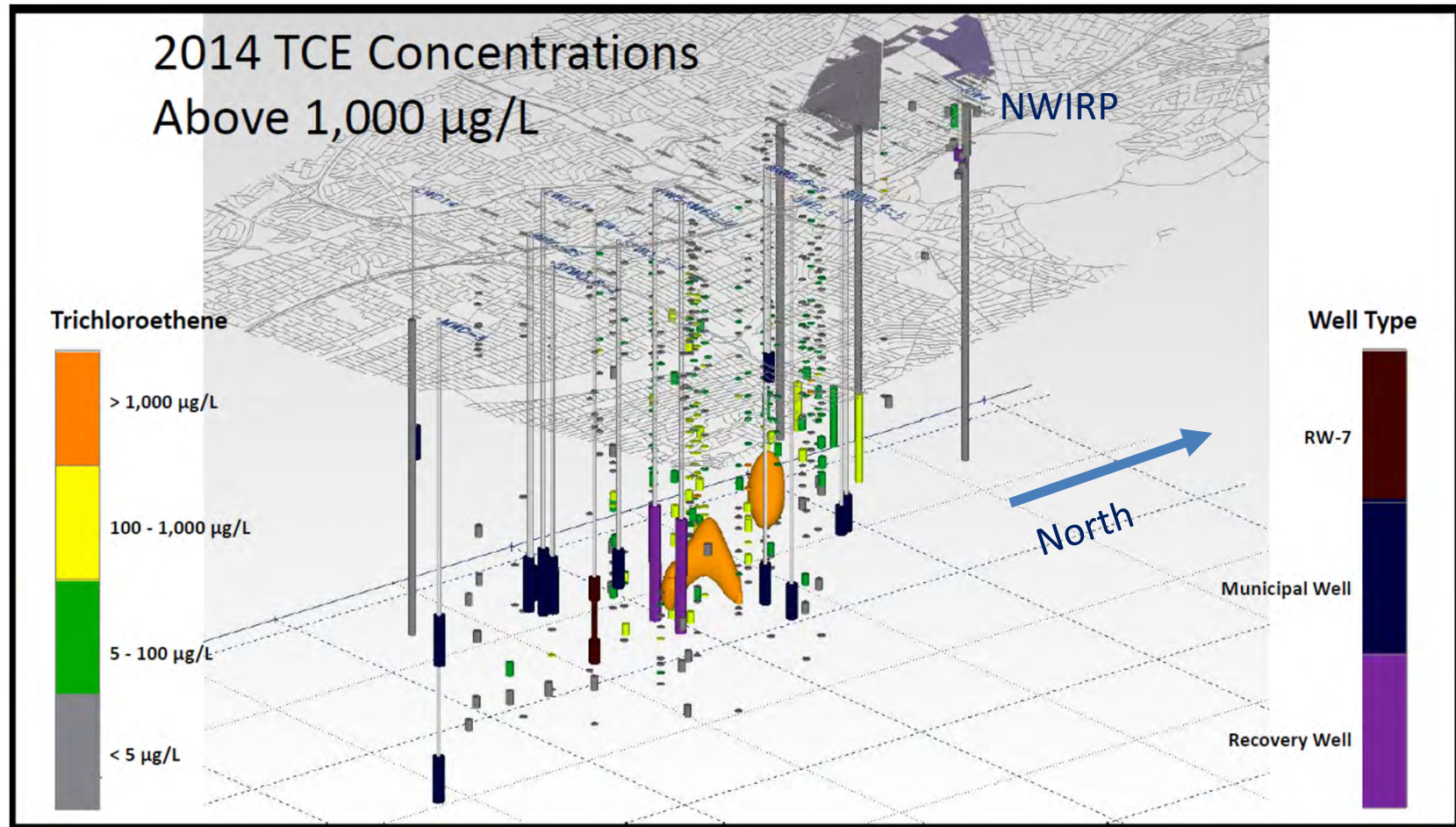


OU2 Groundwater Fate and Transport Modeling – 3D TCE Plume





