

**RESTORATION ADVISORY BOARD MEETING  
NAVAL WEAPONS INDUSTRIAL RESERVER PLANT (NWIRP) BETHPAGE  
WEDNESDAY APRIL 6, 2022**

The forty-ninth (49th) meeting of the Restoration Advisory Board (RAB) was held in-person at the Bethpage Community Senior Center and as an online virtual meeting hosted by WebEx. Panelists for the meeting included representatives from the Navy (Scott Sokolowski, Melissa Forest, Jennifer Zingalie, and David Todd), New York State Department of Environmental Conservation (NYSDEC) (Jason Pelton and Jennifer Pilewski), New York State Department of Health (NYSDOH) (James Sullivan and Jacquelyn Nealon), RAB members (David Sobolow, Sandra D'Arcangelo, Edward Olmsted, Bill Pavone), Nassau County Representative Rose Walker [and representative Joane Foley], AGVIQ (Steve Matney), and APTIM (Monica Smeal, Colton Watkins, Bill Hughes), and Tetra Tech (Jacqueline Boltz, David Brayack, Ernie Wu, Vin Varricchio, Beau Benfield, Will Yeung, Melissa Felton, and Lauren Donston). Other meeting attendees included Massapequa Water District (MWD) (Stan Carey), South Farmingdale Water District (SFWD)(Gary Bosnan and Frank Koch), and 39 attendees from Bethpage and neighboring communities. The meeting attendance sheet is provided in Attachment 1. The Agenda and Definitions are provided in Attachment 2.

**WELCOME AND AGENDA REVIEW**

Tetra Tech representative, Ms. Jackie Boltz, opened the virtual meeting and reviewed the virtual meeting rules. The Management Edge representative, Ms. Gayle Waldron, reviewed the in person meeting rules with the audience. Mr. Scott Sokolowski, the Navy RPM, welcomed the public and reviewed the meeting agenda. Mr. David Sobolow, the RAB community co-chair, provided a community update and introduced the RAB members. The RAB members approved the November 2020 and November 2021 Meeting minutes. These minutes will be finalized and posted to the Navy public website.

**NWIRP BETHPAGE RESTORATION ADVISORY BOARD (RAB) MEMBERSHIP**

Ms. Jennifer Zingalie provided a presentation on RAB membership and responsibilities. The presentation is provided in Attachment 3. There were no questions from the public regarding this presentation.

**NWIRP BETHPAGE PROGRAM OVERVIEW**

Mr. Sokolowski provided a general program overview of the activities at NWIRP Bethpage. The presentation is provided in Attachment 3. The following discussion summarizes the questions and answers regarding this presentation.

Mr. Sobolow inquired about the actual process at the Site 4 Biosparge System, do we actually inject oxygen and air into the ground? Where does the oxygen come from? Ms. Monica Smeal, from APTIM confirmed that there is no oxygen injection rather it is just air from an air compressor.

Mr. Sobolow asked about the constraints regarding the experience with the physical equipment addressing the 1,4-dioxane treatment. Mr. Sokolowski replied that the software systems are providing complicated automated controls, however the physical

**RESTORATION ADVISORY BOARD MEETING  
NAVAL WEAPONS INDUSTRIAL RESERVER PLANT (NWIRP) BETHPAGE  
WEDNESDAY APRIL 6, 2022**

equipment is very effective and can be run in manual mode while the software issues are worked out. Mr. Sobolow inquired if the Navy, and Bethpage, is on the leading edge of addressing 1,4-dioxane as compared to other areas in the country? Mr. David Brayack, Tetra Tech, replied that New York is one of the leading states for regulating the 1,4-dioxane and because of that this technology is being installed a lot on Long Island right now.

Mr. Ed Olmsted asked What is the physical location of the GM-38 AOP system? Mr. Sokolowski replied that the GM-38 treatment plant is located off of Route 135.

Mr. Bill Pavone inquired regarding AOP and light sources, do they seem sufficient to treat to non-detect? Or does the water need to be recycled through to get treated thoroughly? Mr. Brayack replied that the water is recycled back into the head of the plant only during the startup of the system when the UV lamps are warming up, which lasts approximately 3 minutes. The bulbs have not had to be replaced at this point. There are 144 bulbs. There are two chambers that run at 70% and 30-40% capacity approximately. Mr. Pavone asked if the bulbs under warranty? Mr. Brayack replied yes for 2 years.

**OU2 GROUNDWATER MONITORING**

Mr. Brayack, Tetra Tech, provided a presentation on the current status of the OU2 Groundwater Monitoring Program. The presentation is provided in Attachment 3. The following discussion summarizes the questions and answers regarding this presentation.

Mr. Sobolow asked if there are there any wells that need drilled that the Navy does not have access to? Mr. Brayack responded that the Navy has access to everything needed need to at this time.

Mr. Sobolow asked about the level of confidence in the groundwater modeling tool. Mr. Brayack replied that there is high confidence in the modeling, at the higher concentrations. At the 5 ug/L level there is still good confidence. He noted that these models do make some assumptions and that it is a tool and not an absolute.

Mr. Stan Carey, MWD, stated that it was mentioned that the Navy doesn't have the information from Grumman's on site containment (ONCT) system. He asked how do we know that there is not more coming from that system? Mr. Brayack replied that there are some assumptions made when this model was built. Everything we have seen shows that their ONCT system is capturing the VOCs.

**RE-137 INTERIM ACTION UPDATE**

Mr. Brayack, Tetra Tech, provided a presentation on the current status of the RE-137 Interim Action. The presentation is provided in Attachment 3. The following discussion summarizes the questions and answers regarding this presentation.

**RESTORATION ADVISORY BOARD MEETING  
NAVAL WEAPONS INDUSTRIAL RESERVER PLANT (NWIRP) BETHPAGE  
WEDNESDAY APRIL 6, 2022**

Mr. Sobolow asked where does backwash water get discharged? Mr. Brayack replied that there are two 21,000 gallon frack tanks. We run the water to one tank, backwash, and the dirty water goes to the other tank. We have not had to do this yet. Once we are up and running on a more routine schedule we will have a better schedule of when we will need to complete backwashing and carbon changeouts. Mr. Sobolow asked for clarification that the treated water is getting injected back into the aquifer. Mr. Brayack replied yes the treated water gets discharged into the recharge basin which infiltrates the groundwater.

**PHASE III (RW8 TO RW11) SOUTHERN PLUME INTERCEPT TREATMENT SYSTEM**

Mr. Brayack, Tetra Tech, provided a presentation on the current status of the Phase III (RW8 to RW11) Southern Plume Intercept System. The presentation is provided in Attachment 3. The following discussion summarizes the questions and answers regarding this presentation.

Mr. Sobolow asked if the RW8 treatment plant is being sized large enough to accept RW9 and RW10? Mr. Brayack replied that if this route is chosen, the treatment plant would be made large enough to handle all the water.

Mr. Sobolow asked if the Navy has any idea of Northrop Grumman's (NG) levels on their property? Mr. Brayack replied that safety factors are applied and they produce non-detect levels. NG generally achieves non detect levels as well.

Mr. Olmsted expressed appreciation that this is the most pro-active meeting in a long time.

**RE108 PHASE II GROUNDWATER TREATMENT PLANT AND PIPELINE  
CONSTRUCTION OPERATION**

Mr. Stephen Matney, Agviq, provided a presentation on the current status of the RE-108 Phase II Groundwater Treatment Plant. The presentation is provided in Attachment 3. There were no questions from the RAB regarding this presentation.

**QUESTIONS FROM THE PUBLIC**

A community member asked if the Navy collected samples for PFOA and PFOS, if yes, what are the monitoring results? Mr. Brayack responded that the Navy has conducted an on-property investigation. These results have been shared with the RAB and there is a fact sheet available on the website. A Preliminary Assessment has been conducted that looks at the operations that were conducted at the facility in relation to potential PFAS release. There has been some limited PFOA and PFOS data collected off property. The numbers have been generally below or right around 10 ppt, particularly around GM-38.

**RESTORATION ADVISORY BOARD MEETING  
NAVAL WEAPONS INDUSTRIAL RESERVER PLANT (NWIRP) BETHPAGE  
WEDNESDAY APRIL 6, 2022**

A local resident noted that their home is at the entrance on Wadsworth avenue and asked what happens if my foundation is affected by the trucks entering and leaving the area during the construction. Mr. Brayack noted that the Navy is working with the homeowners in that areas specifically and individually and Mr. Sokolowski indicated that someone would be in touch with this resident.

A community member asked if there will be a newsletter posted quarterly or monthly with updates. Mr. Sokolowski replied that there is currently no newsletter set and that the RAB meeting minutes are provided on the public website.

A community member asked if there is a safety precaution plan for the employees to park, etc. at the Wadsworth basin? They noted that they had to move subcontractor vehicles because they were blocking the roadway. Mr. Sokolowski responded that once we have all the easements we will have a better plan for the safety issues. Mr. Brayack added that we are looking into all these potential issues. The community member asked how much dirt is going to be coming in. Mr. Brayack replied we are going to clear the trees, and build up the bottom of the basin. We will be drilling in that basin for about 6 months, and then another contractor will come back out to install the pipeline. As we move through we will work with the local residents to address any concerns. The community member asked about electrical concerns. Mr. Brayack replied that we are looking to run power to the lines all the way back to Seaman's Neck Road rather than connecting to the local electric point because it cannot support our pumps. Mr. Sokolowski added that we will also be distributing notices again once we get closer to doing any more work. The notice will have will have everyone's contact information. He also reminded the public to reach out to the PAO if they have any concern.

Mr. Sobolow and Mr. Sokolowski each thanked the audience for attending and the meeting was then adjourned.

**Attachement 1**  
**April 6, 2022 RAB Meeting Attendees**  
**Naval Weapons Industrial Reserve Plant Bethpage**  
**Page 1 of 2**

	<b>Affiliation</b>	<b>Name</b>
1	AGQIQ	Stephen Matney, AGVIQ
2	APTIM	Bill Hughes
3	APTIM	Colton Watkins
4	Attendee	bob
5	Attendee	Call-in User_10 (516622****)
6	Attendee	Call-in User_11 (757438****)
7	Attendee	Call-in User_2 (516238****)
8	Attendee	Call-in User_4 (516413****)
9	Attendee	Call-in User_5 (516813****)
10	Attendee	Call-in User_6 (516351****)
11	Attendee	Call-in User_7 (516654****)
12	Attendee	Call-in User_8 (631948****)
13	Attendee	Call-in User_9 (631265****)
14	Attendee	chris
15	Attendee	Dale Konas
16	Attendee	DEAN BROWN
17	Attendee	Ed
18	Attendee	EILEEN GLUECKERT
19	Attendee	Elayne
20	Attendee	Eleanor
21	Attendee	Gilda LogAN
22	Attendee	Glen Logan
23	Attendee	James Balas
24	Attendee	John Buhagar
25	Attendee	John Reinhardt
26	Attendee	K. Lumpie
27	Attendee	M. Bohm
28	Attendee	Mary Anne Taylor
29	Attendee	Mike Fienen
30	Attendee	Mike Weber
31	Attendee	Nancy Marksteiner
32	Attendee	Paul Misut
33	Attendee	Phil Sachs
34	Attendee	Ralph Atoria
35	Attendee	Richard Castle
36	Attendee	Richard Humann
37	Attendee	Robert Gregory
38	Attendee	Sal Greco
39	Attendee	Sam
40	Attendee	SAUL Ash
41	Attendee	Ted Masters
42	Attendee	Twin
43	Congress	Cindy Rogers

**Attachement 1**  
**April 6, 2022 RAB Meeting Attendees**  
**Naval Weapons Industrial Reserve Plant Bethpage**  
**Page 2 of 2**

	<b>Affiliation</b>	<b>Name</b>
44	MWD	Stan Carey
45	Navy	Daviod Todd
46	Navy	Jennifer Zingalie
47	Navy	Melissa Forest
48	Navy	Scott Sokolowski
49	NYSDEC	Jason Pelton
50	NYSDEC	Jennifer Pilewski
51	NYSDOH	Jacquelyn Nealon
52	NYSDOH	James Sullivan
53	RAB	Bill Pavone
54	RAB	David Sobolow
55	RAB	Edward Olmsted
56	RAB	Joanne Foley Representing Rose Walker
57	RAB	Sandra D'Arcangelo
58	SFWD	Frank Koch
59	SFWD	Gary Bosnan
60	Tetra Tech	Beau Benfield
61	Tetra Tech	David Brayack
62	Tetra Tech	Ernie Wu
63	Tetra Tech	Jacqueline Boltz
64	Tetra Tech	Lauren Donston
65	Tetra Tech	Melissa Felton
66	Tetra Tech	Vin Varricchio
67	Tetra Tech	William Yeung

# 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.
- 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
- NG- Northrop Grumman
- No. 6 Fuel Oil- tar
- NWIRP-Naval Weapons Industrial Reserve Plant
- 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
- 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

- **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
  - 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
  - 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
  - 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.



# **NAVFAC MID-ATLANTIC NWIRP Bethpage Restoration Advisory Board (RAB) Membership**

**Presented by:**

Jennifer Zingalie, Navy and Marine Corps

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# Overview

- 
- **What is a Restoration Advisory Board?**
  - **What is involved in being a RAB Member?**
  - **What are RAB Responsibilities?**
  - **What are the Navy's Obligations to the RAB?**
  - **Why Would a RAB be Dissolved?**
  - **Current Bethpage RAB Status**
  - **RAB Membership Applications**
    - How to apply
    - Community survey

# What is a Restoration Advisory Board?



A collective forum of ***diverse community members***. The forum will meet or communicate with decision makers, to discuss, and identify the most efficient, and productive means to restore the environment at a site owned or formerly owned by the Department of Defense.

