



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND REGION
FIVE POST OFFICE SQUARE, SUITE 100, BOSTON, MA 02109**

September 15, 2020

Bruce Thompson
de maximis, inc.
200 Day Hill Road, Suite 200
Windsor, CT 06095

Re: Approval of de maximis inc. report titled *Remedial Design Work Plan – Appendix K Site Wide Monitoring Plan* (the “SWMP”), dated August 2020.

Nuclear Metals, Inc. Superfund Site

Dear Mr. Thompson:

EPA, in consultation with the Massachusetts Department of Environmental Protection, has completed its review of the SWMP, dated August 2020. The SWMP was revised in response to EPA comments dated July 16, 2020. The SWMP is subject to the terms and conditions specified in the Consent Decree (CD) for Remedial Design / Remedial Action (RD/RA) for the Nuclear Metals, Inc. Site, which has an effective Date of December 6, 2019.

EPA has reviewed the SWMP and finds that it is acceptable. Therefore, EPA approves the SWMP.

If there is any conflict between the Performance Standards as stated in the SWMP and the Performance Standards as stated in the CD and statement of work (SOW), the CD and SOW shall control.

Please do not hesitate to contact me at (617) 918-1339 or at smith.christopher@epa.gov should you have any questions in this regard.

Sincerely,

A handwritten signature in black ink, appearing to read "Chris Smith", is placed above the printed name.

Christopher Smith
Project Manager

NUCLEAR METALS, INC. SUPERFUND SITE

CONCORD, MASSACHUSETTS

Remedial Design Work Plan – Appendix K Site Wide Monitoring Plan (SWMP)

Prepared by:



de maximis, inc.

200 Day Hill Road, Suite 200
Windsor, CT 06095

August 2020

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Abbreviations and Acronyms

COC	Constituents of Concern
FSP	Field Sampling Plan
FYR	Five-Year Review
gpm	Gallons per minute
mg/L	Milligrams per liter
MNA	Monitored Natural Attenuation
NTCRA	Non-Time-Critical Removal Action
OM&M	Operations, Maintenance and Monitoring
RD	Remedial Design
RD POP	Remedial Design Project Operations Plan
RD/RA	Remedial Design/Remedial Action
RDWP	Remedial Design Work Plan
RI	Remedial Investigation
ROD	Record of Decision
SOP	Standard Operating Procedure
SOW	Statement of Work
TAL	Target Analyte List
TVOC	Total Volatile Organic Compounds
µg/L	Micrograms per liter
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

1. Introduction

On October 17, 2019 the United States Environmental Protection Agency (USEPA) lodged a Consent Decree (CD) with the United States District Court for the District of Massachusetts Eastern Division in connection with Civil Action No. 19-12097-RGS. The CD was entered by the Court on December 6, 2019. The CD and the Statement of Work (SOW) provided as Appendix B to the CD describe the Remedial Design/Remedial Action (RD/RA) activities to be performed for the Nuclear Metals, Inc. (NMI) Superfund Site (Site) in Concord, Massachusetts. The RD/RA activities are to be undertaken by the Settling Defendants (SDs) to the CD, with funding contributions from the Settling Federal Agencies (SFAs).

To efficiently implement the remedy, the work will be divided into five RA projects. RA Projects 1) – 4) below are outlined in Section 1.4 of the SOW. The need for RA Project 5) was identified during the Groundwater NTCRA. The five RA projects are:

- 1) excavation and off-site disposal of contaminated sediments, underground drain lines and debris, and non-HB soils, or “Site-wide Soils and Sediments”;
- 2) ISS of DU in HB soils and of DU and natural uranium in overburden and bedrock groundwater or “ISS”;
- 3) containment of HB stabilized soils with a low-permeability vertical wall and horizontal sub-grade cover or “HB Containment”;
- 4) hydraulic containment and ex-situ treatment of VOCs and 1,4-dioxane in groundwater; and,
- 5) 1,4-dioxane and VOCs in bedrock groundwater.

1.1 Remedial Design Work Plan Overview

Section 3.1 of the SOW requires submittal of a *Remedial Design Work Plan* (RDWP) to summarize pertinent Site information, identify and describe the scopes and procedures for various pre-design investigations, describe the anticipated RD process, and discuss the RD-related deliverables and schedule.

As required by Section 3.3(a) of the SOW, Pre-Design Investigation Work Plans (PDI WPs) have been prepared for the three remedial components (Site-wide Soils and Sediments, ISS, and HB Containment). Hydraulic containment and ex-situ treatment of VOCs and 1,4-dioxane in groundwater as required by the Groundwater NTCRA is operating and does not require further PDI work to complete. However, the extent of 1,4-dioxane and VOCs in bedrock groundwater in the area up gradient from the extraction well needs further delineation. Separate PDI WPs were prepared for each remedial component, and are attached to the RDWP as follows:

- Site-wide Soils and Sediment PDI WP (Appendix A)
- ISS PDI WP (Appendix B)

- HB Containment PDI WP (Appendix C)
- 1,4-dioxane and VOCs in Bedrock Groundwater (Appendix D)

Section 3.4(a) of the SOW requires performance of Treatability Studies (TS) to support the ISS component of the remedy. Separate studies are needed to evaluate and select treatment materials/reagents, for high concentration DU within the HB, low concentration DU outside the HB, and isotopically natural U in bedrock, respectively. In addition to reagent selection, each media will require evaluation to determine the best means to apply the selected reagent. The Treatability Study Work Plan (TSWP) is attached as Appendix E.

The RDWP will also include the following “Supporting Deliverables”:

- To continue the Post-Removal Site Control (PRSC) requirements established pursuant to the Building NTCRA, a “Site Maintenance and Inspection Plan” (SMIP) is provided as Appendix F.
- Health and Safety Plan (HASP) – Appendix G
- Emergency Response Plan (ERP) – Appendix H
- Sampling and Analysis Plan in two parts as:
 - Field Sampling Plan (FSP) – Appendix I
 - Quality Assurance Project Plan (QAPP) – Appendix J
- Site Wide Monitoring Plan (SWMP) – Appendix K
- Community Relations Support Plan (CRSP) – Appendix L.

1.2 Purpose

The purpose of this Site Wide Monitoring Plan (SWMP) is to obtain baseline information regarding the extent of contamination in affected media at the Site; to obtain information, through short- and long- term monitoring, about the movement of and changes in contamination throughout the Site, before and during implementation of the RA; to obtain information regarding contamination levels to determine whether Performance Standards (PS) are achieved; and to obtain information to determine whether to perform additional actions, including further Site monitoring.

The focus of this SWMP is on groundwater prior to and during the RD and RA, as further sampling is necessary to complete the extent of contamination assessment, and because remediation, migration, and natural attenuation processes are expected to change concentrations at monitoring locations during the RD/RA. This SWMP will be updated for long-term Operations, Maintenance, and Monitoring (OM&M). The OM&M SWMP will address long-term monitoring.

Other affected media, including soil and sediment, will be further sampled as part of the PDI efforts. Verification sampling will be conducted as part of the RA to determine whether PS are

achieved. Systematic activities to verify that PS are achieved in soil and sediment will be detailed in the Construction Quality Assurance / Quality Control Plan (CQA/CQP).

1.3 Objective and Scope

The objective of this SWMP is to identify the scope of a groundwater monitoring program for the RD/RA and identify the wells and frequency to perform hydraulic monitoring and sampling. Also addressed is the existing network of monitoring wells, modifications to be made early into the RD, and the potential for future modifications as needed. Establishment of the SWMP will assist in monitoring and further delineating groundwater quality within the source areas as well as downgradient areas of the Site during RD and RA. The program will be used to monitor changes in concentrations of constituents of concern (COCs) within the dissolved-phase plumes, plume size and shape, and the effectiveness of engineered remediation and natural attenuation processes in three dimensions throughout the plume within the overburden and bedrock aquifers. The network of monitoring wells will also be used to demonstrate that groundwater that exceeds site cleanup levels is being captured. Throughout the RD/RA, the well network and associated monitoring is expected to change as data are collected and refine scope.

1.4 Format of Document

This document is organized in the following sections:

- **Section 1 – Introduction:** Describes the purpose, scope, and organization of this document
- **Section 2 – Background:** Summarizes pertinent background information, including the historic investigation phases, the Non-Time-Critical Removal Action (NTCRA) extraction system and capture zone, and the estimated extent of affected groundwater.
- **Section 3 – Groundwater Monitoring Well Network:** Summarizes the Site monitoring well network and need for and procedures associated with periodic well inspections, maintenance, installations, or abandonment.
- **Section 4 – Groundwater Monitoring Events and Scope:** Summarizes the scope and frequencies for planned groundwater sampling events and references the sampling methodologies.
- **Section 5 – Reporting and Schedule:** Identifies the planned reporting and schedule-related components of the SWMP.

2. Background

Installation and sampling of groundwater monitoring wells has progressed in several phases of work beginning during initial construction of the NMI facility. The first phase was in 1957, when eight monitoring wells were installed around the perimeter of the property (PW-1 through PW-8). At the request of the Town of Concord, six wells were installed around the Holding Basin in 1978 (HB-1 through HB-6). Chlorinated solvents were detected in NMI's overburden water supply well (SW-1) during sampling in March 1980 by the Massachusetts Department of Environmental Quality Engineering (MADEQE). At the request of the Concord Board of Health, NMI implemented a semi-annual groundwater monitoring program in 1981. Additional hydrogeologic investigations were performed to characterize flow conditions at the Site in 1984. This study included the installation of monitoring wells at eight on-site locations (P-1, P-1A, P-2, P-3, P-4, ML-1, ML-2, and ML-3) and eight well points near the Assabet River and adjacent wetlands (P-2A, P-3A, A-1 through A-6). To satisfy MassDEP conditions for a discharge permit associated with the Cooling Water Recharge Pond, GZA installed wells MW-1 and MW-2 along Route 62 in 1986. A Phase II study was conducted in 1994 to further characterize the nature and distribution of contamination at the Site and included installation of three multi-level monitoring wells (GZW-6 to GZW-8). By 1994, the semi-annual monitoring program included approximately 36 locations. A supplemental Phase II study in 1996 installed three multi-level well clusters (GZW-9 (GZW-9-1 and GZW-9-2), GZW-10, and GZW-11).

