SIXTH FIVE-YEAR REVIEW REPORT FOR MALTA ROCKET FUEL AREA SUPERFUND SITE TOWNS OF MALTA AND STILLWATER, NEW YORK

Prepared by

U.S. Environmental Protection Agency
Region 2
New York, New York

Pat Evangelista Digitally signed by Pat Evangelista Date: 2024.02.01 17:34:55 -05'00'

February 1, 2024

Pat Evangelista, Director
Superfund and Emergency Management Division

Date

704673

TABLE OF CONTENTS

LIST OF ABBREVIATIONS & ACRONYMS

AOC	Administrative Order on Consent
ARAR	Applicable or Relevant and Appropriate Requirement
AWQS	New York State Ambient Water Quality Standard
AWQG	New York State Ambient Water Quality Guidance
CT	Carbon tetrachloride
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
CSWF	Cold Springs Well Field
DCE	Dichloroethene
DO	Dissolved Oxygen
EPA	United States Environmental Protection Agency
ERZ	Environmental Restriction Zone
ESD	Explanation of Significant Differences
FS	Feasibility Study
ft.	Feet
FYR	Five-Year Review
GE	General Electric Company
HI	Hazard Index
ICs	Institutional Controls
LFRD	Luther Forest Residential Development
LFTC	Luther Forest Technology Campus
LFTCEDC	Luther Forest Technology Campus Economic Development Corporation
LFWF	Luther Forest Well Field
MCL	Maximum Contaminant Level
µg/L	Micrograms per liter
mg/kg	Milligram per kilogram
mg/L	Milligram per liter
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSERDA	New York State Energy Research and Development Authority
PCB	Polychlorinated Biphenyl
PFAS	Per- and polyfluoroalykyl substances
PRP	Potentially Responsible Party
PTI	Power Technologies, Inc.
RAO	Remedial Action Objective
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
RWE	Remedial Work Element
SCWA	Saratoga County Water Authority
SCOs	6 New York Codes, Rules and Regulations Part 375, Soil Cleanup Objectives for Commercial Use

LIST OF ABBREVIATIONS & ACRONYMS (cont'd)

SDMP	Subsurface Drum Management Plan
TCE	Trichloroethylene
VOC	Volatile Organic Compound

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

This is the sixth FYR for the Malta Rocket Fuel Area Superfund site (Site). The triggering action for this statutory FYR is May 1, 2019, the signature date of the previous FYR report. The FYR has been conducted because hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (40 CFR Section 300.430(f)(4)(ii)) and considering EPA policy.

The entire Site is being addressed under one operable unit (OU) with four Remedial Work Elements (RWEs)--RWE I (drinking water); RWE II (groundwater); RWE III (soil); and RWE IV (institutional controls [ICs]).

The Site's FYR team was led by Patricia Simmons Pierre, the EPA Remedial Project Manager (RPM). Other EPA participants included Joel Singerman (Central New York Remediation Section Chief), Abbey States (Human Health Risk Assessor), Detbra Rosales (Ecological Risk Assessor), Rachel Griffiths (Hydrogeologist), and Larisa Romanowski (Community Involvement Coordinator). The "Performing Potentially Responsible Party" for the Site, the General Electric Company (GE), was notified of the initiation of the FYR. The review began on June 12, 2023.

Site Background

The 445-acre Site property includes a square parcel of approximately 165 acres of developed land, formerly known as the Malta Test Station (Test Station).

The U.S. government established the Test Station in 1945 for rocket engine and fuel testing. A restrictive safety easement was established around the Test Station to limit facility access to only those personnel who worked at the facility. This safety easement encompassed approximately 1,800 acres of pine forest in a one-mile radius from the center of the Test Station. The Test Station was first leased by various agencies, including several departments of the military, and then purchased in 1955 by a predecessor of the Department of Defense. GE operated the Test Station as a government contractor from 1945 to 1964. In 1964, the Test Station and the easement property were acquired by a predecessor of the New York State Energy Research and Development Authority (NYSERDA). The safety easement was eliminated at that time. GE continued as an operating contractor while NYSERDA and its predecessor conducted atomic and space research and development at the Test Station. Research and development activities at the Test Station continued until 1984, when NYSERDA sold approximately 81 acres of the Test Station, including most of the original buildings, test areas, rocket gantries and other facilities, to the Wright-Malta

Corporation (Wright-Malta). In 2004, the Luther Forest Technology Campus Economic Development Corporation (LFTCEDC) purchased more than 1,400 acres of property, including the Test Station property and surrounding areas, for the development of the LFTC. In 2009, GlobalFoundries US, Incorporated (GlobalFoundries) purchased a portion of the LFTC; in 2023, it completed the purchase of the entire LFTC property through a subsidiary company, GlobalFoundries Innovation Investments, LLC.

The Test Station, at one time, included 33 buildings, numerous rocket test stands, concrete quench pits, leach fields/septic tanks, dry wells, storage areas, disposal areas, and a small artificial pond known as Muggett's Pond. The Test Station has been fully decommissioned, the existing buildings are currently unoccupied, and a fence surrounds much of the property. The Site also includes portions of predominantly undeveloped woodlands that surround the Test Station; the Saratoga Technology Energy Park, owned by NYSERDA; and areas located adjacent to the Test Station that have been impacted by Site-related contaminants in the groundwater, owned by NYSERDA, the Town of Malta and GlobalFoundries. A Site parcel map is provided in Appendix A, Figure 1.

Test Station operations, which involved the use of carbon tetrachloride (CT) and trichloroethylene (TCE) as solvents and degreasers, resulted in the contamination of the soil and groundwater with volatile organic compounds (VOC) and metals.

Appendix B, attached, summarizes the documents utilized to prepare this FYR. Appendix C, attached, summarizes the Site's history, geology/hydrogeology, and land use. For more details related to background, physical characteristics, geology/hydrogeology, land/resource use, and history related to the Site, please refer to EPA's webpage for the Site, www.epa.gov/superfund/malta-rocket.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Malta Rocket Fuel Area Superfund Site		
EPA ID: NYD980535124		
Region: 2	**State:** NY	**City/County:** Malta and Stillwater/Saratoga
SITE STATUS		
NPL Status: Final		
Multiple OUs? No	**Has the site achieved construction completion?** Yes	

FIVE-YEAR REVIEW SUMMARY FORM (cont'd)

REVIEW STATUS
Lead agency: EPA
Author name (Federal or State Project Manager): Patricia Simmons Pierre
Author affiliation: EPA
Review period: 5/2/2019 – 1/31/2024
Date of site inspection: 9/21/2023
Type of review: Statutory
Review number: 6
Triggering action date: 5/1/2019
Due date *(five years after triggering action date)*: 5/1/2024

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

In the mid-1980s, groundwater at the Site was sampled and found to contain VOCs above federal Maximum Contaminant Levels (MCLs) for drinking water. Specifically, CT and TCE were detected in the groundwater near the center of the Test Station at maximum concentrations of 220 micrograms per liter (μg/L) and 280 μg/L, respectively.

Based on a human health risk assessment, the levels of PCBs in soil at the Building 23P area (where lead was also detected) and the levels of mercury at the Muggett's Pond Drainage Ditch Intersection were found to present unacceptable human health risks. An ecological risk assessment indicated that the soil contaminated with mercury at the Muggett's Pond Drainage Ditch Intersection may pose an ecological risk to terrestrial species. The potential risk posed to Muggett's Pond itself was determined to be minimal based on its small size (0.07 acre) and limited habitat for aquatic receptors.

Response Actions

In 1987, an air stripper was installed on the Test Station water supply wells by Wright-Malta under a New York State Department of Environmental Conservation (NYSDEC) permit to treat the contaminated groundwater prior to its use by employees at the Test Station. In addition, following the listing of the Site on the National Priorities List in 1987, groundwater and surface water quality monitoring between the Site and the Luther Forest Well Field (LFWF) (located approximately one mile southwest of the Site in the Town of Malta) was initiated because of concerns regarding the potential for contaminated Test Station groundwater to affect the LFWF.

In 1989, EPA issued a Unilateral Administrative Order to the PRPs to perform a remedial investigation and feasibility study (RI/FS). In March 1990, GE, NYSERDA, and the Department of Defense entered into a participation agreement and undertook the RI/FS.

Several response actions were performed concurrent with the RI, including the decommissioning and removal of two compressed gas cylinders, excavating and recycling 560 empty, buried, crushed drums, cleaning out several septic tanks, catch basins and dry wells, and cleaning out a sump.

Based on the results of the RI/FS, EPA signed a ROD for the Site in 1996. The following remedial action objectives (RAOs) were established in the ROD:

- Prevent ingestion of groundwater with concentrations of Site-related constituents (primarily the VOCs CT and TCE) above current federal drinking water standards or, if more stringent, New York State drinking water standards. Specifically, prevent the ingestion of groundwater containing concentrations of CT above 5 μg/L; TCE above 5 μg/L, tetrachloroethylene (PCE) above 5 μg/L; chloromethane above 5 μg/L; 1,1,1-trichloroethane above 5 μg/L, and total trihalomethanes (which includes chloroform) above 100 μg/L.
- Prevent ingestion of groundwater with concentrations of Site-related VOCs that pose an unacceptable risk to human health (total carcinogenic risk greater than 1 in 10,000 or a noncarcinogenic Hazard Index greater than 1).
- Prevent further migration of the groundwater plume containing Site-related VOCs above current federal drinking water standards or, if more stringent, New York State groundwater standards,[1] into areas with concentrations of contaminants in groundwater below such standards. Specifically, prevent further migration of groundwater containing more than 5 μg/L of CT, 5 μg/L of TCE, 5 μg/L of PCE, 5 μg/L of chloromethane, 5 μg/L of 1,1,1-trichloroethane, and 7 μg/L of chloroform.
- Restore groundwater so that concentrations of VOCs in the aquifer at the Site are reduced to current federal drinking water standards or, if more stringent, New York State groundwater standards. Specifically, restore the groundwater to concentrations that do not exceed 5 μg/L for CT, 5 μg/L for TCE, 5 μg/L for PCE, 5 μg/L for chloromethane, 5 μg/L for 1,1,1-trichloroethane, and 7 μg/L for chloroform.
- Prevent human exposure to soil at the Building 23P area containing concentrations of PCBs that pose an unacceptable risk to human health (*i.e.,* an excess cancer risk greater than 1 in 10,000) and concentrations of lead in excess of generally accepted cleanup levels for lead in soil for commercial/industrial land use. Specifically, prevent human exposure to PCBs in soil at concentrations greater than 10 milligrams per kilogram (mg/kg) from the surface to a depth of 1 foot and in soil at concentrations greater than 25 mg/kg for soil below a

[1] New York State groundwater standards are now called New York State Ambient Water Quality Standards (AWQSs).

depth of 1 foot, and prevent human exposure to lead in soil at the Building 23P area at concentrations greater than 1,000 mg/kg.

- Prevent unacceptable ecological risk attributable to mercury in soil at the Muggett's Pond Drainage Ditch Intersection. Specifically, prevent ecological exposure to mercury in soil at concentrations greater than 2 mg/kg.