- Provide input to installation decision makers
- Have direct access to agencies overseeing the cleanup
- Share questions, concerns, and ideas with the cleanup agency
  - **NOTE:** Advisory board, *not* a decision-making body



# What is involved in being a RAB Member?



- **Serve a specific term**
  - Attend RAB meetings regularly
    - Two annual meetings
    - Typical meeting takes 2-3 hours
- **Attend a RAB Orientation**
  - RAB members establish a charter, mission statement, goals, and operating procedures
  - Establish Co-Chair
    - Set meeting agendas
    - Focal point for outreach
    - Various Admin duties





# What are the RAB's Responsibilities?



- **Represent** and communicate community interests and concerns to decision-makers
- Learn and understand the Navy's clean up efforts at the site. **Respond** by:
  - Addressing issues associated w/ environmental restoration activities
  - Provide advice/comment to the decision makers on restoration issues *throughout the process*
  - **Provide information to the greater community**
- When applicable, **Review** and comment on documentation and clean-up activities



# What are the Navy's Obligations to the RAB?

- Maintain record of RAB activities
- Maintain an information repository on all activities related to the site
- Keep RAB informed about key issues and upcoming decisions
  - **Community Involvement Plan\***
- Consider and respond in a timely manner to RAB questions, concerns, and ideas
- Provide adequate funding for administrative and technical support

A screenshot of the website for the Naval Weapons Industrial Reserve Plant (NWIRP), Bethpage Environmental Restoration Program. The header includes the Navy seal and the text "Naval Weapons Industrial Reserve Plant (NWIRP), Bethpage Environmental Restoration Program". Below the header are four navigation buttons: "HOME PAGE", "SITE DESCRIPTIONS", "COMMUNITY OUTREACH", and "ADMINISTRATIVE RECORDS". The main content area is titled "New Updates" and lists several reports and documents with links, including the "2021 Annual Report to Congress", "2021 CERCLA Five Year Review", and "2021 Draft Explanation of Significant Differences". A "Background" section features a map of the Long Island Sound area, showing the locations of New York, New Jersey, Connecticut, and the Atlantic Ocean. The map highlights the NWIRP site in Bethpage, New York.

(right: Navy-Bethpage website) → <https://go.usa.gov/DyXF>



# Why would a RAB Be Dissolved?

**DISCLAIMER:** *The Navy has no intention of dissolving the Bethpage RAB. The purpose of this slide is to fully inform the public of the RAB process.*

- All required work is complete
- Property is transferred out of DoD
- 75% of RAB members agree in writing
- No longer sufficient, sustained, community interest



# Current BETHPAGE RAB Status



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## • Local citizens –

- **IDEAL GOAL:** RAB to consist of **10 to 20 members** with diverse backgrounds/Community interests
  - Currently -- **9 RAB members**
  - Community Co-Chair – **David Sobolow**

## • Navy representatives

- One official member – **Co-Chair, Scott Sokolowski**
- Other Navy/contractor participants provide information

## • Regulators

- NYS Department of Environmental Conservation– **Jason Pelton**
  - NYS Department of Health – **James Sullivan**
-



# Currently Accepting Applications for Bethpage RAB Membership

**LEARN MORE:**  
**ARE YOU INTERESTED IN JOINING**  
The Bethpage RAB?

***FILL OUT AN APPLICATION:*** These are located on the Navy-Bethpage site.  
They should be filled out and sent to the Public Affairs Email.

**NAVFAC-Bethpage Website**

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

**E-Mail**

**[NAVFAC ML PAO@navy.mil](mailto:NAVFAC_ML_PAO@navy.mil)**



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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  
06 April 2022

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# Presentation Topics – NWIRP Bethpage Program Overview



- Site 1 General Update
- Site 4 Biosparge System
- Phase I Advanced Oxidation Process (1,4 Dioxane Treatment) and Remedial Well 4 Operation Update
- Upcoming Remedial Construction Projects
- Data Collection and Property Access



11 Union Avenue Excavation



# Site 1



## ■ 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 is in process and expected to be complete in May 2022

- Site 1 Tree Planting – Eastern Boundary Parallel to 11th Street scheduled for April 2022





# Site 4 Biosparge System

- 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 continue to operate for the next four years.

# Drilling Program

## Shallow and Intermediate Data Gaps



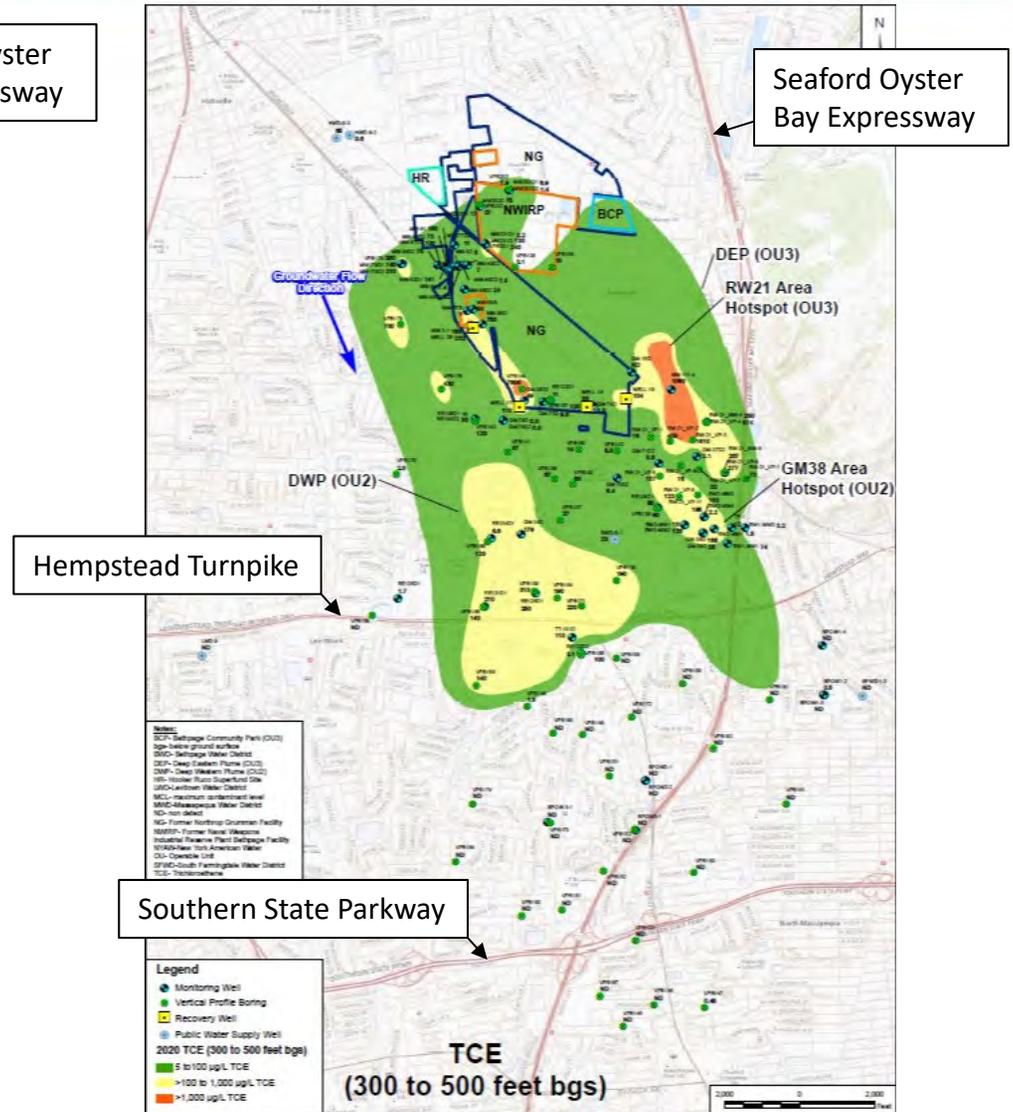
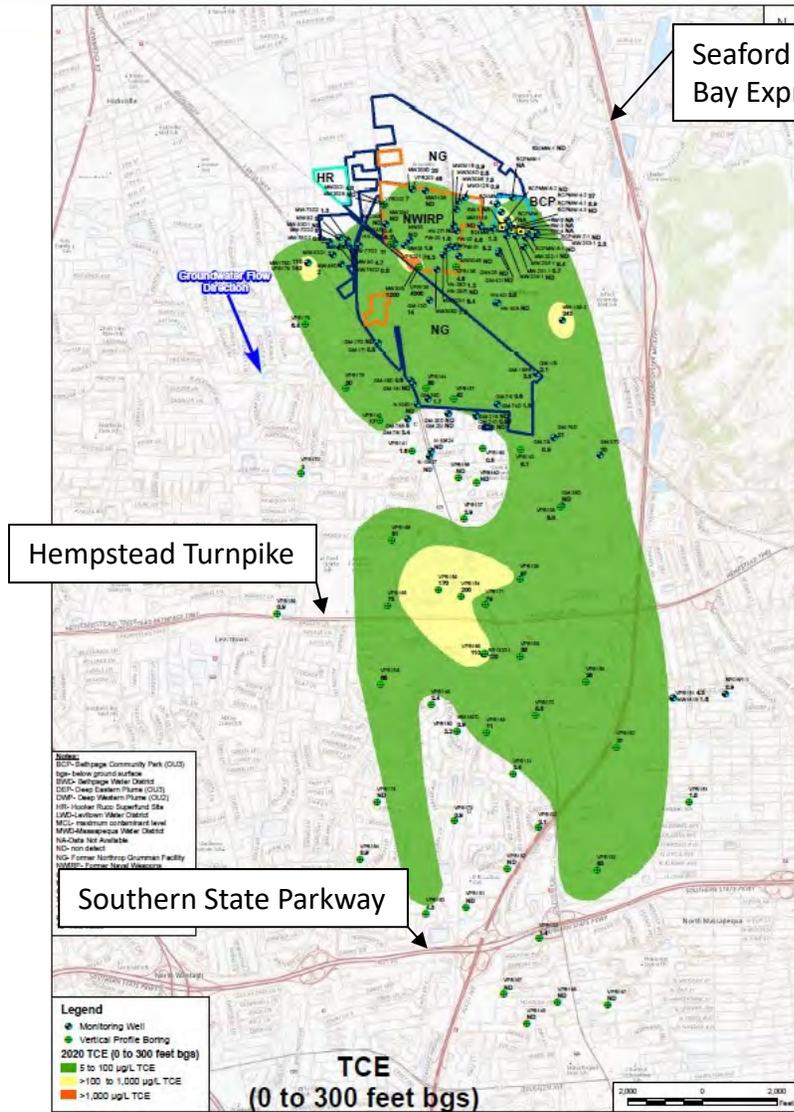
- To date, Navy's vertical profile boring and monitoring well installation program has focused on the determining the extent of the deeper areas of OU2 plume
- Using data from monitoring well samples of groundwater, the plume is 'mapped' at four separate intervals:
  - ~50 to 300 feet below ground surface (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

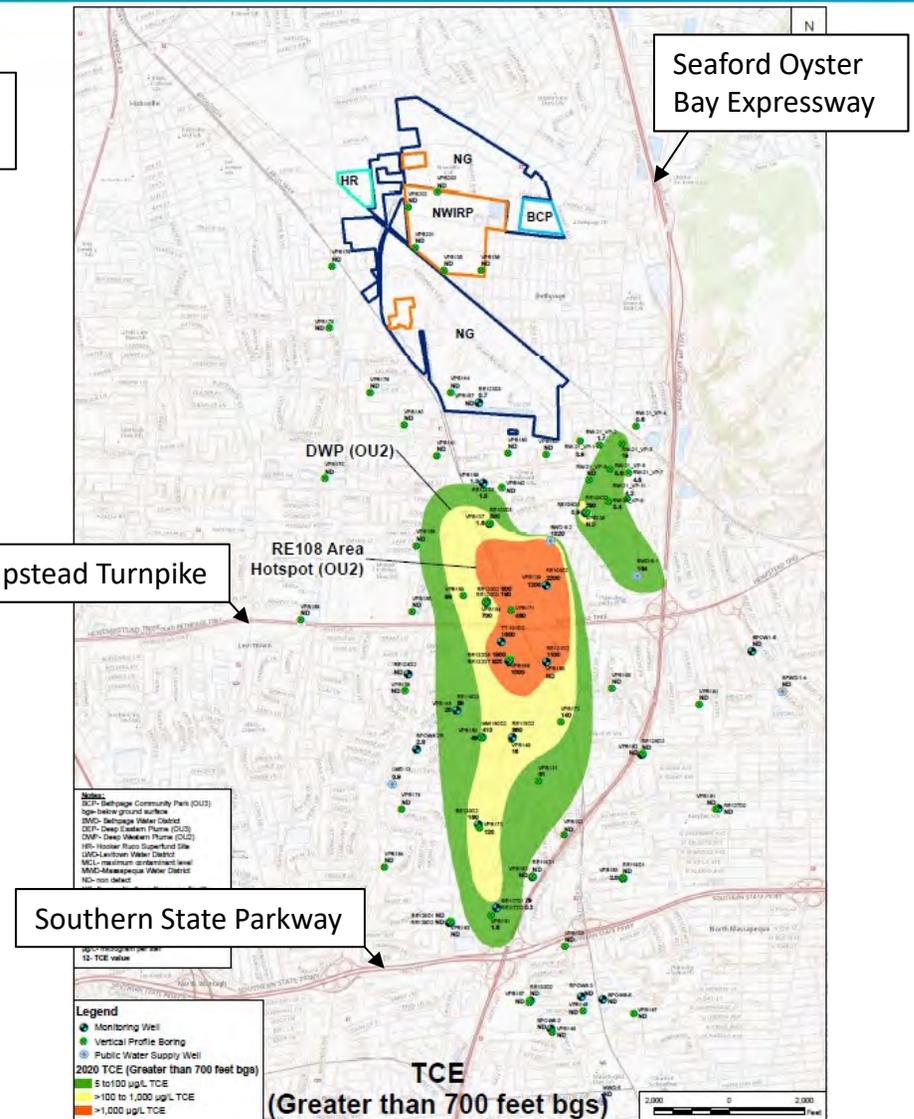
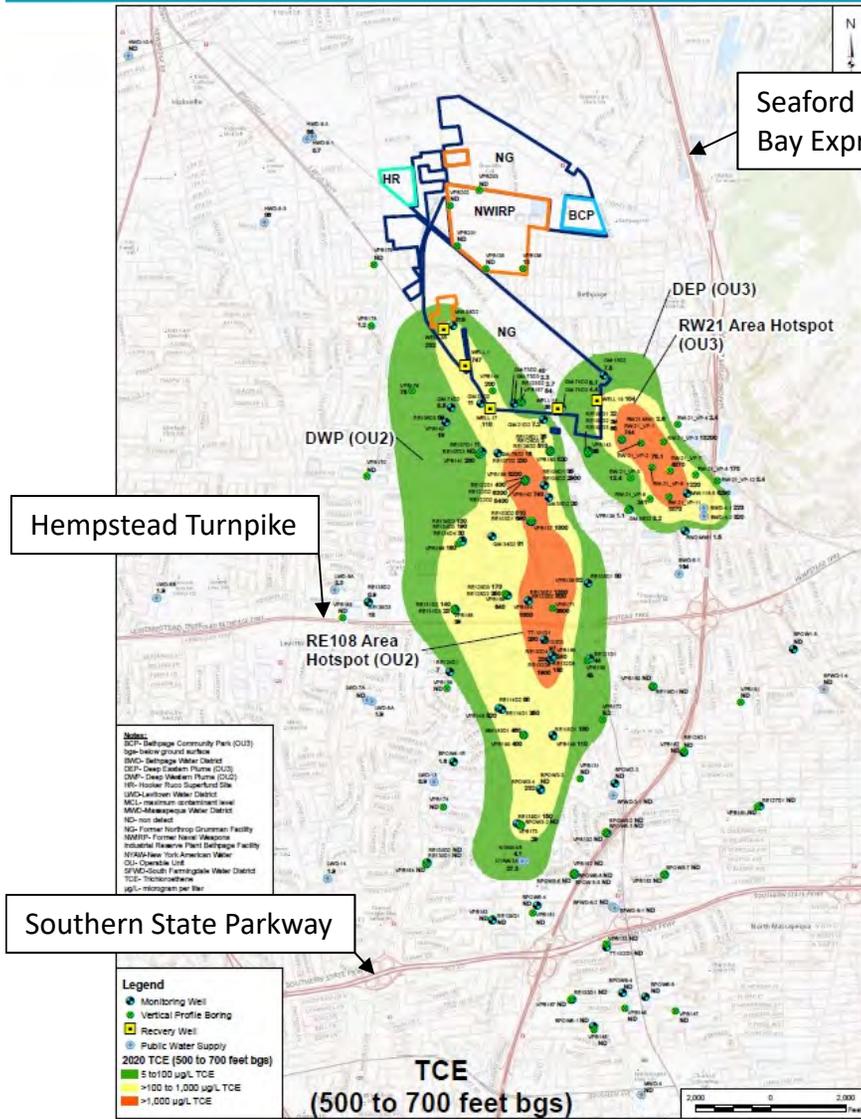
Shallow