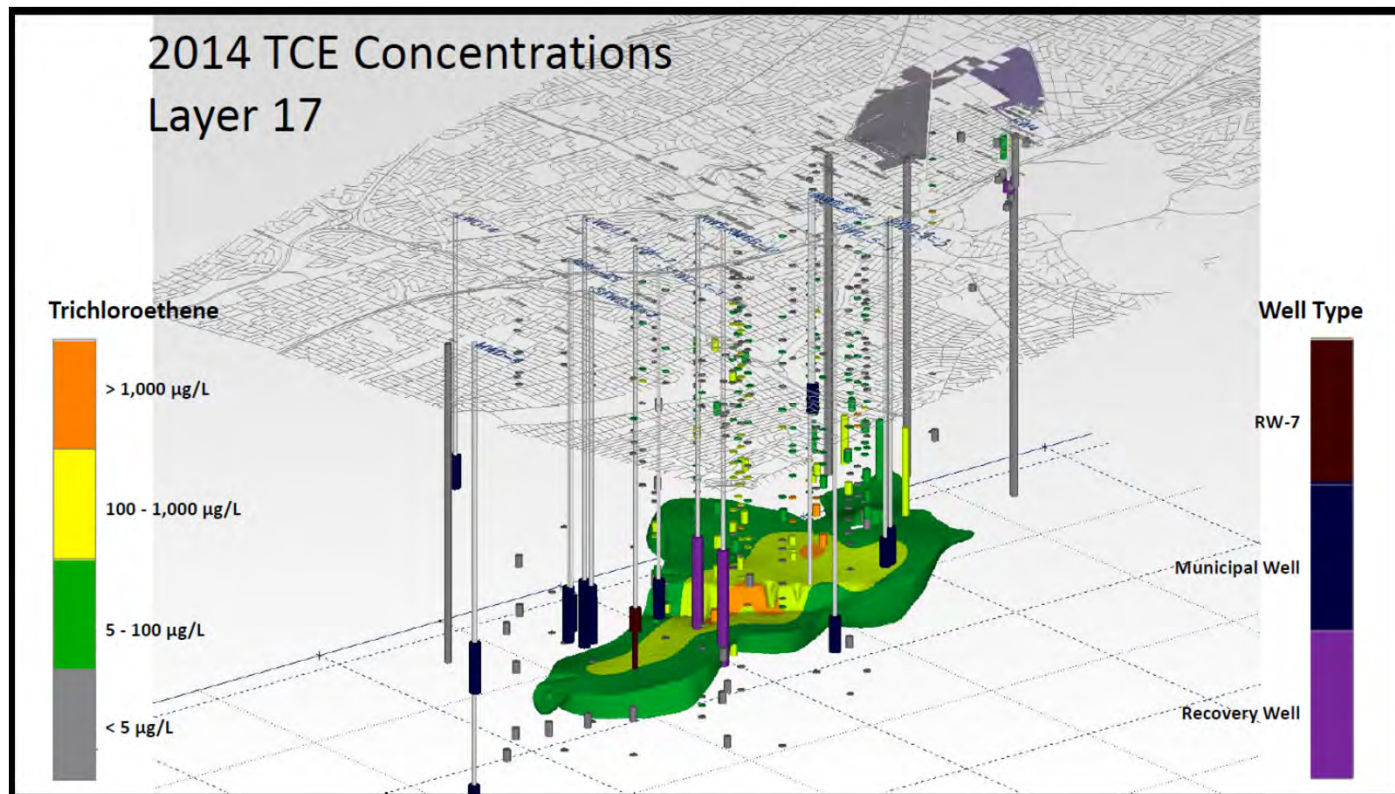
OU2 Groundwater Fate and Transport Modeling – 3D TCE Plume