The major components of the selected remedy are as follows:

- Continued pumping of the Test Station water supply well(s) and treatment of the water by air stripping to provide an acceptable drinking water supply for the Test Station employees, which may be accomplished using the existing air stripper. Continued monitoring of the influent and effluent of the air stripper in accordance with New York State requirements to ensure that it effectively treats the on-Site water supply to federal MCLs, or if more stringent, New York State drinking water standards.
- Natural attenuation (*i.e.,* any combination of dilution, dispersion, adsorption and degradation) and natural discharge to nearby surface water springs and seeps into ravines (where concentrations of VOCs would be reduced to acceptable levels in surface water through volatilization) to address the VOCs that are not captured by the pumping well(s) until the groundwater attains federal MCLs, or if more stringent, New York State groundwater standards. It was estimated that the concentrations of VOCs in groundwater would be reduced to acceptable levels in 110 years.
- Monitoring of surface water and groundwater to ensure that off-Site groundwater users are not impacted by contamination from the Site, that contaminated groundwater does not migrate into uncontaminated areas (*i.e.,* that the groundwater plume is contained) and that natural attenuation is restoring the groundwater to the cleanup standards. The existing surface water and groundwater sample locations may be modified as necessary to meet the objectives of this monitoring program.
- Excavation of contaminated soil at the Building 23P area to a depth of 1 foot or less having a concentration of greater than 10 mg/kg of PCBs, soil at a depth below 1 foot having a concentration of greater than 25 mg/kg of PCBs and soil at any depth with a concentration of lead of greater than 1,000 mg/kg.
- Excavation of contaminated soil at the Muggett's Pond Drainage Ditch Intersection at any depth with a concentration of greater than 2 mg/kg of mercury.
- Backfilling of excavations in the Building 23P area and at Muggett's Pond Drainage Ditch Intersection with clean fill material, grading to blend with the surrounding areas and revegetation.
- Transportation of the excavated soil from the Building 23P area and Muggett's Pond Drainage Ditch Intersection and disposal off-Site at an appropriate EPA-approved facility, consistent with Resource Conservation and Recovery Act and all other applicable or relevant and appropriate requirements.
- Implementation of ICs, which may include new deed restrictions, to prevent ingestion of contaminated groundwater, to restrict withdrawal of groundwater within the vicinity of the

plume that could adversely impact groundwater remediation and to restrict the Test Station to its current commercial/industrial land use.

- Evaluation of Site conditions at least once every five years to ensure that the remedy is protective of human health and the environment. If justified by the review, the EPA may require that additional remedial actions be implemented.

The New York State groundwater standards for the Site contaminants of concern (COCs) were selected in the ROD as the groundwater remediation goals (RGs) and are listed in the table below.

Table 1: Remediation Goals	
COC	**Remediation Goal (micrograms/liter)**
Carbon tetrachloride	5
Chloroform	7
Chloromethane	5
PCE	5
TCE	5
1,1,1- Trichloroethane	5

Status of Implementation

In 1997, EPA and the PRPs signed a Consent Decree for the performance of the work called for in the ROD. GE was designated the party responsible for performing the selected remedy. The components of the remedy were addressed in the four RWEs--RWE I (drinking water); RWE II (groundwater); RWE III (soil); and RWE IV (ICs).

No further remedial action was required for RWE I[2] and RWE II because the air stripper was already in operation and no actions were required related to natural attenuation of the VOCs in the groundwater. The remedial design related to RWE III was approved by the EPA in 1997. The remedial actions performed for RWE III are discussed below. The implementation of the ICs under RWE IV is discussed in the "Institutional Controls Summary" section, below.

Approximately four cubic yards of contaminated soil were excavated from the Building 23P area in 1998. Six post-excavation soil samples were collected from the excavation and analyzed for PCBs and lead. All the samples contained less than 10 mg/kg of total PCBs and less than 1,000 mg/kg of lead, thus, they met the cleanup criteria specified in the ROD. The excavated area was subsequently backfilled with clean fill and seeded. The excavated contaminated soil was transferred to a roll-off container and staged.

Approximately 62 cubic yards of contaminated soil, including visible elemental mercury in soil and debris, were excavated from the concrete trough at the Muggett's Pond Drainage Ditch Intersection and the surrounding areas in 1998. The excavated soil was transferred to 20-cubic

[2] Wright-Malta provided bottled water for consumption by its Test Station employees during the time that the buildings were being used as office space.

yard roll-off containers and one-cubic yard soil boxes and staged. The elemental mercury and associated soil were placed in two one-liter glass bottles, which were stored in a five-gallon pail for secondary containment. The excavated area (except the concrete trough) was subsequently backfilled with clean fill and seeded.

Based on the analysis of samples for hazardous waste characterization, the excavated soil was determined to be nonhazardous and was shipped by truck to Waste Management Inc.'s facility in Model City, New York. The two-liter bottles containing elemental mercury and associated soil were determined to be hazardous and were transported by truck to Advance Environmental Technical Services' transfer station in Flanders, New Jersey in 1998 and ultimately disposed of at AERC/MTI in Allentown, Pennsylvania in 1999.

Post-Remediation Actions

In 2011, during excavation and grading of soils in an area of the GlobalFoundries property that would eventually become a parking lot, approximately 60 drums/containers were encountered. They were sampled and removed for proper off-Site disposal by CT Male Associates, a contractor for GlobalFoundries. NYSDEC provided oversight for the response activities in coordination with EPA.

In 2014, during preconstruction activities associated with another GlobalFoundries parking lot on the Test Station property, an area of buried drums and debris was discovered. Because of concerns about the potential for buried munitions and other military items, an electromagnetic survey was conducted in the planned construction area. The survey found some anomalies and an investigation of the area was performed in 2016. Subsequently, approximately 60 drums and containers and 34 stainless steel cylinders (of varying sizes up to 12 inches in length with U.S. Navy markings) were excavated. The drums and containers were sampled and properly disposed of off-Site by LFTCEDC and GE. Because their contents were unknown, the cylinders were destroyed by controlled detonation in a remote area of the Site. EPA provided oversight for this response action.

As part of the 2011 and 2016 drum removal activities, post-excavation samples were collected from the soil and nearby groundwater monitoring wells and the results were compared to 6 NYCRR Part 375 Soil Cleanup Objectives for Commercial Use (SCOs) and AWQSs, respectively. Based upon the results of these investigations, it was concluded that the responses adequately addressed the limited contamination in these two areas.

Based on the presence of elevated VOCs in the groundwater, the 2009 FYR report recommended that post-construction vapor intrusion sampling be performed at the GlobalFoundries microchip manufacturing building, designated as the Fab 8 Administration 1 Building, that was under construction at that time, and that a mitigation system be installed if vapors were detected above levels of concern. It was also recommended that future construction include vapor mitigation measures that entail either the installation of a vapor barrier and vapor mitigation system (followed by post-installation indoor air sampling to verify that the system is working as intended), or the performance of a vapor intrusion study once construction is completed. The GlobalFoundries manufacturing building was constructed with a vapor barrier and 36-inch-thick concrete foundation slab, which eliminates any potential for vapor intrusion.

In 2010, the Saratoga County Water Authority (SCWA) completed the construction of a 27-mile water supply line which uses the Upper Hudson River as its water source. This waterline supplies water to the LFTC (including the Test Station) and five surrounding municipalities, including the Towns of Malta, Moreau, Wilton, Ballston and Clifton Park and the Village of Stillwater. The on-Site air-stripper treatment system was decommissioned following the connection of the Test Station to the public water line.

The GlobalFoundries Fab 8 Administration 1 Building was completed in 2012 and another building, designated as the Fab 8 Administration 2 Building was completed in 2013. Vapor intrusion studies were conducted by GlobalFoundries at the Administration 1 and 2 Buildings in 2012 and 2013, respectively. The sampling results were compared to values developed using EPA's vapor intrusion screening level calculator and values provided in the New York State Department of Health (NYSDOH) *Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York,* 2006. Based upon these results, EPA determined that no further vapor intrusion sampling was warranted in either building.

In 2018, post-construction indoor air sampling was conducted in the GlobalFoundries M+W Project Building, located in the north corner of the Test Station property. All indoor air results were below the EPA commercial vapor intrusion screening levels and NYSDOH indoor air guidelines. EPA determined that no additional mitigation measures or sampling was necessary to ensure protectiveness for workers in the building at this time.

In 2018, EPA issued an Explanation of Significant Differences (ESD) for the Site. The ESD documents EPA's decision to incorporate into the remedy: 1) ICs that limit occupancy of existing buildings or new construction, on or within 200 feet (ft.) of the Test Station property, unless appropriate vapor intrusion investigations are conducted and/or mitigation measures (including periodic monitoring) are implemented; and 2) EPA's determination that a Subsurface Drum Management Plan (SDMP)[3] should be implemented whenever intrusive activities are planned on the Test Station property. The ESD also documents EPA's decision to eliminate the air stripping of the Test Station groundwater for potable use.

Institutional Controls Summary

The ROD required the implementation of ICs to prevent ingestion of contaminated groundwater, restrict withdrawal of groundwater within the vicinity of the plume that could adversely impact groundwater remediation, and restrict the Test Station to commercial/industrial use, which is its current land use. To implement the ICs, an environmental restriction zone (ERZ)[4] was designated to prevent the capture zone of hypothetical future pumping wells from intersecting the groundwater plume of VOCs and thereby ensure containment of the plume in the ERZ. Three Environmental Restriction Easement and Declaration of Restrictive Covenants (Environmental Easements) were recorded with the Saratoga County Clerk for the property located within the ERZ (owned by Luther Forest, NYSERDA and Wright-Malta) in 1999. The ESD incorporated into the remedy ICs that: 1) limit occupancy of existing buildings or new construction on or within 200 ft. of the Test Station

[3] The SDMP was finalized in 2021.

[4] The ERZ extends approximately 1,500 ft. from the upgradient and lateral edges of the VOC plume, and approximately 1,500 ft. from the downgradient edge of the VOC plume (see Appendix A, Figure 1).

property unless appropriate vapor intrusion investigations are conducted and/or mitigation measures (including periodic monitoring) are implemented;[5] and 2) require that a SDMP be implemented whenever intrusive activities are planned on the Test Station property. Additional Environmental Easements are being finalized and will include the ICs called for in the ESD. The 1999 Environmental Easements remain in full force and effect.

Table 2: Summary of Planned and/or Implemented Institutional Controls

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Parcel(s) Impacted	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Groundwater	Yes	Yes	Sitewide	Prevent the utilization of the groundwater underlying the ERZ, prevent the development of the Site for residential use, and allow access for maintenance and monitoring activities.	Environmental Easements recorded by the Saratoga County Clerk on June 3, June 11, and June 28, 1999.
Land	Yes	Yes	Test Station Property	Restrict the Test Station property to commercial/industrial land use.	Environmental Easements recorded by the Saratoga County Clerk on June 11, 1999.
Land	Yes	Yes	Test Station Property	Establish Site-specific protocol for the management of any buried drums/debris encountered during intrusive construction activities.	Subsurface Drum Management Plan for Intrusive Activities Associated with Site Development, March 2021.

[5] The 1999 Operation and Maintenance Manual, Remedial Work Element IV, Institutional Controls, should be updated to include the vapor intrusion IC required by the ESD and the new Environmental Easements, when they are finalized.