Intermediate



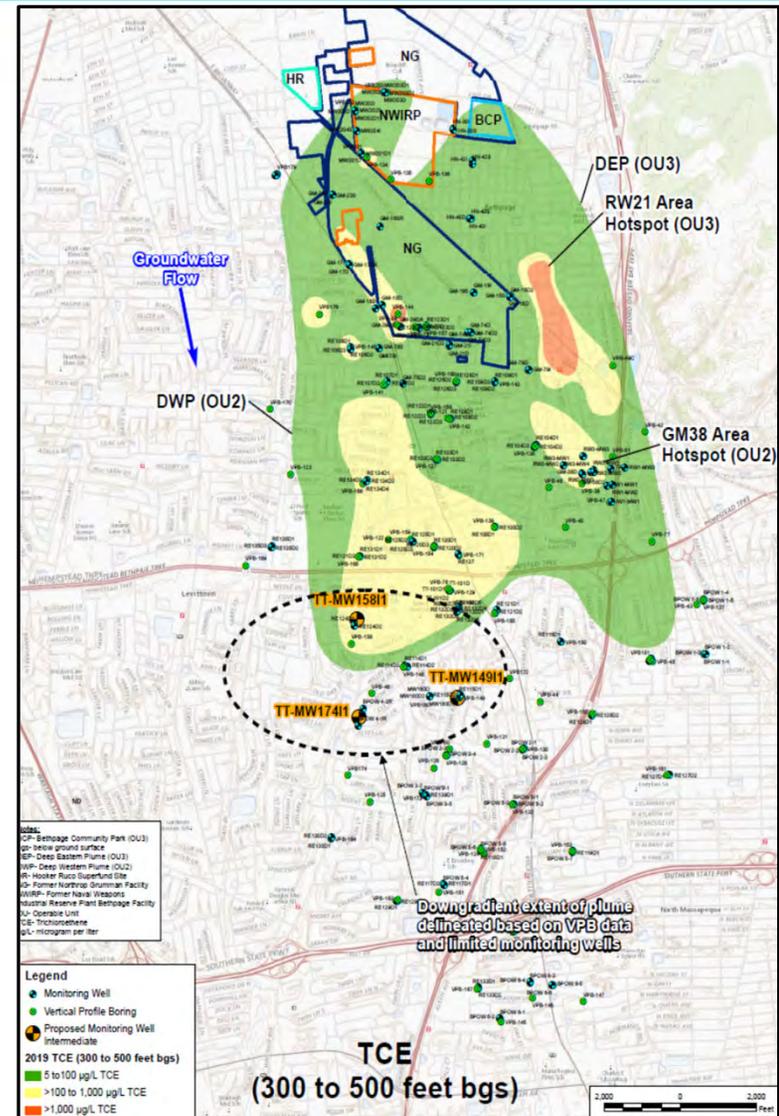
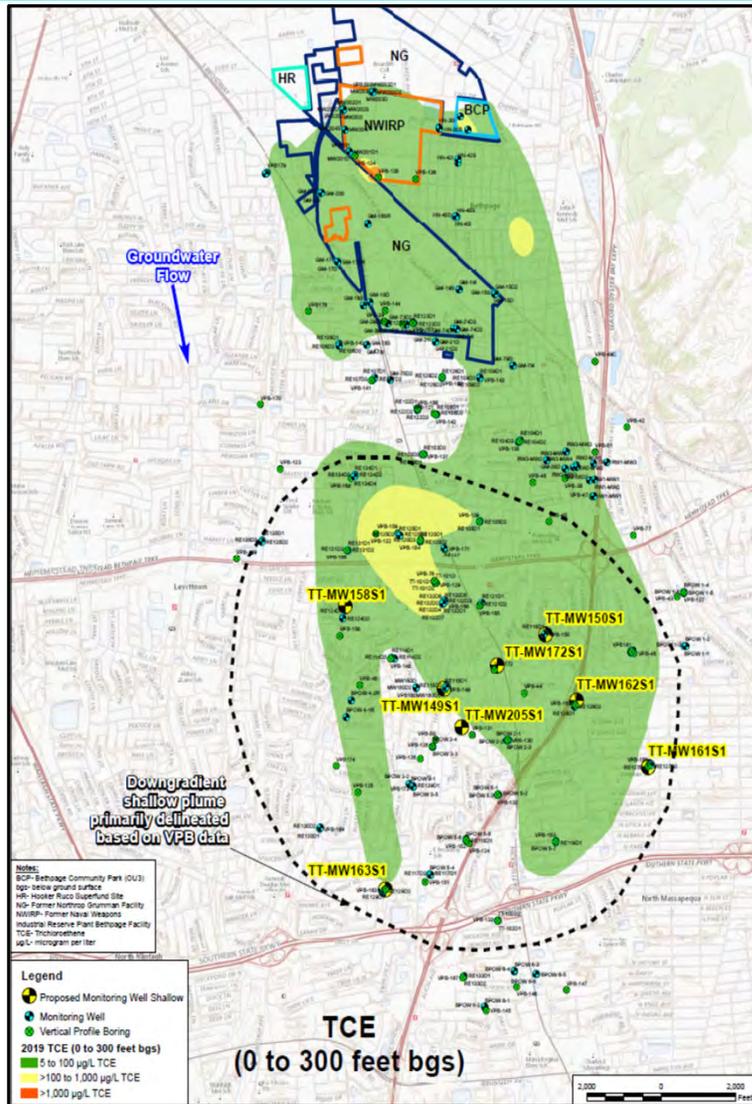
# Navy-Northrop Grumman TCE Plume Maps

Deep





# Planned Shallow and Intermediate Data Gap Wells



# Phase I – RE108 Area Hotspot AOP (1,4 Dioxane Treatment)



- 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 monthly and 1,4 dioxane and trichloroethylene (TCE) are non-detect in the effluent



# Upcoming Remedial Construction Projects, Data Collection, and Property Access



- Remedial Construction Projects
  - The Phase I GM38 Groundwater Treatment Plant is in consideration for treatment system upgrades that will take place 2023-2024
  - RE137 temporary treatment system (near the on-ramp from Hicksville Road onto Hempstead Turnpike heading south) online is now operational
  - Phase II Recovery Wells 6A, 6B, 7A, and 7B have been completed. RW 5A and 5B site preparation has begun and should be complete by October 2022
  - Phase III Recovery Wells 8 and 9 will be completed later 2022
  - Phase II Groundwater Treatment Plant construction began in December 2021 and is projected to be commissioned by December 2022



# Data Collection and Property Access

- Data Collection
  - Regular groundwater monitoring activities
  - Data gap study is in progress
- Property Access
  - The Navy has the access required for current groundwater investigations and remedial construction activities
  - We are reviewing access requirements for 2023 and future projects



## NEXT: Groundwater Monitoring Results Dave Brayack, Tetra Tech



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

## Operable Unit 2 Groundwater Monitoring/ Modeling Results

Presented by:  
David Brayack, Project Manager  
Tetra Tech  
06 Apr 2022

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

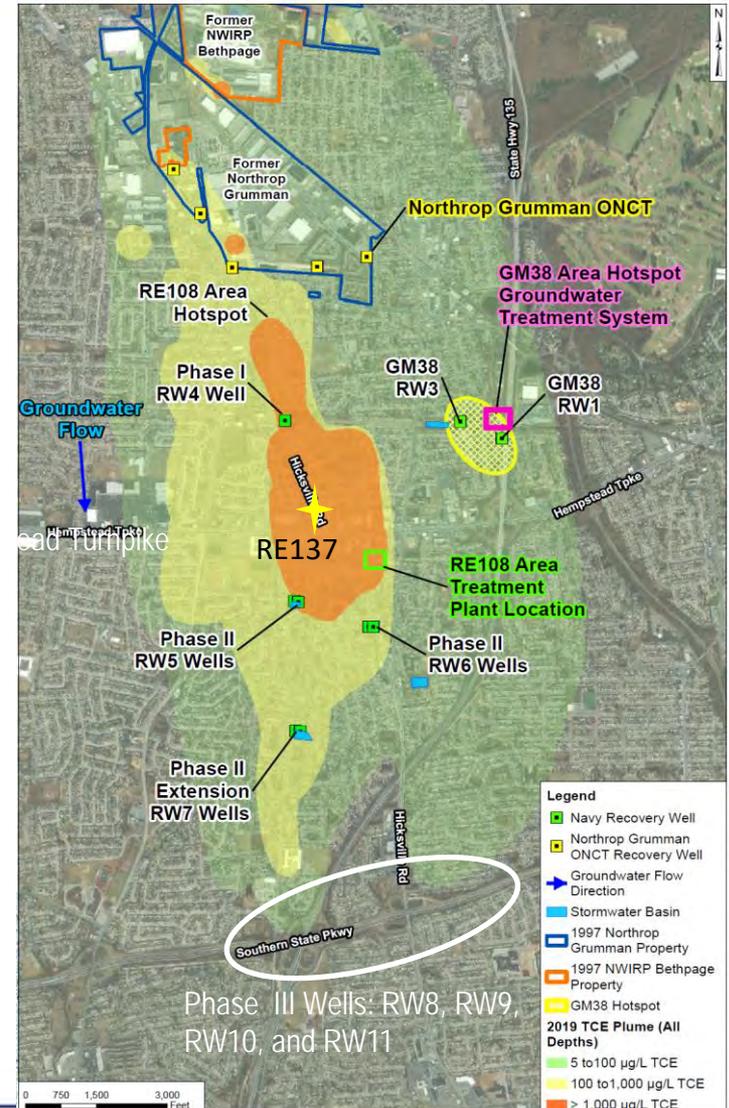


- Overview of the OU2 Remedial Activities
- OU2 Groundwater Monitoring Activities
- OU2 Groundwater Fate and Transport Modeling



