THIRD FIVE-YEAR REVIEW REPORT FOR TROY MILLS LANDFILL SUPERFUND SITE CHESHIRE COUNTY, NEW HAMPSHIRE

Prepared by

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LIST OF ABBREVIATIONS & ACRONYMS

1,2,4-TMB	1,2,4-Trimethylbenzene
1,3,5-TMB	1,3,5-Trimethylbenzene
AGQS	New Hampshire Ambient Groundwater Quality Standards
ARARs	Applicable or Relevant and Appropriate Requirements
ATSDR	Agency for Toxic Substances and Disease Registry
ATV	All-Terrain Vehicle
AURs	Activity And Use Restrictions
Bgs	Below ground surface
BEHP	bis(2-ethylhexyl)phthalate
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
CalEPA	California Environmental Protection Agency
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code Of Federal Regulations
CIC	Community Involvement Coordinator
cis-DCE	Cis-1,2-Dicholoroethene
cm^2	Centimeters squared
COC	Contaminant of Concern
COPC	Contaminant of Potential Concern
CSF	Cancer Slope Factor
Cvoc	Chlorinated VOC
CWA	Federal Clean Water Act
DEHP	di(2-ethylhexyl) phthalate
DO	Dissolved Oxygen
EAs	Electron Acceptors
ED	Electron Donor
EPA	U.S. Environmental Protection Agency
EPCs	Exposure Point Concentrations
ESAT	Environmental Services Assistance Team
ESD	Explanation of Significant Differences
ESI	Expanded Site Inspection
Fe^{2+}	Ferrous iron ion
FS	Feasibility Study
FYR	Five-Year Review
GEI	GEI Consultants, Inc.
GMZ	Groundwater Management Zone
GZA	GZA GeoEnvironmental, Inc.
HQ	Hazard Quotient
HRS	Hazard Ranking System
ICLs	Interim Cleanup Levels
ICs	Institutional Controls
IRA	Interim Remedial Action
IRIS	Integrated Risk Information System
Kg	Kilograms
L/day	Liters per day
LIF	Laser Induced Fluorescence

LIST OF ABBREVIATIONS & ACRONYMS, cont'd.	
LNAPL	Light Non-Aqueous Phase Liquid
LTRA	Long-Term Response Action
MAROS	Monitoring and Remediation Optimization System
MCLs	Maximum Contaminant Levels
MCLGs	Maximum Contaminant Level Goals
µg/L	Micrograms per Liter
mg/day	Milligrams per Day
mg/kg	Milligrams per Kilogram
mg/kg-day	Milligrams per Kilogram-Day
mg/L	Milligrams per Liter
MNA	Monitored Natural Attenuation
MOM	Management of Migration
NAI	Normandeau Associates, Inc.
NCP	National Oil and Hazaardous Substances Pollution Contingency Plan
ng/L	Nanograms per Liter
NHDES	New Hampshire Department of Environmental Services
NHANES	National Health and Nutrition Examination Survey
NHSWM	New Hampshire Bureau of Solid Waste Management
NOAA	National Oceanic and Atmospheric Administration
NPL	National Priority Listing
NRC	NRC East Environmental Services, Inc.
NRWQC	National Recommended Water Quality Criteria
O&M	Operation And Maintenance
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
PCP	Pentachlorophenol
PFAS	Per- and Polyfluoroalkyl Substances
PFBA	Perfluorobutanoic Acid
PFBS	Perfluorobutane Sulfonic Acid
PFHpA	Perfluoroheptanoic Acid
PFHxA	Perfluorohexanoic Acid
PFHxS	Perfluorohexane Sulfonate
PFNA	Perfluorononanoic Acid
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonate
PRP	Potentially Responsible Party
RAO	Remedial Action Objective
RG	Remedial Goal
RI	Remedial Investigation
ROD	Record of Decision
SL	Screening Level
SQuIRT	Screening Quick Reference for Inorganics in Sediment
SRS	New Hampshire Soil Remediation Standards
START	Superfund Technical Assessment and Response Team
SVOC	Semi-volatile Organic Compound
TBC	To Be Considereds

TEC	Threshold Effect Concentration
TML	Troy Mills Landfill
UU/UE	Unlimited Use/Unrestricted Exposure
VOC	Volatile Organic Compound
WQCTS	New Hampshire Water Quality Criteria for Toxic Substances

I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order 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 five-year review reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) has prepared this five-year review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP)(40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the third FYR for the Troy Mills Landfill (TML) Superfund Site (Site) located in Troy, New Hampshire. The triggering action for this statutory review was the signing of the previous FYR on 09/18/2015. The FYR has been prepared due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of an undeveloped 2-acre former drum disposal area within a 17.8-acre Groundwater Management Zone (GMZ) that is located within an approximately 270-acre undeveloped property. One site-wide Operable Unit (OU) addresses the former drum disposal area and the presence of volatile organic compounds (VOCs), semi-VOCs, and inorganic compounds in groundwater, leachate, surficial soil, surface water, and sediment.

The Troy Mills Landfill Superfund Site Five-Year Review was led by Gerardo Millán-Ramos, Remedial Project Manager, EPA Region 1 Superfund and Emergency Management Division. Participants included:

Michael Summerlin, New Hampshire Department of Environmental Services (NHDES) Project Manager
Robin Mongeon, NHDES Supervisor
Tanya Justham, GZA Inc. (NHDES contractor)
Courtney Carrol, EPA Human Health Risk Assessor
Paulina Do, EPA Human Health Risk Assessor
Bart Hoskins, EPA Ecological Risk Assessor
TaChalla Gibeau, EPA Ecological Risk Assessor
David Peterson, EPA Case Team Attorney
Kelsey Dumville, EPA Community Involvement Coordinator
ZaNetta Purnell, EPA Community Involvement Coordinator

The review began on 1/22/2020.

The Troy Mills Landfill Superfund Site is located in Troy, New Hampshire about 1.5 miles south of the center of the Town of Troy. Access to the Site is off of Rockwood Pond Road via a private gravel pit access road in Fitzwilliam, New Hampshire. The Site is bordered to the north by an 8-acre solid waste landfill that is separately regulated by NHDES; to the east by a former railroad bed currently used as a State-owned walking, all-terrain vehicle (ATV), and snowmobile trail, and beyond by undeveloped land; to the west by the main Site access road, a wetland area, and Rockwood Brook; and to the south by the eastern branch of Rockwood Brook and beyond by undeveloped land, a utility right of way, and several residential trailers. Rockwood Brook flows south to north and continues downstream to Sand Dam Pond, a recreational area located approximately 1 mile north of the Site. See **Figure 1** for a Site and Locus Plan.

Troy Mills, Inc. (TMI) disposed of hazardous substances that were generated at its acrylic fabric manufacturing facility in Troy between 1967 and 1978. An estimated 6,000 to 10,000 55-gallon drums of waste liquid and sludge containing mostly plasticizers such as [di](2-ethylhexyl) phthalate (DEHP) and a petroleum-based solvent known as Varsol^{TM} were disposed of on Site. Other drummed waste included pigments, surplus mixes, and tank residuals of vinyl resins, paint resins, and top coating products.

Following a bankruptcy filing by TMI, NHDES referred the Site to EPA Region 1 in 2001 to have the Site evaluated for a CERCLA removal action. At the same time, EPA began evaluating the Site for listing on the Superfund National Priorities List (NPL). In September 2003, the Site was listed on the NPL and a CERCLA time-critical removal action was initiated. The first phase of the removal action included the installation of three Light Non-Aqueous Phase Liquid (LNAPL) interceptor trenches to capture free product floating on the groundwater. The second phase of the removal action, which was initiated in July 2004, involved the excavation of 7,692 buried drums, the removal of 29,924 gallons of flammable liquid waste and 3,099 cubic yards of sludge, and the excavation of 26,244 tons of heavily contaminated soil which were all transported off-Site for disposal at permitted facilities. In the spring and summer of 2005, EPA completed its time-critical removal action with the construction of a two-foot thick permeable soil cap over the excavation area to prevent direct contact risks to underlying residual contaminated soils.

A Record of Decision (ROD) for the Site was signed on September 30, 2005 and amended by a 2014 Explanation of Significant Differences (ESD). The selected remedy included source control, management of contaminant migration, and institutional controls (ICs). The 2005 ROD also incorporated components of the time-critical removal action into the remedy (operation and maintenance (O&M) of the interceptor trenches and permeable soil cap). Long-term remedial actions, as specified in the ROD, began in 2006 and were implemented to address remaining Site risks through monitored natural attenuation (MNA) of groundwater contaminants; collection and off-site disposal of LNAPL; monitoring of groundwater, surface water, sediment, leachate, and wetland soil quality; maintaining the permeable soil cap over the former drum disposal area; and implementing appropriate ICs. The 2014 ESD updated cleanup levels for several Chemicals of Concern (COCs) and updated Applicable or Relevant and Appropriate Requirements (ARARs) cited in the ROD both to include revised State and federal standards and to identify additional standards that were not specifically identified in the ROD. The updated ARARs are shown in Attachment 1 of the ESD.

Since 1979, multiple investigations have been conducted in and around the former drum disposal area and have documented the presence of VOCs, semi-VOCs, and inorganic compounds in groundwater, leachate, surficial soil, surface water, and sediment. For a list of these investigations and more detailed information about Site milestones please see the chronology and background information provided in the September 2015 Five Year Review.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Troy Mills Landfill Superfund Site		
EPA ID: NHD980520217		
Region: 1	**State:** NH	**City/County:** Troy, Cheshire County

SITE STATUS	
NPL Status: Final	
Multiple OUs? No	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: EPA
Author name (Federal or State Project Manager): Gerardo Millán-Ramos
Author affiliation: EPA, Region 1
Review period: 1/22/2020 - 9/18/2020
Date of site inspection: 4/20/2020
Type of review: Statutory
Review number: 3
Triggering action date: 9/18/2015
Due date *(five years after triggering action date)*: 9/18/2020

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

In 2005 subsequent to the removal actions within the drum disposal area, EPA completed a Remedial Investigation (RI) that included the collection and analysis of surface water, sediment, and wetland soil samples from nearby Rockwood Brook and the surrounding wetland aka Rockwood Brook Wetland Study Area. EPA also evaluated historical groundwater data, collected and analyzed air and soil samples from locations throughout the TML Site, and evaluated analytical data collected over the course of the drum removal action.

The baseline human health risk assessment completed as part of the RI indicated that future recreational users and near-Site residents potentially exposed to residual contaminants of concern (COCs) in groundwater, LNAPL-contaminated leachate, and wetland soil via ingestion or direct contact may present an unacceptable human health risk (*e.g.*, cancer risk exceeding 1E-04 and non-cancer hazard index exceeding 1.0). As concluded in the RI and presented in the ROD, actual releases or threats of

releases of residual hazardous substances from this Site, if not addressed, may present an imminent and substantial endangerment to public health or welfare.

The baseline ecological risk assessment completed as part of the RI concluded that there is negligible ecological risk to organisms within Rockwood Brook surface water, sediment, and wetlands at the TML Site.

Contaminants of concern (COCs) by media type

Leachate

- bis(2-ethylhexyl)phthalate (BEHP) aka di(2-ethylhexyl) phthalate (DEHP)

Wetland soil

- Manganese

Groundwater

- 1 ,3,5 Trimethylbenzne
- 1 ,4-Dioxane
- 2-Butanone
- 4-lsopropylene
- Benzene
- cis-1,2 Dichloroethene
- n-Butylbenzene
- n-Propylbenzene
- Tetrachloroethene
- Tetrahydrofuran
- Toluene
- Trichloroethene
- Vinyl Chloride
- Benzo(a)pyrene
- Benzo(b) fluoranthene
- Bis(2-ethylhexyl)phthalate
- Dibenzo(a,h) anthracene
- Naphthalene
- Pentachlorophenol (PCP)
- Arsenic
- Boron
- Manganese

The following is a summary of the resources/receptors that have been or could potentially be affected, as well as primary human health threat and exposure pathways and considerations identified in the risk assessment that was perfomed.

- Recreational user (adult and young child) from exposure to leachate (by dermal contact) along the access road.
  For future recreational leachate exposures, exposure durations of 24 years and 6 years, respectively, were presumed for an adult and young child. Body weights of 70 kg and 15 kg were used for the adult and child, respectively. Dermal contact was assumed with 4,500 cm^2 of surface area for the adult and 1,500 cm^2 for the child. Future leachate exposures were presumed to occur 104 days/year.

- Recreational user (adult and young child) from exposure to wetland soil (by ingestion and dermal contact) within the adjacent Rockwood Brook wetlands.
  For future recreational wetland soil exposures, ingestion of 100 mg/day for 24 years was presumed for an adult. For a young child (age 1 to 6), ingestion of 200 mg/day for 6 years was presumed. Body weights of 70 kg and 15 kg were used for the adult and child, respectively. Dermal contact was presumed with 5,700 cm^2 of surface area for the adult and 2,800 cm^2 for the child. Future wetland soil exposures were presumed to occur 104 days/year.

- Adjacent residential household exposure to untreated groundwater (by ingestion, dermal contact, and inhalation) from a groundwater plume area delineated by Site monitoring wells.
  For future residential exposures to untreated groundwater, drinking water ingestion rates of 2 L/day and 1.5 L/day for the adult and young child, respectively, were presumed. An exposure frequency of 350 days/year was used for a combined exposure duration of 30 years. Dermal contact was presumed with 18,000 cm^2 of surface area for the adult, and 6,600 cm^2 for the child. Showers/baths were presumed to occur 350 days/year for 0.58 hr/day for the adult and 1 hr/day for the child. Airborne concentrations of volatile compounds released during showering/bathing were estimated using the Foster and Chrostowski shower model.

For more detailed information about the risk characterization and exposure assessment of the COCs, please see Tables G-1 through G-10 of the September 2005 ROD.

Response Actions

Pre-ROD activities

August 1978	Inspection at the Site performed by New Hampshire Bureau of Solid Waste Management (NHSWM). It documented the existence of iron-stained water, characterized as leachate, emanating from the landfill.
October 1980	Order issued by NHDES requiring TMI to cease dumping in the drum disposal landfill, excavate a minimum of three test pits in this area, and install well points for collecting groundwater samples. TMI contracted with Normandeau Associates, Inc. (NAI) to conduct a three-phase landfill leachate investigation.
May 1981	Notification of Hazardous Waste Site form filed by TMI with U.S. EPA for the drum disposal landfill.

- January 1985 — TMI Consent Agreement with NHDES requiring the submittal of a Waste Analysis Plan, a Preliminary Risk Assessment, a Remedial Investigation/ Feasibility Study, and an engineering design of the selected remedial alternative.

- March 1986 — State Level I Human Health Risk Assessment completed by Charles T. Main.

- October 1988 — State RI completed by ChemCycle and GEI Consultants, Inc. (GEI).

- November 1991 — Risk Assessment of Rockwood Brook Landfill completed by Menzie-Cura & Associates and GEI. It concluded that there is no demonstrable risk to human health or aquatic biota under prevailing steady-state conditions.

- December 1992 based — Draft State Feasibility Study completed by GEI. Recommended remedy is on the absence of existing risks to the environment or human health, the lack of degradation of groundwater quality at the drum disposal landfill and the conclusion that unacceptable risks to human health or the environment would result only under extraordinary conditions.

- April 2000 — NHDES agreement to a modified version of a containment-based remedial action proposed in 1998, with the condition of commitment by TMI to long-term operation, maintenance, and monitoring. Cost of the proposed remediation estimated to be $1.7M.

- December 2000 — NHDES approval of TMI's deferred remediation of the drum disposal landfill from the originally proposed date to a later unspecified date due to unfavorable corporate financial and market conditions. The approval was based on the remote location of the TML Site and monitoring data that did not suggest an imminent and substantial threat to public health or the environment.

- July 2001 — NHDES request to EPA to initiate an Expanded Site Inspection (ESI) and the preparation of a Hazard Ranking System (HRS) package for the Site, in case TMI became unable to implement the proposed remediation.

- July 2001 — Groundwater Management Permit No. GWP-198405082-T-001 issued by NHDES.

- October 2001 — On-Site reconnaissance to initiate the ESI conducted by Superfund Technical Assessment and Response Team (START) personnel.
- December 2001 — ESI conducted by START. It included the collection of leachate and soil samples from the drum disposal landfill, and sediment and surface water samples to assess the potential impacts of contaminant migration from the drum disposal landfill to downstream water bodies.
- January 2002 — NHDES request to TMI to conduct the Remedial Activities Contingency Plan for TML.
- February 2002 — NHDES determination that TMI did not have the resources to undertake either the Contingency Plan or the longterm operation, maintenance, or monitoring of the TML. Also, NHDES request to EPA to implement the Contingency Plan and prepare for the removal of buried drums that still contained liquid product.
- August 2002 — Site reconnaissance conducted by START. It included a geophysical survey to delineate the approximate boundary of the buried drum landfill and identify possible test pit locations. Results were reported in November 2002.
- September 2003 — Placement of TML on EPA's NPL and initiation of the CERCLA time-critical removal action.
- Sept. – Oct. 2003 — Installation of LNAPL interceptor trenches by EPA's contractor.
- July – Nov. 2004 — Excavation and removal of approximately 7,670 55-gallon drums from the drum disposal landfill by EPA START and Emergency and Rapid Response Services contractors.
- July 2005 — Reuse Assessment issued by EPA.
- September 2005 — Final CERCLA RI and Feasibility Study (FS) report prepared by Metcalf & Eddy, Inc.

Remedial Action Objectives (RAOs) for the selected remedy

As stated in the the 2005 ROD, the RAOs for the selected remedy are:

- *Contain and remove LNAPL to the extent practicable and prevent dermal contact exposure to LNAPL-contaminated leachate until the presence of LNAPL has dissipated. The baseline human*

health risk assessment concluded that elevated levels of bis(2-ethylhexyl)phthalate in LNAPL-contaminated leachate pose a potential cancer risk and non-cancer hazard to future adult and young child recreational users of the Site.

- *Limit migration of groundwater contaminants beyond a designated New Hampshire groundwater management zone (GMZ) to downgradient areas, and over time, restore all Site groundwater to safe drinking water levels. In addition, prevent ingestion of Site groundwater until it has been restored to safe drinking water levels. The baseline human health risk assessment concluded that elevated levels of VOCs, SVOCs, and metals pose a cancer and non-cancer hazard to future adult and young child residential drinking water users. In addition, the human health risk assessment concluded that an elevated level of naturally-occurring manganese in wetland soils carried by the migration of groundwater to the adjacent wetlands poses a non-cancer hazard to future adult and young child recreational users.*

- *Implement EPA's presumptive capping remedy for landfill sites to continue to prevent direct contact with residual soils within the former drum disposal area, through the maintenance of the permeable soil cap installed as part of EPA's removal action. A risk assessment was not performed to quantitatively assess exposure risks from the residual soils as the soils are currently under a two-foot soil cap and not available to exposure under current or reasonably-anticipated future recreational land uses. Implementation of EPA's presumptive capping remedy will ensure that the cap is maintained to prevent potential future exposures.*

Status of Implementation

Since the last FYR, EPA and NHDES completed several Long-Term Response (LTRA) activities as part of the remedy. See Systems Operations/Operation & Maintenance below for a list of these activities. The funding for these activities by USEPA ended on September 18, 2017, at which time all activities (remaining activities constituting O&M) became the responsibility of NHDES to implement and fund.

Institutional Controls (ICs)

As part of a bankruptcy settlement with the United States, approved by the court on June 27, 2008 (In re: Troy Mills, Incorporated, BK. No.:01-13341), the Trustee for the Bankruptcy Estate of Troy Mills, Inc. signed an Easement Deed and Restrictive Covenants to the State of New Hampshire to establish ICs over the Site in November 2009, which was recorded in January 2010. The following table summarizes the ICs established by this instrument.