Table 2: Summary of Planned and/or Implemented Institutional Controls					
Media, engineered controls, and areas that do not support UU/UE based on current conditions	**ICs Needed**	**ICs Called for in the Decision Documents**	**Parcel(s) Impacted**	**IC Objective**	**Title of IC Instrument Implemented and Date (or planned)**
Groundwater/ Vapor	Yes	Yes	Within 200 ft. of and on the Test Station Property	Limit occupancy of existing buildings or new construction, on or within 200 ft. of the Test Station property, unless appropriate vapor intrusion investigations are conducted and/or mitigation measures (including periodic monitoring) are implemented.	Planned Environmental Easements. Anticipated completion: June 30, 2024.
Land	Yes	Yes	Test Station Property	Establish Site-specific protocol for the management of any buried drums/debris encountered during intrusive construction activities.	Planned Environmental Easements Anticipated. completion: June 30, 2024.

System Operations, Monitoring and Maintenance

System Operations

System operation activities related to RWE I previously included the collection of influent and effluent water samples from the on-Site water supply system quarterly and analysis for the presence of VOCs to ensure that the air stripper was functioning as designed and the Test Station potable water supply was being effectively treated and meeting MCLs. All activities related to RWE I ceased after 2010, when the LFTC was connected to the newly installed SCWA public water supply and the air stripper was decommissioned.

Monitoring

As part of the RWE II monitoring activities, groundwater and surface water samples are collected and analyzed for VOCs, hexavalent chromium and total chromium, and natural attenuation parameters.[6] Hexavalent chromium and total chromium, though not listed in the ROD as COCs,

[6] Groundwater samples are analyzed for natural attenuation parameters based upon a recommendation in the 2009 FYR report.

were added to the list of analytes for selected wells (along the western side of the Site) in the early 1990s because these contaminants were detected in downgradient monitoring wells.

From 2003 through 2004, GE analyzed selected samples for ammonium perchlorate (a chemical associated with rocket fuel) in response to a request from NYSDOH. These analyses were discontinued because ammonium perchlorate was either not detected or detected at levels below the method reporting limit in all the samples.

The 2009 FYR report recommended sampling for hydrazine, another chemical associated with rocket fuel that was reportedly used widely across the Site and burned in one area (with a NYSDEC permit), to ensure full contaminant characterization at the Site. Hydrazine sampling was conducted at the Site during 2012 and 2013. Hydrazine sampling was discontinued because the results did not indicate the presence of this compound at the Site.

Based on a request from NYSDEC, as part of the May 2021 sampling event, GE analyzed select groundwater samples for 1,4-dioxane and per- and poly-fluoroalkyl substances (PFAS). As discussed in the "Data Review" section below, these analyses were discontinued because contaminant concentrations did not exceed their respective NYSDEC MCLs.

Groundwater elevations are measured as part of the routine monitoring events to evaluate potential changes in the size and shape of the contaminant plume and ensure that off-Site groundwater users are not impacted by Site contamination.

Monitoring events at the Site have been conducted semiannually in May and October. Based upon a review of historical groundwater data, it was determined that there is no seasonal fluctuation in groundwater concentrations. Therefore, in May 2023, the sampling frequency was reduced from semiannual to annual events (in the fall).

Site inspections are conducted during the routine groundwater sampling events to ensure that the monitoring wells remain secured and are accessible and fully operational and to determine if any changes or development (specifically, installation of groundwater wells and new construction) have occurred within the ERZ and ensure that the SDMP is implemented if intrusive activities are planned. In addition, representatives from NYSERDA, GlobalFoundries and the Town of Malta (owners of the property located within the ERZ) are interviewed about current or proposed changes in land use, groundwater usage, and compliance with the ESD and notice requirements in the respective deed restrictions. EPA is notified in writing of any changes observed during the sampling events or discovered during the interviews and the findings of these inspections and interviews are summarized in the Annual Operation and Maintenance (O&M) Reports.

New York State requires annual certification that ICs required by ROD are in place, and that remedy-related O&M is being performed. This certification is included as an attachment to the annual O&M reports.

Climate Change

Potential impacts from climate change have been assessed at the Site using EPA tools, including Climate Explorer, Flood Factor, and Sea Level Rise Viewer identified in Appendix D, attached. The performance of the remedy is currently not at risk due to the expected effects of climate change in the region and near the Site.

III. PROGRESS SINCE THE LAST REVIEW

The protectiveness determinations and status of the recommendations from the last FYR are listed respectively in Table 3 and Table 4, below.

Table 3: Protectiveness Determinations/Statements from the 2019 FYR

OU#	Protectiveness Determination	Protectiveness Statement
01	Short-term Protective	The implemented remedy protects human health and the environment in the short term. To be protective in the long term, the ICs and SDMP required in the 2018 ESD need to be implemented.
Sitewide	Short-term Protective	The implemented Sitewide remedy protects human health and the environment in the short term. To be protective in the long term, the ICs and SDMP required in the 2018 ESD need to be implemented.

Table 4: Status of Recommendations from the 2019 FYR

Issue	Recommendations and Follow-Up Actions	Status
The 2018 ESD incorporates into the remedy ICs that limit occupancy of existing buildings or new construction on or within 200 ft. of the Test Station property, unless appropriate vapor intrusion investigations are conducted and/or mitigation measures (including periodic monitoring) are implemented.	The existing Environmental Easements should be amended to include the ICs required in the 2018 ESD.	EPA is actively working with GlobalFoundries and other landowners to develop and finalize the new Environmental Easements.
The 2018 ESD requires that an SDMP be implemented whenever intrusive activities are planned on the Test Station property.	The existing Environmental Easements for the Site need to be supplemented to include the implementation of the SDMP required in the 2018 ESD.	The SDMP was finalized in March 2021. The new Environmental Easements for the Site are being drafted.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement and Site Interviews

On August 7, 2023, EPA Region 2 posted a notice on its website indicating that it would be reviewing site cleanups and remedies at 42 Superfund sites in New York, New Jersey, Puerto Rico and the U.S. Virgin Islands, including the Malta Rocket Fuel Area Site. The announcement can be found at the following web address: https://www.epa.gov/superfund/R2-fiveyearreviews.

In addition to this notification, the EPA CIC for the Site, Larisa Romanowski, posted a public notice on the EPA Site webpage, http://www.epa.gov/superfund/malta-rocket. Ms. Romanowski also provided the notice to the Towns of Malta and Stillwater by email on December 6, 2023, with a request that it be posted in municipal offices and on the town webpages. The notice indicated that a FYR would be conducted at the Malta Rocket Fuel Area Superfund site to ensure that the cleanup at the Site continues to be protective of people's health and the environment. The notice also included contact information for questions related to the FYR process or the Site.

Once the FYR is completed, the results will be made available on EPA's webpage for the Site, (www.epa.gov/superfund/malta-rocket) and at the Site repositories, which are Malta Town Hall, 2540 Route 9, Ballston Spa, New York; Round Lake Library, 31 Wesley Ave, Round Lake, New York; and the EPA Region 2, Superfund Records Center, 290 Broadway, 18th Floor, New York, New York.

Data Review

During this review period, groundwater and surface water samples were collected semiannually from 2018 through 2022 in May and October. Groundwater elevation measurements were also collected during each sampling event.

Groundwater samples were collected from 11 shallow aquifer monitoring wells (DGC-3S, DGC-4S, MW-1, MW-4, M-4S, M-10S, M-13S, M-25S, M-26S, M-28S, and M-29S) and nine deep aquifer monitoring wells (M-4D, M-11D, M-13D, M-24DR, M-25D, M-26D, M-27D, M-28D, and M-29D). All samples were analyzed for VOCs and dissolved oxygen (DO) levels as an indicator of natural attenuation (*i.e.,* degradation). Samples collected from monitoring wells M-13D and M-27D were also analyzed for hexavalent and total chromium. During the May 2021 event, samples from monitoring wells MW-25S (the most impacted well in the monitoring network), MW-28S (upgradient of MW-25S), and DGC-4S (downgradient of monitoring well MW-25S) were also analyzed for 1,4-dioxane and PFAS.

Surface water samples were collected from six locations, SW-A SW-B, SW-D, SW-E, SW-F, and SW-G, and analyzed for VOCs. Samples collected at surface water location SW-B were also analyzed for hexavalent and total chromium. All groundwater monitoring well and surface water sampling locations are depicted in Appendix A, Figure 2, and the sampling results are discussed below.

Shallow Groundwater

Shallow groundwater at the Site generally refers to depths ranging from about 30 to 50 feet below ground surface (bgs). While it primarily flows in the south-southwest direction, there is a potential radial component to the shallow groundwater. Compounds detected in the shallow groundwater include acetone, chloromethane, CT, chloroform and TCE; however, only concentrations of TCE and CT regularly exceeded their respective RGs of 5 µg/L during this review period.

The majority of shallow groundwater monitoring wells either did not have detectable concentrations of COCs or did not have exceedances of the RGs during the review period. Monitoring wells DGC-3S and DGC-4S are sentinel wells located downgradient of the LFWF and have consistently shown no indication of VOC contamination. Monitoring wells MW-1 and MW-4 are located hydraulically upgradient along the south-southeast Test Station boundary and have shown no presence of COCs since being added to the monitoring program in 2012. Monitoring wells M-10S and M-13S, situated along the south-southwest edge of the LFWF property boundary, showed VOC concentrations at levels below the RGs. Monitoring well M-26S, located along the north-northeast Test Station boundary, showed mostly non-detectable concentrations of COCs, and all detectable concentrations were below their RGs. Monitoring well M-4S, which is located downgradient from the Test Station boundary to the north-northwest, exhibited no COC concentrations above the RGs during the review period.

Monitoring wells M-25S, M-28S, and M-29S are situated along the north-northwest Test Station boundary. During this review period, concentrations of TCE and CT exceeded their RGs in monitoring well M-25S with maximum detections in October 2019 of 28.7 µg/L and 17.3 µg/L, respectively. Concentrations of CT in monitoring well M-28S (maximum of 4.9 µg/L in May 2022) remained below the RG of 5 µg/L; however, TCE was detected at a maximum of 16.2 µg/L in October 2022, exceeding the RG of 5 µg/L. Concentrations of CT sporadically exceeded RGs in monitoring well M-29S, with a maximum concentration of 8.7 µg/L in May 2020.

Overall, the data collected during the review period indicate that low level concentrations of COCs are present in the shallow aquifer and generally do not exceed their respective RGs. The exception to this is along the north-northwest Test Station boundary where monitoring wells M-25S, M-28S, and M-29S showed TCE and CT concentrations exceeding their respective RGs of 5 µg/L. Downgradient monitoring well M-4S had no constituents detected above RGs during the review period, which indicates that the area of impact along the north-northwest Test Station boundary is limited in extent.

Deep Groundwater

The deep groundwater at the Site flows to the north-northwest and southwest and, generally, refers to depths ranging from 70 to 90 ft. bgs. While compounds detected in the deep groundwater historically include acetone, CT, chloroform, TCE, cis-1,2-dichloroethene (DCE), 1,1,1-trichloroethane, 1,1-DCE, and chromium, the only compounds regularly exceeding their respective RGs during this review period were CT and TCE. Isolated exceedances of total chromium above its RGs of 50 µg/L were noted during the review period, but the exceedances are not indicative of individual trends or sitewide patterns.