OU2 Groundwater Fate and Transport Modeling – Model Layer 17

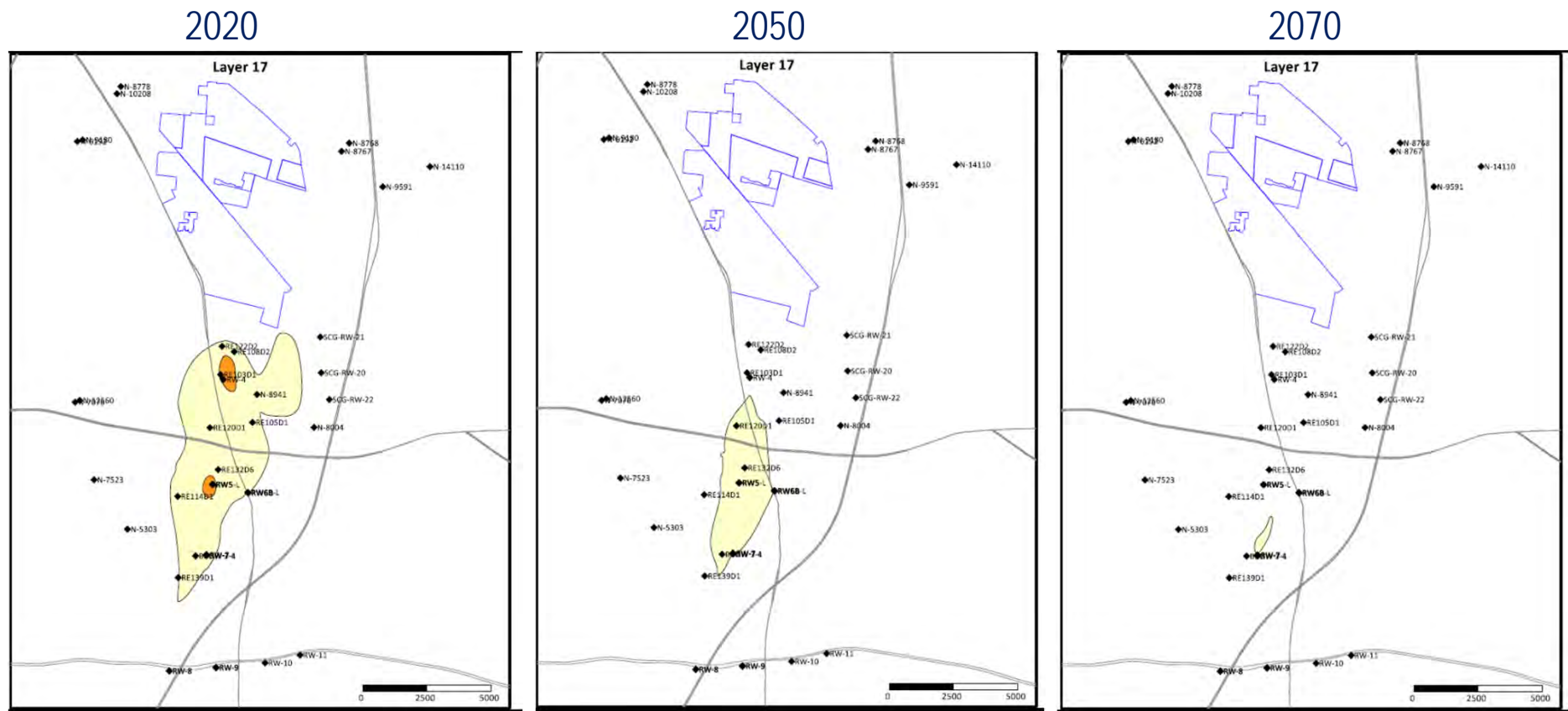
- Plume Layer 17 (approximately 700 to 750 feet below ground surface)
- Layer 17 is of primary interest because of contamination, high rate flow zone, and depth of water supplies in the area
- Layer 17 is also a target zone for remediation wells





OU2 Groundwater Fate and Transport Modeling

- Preliminary Layer 17 plume cleanup estimates (greater than 100 ug/L TCE)
- Different layers and concentrations cleanup at different rates