# OU2 Groundwater Remediation Overview

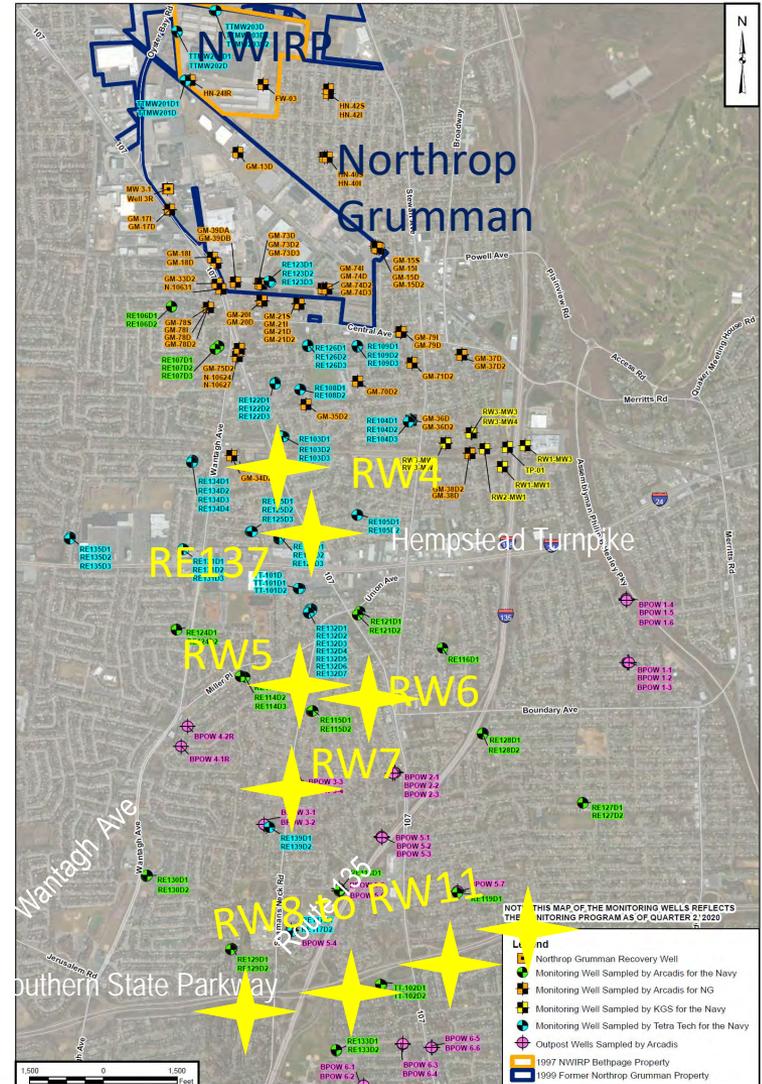
- Northrop Grumman Onsite Containment System – 1998
- Navy GM38 Area Hotspot Treatment System – 2009
- Navy GM38 Advanced Oxidation Process (AOP) – May 2021
- Navy Phase I Recovery Well RW4 – April 2021
- Navy RE137 Interim Treatment System – March 2022
- Navy Phase II Recovery Wells – 4 of 6 complete
- Navy Phase II Treatment System – under construction
- Navy Phase III Recovery Wells – 1 of 4 started (April 2022)





# OU2 Groundwater Monitoring Program

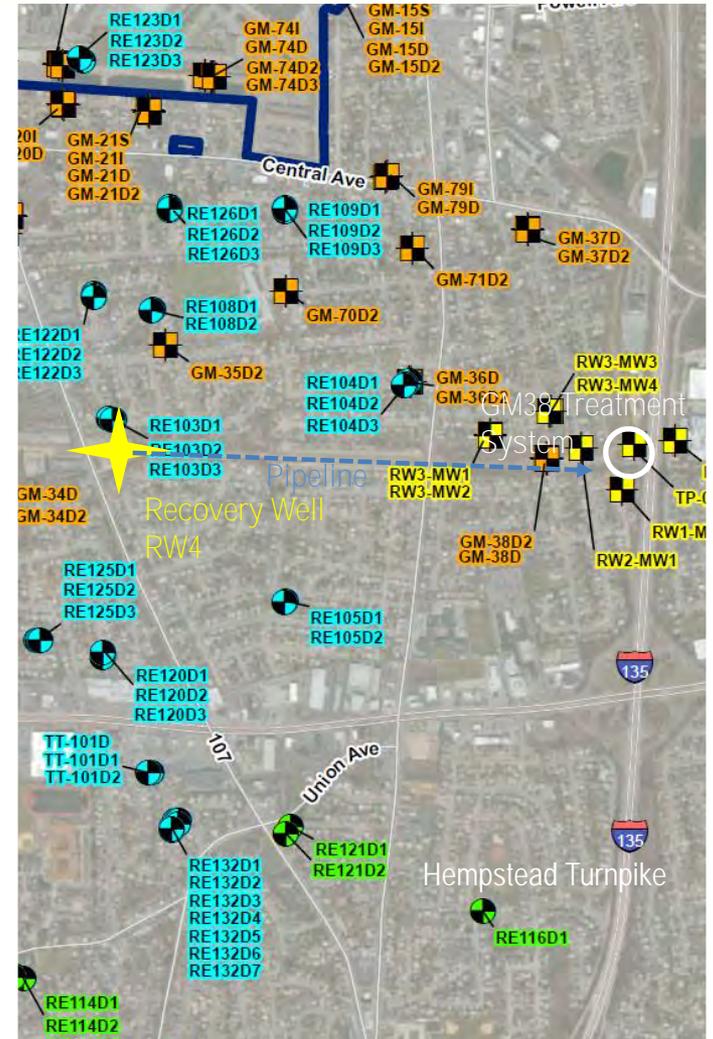
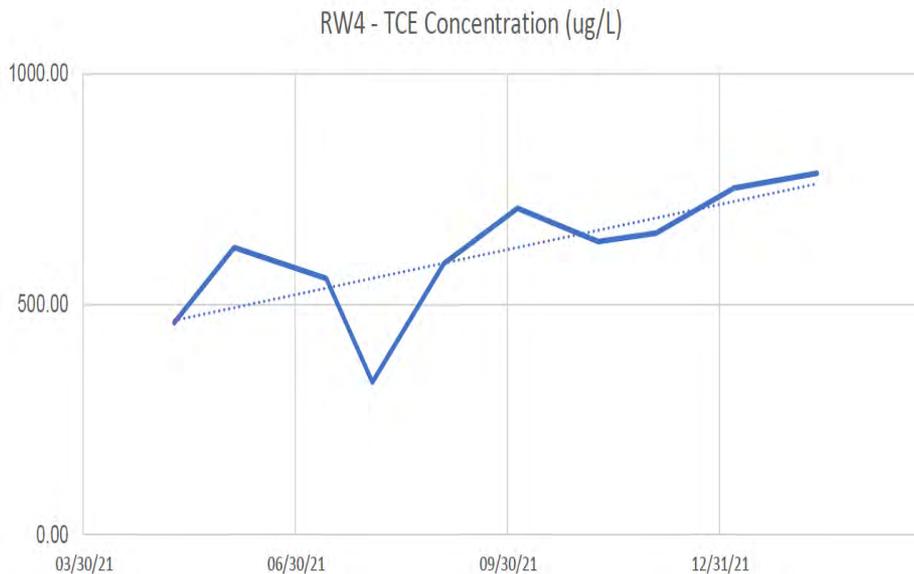
- Monitoring – OU2 plume migration, attenuation, and cleanup
- Groundwater samples – 180 wells on a quarterly, semi-annual, or annual basis, and analyzed for Volatile Organic Compounds (VOC) and 1,4-dioxane
- New monitoring wells continue to be added as needed:
  - Shallow groundwater (200 to 300 feet below ground surface): 2 of 11 wells completed
  - Recovery wells: 8 monitoring wells at RW8 and RW9 completed





# OU2 Groundwater Monitoring – Recovery Wells RW4

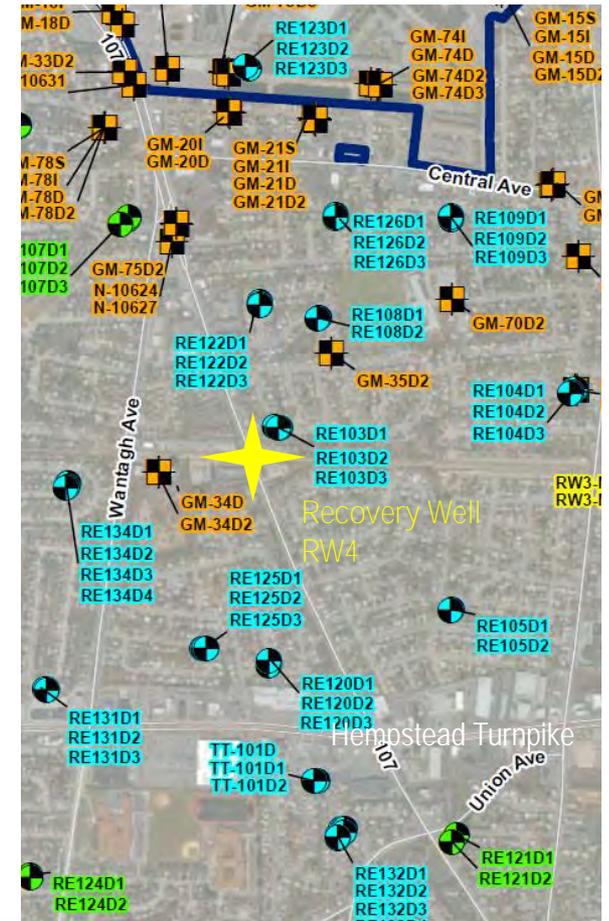
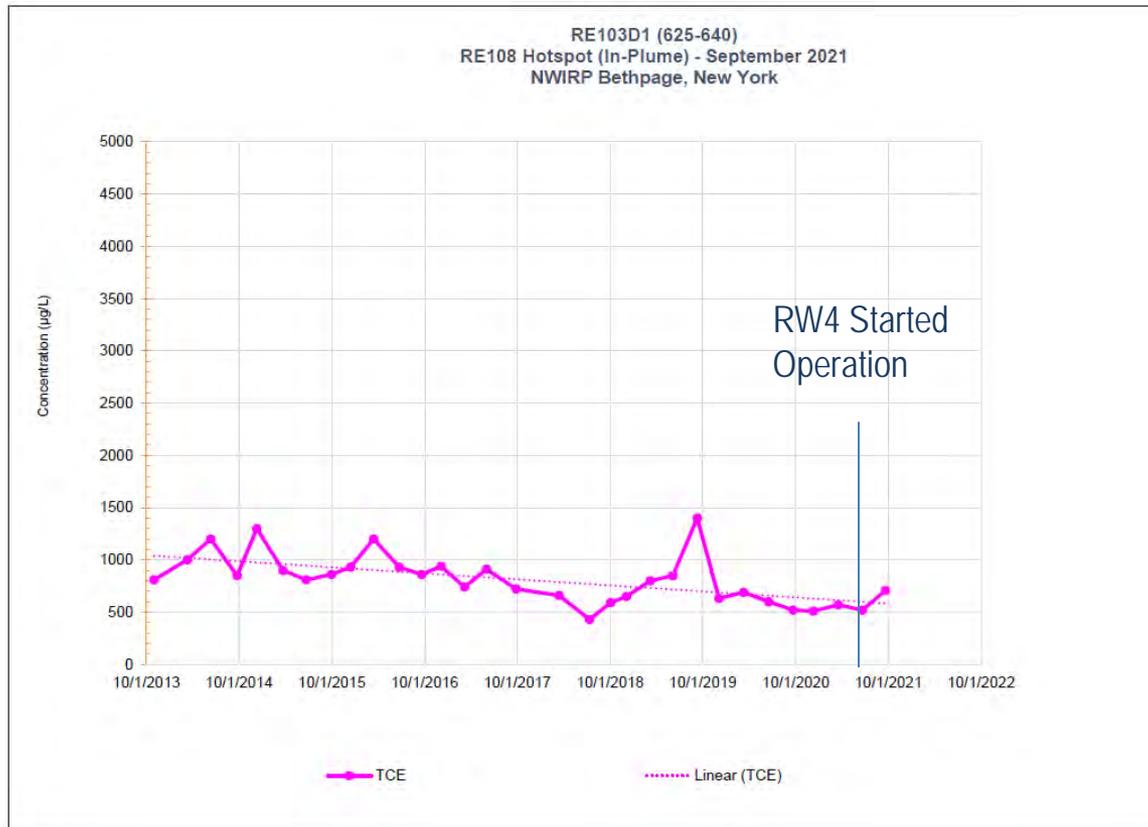
- Well and pipeline started operation in April 2021
- Trichloroethene (TCE) concentrations are increasing
- VOC loading at GM38 has increased by 400 percent