During this review period, TCE concentrations in the deep monitoring wells ranged from not detected to 50 µg/L (September 2022) and CT concentrations ranged from not detected to 29.4 µg/L (June 2019), with maximum concentrations consistently being found in monitoring well M-25D, which is along the north-northwest Test Station boundary. Trend graphs, provided in Appendix E, show declining or stable concentrations of CT and TCE over the FYR period with the exception of TCE in monitoring well MW-24DR and CT in monitoring well MW-27D.

Monitoring wells M-4D, which is downgradient from the Test Station boundary to the north-northwest, and M-26D, located along the north-northeast Test Station boundary, did not have detectable concentrations of COCs during the review period. Concentrations of COCs in monitoring well M-13D, which is located on the downgradient south-southwest side of the Test Station boundary, did not exceed RGs during the review period.

Monitoring well M-11D, located on the north-northeast Test Station boundary, exhibited concentrations of CT above RGs during two sampling events this review period. The maximum CT concentration of 7.6 µg/L was observed during the September 2022 sampling event. All other sampling events and COCs were below RGs.

During this review period, TCE concentrations in monitoring well M-27D, located on the south-southwest side downgradient of the Test Station boundary, ranged from not detected to 5.8 µg/L (October 2019), slightly exceeding its RG of 5 µg/L. CT concentrations in this monitoring well have exhibited an increasing trend throughout the review period, with concentrations ranging from not detected in June 2019 to 11 µg/L in May 2022, above its RG of 5 µg/L. Total chromium was consistently detected during the review period, however, it only exceeded its RG of 50 µg/L twice, with a concentration of 228 µg/L in October 2020 and 66 µg/L in May 2022. Hexavalent chromium was not detected or was below the RG during the review period.

Monitoring wells M-24DR, M-28D, and M-29D are situated on the north-northwest boundary. During the review period, concentrations of CT remained below its RG in monitoring well M-24DR, but concentrations of TCE sporadically exceeded its RG of 5 µg/L with a maximum concentration of 10.3 µg/L in October 2019. No exceedances of RGs were reported in samples from monitoring well M-28D during the review period. Monitoring well M-29D exhibited stable trends for TCE and CT during the review period, though concentrations remain above their respective RGs with maximum concentrations during the review period of 33 µg/L TCE (October 2021) and 13.2 µg/L CT (June 2019).

In summary, groundwater data in both the shallow and deep aquifer indicate stable or decreasing concentrations of VOCs in most wells, except for shallow and deep wells at the north-northwest property boundary. Many monitoring locations did not have concentrations of COCs above their respective RGs during the review period. COC concentrations at downgradient monitoring wells M-4S and M-4D, located on the north-northwest side of the Test Station boundary, have not exceeded RGs. This indicates that COC impacts on the north-northwest boundary are localized and have not migrated to downgradient locations. Monitoring will continue to be conducted on an annual basis.

Surface Water

VOC concentrations were below their AWQSs at all surface water sampling locations and chromium was not detected at surface water location SW-B during the review period. Isolated detections of acetone above of the New York State Ambient Water Quality Guidance (AWQG) value of 50 µg/L were observed at surface water locations SW-B (77.8 µg/L) and SW-D (70 µg/L) during the previous review period. However, data collected during this review period shows that acetone concentrations have remained steady and below the AWQG value.

Natural Attenuation Processes

DO concentrations are evaluated to determine if groundwater conditions are suitable for reductive dechlorination of TCE and CT. Generally, DO concentrations less than 1 milligram per liter (mg/L) are considered anaerobic and, therefore, conducive to reductive dechlorination. Data collected during the May and September 2022 sampling events indicates that only monitoring wells DGC-4S, M-4D, M-13D, and M-26D had DO concentrations that were below 1 mg/L, however, none of these wells have detectable COCs. The groundwater at the Site is primarily aerobic and is not supportive of reductive dechlorination because most monitoring wells contain DO above 1 mg/L, and dechlorination daughter products are generally absent from the groundwater. Multiple lines of evidence indicate that reductive dechlorination is not occurring. Instead, the main processes driving the decreases in contaminant concentrations are natural dispersion and dilution.

Emerging Contaminant Sampling

In March 2021, groundwater samples were collected and analyzed for emerging contaminants PFAS and 1,4-dioxane. Samples were collected from monitoring wells MW-25S (the most impacted well in the monitoring network), MW-28S (upgradient of MW-25S), and DGC-4S (downgradient of monitoring well MW-25S). There were no exceedances of the NYSDEC MCL of 10 nanograms per liter for perfluorooctanoic acid or perfluorooctanesulfonic acid. There were no detections of 1,4-dioxane, and, therefore, no exceedances of the NYSDEC MCL of 1 µg/L. Based on the groundwater monitoring data, the Site is not considered to be a source of PFAS or 1,4-dioxane and no further monitoring of these contaminants is recommended.

Site Inspection

The Site inspection was conducted on September 21, 2023. In attendance were EPA RPM, Patricia Simmons Pierre, NYSDEC Project Manager, Steven Scharf, Matthew Calacone of GE, and David Hoffman and Andrew Lacourciere representing GlobalFoundries. The purpose of the inspection was to assess the protectiveness of the remedy.

Messrs. Calacone, Hoffman and Lacourciere were interviewed in relation to this FYR. Messrs. Hoffman and Lacourciere advised that there are no redevelopment plans for the Site property that would conflict with the ICs established in the ROD and ESD. No issues impacting the current or future protectiveness of the remedy were identified during the Site visit.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

The ROD called for the excavation and off-Site disposal of contaminated soils. The soil contamination has been addressed through the removal of contaminated soil and backfilling with clean soil. The remedy eliminated any potential for on-Site exposures through dermal contact with and ingestion of contaminated soil by human and ecological receptors, as well as any potential impacts of the contaminated soil on groundwater through removal of the contaminated source.

The ROD called for continued pumping of the Test Station water supply well(s) to provide a potable water source for Test Station employees and natural attenuation (*i.e.,* dilution, dispersion, adsorption, and possibly degradation) and natural discharge to nearby surface water springs and seeps into ravines (where concentrations of VOCs would be reduced to acceptable levels in surface water through volatilization) to address the VOCs that are not captured by the pumping well(s) until the groundwater attains federal MCLs, or if more stringent, AWQSs. It was estimated in the ROD that the concentrations of VOCs in the groundwater would be reduced to acceptable levels in 110 years.

Following the installation of a public water line in 2010, the pumping of the Test Station water supply wells was discontinued. Overall, the two persistent and widespread contaminants that remain at the Site above their respective AWQS in both the shallow and deep aquifers are CT and TCE. Shallow and deep monitoring well trend data (provided in Appendix E) shows stable or declining trends for both constituents. Deep aquifer monitoring well M-25D has the highest concentrations of CT and TCE; both contaminants exhibited decreasing trends in this well during the review period. Emerging contaminants in groundwater, including PFAS and 1,4-dioxane, did not exceed their NYSDEC MCLs and no further sampling for these constituents is recommended. Surface water data collected during the review period indicate that VOC concentrations are below the AWQSs at all surface water sampling locations and that chromium was not detected at surface water sampling location SW-B.

The overall declining concentrations in the groundwater, coupled with stability of the plume, support the conclusion that the remedy is functioning as intended.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

The exposure assumptions and toxicity values that were used to estimate the potential cancer risks and noncancer hazards in the risk assessment followed the general risk assessment practice at the time. Although specific parameters and toxicity values may have changed, the risk assessment process that was used is still consistent with current practice and the need to implement a remedial action remains valid. The RAOs of preventing groundwater ingestion, groundwater restoration, preventing migration of groundwater contamination, and preventing direct exposure to soils from human and ecological receptors are still valid. There are no changes in the physical conditions of the Site or Site uses that would affect the protectiveness of the selected remedy.

Soils contaminated with PCBs, lead, and mercury were excavated and disposed off-Site in 1998. ICs to restrict the land use within the ERZ to commercial/industrial have been in place since 1999. There is currently no residential or recreational development expected in the next review period, either on-Site or within one mile of the Test Station. The recommended commercial/industrial cleanup value for lead is currently 800 mg/kg. The 2009 FYR confirmed that the post-excavation data met this goal despite the 1,000 mg/kg remedial goal established in the ROD. Buried drums discovered during redevelopment activities were removed from the Site in 2011 and 2016; post-excavation soil sampling confirmed that the response efforts addressed the contamination and met current SCOs for commercial use and AWQSs.

The selected remedy previously allowed for groundwater treated on-Site to be used as a potable supply for the Test Station. However, the Site groundwater has not been used for this purpose since 2010, when the Test Station was connected to a public water supply line that sources from the Hudson River. As observed in monitoring well data collected during the FYR period, concentrations of CT and TCE in the northwestern portion of the Site (within the boundaries of the Test Station) continue to exceed their respective remediation goals, however, the plume does not appear to be migrating and concentrations are gradually decreasing. No private potable supply wells are in use in the vicinity of the Site and all neighboring residential communities obtain their potable water from either the LFWF or the CSWF, which are not impacted by Site-related contaminants. ICs are in place to prevent the installation of new wells in the ERZ and groundwater use is not expected to change during the next FYR period. Therefore, the ingestion of groundwater pathway is incomplete and the groundwater remedy remains protective.

Vapor intrusion investigations were conducted in 2013 at the Fab 8 Administration 1 and 2 buildings (constructed with 12-inch concrete slabs and vapor barriers), which indicated that no additional mitigation measures were necessary. In 2018, additional indoor air sampling was conducted at the Global Foundries M&W Projects Building, which is built with a 12-inch concrete vapor barrier. All indoor air sampling results were below the EPA commercial vapor intrusion screening levels (set at a cancer risk of 10^{-6} and a hazard of 1) and the NYSDOH indoor air guidelines. EPA determined that no additional mitigation measures or sampling was necessary to ensure protectiveness for workers in the building at this time. Further evaluation of the vapor intrusion pathway may be necessary in the future if nearby monitoring wells indicate increasing VOC concentrations or if there are any changes made to the vapor barriers currently in place.

Additional ICs were incorporated into the remedy by the ESD to require vapor intrusion investigations and/or implement mitigation measures (including periodic monitoring) for all existing buildings and new construction within 200 ft. of the Test Station property boundaries to ensure that occupants are not exposed to unacceptable levels of contaminants via vapor intrusion.

Shallow groundwater data collected during the review period was screened against EPA's commercial vapor intrusion screening levels to assess the potential for vapor intrusion from the groundwater plume if additional new buildings were constructed on-Site. Concentrations of TCE at monitoring well M-25S exceeded these screening levels (set at a cancer risk of 10^{-4} and a hazard quotient of 1), indicating the potential for unacceptable risk from vapor intrusion if a building was constructed in the vicinity of this well with no vapor controls in place. However, there are currently no buildings within 200 ft. of this well and the ICs would ensure protectiveness for any future

construction within the ERZ. The vapor intrusion pathway was also considered in the vicinity of monitoring well 27D, near the Luther Forest Athletic Fields. Groundwater data collected during this FYR period for monitoring well M-27D (screened at approximately 80 ft. bgs) showed detections of TCE and CT that exceeded their respective remediation goals. Maximum VOC concentrations at monitoring well 27D were below EPA's vapor intrusion screening levels and the structures are well-ventilated and open to the atmosphere; therefore, incorporation of vapor intrusion mitigation measures into the building design was deemed unnecessary by EPA in the 2014 FYR. Vapor intrusion data across the Site currently indicates that there is no completed vapor intrusion pathway. Vapor intrusion sampling and mitigation measures, if determined to be necessary, should continue for any future construction within the ERZ.