A variety of groundwater investigation activities were conducted during the Remedial Investigation (RI). Activities relevant to the groundwater monitoring network included:

- Well integrity testing of existing, pre-RI wells;
- Drilling of new shallow and deep overburden wells; and,
- Drilling of new shallow- and medium-depth bedrock wells.

As presented in the RI Field Sampling Plan, 51 pre-RI monitoring wells were considered potentially usable for water level monitoring and 32 for groundwater sampling.

Eighteen wells were eliminated from the monitoring network during integrity testing:

- ML-2-2, ML-2-3, ML-3-2, HA-2 and HA-3: no water level was recorded, the well or Barcad sampler appeared dry.
- PZ-6, PZ-9, ML-2-1, ML-2-2, ML-2-3, GZW-6-1, and GZW 6-3: water levels were anomalous; these wells were replaced with new wells.
- PW-4, PW-5, PW-6, PW-8, TW-2 and TW-4: these wells had unknown screened intervals (PW-8 was replaced).

A total of 29 groundwater monitoring wells were installed in the overburden during the RI. Of these wells, 23 were installed to intercept the water table (designated as MW-S##) and four wells (designated as MW-SD##) were installed deeper in the sand and gravel deposits to assess vertical

gradients of head and concentration. Four wells (designated as MW-T##, for Till) were planned for installation within the till deposits at the Site; however, due to thin till thickness, only two wells (MW-T10 and MW-T24) were installed.

Twelve shallow bedrock wells (designated MW-BS## for Bedrock, Shallow) were installed during Phase 1A to assess groundwater quality and better understand the hydraulic relationship between overburden and shallow bedrock. Based on results of the Phase 1A, one additional shallow bedrock well was drilled during the Phase 1B to further delineate the extent of uranium in bedrock (MW-BS28).

During Phase 1C, from July to October 2007, five additional bedrock wells were drilled to further delineate uranium with a natural isotopic signature in bedrock. Three shallow bedrock wells (MW-BS14, MW-BS15, and MW-BS31) were drilled in locations downgradient of the northwest property boundary.

Two medium-depth bedrock wells were co-located with shallow bedrock wells to collect information on uranium concentrations with depth and vertical hydraulic gradients. These wells included one on-site well (MW-BM03) paired with MW-BS03, the well with the highest detect of uranium with a natural isotopic signature, and one off-site downgradient well (MW-BM15), paired with MW-BS15.

The next phase of groundwater monitoring well installation occurred in 2016 to complete delineation of the 1,4-dioxane plume to the cleanup level of 0.46 µg/L identified in the 2015 Record of Decision (USEPA, 2015). This work occurred in the downgradient area, extending from 2229 Main Street property to the vicinity of the Acton Water District's Assabet 1A well on the west side of the Assabet River. 34 additional monitoring wells were installed at 15 locations (most wells were installed in clusters, with wells at multiple depths, typically shallow and deep overburden, and shallow bedrock).

The plume of off-property VOC and 1,4-dioxane contaminated groundwater has been hydraulically cutoff through operation of the ex-situ treatment system developed and implemented through a 2016 Non-Time-Critical Removal Action (NTCRA) for Groundwater. This system utilizes one extraction well (EW-1) to extract groundwater and in doing so has successfully cutoff the 1,4-dioxane and VOC plume (and highest concentrations) upgradient of the well. The Groundwater NTCRA hydraulic containment and treatment system (HCTS) will continue in operation as a component of the RA.

Additional monitoring wells will be installed as part of Pre-Design Investigations to be conducted pursuant to those workplans submitted as components of the RDWP.

2.1 Summary of Existing Monitoring Well Network

The current monitoring well network, at the start of the RD/RA, consists of 130 monitoring wells that were sampled in November 2019 as part of the first comprehensive sampling event (Table 1). The 130 wells that comprise the "active" monitoring well network are shown on Figure 1.

Their role within the monitoring program is indicated in Table 2 and further discussed in Section 4.

There are also four wells that were not sampled, and which are proposed to be abandoned, and three wells that were used for water level measurement only. In addition, through the comprehensive sampling program completed in November 2019, additional wells were identified as suspect and have been proposed to be replaced.

2.2 Well Inspection, Maintenance and Network Modifications

A well inspection and maintenance program for the Site was initiated in 2018 as part of the Post-Removal Site Control conducted pursuant to the Building NTCRA. The program consisted of inspection, followed by, as needed, repair of surface completions and protective casings, as well as removal of accumulated silt from wells through re-development. The well inspection and maintenance program was completed between March and June 2019 and documented in the attached *Monitoring Well Integrity Assessment*.

Based on the results of periodic inspections, field conditions, and changes in operational conditions during the O&M phase of the project, monitoring wells may need to be added, maintained, or abandoned to maintain the network over the course of the long-term monitoring period. Specific procedures for accomplishing these tasks can be found in the FSP.

3. Groundwater Monitoring Events and Scope

This section summarizes the scope and rationale of the groundwater monitoring program for the NMI Site, including sampling frequencies and groups of wells.

3.1 Sampling Design and Rationale

An initial comprehensive sampling event (all available wells) was conducted in November 2019 under the Groundwater NTCRA. A second comprehensive event will be performed once all new wells proposed under the PDI WPs are installed. Comprehensive sampling events after that will be performed every five years during the year prior to a Five-Year Review. These comprehensive events are expected to encompass all available wells to provide information regarding progress in meeting site-wide groundwater PS. More frequent events, such as annual sampling, will focus on sub-sets of monitoring wells to focus on key aspects of the plumes on the 2229 Main Street property and assist in tracking progress in remediating the downgradient VOC and 1,4-dioxane plume. Sampling events will be coordinated, to the extent possible, with sampling on the WR Grace Acton Site's annual sampling. Additional semi-annual (every six months) and monthly sampling events focusing on a small sub-set of wells used as needed to evaluate continuing capture of the downgradient VOC and 1,4-dioxane plume.

Certain monitoring wells will be sampled as part of planned PDI work. Those results will be provided and assessed in the respective PDI reports and will also be incorporated into the site groundwater database, allowing for the resulting data to be utilized in analyses of the SWMP.

The groundwater monitoring program described below designates monitoring wells for each type of sampling event that are referenced below and used on the attached tables and figures. The various designations are as follows:

- "M" – indicates wells subject to monthly sampling.
- "S" – indicates wells subject to semi-annual sampling
- "A" – indicates wells subject to annual sampling.
- "C" – indicates wells subject to sampling for a second comprehensive round.
- "W" – indicates wells subject to water-level gauging only during second comprehensive round.

Table 2 summarizes the specific wells included in each well designation group, their analytes and needs for hydraulic monitoring.

3.1.1 Monthly Sampling

Monthly sampling is applicable to the "M" group designation designations as indicated on Table 2.1 and shown on Figure 2. These wells are appropriate to monitor frequently for the following purposes:

- confirm the effectiveness of plume containment by the HCTS system; and,
- evaluate influent 1,4-dioxane concentrations at the Acton Water Department Assabet 1A and 2A production wells.

3.1.2 Semi-Annual Sampling

Semi-annual sampling is applicable to the “S” group and is focused solely on collection of hydraulic elevations across the NMI Site. This round of monitoring is designed to assist in defining potentiometric surfaces and confirm hydraulic containment of the 1,4-dioxane plume is being maintained. Monitoring wells to be measured during this round are presented in Table 2.2. These well locations are shown on Figure 1.

3.1.3 Annual Sampling

Annual sampling is applicable to the “A” group designations as indicated on Table 2.3 and shown on Figure 3. These wells are appropriate to monitor annually for the following purposes:

- confirm the effectiveness of plume containment by the HCTS system;
- confirm that the VOC and 1,4-dioxane plume and VOCs remains stable and/or continues to attenuate; and,
- confirm the extent of the depleted uranium plume (DU) in overburden and isotopically natural uranium (U) in bedrock is stable or attenuating;

3.1.4 Comprehensive Sampling

A second comprehensive sampling event will be completed upon installation of all monitoring wells associated with the Pre-Design Investigations. This comprehensive round is aimed at gathering follow up data at areas monitored during the November 2019 comprehensive round and assist in identifying trends and characteristics of the various contaminant plumed. The second comprehensive sampling event will provide a strong dataset to continue to confirm the following:

- Continued containment of groundwater with VOC and 1,4-dioxane concentrations above PS;
- Trends and progress towards meeting site-wide PS; and,
- That groundwater remedy described in the ROD remains protective, including data to assess whether the post-soil remedy potential for vapor intrusion issues on the 2229 Main Street property.

Wells to be sampled during the second comprehensive sampling event have a “C” designation and are presented in Table 2.4. Figure 1 identifies the existing monitoring well network which doubles as the existing wells to be sampled through comprehensive sampling events.

3.2 Sampling Methodology

The FSP identifies two groundwater sampling methods to be used for groundwater monitoring at the Site: low flow sampling and passive sampling methods (HydraSleeve™ and SnapSamplers).

3.3 Analytes

The laboratory analytical parameters have been identified by each well and group in Table 2, which considers the range of COCs previously identified above PS at each location. Selection of analytes also incorporates the potential for any COC to migrate downgradient towards previously non-detect monitoring locations.

3.4 Data Quality Objectives

3.4.1 Step 1: State the Problem

As specified in the United States Environmental Protection Agency's (USEPA's) Record of Decision (ROD), the selected remedy for the NMI Site included extraction and ex-situ treatment of volatile organic compounds (VOCs) and 1,4-dioxane in overburden and bedrock aquifers; in-situ treatment of DU in the overburden aquifer and natural uranium in the bedrock aquifer; and long-term monitoring to assess the effectiveness of in- and ex-situ treatment.