# OU2 Groundwater Monitoring – Recovery Wells RW4 (Phase I)

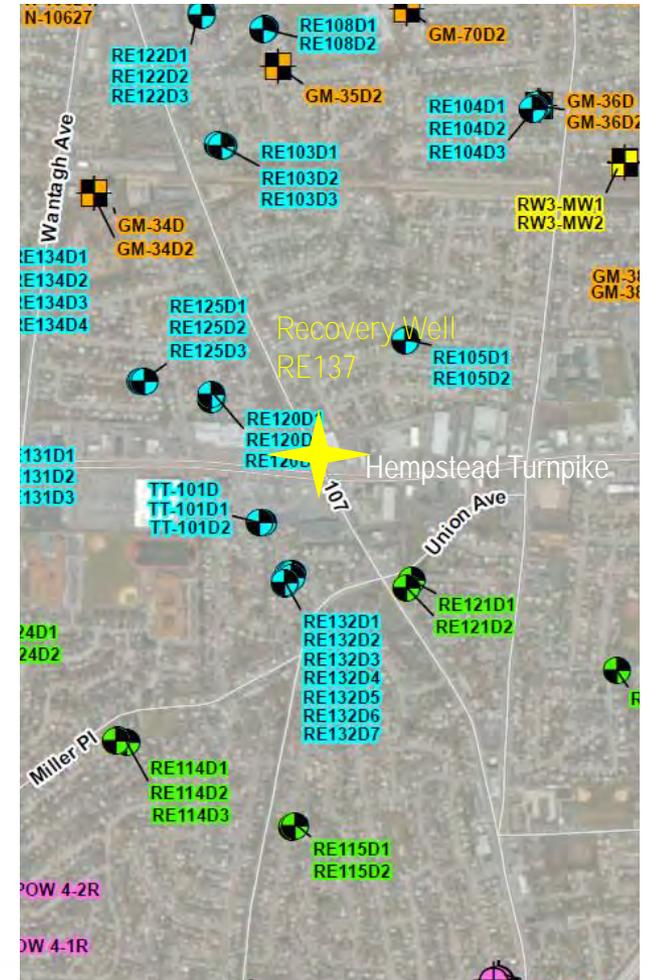
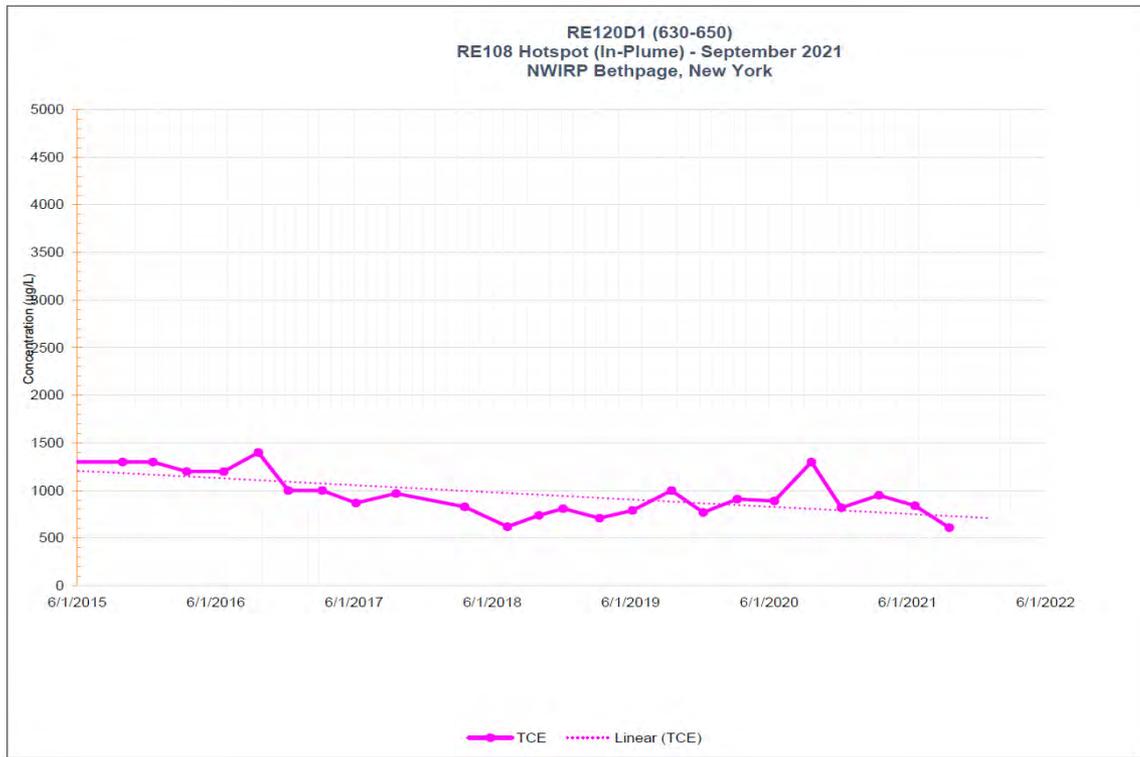
- Data analysis: Changes in water level and VOC concentrations





# OU2 Groundwater Monitoring – Recovery Well RE137

- Pilot testing – Startup in March 2022
- Planned operation through October 2023





# OU2 Groundwater Monitoring – Recovery Well RW5 (Phase II)

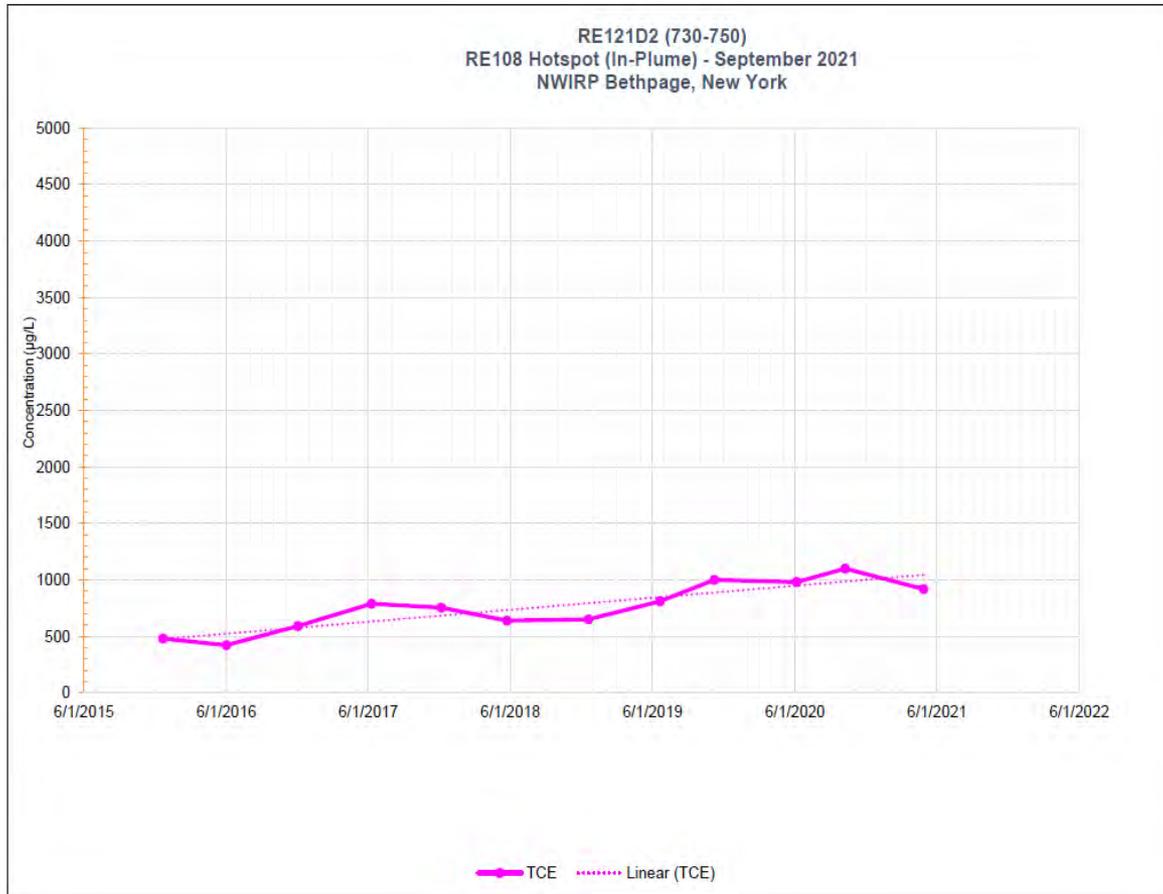
- RW5 installation and operation in late 2022





# OU2 Groundwater Monitoring – Recovery Well RW6 (Phase II)

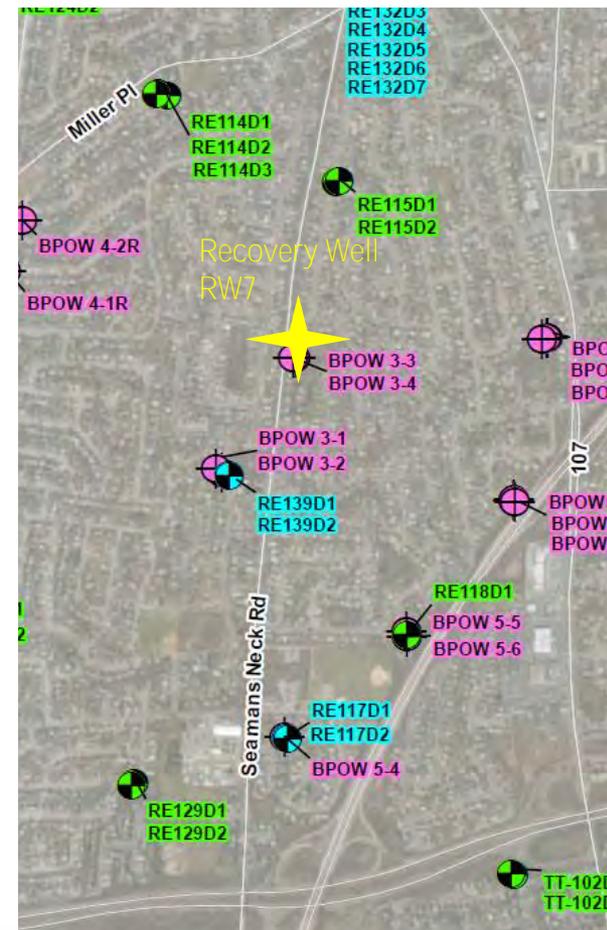
- RW6 is installed and planned for operation in 2022



# OU2 Groundwater Monitoring – Recovery Well RW7 (Phase II Extension)



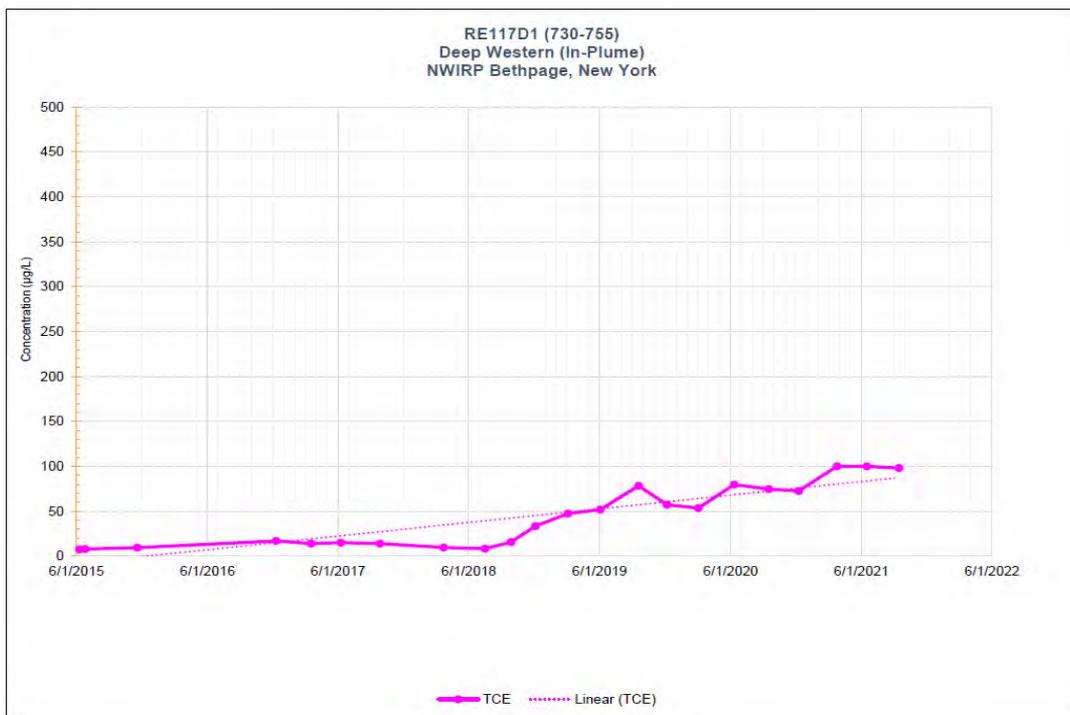
- RW7 is installed and planned for operation in 2022





# OU2 Groundwater Monitoring – Recovery Well RW8 to RW11 (Phase III)

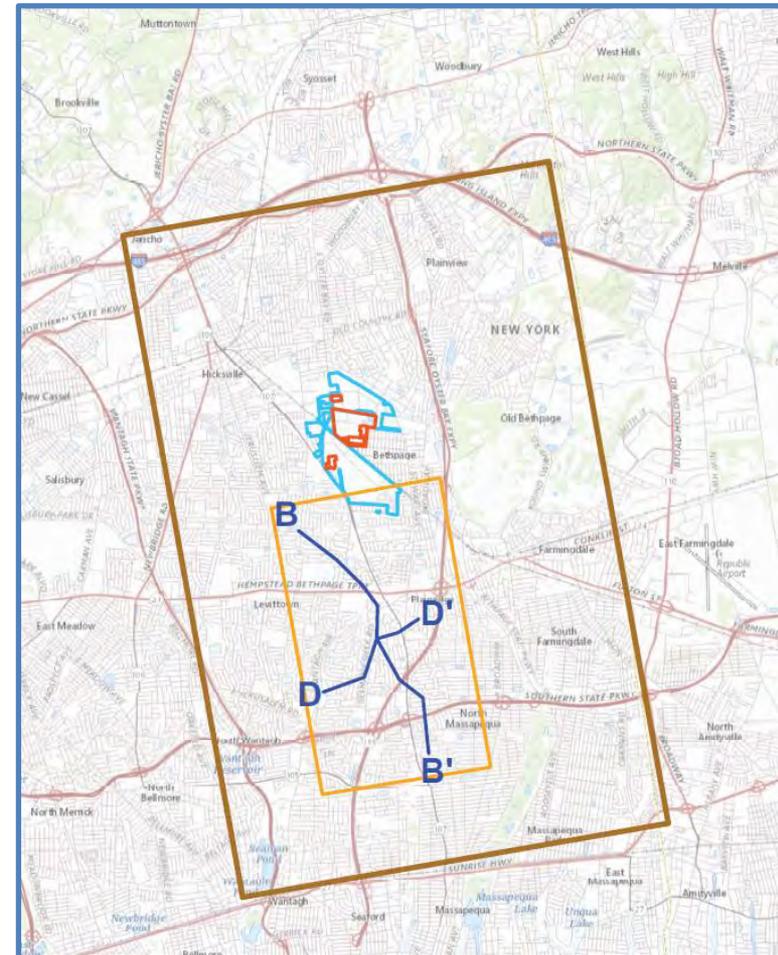
- Recovery Wells RW8 and RW9 target groundwater at monitoring well RE117
- RW8 and RW9 to be installed in 2022 and be operation in 2024
- RW10 and/or RW11 to based on a data gap investigation