Table 1: Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Groundwater	Yes	Yes	GMZ within the area of Easement described in Exhibit B of the IC Instrument	Prohibit the extraction of any groundwater, injection of water into the ground or application of surface water in a manner that causes the migration of any contaminated groundwater in excess of Interim Groundwater Cleanup Levels established under the ROD, to a point beyond the applicable GMZ.	Easement Deed and Restrictive Covenants, January 2010
Surface and subsurface soils	Yes	Yes	Activity and Use Restrctions (AUR) within the area of Easement described in Exhibit B of the IC Instrument	Prevent direct exposure to and protect the public and Site personnel (from exposure to the contaminants), and to protect the integrity of the Grantee's remedial activities, and to prevent interference with such remedial activities.	Easement Deed and Restrictive Covenants, January 2010
Soil Cap	Yes	Yes	AUR shown in Exhibit C of the IC Instrument	Protect the integrity of the Grantee's remedies with respect to the AUR shown in Exhibit C, prohibits any action that may impact the integrity of the soil cap within the AUR.	Easement Deed and Restrictive Covenants, January 2010
Facilities associated with any environmental investigation, response action or other corrective action	Yes	Yes	AUR shown in Exhibit C of the IC Instrument	Prevent the grantor from disturbing, moving, damaging, marring, tampering with, interfere with, obstructing, or impeding any monitoring wells, treatment facilities, piping, and other facilities associated with any environmental investigation, response action or other corrective action.	Easement Deed and Restrictive Covenants, January 2010

Systems Operations/Operation & Maintenance

Pursuant to Section 300.435(f)(3) of the NCP, 40 CFR § 300.435(f)(3), on September 18, 2017, NHDES assumed all responsibilities for conducting and funding LTRA activities at the Site, as O&M activities.

During this 5YR period the following O&M activities were completed:

- Inspection and maintenance of the landfill cap.
- Installation, replacement and maintenance of monitoring wells.
- Installation of controls for managing trespassing and informing the public.

Ongoing O&M activities include:

- Annual Inspection and maintenance of the soil cap to verify:
    - maintanance of the vegetative growth and soil cover through annual reseeding, fertilizing, and mowing, as necessary;
    - repair of the soil cover if settlement occurs;
    - land use activities are not causing impacts to the cover materials; and
    - maintanance of the gates and Site perimeter engineering controls.

- Annual Inspection and maintenance of the monitoring well network to verify:
    - maintenance or replacement of monitoring well locks;
    - replacement of monitoring well protective casings or surface seals if damaged;
    - redevelopment of monitoring wells if sediment accumulates in them;
    - replacement of damaged dedicated sampling equipment; and
    - sampling and analysis of groundwater, surface water, sediment, wetland soil and leachate.

The following is a summary of system operations/O&M issues that have been encountered during this review period and actions that addressed them.

- Continued siltation within some monitoring wells
  Some wells showed a greater than 0.5 ft. discrepancy between the reported and measured well depths. Collection of well-bottom measurements during each sampling event is performed to monitor this condition.

- Groundwater retraction in sample tubes
  The groundwater in sample tubes at several well locations periodically retracted down the tubing (variable lengths between 0.1 and 1 ft. down the tubing) while the bladder pump was in its filling cycle. This atypical movement suggests that the ball valve in the bladder pump may intermittently seat due to small sediment particles entrained in groundwater. This condition is being monitored. The NHDES contractor for O&M activities (GZA) has indicated that as long as the observation remains intermittent, pump maintenance is not necessary. However, if it increases, removal and rehabilitation of the affected bladder pump may be required.

- Dirt and rust in locks securing well standpipes
  Locks have been cleaned or replaced as needed. GZA has recommended continued replacement or cleaning of locks securing the well standpipes as needed due to this condition.

- Boulders moved
  While installing new signs in 2017, GZA observed that several boulders located near the northern Site access gate had been moved allowing ATVs to access the Upper Access Road and landfill cap. GZA's subcontractor for the test pitting activities, NRC East Environmental Services, Inc. (NRC), dug a shallow trench and replaced the boulders within the trench to block access to the Site and limit the ability of trespassers to move boulders in the future.

- "Private Property" signs removed
  In 2018 two "Private Property" signs had been removed, one from a post near the northern entrance to the Site and one from the northern gate. GZA replaced both signs.

- Padlock replaced
  In 2018 the padlock on the northern gate appears to have been cut off and replaced with a different lock. GZA removed the lock and replaced it with one keyed the same as the lock on the southern gate.

- Detached/broken support cable for dedicated pumps
  During the comprehensive water level round, GZA observed that the support cable for the dedicated pump at wells MW-601D and MW-701 had detached from the support collar or broken. Both pumps were removed from the well, inspected for damage, and reinstalled in their respective wells with new support cables.

O&M costs for the last five years since October 2015 have totaled $422,066 for an average cost of $84,413 per year.

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the last five-year review as well as the recommendations from the last five-year review and the current status of those recommendations.

Table 2: Protectiveness Determinations/Statements from the 2015 FYR

OU #	Protectiveness Determination	Protectiveness Statement
Sitewide	Short-term Protective	*The remedy implemented at the TML Superfund Site is currently protective of human health and the environment, because the remedy included source control (removal of LNAPL and maintenance of the permeable soil cap overlying residual contaminated soil), MNA of contaminated groundwater underlying TML, and ICs. With the source control remedy completed, groundwater quality is anticipated to be restored to acceptable levels through dilution and natural attenuation. A review of documents; applicable or relevant and appropriate requirements (ARARs); and the results of the Site inspection indicate that the remedy is currently protective for exposures envisioned by the ROD.* *In order for the remedy to be protective in the long term, however, the following actions should be considered:* *<u>Site security options to limit trespassing and Site access</u>* • *EPA will review options with State and Town officials including but not limited to: erect additional fences and signage; relocate the gate; determine in consultation with State and Town officials whether there are other effective means to limit trespassing and access. If trespassing persists, EPA will consider whether a revised human health risk assessment is needed.* *<u>IC options to prevent potential exposure to contaminated soils</u>* • *EPA, in consultation with State and Town officials, will consider modification of existing ICs, more effective enforcement of existing ICs, or implementation of additional ICs to limit exposure to contaminated soils.* *<u>Evaluate extent of contaminated sediment and conduct toxicity evaluation and ecological risk assessment</u>* • *Evaluate wetland to determine current extent of contaminated sediment and if some areas need a re-assessment of ecological risk to benthic invertebrates through chemical analysis and toxicity testing.*

Table 3: Status of Recommendations from the 2015 FYR

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
Entire Site	*Evidence of trespassing and recreational use of Site areas. Access is obtained by cutting locks and opening gates installed to prohibit trespassing.*	*EPA will review options with State and Town officials including but not limited to: erect additional fences and signage; relocate the gate; determine in consultation with State and Town officials whether there are other effective means to limit trespassing and access. If trespassing persists, EPA will consider whether a revised risk determination is needed.*	Completed	Between June 6 and 9, 2017 GZA's subcontractor, Edward Paige Corp.(Eward Paige) performed Site improvements to enhance Site security and limit access by recreational users. Refer to Figure 1A and Figure 1B of the September 13, 2017 Technical Memorandum for Site Maintenance and Supplemental Investigations prepared by GZA for approximate locations of Site security enhancementsand its Photograph Log for documentation of those. See text below this table for a description of the tasks completed.	8/8/2017
Entire Site	*Current ICs to limit access to contaminated Site soils are not fully effective.*	*EPA, in consultation with State and Town officials, will consider modification of existing ICs, more effective enforcement of existing ICs, or implementation of additional ICs to limit exposure to contaminated soils.*	Considered But Not Implemented		8/8/2017

Entire Site	*Flooding of the wetland areas due to beaver damning activity may have dispersed contaminated leachate within the wetland areas. The extent of sediment and wetland soil currently impacted by the discharge of contaminated leachate and groundwater is unknown, potentially resulting in changes to ecological receptors.*	*Determine the nature and extent of sediment and wetland soil contaminated by flooding of the wetland areas. Review the ecological risk assessment, especially for benthic invertebrates, through chemical analysis and toxicity testing. Determine if a revised decision document is needed to address any change to conditions at the Site.*	Completed	EPA tasked TechLaw, Inc, under the Environmental Services Assistance Team (ESAT) contract, to re-evaluate potential for ecological risk in Rockwood Brook and the surrounding wetland area by collecting and evaluating data from seep sediment samples collected in August and October from groundwater seeps by Rockwood Brook and the forested wetland associated with the Site, as well as upstream reference locations. Data from 10-day sediment toxicity tests using the amphipod *Hyalella azteca* and the chironomid fly *Chironomus dilutus. Toxicity tests were performed on* seven sediment samples collected in October 2016, from locations selected based on the August 2016 sampling.The purpose of this task was to re-assess remedy protectiveness for ecological receptors in Rockwood Brook and the forested wetland, and determine what further monitoring is required for ecological risk purposes. Please see text below this table for a description of the deliverables, the major findings and conclusions.	5/18/2017

Recommendation # 1 Implementation Status

Tasks completed include the following:

- installation of wood posts and guard rails along areas of the wetland on the Lower Access Road to limit access to the wetland and create a visual boundary for pedestrian trespassers . Wooden posts consist of 6-inch by 6-inch Alkaline Copper Quaternary (ACQ) pressure-treated softwood installed extending at least 3.5 feet below grade. Posts extend approximately 2 to 3 feet above grade with rails shiplapped and bolted to the posts with 5/8-inch by 14-inch galvanized carbon steel bolts. The rails consist of 2-inch by 8-inch ACQ pressure treated, rough cut boards;

- repair of the existing chain-link gate at the southern entrance point to the Site, and installation of a tamper-proof locking mechanism on the gate;

- placement of large boulders (4-foot diameter, minimum) along the east side of the road leading to and from the southern access gate in order to prevent access by vehicles, including ATVs, around the gate;

- removal of the chain-link gate at the northern entrance point to the Site at the intersection with the rail trail;

- installation of a chain-link gate with a tamper-proof locking mechanism at the access road just north of the intersection of the Lower and Upper Access Roads, and placement of large boulders (4-foot diameter, minimum) on the east and west sides of the gate to meet the earthen berms on each side;

- removal of the remnants of a pipe gate and concrete footings located at the brook crossing to the sand pit;

- placement of the removed pipe gate and concrete footings and large boulders (4-foot diameter, minimum) between the existing earthen berm and trees at the entrance to the upper portion of the property (*i.e.*, capped landfills), north of the intersection of the Lower and Upper Access Roads ;

- placement of boulders (4-foot diameter, minimum) across the clearing along the east side of the Lower Access Road, south of the newly installed northern gate, to limit access from the Lower Access Road to the Upper Access Road and cap area;

- installation of nine wooden sign posts along the Lower Access Road adjacent to the wetland;

- removal of a dead tree proximate to the access path from the Lower Access Road to monitoring well TRY_MW-105S/D;

- excavation and cleaning of a 24-inch culvert north of the newly installed northern Site gate that had become blocked causing erosion of the Access Road. The Access Road was regraded; and

- installation of new signage for the Site (one *Troy Mills Landfill Superfund Site* sign was attached to both the northern and southern Site access gates, nine *wetland access warning* signs were installed on the wooden sign posts placed by Edward Paige, and three *No Trespassing/Private Property* signs were installed.

<u>Recommendation # 3 Implementation Status</u>

The completed review of the Site conditions and ecological risk assessment included:

- an evaluation of the likelihood of population-level effects to the Benthic Macroinvertebrate (BMI) community in Rockwood Brook and the adjacent forested wetland;

- a summary and interpretation of the sediment analytical chemistry data for the samples collected in August and October 2016; and

- recommendations on a future monitoring program of seep sediment chemical analyses to determine whether conditions in Rockwood Brook and the forested wetland remain protective of benthic organisms.

The major findings and conclusions of the ecological risk assessment review were:

- Toxicity test results indicated that survival and growth (biomass) for both test species (*H. azteca* and *C. dilutus*) were significantly reduced at one sampling location, Station SW-Leach-A-01. This sample was collected from a groundwater seep which originates at a culvert under the Site access road. Surface water from this seep drains, via several connecting pools, through a forested wetland, and ultimately joins Rockwood Brook.

- A review of the chemical analysis data (metals and DEHP) from the samples included in toxicity tests did not reveal any dose-response suggesting that these contaminants contributed to observed toxicity. None of the sediment samples from seeps adjacent to Rockwood Brook itself exhibited any adverse effects on test organisms, which is consistent with findings of the 2005 Baseline Ecological Risk Assessment performed by Metcalf and Eddy, Inc.

- The observed reduced survival and growth were possibly caused by physical and chemical habitat degradation associated with the visible iron floc caused by precipitation of iron, manganese, and other constituents from groundwater as it discharges to the surface. The adverse effects appeared to be limited to the small area of of the seep. No site-related chemicals were found to be notably elevated in seep sediments adjacent to Rockwood Brook.

- The overall conclusion was that the small area of impacted sediments is not likely to pose a population-level risk to the benthic invertebrate community in Rockwood Brook, and the remedy remains protective[1].

Due to consistent concentrations of DEHP above the New Hampshire Ambient Groundwater Quality Standards (AGQS) in a well (TRY_MW-205) which is in an area outside and cross-gradient to the drum removal area, GZA performed a surficial geophysics study (May 2017) and focused test pit explorations (August 2017) in this area to explore whether a separate source may exist. The studies and the explorations concluded that waste material from a 55-gallon drum observed in one of the test pits and left in place may be a potential continuing source of contamination to groundwater within that area. For

[1] The Techlaw report stated that sediment analytical chemistry analysis indicated no population level effects to the local benthic macroinvertebrate (BMI) community for either Rockwood Brook or the forested wetland, but that the sediment toxicity testing indicated the potential for impact to the local BMI population in the forested wetland (but not in Rockwood Brook). The forested wetland is impacted but the risk is inconclusive.

detailed information about these activities, please refer to GZA's Technical Memorandum - Site Maintenance and Supplemental Investigations, dated September 13, 2017.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

A public notice was made available by an EPA issued press release titled *News Releases from Region 01 EPA Reviews Three New Hampshire Superfund Site Cleanups This Year*, on 3/13/2020, stating that there was a five-year review and that EPA will publicly share the results in a final report via its website. The results of the review and the report are available at the Site information repository located at www.epa.gov/superfund/troymills.

In 2017, EPA transferred the local information repository to an online format, which allowed EPA to more efficiently and conveniently make information available to the public while minimizing the burden and holdings at the local information repository.[2]

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy that has been implemented to date**.** The results of these interviews are summarized below.

NHDES Project Manager, Michael Summerlin, and the GZA's Senior Project Manager, Tanya Justham were interviewed. Both understand that the remedy has been effective at addressing all COCs except DEHP and that it progressing well. They do point out that more data and analysis is needed to refine the conceptual Site model regarding the fate and transport of DEHP and Per- and Polyfluoroalkyl Substances (PFAS) at the Site.

Efforts were made to interview members of the Town Board of Selectmen, Police, and Conservation Comission but they were usuccessful. Please see copies of the Interview questionaires in Appendix D.

Data Review

Interim cleanup levels (ICLs) for COCs were established in the 2005 ROD issued by EPA Region 1 for groundwater and leachate at the Site and amended in the March 2014 ESD[3]. Refer to **Figure 1** for a Site Locus and Site Plan illustrating monitoring well and multi-media sampling locations. The regulatory standards used to evaluate data for the various Site media include the following:

- Results of the analyses of groundwater were compared to the ROD ICLs for COCs, which are based on federal Safe Drinking Water Act (SDWA), Maximum Contaminant Levels (MCLs) and

[2] On March 18, 2013, the EPA promulgated a final rule to amend 40 C.F.R § 300.805(c) of the NCP "Location of the Administrative Record File" to acknowledge advancements in technologies used to manage and convey information to the public. This enabled the EPA to make available to the public Administrative Records via the internet. The Troy Public Library continues to serve as the required local information repository and is critical to providing the public with access to the online Site Profile Page and Administrative Records.

[3] Lead was not identified as a COC in the ROD. A review of the RI indicates that the maximum concentration of lead in soils was 25.1 mg/Kg. This level of lead is below the site-specific lead soil screening levels (SLs) of 200 ppm and 1,000 ppm that have been developed for residential and commercial/industrial exposures, respectively.

Maximum Contaminant Level Goals (MCLGs) (40 C.F.R. 141, Subpart B, F and G); federal risk-based standards; and more stringent New Hampshire AGQS as defined in State of New Hampshire Code of Administrative Rules Env-Or 600 (Contaminated Sites Management), Env-Or 603.3;

- Results of the analyses of leachate and surface water were compared to federal Clean Water Act (CWA), National Recommended Water Quality Criteria (NRWQC)(40 C.F.R. 122.44) and more stringent Water Quality Criteria for Toxic Substances (WQCTS) as defined in State of New Hampshire Code of Administrative Rules Env-Wq 1700 (Surface Water Quality Regulations), Env-Wq 1703.21. Leachate was further compared to the ROD ICL for bis(2-ethylhexyl) phthalate (BEHP) also known as DEHP (6 micrograms per Liter (µg/L));

- Results of the analyses of wetland soil samples were compared[4] to New Hampshire Soil Remediation Standards (SRS) as defined in State of New Hampshire Code of Administrative Rules Env-Or 600 (Contaminated Sites Management), Env-Or 606.19; and

- Results of the analyses of sediment collected from Rockwood Brook were compared to the consensus-based Threshold Effect Concentration (TEC) included in the National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Table for Inorganics in Sediment (SQuIRT)[5].

- The reviewed analytical data was available from the following reports:
    - Fall 2 FYR014 Monitoring Report (GZA, February 2016)
    - Revised Spring 2015 Data Transmittal (GZA, February 2016)
    - Spring 2016 Monitoring Report (GZA, May 2017)
    - Sediment Toxicity Report (EPA/TechLaw, May 2017)
    - Technical Memo on the passive flux meter pilot study (GZA, June 2017)
    - Technical Memo on test pits and security enhancements (GZA, September 2017)
    - Fall 2018 Monitoring Report (GZA, June 2019)
    - Spring 2019 PFAS surface water and leachate sampling report (GZA, June 2019)
    - Spring 2020 Monitoring Report (GZA, August 2020)

The following summarizes the analytical results for each media at the Site, during this review period.

Groundwater

Background Water Quality

To characterize background water quality and confirm the eastern compliance boundary, well TRY_MW-701 (bedrock groundwater), which is situated east and hydraulically upgradient of the former drum disposal area, was sampled. Consistent with results from historical monitoring events, VOCs, SVOCs, and 1,4-dioxane were not detected above laboratory reporting limits. Manganese was detected at this well

[4] The ROD did not establish remediation goals (RGs) for COCs in wetland soil based on risk calculations that determined there was currently no unacceptable risk for COCs in wetland soils based on the current undeveloped status of the Site. The ROD deferred any reassessment of wetland soil risk to the future, in the event that Site use changes.

[5] Buchman, M.F., 2008. NOAA Screening Quick Reference Tables, NOAA OR&R Report 08-1, Seattle, WA, Office of Response and Restoration Division, National Oceanic and Atmospheric Administration.

at a maximum concentration of 0.01 milligrams per liter (mg/L), which is below the AGQS (0.84 mg/L) and the EPA Health Advisory standard (0.3 mg/L)[6]. No PFAS was detected above the laboratory reporting limit at this well, except PFNA at a maximum concentration of 3.7 ng/L, below the NH MCL (11.0 ng/L)[7].

ROD ICL Exceedances

VOCs detected in groundwater that exceeded ROD ICLs included 1,2,4-trimethylbenzene (1,2,4-TMB), naphthalene[8] and cis-1,2-dichloroethene (cis-DCE). The only detected SVOC that exceeded a ROD ICL was DEHP and the only detected metal that exceeded a monitoring standard (EPA Health Advisory) was manganese.