Although the ecological risk assessment screening and toxicity values used to support the ROD may not necessarily reflect the current values, the removal of contaminated soil from the Muggett's Pond Drainage Ditch Intersection eliminated any potential risk to ecological receptors. If, in the unlikely event that the current Site use changes from commercial/industrial, then the soil remedy for PCBs may need to be reevaluated to determine its protectiveness for ecological receptors.

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

There is no further information that calls into question the protectiveness of the selected remedies.

VI. ISSUES/RECOMMENDATIONS

<table>
<tr><th colspan="5">Issues/Recommendations</th></tr>
<tr><td colspan="5">OU(s) without Issues/Recommendations Identified in the Five-Year Review:</td></tr>
<tr><td colspan="5">None</td></tr>
<tr><td colspan="5">Issues and Recommendations Identified in the Five-Year Review:</td></tr>
<tr><td rowspan="3">OU(s): 01</td><td colspan="4">Issue Category: Institutional Controls</td></tr>
<tr><td colspan="4">Issue: The ESD incorporates into the remedy an IC related to vapor intrusion and the implementation of the SDMP. EPA is working with the current landowners to finalize Environmental Easements for the Test Station property and the other parcels.</td></tr>
<tr><td colspan="4">Recommendation: Environmental Easements that include an IC related to vapor intrusion and implementation of the SDMP should be finalized.</td></tr>
<tr><td>Affect Current Protectiveness</td><td>Affect Future Protectiveness</td><td>Party Responsible</td><td>Oversight Party</td><td>Milestone Date</td></tr>
<tr><td>No</td><td>Yes</td><td>PRP</td><td>EPA</td><td>6/30/2024</td></tr>
</table>

OTHER FINDINGS

The following suggestion, which was identified during the FYR, does not affect current or future protectiveness:

- The 1999 Operation and Maintenance Manual, Remedial Work Element IV, Institutional Controls, should be updated to include the vapor intrusion IC required by the 2018 ESD and the new Environmental Easements, when they are finalized.

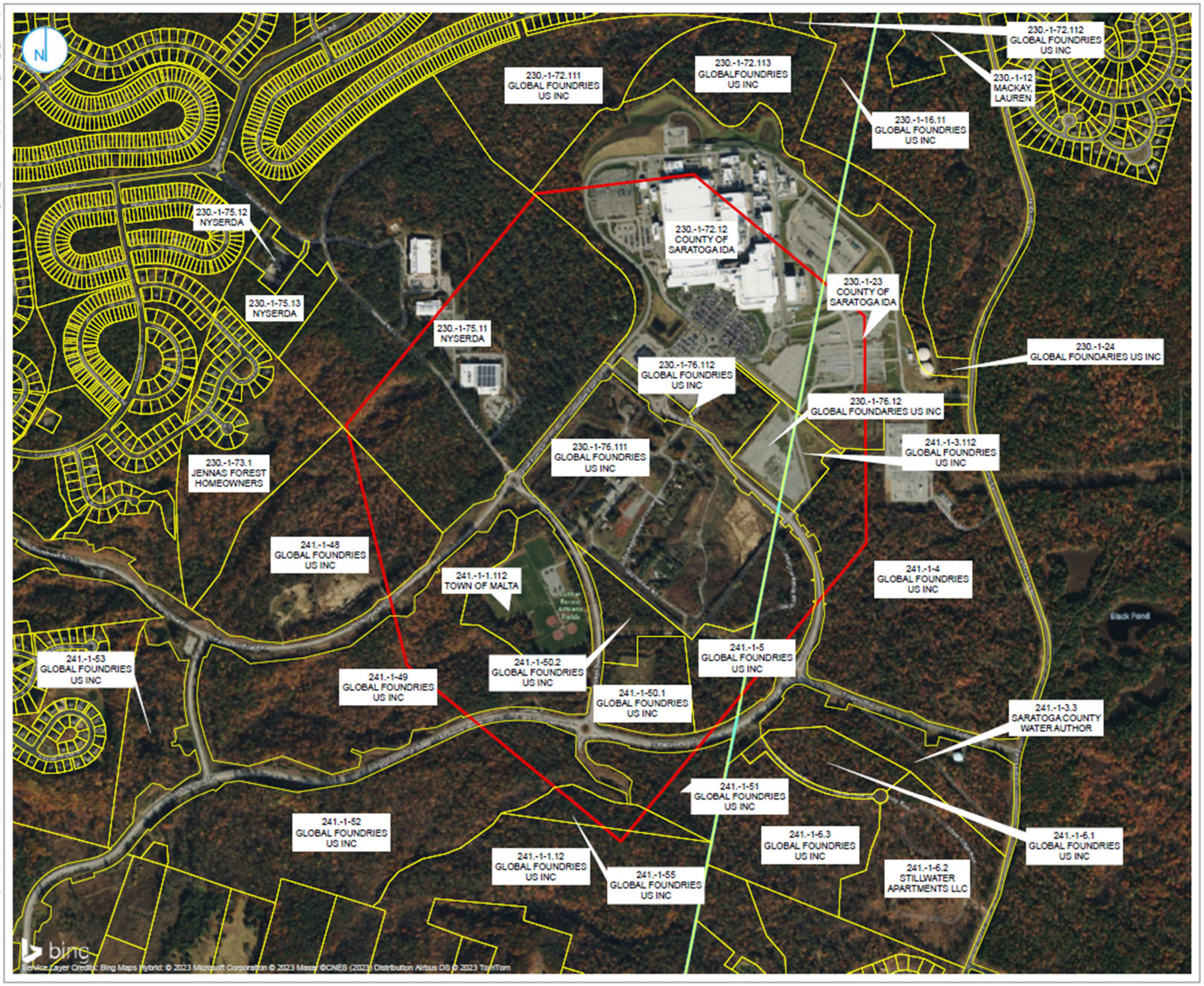
VII. PROTECTIVENESS STATEMENTS

Protectiveness Statements	
Operable Unit: 01	*Protectiveness Determination:* Short-term Protective
Protectiveness Statement: The implemented remedy is protective of human health and the environment in the short term. To be protective in the long term, the environmental easements related to vapor intrusion and implementation of the SDMP required in the 2018 ESD need to be finalized.	
Sitewide Protectiveness Statement	
Protectiveness Determination: Short-term Protective	
Protectiveness Statement: The implemented Sitewide remedy is protective of human health and the environment in the short term. To be protective in the long term, the environmental easements related to vapor intrusion and implementation of the SDMP required in the 2018 ESD need to be finalized.	

VIII. NEXT REVIEW

The next FYR report for the Site is required five years from the completion date of this review.

APPENDIX A – FIGURES



1999 Enviromental Restriction Zone
Parcel Boundary
Stillwater/Malta Town Line

Notes:
1. Parcel boundaries based on Saratoga County Planning Department.
2. Environmental Restriction Zone considered approximate.

0 1,000 2,000 Feet

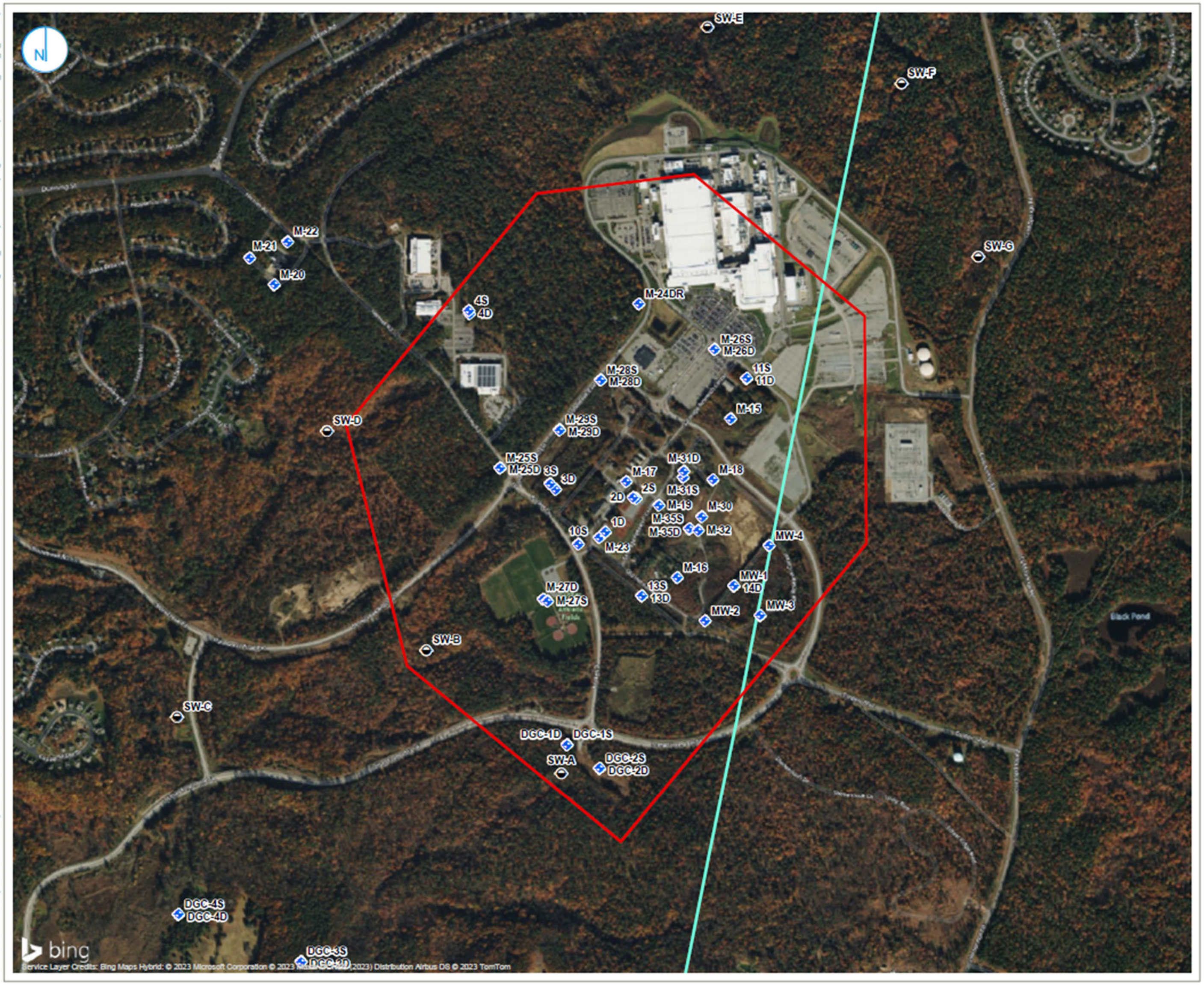
SITE PARCEL MAP

MALTA ROCKET FUEL AREA SITE
MALTA, NEW YORK

FIGURE 1

RAMBOLL US CONSULTING, INC.
A RAMBOLL COMPANY

RAMBOLL



K:\GE-CEP.1087692\Standards\GIS\Malta Rocket Fuel\DEC PYR\Figure 2_Site Layout and Sampling Locations.aprx\Ramboll_ANSI_B_Landscape

PROJECT: 169000XXXX | DATED: 10/18/2023 | DESIGNER: GARDNEME

- Monitoring Well Location
- Surface Water Location
- 1999 Enviromental Restriction Zone
- Stillwater/Malta Town Line

Note:
1. Environmental Restriction Zone considered approximate.