-
- Map Labels:**
- Former NWIRP Bethpage
 - Former Northrop Grumman
 - Northrop Grumman ONCT
 - RE108 Area Hotspot
 - Phase I RW4 Well
 - Groundwater Flow
 - Hempstead Tpke
 - Hempstead Turnpike
 - RE137
 - GM38 RW3
 - GM38 RW1
 - GM38 Area Hotspot Groundwater Treatment System
 - Hempstead Tpke
 - Phase II RW5 Wells
 - Phase II RW6 Wells
 - Phase II Extension RW7 Wells
 - RE108 Area Treatment Plant Location
 - Hicksville Rd
 - Southern State Pkwy
- Legend:**
- Navy Recovery Well
 - Northrop Grumman ONCT Recovery Well
 - Groundwater Flow Direction
 - Stormwater Basin
 - 1997 Northrop Grumman Property
 - 1997 NWIRP Bethpage Property
 - GM38 Hotspot
 - 2019 TCE Plume (All Depths)
 - 5 to 100 µg/L TCE
 - 100 to 1,000 µg/L TCE
 - > 1,000 µg/L TCE
- Scale:** 0 750 1,500 3,000 Feet



Department of Navy Naval Weapons Industrial Reserve Plant Restoration Advisory Board Meeting

RE108 Phase II Groundwater Treatment Plant and Pipeline Construction and Operation

Presented by:
Stephen Matney, Project Manager
AGVIQ, LLC
16 November 2021



Presentation Topics

- RE108 Area Hotspot Treatment System - Phase II Overview
- RE108 Area Hotspot Treatment System – Phase II Status and Schedule
- Project Outreach and Monitoring
- Questions/Points of Contact

16 November 2021

RE108 Area Hotspot Treatment System – Phase II System Status and Schedule



- April 2021 - Demolition, site grading, and seeding of 11 Union Avenue completed
- September 2021 -The 100 percent design was completed and issued for construction by Tetra Tech.
- March 2021 - Tetra Tech began recovery well installation.
 - RW6A/B located on Patricia Court in the Town of Oyster Bay
 - RW7A/B located at Nassau County stormwater basin N-210
 - RW5A/5B located at Nassau County stormwater basin N-213
- December 2021 - Mobilization for construction of the Groundwater Treatment Plant at 11 Union Avenue.



RE108 Area Hotspot Treatment System – Phase II System Status and Schedule



<u>Project Activities</u>	<u>Estimated Dates</u>
Construction of Water Treatment Plant	December 2021 – December 2022
Drilling and Installation of Recovery Wells	March 2021 – November 2022
Installation of Conveyance Pipelines	February 2022 – May 2022
Commissioning Operations	August 2022 – December 2022

Project Outreach and Monitoring



- AGVIQ and NAVFAC intend to conduct a Pre-construction meeting and routine progress update meetings throughout construction for representatives from the Town of Oyster Bar and the Town of Hempstead, property owners, and nearby residents.
- October 2021 – AGVIQ and NAVFAC hand-delivered Construction Notices to buildings/residents surrounding 11 Union Avenue and will hand-deliver Construction Notices to residences in close proximity of the pipeline work prior to start of construction.



CONSTRUCTION NOTICE

October 27, 2021

Please be advised that the Department of the Navy (Navy), in conjunction with the New York State Department of Environmental Conservation (NYSDEC), will be conducting environmental remedial action activities at 11 Union Ave starting in December 2021. The environmental remedial action activities include the construction of a treatment system including a treatment facility building that will be constructed on the property located at 11 Union Avenue. The treatment system building exterior is designed to be consistent with the adjacent building and will be located in the center of the parcel. A 6-foot-high fence with a swing gate will be installed across the front of the lot along Union Avenue. The area surrounding treatment system building will consist of an asphalt access drive. Additional general parameters of the treatment system building include the following:

- One-story building with a typical internal clearance height of approximately 20 feet, with an overall roof height of approximately 41 feet above grade.
- Approximately 11,000 sq. ft. building.
- Reinforced concrete floor slab on grade with two deep sumps measuring approximately 10 sq. ft. and 15 sq. ft., and 8 feet to 10 feet deep each.

Additional information on the Navy's cleanup program is available at <http://go.usa.gov/DvXF>.

The Navy and its contractors are taking all reasonable steps to minimize disruption to you and your neighbors during remedial action activities. Heavy equipment will only be operated between the hours of 7:00 AM and 5:00 PM, Monday through Friday, to limit noise disturbance. If it is necessary to visit the work site during other hours or weekends, activities will be kept to a minimum. Construction activities at 11 Union Avenue are expected to be completed in December 2022.