Distribution of Contaminants

Refer to Table 5A of the Spring 2020 Monitoring Report (GZA, August 2020) listed in Appendix A for a summary of the groundwater analytical results for contaminants detected in groundwater; it illustrates exceedances of applicable action limits. Also, refer to this report's Figures 3, 4, 5, and 6A for an illustration of the spatial distribution of regulatory exceedances in groundwater. At the TML Site, dissolved phase contaminants have migrated from the former drum disposal areas toward the wetland and Rockwood Brook located on the western edge of the Site.

VOCs

Consistent with historical data results from the RI dated September 2005 and historical monitoring data results since 2007, the source of residual VOC contamination in groundwater is anticipated to be the former drum disposal area and an area directly north of it between MW-205, MW-803, and MW-804. The spatial variability of contaminant concentrations observed is suspected to be related to the historical nature of discrete releases from drums throughout this area. The following graphs and tables refer to those shown at the Spring 2020 Monitoring Report (GZA, August 2020). The figures are included in Appendix B of this report.

The area of highest contaminant concentrations (highest number of detected contaminants per well and longest traceable plume) continues to be within overburden groundwater along the northern side of the former drum disposal area with the primary plume axis trending along the east to west flow path and including wells MW-205, MW-804, MW-805, MW-601D, MW-101S, and MW-C6S. The plume appears to originate just to the north of the former drum disposal area between wells MW-802/MW-803 and MW-205/MW-804. Within the plume area, contaminants are largely petroleum distillate-related and include sec-butylbenzene, p-isopropyltoluene, n-propylbenzene, n-butylbenzene, t-butylbenzene, 1,2,4-TMB, and 1,3,5-TMB, BTEX compounds (ethylbenzene, and xylenes), isopropylbenzene, 2-butanone, and naphthalene. See **Figure 3** which illustrates the distribution of key VOC COCs at the Site.

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[6] There is no EPA ROD ICL for manganese. However the 2014 ESD added the EPA Health Advisory standard of 0.3 mg/L as an action specific ARAR. To attain this ARAR, it shall be used to establish monitoring standards for groundwater.

[7] In 2016, New Hampshire adopted EPA's HA for PFOA and PFOS as an Ambient Groundwater Quality Standard (AGQS) at 70 ng/L (ppt), individually or combined. Subsequently, in September 30, 2019, the State adopted the following drinking water MCLs and AGQS for four specific PFAS: PFOA (12 ppt), PFOS (15 ppt), PFHxS (18 ppt), and PFNA (11 ppt). Then, on November 26, 2019, the New Hampshire Superior Court enjoined NHDES from enforcing these new MCLs /AGQSs beyond December 31, 2019, until it properly analyzed the costs and benefits of the new standards in compliance with the New Hampshire Safe Drinking Water Act. Most recently, in July 2020 the State promulgated State MCLs for these four PFAS compounds into the State's Safe Drinking Water Act which went into effect immediately upon the signing of the statute. Current state law requires AGQS be the same value as any MCL established by NHDES and that they be at least as stringent as health advisories set by EPA.

[8] Note that naphthalene is analyzed and reported as both a VOC and an SVOC. To be conservative for both discussion and illustrative purposes, the higher of the two naphthalene concentrations is always used.

The temporal concentration trends for petroleum-related VOCs since 2008 have generally been relatively stable or decreasing for each of the monitoring wells, with the exception of wells MW-205, MW-804, and MW-805, which have had relatively variable concentration trends. Detected concentrations of 1,2,4-TMB in groundwater samples from wells MW-804, MW-805, MW-205 have been variable over the respective sampling periods (**Graph 1**, **Graph 2**, and **Graph 3**) with concentrations ranging between 170 µg/L and 510 µg/L in samples collected from wells MW-804 and MW-805 and between 80 µg/L and 525 µg/L in samples collected from MW-205. The ICL for 1,2,4-TMB is 330 µg/L.

One COC, cis-1,2-DCE, was detected during the fall 2018 and spring 2020 monitoring rounds at monitoring wells MW-C6S, MW-C6D, MW-104S, and MW-601D, MW-101S, MW-104S, MW-201SX, MW-301X, MW-202P, MW-601S, MW-601D, MW-801, MW-802, and MW-803[9]. The detected concentrations of cis-1,2-DCE ranged from 0.61 µg/L at well MW-202P to 62 µg/L at well MW-C6D located immediately to the west of the former location of the LNAPL interceptor trenches[10]. Concentrations of cis-1,2-DCE in groundwater samples have historically been decreasing or generally stable at each of the well locations where cis-1,2-DCE has been detected. The ICL for cis-1,2-DCE is 70 µg/L.

Concentrations of 1,4-dioxane exceeding the current AGQS[11] (0.32 µg/L) were detected at monitoring wells M-7 (0.42 – 1.6 µg/L), MW-C6D (0.49 µg/L) , MW-202P (0.37 – 0.65 µg/L) and MW-501D (0.33 – 0.41 µg/L). 1,4-dioxane has not been detected above the ROD ICL (3 µg/L) in any monitoring well at the Site since 2004. Refer to Table 5A.

SVOCs

DEHP was detected in groundwater samples collected from monitoring wells MW-803, MW-804, MW-205, and MW-A28, MW-101S, MW-204, and MW-A28 at concentrations that exceeded the AGQS/ROD ICL of 6 µg/L (See **Figure 4**). The highest concentration of DEHP was detected at MW-A28 (100 µg/L), which is located south west of the former LNAPL trenches between the lower access road and the wetland. The fall 2018 and spring 2020 detections of DEHP appear coincident with the petroleum-related VOC plume. The DEHP plume is located hydraulically within and side gradient of the former drum disposal area.

Historically, monitoring well MW-205 is the only monitoring location with a long-term (greater than 10 years of sampling data) and consistent history of DEHP detections. A temporal trend of decreasing concentrations has been observed for samples collected from this well since October 2005; however, reliable sample collection (eliminating the possibility cross-contamination) began during 2008 following the installation of a dedicated bladder pump. Since 2008, concentrations of DEHP detected within MW-205 (3.6 µg/L - 77 µg/L) have been variable to slighltly decreasing (Graph 3). Based on the comparison of DEHP concentrations and the calculated groundwater elevation within MW-205 since 2008, there appears to be an inverse correlation such that as groundwater level rises, concentrations of DEHP generally decrease (Graph 4).

[9] Although there are many COCs that are consistently detected below standards, Cis-1,2-DCE is the only chlorinated VOC that has continuously been detected over the last 5 years, hence its discussion as part of the data review.
[10] The LNAPL recovery trenches were decommissioned in January 2014. Please see Remedial Action Performance under Question A of Section V Technical Assessment for more information.
[11] The AGQS for 1,4-dioxane was reduced from 3 µg/L to 0.32 µg/L on September 1, 2018.

Potential temporal trends of decreasing DEHP concentrations have been observed in well MW-803 (Graph 5) and no discernible trend has been observed in well MW-804 (Graph 1). It should be noted that prior to 2016 both wells were sampled using a non-dedicated SamplePro bladder pump, which may have introduced DEHP contamination to the samples.

At monitoring well MW-A28, detected concentrations of DEHP indicate an increasing temporal trend (Graph 6).

ARSENIC AND MANGANESE

Arsenic was not detected at concentrations exceeding the ROD ICL (0.05 mg/L) nor the AGQS (0.01 mg/L) in any of the groundwater samples collected during the Spring 2016, Fall 2018, and Spring 2020 monitoring events.

Manganese was detected at concentrations exceeding the EPA monitoring standard (0.3 mg/L) in groundwater samples from each of the sampled monitoring wells with the exception of wells M-1, M-7, M-7D, MW-A28, MW-101D, MW-105D, MW-202P, MW-501D, MW-508X, MW-701, MW-702SX, and MW-702D. It was detected at concentrations above the AGQS (0.84 mg/L) in samples collected from each of the sampled monitoring wells with the exception of wells M-1, M-7D, MW-A28, MW-C6D, MW-101D, MW-104D, MW-105D, MW-105S, MW-202P, MW-501D, MW-508X, MW-701, MW-702SX, and MW-702D.

Refer to **Figure 5** for the distribution of manganese concentrations detected in Site wells sampled during the spring 2020 monitoring round.The highest manganese concentrations were generally detected in shallow overburden wells located near the axis of the contaminant plume. Detected manganese concentrations have generally been increasing or variable since at least 2014 in individual wells over time with the exception of wells M-7, MW-A28, MW-C6S, MW-104D, MW-105S, W-105D, MW-204, MW-803, and MW-804, which display decreasing trends (Graph 7B and Graph 7D).

PFAS

During the fall 2018 sampling event, a subset of the Site's monitoring wells was sampled to preliminarily understand the presence of these compounds in Site groundwater. Of the locations sampled, detected exceedances of the EPA Screening Levels (SLs) and the NH MCLs were observed in samples collected from all sampled wells with the exception of two upgradient bedrock wells. In the Spring 2020 sampling event, the sampling for PFAS was extended to all 32 monitoring wells at the Site. Refer to Table 6 for PFAS compounds analyzed and detected.

Results were compared against EPA SLs for Perfluorobutane Sulfonate (PFBS) (40,000 ng/L), Perfluorooctane Sulfonate (PFOS) (40 ng/L), and Perfluoro-n-Octanoic Acid (PFOA) (40 ng/L) that were established to assess the presence of these contaminants at the Site. As of July 23, 2020, the following NH PFAS MCLs became effective, by law: PFOA at 12 ng/L, PFOS at 15 ng/L, PFHxS of 18 ng/L, and PFNA of 11 ng/L.

Regarding the newly promulgated State PFAS standards, the following sampling results from the Groundwater Monitoring have been documented to date:

Compound	Sample Range (ng/L)	State MCL (ng/L)
Perfluorooctane Sulfonate (PFOS)	3.70 – 10.90	15
Perfluoro-n-Octanoic Acid (PFOA)	47.00 – 2140.00	12
Perfluorohexane Sulfonate (PFHxS)	4.80 – 22.50	18
Perfluorononanoic Acid (PFNA)	3.70 – 61.80	11

During fall 2018 detected concentrations for PFBS and PFOS did not exceed the established SLs, while detected concentrations of PFOA (47 - 790 ng/L) exceeded the SL in most of the sampled wells (8 out of 11 wells).

During spring 2020 results were similar with no exceedances to the PFBS and PFOS SLs and detected concentrations of PFOA (6.4 – 2140 ng/L) exceeding the SL and the NH MCL (12 ng/L) in the majority of the sampled wells (23 out of 32 wells). The maximum concentration of PFOA was observed at well (MW-102).

The detected concentrations of PFNA exceeded the NH MCL (11 ng/L) in 8 wells and the detected concentration of PFHxS exceeded the NH MCL (18 ng/L) in well MW-102. None of the detected concentrations of PFOS exceeded the NH MCL (15 ng/L). With the exception of well couplet MW-105, each of the wells with exceedances of PFNA or PFHxS are located within the GMZ. This well couplet is located at a downgradient boundary of the GMZ. Please see **Figures 6A and 6B** for a depiction of PFOA concentrations throughout the Site and its estimated distribution in overburden groundwater[12].

Most detected PFAS compounds were relatively consistent between the sampled monitoring wells. The initial screening for PFAS in groundwater has indicated that concentrations of PFOA exceeding the SL and the NH MCL, and PFNA exceeding the NH MCL are prevalent at the Site. Because of these observations and the recent promulgation of the NH PFAS MCLs, continued PFAS monitoring is recommended. EPA will be assessing whether a future CERCLA decision document will be required to add the new State PFAS MCLs as an ARAR for the remedy .

Leachate

Refer to Table 7 for a summary of the leachate analytical results for the samples collected during Spring 2016, Fall 2018, Spring 2020 and previous sampling events. Refer to **Figure 7** for the spatial distribution of the contaminants detected within the leachate samples relative to the surface water samples. The following summarizes the leachate analytical results:

VOCs and SVOCs

These compounds were not detected above the laboratory detection limits in the samples collected from leachate location SW-LEACH-B. Of the VOCs detected within the sample collected from location SW-LEACHATE, none exceeded their respective AGQS or WQCTS. The contaminants detected consisted of various petroleum-related VOCs including sec-butylbenzene, t-butylbenzene, isopropylbenzene, and p-isopropyltoluene, ethylbenzene, n-propylbenzene, and n-butylbenzene, consistent with the observed

[12] For these depictions, PFOA was selected from all PFAS compounds because it exceeded the EPA SL, the EPA Health Advisory, and the NHDES AGQS.

groundwater contamination. Total detected VOC concentrations at SW-LEACHATE have generally displayed a decreasing trend since 2006.

DEHP was not detected above the laboratory reporting limit of 3 µg/L in the samples collected from either leachate location. DEHP has not been detected above the laboratory reporting limit in the leachate samples since 2014. No other SVOCs were detected above the laboratory reporting limits.

ARSENIC AND MANGANESE

Arsenic was detected in the leachate samples at concentrations ranging from 0.00058 mg/L to 0.00105 mg/L, below both the AGQS and WQCTS.

Manganese was detected in the samples collected from the leachate in exceedance of the AGQS (0.84 mg/L) at a concentration of 3.6 mg/L at SW-LEACHATE and below the AGQS at a concentration of 0.4493 mg/L at SW-LEACH-B. There is currently no WQCTS or ROD ICL to evaluate the data. The concentration detected at SW-LEACHATE is slightly lower than pre-2018 historical manganese concentrations detected at that location and may indicate a decreasing trend.

PFAS

Of the 24 PFAS compounds analyzed in 2019, nine were detected within the sample from location SW-LEACHATE and 10 were detected in the sample from location SW-LEACH-B. The detected concentrations ranged from 2.94 ng/L (perfluorohexane sulfonic acid [PFHxS] at location SW-LEACH-B) to 343 ng/L (PFOA at location SW-LEACHATE).

Of the 36 PFAS compounds analyzed for in leachate during 2020, nine were detected within the sample from SW-LEACHATE and six were detected in the sample collected from SW-LEACH-B (refer to Table 9). The detected concentrations ranged from 2.02 ng/L (PFOS at SW-LEACH-B) to 363 ng/L (PFOA at SW-LEACHATE).

In 2019, relatively higher (compared to surface water) concentrations of 10 PFAS compounds were detected in the two leachate samples collected. The PFAS compounds detected within the leachate samples were consistent with the compounds detected in Site groundwater during fall 2018.

In 2020, relatively higher (compared to surface water) concentrations of PFAS compounds were detected in the two leachate samples collected. The PFAS compounds detected within the leachate samples are consistent with the compounds detected in Site groundwater.

The concentration of PFOA detected in the leachate sample collected from SW-LEACHATE (363 ng/L) did exceed the EPA SL for groundwater of 40 ng/L. Although there are no regulatory standards or screening levels for PFAS in leachate, leachate does represent concentrations of PFAS in groundwater

as it discharges to the wetland. Thus, the concentrations above indicate that groundwater is discharging as leachate with elevated PFOA concentrations, but attenuating upon reaching Rockwood Brook.

Wetland Soil

Monitoring of wetland soil is included in the monitoring program to help assess the impact from leachate and to monitor MNA progress. There are no ROD ICLs for contaminants in wetland soil. No wetland soil data was collected during this review period. The following is a summary of the available data.

During the RI, five soil samples were collected from the Rockwood Brook Wetland Study Area and three from an area interpreted as background, and analyzed for VOCs, SVOCs, and metals. Of the 10 VOCs, nine SVOCs, and 24 metals detected at least once in the soil samples collected from the Wetland Study Area, only DEHP and beryllium were detected at concentrations above the SRS. Manganese concentrations reported for all five of the wetland soil samples were elevated above concentrations detected within the background samples. For the four wetland soil sampling locations included in the monitoring program since 2006, concentrations of DEHP and manganese exceeding the SRS have been detected fairly consistently at each sampling location.

Sediment

Monitoring of sediments is included in the monitoring program to help assess the impact from leachate and to monitor MNA progress. There are no ROD ICLs for contaminants in sediment. No sediment data was collected during this review period, other than the seep sediment data collected by EPA and their contractor, TechLaw during August and October 2016 (See note on Table 3 above). The following is a summary of the available data.

During the RI, five sediment samples were collected from Rockwood Brook in an area hydraulically downgradient from the former drum disposal area, and three reference sediment samples were collected from upstream locations on the west branch of Rockwood Brook. One VOC (acetone), four SVOCs (dibenzofuran, di-nbutylphthalate, fluoranthene, and pyrene), and several metals were detected in the sediment collected from at least one reference sample location.

Five VOCs (acetone, 1,1-dichloroethane, 2-butanone, 4-isopropyltoluene, and styrene) and nine SVOCs, primarily phthalates, were detected in the samples collected from the downgradient sediment locations. The same metals detected in the reference samples were also detected in the downgradient samples, and a comparison of average concentrations indicated that the downgradient concentrations were slightly higher than reference concentrations.

Concentrations of VOCs and SVOCs have not been detected above laboratory reporting limits within sediment samples collected from one sediment location (TRY_SED-3) since 2006. Also, since 2006, none of the metals analyzed for have exceeded the NOAA SQuIRT TEC screen values available, with the exception of mercury during October 2009.

Surface Water

Surface water samples were collected during spring 2016, fall 2018, and spring 2020 for analysis of VOCs, SVOCs, manganese, arsenic, and hardness. Results of the analyses were compared to the WQCTSs. The rationale for sampling surface water is to monitor possible impacts from groundwater migrating downgradient from the former drum disposal area. All monitoring rounds included the collection of surface water samples at four locations along Rockwood Brook (SW-1, SW-3, SW-4, and SW-100). Refer to **Figure 7.**

VOCs, SVOCs and ARSENIC

Consistent with historical results, concentrations of VOCs, SVOCs, and arsenic were not detected within the surface water samples collected during any of the monitoring rounds.

MANGANESE

Manganese was detected at relatively low concentrations within each of the surface water samples collected, consistent with historical results. There is currently no WQCTS or NRWQC to evaluate the surface water manganese data against. It should be noted that based on the measured hardness within the collected samples of surface water, water within Rockwood Brook, both up and downgradient of the former drum disposal area, is classified as soft[13], which suggests metals are likely not being mobilized from sediments and subsurface soils into the surface water.

PFAS

In May 2019 NHDES initiated a surface water screening program to assess the presence of PFAS concentrations in surface water. The Spring 2019 sampling effort included the collection of seven surface water and two leachate samples, and the Spring 2020 sampling was expanded to include one surface water sample (SW-SDP) from the recreational public beach area at Sand Dam Pond located downstream of the Site on Rockwood Brook.

In 2019, five of 24 analyzed PFAS compounds were detected in the surface water. The detected concentrations ranged from 1.82 ng/L (perfluorohexanoic acid [PFHxA] at sample SW-SDP-2.5) to 5.38 ng/L (perfluorobutanoic acid [PFBA] at sample SW-SDP-2.5). Stratification of PFAS concentrations was not indicated by the results of the Sand Dam Pond samples collected at multiple depths, and PFAS compounds were not detected above the laboratory reporting limit (maximum reporting limit of 1.85 ng/L) in any of the samples collected from upstream locations. These locations represent the upstream edge of expected impacts to Rockwood Brook.

[13] Soft water is water that is free from dissolved salts of such metals as calcium, iron, or magnesium, which form insoluble deposits such as appear as scale in boilers or soap curds in bathtubs and laundry equipment. In contrast, hard water water contains salts of calcium and magnesium principally as bicarbonates, chlorides, and sulfates. https://www.britannica.com/science/soft-water

Of the 36 PFAS compounds analyzed in 2020, three (PFHxA, PFHpA, and PFOA) were detected. The detected concentrations ranged from 1.94 ng/L (PFHpA at SW-SDP-0) to 4.15 ng/L (PFOA at SW-100). Detected concentrations did not exceed the Site-specific PFOA surface water screening level established by EPA, and there were no detections above the laboratory reporting limit (maximum reporting limit of 1.89 ng/L) in the upstream sample locations. Results for the spring 2020 sampling event were relatively consistent with those from the May 2019 sampling event.