The problem to be addressed at the NMI Site is potential current and future risks associated with groundwater affected by Site-related constituents. These remedial measures will mitigate uncontrolled migration of and exposure to Site-related constituents of concern (COCs) and will allow for the restoration of the Site to beneficial uses.

3.4.2 Step 2: Identify the Goal of the Study

Purposes for Monitoring Well Network

The proposed monitoring network associated with the general plume characterization will initially consist of 130 monitoring wells to be used for sampling and water level measurements and continue to grow through implementation of PDIs and identification of potential data gaps. The data obtained from monitoring this extensive monitoring network will be used to characterize the COC plume in terms of:

- Plume extent
- Temporal and spatial variations in plume chemistry and geometry
- Capture of all groundwater that exceeds risk-based levels.
- Progress in meeting the long-term remedial goal of groundwater restoration
- Effectiveness of institutional controls

Groundwater Monitoring Program

The key goals of the Groundwater Monitoring Program are to provide a groundwater sampling schedule, including frequency, analytical parameters and sampling methods.

3.4.3 Step 3: Identify Information Inputs

Information inputs incorporate both the concentration and distribution of COCs in site media. A fundamental basis for decision-making is that enough data points of acceptable quality are available from the specific RD investigation associated with the specific RD Work Plan to support the decision. Thus, the necessary input for the decision is the proportion of non-rejected (usable) data points.

3.4.4 Step 4: Define the Boundaries of Sampling

The NMI Site consists of the 2229 Main Street property (46 acres) and those areas where groundwater contamination has come to be located. The NMI Property is bordered by Main Street (Route 62) and several commercial and residential properties to the north, residential properties to the east, and residential/woodland and commercial/industrial properties to the west. The areal extent of the COC plumes has migrated off site and now consists of portions of the properties located at:

284 High Street, Acton	2284 Main Street, Concord
16 Knox Trail, Acton	2250 Main Street, Concord
112 Powder Mill Road, Acton	222B Main Street, Concord
2320 Main Street, Concord	2194 Main Street, Concord
35 Forest Ridge Road, Concord	

3.4.5 Step 5: Develop the Analytic Approach

Typically, the decision on whether data can be used will be based on the validation results. Following validation, the data will be flagged, as appropriate, and any use restrictions will be noted. The RD Work Plans have been devised so that the loss of any single data point will not hinder description of the distribution of COCs or the development of a risk assessment. A decision rule is adopted that 90 percent of the data points not be rejected or deemed unusable as a condition for use of the data set for decision-making purposes. The usable data will be evaluated versus the performance standards. The required reporting limits are also documented in Worksheets 15-1 through 15-3 of the QAPP so that the lowest achievable detection limit will be reported by the laboratory.

3.4.6 Step 6: Specify Performance or Acceptance Criteria

Based on the potential uses of data in the decision-making process, performance and acceptance criteria are specified in the NMI Remedial Design/Remedial Action (RD/RA) Statement of Work (SOW). The work plans required by the SOW identified the various sampling and analysis programs that this SWMP addresses. Corrective actions are described within this document. The representative nature of the sampling design has been facilitated by discussions among professionals familiar with the site and the appropriate government agencies.

3.4.7 Step 7: Develop the Plan for Obtaining Data

The overall QA objective is to develop and implement procedures for field sampling – Chain-of-Custody, laboratory analysis and reporting – that will provide results to support the evaluation of site data consistent with requirements identified in the NMI RD/RA SOW. Specific procedures for sampling, chain of custody procedures, laboratory instrument calibration, laboratory analysis, data reporting, internal QC, audits, preventive maintenance of field equipment and corrective action are described in other sections of this SWMP, principally in the FSP and the QAPP.

4. Reporting and Schedule

4.1 Reporting

A Groundwater Monitoring Report (GMR) will be prepared on an annual basis to document the scope and results of the groundwater monitoring activities performed in a calendar year. The GMR will document the scope of the completed work for that year, tabulate analytical results, present groundwater gauging data, and include any recommendations for program modifications for consideration by the USEPA and MassDEP. Additionally, figures depicting concentration contours for primary contaminants of concern will be incorporated to assist in monitoring the conditions of the various plumes. If modifications to the SWMP are proposed and approved by the USEPA, a revised SWMP may be prepared to reflect the program modifications.

4.2 Schedule

The frequency of the sampling and monitoring events for the various well classifications was discussed in the program description in Section 3. In summary, the sampling schedule is as follows:

Frequency	Number of Monitoring Locations	Number of Sample Locations
Monthly	10	4
Semi-annual	157	
Annual	48	50
Second Comprehensive round ¹	150	144

1- To be completed after installation of monitoring wells included in pre-design investigations.

5. References

U.S. Environmental Protection Agency, 2015, Record of Decision (ROD), Nuclear Metals, Inc. Superfund Site, Concord, MA, September 2015.

Tables

Table 1
November 2019 Comprehensive Sampling Event
Site Wide Monitoring Plan
NMI RD/RA

MW-SD26	2	676672.8413	2986809.146	X	X	X	X	X	X	X	X		
MW-SD27	2	677419.35	2986301.89	X	X	X	X	X	X	X	X		
MW-SD29	2	676927.1	2986316.1	X	X	X	X	X	X	X	X		
MW-SD30	1	677394.25	2986230.44	X	X	X	X	X	X	X	X		
MW-SD32	2	676245.1259	2986975.518	X	X	X	X	X	X	X	X		
MW-SD34	3	676012.5409	2986771.18	X	X	X	X	X	X	X	X	X	
MW-SD35	2	676167.7424	2986228.569	X	X	X	X	X	X	X	X		
MW-SD36	2	675633.119	2986455.835	X	X	X	X	X	X	X	X		
MW-SD37	2	675280.9907	2986753.462	X	X	X	X	X	X	X	X		
MW-SD38	3	675272.1491	2987036.888	X	X	X	X	X	X	X	X		
MW-SD39	3	675194.8534	2986592.584	X	X	X	X	X	X	X	X		
MW-SD40	2	675748.2086	2986776.318	X	X	X	X	X	X	X	X		
MW-SD41	3	675514.8019	2986915.587	X	X	X	X	X	X	X	X		
MW-SD42A	3	675550.3442	2986806.565	X	X	X	X	X	X	X	X		
MW-SD43	2	675465.8572	2986640.193	X	X	X	X	X	X	X	X		
MW-SD44	3	675483.9521	2986843.633	X	X	X	X	X	X	X	X		
MW-SD45	2	675738.6844	2986856.8	X	X	X	X	X	X	X	X		
MW-SD46	3	675119.8455	2986869.83	X	X	X	X	X	X	X	X		
MW-SM13	1	677060.66	2986109.14	X	X	X	X	X	X	X	X		
MW-SM46	2	675121.0812	2986864.268	X	X	X	X	X	X	X	X		
MW-T10	2	677467.19	2985619.51	X	X	X	X	X	X	X	X		
MW-T24	2	677665.21	2985942.93	X	X	X	X	X	X	X	X		
OW-2	1	676745.4751	2986552.42	X	X	X	X	X	X	X	X		
OW-3	1	676992.4143	2986547.55	X	X	X	X	X	X	X	X		
P-1	2	677203.8651	2986863.384	X	X	X	X	X	X	X	X		
P-1A	1	677175.5383	2986865.383	X	X	X	X	X	X	X	X		
P-2	1	677189.5149	2986739.848	X	X	X	X	X	X	X	X		
P-3	1	677227.0834	2986599.369	X	X	X	X	X	X	X	X		
P-4	1	677210.1405	2986378.351	X	X	X	X	X	X	X	X		
PT-09	2	675773.483	2986659.884	X	X	X	X	X	X	X	X		
PT-10		675808.1227	2986692.785	X									
PT-11P	1	676027.68	2986755.09	X	X	X	X	X	X	X	X		
PW-5		678244.78	2985986.95										
PW-6		677789.52	2985680.36	X	X	X	X	X	X	X	X		
PZ-RI-D02		678060.1441	2986282.028										
PZ-RI-S01		678253.5431	2985987.928	X									
PZ-RI-S02		678058.9436	2986277.728	X									
PZ-RI-S04		677829.8462	2986250.583										
PZ-RI-S05		677713.1442	2986010.528	X									
PZ-RI-S06		677652.5451	2986051.328										
SW-1	2	677224.1696	2986473.037	X	X	X	X	X	X	X	X		
SW-2A	5	677487.02	2985621.61	X	X	X	X	X	X	X	X		
					130	130	130	130	130	130	130	22	21
Duplicates						13	13	13	13	13	13	2	2
Trip Blanks						10							
Equipment Blanks						13	13	13	13	13	13	2	2
MS/MSD						9	9	9	9	1	9	1	1
Hold Times						14 days	7 days	7 days	180 days	180 days	48 hrs	14 days	28 days
Preservative						HCL	ICE	ICE	HNO3	HNO3	ICE	ICE	H2SO4
Bottleware						40 ml -G	1 L -G/A	1L -G/A	500 ml -P	500 ml -P	250 ml -P	250ml-P	250 ml-P
Bottleware #						3	2	2	1	1	1	2	1

Trip Blanks = Per GW NTCRA QAPP, 1 trip blank will be included in each VOC sample cooler shipped.

Table 1
November 2019 Comprehensive Sampling Event
Site Wide Monitoring Plan
NMI RD/RA

MS/MSD = Approximatley 1 MS/MSD shall be collected for each 15 samples per analysis.
Duplicate = Will be collected at a frequency of 10% for groundwater samples.