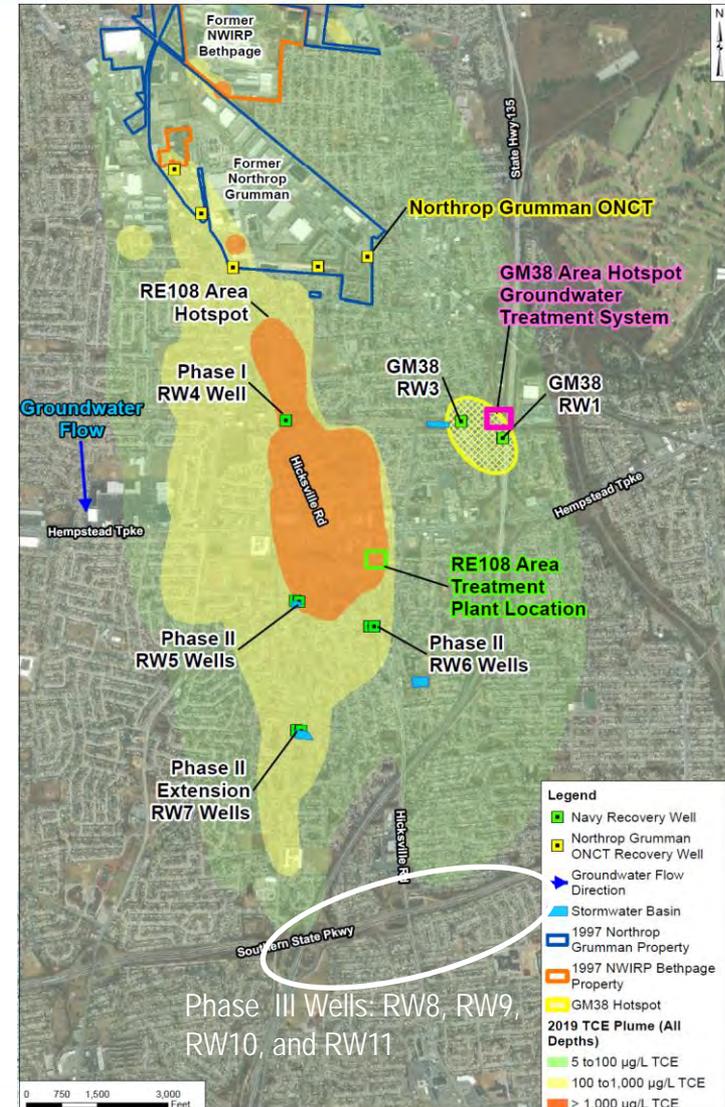
# OU2 Groundwater Fate and Transport Modeling

- Flow model used to evaluate OU2 plume behavior over time
- Model is approximately 42 square miles and 2 million cells
- Design, evaluate, and optimize remedial systems

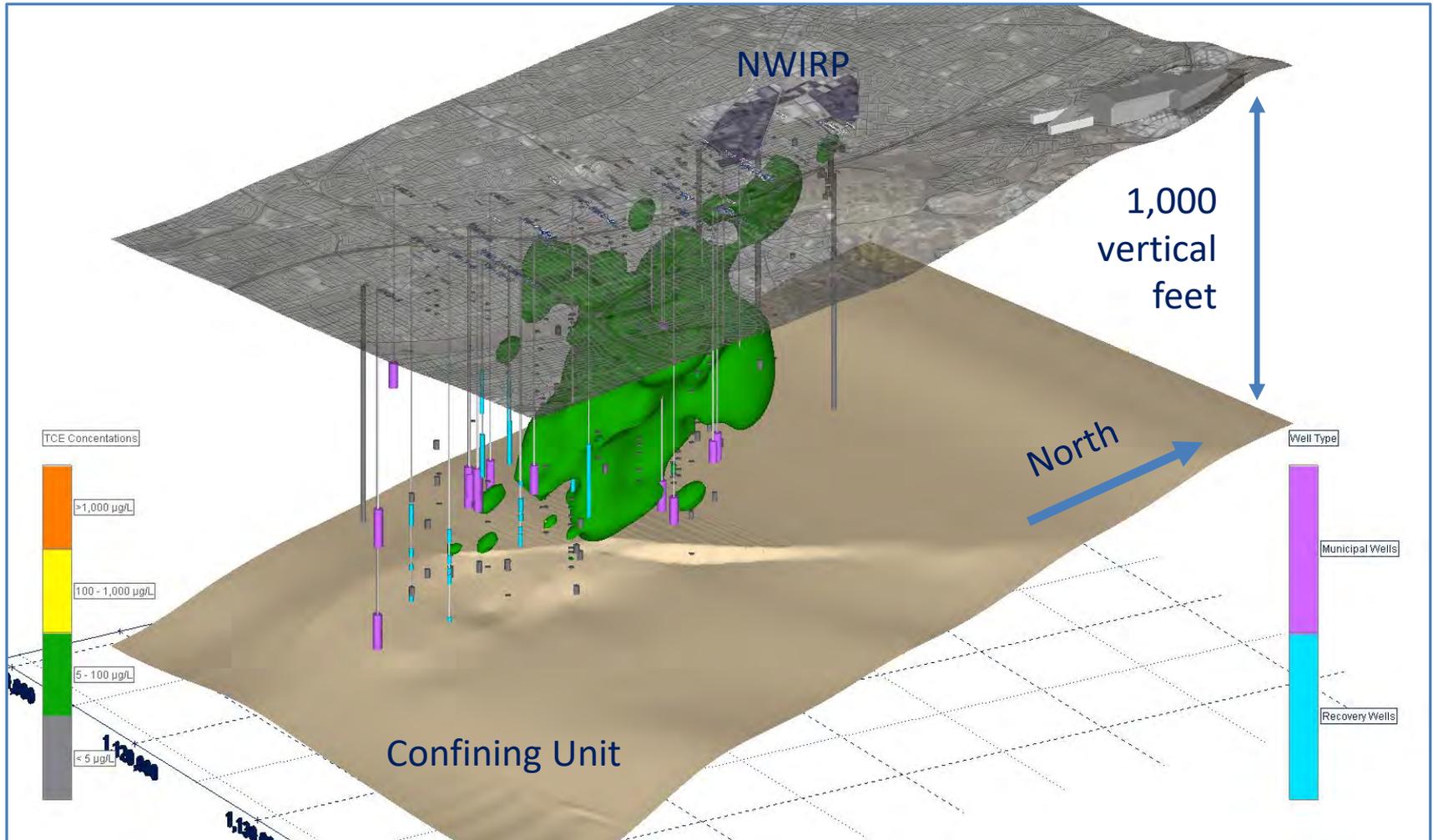


# OU2 Groundwater Fate and Transport Modeling

- 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
- Boundary likely includes non-OU2 contributors

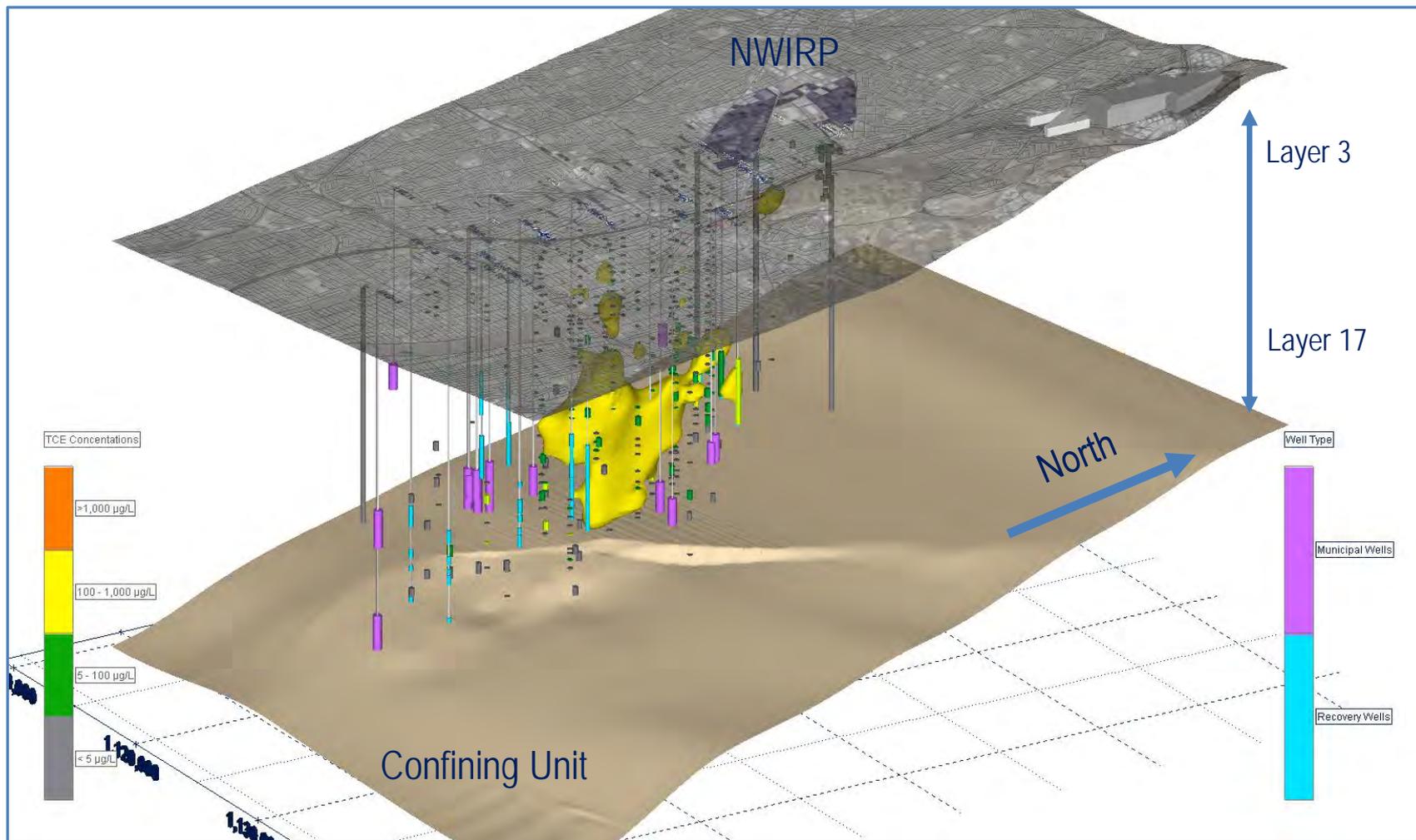


# OU2 Groundwater Fate and Transport Modeling – 3D TCE Plume





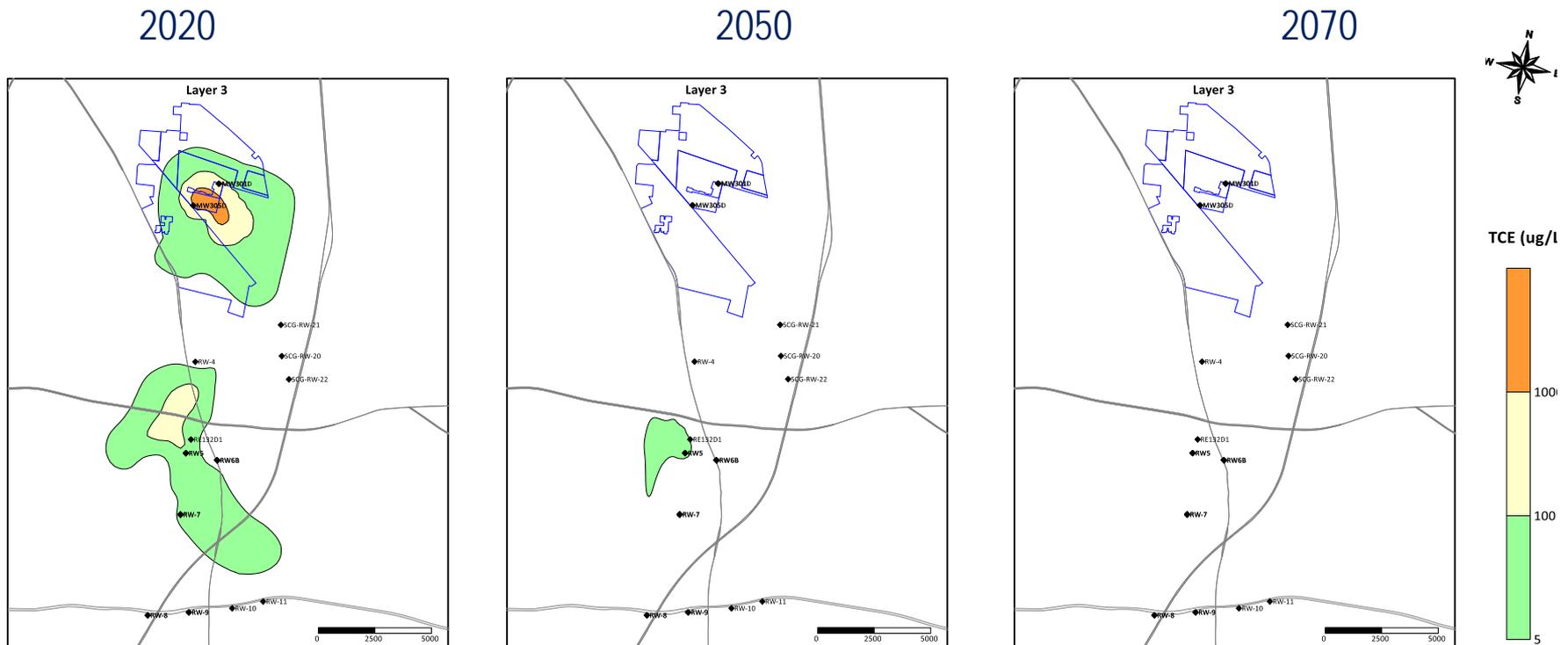
# OU2 Groundwater Fate and Transport Modeling – 3D TCE Plume