Currently, no EPA or NHDES PFAS standard for surface water exists. EPA Site-specific SLs for PFOA, PFOS, and PFBS in surface water have been calculated to be 713ng/L, 713ng/L, and 713,000 ng/L, respectively.

A comparison of the observed PFAS concentrations[14] in surface water to the EPA SLs reveals that none of the observed concentrations have met or exceeded the SLs. The highest PFOA concentration has been 5.34 ng/L, significantly below the SL (713 ng/L). PFOS and PFBS concentrations have been non-detect. Refer to Table 9 of the GZA Spring 2020 Monitoring Report for surface water and leachate results.

Site Inspection

Due to the COVID-19 pandemic, a regular site inspection was not conducted for this FYR. In lieu of a regular site inspection, this report has included the most recent Site inspection performed by the NHDES contractor, GZA. While conducting the spring 2020 monitoring round on 04/20/2020, GZA performed their routine inspection of field and maintenance site conditions. The landfill cap was observed to be generally in good condition and except for one "Private Property - No Trespassing" sign that had been removed from a post near the northern entrance to the Site, no access security issues were observed. The engineering controls installed during 2017 to limit trespassing were observed to be in good condition.

The beaver dam on Rockwood Brook by the MW-105D series wells was partly reconstructed and elevated water levels were observed in the area behind the dam. At the time of sampling, GZA did not observe surface water and leachate monitoring locations to be impacted by the elevated water levels, with the exception of SW-LEACH-B.

Refer to Appendix F of the Spring 2020 Monitoring Report (GZA August 2020) for a photographic log of the Site conditions.

V. TECHNICAL ASSESSMENT

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

Yes. The remedy is functioning as intended by the decision documents**.** The selected remedy included source control (removal of LNAPL, which has been completed, and maintenance of the permeable soil cap overlying residual contaminated soil); monitored natural attenuation of the groundwater underlying the TML; monitoring of surface water, sediment, leachate, and wetland soil; and ICs.

[14] The surface water data was obtained from the GZA Spring 2019 PFAS Surface Water and Leachate Sampling Report, dated June 26, 2019 and the GZA Spring 2020 Monitoring Round Data Report dated August 13, 2020.

An analysis of the remedial action performance, the remedy's operations & maintenance, and the implementation of ICs and other measures supports this conclusion. The following is a summary of the analysis performed.

Remedial Action Performance

Permeable Soil Cap - Former Drum Disposal Area

Residual contaminated soils are currently under a 2-foot soil cap and not available for potential exposure under current restricted access or reasonably-anticipated future recreational land uses. The capping remedy is effective if properly maintained to prevent potential future exposures. Inspection of the cap has indicated the cap is still in good condition and is functioning as intended.

LNAPL Recovery Trenches

Between 2011 and 2013, phased supplemental LNAPL investigations were performed to further delineate the LNAPL source area and aid the evaluation of potential focused remedial alternatives in the vicinity of the LNAPL interceptor trenches and former drum disposal area. It was concluded that the interceptor trenches were no longer recovering free product and that LNAPL present in the vicinity of the interceptor trench area appeared to be both laterally and vertically discontinuous. Based on these findings, the interceptor trenches were decommissioned in January 2014 in accordance with the ROD.

Monitored Natural Attenuation (MNA)

MNA is identified in the ROD as the primary remedy component to achieve the "Management of Migration" (MOM) RAO. It will continue until groundwater cleanup levels are met. The remedy is generally functioning as intended, although there are factors that may result in a longer time period than identified in the ROD for MNA to achieve full groundwater cleanup, as described below.

At the time of the 2015 FYR, a very detailed evaluation of the MNA conditions at the Site was perfomed (see Section IV Technical Assesment in the 2015 Five Year Review Report). The reviewed data suggested sporadic to potentially ongoing reduction of chlorinated volatile organic compounds (cVOCs) in the groundwater, and cVOC and SVOC plumes were deemed to be stable or shrinking due to favorable redox conditions. However, the MNA timeframe of DEHP may exceed the original ROD estimate of 2035 due to the extent of contamination and its recalcitrance to attenuate in an anaerobic groundwater environment. Also, various limiting factors were found to preclude the development of an accurate remedial timeframe projection. Thus, the evaluation concluded that remedial goals for groundwater would likely not be met by the 2035 date estimated in the ROD, and recommended future consideration to evaluating MNA effectiveness and schedule for achieving cleanup levels relative to residual DEHP in soil and groundwater.

During this review period, routine monitoring was conducted to evaluate the effectiveness of the MNA component and included the sampling and chemical analysis of groundwater from monitoring wells, surface water, seep sediment, leachate, and wetland soils. Also, MNA field screening parameters (pH, Oxidation-Reduction Potential, Specific Conductance, Dissolved Oxygen, Turbidity, and Temperature) were tested at a number of monitoring wells (See Table 5B of the GZA 2020 Spring Monitoring Report).

A review of the monitoring data collected during this review period indicates that concentrations of VOCs, both petroleum distillate-related and cVOCs, have decreased below ROD ICLs with the exception of 1,2,4-TMB at four monitoring wells (MW-804, MW-805, MW-205) on the main plume axis. Concentrations of DEHP continue to exceed the ROD ICL at four wells (MW-205, MW-803, MW-

804 and MW-A28) with decreasing (one well), increasing (two wells), and variable (one well) temporal concentration trends observed at the various wells. For 1,4-dioxane none of the concentrations detected have met or exceeded the ROD ICL, and concentration trends have generally been stable to decreasing.

Based on the aforementioned observations, MNA mechanisms appear to continue working at the Site. However, a time-frame for achieving cleanup levels relative to DEHP in soil and groundwater has not been developed.

System Operations/O&M

Operating procedures, as decribed above in Section II, continue to ensure the effectiveness of the remedy. No frequent equipment breakdowns or changes indicating a potential issue affecting protectiveness have been identified. Average annual O&M costs have decreased largely due to efficiencies obtained in monitoring costs and the decommissioning of the LNAPL trenches.

Implementation of Institutional Controls and Other Measures

ICs, as presented above in Section II, are in place and Monitoring Reports from GZA show no violations of the restrictions imposed by these; thus they seem to be proving generally effective in preventing exposures. Access controls (*e.g.* fencing, warning signs, and structures blocking ATV access) are in place, as of the date of the last inspection. However, historically, frequent tampering with some of the components (*i.e.* locks and signs removed) as shown in the monitoring reports, indicate some limitations in their effectiveness in limiting access to the Site and that alternatives to prevent/minimize tresspasing/tampering should be explored with the Town and NHDES.

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?

No. There have been changes in toxicity values, exposure assumptions, exposure pathways and methods of evaluating risk since the 2005 ROD and 2014 ESD were issued, as discussed below. However, these changes are not expected to alter the protectiveness of the remedy because the RAOs remain valid, land use has not changed since the last FYR, and ICs are in place. The Site remains within a large undeveloped parcel of land, and ICs are in place to prevent exposure to contaminated groundwater, soil, sediment, and leachate.

Residual contaminated soil within the source area is currently under a 2-foot soil cap and isolated from potential exposure under current or reasonably-anticipated future recreational land uses. Groundwater in the vicinity of the Site is not used as a potable water supply. ICs have been established to restrict the use of groundwater until groundwater cleanup levels are achieved, and to prohibit the alteration of surface and subsurface soils, and the cap until the remedy is completed.

Changes in Standards and TBCs

New standards should be considered during the five-year review process as part of the protectiveness determination. Under the NCP, if a new requirement is promulgated after the ROD is signed, and the requirement is determined to be an ARAR, the new requirement must be attained only if necessary to ensure that the remedy is protective of human health and the environment.

EPA guidance states:
"Subsequent to the initiation of the remedial action new standards based on new scientific information or awareness may be developed and these standards may differ from the cleanup standards on which the remedy was based. These new … [standards] should be considered as part of the review conducted at least every five years under CERCLA §121(c) for sites where hazardous substances remain on-site. The review requires EPA to assure that human health and the environment are being protected by the remedial action. Therefore, the remedy should be examined in light of any new standards that would be applicable or relevant and appropriate to the circumstances at the site or pertinent new [standards], in order to ensure that the remedy is still protective. In certain situations, new standards or the information on which they are based may indicate that the site presents a significant threat to health or environment. If such information comes to light at times other than at the five-year reviews, the necessity of acting to modify the remedy should be considered at such times." (See CERCLA Compliance with Other Laws Manual: Interim Final (Part 1) EPA/540/G-89/006 August 1988, p. 1-56.)

Interim Cleanup Levels (ICLs) were identified in the 2005 ROD for groundwater based on Safe Drinking Water Act Maximum Contaminant Levels (MCLs) and Maximum Contaminant Level Goals (MCLGs), federal risk-based standards, and more stringent New Hampshire AGQSs. In March 2014, EPA issued an Explanation of Significant Differences (ESD) for the TML Site and updated cleanup levels for several COCs. The ESD also updated ARARs cited in the 2005 ROD to include the revised State and federal standards and to identify additional standards that were not specifically identified in the ROD. The updated ARARs were included in Attachment 1 of the ESD and none of the revisions significantly changed the scope of the remedy.

As part of this FYR, current EPA MCLs, MCLGs, federal risk-based standards, and New Hampshire AGQSs published by the NHDES during the last five years were reviewed. The Groundwater ICLs presented in the 2005 ROD and updated in the March 2014 ESD remain valid. Also, the leachate cleanup level for DEHP which is a risk-based level for the protection of recreational dermal contact exposure, and the RfD value used in the 2005 ROD are still valid. However, a newly promulgated decrease of the NHDES AGQS for 1,4-dioxane (0.32 µg/l) became effective on September 1, 2018, and NHDES enacted by statute MCLs for four PFAS compounds, effective on July 23, 2020.

1,4-dioxane

Using 2013 updated IRIS toxicity information and the standard Superfund risk assessment approach, EPA's carcinogenic risk range of 10^{-6} to 10^{-4} for 1,4-dioxane equates to a concentration range of 0.46 to 46 ug/L (ppb).

In September 2018, NHDES modified its AGQS for 1,4-dioxane from 3.0 ug/L (ppb) to 0.32 ug/L (ppb).The current ROD ICL of 3.0 µg/L for 1,4-dioxane equates to a carcinogenic risk of 6.5×10^{-6}, which is still within EPA's acceptable risk range. Since the existing cleanup level remains protective, the remedy does not need to be modified to incorporate the new AGQS of 0.32 µg/L for 1,4-dioxane, as a cleanup level, at this time.

PFAS

In May 2016, EPA issued final lifetime drinking water Health Advisories (HAs) for PFOA and PFOS. The EPA HA for PFOA and PFOS is 70 ng/L individually or combined. See also EPA's "Interim

Recommendations to Address Groundwater Contaminated with Perfluorooctanoic Acid and Pefluorooctanesulfonate" (OSWER Directive 9283.1-47, December 19, 2019).

In 2016, New Hampshire adopted EPA's HA for PFOA and PFOS as an Ambient Groundwater Quality Standard (AGQS) at 70 ng/L , individually or combined. Subsequently, on September 30, 2019, the State adopted the following AGQSs for four specific PFAS:

PFOA 12 ng/L
PFOS 15 ng/L
Perfluorohexane sulfonate (PFHxS) 18 ng/L
Perfluorononanoic acid (PFNA) 11 ng/L

Current state law requires AGQS be the same value as any MCL established by NHDES and that they be at least as stringent as health advisories set by EPA. On November 26, 2019, the New Hampshire Superior Court enjoined NHDES from enforcing these new AGQSs beyond December 31, 2019, until it properly analyzes the costs and benefits of the new standards in compliance with the New Hampshire Safe Drinking Water Act.

However, in July 2020 New Hampshire promulgated State MCLs for these four PFAS compounds into the State's Safe Drinking Water Act which went into effect immediately upon the signing of the statute. After the State promulgated the new PFAS MCLs, on September 4, 2020 the Superior Court ended its injunction on the application of the new AGQSs effective on the date that the new statutorily mandated levels went into effect. As shown in the Data Review Section above, the data up to date shows exceedances of some of these newly promulgated standards.

Given the timing of the issuance of this five-year review and the state's actions to establish standards for the PFAS substances listed above, at this time EPA has made no determination of whether these new standards will be adopted for this Site. For purposes of this five-year review, EPA has evaluated the PFAS data collected against EPA's site-specific screening levels, Health Advisories and/or the State's current AGQS standard (of 70 ng/l PFOS and PFOA individually or combined), and/or appropriate site-specific screening levels for PFAS. EPA recommends further evaluation to determine if any additional actions are needed.

The additional measure of collecting PFAS samples as part of the Site's groundwater monitoring plan is working as designed and it does not call into question the protectiveness of the remedy because there are no exposures to the groundwater and institutional controls are effectively restricting the use of groundwater until cleanup levels are met. EPA will evaluate the protectiveness of the remedy in light of the new standards noted above and will determine whether or not additional action is necessary.

Changes in Toxicity and Other Contaminant Characteristics

2017 1,3,5-Trimethylbenzene non-cancer toxicity value

In June 2017, EPA finalized an inhalation reference concentration (RfC) for 1,3,5-trimethylbenzene based on a new IRIS value. Previously, there was no RfC value for 1,3,5-trimethylbenzene.

There is a ROD ICL for 1,3,5-Trimethylbenzene in groundwater. With this finalized RfC for 1,3,5-trimethylbenzene, an inhalation unit risk value is available for this chemical. However, the level in ambient

air is expected to be minimal and thus inhalation is not a complete exposure pathway. Therefore, this change is not expected to affect the protectiveness of the remedy.

2017 1,2,4-Trimethylbenzene non-cancer toxicity value

In June 2017, EPA finalized a new inhalation reference concentration (RfC) for 1,2,4-trimethylbenzene. The new IRIS value replaces an EPA PPRTV that was used previously and indicates that 1,2,4-trimethylbenzene is less toxic from non-cancer health effects. This change would result in decreased non-cancer hazard from inhalation exposure to 1,2,4-trimethylbenzene.

This chemical is a COC and there is a ROD ICL for it in groundwater. Because of this decreased hazard and the expectation for levels in ambient air to be minimal (*i.e.* not a complete inhalation exposure pathway), this change is not expected to affect the remedy protectiveness.

2016 Perfluorooctanoic acid (PFOA) and Perfluorooctane sulfonate (PFOS) non-cancer toxicity values

In May 2016, EPA issued final lifetime drinking water health advisories for PFOA and PFOS, which identified a chronic oral reference dose (RfD) of 2E-05 mg/kg-day for PFOA and PFOS (USEPA, 2016a and USEPA, 2016b). These RfD values should be used when evaluating potential risks from ingestion of contaminated groundwater at Superfund sites where PFOA and PFOS might be present based on site history. Potential estimated health risks from PFOA and PFOS, if identified, would likely increase total site risks due to groundwater exposure. Further evaluation of potential risks from exposure to PFOA and PFOS in other media at the Site might be needed based on site conditions and may also affect total site risks.

PFOA and PFOS belong to a group of compounds known as PFAS, which are known to be stable, persistent, and bioacummulative in the environment. Given the site history, which included the disposal of textiles among other substances at the TML Site, it was determined that PFAS may be present in groundwater and other media at the Site. Site-specific screening levels (SLs) for PFOA (40 ng/L) and PFOS (40 ng/L) in groundwater were calculated using the Regional Screening Level (RSL) calculator for a residential scenario and utilizing a Hazard Index (HI) = 0.1 to determine if the contaminant levels may warrant further investigation. Subsequently, in June 2020 EPA developed Site-specific SLs for PFOA (713 ng/L) and PFOS (713 ng/L) in surface water. These SLs assume a recreational surface water exposure pathway for a child swimmer based on ingestion exposure.

PFOA has been the only PFAS compound to exceed its SL in groundwater and no PFAS compounds have exceeded SLs in surface water. Since contaminated groundwater is not being used at the Site and there are ICs prohibiting its use until ICLs are met, this toxicity value change has no impact in the current protectiveness of the remedy.

2014 Perfluorobutanesulfonic acid (PFBS) non-cancer toxicity value

PFBS has a chronic oral RfD of 2E-02 mg/kg-day based on an EPA PPRTV (USEPA, 2014a). This RfD value should be used when evaluating potential risks from ingestion of contaminated groundwater at Superfund sites where PFBS might be present based on site history. Potential estimated health risks from PFBS, if identified, would likely increase total site risks due to groundwater exposure. Further evaluation of potential risks from exposure to PFBS in other media at the Site might be needed based on site conditions and may also affect total site risks.

PFBS belongs to a group of compounds known as PFAS, which are known to be stable, persistent, and bioacummulative in the environment. Given the site history, which included the disposal of textiles among other substances at the TML Site, it was determined that PFAS may be present in groundwater and other media at the Site. A Site-specific screening level (SL) for PFBS (40,000 ng/L) in groundwater was calculated using the Regional Screening Levels (RSL) calculator for a residential scenario and utilizing a Hazard Index (HI) = 0.1 to determine if the contaminant levels may warrant further investigation. Subsequently, in June 2020 EPA developed Site-specific SLs for PFBS (713,000 ng/L) in surface water. This SL assumes a recreational surface water exposure pathway for a child swimmer based on ingestion exposure. Since PFBS has not exceeded the site-specific SL in groundwater nor in surface water, groundwater is not being used at the Site, and there are ICs prohibiting its use until ICLs are met, this toxicity value change is not expected to affect the remedy protectiveness.

Changes in Risk Assessment Methods

2018 EPA VISL Calculator

In February 2018, EPA launched an online Vapor Intrusion Screening Level (VISL) calculator which can be used to obtain risk-based screening level concentrations for groundwater, sub-slab soil gas, and indoor air. The VISL calculator uses the same database as the Regional Screening Levels for toxicity values and physiochemical parameters and is automatically updated during the semi-annual RSL updates.
Please see the User's Guide for further details on how to use the VISL calculator.
https://www.epa.gov/vaporintrusion/vapor-intrusion-screening-level-calculator.

The Site remains undeveloped, there are no buildings within the Site and the closest residences appear to be approximately 0.45 miles upgradient and cross-gradient from the source of the plume. Since there is no complete vapor intrusion pathway (no receptors), this change in risk assessment methods has no current impact on remedy protectiveness. However, if there is a change in site conditions that could lead to vapor intrusion exposure, this pathway may need to be re-evaluated.

Changes in Exposure Pathways

No changes have been identified in the current and reasonably anticipated future land use of the Site. In mid June 2020 a property owner informed GZA that a water supply well approximately 400 feet deep was installed as part of an ongoing residential building project. The water supply well is located approximately 2,000 feet south of the southern Site entrance. Due to its location (outside of the GMZ and cross-gradient from the groundwater flow, this change is not expected to affect the remedy. See **figure 2** for a depiction of the overburden groundwater elevations and potentiometric surfaces.

There have been no changes to human health or ecological routes of exposures. In 2015 there was concern about the dispersion of contaminated leachate within wetland areas due to flooding by beaver damming activity, and its effect on ecological receptors. During a Site visit in August 2016 EPA noticed that the beaver dam had been breached and the localized flooding drained. Also, as explained above in Section III, an ecological risk assessment review was completed in May 2017 and no additional ecological routes of expousure were identified. Nonetheless, the ecological risk assessment review performed during this Five Year Review has recommeneded that monitoring of sediment in groundwater seeps should continue

in order to ensure that ongoing seep discharges do not extend to Rockwood Brook. Specifically, monitoring for SVOCs and metals within stations in the forested wetland and adjacent to Rockwood Brook near known discharge points for groundwater seepage into Rockwood Brook (*e.g.* locations Leach A-01 and Leach B-01, respectively), is recommeneded to be performed prior to the next Five Year Review to ensure that contaminants remain largely restricted to the immediate areas of groundwater discharge and to monitor for any increases over time.