Notes

1. Field parameters include specific conductance, pH, oxidation reduction potential, temperature, dissolved oxygen and turbidity.
2. VOCs = Volatile Organic Compounds, SVOCs = Semivolatile Organic Compounds, PFAS = Per-and-polyfluoroalkyl substances, Carb = Carbonate, Bicarb = Bicarbonate.
3. U = Uranium, As = Arsenic, Fe = Iron, MN = Manganese, Ca = Calcium, Mg = Magnesium, Na = Sodium, K = Potassium.
4. I.D. = Isotope Dilution.
5. Geochemistry Parameters include: Total Phosphorous (Method 365.1), Orthophosphat (SMP4500-E), Dissolved Organic Carbon (Method 9060), Anions (Method 300) and Alkalinity (Method 310.1)

Table 2.1 Well Designation "M"
Monthly Hydraulic and Quality Monitoring Round
Site Wide Monitoring Plan
NMI RD/RA

Well ID	Water Levels	Field Parameters	1,4-dioxane
			Method 8270D SIM
ASSABET-1A	X		X
ASSABET-2A	X		X
MW-SD42A	X	X	X
MW-SD44	X	X	X
MW-SD45	X		
MW-SD34	X		
MW-BS34	X		
PT-09	X		
PT-10	X		
PT-11P	X		
Totals	10	2	4

1. Quality Control Samples, hold times, preservatives, and bottleware will be consistent with the NMI RD/RA QAPP
2. Monthly sampling will be coupled with Annual and Comprehensive events, when applicable.

Table 2.2 Well Designation "S"
Semi-Annual Hydraulic Monitoring Round
Site Wide Monitoring Plan
NMI RD/RA

Location Name	Water Levels
EW-1	X
9-78	X
A-2E	X
AR-PHS	X
ASBRV-U2	X
B-06	X
MW-1	X
MW-S14	X
MW-BS14	X
MW-S15	X
MW-BM15	X
MW-BS15	X
MW-S26	X
MW-SD26	X
MW-BS26	X
MW-BS31	X
MW-S32	X
MW-SD32	X
MW-BS32	X
MW-SD34	X
MW-BS34	X
MW-S35	X
MW-SD35	X
MW-BS35	X
MW-S36	X
MW-SD36	X
MW-BS36	X
MW-S37	X
MW-SD37	X
MW-BS37	X
MW-S38	X
MW-SD38	X
MW-BS38	X
MW-S39	X
MW-SD39	X
MW-BS39	X
MW-S40	X
MW-SD40	X
MW-BS40	X

Table 2.2 Well Designation "S"
Semi-Annual Hydraulic Monitoring Round
Site Wide Monitoring Plan
NMI RD/RA

Location Name	Water Levels
MW-SD41	X
MW-SD42A	X
MW-SD43	X
MW-SD44	X
MW-SD45	X
MW-S46	X
MW-SD46	X
MW-BS46	X
OW-2	X
PT-09	X
PT-11	X
PZ-1A	X
PZ-2A	X
PT-10	X
PZ-Mpond	X
SG-Mpond	X
PZ-Tpond	X
SG-Tpond	X
AR-01	X
P-1	X
GZW-8-1	X
GZW-8-2	X
P-1A	X
ASRSBV-D2	X
MW-BS25	X
GZW-11-1	X
GZW-11-2	X
MW-S28	X
MW-BS28	X
GZW-10-1	X
GZW-10-2	X
MW-S01	X
MW-SD01	X
MW-BS01	X
GzW-6-1	X
GZW-6-2	X
MW-SD13	X

Table 2.2 Well Designation "S"
Semi-Annual Hydraulic Monitoring Round
Site Wide Monitoring Plan
NMI RD/RA

Location Name	Water Levels
MW-SM13	X
MW-BS13	X
MW-S03	X
MW-BM03	X
MW-BS03	X
MW-S09	X
MW-S23	X
MW-S04	X
MW-BS04	X
PW-7A	X
HA-9	X
MW-T10	X
MW-SD10	X
MW-BS10	X
SW-2A	X
MW-S12	X
MW-BS12	X
MW-BS21	X
MW-S21	X
MW-S19	X
HA-10	X
HA-10A	X
MW-S20	X
GZW-5	X
MW-S02	X
MW-SD02	X
MW-BS02	X
MW-S07	X
MW-S17	X
MW-SD17	X
MW-BS17	X
AST-2	X
GZW-9-2	X
MW-BS22	X
MW-S22	X

Table 2.2 Well Designation "S"
Semi-Annual Hydraulic Monitoring Round
Site Wide Monitoring Plan
NMI RD/RA

Location Name	Water Levels
MW-2	X
ML-1-2	X
MW-S27	X
MW-SD27	X
MW-S30	X
MW-SD30	X
MW-T02	X
MW-S06	X
MW-SD06	X
TW-4	X
PW-4	X
MW-8A	X
MW-S16	X
MW-S05	X
GZW-7-2	X
GZW-7-1	X
MW-T24	X
HB-9	X
HB-11	X
HB-7	X
HBPZ-2R	X
MW-S18	X
HB-10S	X
HB-10	X
PW-6	X
MW-11	X
HB-620	X
HB-12	X
MW-S24	X
GZW-7S	X
ASBRV-U1	X
AR-02	X
Wells to be installed during PDIs	
MW-BS50	X
MW-BS51	X

Table 2.2 Well Designation "S"
Semi-Annual Hydraulic Monitoring Round
Site Wide Monitoring Plan
NMI RD/RA

Location Name	Water Levels
MW-BS52	X
MW-BS53	X
MW-BS54	X
MW-S60	X
MW-S63	X
MW-BS7-2 ¹	X
BEW-1	X
BEW-2	X
BEW-3	X
BEW-4	X
BEW-5	X
BEW-6	X
Total	157

1. Semi-annual sampling will be coupled with Annual and Comprehensive events, when applicable.

Table 2.3 Well Designation "A"
Annual Hydraulic and Quality Monitoring Round
Site Wide Monitoring Plan
NMI RD/RA

Well ID	Water Levels	Field Parameters	VOCs	1,4-dioxane	U-Total ²³⁵ U / ²³⁸ U and Th ²³² Th	Total and Dissolved Metals	Phosphorous
			Method 8260	Method 8270D SIM	Method 6020A ICP-MS	Method 6020A ICP-MS	Method 365.1
SW-101		X		X			
SW-102		X		X			
SW-103		X		X			
ASSABET-1A	X	X		X			
ASSABET-2A	X	X		X			
EW-1	X	X		X			
GZW-10-2	X	X	X		X	X	
GZW-7-1	X	X			X	X	
HB-12	X	X			X	X	
HBPZ-2R	X	X			X	X	X
MW-8A	X	X		X	X	X	X
MW-BM03	X	X		X	X	X	
MW-BM15	X	X		X			
MW-BS01	X	X	X	X	X	X	X
MW-BS02	X	X		X	X	X	
MW-BS03	X	X		X	X	X	
MW-BS10	X	X		X	X	X	
MW-BS13	X	X		X	X	X	
MW-BS14	X	X		X	X	X	
MW-BS15	X	X		X			
MW-BS28	X	X		X	X	X	
MW-BS32	X	X		X			
MW-S02	X				X	X	X
MW-S24	X	X		X	X	X	X
MW-S32	X	X	X	X			
MW-S38	X	X	X	X			
MW-S40	X	X		X			
MW-SD01	X	X		X	X	X	X
MW-SD26	X	X		X			
MW-SD32	X	X		X			
MW-SD34	X	X		X			
MW-SD38	X	X	X	X			
MW-SD42A	X	X		X			
MW-SD44	X	X		X			
MW-SD46	X	X		X			
MW-SM46	X	X		X			
Wells to be installed during PDIs							
MW-BS50	X	X	X	X			
MW-BS51	X	X	X	X			
MW-BS52	X	X	X	X			
MW-BS53	X	X	X	X			
MW-BS54	X	X	X	X	X	X	
MW-S60	X				X	X	X
MW-S63	X				X	X	X
MW-BS7-2 ¹	X	X		X	X	X	
BEW-1	X	X		X	X	X	
BEW-2	X	X		X	X	X	
BEW-3	X	X		X	X	X	
BEW-4	X	X	X	X	X	X	X
BEW-5	X	X	X	X	X	X	
BEW-6	X	X	X	X			
Totals	47	47	14	44	26	26	10

1. Replacement well for GZW-7-2

2. Quality Control Samples, hold times, preservatives, and bottleware will be consistent with the NMI RD/RA QAPP

Table 2.4 Well Designation "C"
Comprehensive Water Quality Monitoring Rounds
Site Wide Monitoring Plan
NMI RD/RA