0 1,000 2,000 Feet

SITE LAYOUT AND SAMPLING LOCATIONS

MALTA ROCKET FUEL AREA SITE
MALTA, NEW YORK

FIGURE 2

RAMBOLL US CONSULTING, INC.
A RAMBOLL COMPANY

RAMBOLL

APPENDIX B – REFERENCES

Documents, Data and Information Reviewed in Completing the Five-Year Review	
Document Title and Author	**Date**
Remedial Investigation Report, Volumes I - VIII, Malta Rocket Fuel Area Superfund Site, ERM-Northeast, Inc.	February 1995
Record of Decision, Malta Rocket Fuel Area Superfund Site, EPA	July 1996
Remedial Design Reports, Remedial Work Elements I, III, and IV, Malta Rocket Fuel Area Superfund Site, ERM-Northeast	August 1997
Operation and Maintenance Manual, Remedial Work Element II, Groundwater, Malta Rocket Fuel Area Superfund Site, ERM-Northeast, Inc.	January 1998
Consent Decree, United States v. Curtiss-Wright Corporation, et al., Civil Action No. 98-CV-0014, entered in the United States District Court for the Northern District of New York	March 1998
Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water, EPA/600/R-98/128, EPA	September 1998
Operation and Maintenance Manual, Remedial Work Element IV, Institutional Controls, Malta Rocket Fuel Area Superfund Site, IT Corporation	September 1999
Operation and Maintenance Manual, Remedial Work Element I, Drinking Water, Malta Rocket Fuel Area Superfund Site, IT Group,	January 2002
Five-Year Review Reports, Malta Rocket Fuel Area Superfund Site, EPA	September 2004 August 2009 July 2014 May 2019
EPA Guidance for Conducting Five-Year Reviews, EPA	2016
Explanation of Significant Differences, Malta Rocket Fuel Area Site, EPA	April 2018
Subsurface Drum Management Plan for Intrusive Activities with Site Development, Malta Rocket Fuel Area Superfund Site	March 2021
Annual O&M Reports, Remedial Work Elements I, II, and IV, Malta Rocket Fuel Area Superfund Site, Tetra Tech, Inc.	2019 – 2022

APPENDIX C – SITE HISTORY, GEOLOGY/HYDROGEOLOGY and LAND USE

Site History

The land outside the former safety easement is zoned for residential use; approximately 12,000 people live within a two-mile radius of the Site. The Luther Forest Well Field (LFWF) is located approximately one mile southwest of the Site in the Town of Malta. This well field consists of five production wells connected to the Luther Forest water distribution system, which are operated by the Saratoga Water Company. Regional groundwater flow in the vicinity of the LFWF is in a southwest direction toward Round Lake. The Cold Springs Well Field (CSWF) is located approximately one mile northeast of the Site in the Town of Stillwater. This well field consists of one well that was installed in 1990 but was not connected to the Luther Forest water distribution system until 1993. There are two additional production wells in the vicinity of the Site--the Saratoga Hollow and Saratoga Ridge Wells. These wells provide water to the Saratoga Glen Hollow housing development and the Saratoga Ridge Townhouse development, respectively. Regional groundwater in the vicinity of the CSWF is believed to flow northeast toward Saratoga Lake. Potable water for Luther Forest is obtained from LFWF and CSWF.

In 1979, approximately eight grams of uranium hexafluoride gas were released in a portion of the former GE/Exxon Nuclear building, depositing a thin film on the floor of the room. The area was decontaminated and the contaminated material was sent to licensed disposal facilities. A subsequent radiation survey of the building indicated that all beta and gamma readings taken were within the limits of unrestricted use.

In 1980, the combustible contents of drums containing hydrazine and CAVEA-B, experimental liquid rocket propellants, were burned on-site by NYSERDA in accordance with a New York State Department of Environmental Conservation (NYSDEC) restricted burning permit. The non-combustible drum contents were transferred to new poly-lined drums and staged until they were disposed of off-site in 1981.

In June 1985, transformers located on a portion of the Test Station leased to Power Technologies, Inc. (PTI) were tested and found to contain polychlorinated biphenyls (PCBs). NYSERDA and PTI decontaminated the transformers in 1987.

In 1985 and 1986, groundwater at the site was sampled and found to contain carbon tet, TCE, chloroform and several metals. In 1987, an air stripper was installed on the Test Station water supply wells by Wright-Malta (under an NYSDEC permit) to treat the groundwater prior to its use by employees at the Test Station.

In 1987, NYSERDA sampled liquid and sludge from several septic tanks. Based on detections of VOCs in these samples, NYSERDA subsequently pumped out and rinsed the septic tanks.

In July 1987, the site was placed on the National Priorities List (NPL). Following the listing of the site on the NPL, because of concerns regarding the potential for the contaminated groundwater from the Test Station to affect the LFWF (the CSWF and the Saratoga Hollow and Saratoga Ridge wells did not exist at that time), groundwater and surface water quality monitoring between the Test Station and the LFWF was initiated. This monitoring system serves as an “early warning” to ensure that contaminated groundwater from the Test Station is not migrating toward the Luther Forest Residential Development (LFRD).

In 1989, a drum containing 4,270 milligrams per liter (mg/L) of lead, 235 mg/L of zinc and 93 mg/L of copper was disposed of off-site by NYSERDA in a Resource Conservation and Recovery Act-compliant facility.

In September 1989, the EPA issued a Unilateral Administrative Order to eight potentially responsible parties (PRPs), Advanced Nuclear Fuels, Inc., Curtiss-Wright Corporation, GE, MTI, NYSERDA, Olin Corporation, PTI, and Wright-Malta, to perform a remedial investigation and feasibility study (RI/FS). In March 1990, GE, NYSERDA and DOD entered into a participation agreement and undertook performance of the RI/FS.

From 1991 to 1994, a comprehensive RI was performed to define the nature and extent of the contamination at the site. A total of 48 distinct areas of concern and site-wide groundwater and surface water were investigated. Components of the RI field work include a groundwater investigation, including the installation of 30 wells to supplement the existing network of 18 monitoring wells; surface water and sediment investigations at six surface water bodies at the site; a radiation survey in the former GE/Exxon Nuclear building; geophysical surveys at 19 areas to identify locations of possible buried metal; soil gas surveys at 46 areas to provide a semi-quantitative evaluation of the extent of VOCs in shallow soil; a surface soil investigation of 67 samples collected from 60 locations, a subsurface soil investigation consisting of 254 shallow subsurface soil samples and three deep subsurface soil samples; a dry well investigation of 31 soil and sediment samples from 23 dry well features (dry wells, catch basins, floor drains, a swale and an open sump); and a septic tank investigation.

Several response actions were performed concurrent with the RI, including: the decommissioning and removal of two compressed gas cylinders; excavating and recycling 560 empty, buried, crushed drums; cleaning out several septic tanks, catch basins and dry wells and cleaning out a sump.

Site Geology/Hydrogeology

The Site is underlain by several layers of unconsolidated sediment with a total thickness reaching up to 250 feet (ft.) in some areas. There is a surficial layer of aeolian (wind-blown) sand and silt deposits varying in thickness from 0 to 14 ft. Underlying the aeolian deposits is a thick (up to 220 ft.) sequence of glaciolacustrine (originating from glacial lakes) deposits. Below the glaciolacustrine deposits is approximately 10 to 15 ft. of a dense glacial till consisting of shale fragments, silt and clay. Directly above the bedrock and immediately below the glacial till lies a thin layer (less than 2 ft.) of fine to coarse sand with minor amounts of silt and clay.

Based upon the hydraulic gradients observed at the Site, for both the shallow and deep aquifers, radial flow is to the north, west and southwest from the center of the Test Station. In addition, as groundwater flows laterally away from the source areas, it also flows downward.

Much of the groundwater in the vicinity of the site eventually breaks out as surface water springs and seeps into ravines surrounding the site. The Test Station is situated on a drainage divide with surface water in the northern portion of the Test Station flowing toward Saratoga Lake, and surface water in the southern portion of the Test Station flowing toward Round Lake and Little Round Lake. The depth to groundwater at the site ranges from approximately 15 to 55 ft. below the land surface.

The LFWF is located approximately one mile southwest of the Test Station and north of Knapp Road, in the Town of Malta. This well field consists of five production wells connected to the Luther Forest water distribution system, which are operated by the Saratoga Water Company. Regional groundwater flow in the vicinity of the LFWF is in a southwest direction toward Round Lake. The CSWF is located approximately one mile northeast of the site, along Cold Springs Road in the Town of Stillwater. This well field consists of one well that was installed in 1990 but was not connected to the Luther Forest water distribution system until 1993. There are two additional production wells in the vicinity of the site, the

Saratoga Hollow and Saratoga Ridge Wells. These wells are located along Lake Road north of the CSWF, and they provide water to the Saratoga Glen Hollow housing development and the Saratoga Ridge Townhouse development, respectively. Regional groundwater in the vicinity of the CSWF is believed to flow northeast toward Saratoga Lake.

In February 2010, the Saratoga County Water Authority completed the construction of a 27-mile water supply line which uses the Upper Hudson River as its water source. This waterline supplies the area formerly known as the LFTC (including the Test Station) and five surrounding municipalities including the Towns of Malta, Moreau, Wilton, Ballston and Clifton Park and the Village of Stillwater. Previously, the potable water at the Test Station was supplied by two on-site production wells.

Land and Resource Use

Established by the U.S. Government Department of War (which later became the Department of Defense) in 1945, the Test Station was used as a research and development facility for rocket and weapons testing for more than 50 years.

In 1955, the U.S. Government established a perpetual restrictive safety easement around the Test Station to limit facility access to only those personnel who worked at the facility. This safety easement encompassed approximately 1,800 acres of pine forest in a circular#area of a one-mile radius from the center of the Test Station. The safety easement was eliminated in 1964. The land outside the former safety easement is zoned for residential use; approximately 12,000 people live within a two-mile radius of the site. The LFRD, located to the west#of the Site, is owned by The Luther Forest Corporation. Potable water for the LFRD is obtained from the LFWF and the CSWF.

Active redevelopment of the Site property, which is zoned for industrial use, is underway. In 2004, the Luther Forest Technology Campus Economic Development Corporation purchased more than 1,400 acres of property, including the Test Station property and surrounding areas, for the development of the Luther Forest Technology Campus (LFTC). In 2009, GlobalFoundries US, Incorporated purchased and developed a portion of the LFTC property, and in 2023, completed the purchase of the entire LFTC property.

APPENDIX D – CLIMATE CHANGE RESOURCES

Climate Change Tools

In accordance with the Region 2 *Guidance for Incorporating Climate Change Considerations in Five Year Reviews*, three climate change tools were utilized to assess the Malta Rocket Fuel Area site (Site). Screenshots from each of the tools assessed are included here.

The first tool utilized was The Climate Explorer. As can be seen from Figure C-1, over the next several decades there is a projected increase of between two and 15 days per year with maximum temperatures greater than 100°F in Saratoga County. However, as can be seen on Figure C-2, there is little change in potential drought conditions in the coming years. A summary of the Top Climate Concerns from the tool can be seen in Figure C-3.