Expected Progress Towards Meeting RAOs

Two of the three RAOs have been met (*i.e.* the containment and removal of NAPL to the extent practicable and the implementation of EPA's presumptive capping remedy for landfill sites within the former drum disposal area) and substantial progress has been made to achieve the MOM RAO (*i.e* limiting the migration of groundwater contaminants beyond a designated New Hampshire GMZ to downgradient areas, and over time, restoring all Site groundwater to safe drinking water levels, plus the prevention of Site groundwater ingestion until it has been restored to safe drinking water levels).

Site groundwater ingestion has been prevented through the establishment of Site access restrictions and ICs (see Section II above). As evidenced by the ongoing groundwater monitoring results, groundwater contaminant migration remains within a New Hampshire GMZ and site contaminant concentrations are generally below regulatory standards or trending downward. However, manganese levels are not declining as expected in wetland soils and clean-up levels in groundwater may not be attained within the anticipated time frame established in the ROD (less than 30 years after completion of the source control component for some contaminants, *i.e.* 2035), due to continued elevated levels of DEHP. The fate and transport of DEHP at the Site needs to be better understood in order to refine the Site's CSM and determine the timeframe needed to achieve all ICLs at the Site.

The presence of PFAS in Site groundwater also needs to be assessed to determine if any PFAS compounds need to be incorporated into the Site's CSM and the MNA model and determine if any modification of the groundwater remedy is required (including adding an ICL for any relevant PFAS compounds).

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

No. No other information has come to light that could call into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
None.

Issues and Recommendations Identified in the Five-Year Review:

OU(s): Entire Site	Issue Category: Remedy Performance			
	Issue: Need to assess whether the newly promulgated NH PFAS standards will require modification of the remedy.			
	Recommendation: Evaluate whether the remedy remains protective in light of the newly promulgated NH PFAS standards and whether additional action is needed.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	9/30/2021

OU(s): Entire Site	Issue Category: Monitoring			
	Issue: DEHP in groundwater continues to exceed the ICL; manganese levels continue not declining as expected in wetland soils; and clean-up levels in groundwater may not be attained within the anticipated time frame established in the ROD (*i.e.* 2035).			
	Recommendation: Continue monitoring for these contaminants, refine the conceptual site model regarding their fate and transport, and determine the timeframe needed to achieve all ICLs at the Site.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	9/30/2023

OU(s): Entire Site	Issue Category: Monitoring			
	Issue: The overall conclusion of the ecological risk assessment completed in May 2017 was that impacted seep sediments are not likely to pose a population-level risk to the benthic invertebrate community in Rockwood Brook, and that the remedy remains protective. However, to ensure that contaminants remain largely restricted to the immediate areas of groundwater discharge and to monitor for any increase of contaminant discharge over time, seep sediment monitoring must resume.			
	Recommendation: Test for SVOCs and metals in seep sediments in the forested wetland and adjacent to Rockwood Brook near known discharge points for groundwater seepage into Rockwood Brook (e.g. locations Leach A-01 and Leach B-01) prior to the next Five Year Review.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**

No	Yes	State	EPA	9/30/2024

Other Issues not affecting protectiveness

Frequent tampering with some of the components (*i.e.* locks and signs removed) as shown in the monitoring reports, indicate some limitations in their effectiveness in preventing Site access. Alternatives to prevent/minimize trespassing/tampering should be explored with the Town and NHDES.

Under NH law the posting of No Trespassing signs need to meet specific location and spacing requirement in order to achieve legal standing for prohibiting trespassing. State posting standards are: "Under state law (RSA 635:4), the legal manner of posting calls for posting durable signs with any words describing the physical activity prohibited, such as "No Hunting or Trespassing," in letters at least 2 inches high, and with the owner's name and address. The signs may be no further than 100 yards apart on all sides of the property and shall also be posted at gates, bars and all commonly used entrances." To ensure future law enforcement, if needed, it is advised that the current placement of all signs be verified against these legal requirements and adjustments made as necessary.

VII. PROTECTIVENESS STATEMENT

OU 1 and Sitewide Protectiveness Statement
Protectiveness Determination: Short-term Protective Click here to enter a date
Protectiveness Statement: The remedy at the TML Superfund Site is currently protective of human health and the environment in the short-term, because as evidenced by a review of all available documents; applicable or relevant and appropriate requirements (ARARs); and the results of the Site inspection, the source control remedy (*i.e.* removal of LNAPL and maintenance of the permeable soil cap overlying residual contaminated soil); MNA of contaminated groundwater underlying TML; monitoring of groundwater, surface water, sediment, leachate, and wetland soil quality; and ICs, are preventing all human and ecological exposures as envisioned in the decision documents. However, in order for the remedy to be protective in the long term, the following actions need to be taken: • An evaluation of whether the remedy remains protective in light of the newly promulgated NH PFAS standards and whether or not additional action is needed. • Continued monitoring for DEHP, manganese, and PFAS; refinement of the conceptual site model regarding their fate and transport; and determination of the timeframe needed to achieve all ICLs at the Site. • Testing for SVOCs and metals in seep sediments in the forested wetland and adjacent to Rockwood Brook near known discharge points for groundwater seepage into Rockwood Brook (e.g. locations Leach A-01 and Leach B-01) prior to the next Five Year Review.

VIII. NEXT REVIEW

The next five-year review report for the Troy Mills Landfill Superfund Site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

FALL 2014 MONITORING REPORT TROY MILLS LANDFILL SUPERFUND SITE, TROY, NEW HAMPSHIRE. GZA Geoenvironmental Inc. February 5, 2016.

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SPRING 2016 MONITORING REPORT TROY MILLS LANDFILL SUPERFUND SITE, TROY, NEW HAMPSHIRE. GZA Geoenvironmental Inc. May 26, 2017.

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Drinking Water Health Advisory for Perfluorooctane Sulfonate (PFOS). EPA Office of Water. May 2016. (USEPA, 2016b). Available online at: https://www.epa.gov/sites/production/files/2016-05/documents/pfos_health_advisory_final_508.pdf

Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA). EPA Office of Water. May 2016. (USEPA, 2016a). Available online at: https://www.epa.gov/sites/production/files/2016-05/documents/pfoa_health_advisory_final_508.pdf

Explanation of Significant Differences, Troy Mills Landfill Superfund Site EPA ID: NHD980520217, Troy, NH. EPA Region 1. March 2014.

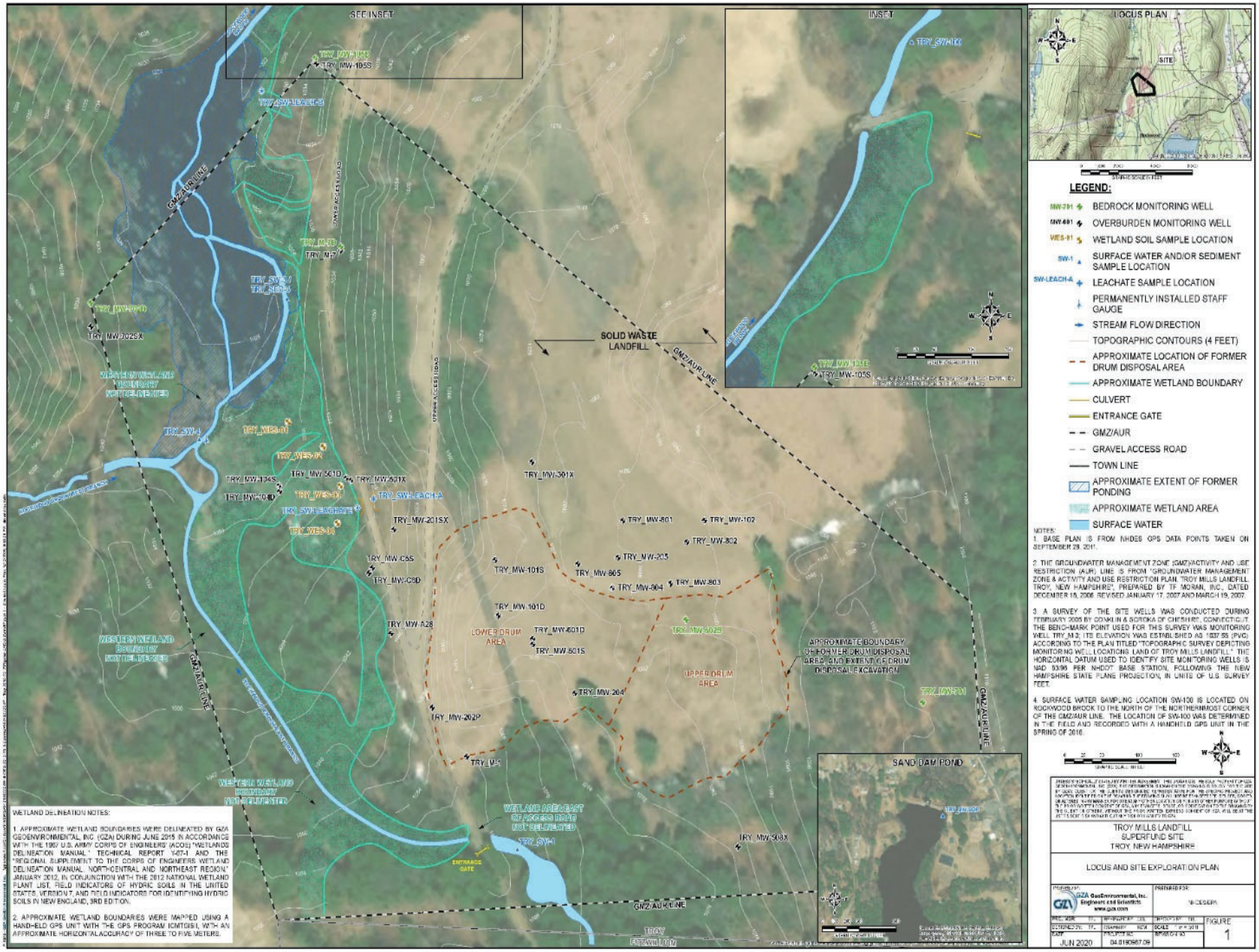
Record of Decision, Troy Mills Landfill Superfund Site EPA ID: NHD980520217, Troy, NH. EPA Region 1. September 2005.

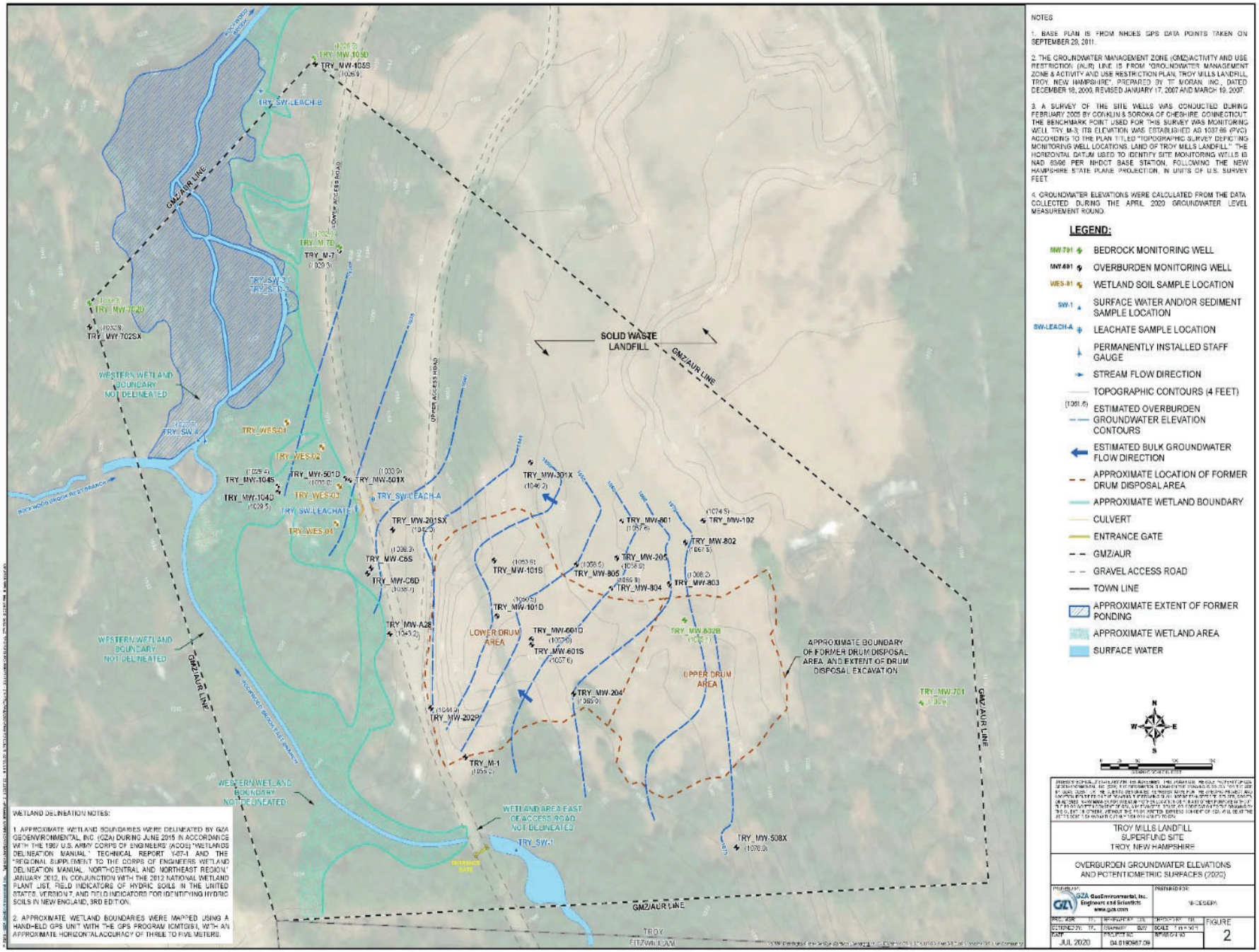
Second Five Year Review, Troy Mills Landfill Superfund Site EPA ID: NHD980520217, Troy, NH. EPA Region 1. September 2015.

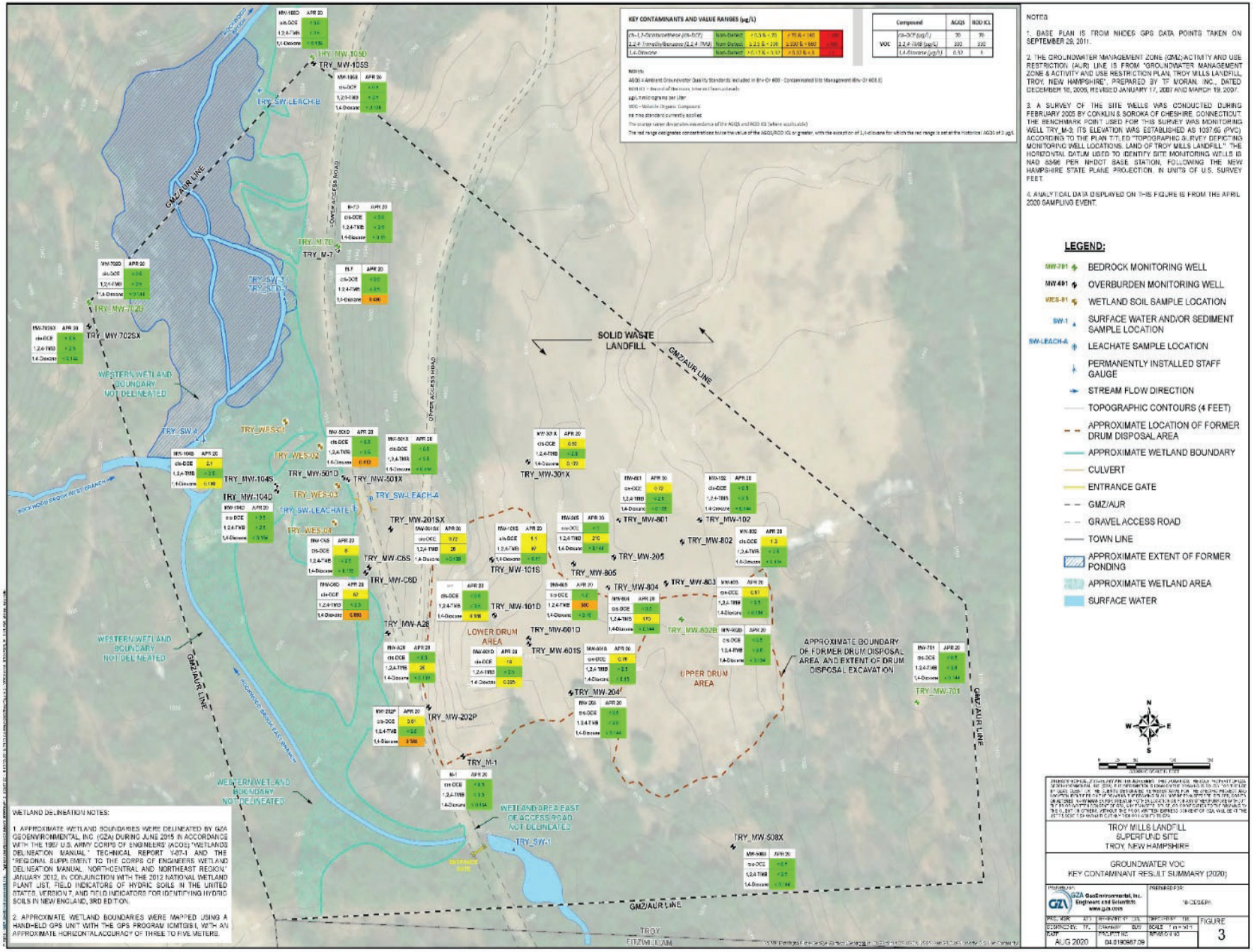
Site-specific Screening Levels for Surface Water for PFOA, PFOS and PFBS for the Troy Mills Landfill NPL Site. Technical Memo from Paulina Do and Courtney Carroll, Risk Assessors to Gerardo Millan-Ramos, Remedial Project Manager. EPA Region 1. June 22, 2020.