Onsite prime contractor for the Navy will be AGVIQ and their subcontractors. Inquiries may be directed to Mr. Stephen Matney, the Navy's Task Order Manager or other contacts as listed below.

We appreciate your cooperation and patience as we complete this important project. If you require additional information, please contact:

Stephen Matney
AGVIQ
Project Manager
(757) 213-8583

Scott Sokolowski
U.S. Navy
Remedial Project Manager
(757) 341-2011
scott.c.sokolowski.civ@us.navy.mil

Jason Pelton
NYSDEC
Project Manager
(516) 402-9478
Jason.Pelton@dec.ny.gov

Bill Fonda
NYSDEC Regional Citizen
Participation Specialist
(631) 444-0350
bill.fonda@dec.ny.gov

Jim Sullivan
NYSDOH
Project Manager
(516) 402-7860
James.sullivan@health.ny.gov



Project Outreach and Monitoring (continued)

- The Navy and its contractors will take all reasonable steps to minimize disruption to the neighbors
 - Heavy equipment operations are limited to the hours between 8:00 AM and 5:00 PM to limit noise disturbance
 - Affected school bus schedules will be identified and construction operations modified, as appropriate, to limit interruption and safety risks to the students
 - Noise and dust monitoring will be conducted at the perimeter of the work zones



Questions/Points of Contact

<u>Point of Contact</u>	<u>Name</u>	<u>Contact Information</u>
Navy Remedial Project Manager	Scott Sokolowski	scott.c.sokolowski.civ@us.navy.mil
NYSDEC Project Manager	Jason Pelton	jason.pelton@dec.ny.gov
AGVIQ Project Manager	Stephen Matney	<u>smatney@tikigaq.com</u>



Department of Navy Naval Weapons Industrial Reserve Plant Restoration Advisory Board Meeting

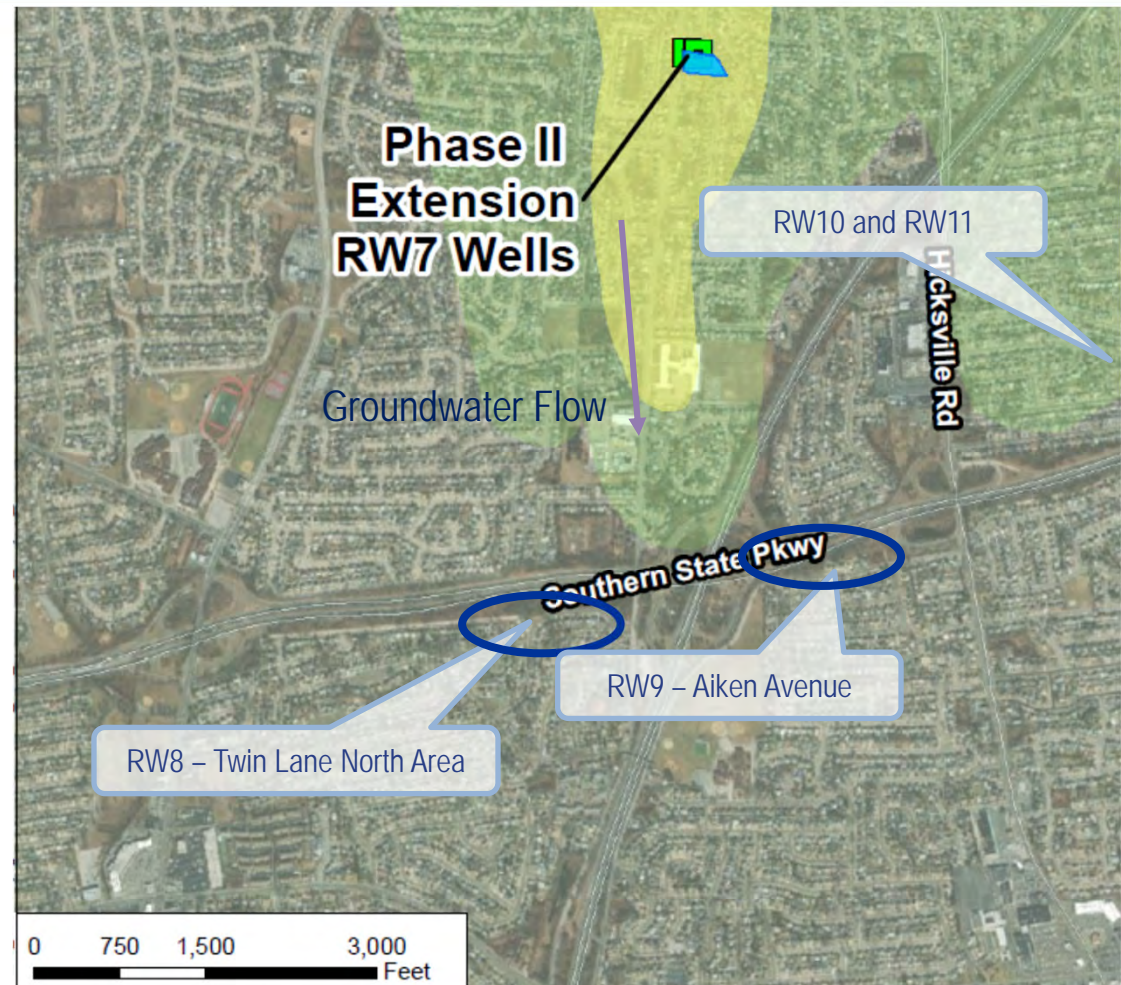
Phase III (RW8 and RW9) – Southern Plume Intercept Treatment System Update