MW-S40	675752.8769	2986773.872	X	X	X	X	X	X	X	X		
MW-SD01	677054.01	2986336.79	X	X	X	X	X	X	X	X		X
MW-SD02	677376.03	2986139.93	X	X	X	X	X	X	X	X		X
MW-SD06	677283.71	2986256.42	X	X	X	X	X	X	X	X		
MW-SD10	677462.75	298610.21	X	X	X	X	X	X	X	X		
MW-SD13	677055.42	2986101.42	X	X	X	X	X	X	X	X		
MW-SD17	677571.78	2986376.84	X	X	X	X	X	X	X	X		
MW-SD26	676672.8413	2986809.146	X	X	X	X	X	X	X	X		
MW-SD27	677419.35	2986301.89	X	X	X	X	X	X	X	X		
MW-SD29	676927.1	2986316.1	X	X	X	X	X	X	X	X		
MW-SD30	677394.25	2986230.44	X	X	X	X	X	X	X	X		
MW-SD32	676245.1259	2986975.518	X	X	X	X	X	X	X	X		
MW-SD34	676012.5409	2986771.18	X	X	X	X	X	X	X	X	X	
MW-SD35	676167.7424	2986228.569	X	X	X	X	X	X	X	X		
MW-SD36	675633.119	2986455.835	X	X	X	X	X	X	X	X		
MW-SD37	675280.9907	2986753.462	X	X	X	X	X	X	X	X		
MW-SD38	675272.1491	2987036.888	X	X	X	X	X	X	X	X		
MW-SD39	675194.8534	2986592.584	X	X	X	X	X	X	X	X		
MW-SD40	675748.2086	2986776.318	X	X	X	X	X	X	X	X		
MW-SD41	675514.8019	2986915.587	X	X	X	X	X	X	X	X		
MW-SD42A	675550.3442	2986806.565	X	X	X	X	X	X	X	X		
MW-SD43	675465.8572	2986640.193	X	X	X	X	X	X	X	X		
MW-SD44	675483.9521	2986843.633	X	X	X	X	X	X	X	X		
MW-SD45	675738.6844	2986856.8	X	X	X	X	X	X	X	X		
MW-SD46	675119.8455	2986869.83	X	X	X	X	X	X	X	X		
MW-SM13	677060.66	2986109.14	X	X	X	X	X	X	X	X		
MW-SM46	675121.0812	2986864.268	X	X	X	X	X	X	X	X		
MW-T10	677467.19	2985619.51	X	X	X	X	X	X	X	X		
MW-T24	677665.21	2985942.93	X	X	X	X	X	X	X	X		
OW-2	676745.4751	2986552.42	X	X	X	X	X	X	X	X		
OW-3	676992.4143	2986547.55	X	X	X	X	X	X	X	X		
P-1	677203.8651	2986863.384	X	X	X	X	X	X	X	X		
P-1A	677175.5383	2986865.383	X	X	X	X	X	X	X	X		
P-2	677189.5149	2986739.848	X	X	X	X	X	X	X	X		
P-3	677227.0834	2986599.369	X	X	X	X	X	X	X	X		
P-4	677210.1405	2986378.351	X	X	X	X	X	X	X	X		
PT-09	675773.483	2986659.884	X	X	X	X	X	X	X	X		
PT-10	675808.1227	2986692.785	X									
PT-11P	676027.68	2986755.09	X	X	X	X	X	X	X	X		
PW-5	678244.78	2985986.95										
PW-6	677789.52	2985680.36	X	X	X	X	X	X	X	X		
PZ-RI-D02	678060.1441	2986282.028										
PZ-RI-S01	678253.5431	2985987.928	X									
PZ-RI-S02	678058.9436	2986277.728	X									
PZ-RI-S04	677829.8462	2986250.583										
PZ-RI-S05	677713.1442	2986010.528	X									
PZ-RI-S06	677652.5451	2986051.328										
SW-1	677224.1696	2986473.037	X	X	X	X	X	X	X	X		
SW-2A	677487.02	2985621.61	X	X	X	X	X	X	X	X		

Wells to be installed during PDIs

Table 2.4 Well Designation "C"
Comprehensive Water Quality Monitoring Rounds
Site Wide Monitoring Plan
NMI RD/RA

MW-BS50	-	-	X	X	X	X	X	X	X	X		
MW-BS51	-	-	X	X	X	X	X	X	X	X		
MW-BS52	-	-	X	X	X	X	X	X	X	X		
MW-BS53	-	-	X	X	X	X	X	X	X	X		
MW-BS54	-	-	X	X	X	X	X	X	X	X		
MW-S60	-	-	X	X	X	X	X	X	X	X		
MW-S63	-	-	X	X	X	X	X	X	X	X		
MW-BS7-2 ¹	-	-	X	X	X	X	X	X	X	X	X	
BEW-1	-	-	X	X	X	X	X	X	X	X		
BEW-2	-	-	X	X	X	X	X	X	X	X		
BEW-3	-	-	X	X	X	X	X	X	X	X		
BEW-4	-	-	X	X	X	X	X	X	X	X		
BEW-5	-	-	X	X	X	X	X	X	X	X		
BEW-6	-	-	X	X	X	X	X	X	X	X		
			150	144	144	144	144	144	144	144	23	21
Duplicates					14	14	14	14	14	14	2	2
Trip Blanks					10							
Equipment Blanks					14	14	14	14	14	14	2	2
MS/MSD					10	10	10	10	1	10	2	1
Hold Times					14 days	7 days	7 days	180 days	180 days	48 hrs	14 days	28 days
Preservative					HCL	ICE	ICE	HNO3	HNO3	ICE	ICE	H2SO4
Bottleware					40 ml -G	1 L -G/A	1L -G/A	500 ml -P	500 ml -P	250 ml -P	250ml-P	250 ml-P
Bottleware #					3	2	2	1	1	1	2	1

Figures

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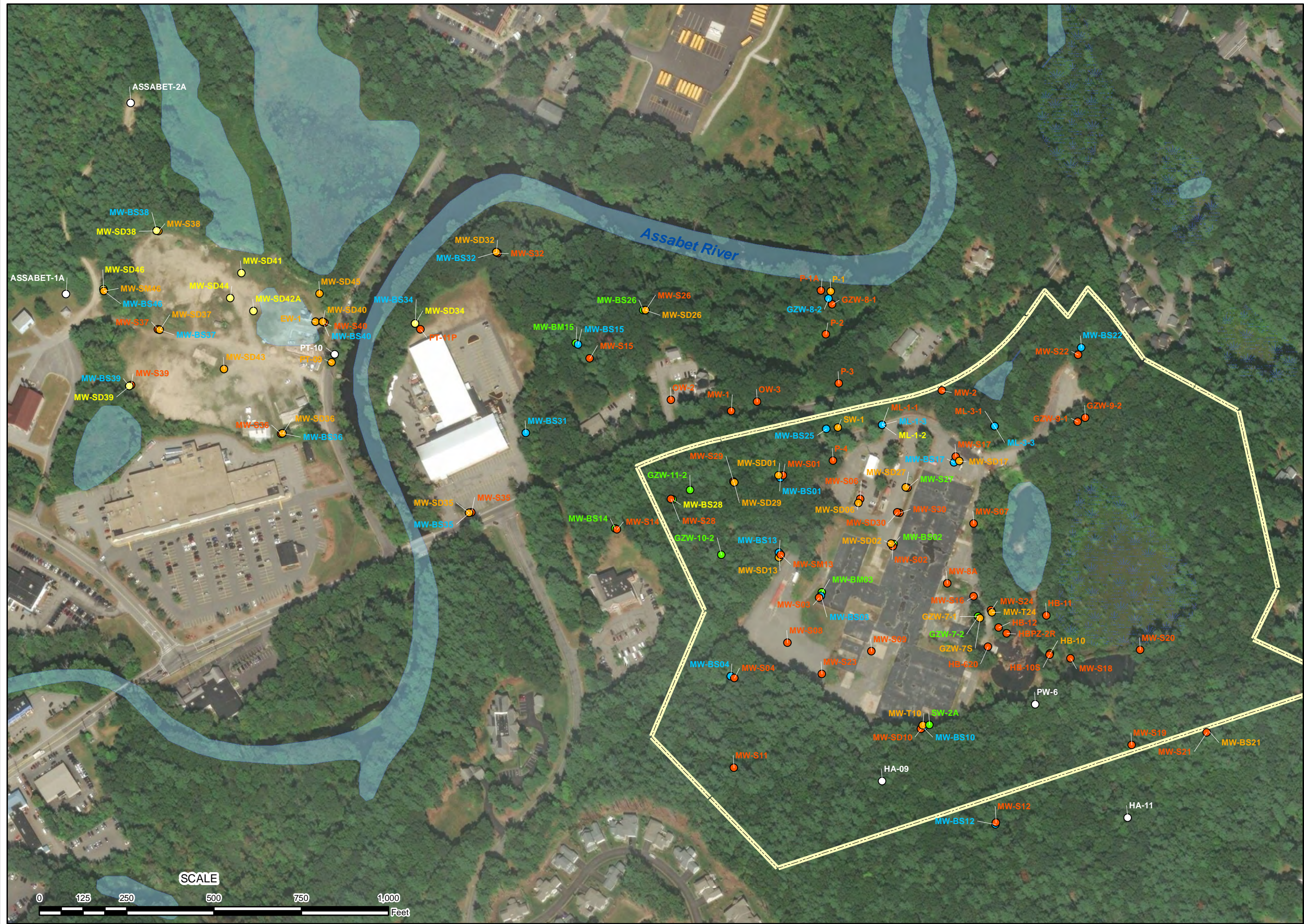


Figure 1

Existing Monitoring Well Network

Site Wide Monitoring Plan

Nuclear Metals Inc.
(Remedial Design/Remedial Action)
Concord, Massachusetts

Description:

Planned well sample locations.

Map Legend:

Well Formation

- Undefined
- Shallow Overburden (SOB)
- Middle Overburden (MOB)
- Till
- Weathered Bedrock (WBR)
- Bedrock (BR)
- Site Boundary

Spatial Projection:

Coordinate System:
MA State Plane Mainland
FIPS Zone: 2001
Units: US Survey Feet
Datum: NAD83

Plot Info:

Project No.: 3243
Plot Date: 24 February, 2020
Arc Operator: LDS
Reviewed by: HG



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Figure 2

Monthly Monitoring
Well Network

- Well Designation "M"

Site Wide Monitoring Plan

Nuclear Metals Inc.
(Remedial Design/Remedial Action)
Concord, Massachusetts

Description:

Planned well sample locations.