The second tool utilized is called the Flood Factor. The location of the Luther Forest Technology Campus (LFTC) in Malta, New York, which encompasses the Site property, was used to represent the Site area. There are seven parcels within the LFTC that have greater than a 26% chance of being severely affected by flooding over the next 30 years (See Figure C-4). Overall, the LFTC has a moderate risk of flooding over the next 30 years. However, because ongoing remedial activities being conducted at the Site only involve routine inspections and groundwater sampling, the risk of impacts to remedy implementation from flooding is low.

The final tool utilized is called Sea Level Rise Viewer. A rise in the sea level results in flooding that occurs more frequently and lasts for longer durations of time, referred to as tidal flooding. The Sea Level Rise Viewer indicates that the LFTC and surrounding area is not subject to tidal flooding.

Figure C-1
Climate Change Explorer
Saratoga County Days with Max Temperature > 100°F

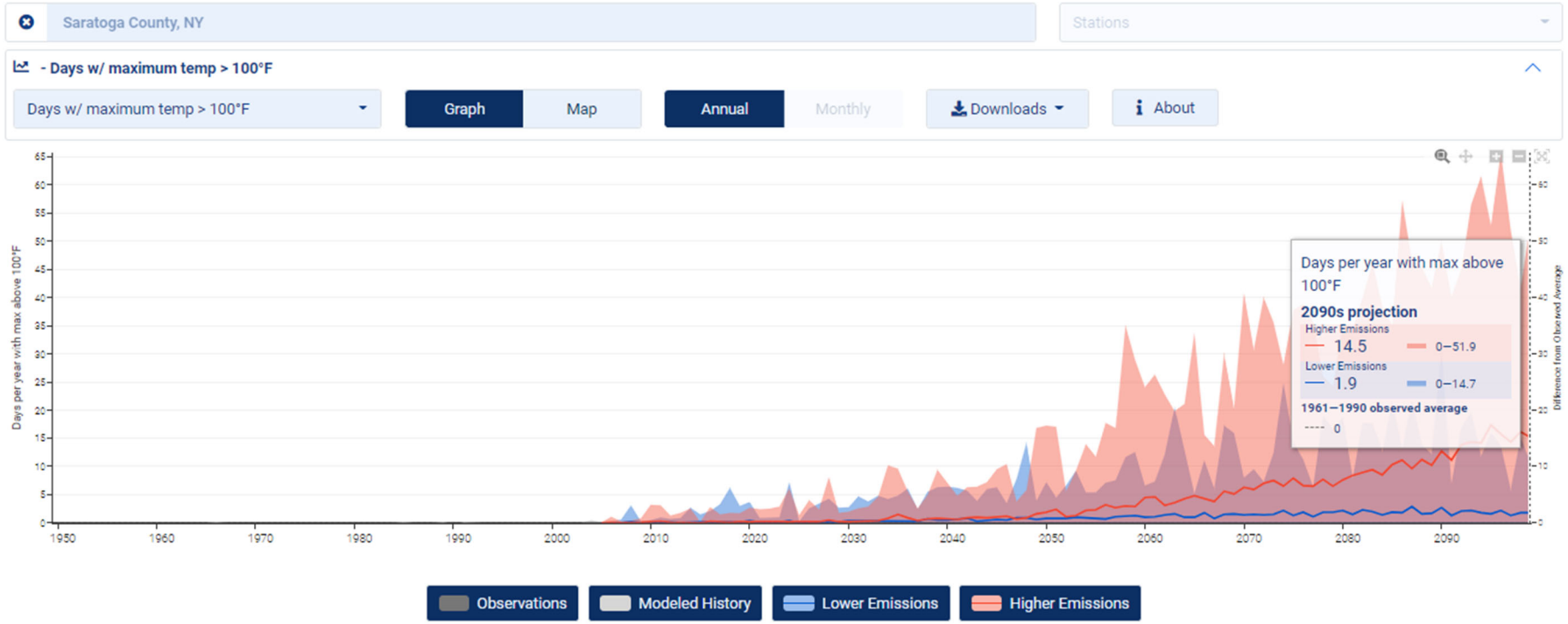


Figure C-2
Climate Change Explorer
Saratoga County Drought Conditions

Figure C-3
Climate Change Explorer
Summary of Top Climate Concerns for Saratoga County

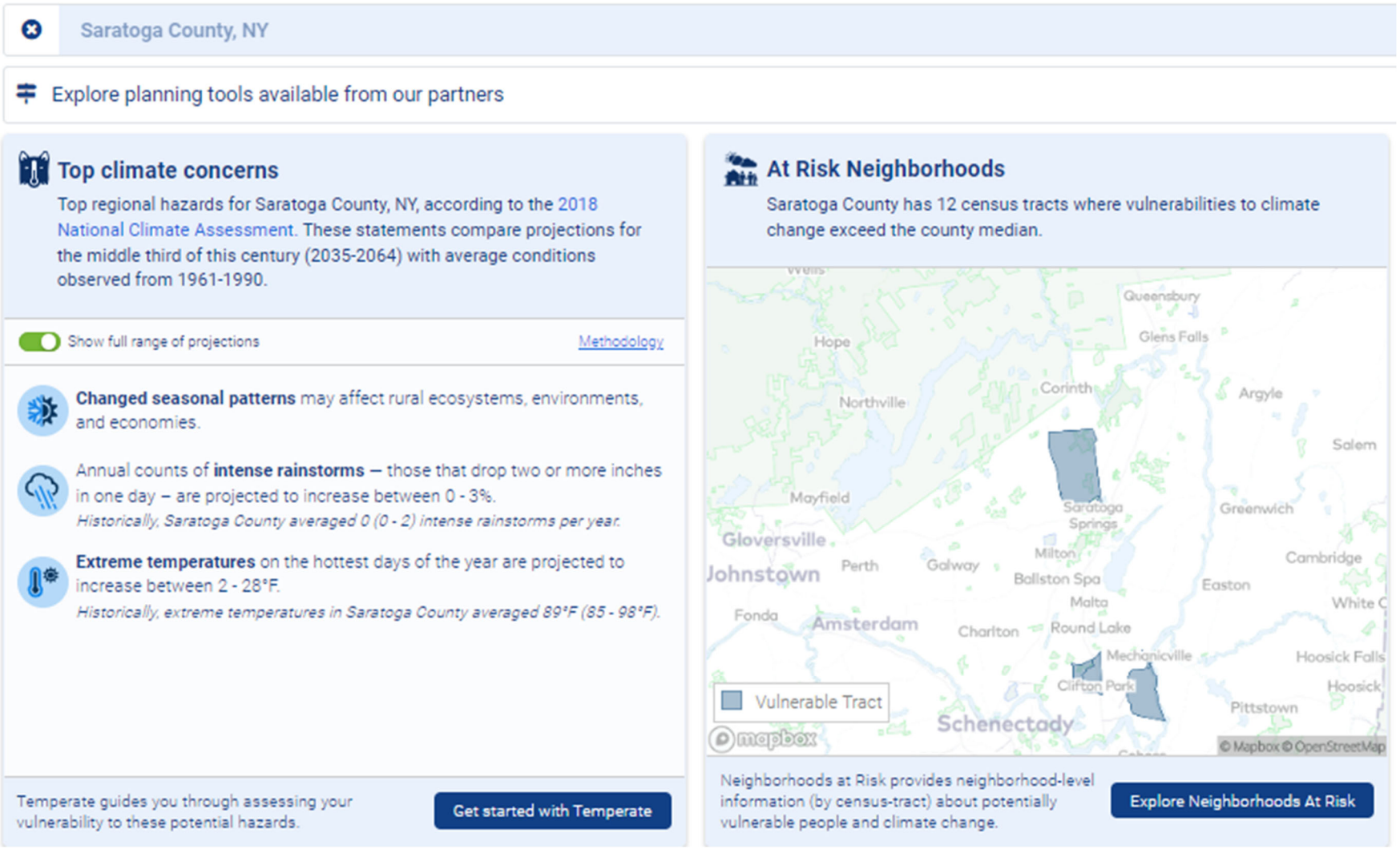


Figure C-4
Flood Factor
Flood Risk Overview for Site Area

FLOOD RISK OVERVIEW

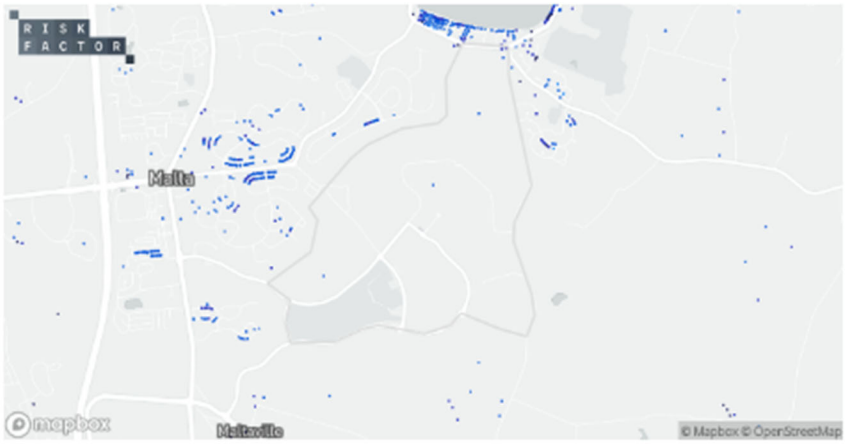
Does Luther Forest Technology Campus have risk?

Moderate

FLOOD FACTOR™

There are **7** properties in **Luther Forest Technology Campus** that have greater than a 26% chance of being severely affected by flooding over the next 30 years. This represents 20% of all properties in Luther Forest Technology Campus.

In addition to damage on properties, flooding can also cut off access to utilities, emergency services, transportation, and may impact the overall economic well-being of an area. Overall, **Luther Forest Technology Campus** has a **moderate risk of flooding** over the next 30 years, which means flooding is likely to impact day-to-day life within the community. This is based on the level of risk the properties face rather than the proportion of properties with risk.