Presented by:
David Brayack, Project Manager
Tetra Tech
16 Nov 2021



Phase III – Southern Plume Intercept Treatment System, Borings, Wells, and Treatment Plant

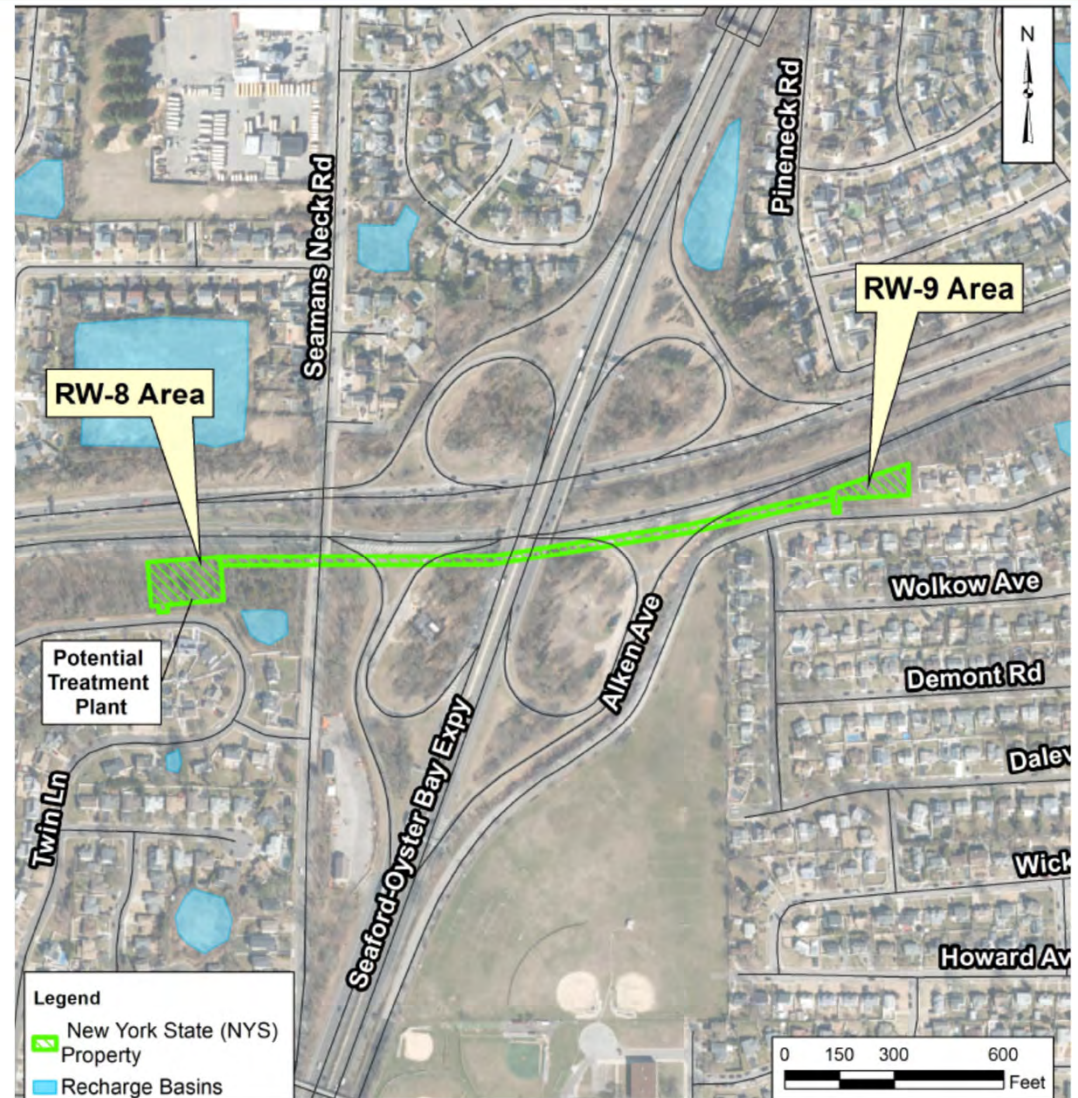
- Location is based on extensive monitoring of plume migration and modeling of groundwater flow
- Additional pre-design investigations and testing are required in this area (well depth and pumping rates)
- Work is broken into Part A and B
- Part A - RW8 and RW9 target deep groundwater that is not captured by Recovery Well RW7 – Initial focus
- Part B – RW10 and RW11 wells possible to the northeast, with a separate treatment plant – shallow groundwater
- Part B System requirements are dependent on additional plume delineation planned for 2022