Map Legend:

Planned Samples

- Water Level
● Measurement
(Count: 10)
- 1,4-Dioxane
(Count: 4)
- Field Parameters
(Count: 2)
- Site Boundary

Spatial Projection:

Coordinate System:
MA State Plane Mainland
FIPS Zone: 2001
Units: US Survey Feet
Datum: NAD83

Plot Info:

Project No.: 3243
Plot Date: 24 February, 2020
Arc Operator: LDS
Reviewed by: HG



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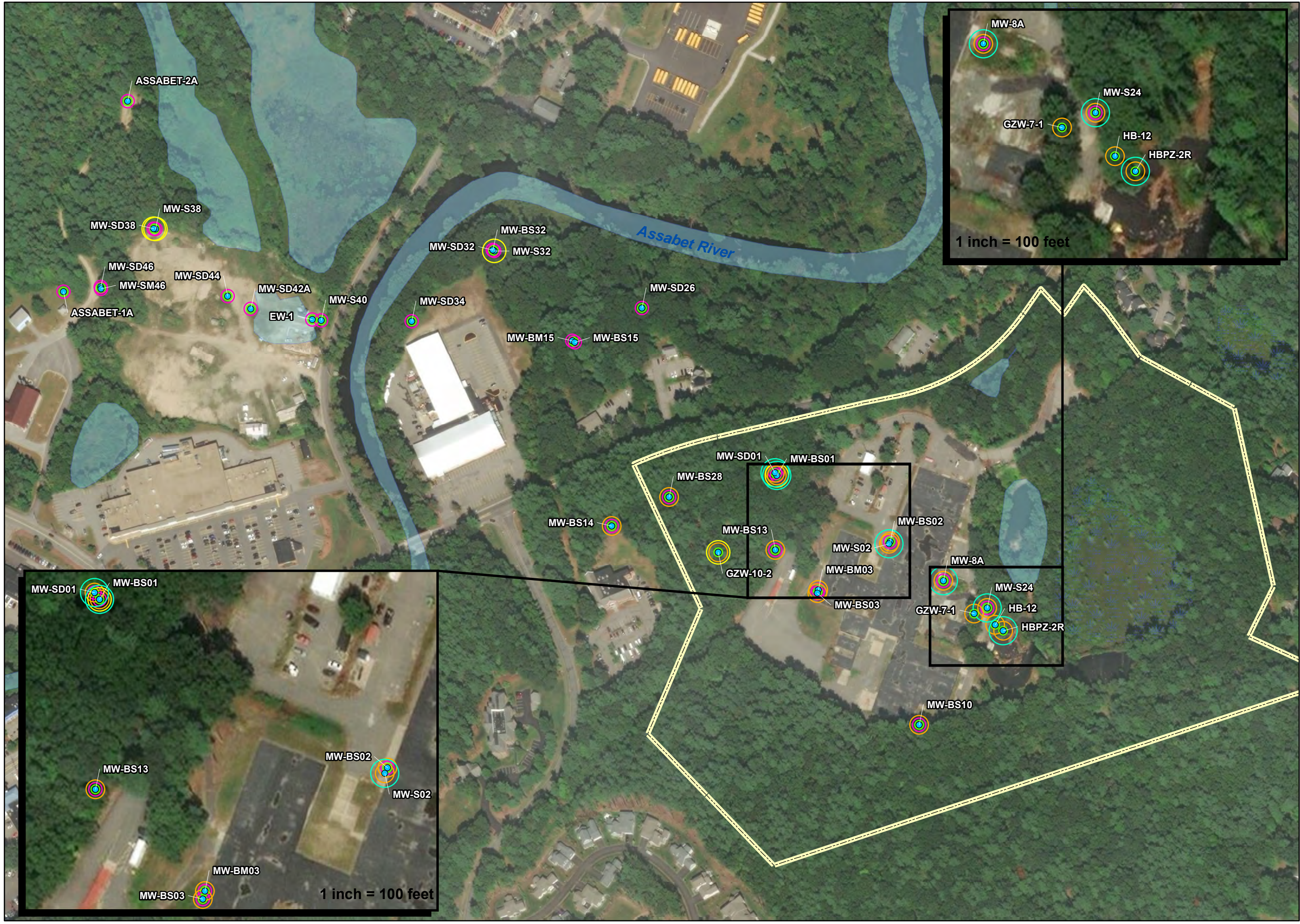


Figure 3
Annual Monitoring Well Network
- Well Designation "A"
Site Wide Monitoring Plan
Nuclear Metals Inc.
(Remedial Design/Remedial Action)
Concord, Massachusetts

Description:
Planned well sample locations.

- Map Legend:
- Planned Samples**
- Water Level Measurement (Count: 33)
 - Field Parameters (Count: 32)
 - 1,4-Dioxane (Count: 28)
 - Metals / Uranium (Count: 16)
 - VOCs (Count: 5)
 - Phosphorus (Count: 6)
 - Site Boundary

Spatial Projection:

Coordinate System:
MA State Plane Mainland
FIPS Zone: 2001
Units: US Survey Feet
Datum: NAD83

Plot Info:

Project No.: 3243
Plot Date: 26 February, 2020
Arc Operator: LDS
Reviewed by: HG



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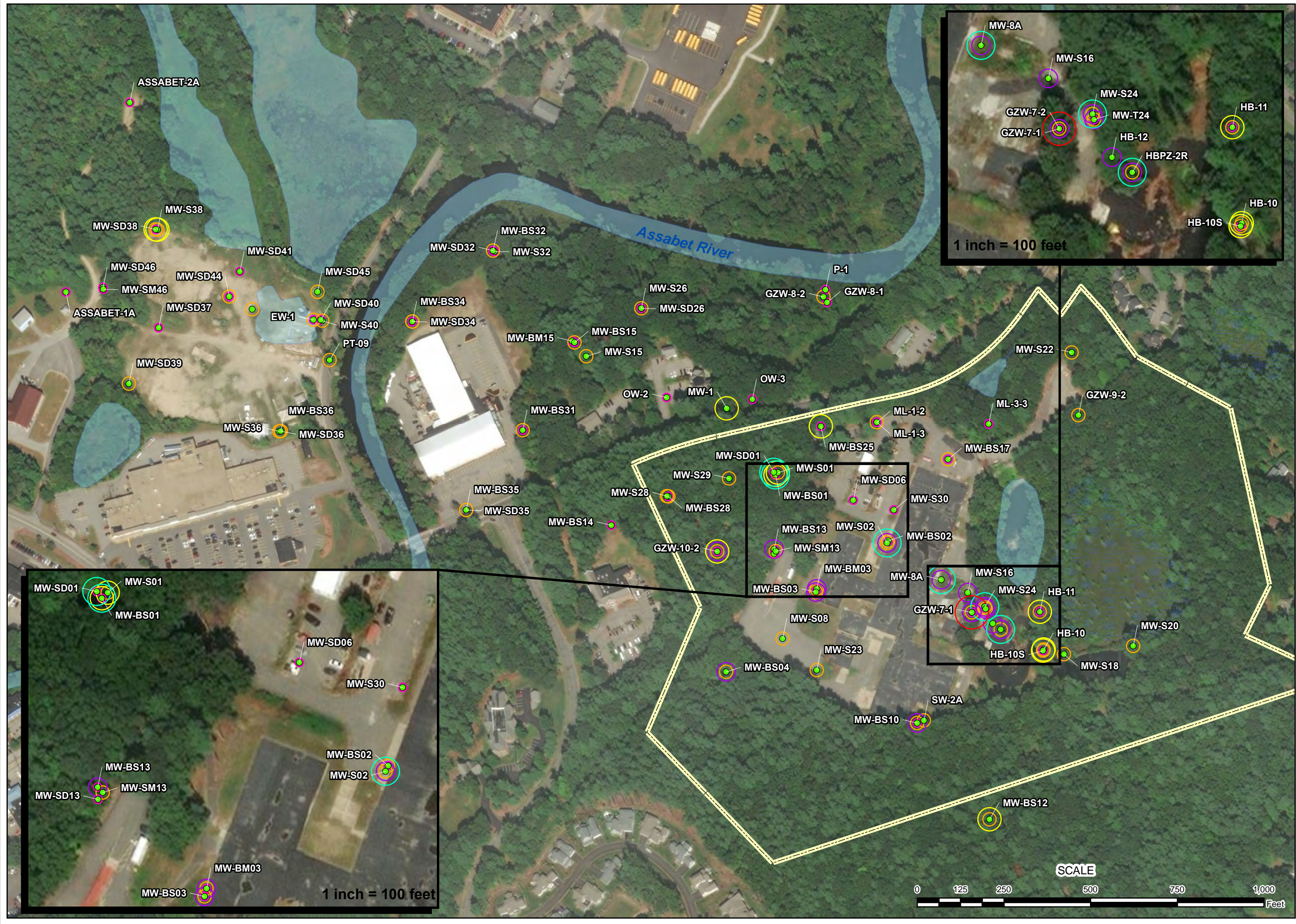


Figure 4

Comprehensive Monitoring Well Network

- Well Designation "C"

Site Wide Monitoring Plan

Nuclear Metals Inc.

(Remedial Design/Remedial Action)

Concord, Massachusetts

Description:

Planned well sample locations.

Map Legend:

Planned Samples

Field Parameters
(Count: 81)

1,4-Dioxane
(Count: 44)

Metals
(Count: 51)

Uranium
(Count: 15)

VOCs
(Count: 11)

Phosphorus
(Count: 6)

PFAS
(Count: 1)

Site Boundary

Spatial Projection:

Coordinate System:
MA State Plane Mainland
FIPS Zone: 2001
Units: US Survey Feet
Datum: NAD83

Plot Info:

Project No.: 3243

Plot Date: 26 February, 2020

Arc Operator: LDS

Reviewed by: HG

ddms

Attachment
Monitoring Well Integrity Assessment

This Monitoring Well Integrity Assessment was performed to evaluate the physical and hydrological condition of each monitoring well to establish a baseline groundwater monitoring network.

This inspection included an assessment of the external and internal conditions of all monitoring wells proposed for use as part of the Site Wide Monitoring Program (SWMP). A visual inspection of the condition of each monitoring well was completed to verify the presence of a lock, expansion plug, and to evaluate the overall condition of the surface completion (road box, stand-pipe and concrete pad). In addition, each monitoring well was gauged to measure the depth to water (DTW) and depth to bottom (DTB) to confirm the well depth and verify that no obstruction, or internal damage to the monitoring well was present.

The results of the well integrity assessment are summarized in Tables 1 & 2. Based on results of this assessment recommendations have been identified for repair, development or abandonment of wells included in the SWMP. These recommendations are included on the attached.

Monitoring wells – Repairs & General Maintenance

The following summarizes suggested repairs and general maintenance for wells included in the Site-Wide Monitoring Program (SWMP). Repairs and general maintenance information for specific monitoring wells is included on Table 1.