# OU2 Groundwater Fate and Transport Modeling

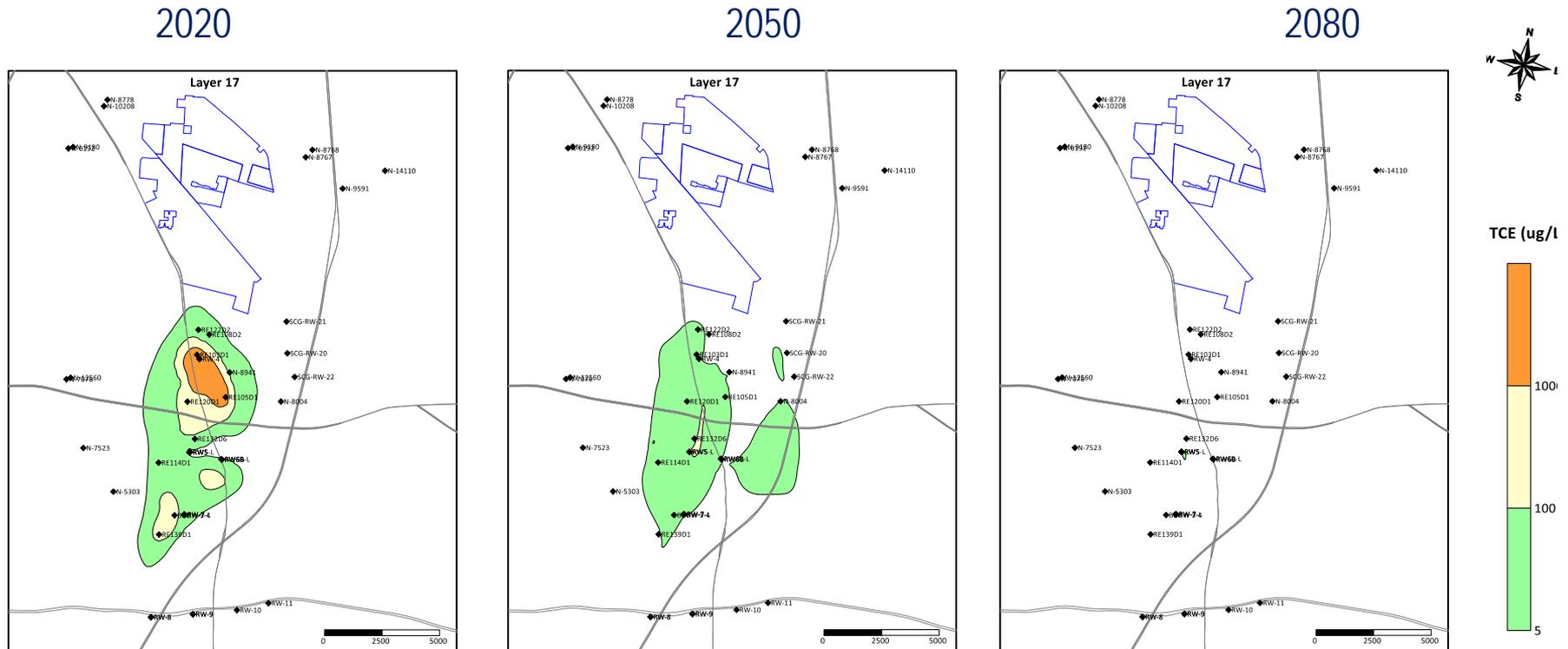
- Layer 3 (Approx. 250 feet below ground surface) plume cleanup estimates (Trichloroethene)
- Different layers and concentrations cleanup at different rates (Shallow layers cleanup faster)





# OU2 Groundwater Fate and Transport Modeling

- Layer 17 (Approx. 700 feet below ground surface) plume cleanup estimates (Trichloroethene)
- Different layers and concentrations cleanup at different rates (Deeper layers take longer)





# OU2 Groundwater Fate and Transport Modeling

- Three-dimensional plume video



# OU2 Groundwater Fate and Transport Modeling

## RAB Member Questions



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

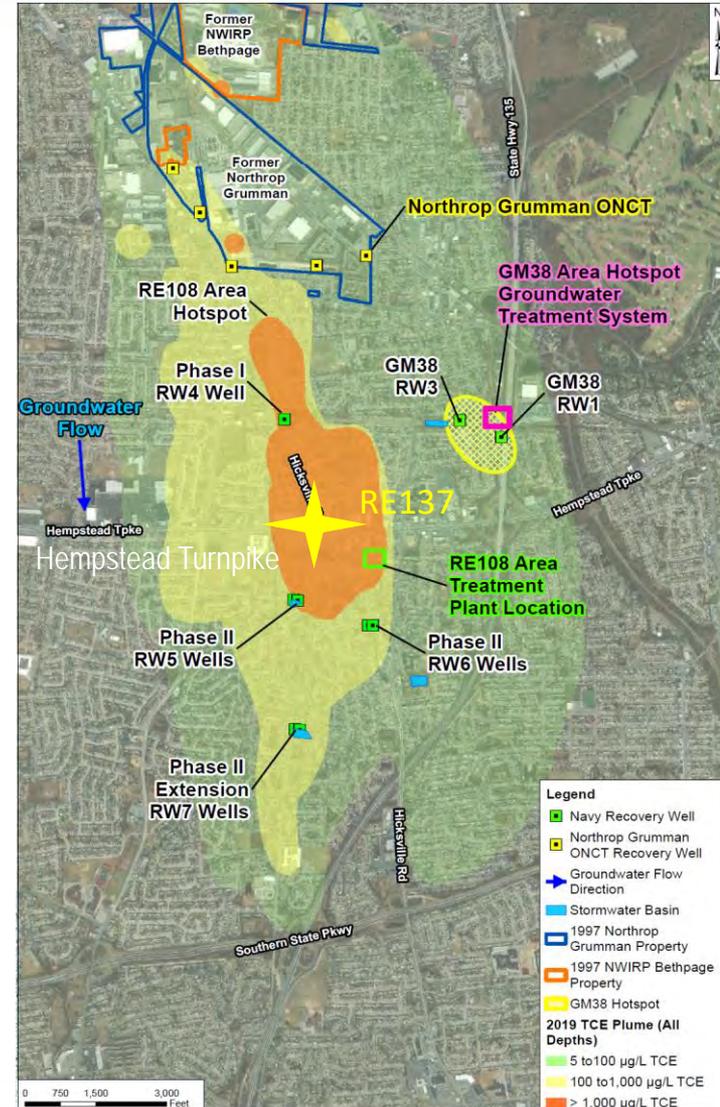
## Recovery Well RE137 Interim Action Update

Presented by:  
David Brayack, Project Manager  
Tetra Tech  
06 Apr 2022



# RE137 Pilot-Scale Testing

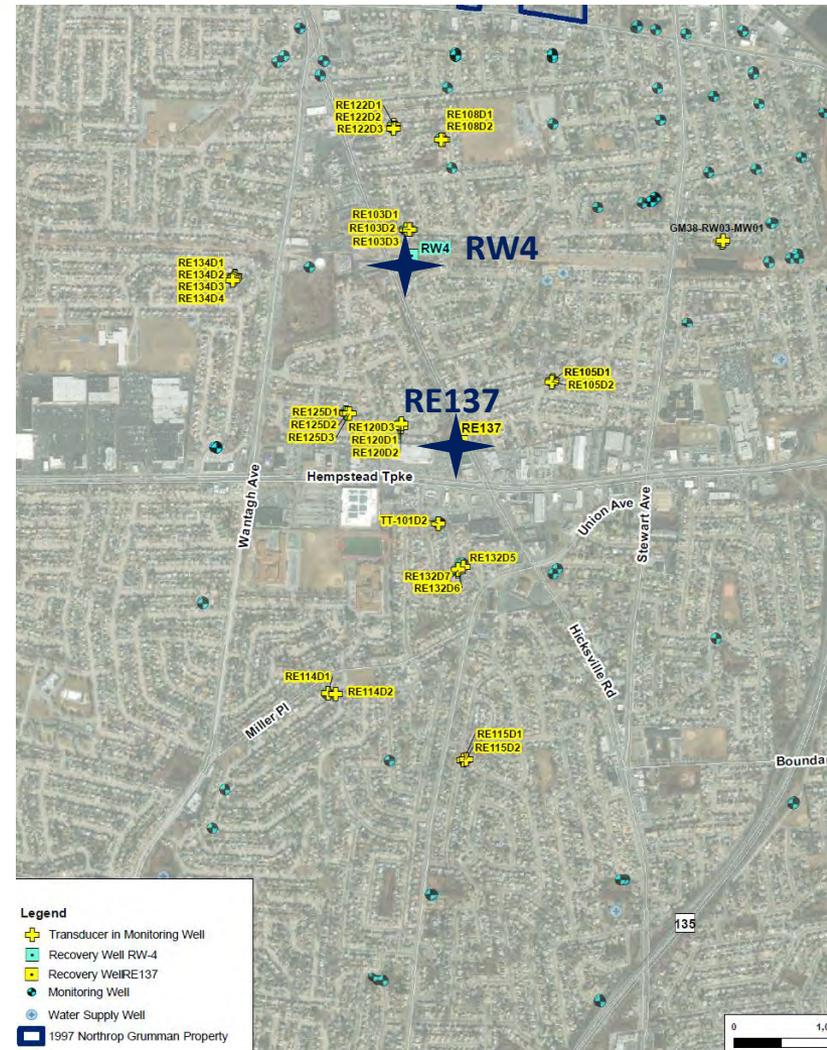
- RE137 was considered a groundwater recovery well for Phase II RE108 Area Hotspot Treatment System
- Well was too far north to intercept the hotspot, but could help slow down migration
- Test to run for approx. 20 months, potentially longer
- Treatment consists of Advanced Oxidation Process (AOP) technology and granular activated carbon (GAC)



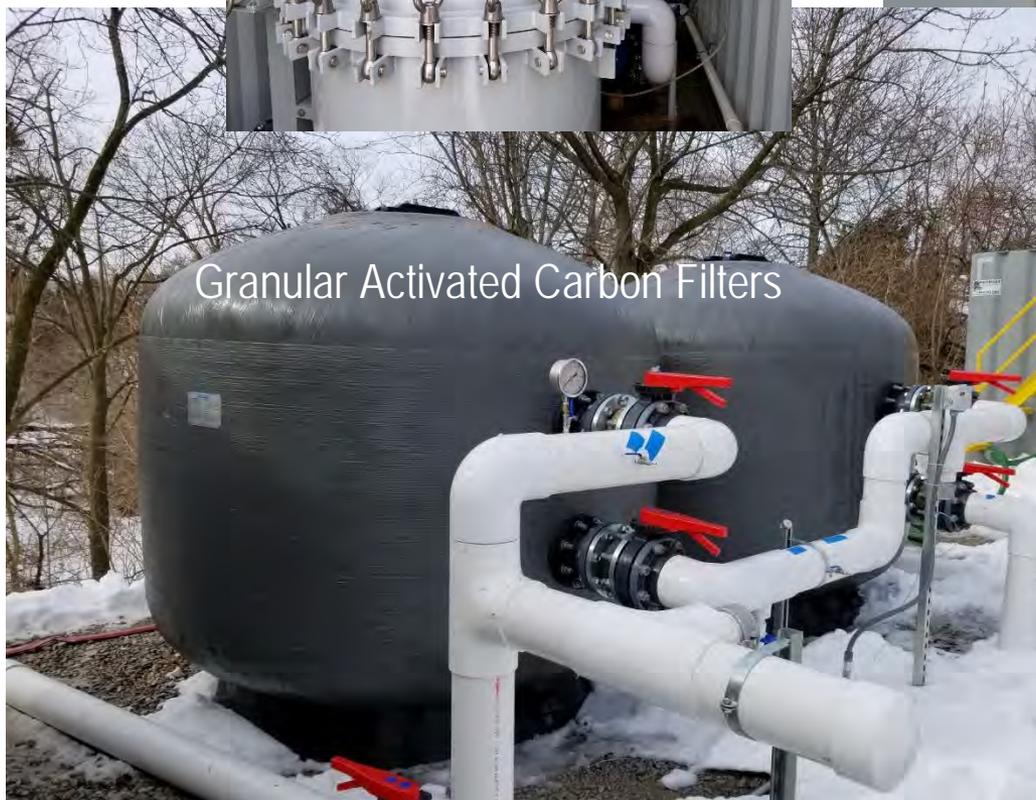
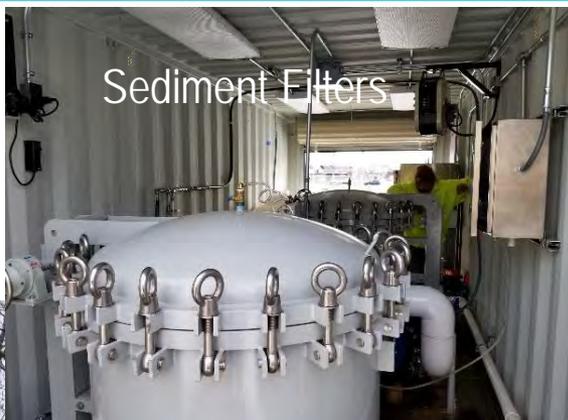


# RE137 Pilot-Scale Testing

- System should extract up to 210 million gallons per year
- Monitoring wells (yellow highlight) are being used to evaluate both recovery wells RW4 and RE137



# RE137 Pilot-Scale Testing





# RE137 Pilot-Scale Testing

- Performance Results: greater than 99 percent removal

Parameter	RE137 - Influent (micrograms per liter)	Treatment System Effluent (micrograms per liter)
1,4-dioxane (8260 SIM)	17	Not detected
1,1,2-Trichloroethane	1.1	Not detected
1,1-Dichloroethane	1	Not detected
1,1-Dichloroethene	6.9	Not detected
Carbon Tetrachloride	2.8	Not detected
Chloroform	1.4	Not detected
cis-1,2-Dichloroethene	3.9	Not detected
Freon 113	25.1	Not detected
Tetrachloroethene	3.6	Not detected
Trichloroethene	1,930	Not detected