Phase III – Southern Plume Intercept Treatment System, Borings, Wells, and Treatment Plant



- Schedule - Drilling at Twin Lane North started in March 2021 (brush clearing and fencing), with four periods of activity anticipated:
 - Vertical Profile Boring (1) and wells (3) installation - April to August 2021
 - Recovery Well installation and aquifer testing - late 2021 to mid 2022 to support Pre-design data needs
 - Treatment System design 2022 to 2023 – finalize treatment requirements, building size, and location, piping runs, and discharge point
 - Treatment Plant construction and operation to start in 2024
- RW9 activities started in Oct 2021 and will be completed in 2022



- **Regulatory:**

- AROD- Amended Record of Decision
- Compliance sampling- collection of samples to demonstrate that chemicals are below regulatory levels
- CCR- Construction Completion Report
- CERCLA- **Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)** – the legal mechanism for cleaning up inactive hazardous waste sites at DOD (Department of Defense) facilities, this is the defining regulation for the Navy's Environmental Restoration (ER) Program at NWIRP Bethpage under NYSDEC authority.
- ESD- Explanation of Significant Differences
- Feasibility Study- collection of data used to determine if a remedy will work
- Five-Year Review (FYR)- required by CERCLA and is prepared in accordance with USEPA guidance. To evaluate the effectiveness of the remedies to determine if they continue to protect human health and the environment in accordance with the requirements set forth in the Record of Decision (ROD).
- NYSDEC- New York State Department of Environmental Conservation(NYSDEC)
provides regulatory review and approval of Navy actions at NWIRP Bethpage
- NYSDOH- **New York State Department of Health (NYSDOH)** assists NYSDEC.
- PDI- Pre-Design Investigation
- Proposed Plan- Plan of action that is sent to the state for approval prior to the Final Record of Decision
- RCRA- **Resource Conservation and Recovery Act (RCRA) Corrective Action** – a statutorily required cleanup program, similar to CERCLA, that addresses active solid waste management units and contaminated media as a condition of RCRA permits - NWIRP Bethpage has a RCRA Permit with NYSDEC
- ROD –Record of Decision
- SR- selected remedy
- USEPA- **United States Environmental Protection Agency (USEPA)** Provides federal review of the Navy actions.