- Locks were added or replaced at 61 well locations.
- Expansion plugs were replaced at 43 monitoring wells.
- Road-box covers were missing and will be replaced at 5 monitoring well locations.
- The measuring mark was missing and was added to the casing or stand-pipe at 9 well locations.
- The concrete pads and road-boxes were replaced at MW-SD06 and HB-12, and the surface completion at MW-BS39 is scheduled for replacement in October 2019. Additional well pad repairs included in Table 1 shall be recommended following implementation of the Remedial Action (RA).
- The road-boxes were re-threaded and new bolts were installed at approximately 36 monitoring wells that are finished to grade.
- A flush well plug shall be installed at MW-31. There is limited space between the steel casing of the well and the road-box cover which does not permit closure of this well with a standard well plug.
- Vegetative overgrowth will be cleared to permit access leading to monitoring wells P-1, P-1A, P-2 and GZW-8.
- A total of 14 monitoring wells were considered not useable or will not be included in this site wide monitoring event.

- A total of 51 monitoring wells were not located and are assumed abandoned or destroyed.
- Monitoring wells ML-2-1, ML-2-2, ML-2-3, and MW-S05 were likely destroyed during Building NTCRA demolition activities.

Monitoring Wells – Development

A total of 39 monitoring wells where more than 10% of the screen was occluded by sediment were selected for redevelopment. Well development was performed to improve water quality and reduce the potential for matrix interference during laboratory analysis. Well development was generally completed in accordance with SOP-005, Monitoring Well Development, as included as Attachment A in the July 2018, Field Sampling/Quality Assurance Project Plan, Non-Time Critical Removal Action for Groundwater. Well development, as part of this event, was conducted to remove accumulated sediments from older, existing wells. Monitoring wells were considered developed when well water was clear to the unaided eye and the well screen had less than 10% of the screen obstructed by sediment.

O&M, Inc. field personnel completed the development of all 39 monitoring wells in April 2019. Well development purge forms were used to document total well volumes removed and visual observations throughout the development process. Following well development activities, the depth to the bottom of each well was measured to confirm successful development was complete. Currently, total of 7 monitoring wells do not meet the well development criteria and are selected for re-development.

Monitoring wells – Abandonment

A total of 13 monitoring wells were identified as not useable for monitoring and are recommended for abandonment. The decision to abandon monitoring wells is based on a review of the current monitoring well condition as well as a review of construction logs and previous well assessment information as included in Table 2.13.1, Results of Well Integrity Testing, of the April 2017, Remedial Investigation Report.

Monitoring Wells – Dormant

A total of 3 monitoring wells were not included in this sample round and will be retained in dormant status. A summary of the well assessment details for these dormant monitoring wells is included in Table 2.



Tables

Table 1 – Well Repair Maintenance Log

Well ID	Well Diameter	Well ID Label Needed	Well Cover Missing	Lock Missing	Expansion Plug Missing	Measuring Mark Missing	Comments/ Recommendations
GZW-10-1	0.5	--	--	--	--	--	
GZW-10-2	1.5	--	--	--	X	--	
GZW-11-2	1.5	--	--	X	X	--	loose collar, change lock
GZW-5	1.5	--	--	X	--	--	
GZW-6-1	1.5	--	X	X	X	X	
GZW-7-1	1.5	--	--	X	X	--	
GZW-7-2	1	--	--	X	X	--	
GZW-7S	2	--	--	X	X	--	Well development complete
GZW-8-1	1.5	--	--	X	X	--	
GZW-8-2	1	--	--	X	X	--	
GZW-9-1	1.5	--	--	X	X	--	
GZW-9-2	1.5	--	--	X	X	--	
HA-09	2	--	--	--	X	--	
HA-10A	2	--	--	X	X	--	
HA-11	2	--	--	X	X	--	
HB-07	1	--	--	X	X	--	
HB-10	1.5	--	--	X	--	--	Well development recommended
HB-10S	2	--	--	X	X	--	Well development complete

Table 1 – Well Repair Maintenance Log

Well ID	Well Diameter	Well ID Label Needed	Well Cover Missing	Lock Missing	Expansion Plug Missing	Measuring Mark Missing	Comments/ Recommendations
HB-11	2	--	--	--	--	--	
HB-12	2	--	X	X	--	--	Replaced road-box & concrete pad - immediate
HB-620	2	--	--	X	--	--	Well development complete
HBPZ-2R	2	--	--	X	X	--	Well development complete
ML-1-1	Barcad	--	--	--	--	--	
ML-1-2	Barcad	--	--	--	--	--	
ML-1-3	Barcad	--	--	--	--	--	
ML-3-1	1.5	--	--	X	X	X	Well development complete
ML-3-3	Barcad	--	--	--	--	--	
MW-1	2	--	--	X	X	--	Well development recommended
MW-2	2	--	--	X	X	--	Well development recommended
MW-8A	2	--	--	X	X	--	
MW-BM03	2	--	--	X	--	--	Replace Road Box, well development complete
MW-BM15	2	--	--	--	X	--	
MW-BS01	2	--	--	--	--	--	
MW-BS02	2	--	--	X	--	--	
MW-BS03	2	--	--	X	X	X	
MW-BS04	2	--	--	--	X	--	

Table 1 – Well Repair Maintenance Log

Well ID	Well Diameter	Well ID Label Needed	Well Cover Missing	Lock Missing	Expansion Plug Missing	Measuring Mark Missing	Comments/ Recommendations
MW-BS10	2	--	--	--	--	--	
MW-BS12	2	--	--	X	--	--	
MW-BS13	2	--	--	--	--	--	Well development complete
MW-BS14	2	--	--	--	--	--	
MW-BS15	2	--	--	--	X	--	
MW-BS17	2	--	--	X	--	--	Replace Road Box
MW-BS21	2	X	--	X	--	--	
MW-BS22	2	--	--	--	--	--	
MW-BS25	2	--	--	X	X	--	Replace Road Box
MW-BS26	2	--	--	--	--	--	Well development complete
MW-BS28	2	--	--	--	--	--	
MW-BS31	2	--	--	X	X	--	Well development complete
MW-BS32	2	--	--	--	--	--	Well development complete
MW-BS34	2	--	--	--	--	--	
MW-BS35	2	--	--	X	--	--	Well development complete
MW-BS36	2	--	--	--	--	--	
MW-BS37	2	--	--	--	--	--	
MW-BS38	2	--	--	--	--	--	Well development complete

Table 1 – Well Repair Maintenance Log

Well ID	Well Diameter	Well ID Label Needed	Well Cover Missing	Lock Missing	Expansion Plug Missing	Measuring Mark Missing	Comments/ Recommendations
MW-BS39	2	--	--	--	--	--	Replace Road Box - immediate
MW-BS40	2	--	--	--	--	--	
MW-BS46	2	--	--	--	--	--	
MW-S01	2	--	--	--	--	--	
MW-S02	2	--	--	X	--	--	Replace Road box, well development complete
MW-S03	2	--	--	X	--	--	
MW-S04	2	--	--	--	--	--	
MW-S06	2	--	--	X	X	--	Replace Road Box
MW-S07	2	--	--	X	--	--	
MW-S08	2	--	--	X	--	--	Replace Road Box
MW-S09	2	--	--	X	--	--	
MW-S11	2	--	--	--	--	--	
MW-S12	2	--	--	X	--	--	
MW-S14	2	--	--	--	--	--	Well development recommended
MW-S15	2	--	--	--	--	--	
MW-S16	2	--	--	X	X	--	Replace Road Box, well development complete
MW-S17	2	--	--	X	--	--	Replace Road Box
MW-S18	2	--	--	--	X	--	

Table 1 – Well Repair Maintenance Log

Well ID	Well Diameter	Well ID Label Needed	Well Cover Missing	Lock Missing	Expansion Plug Missing	Measuring Mark Missing	Comments/ Recommendations
MW-S19	2	--	--	--	--	--	Well development complete
MW-S20	2	--	--	--	--	--	
MW-S21	2	--	--	X	--	X	
MW-S22	2	--	--	--	--	--	
MW-S23	2	--	--	X	--	--	
MW-S24	2	--	--	X	X	--	
MW-S26	2	--	--	--	--	--	
MW-S27	2	--	--	--	--	--	Replace Road Box, well development complete
MW-S28	2	--	--	--	--	--	
MW-S29	2	--	--	--	--	--	
MW-S30	2	--	--	X	--	--	Replace Road Box
MW-S32	2	--	--	--	--	--	Well development recommended
MW-S35	2	--	--	X	--	--	Replace Road Box
MW-S36	2	--	--	--	--	--	
MW-S37	2	--	--	--	--	--	Well development complete
MW-S38	2	--	--	--	--	--	
MW-S39	2	--	--	--	--	--	Well development complete
MW-S40	2	--	--	--	--	--	

Table 1 – Well Repair Maintenance Log

Well ID	Well Diameter	Well ID Label Needed	Well Cover Missing	Lock Missing	Expansion Plug Missing	Measuring Mark Missing	Comments/ Recommendations
MW-SD01	2	--	--	--	--	--	
MW-SD02	2	--	--	X	--	--	Replace Road Box, well development recommended
MW-SD06	2	X	X	X	X	X	Replaced Road Box & concrete pad - immediate, well development recommended
MW-SD10	2	--	--	--	--	--	Well development complete
MW-SD13	2	--	--	--	--	--	
MW-SD17	2	--	--	X	--	--	Replace Road Box
MW-SD26	2	--	--	--	--	--	Well development complete
MW-SD27	2	--	--	X	--	--	Replace Road Box
MW-SD29	2	--	--	--	--	--	
MW-SD30	2	--	--	X	--	--	
MW-SD32	2	--	--	--	--	--	Well development complete
MW-SD34	2	--	--	--	--	--	Well development complete
MW-SD35	2	--	--	X	--	--	
MW-SD36	2	--	--	--	--	--	
MW-SD37	2	--	--	--	--	--	
MW-SD38	2	--	--	--	--	--	Well development complete
MW-SD39	2	--	--	--	--	--	Well development complete