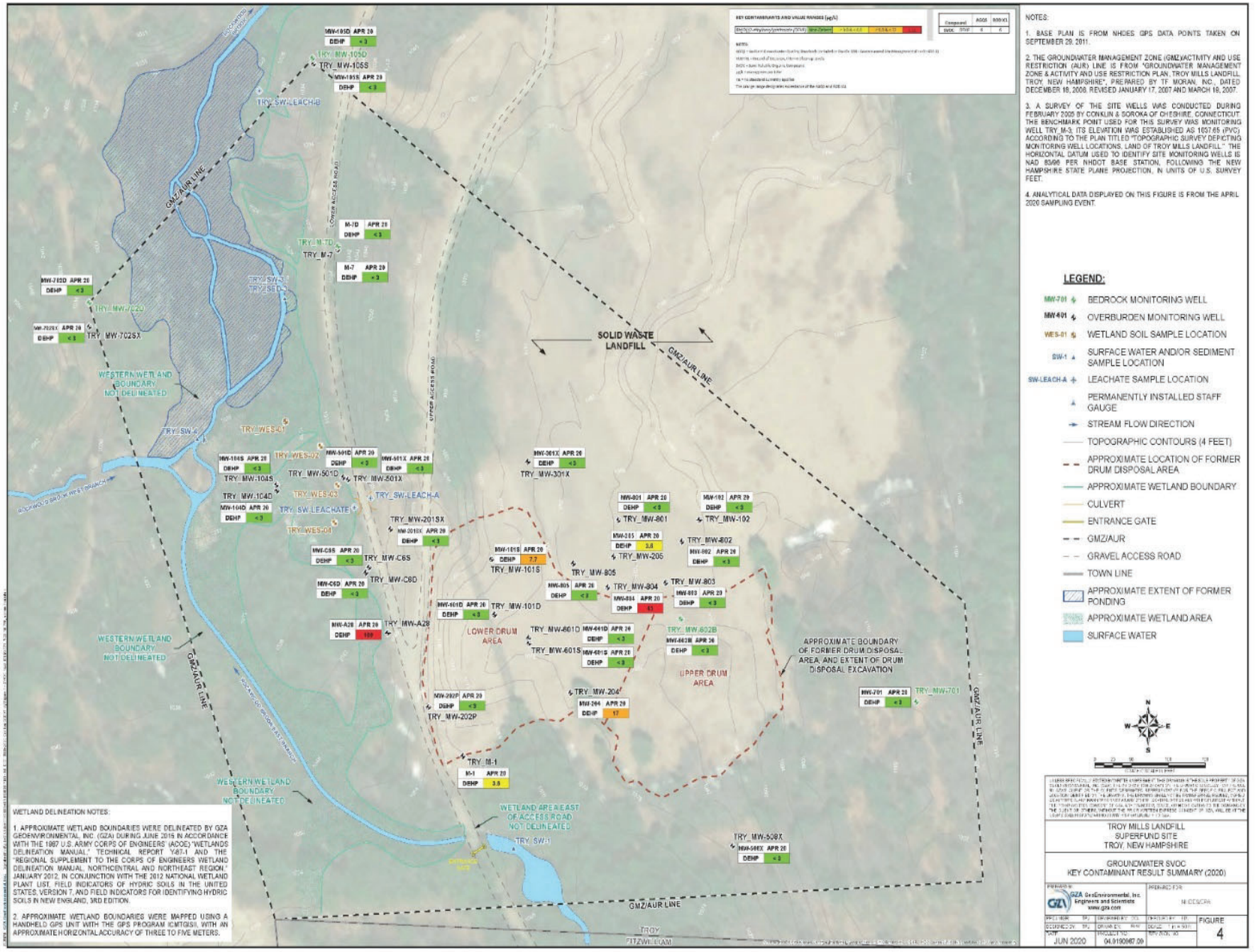
New Hampshire House Bill 1264 (Signed into law 07/23/2020). https://legiscan.com/NH/text/HB1264/2020

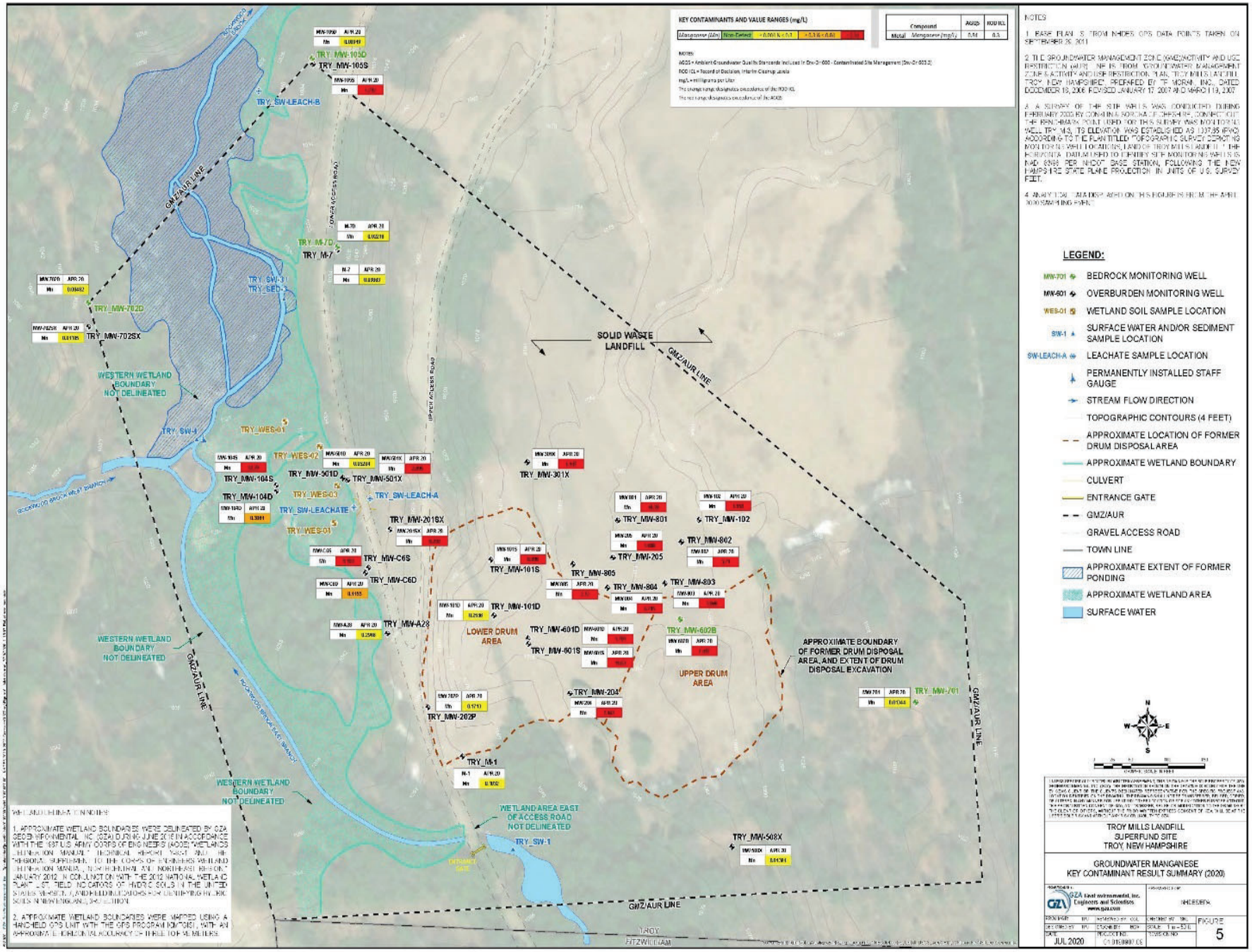
APPENDIX B – Site Figures

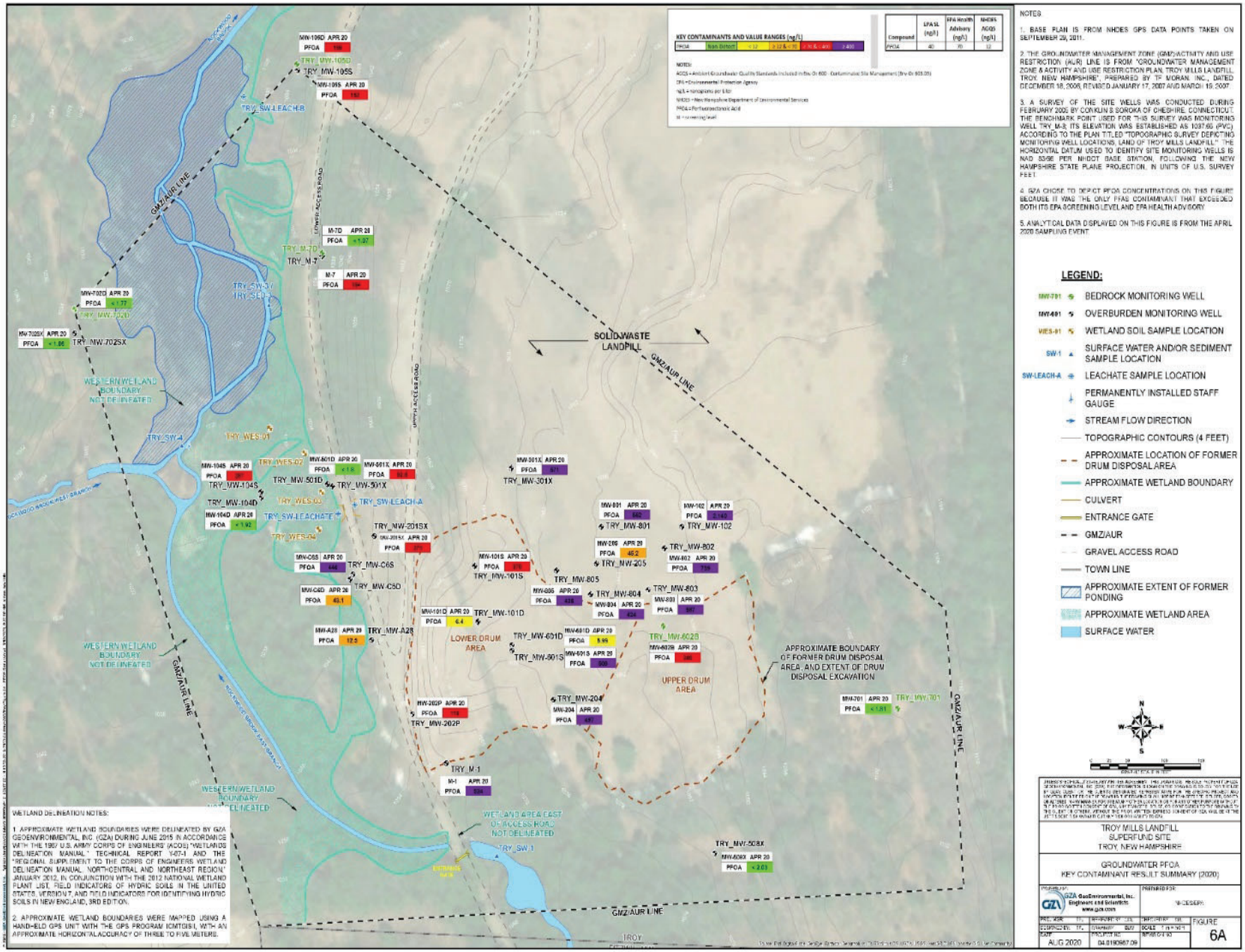

SEE INSET
INSET
LOCUS PLAN
SITE
LEGEND:
BEDROCK MONITORING WELL
OVERBURDEN MONITORING WELL
WETLAND SOIL SAMPLE LOCATION
SURFACE WATER AND/OR SEDIMENT SAMPLE LOCATION
LEACHATE SAMPLE LOCATION
PERMANENTLY INSTALLED STAFF GAUGE
STREAM FLOW DIRECTION
TOPOGRAPHIC CONTOURS (4 FEET)
APPROXIMATE LOCATION OF FORMER DRUM DISPOSAL AREA
APPROXIMATE WETLAND BOUNDARY
CULVERT
ENTRANCE GATE
GMZ/AUR
GRAVEL ACCESS ROAD
TOWN LINE
APPROXIMATE EXTENT OF FORMER PONDING
APPROXIMATE WETLAND AREA
SURFACE WATER
NOTES:
1. BASE PLAN IS FROM NHDES GPS DATA POINTS TAKEN ON SEPTEMBER 29, 2011.
2. THE GROUNDWATER MANAGEMENT ZONE (GMZ)/ACTIVITY AND USE RESTRICTION (AUR) LINE IS FROM "GROUNDWATER MANAGEMENT ZONE & ACTIVITY AND USE RESTRICTION PLAN, TROY MILLS LANDFILL, TROY, NEW HAMPSHIRE", PREPARED BY TF MORAN, INC., DATED DECEMBER 19, 2006, REVISED JANUARY 17, 2007 AND MARCH 19, 2007.
3. A SURVEY OF THE SITE WELLS WAS CONDUCTED DURING FEBRUARY 2005 BY GOVAN IN A SOKOKA OF CHESHIRE, CONNECTICUT. THE BENCH-MARK POINT USED FOR THIS SURVEY WAS MONITORING WELL TRY_M-3; ITS ELEVATION WAS ESTABLISHED AS 1037.55 (PVC) ACCORDING TO THE PLAN TITLED "TOPOGRAPHIC SURVEY DEPICTING MONITORING WELL LOCATIONS LAND OF TROY MILLS LANDFILL". THE HORIZONTAL DATUM USED TO IDENTIFY SITE MONITORING WELLS IS NAD 83/96 PER NHDOT BASE STATION, FOLLOWING THE NEW HAMPSHIRE STATE PLANE PROJECTION, IN UNITS OF U.S. SURVEY FEET.
4. SURFACE WATER SAMPLING LOCATION SW-100 IS LOCATED ON ROCKWOOD BROOK TO THE NORTH OF THE NORTHERNMOST CORNER OF THE GMZ/AUR LINE. THE LOCATION OF SW-100 WAS DETERMINED IN THE FIELD AND RECORDED WITH A HANDHELD GPS UNIT IN THE SPRING OF 2016.
WETLAND DELINEATION NOTES:
1. APPROXIMATE WETLAND BOUNDARIES WERE DELINEATED BY GZA GEOENVIRONMENTAL INC. (GZA) DURING JUNE 2015 IN ACCORDANCE WITH THE 1987 U.S. ARMY CORPS OF ENGINEERS (ACOE) "WETLANDS DELINEATION MANUAL," TECHNICAL REPORT Y-87-1 AND THE "REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION," JANUARY 2012, IN CONJUNCTION WITH THE 2012 NATIONAL WETLAND PLANT LIST, FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, VERSION 7, AND FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND, 3RD EDITION.
2. APPROXIMATE WETLAND BOUNDARIES WERE MAPPED USING A HAND-HELD GPS UNIT WITH THE GPS PROGRAM ICMTGIS1, WITH AN APPROXIMATE HORIZONTAL ACCURACY OF THREE TO FIVE METERS.
SOLID WASTE LANDFILL
GMZ/AUR LINE
UPPER ACCESS ROAD
LOWER ACCESS ROAD
LOWER DRUM AREA
UPPER DRUM AREA
APPROXIMATE BOUNDARY OF FORMER DRUM DISPOSAL AREA AND EXTENT OF DRUM DISPOSAL EXCAVATION
WESTERN WETLAND BOUNDARY NOT DELINEATED
WETLAND AREA EAST OF ACCESS ROAD NOT DELINEATED
SAND DAM POND
ENTRANCE GATE
TROY MILLS LANDFILL
SUPERFUND SITE
TROY, NEW HAMPSHIRE
LOCUS AND SITE EXPLORATION PLAN
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com
PREPARED FOR:
NHDES/EPA
JUN 2020
04.0190967.09
FIGURE
1

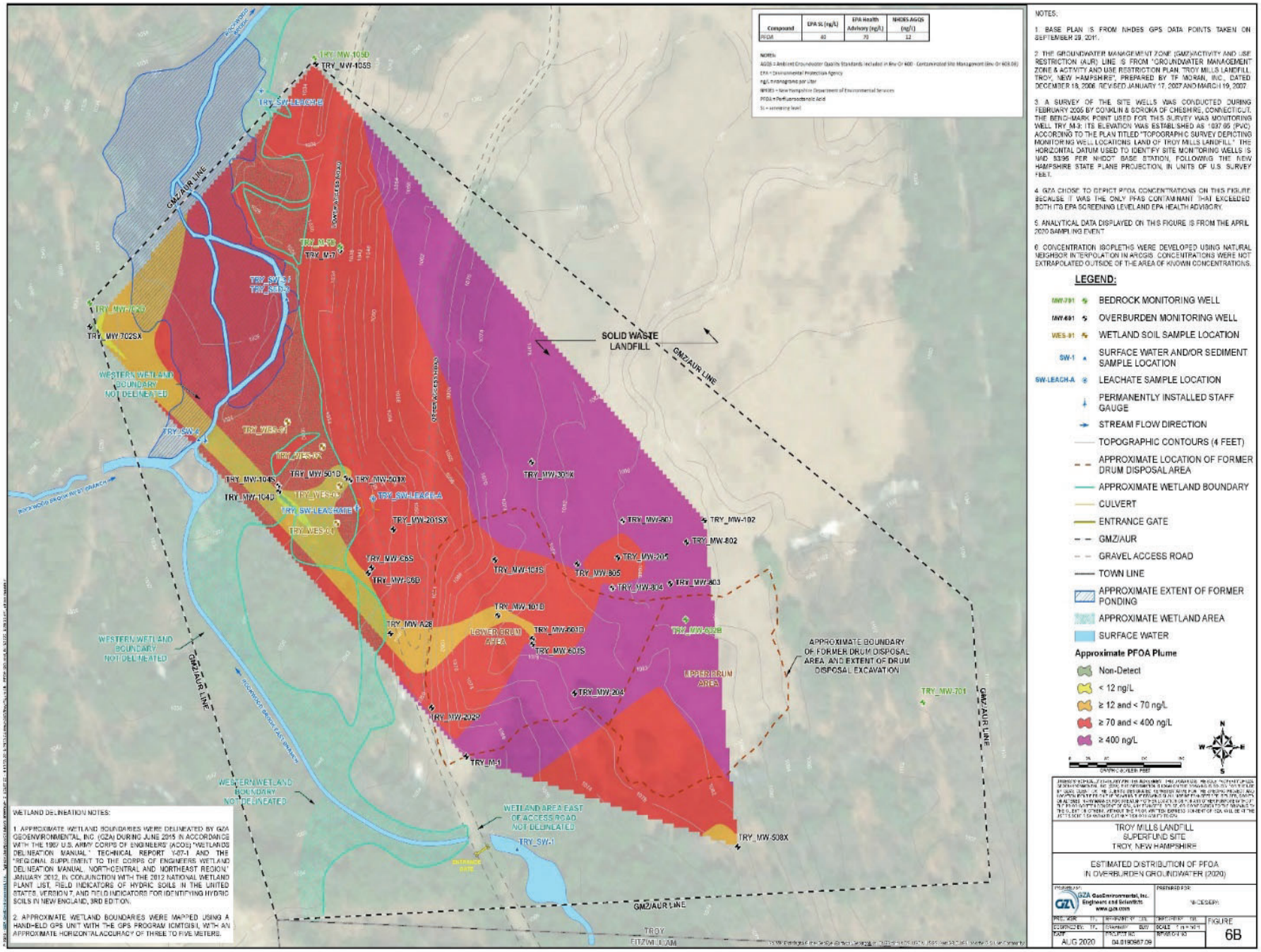

NOTES
1. BASE PLAN IS FROM NHDES GPS DATA POINTS TAKEN ON SEPTEMBER 29, 2011.
2. THE GROUNDWATER MANAGEMENT ZONE (GMZ)/ACTIVITY AND USE RESTRICTION (AUR) LINE IS FROM "GROUNDWATER MANAGEMENT ZONE & ACTIVITY AND USE RESTRICTION PLAN, TROY MILLS LANDFILL, TROY, NEW HAMPSHIRE", PREPARED BY TF MORAN, INC., DATED DECEMBER 18, 2000, REVISED JANUARY 17, 2007 AND MARCH 19, 2007.
3. A SURVEY OF THE SITE WELLS WAS CONDUCTED DURING FEBRUARY 2005 BY CONKLIN & SOROKA OF CHESHIRE, CONNECTICUT. THE BENCHMARK POINT USED FOR THIS SURVEY WAS MONITORING WELL TRY_M-3; ITS ELEVATION WAS ESTABLISHED AS 1037.65 (PVC) ACCORDING TO THE PLAN TITLED "TOPOGRAPHIC SURVEY DEPICTING MONITORING WELL LOCATIONS, LAND OF TROY MILLS LANDFILL". THE HORIZONTAL DATUM USED TO IDENTIFY SITE MONITORING WELLS IS NAD 83/96 PER NHDOT BASE STATION, FOLLOWING THE NEW HAMPSHIRE STATE PLANE PROJECTION, IN UNITS OF U.S. SURVEY FEET.
4. GROUNDWATER ELEVATIONS WERE CALCULATED FROM THE DATA COLLECTED DURING THE APRIL 2020 GROUNDWATER LEVEL MEASUREMENT ROUND.
LEGEND:
BEDROCK MONITORING WELL
OVERBURDEN MONITORING WELL
WETLAND SOIL SAMPLE LOCATION
SURFACE WATER AND/OR SEDIMENT SAMPLE LOCATION
LEACHATE SAMPLE LOCATION
PERMANENTLY INSTALLED STAFF GAUGE
STREAM FLOW DIRECTION
TOPOGRAPHIC CONTOURS (4 FEET)
ESTIMATED OVERBURDEN GROUNDWATER ELEVATION CONTOURS
ESTIMATED BULK GROUNDWATER FLOW DIRECTION
APPROXIMATE LOCATION OF FORMER DRUM DISPOSAL AREA
APPROXIMATE WETLAND BOUNDARY
CULVERT
ENTRANCE GATE
GMZ/AUR
GRAVEL ACCESS ROAD
TOWN LINE
APPROXIMATE EXTENT OF FORMER PONDING
APPROXIMATE WETLAND AREA
SURFACE WATER
WETLAND DELINEATION NOTES:
1. APPROXIMATE WETLAND BOUNDARIES WERE DELINEATED BY GZA GEOENVIRONMENTAL INC (GZA) DURING JUNE 2015 IN ACCORDANCE WITH THE 1987 U.S. ARMY CORPS OF ENGINEERS' (ACOE) "WETLANDS DELINEATION MANUAL" TECHNICAL REPORT Y-87-1 AND THE "REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION" JANUARY 2012, IN CONJUNCTION WITH THE 2012 NATIONAL WETLAND PLANT LIST, FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, VERSION 7, AND FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND, 3RD EDITION.
2. APPROXIMATE WETLAND BOUNDARIES WERE MAPPED USING A HAND-HELD GPS UNIT WITH THE GPS PROGRAM ICMTGIS11, WITH AN APPROXIMATE HORIZONTAL ACCURACY OF THREE TO FIVE METERS.
SOLID WASTE LANDFILL
GMZ/AUR LINE
LOWER ACCESS ROAD
UPPER ACCESS ROAD
WESTERN WETLAND BOUNDARY NOT DELINEATED
WETLAND AREA EAST OF ACCESS ROAD NOT DELINEATED
LOWER DRUM AREA
UPPER DRUM AREA
APPROXIMATE BOUNDARY OF FORMER DRUM DISPOSAL AREA AND EXTENT OF DRUM DISPOSAL EXCAVATION
ENTRANCE GATE
TROY MILLS LANDFILL
SUPERFUND SITE
TROY, NEW HAMPSHIRE
OVERBURDEN GROUNDWATER ELEVATIONS AND POTENTIOMETRIC SURFACES (2020)
GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com
PREPARED FOR:
NHDES/EPA
PROJECT MGR: TF
RESPONSIBILITY: GZA
APPROVED BY: TF
DESIGNED BY: TF
DRAWN BY: SJW
SCALE: 1 IN = 300 FT
CHECKED BY: TF
PROJECT NO: 04.0190967.09
DATE: JUL 2020
FIGURE 2