Luther Forest Technology Campus Flood Risk

Residential **Moderate Risk**
2 out of 6 homes

Road **Minor Risk**
3 out of 12 miles of roads

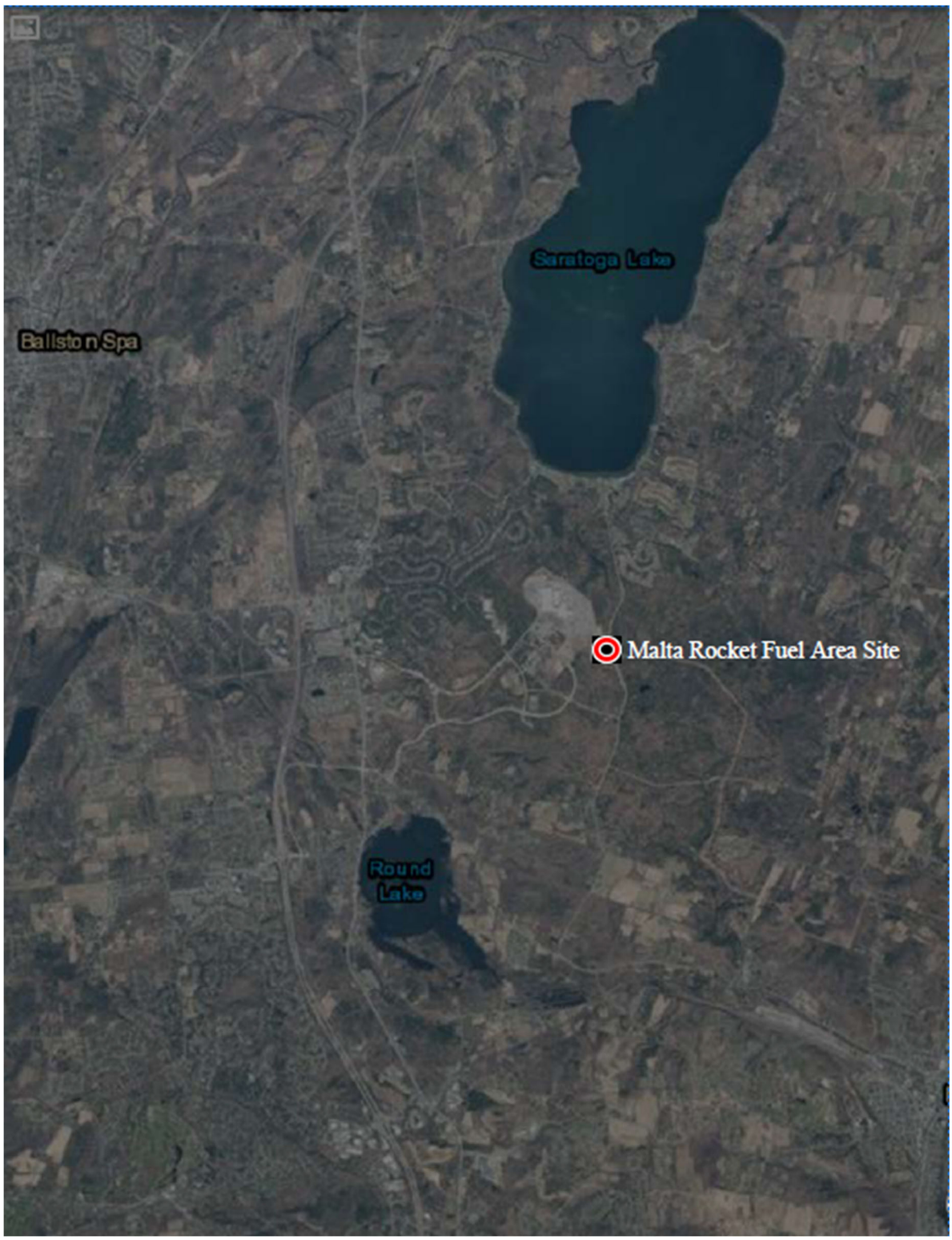
Commercial **Moderate Risk**
1 out of 6 commercial properties

Critical Infrastructure **Minimal Risk**
0 out of 2 infrastructure facilities

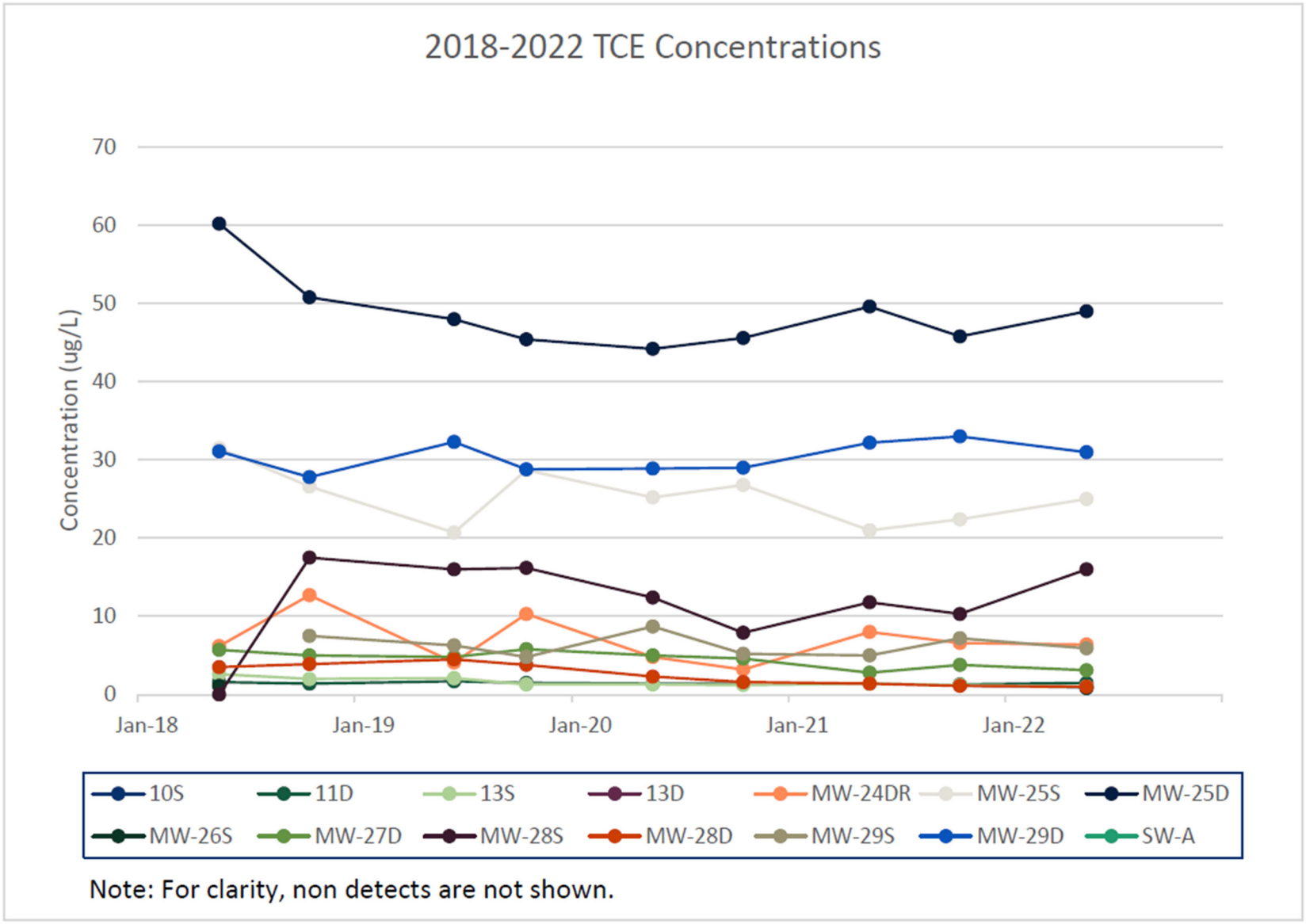
Social Facilities **Risk - N/A**
-- out of -- social facilities

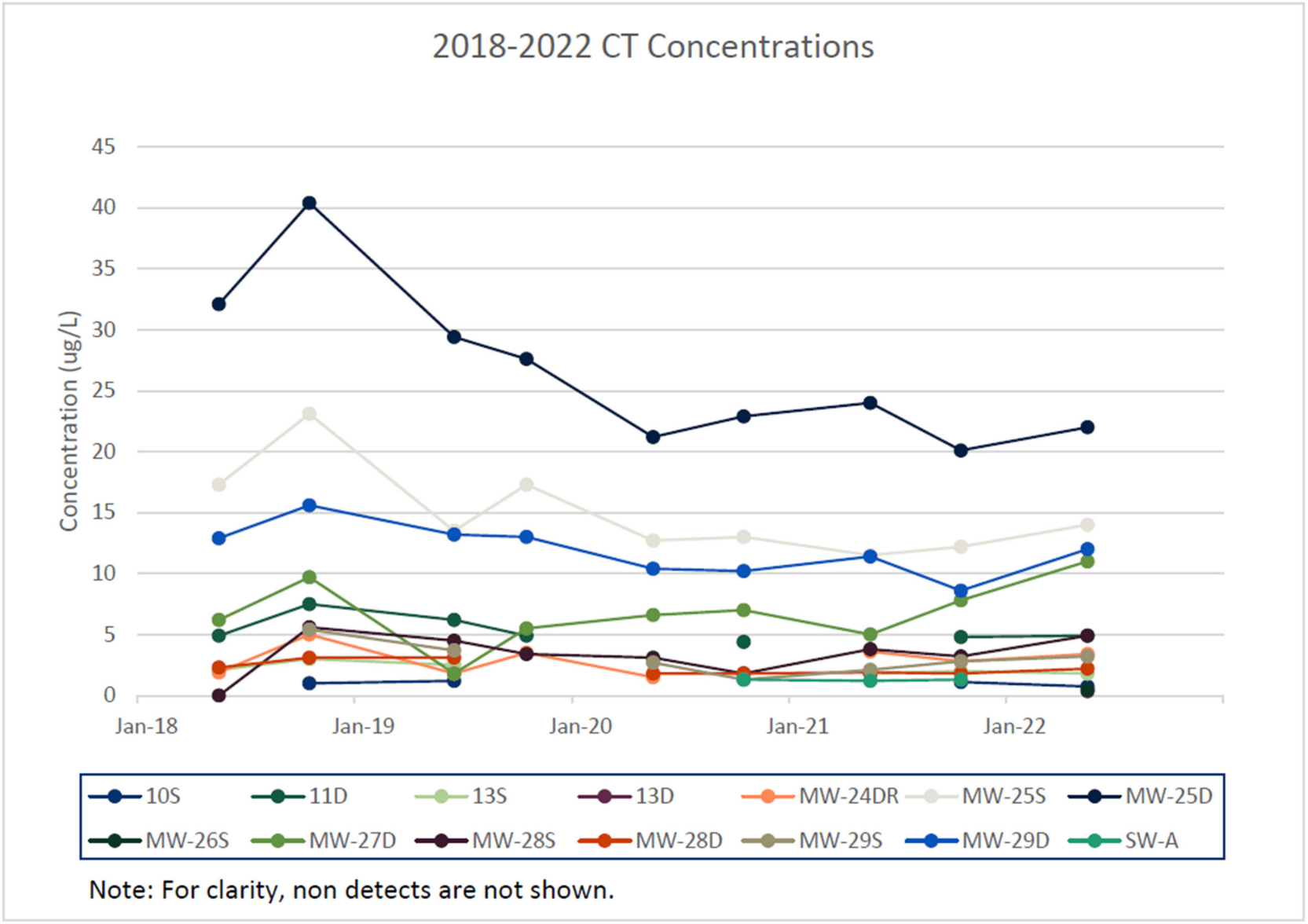
Minor | Moderate | Major | Severe | Extreme

Figure C-5
Sea Level Rise Viewer



APPENDIX E – MONITORING WELL CONCENTRATION TREND GRAPHS


2018-2022 TCE Concentrations
Concentration (ug/L)
70
60
50
40
30
20
10
0
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
10S
11D
13S
13D
MW-24DR
MW-25S
MW-25D
MW-26S
MW-27D
MW-28S
MW-28D
MW-29S
MW-29D
SW-A
Note: For clarity, non detects are not shown.


2018-2022 CT Concentrations
Concentration (ug/L)
45
40
35
30
25
20
15
10
5
0
Jan-18
Jan-19
Jan-20
Jan-21
Jan-22
10S
11D
13S
13D
MW-24DR
MW-25S
MW-25D
MW-26S
MW-27D
MW-28S
MW-28D
MW-29S
MW-29D
SW-A
Note: For clarity, non detects are not shown.