# RE137 Pilot-Scale Testing

## RAB Member Questions



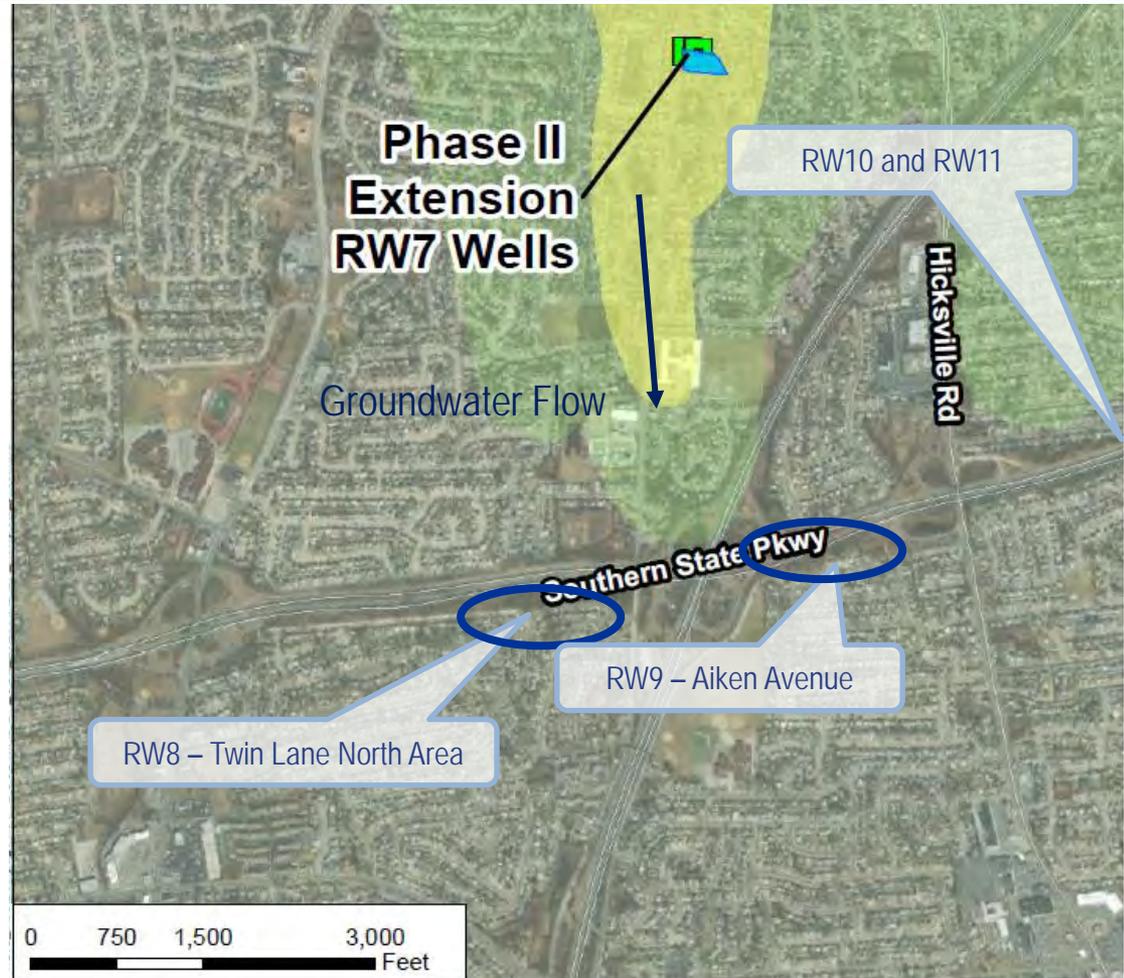
Department of Navy  
Naval Weapons Industrial Reserve Plant Bethpage  
Restoration Advisory Board Meeting

Phase III (RW8 to RW11) – Southern Plume Intercept  
Treatment System Update

Presented by:  
David Brayack, Project Manager  
Tetra Tech  
06 April 2022

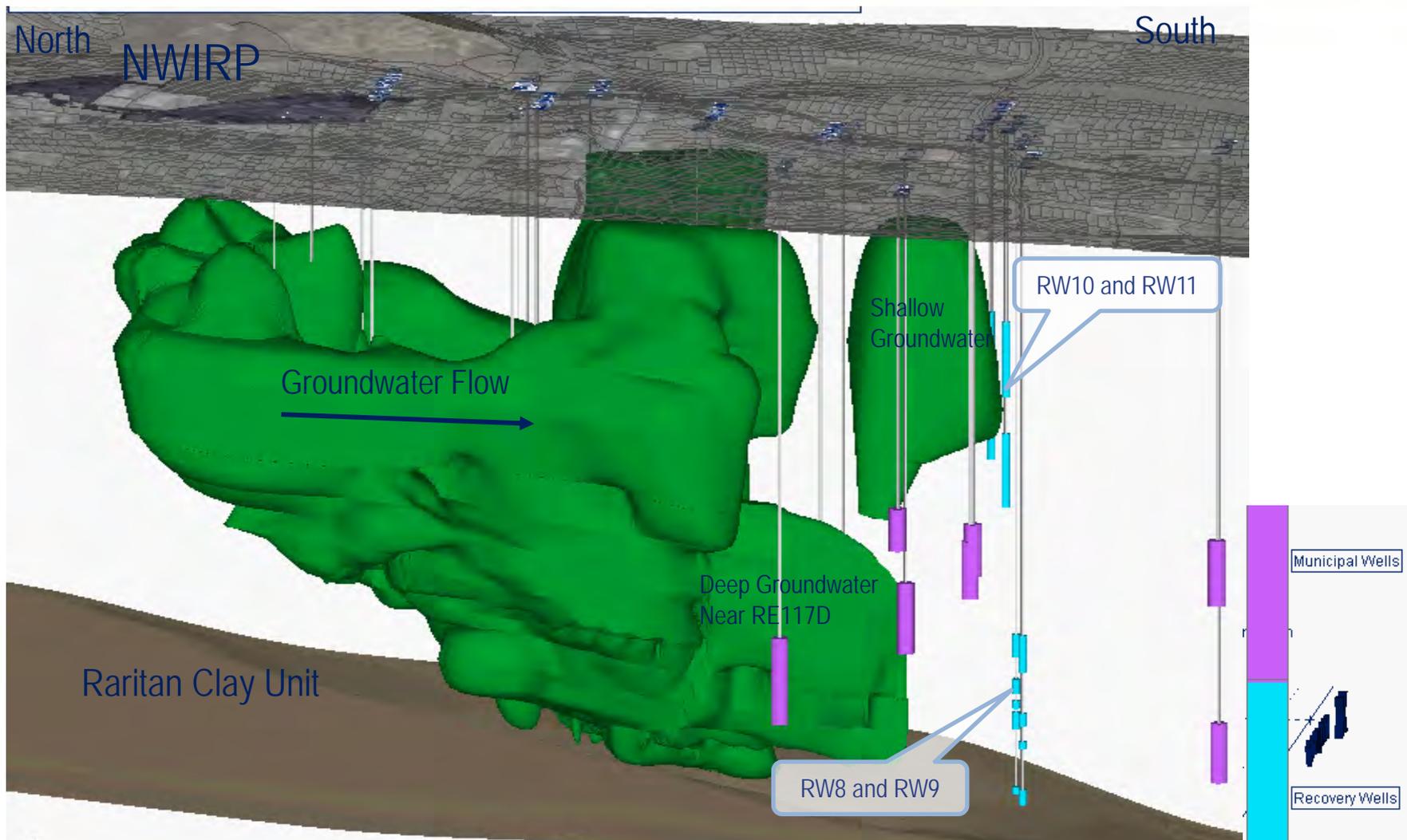
# Phase III – Southern Plume Intercept Treatment System Update

- Location based on extensive monitoring of plume migration and space available
- Phase III-A - RW8 and RW9 target deep groundwater that is not captured by Recovery Well RW7 – Initial focus on deep groundwater
- Phase III-B – Potential for RW10 and/or RW11 wells to the east, with a possibility of a separate treatment plant – shallow groundwater



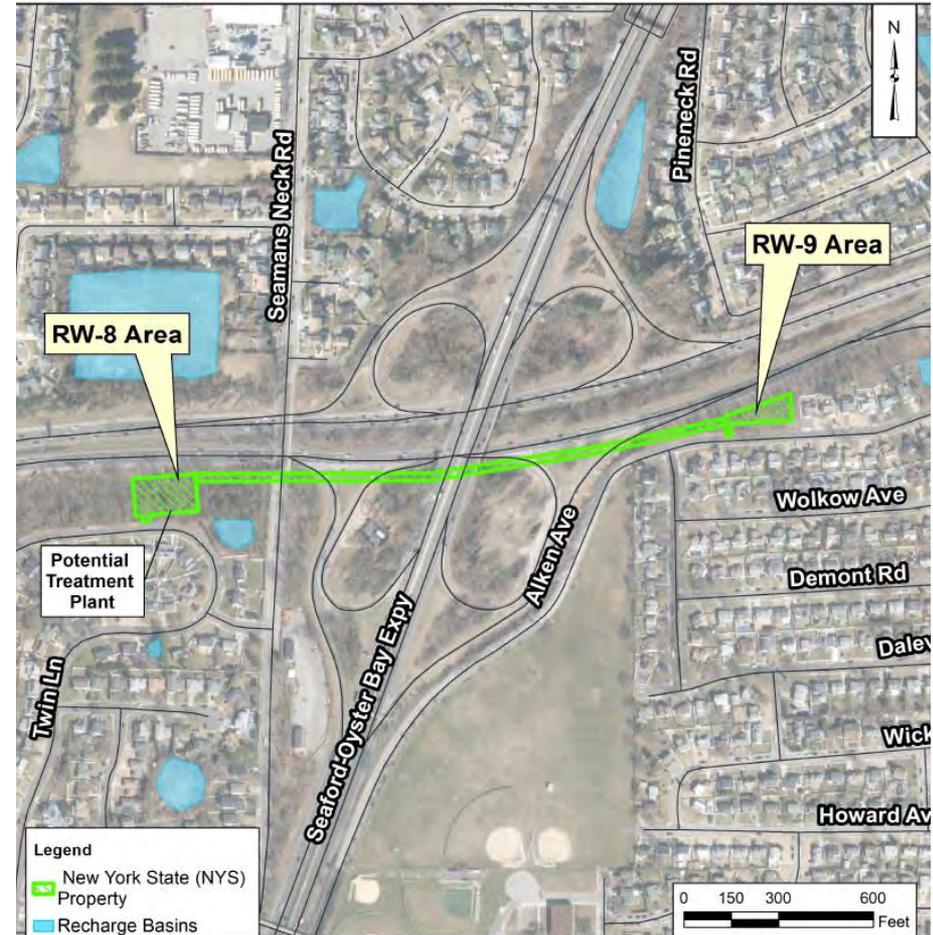


# Phase III – Southern Plume Intercept Treatment System Update



# Phase III – Southern Plume Intercept Treatment System Update

- Phase III drilling started in March 2021
- RW8 and RW9: (2) vertical profile borings and (8) monitoring wells are complete
- Computer modeling runs to evaluate capture are complete
- Recovery Well RW8 installation started in March 2022, to be followed by pumping tests in June/July
- Recovery Well RW9 to be installed in late 2022, followed by pumping tests



# Phase III – Southern Plume Intercept Treatment System, Recovery Well RW8 Area



# Phase III – Southern Plume Intercept Treatment System, Recovery Well RW9 Area





# Phase III – Southern Plume Intercept Treatment System Update – Path Forward

- Phase III-A (RW8 and RW9) Treatment System design: 2022 to 2023
- Treatment Plant construction and operation to start in 2024
- Phase III-B (RW10 and/or RW11) Treatment System pproximately one year after Phase III-A System



# Phase III – Southern Plume Intercept Treatment System Update – Path Forward

## RAB Questions



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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  
06 April 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
- Points of Contact
- Questions/Answers



# RE108 Area Hotspot Treatment System – Phase II System Overview

## Construction of Water Treatment Plant

- To be constructed at 11 Union Avenue

## Drilling and Installation of Recovery Wells (RWs)

- RW 5A/5B (Longfellow Avenue)
- RW 6A/6B (Patricia Court)
- RW 7A/7B (Seaman's Neck Road)

## Installation of Influent and Effluent Pipelines

- RW 5A/5B Extraction Pipeline
- RW 6A/6B Extraction Pipeline
- RW 7A/7B Extraction Pipeline
- Effluent Pipeline to recharge basins N-477 (Boundary Avenue) and N-210 (Seaman's Neck Road)





# RE108 AREA HOTSPOT TREATMENT SYSTEM – PHASE II – CONSTRUCTION UPDATE



The following are photographs of progress on the project:



March 15<sup>th</sup>, 2022. field crews marking out the locations for footing forms within the sump area in northern portion of water treatment plant footer. Looking east.



March 18<sup>th</sup>, 2022. Initial stages of rebar installation within the sump area in northern portion of water treatment plant footer. Looking east.

# RE108 AREA HOTSPOT TREATMENT SYSTEM – PHASE II – CONSTRUCTION UPDATE



The following are photographs of progress on the project:



March 14<sup>th</sup>, 2022. Nassau County Basin N477 prior to clearing and grubbing activities. Looking west.



March 14<sup>th</sup>, 2022. Initial stages of clearing and grubbing within Nassau County Basin N477. Excavator being used to move cut organic debris to woodchipper. Looking north northwest.



# 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



<b><u>Project Activities</u></b>	<b><u>Estimated Dates</u></b>
Construction of Water Treatment Plant	December 2021 – December 2022
Drilling and Installation of Recovery Wells	March 2021 – November 2022
Installation of Conveyance Pipelines	April 2022 – October 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.
- February 2022 - AGVIQ and NAVFAC hand-delivered Construction Notices to buildings/residents along the affected streets in close proximity of the pipeline work.





## 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



## 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	smatney@tikigaq.com

Questions



# Questions and Answers

## RAB Members