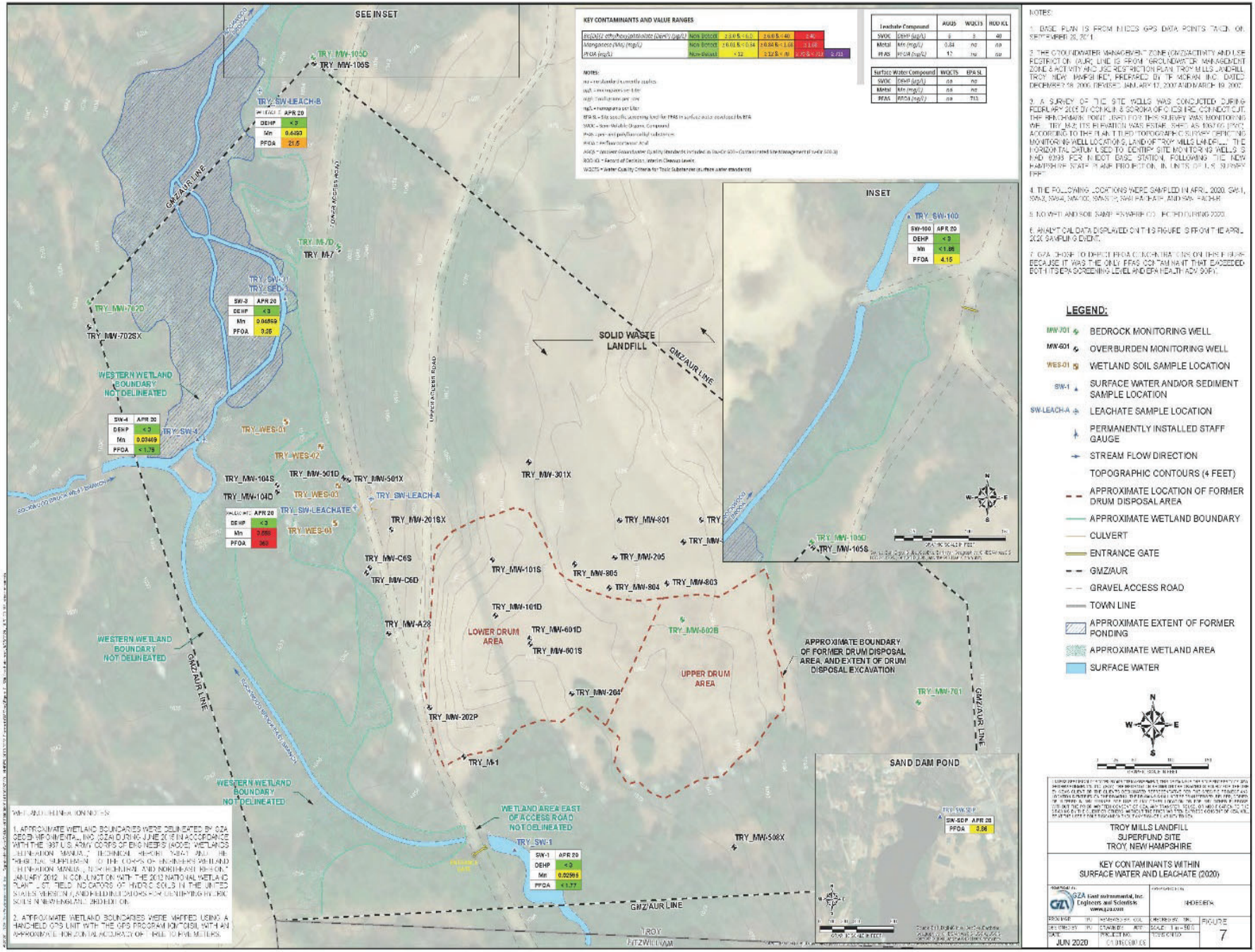

KEY CONTAMINANTS AND VALUE RANGES (µg/L)
Compound
AGQS
ROD ICL
VOC
LEGEND:
BEDROCK MONITORING WELL
OVERBURDEN MONITORING WELL
WETLAND SOIL SAMPLE LOCATION
SURFACE WATER AND/OR SEDIMENT SAMPLE LOCATION
LEACHATE SAMPLE LOCATION
PERMANENTLY INSTALLED STAFF GAUGE
STREAM FLOW DIRECTION
TOPOGRAPHIC CONTOURS (4 FEET)
APPROXIMATE LOCATION OF FORMER DRUM DISPOSAL AREA
APPROXIMATE WETLAND BOUNDARY
CULVERT
ENTRANCE GATE
GMZ/AUR
GRAVEL ACCESS ROAD
TOWN LINE
APPROXIMATE EXTENT OF FORMER PONDING
APPROXIMATE WETLAND AREA
SURFACE WATER
NOTES
1. BASE PLAN IS FROM NHDES GPS DATA POINTS TAKEN ON SEPTEMBER 29, 2011.
2. THE GROUNDWATER MANAGEMENT ZONE (GMZ)/ACTIVITY AND USE RESTRICTION (AUR) LINE IS FROM "GROUNDWATER MANAGEMENT ZONE & ACTIVITY AND USE RESTRICTION PLAN, TROY MILLS LANDFILL, TROY, NEW HAMPSHIRE", PREPARED BY TF MORAN, INC., DATED DECEMBER 16, 2005, REVISED JANUARY 17, 2007 AND MARCH 19, 2007.
3. A SURVEY OF THE SITE WELLS WAS CONDUCTED DURING FEBRUARY 2005 BY CONKLIN & SOROKA OF CHESHIRE, CONNECTICUT. THE BENCHMARK POINT USED FOR THIS SURVEY WAS MONITORING WELL TRY_M-3. ITS ELEVATION WAS ESTABLISHED AS 1097.65 (PVC) ACCORDING TO THE PLAN TITLED "TOPOGRAPHIC SURVEY DEPICTING MONITORING WELL LOCATIONS, LAND OF TROY MILLS LANDFILL". THE HORIZONTAL DATUM USED TO IDENTIFY SITE MONITORING WELLS IS NAD 83/96 PER NHDOT BASE STATION, FOLLOWING THE NEW HAMPSHIRE STATE PLANE PROJECTION, IN UNITS OF U.S. SURVEY FEET.
4. ANALYTICAL DATA DISPLAYED ON THIS FIGURE IS FROM THE APRIL 2020 SAMPLING EVENT.
WETLAND DELINEATION NOTES:
1. APPROXIMATE WETLAND BOUNDARIES WERE DELINEATED BY GZA GEOENVIRONMENTAL INC (GZA) DURING JUNE 2015 IN ACCORDANCE WITH THE 1987 U.S. ARMY CORPS OF ENGINEERS (ACOE) "WETLANDS DELINEATION MANUAL," TECHNICAL REPORT Y-87-1 AND THE "REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION," JANUARY 2012, IN CONJUNCTION WITH THE 2012 NATIONAL WETLAND PLANT LIST, FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, VERSION 7, AND FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND, 3RD EDITION.
2. APPROXIMATE WETLAND BOUNDARIES WERE MAPPED USING A HAND-HELD GPS UNIT WITH THE GPS PROGRAM ICMTGISI, WITH AN APPROXIMATE HORIZONTAL ACCURACY OF THREE TO FIVE METERS.
TROY MILLS LANDFILL
SUPERFUND SITE
TROY, NEW HAMPSHIRE
GROUNDWATER VOC
KEY CONTAMINANT RESULT SUMMARY (2020)
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com
PREPARED FOR:
NHDES/EPP
FIGURE
3
AUG 2020
04.0190987.09


NOTES:
1. BASE PLAN IS FROM NHDES GPS DATA POINTS TAKEN ON SEPTEMBER 29, 2011.
2. THE GROUNDWATER MANAGEMENT ZONE (GMZ)/ACTIVITY AND USE RESTRICTION (AUR) LINE IS FROM "GROUNDWATER MANAGEMENT ZONE & ACTIVITY AND USE RESTRICTION PLAN, TROY MILLS LANDFILL, TROY, NEW HAMPSHIRE", PREPARED BY TF MORAN, INC., DATED DECEMBER 18, 2006, REVISED JANUARY 17, 2007 AND MARCH 19, 2007.
3. A SURVEY OF THE SITE WELLS WAS CONDUCTED DURING FEBRUARY 2005 BY CONKLIN & SOROKA OF CHESHIRE, CONNECTICUT. THE BENCHMARK POINT USED FOR THIS SURVEY WAS MONITORING WELL TRY M-3; ITS ELEVATION WAS ESTABLISHED AS 1037.65 (PVC) ACCORDING TO THE PLAN TITLED "TOPOGRAPHIC SURVEY DEPICTING MONITORING WELL LOCATIONS, LAND OF TROY MILLS LANDFILL." THE HORIZONTAL DATUM USED TO IDENTIFY SITE MONITORING WELLS IS NAD 83/96 PER NHDOT BASE STATION, FOLLOWING THE NEW HAMPSHIRE STATE PLANE PROJECTION, IN UNITS OF U.S. SURVEY FEET.
4. ANALYTICAL DATA DISPLAYED ON THIS FIGURE IS FROM THE APRIL 2020 SAMPLING EVENT.
LEGEND:
BEDROCK MONITORING WELL
OVERBURDEN MONITORING WELL
WETLAND SOIL SAMPLE LOCATION
SURFACE WATER AND/OR SEDIMENT SAMPLE LOCATION
LEACHATE SAMPLE LOCATION
PERMANENTLY INSTALLED STAFF GAUGE
STREAM FLOW DIRECTION
TOPOGRAPHIC CONTOURS (4 FEET)
APPROXIMATE LOCATION OF FORMER DRUM DISPOSAL AREA
APPROXIMATE WETLAND BOUNDARY
CULVERT
ENTRANCE GATE
GMZ/AUR
GRAVEL ACCESS ROAD
TOWN LINE
APPROXIMATE EXTENT OF FORMER PONDING
APPROXIMATE WETLAND AREA
SURFACE WATER
SOLID WASTE LANDFILL
GMZ/AUR LINE
LOWER DRUM AREA
UPPER DRUM AREA
APPROXIMATE BOUNDARY OF FORMER DRUM DISPOSAL AREA AND EXTENT OF DRUM DISPOSAL EXCAVATION
WESTERN WETLAND BOUNDARY NOT DELINEATED
WETLAND AREA EAST OF ACCESS ROAD NOT DELINEATED
WETLAND DELINEATION NOTES:
1. APPROXIMATE WETLAND BOUNDARIES WERE DELINEATED BY GZA GEOENVIRONMENTAL, INC. (GZA) DURING JUNE 2016 IN ACCORDANCE WITH THE 1987 U.S. ARMY CORPS OF ENGINEERS' (ACOE) "WETLANDS DELINEATION MANUAL," TECHNICAL REPORT Y-87-1 AND THE "REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION," JANUARY 2012, IN CONJUNCTION WITH THE 2012 NATIONAL WETLAND PLANT LIST, FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, VERSION 7, AND FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND, 3RD EDITION.
2. APPROXIMATE WETLAND BOUNDARIES WERE MAPPED USING A HANDHELD GPS UNIT WITH THE GPS PROGRAM ICMTGIS II, WITH AN APPROXIMATE HORIZONTAL ACCURACY OF THREE TO FIVE METERS.
TROY MILLS LANDFILL
SUPERFUND SITE
TROY, NEW HAMPSHIRE
GROUNDWATER SVOC
KEY CONTAMINANT RESULT SUMMARY (2020)
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com
NHDES/EPA
JUN 2020
04.0190987.09
FIGURE
4


KEY CONTAMINANTS AND VALUE RANGES (mg/L)
Manganese (Mn) Non-Detect < 0.001 < 0.1 > 0.1 & < 0.60 > 0.60
Compound AGQS RODTCL
Metal Manganese (mg/L) 0.84 0.6
NOTES
AGQS = Ambient Groundwater Quality Standards included in Env-Or 600 - Contaminated Site Management (Env-Or 603.2)
RODTCL = Record of Decision, Interim Cleanup Levels
mg/L = milligrams per liter
The orange range designates exceedance of the RODTCL
The red range designates exceedance of the AGQS
NOTES
1. BASE PLAN IS FROM INDEX OPS DATA POINTS TAKEN ON SEPTEMBER 26, 2011
2. THE GROUNDWATER MANAGEMENT ZONE (GME)/ACTIVITY AND USE RESTRICTION (AUR) LINE IS FROM "GROUNDWATER MANAGEMENT ZONE & ACTIVITY AND USE RESTRICTION PLAN, TROY MILLS LANDFILL TROY, NEW HAMPSHIRE", PREPARED BY TF MORAN, INC., DATED DECEMBER 19, 2006 REVISED JANUARY 17 2007 AND MARCH 19, 2007.
3. A SURVEY OF THE SITE WAS CONDUCTED DURING FEBRUARY 2005 BY CONKLIN & SORCHA OF CHESHIRE, CONNECTICUT. THE BENCHMARK POINT USED FOR THIS SURVEY WAS MONITORING WELL TRY MW-3. TS ELEVATION WAS ESTABLISHED AS 1037.85 (NAVD) ACCORDING TO THE PLAN TITLED "TOPOGRAPHIC SURVEY DEPICTING MONITORING WELL LOCATIONS, LAND OF TROY MILLS LANDFILL". THE HORIZONTAL DATUM USED TO IDENTIFY SITE MONITORING WELLS IS (NAD, 1983) PER NHDOT BASE STATION, FOLLOWING THE NEW HAMPSHIRE STATE PLANE PROJECTION IN UNITS OF U.S. SURVEY FEET.
4. ANALYTICAL DATA DISPLAYED ON THIS FIGURE IS FROM THE APRIL 2020 SAMPLING EVENT.
LEGEND:
BEDROCK MONITORING WELL
OVERBURDEN MONITORING WELL
WETLAND SOIL SAMPLE LOCATION
SURFACE WATER AND/OR SEDIMENT SAMPLE LOCATION
LEACHATE SAMPLE LOCATION
PERMANENTLY INSTALLED STAFF GAUGE
STREAM FLOW DIRECTION
TOPOGRAPHIC CONTOURS (4 FEET)
APPROXIMATE LOCATION OF FORMER DRUM DISPOSAL AREA
APPROXIMATE WETLAND BOUNDARY
CULVERT
ENTRANCE GATE
GMZ/AUR
GRAVEL ACCESS ROAD
TOWN LINE
APPROXIMATE EXTENT OF FORMER PONDING
APPROXIMATE WETLAND AREA
SURFACE WATER
SOLID WASTE LANDFILL
GMZ/AUR LINE
LOWER DRUM AREA
UPPER DRUM AREA
APPROXIMATE BOUNDARY OF FORMER DRUM DISPOSAL AREA AND EXTENT OF DRUM DISPOSAL EXCAVATION
WESTERN WETLAND BOUNDARY NOT DELINEATED
WETLAND AREA EAST OF ACCESS ROAD NOT DELINEATED
WETLAND DELINEATION NOTES:
1. APPROXIMATE WETLAND BOUNDARIES WERE DELINEATED BY GZA GEOENVIRONMENTAL, INC. (GZA) DURING JUNE 2016 IN ACCORDANCE WITH THE 1987 U.S. ARMY CORPS OF ENGINEERS (ACOE) "WETLANDS DELINEATION MANUAL", "TECHNICAL REPORT Y-87-1" AND THE "REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NEW ENGLAND AND NORTHEAST REGION", JANUARY 2012. IN CONJUNCTION WITH THE 2012 NATIONAL WETLANDS PLANT LIST, FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES VERSION 7.0 AND FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND, 3RD EDITION.
2. APPROXIMATE WETLAND BOUNDARIES WERE MAPPED USING A HANDHELD GPS UNIT WITH THE GPS PROGRAM (NOMAD), WITH AN APPROXIMATE HORIZONTAL ACCURACY OF THREE TO SIX METERS.
TROY MILLS LANDFILL
SUPERFUND SITE
TROY, NEW HAMPSHIRE
GROUNDWATER MANGANESE
KEY CONTAMINANT RESULT SUMMARY (2020)
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com
PREPARED FOR: INDEEMIT
DESIGNED BY: BJC
DRAWN BY: BJC
CHECKED BY: SNL
SCALE: 1 in = 500 ft
DATE: JUL 2020
PROJECT NO.: 01.0159907.05
FIGURE 5