Table 1 – Well Repair Maintenance Log

Well ID	Well Diameter	Well ID Label Needed	Well Cover Missing	Lock Missing	Expansion Plug Missing	Measuring Mark Missing	Comments/ Recommendations
MW-SD40	2	--	--	--	--	--	Well development complete
MW-SD41	2	--	--	--	--	--	Well development complete
MW-SD42A	2	--	--	--	--	--	Well development complete
MW-SD43	2	--	--	--	--	--	Well development complete
MW-SD44	2	--	--	--	--	--	
MW-SD45	2	--	--	--	--	--	
MW-SD46	2	--	--	--	--	--	
MW-SM13	2	--	--	--	--	--	
MW-SM46	2	--	--	--	--	--	
MW-T10	2	--	--	--	--	--	
MW-T24	2	--	--	X	--	--	Replace Road Box
OW-2	2	--	--	X	--	--	Well development complete
OW-3	2	--	--	X	X	--	
P-1	2	--	--	X	X	--	Clear vegetative overgrowth, well development complete
P-1A	1.5	--	--	--	--	--	Replace Road Box, clear vegetative overgrowth, well development recommended
P-2	1.5	--	--	--	--	--	Clear vegetative overgrowth
P-3	2	--	--	X	X	--	Well development complete

Table 1 – Well Repair Maintenance Log

Well ID	Well Diameter	Well ID Label Needed	Well Cover Missing	Lock Missing	Expansion Plug Missing	Measuring Mark Missing	Comments/ Recommendations
P-4	1.5	--	--	--	--	--	
PT-09	1.5	--	--	--	--	--	Grace Well, well development complete
PT-11P	1.5	--	--	--	X	--	Grace Well
PW-5	2.5	--	--	X	X	X	
PW-6	2.5	--	--	X	X	X	
PZ-RI-D02	1	--	--	--	X	--	
PZ-RI-S01	1	X	--	--	X	--	
PZ-RI-S02	1	--	--	--	--	--	
PZ-RI-S04	1	--	--	--	--	--	
PZ-RI-S05	1	--	--	X	X	--	
PZ-RI-S06	1	--	--	--	X	--	

Note:

“—” = No action required

“X” = Action required

Table 2 – Wells To Abandon Or Not Located

Well ID	Well Diameter	Well ID Label Needed	Well Cover Missing	Lock Missing	Expansion Plug Missing	Measuring Mark Missing	Comments/ Recommendations
HB-09	1.5	--	--	X	X	--	Not useable for monitoring (well obstruction) - abandonment recommended.
MW-S05	2	--	--	--	--	--	Destroyed
MW-8	--	--	--	--	--	--	Not useable for monitoring - could not locate, may not exist.
MW-10	--	--	--	--	--	--	Not useable for monitoring - could not locate, may not exist.
MW-11	2	--	--	--	X	--	Not Useable for monitoring - abandonment recommended.
MW-S05	2	--	--	--	--	--	Could not locate, may not exist.
P-2A	1.25	--	--	--	--	--	Not Useable for monitoring - abandonment recommended.
P-3A	1.25	--	X	X	X	--	Not Useable for monitoring - abandonment recommended.
PT-11B1	Barcad	--	--	--	--	--	Grace well - Not included in sample round.
PT-11B2	Barcad	--	--	--	--	--	Grace well - Not included in sample round.
PT-11B3	Barcad	--	--	--	--	--	Grace well - Not included in sample round.
PW-3	--	--	--	--	--	--	Not useable for monitoring - could not locate, may not exist.
PW-4	No Data	--	--	--	--	--	Could not locate, may not exist.
PW-7A	1.5	--	--	--	--	--	Not useable for monitoring (well obstruction) - abandonment recommended.

Table 2 – Wells To Abandon Or Not Located

Well ID	Well Diameter	Well ID Label Needed	Well Cover Missing	Lock Missing	Expansion Plug Missing	Measuring Mark Missing	Comments/ Recommendations
PZ-1	--	--	--	--	--	--	Not useable for monitoring - could not locate, may not exist.
PZ-1A	4 inch	--	--	--	--	--	Could not locate, may not exist.
PZ-2	--	--	--	--	--	--	Not useable for monitoring - could not locate, may not exist.
PZ-3	--	--	--	--	--	--	Not useable for monitoring - could not locate, may not exist.
PZ-4	0.5	--	--	--	--	--	Not useable for monitoring (well obstruction) - abandonment recommended.
PZ-5	--	--	--	--	--	--	Not useable for monitoring - could not locate, may not exist.
PZ-6	--	--	--	--	--	--	Not useable for monitoring - could not locate, may not exist.
PZ-7	--	--	--	--	--	--	Not useable for monitoring - abandonment recommended
PZ-9	--	--	--	--	--	--	Not useable for monitoring - could not locate, may not exist.
PZ-RI-D01	1	X	--	--	X	--	Not useable for monitoring - abandonment recommended
PZ-RI-S03	No Data	--	--	--	--	--	Could not locate, may not exist.
GZW-2	--	--	--	--	--	--	Could not locate, may not exist.
GZW-3	--	--	--	--	--	--	Could not locate, may not exist.
GZW-4	--	--	--	--	--	--	Could not locate, may not exist.
GZW-6-2	Barcad	--	--	--	X	--	Not useable for monitoring - abandonment recommended

Table 2 – Wells To Abandon Or Not Located

Well ID	Well Diameter	Well ID Label Needed	Well Cover Missing	Lock Missing	Expansion Plug Missing	Measuring Mark Missing	Comments/ Recommendations
GZW-6-3	Barcad	--	--	--	--	--	Not useable for monitoring
GZW-8	--	--	--	--	--	--	Could not locate, may not exist.
GZW-11-1	0.5	--	--	X	X	--	Not useable for monitoring - abandonment recommended.
HA-01	--	--	--	--	--	--	Could not locate, may not exist.
HA-02	2	--	X	X	--	--	Not useable for monitoring - abandonment recommended.
HA-03	--	--	--	--	--	--	Could not locate, may not exist.
HA-04	--	--	--	--	--	--	Could not locate, may not exist.
HA-05	--	--	--	--	--	--	Could not locate, may not exist.
HA-05A	--	--	--	--	--	--	Could not locate, may not exist.
HA-06	--	--	--	--	--	--	Could not locate, may not exist.
HA-07	--	--	--	--	--	--	Could not locate, may not exist.
HA-08	--	--	--	--	--	--	Could not locate, may not exist.
HA-10	2	--	--	X	X	--	Not useable for monitoring - abandonment recommended.
HA-12	2	--	--	--	--	--	Not useable for monitoring - could not locate, may not exist.
HB-01	1.5	--	--	--	--	--	Not useable for monitoring - could not locate, may not exist.
HB-02	1.5	--	--	--	--	--	Not useable for monitoring - could not locate, may not exist.

Table 2 – Wells To Abandon Or Not Located

Well ID	Well Diameter	Well ID Label Needed	Well Cover Missing	Lock Missing	Expansion Plug Missing	Measuring Mark Missing	Comments/ Recommendations
HB-03	1.5	--	--	--	--	--	Not useable for monitoring - could not locate, may not exist.
HB-04	1.5	--	--	--	--	--	Not useable for monitoring - could not locate, may not exist.
HB-05	1.5	--	--	--	--	--	Not useable for monitoring - could not locate, may not exist.
HB-06	1.5	--	--	--	--	--	Not useable for monitoring , could not locate, may not exist.
HB-08	--	--	--	--	--	--	Not useable for monitoring - could not locate, may not exist.
HBPZ-1	--	--	--	--	--	--	Not useable for monitoring - could not locate, may not exist.
HBPZ-2	--	--	--	--	--	--	Not useable for monitoring , could not locate, may not exist.
HBPZ-3	--	--	--	--	--	--	Not useable for monitoring , could not locate, may not exist.
HBPZ-4	--	--	--	--	--	--	Not useable for monitoring , could not locate, may not exist.
J-2	No Data	--	--	--	--	--	Could not locate, may not exist.
J2-B1	No Data	--	--	--	--	--	Could not locate, may not exist.
J2-B2	No Data	--	--	--	--	--	Could not locate, may not exist.
J3-B1	Barcad	--	--	--	--	--	Could not locate, may not exist.
J3-B2	Barcad	--	--	--	--	--	Could not locate, may not exist.
ML-2-1	1.5	--	--	--	--	--	Destroyed
ML-2-2	1.5	--	--	--	--	--	Destroyed

Table 2 – Wells To Abandon Or Not Located

Well ID	Well Diameter	Well ID Label Needed	Well Cover Missing	Lock Missing	Expansion Plug Missing	Measuring Mark Missing	Comments/ Recommendations
ML-2-3	1.5	--	--	--	--	--	Destroyed
ML-3-2	Barcad	--	--	--	--	--	Not useable for monitoring - abandonment recommended.
OW-1	2						Abandoned
PMW-35	#N/A	--	--	--	--	--	Could not locate, may not exist.
PT-01AB1	No Data	--	--	--	--	--	Could not locate, may not exist.
PT-03B1	Barcad	--	--	--	--	--	Could not locate, may not exist.
PT-03B2	Barcad	--	--	--	--	--	Could not locate, may not exist.
PT-03P	1.5	--	--	--	--	--	Grace Well - Not Useable For Monitoring
PT-10	1.5	--	--	--	X	--	Grace Well - Not Useable For Monitoring
PW-1	--	--	--	--	--	--	Not useable for monitoring - could not locate, may not exist.
PW-2	--	--	--	--	--	--	Not useable for monitoring - could not locate, may not exist.
PW-7	--	--	--	--	--	--	Not useable for monitoring - could not locate, may not exist.
PW-8	--	--	--	--	--	--	Not useable for monitoring - could not locate, may not exist.
PZ-2A	24 inch	--	--	--	--	--	Could not locate, may not exist.

Note:

"Grace Well" = Monitoring well associated with the WR Grace Site in Acton, MA.

"X" = Action required.

"—" = Information not available

Table 2 – Wells To Abandon Or Not Located