KEY CONTAMINANTS AND VALUE RANGES (ng/L)
PFOA
Non-Detect
Compound
LPA SL (ng/L)
EPA Health Advisory (ng/L)
NHDES AGQS (ng/L)
PFOA
40
70
12
NOTES:
AGQS = Ambient Groundwater Quality Standards included in Env-Or 600 - Contaminated Site Management (Env-Or 603.05)
EPA = Environmental Protection Agency
ng/L = nanograms per Liter
NHDES = New Hampshire Department of Environmental Services
PFOA = Perfluorooctanoic Acid
SOLID WASTE LANDFILL
GMZ/AUR LINE
GRAVEL ACCESS ROAD
WESTERN WETLAND BOUNDARY NOT DELINEATED
LOWER DRUM AREA
UPPER DRUM AREA
APPROXIMATE BOUNDARY OF FORMER DRUM DISPOSAL AREA AND EXTENT OF DRUM DISPOSAL EXCAVATION
WETLAND AREA EAST OF ACCESS ROAD NOT DELINEATED
ENTRANCE GATE
TROY
WETLAND DELINEATION NOTES:
1. APPROXIMATE WETLAND BOUNDARIES WERE DELINEATED BY GZA GEOENVIRONMENTAL, INC. (GZA) DURING JUNE 2015 IN ACCORDANCE WITH THE 1987 U.S. ARMY CORPS OF ENGINEERS' (ACOE) "WETLANDS DELINEATION MANUAL" TECHNICAL REPORT Y-87-1 AND THE "REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION" JANUARY 2012, IN CONJUNCTION WITH THE 2012 NATIONAL WETLAND PLANT LIST, FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, VERSION 7, AND OTLO INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND, 3RD EDITION.
2. APPROXIMATE WETLAND BOUNDARIES WERE MAPPED USING A HAND-HELD GPS UNIT WITH THE GPS PROGRAM ICMTGIS1, WITH AN APPROXIMATE HORIZONTAL ACCURACY OF THREE TO FIVE METERS.
NOTES:
1. BASE PLAN IS FROM NHDES GPS DATA POINTS TAKEN ON SEPTEMBER 29, 2011.
2. THE GROUNDWATER MANAGEMENT ZONE (GMZ)/ACTIVITY AND USE RESTRICTION (AUR) LINE IS FROM "GROUNDWATER MANAGEMENT ZONE & ACTIVITY AND USE RESTRICTION PLAN, TROY MILLS LANDFILL, TROY, NEW HAMPSHIRE", PREPARED BY TF MORAN, INC., DATED DECEMBER 18, 2006, REVISED JANUARY 17, 2007 AND MARCH 19, 2007.
3. A SURVEY OF THE SITE WELLS WAS CONDUCTED DURING FEBRUARY 2005 BY CONKLIN & BOROKA OF CHESHIRE, CONNECTICUT. THE BENCHMARK POINT USED FOR THIS SURVEY WAS MONITORING WELL TRY_M-3. ITS ELEVATION WAS ESTABLISHED AS 1037.69 (PVC) ACCORDING TO THE PLAN TITLED "TOPOGRAPHIC SURVEY DEPICTING MONITORING WELL LOCATIONS, LAND OF TROY MILLS LANDFILL". THE HORIZONTAL DATUM USED TO IDENTIFY SITE MONITORING WELLS IS NAD 83/96 PER NHDOT BASE STATION, FOLLOWING THE NEW HAMPSHIRE STATE PLANE PROJECTION, IN UNITS OF U.S. SURVEY FEET.
4. GZA CHOSE TO DEPICT PFOA CONCENTRATIONS ON THIS FIGURE BECAUSE IT WAS THE ONLY PFAS CONTAMINANT THAT EXCEEDED BOTH ITS EPA SCREENING LEVEL AND EPA HEALTH ADVISORY.
5. ANALYTICAL DATA DISPLAYED ON THIS FIGURE IS FROM THE APRIL 2020 SAMPLING EVENT.
LEGEND:
BEDROCK MONITORING WELL
OVERBURDEN MONITORING WELL
WETLAND SOIL SAMPLE LOCATION
SURFACE WATER AND/OR SEDIMENT SAMPLE LOCATION
LEACHATE SAMPLE LOCATION
PERMANENTLY INSTALLED STAFF GAUGE
STREAM FLOW DIRECTION
TOPOGRAPHIC CONTOURS (4 FEET)
APPROXIMATE LOCATION OF FORMER DRUM DISPOSAL AREA
APPROXIMATE WETLAND BOUNDARY
CULVERT
ENTRANCE GATE
GMZ/AUR
GRAVEL ACCESS ROAD
TOWN LINE
APPROXIMATE EXTENT OF FORMER PONDING
APPROXIMATE WETLAND AREA
SURFACE WATER
N
W
E
S
TROY MILLS LANDFILL
SUPERFUND SITE
TROY, NEW HAMPSHIRE
GROUNDWATER PFOA
KEY CONTAMINANT RESULT SUMMARY (2020)
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com
PREPARED FOR:
NH DES/EPA
AUG 2020
04.0160967.09
FIGURE
6A


Compound | EPA SL (ng/L) | EPA Health Advisory (ng/L) | NHDES AGQS (ng/L)
PFOA | 40 | 70 | 12
NOTES:
AGQS = Ambient Groundwater Quality Standards included in Env-Or 600 - Contaminated Site Management (Env-Or 609.04)
EPA = Environmental Protection Agency
ng/L = nanograms per liter
NHDES = New Hampshire Department of Environmental Services
PFOA = Perfluorooctanoic Acid
SL = screening level
NOTES:
1. BASE PLAN IS FROM NHDES GPS DATA POINTS TAKEN ON SEPTEMBER 29, 2011.
2. THE GROUNDWATER MANAGEMENT ZONE (GMZ)/ACTIVITY AND USE RESTRICTION (AUR) LINE IS FROM "GROUNDWATER MANAGEMENT ZONE & ACTIVITY AND USE RESTRICTION PLAN, TROY MILLS LANDFILL, TROY, NEW HAMPSHIRE", PREPARED BY TF MORAN, INC., DATED DECEMBER 18, 2006, REVISED JANUARY 17, 2007 AND MARCH 19, 2007.
3. A SURVEY OF THE SITE WELLS WAS CONDUCTED DURING FEBRUARY 2005 BY CONKLIN & SOROKA OF CHESHIRE, CONNECTICUT. THE BENCH-MARK POINT USED FOR THIS SURVEY WAS MONITORING WELL TRY_M-9; ITS ELEVATION WAS ESTABLISHED AS 1037.65 (PVC) ACCORDING TO THE PLAN TITLED "TOPOGRAPHIC SURVEY DEPICTING MONITORING WELL LOCATIONS LAND OF TROY MILLS LANDFILL." THE HORIZONTAL DATUM USED TO IDENTIFY SITE MONITORING WELLS IS NAD 83/95 PER NHDOT BASE STATION, FOLLOWING THE NEW HAMPSHIRE STATE PLANE PROJECTION, IN UNITS OF U.S. SURVEY FEET.
4. GZA CHOSE TO DEPICT PFOA CONCENTRATIONS ON THIS FIGURE BECAUSE IT WAS THE ONLY PFAS CONTAMINANT THAT EXCEEDED BOTH ITS EPA SCREENING LEVEL AND EPA HEALTH ADVISORY.
5. ANALYTICAL DATA DISPLAYED ON THIS FIGURE IS FROM THE APRIL 2020 SAMPLING EVENT.
6. CONCENTRATION ISOPLETHS WERE DEVELOPED USING NATURAL NEIGHBOR INTERPOLATION IN ARCGIS. CONCENTRATIONS WERE NOT EXTRAPOLATED OUTSIDE OF THE AREA OF KNOWN CONCENTRATIONS.
LEGEND:
BEDROCK MONITORING WELL
OVERBURDEN MONITORING WELL
WETLAND SOIL SAMPLE LOCATION
SURFACE WATER AND/OR SEDIMENT SAMPLE LOCATION
LEACHATE SAMPLE LOCATION
PERMANENTLY INSTALLED STAFF GAUGE
STREAM FLOW DIRECTION
TOPOGRAPHIC CONTOURS (4 FEET)
APPROXIMATE LOCATION OF FORMER DRUM DISPOSAL AREA
APPROXIMATE WETLAND BOUNDARY
CULVERT
ENTRANCE GATE
GMZ/AUR
GRAVEL ACCESS ROAD
TOWN LINE
APPROXIMATE EXTENT OF FORMER PONDING
APPROXIMATE WETLAND AREA
SURFACE WATER
Approximate PFOA Plume
Non-Detect
< 12 ng/L
≥ 12 and < 70 ng/L
≥ 70 and < 400 ng/L
≥ 400 ng/L
SOLID WASTE LANDFILL
GMZ/AUR LINE
WESTERN WETLAND BOUNDARY NOT DELINEATED
WETLAND AREA EAST OF ACCESS ROAD NOT DELINEATED
LOWER DRUM AREA
UPPER DRUM AREA
APPROXIMATE BOUNDARY OF FORMER DRUM DISPOSAL AREA AND EXTENT OF DRUM DISPOSAL EXCAVATION
TRY_MW-105D
TRY_MW-105S
TRY_SW-LEACH-E
TRY_M-9
TRY_M-7
TRY_SW-3
TRY_WES-3
TRY_MW-702D
TRY_MW-702SX
TRY_SW-4
TRY_WES-1
TRY_WES-2X
TRY_MW-104S
TRY_MW-104D
TRY_MW-501D
TRY_MW-501X
TRY_WES-2S
TRY_SW-LEACH-A
TRY_SW-LEACH-B
TRY_WES-4
TRY_MW-201SX
TRY_MW-CBS
TRY_MW-CBD
TRY_MW-A28
TRY_MW-101D
TRY_MW-101S
TRY_MW-201D
TRY_MW-603S
TRY_MW-202*
TRY_M-1
TRY_MW-204
TRY_MW-205
TRY_MW-805
TRY_MW-804
TRY_MW-803
TRY_MW-802
TRY_MW-801
TRY_MW-102
TRY_MW-302B
TRY_MW-701
TRY_MW-508X
TRY_SW-1
WETLAND DELINEATION NOTES:
1. APPROXIMATE WETLAND BOUNDARIES WERE DELINEATED BY GZA GEOENVIRONMENTAL, INC. (GZA) DURING JUNE 2015 IN ACCORDANCE WITH THE 1987 U.S. ARMY CORPS OF ENGINEERS' (ACOE) "WETLANDS DELINEATION MANUAL," TECHNICAL REPORT Y-87-1 AND THE "REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTH-CENTRAL AND NORTHEAST REGION," JANUARY 2012, IN CONJUNCTION WITH THE 2012 NATIONAL WETLAND PLANT LIST, FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, VERSION 7, AND FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND, 3RD EDITION.
2. APPROXIMATE WETLAND BOUNDARIES WERE MAPPED USING A HAND-HELD GPS UNIT WITH THE GPS PROGRAM ICMTGIS1, WITH AN APPROXIMATE HORIZONTAL ACCURACY OF THREE TO FIVE METERS.
TROY MILLS LANDFILL
SUPERFUND SITE
TROY, NEW HAMPSHIRE
ESTIMATED DISTRIBUTION OF PFOA IN OVERBURDEN GROUNDWATER (2020)
GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com
PREPARED FOR:
NHDES/EPA
PROJ. MGR.: TF | DESIGNED BY: DJL | DRAWN BY: DJL | CHECKED BY: TF
SCALE: AS SHOWN
DATE: AUG 2020
PROJECT NO.: 04.0190567.09
FIGURE 6B


SEE INSET
KEY CONTAMINANTS AND VALUE RANGES
Leachate Compound
Surface Water Compound
NOTES:
INSET
SOLID WASTE LANDFILL
GMZ/AUR LINE
UPPER ACCESS ROAD
LOWER DRUM AREA
UPPER DRUM AREA
APPROXIMATE BOUNDARY OF FORMER DRUM DISPOSAL AREA, AND EXTENT OF DRUM DISPOSAL EXCAVATION
SAND DAM POND
WESTERN WETLAND BOUNDARY NOT DELINEATED
WETLAND AREA EAST OF ACCESS ROAD NOT DELINEATED
TROY
FITZWILLIAM
LEGEND:
BEDROCK MONITORING WELL
OVERBURDEN MONITORING WELL
WETLAND SOIL SAMPLE LOCATION
SURFACE WATER AND/OR SEDIMENT SAMPLE LOCATION
LEACHATE SAMPLE LOCATION
PERMANENTLY INSTALLED STAFF GAUGE
STREAM FLOW DIRECTION
TOPOGRAPHIC CONTOURS (4 FEET)
APPROXIMATE LOCATION OF FORMER DRUM DISPOSAL AREA
APPROXIMATE WETLAND BOUNDARY
CULVERT
ENTRANCE GATE
GMZ/AUR
GRAVEL ACCESS ROAD
TOWN LINE
APPROXIMATE EXTENT OF FORMER PONDING
APPROXIMATE WETLAND AREA
SURFACE WATER
WETLAND DELINEATION NOTES:
TROY MILLS LANDFILL
SUPERFUND SITE
TROY, NEW HAMPSHIRE
KEY CONTAMINANTS WITHIN SURFACE WATER AND LEACHATE (2020)
GZA GeoEnvironmental, Inc. Engineers and Scientists
www.gza.com
PROJECT MGR.
RHODES/BTK
CHECKED BY
SCALE
1 in = 500 ft
DATE
JUN 2020
PROJECT NO.
FIGURE
7

APPENDIX C – Interviews

TROY MILLS LANDFILL SUPERFUND SITE FIVE-YEAR REVIEW INTERVIEW FORM	
Site Name: TROY MILLS LANDFILL	
EPA ID: NHD980520217	
Interviewer name: (form completed by subject)	**Interviewer affiliation:**
Subject name: Michael Summerlin	**Subject affiliation:** NHDES Project Manager
Subject contact information: Michael.SummerlinJr@des.nh.gov	
Interview date: April 8, 2020	**Interview time:** n/a
Interview location: n/a	
Interview format (circle one): In Person Phone Mail Email Other:	
Interview category: State regulatory agency	

1. **What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?**

My overall impression of the project is that it is going well and remedial goals are tracking acceptably. There are some elements of the conceptual model that require further refinement, such as fate of bis[di](2-ethylhexyl) phthalate (DEHP), and the best way to measure it, and horizontal and vertical extent of per- and polyfluoroalkyl substances (PFAS); but, those will get addressed over time. At this time, active remediation appears satisfactorily complete, notwithstanding the potential presence of random isolated sources in the form of individual drums of semi-solid waste potentially present throughout the area to the north of the "upper and lower drum areas" as observed during test-pitting activities in 2017. Maintenance requirements are minimal; keeping the signage and vehicle barriers in-place are the only concerns. Opportunities for re-use are limited given the absence of a viable owner and to some degree the landlocked nature of the property; however, it is an ideal property for utility-scale solar and such a development could be leveraged to add fencing to surround the cap areas and thereby further (potentially) reduce the trespassing issues that affect the integrity of the caps.

2. **What is your assessment of the current performance of the remedy in place at the Site?**

For the Contaminants of Concern (COCs) except DEHP, it is effective. For DEHP, further evaluation over time is necessary.

3. **What are the findings from the monitoring data? What are the key trends in contaminant levels that are being documented over time at the Site?**

Trends are favorable across the COCs with the exception of DEHP. PFAS requires additional delineation and temporal data.

DEHP trends have been variable between monitoring wells with wells exhibiting increasing temporal trends (MW-A28 and MW-803), decreasing temporal trends (MW-804), or variable concentrations with no obvious trend (MW-205). Dissolved DEHP will biodegrade under aerobic conditions, but not in anoxic environments or by abiotic mechanisms. Zones of Site groundwater identified as being zones of significant DEHP contamination (i.e., based on reviews of data collected to date) are generally observed as being consistently anoxic and anaerobic.

4. **Is there a continuous on-site O&M presence? If so, please describe staff responsibilities and activities. Alternatively, please describe staff responsibilities and the frequency of site inspections and activities if there is not a continuous on-site O&M presence.**

There is not a continuous on-site O&M presence. Inspections occur by NHDES' consultant contractor, GZA, incidental to field sampling or other investigation programs. Additional inspections by NHDES personnel occur periodically, intended at least annually.

5. **Have there been any significant changes in site O&M requirements, maintenance schedules or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.**

There have not been any changes in site O&M requirements, maintenance schedules, or sampling routines in the last 5 years. The LNAPL recovery trenches were removed in December 2013.

6. **Have there been unexpected O&M difficulties or costs at the Site since start-up or in the last five years? If so, please provide details.**

A need for improved security was identified during the previous 5YR and enhancements were achieved in 2017 with the relocation of a gate and installation of additional barriers in the form of boulders intending to eliminate vehicular trespassing on the caps, and incorporation of signage intending to notify and educate pedestrian trespassers.

7. **Have there been opportunities to optimize O&M activities or sampling efforts? Please describe changes and any resulting or desired cost savings or improved efficiencies.**

The more intensive decontamination method (using hexane) that was previously used for the entire site has now been limited to the wells with historical detections of DEHP, saving approximately 2 hours of effort during the comprehensive water level round and approximately 1 hour of effort per each monitoring well for which the more intensive method is no longer used. Additionally, installation of dedicated bladder pumps in the DEHP-bearing wells has reduced the field labor associated with the intensive decontamination requirements necessary when a non-dedicated pump was retrieved from such a well and prepared for use at a subsequent well. I would estimate that an hour per well was saved at the 6 wells that now have dedicated bladder pumps in DEHP-product wells.

8. **Do you have any comments, suggestions or recommendations regarding O&M activities and schedules at the Site?**

Our initial effort of sampling groundwater for PFAS analysis at select upgradient, source area, and downgradient compliance boundary monitoring well locations in 2018 has revealed a PFAS presence that requires further delineation and assessment. Concentrations in groundwater exceed the EPA's groundwater screening level and NHDES' Ambient Groundwater Quality Standard (AGQS). Because this is an emerging contaminant that has come into the spotlight subsequent to Remedial Investigation and Feasibility Study activities for the site, NHDES views it as appropriate for EPA to undertake the necessary investigations. NHDES will collect groundwater samples from all of the existing site monitoring locations during the spring 2020 groundwater monitoring event for confirmation at previously sampled locations and to provide initial data at remaining locations. This will provide a platform from which to determine additional investigation needs that may be necessary, such as installation of additional groundwater monitoring locations further afield and/or within the existing network but at additional depths.

9. **Do you consent to have your name included along with your responses to this questionnaire in the FYR report?**

Yes. Please include this interview record in its entirety in an appendix to the 5YR report.

INTERVIEW RECORD			
Site Name: Troy Mills Landfill Superfund Site		**EPA ID No.:** NHD980520217	
Subject: 2020 Five Year Review	**Date:**	**Time:**	
Type: ☐ Telephone ☒ E-mail ☐ Other		☐ Incoming ☒ Outgoing	
☐ Visit **Location of Visit:**			
Contact Made By:			
Name: ZaNetta Purnell	**Title:** Community Involvement Coordinator	**Organization:** USEPA	
Individual Contacted:			
Name: Tanya Justham	**Title:** Project Manager	**Organization:** GZA	
Telephone No: 603-493-1548 **Fax No:**	**Street Address:** 5 Commerce Park N, Suite 201 **City, State, Zip:** Bedford, NH 03110		
E-Mail Address: Tanya.justham@gza.com			

1. What is your overall impression of the project?

My overall impression of the project is that, with the exception of the semi-volatile organic compound bis-2(ethylhelxyl)phthalate and the newly identified per- and polyfluoroalkyl substance contamination, site contaminant concentrations are generally below regulatory standards or trending downward and the remedy is effective.

2. Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.

Prior to the installation of engineering controls in 2017 to limit access to the site, trespassing on the site in the form of recreational users (i.e., hikers, horse-back riding, and ATV users) was relatively common at the site; however, GZA was not aware of any complaints or incidents related to the trespasser use. Since 2017, a private property sign located at the conjunction of the northern access road to the site and the DRED trail has regularly needed to be replaced. GZA is not aware of any other complaints, violations, or incidents related to the site.

3. Do you feel well informed about the site's activities and progress?

As the contractor for NHDES on the site, I do feel well informed about the site's activities and progress.

4. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?

I do not have any comments, suggestions, or recommendations regarding the site's management or operation beyond what was recommended in the draft 2020 sampling summary report, which is currently under EPA review.

5. What effects have site operations had on the surrounding community?

In general, active O&M activities for the site have had little effect on the surrounding community. The installation of engineering controls limited site access for recreational users of the site (e.g., ATV driving on the site), which may have upset some community members.

6. Are you aware of any community concerns regarding site's operations and administration? If so, please give details.

The individual who owns the property to the south of the site (in Fitzwilliam) through which the site is accessed has expressed concerns for the water supply well that he recently installed on his property relative to its proximity to the site. I am not aware of any other community concerns in regards to the site's operations and administration.