Resource Technologies, Inc.

1050 East Main Street Suite 4, Bozeman, Montana 59715
Voice: (406) 585-8005 • Fax: (406) 585-0069 • e-mail: mail@rtimt.com

March 11, 2025

Ms. Daphne Ryan
Montana Department of Environmental Quality
Petroleum Tank Cleanup Section
P. O. Box 200901
Helena, MT 59620-0901

Subject: Corrective Action Work Plan; Former Rapley Property,
205 31st Avenue South, Great Falls, Cascade County, Montana;
Facility ID 07-04772 (TID 17201), Release 4325, Work Plan ID 34968

Responsible Party: Richard Teesdale
205 31st Avenue South
Great Falls, MT 59401
(406) 581-5094

Dear Ms. Ryan:

On behalf of Richard Teesdale, Resource Technologies, Inc. (RTI) is submitting the following workplan and budget for corrective action at the former Rapley Property located in Great Falls, Montana. Proposed activities are intended to provide information to aid in determining the need for future corrective actions or to facilitate site closure associated with Release 4325. This workplan was prepared pursuant to the work plan request issued by the Montana Department of Environmental Quality-Petroleum Tank Cleanup Section (MDEQ) in a letter to Richard Teesdale dated January 13, 2025.

BACKGROUND

The former Rapley Property (Site) is located at 205 31st Avenue South, Great Falls, Montana (Figure 1). The site was in operation until the 1960's when a petroleum underground storage tank (UST) and dispenser were removed. A single-family residence is located on the property. The former UST basin and associated dispenser location was approximately 20 feet east of the southeast corner of the house (Figure 2).

Release 4325 was discovered in May 1995 when flooding in the vicinity of the site resulted in visible petroleum sheen on ponded water in the vicinity of the site. Ponded water with petroleum sheen reportedly extended 625 feet into the pasture northeast of the site.

In 1996 and 1997, investigations were conducted by the Cascade County Health Department and MDEQ that included sampling from test pits, hand-augured boreholes, and test wells. In 1999 and 2000, MDEQ conducted further investigation including a geophysical survey of the area to determine the presence of any unknown USTs, and installation of soil borings and groundwater monitoring wells for soil and groundwater sampling. MDEQ ultimately determined that the source of the petroleum impacts was the former gasoline UST and dispenser that was removed in 1968.

AMEC Geomatrix performed remedial investigation and excavation (2007 and 2010, respectively). NewFields performed vapor mitigation and groundwater sampling (2014) and soil vapor and ambient air monitoring (2016). RTI has performed groundwater monitoring (2018-present) and soil excavation (July 2020).

Excavation activities in 2020 removed 2,100 cubic yards of soil from the area surrounding the former UST basin and dispenser where contaminated soils were left in place from a previous excavation. Prior to backfilling, 2,250 pounds of oxygen releasing compound (ORC) pellets were placed in the excavation basin.

Soil data collected during monitoring well installation in 2021 indicated substantial vadose-zone soil impacts in the vicinity of well pair MW-7A (S and D) where excavation was limited by proximity to the water-main line that runs along the north edge of 31st Avenue South (Figure 2) (*Monitoring Well Installation and Groundwater Sampling Report, RTI, March 22, 2022*). Other areas of persistent soil impacts reside within the zone of groundwater fluctuation and extend northeast of the former excavation in the direction of wells MW-3 and MW-6A. These impacts were expected to naturally attenuate; however, due to the clay soils, the natural attenuation rate appears to be slow as dissolved contaminant concentrations in well MW-3 and MW-6A have remained elevated since the 2020 excavation.

In 2023 and 2024, RTI conducted a remedial investigation to assess the extent of petroleum impacts to soil and groundwater at the site. Eleven soil borings along the water main were advanced, and two new monitoring wells were developed as part of the investigation. The investigation indicated that impacts persisted south of the excavation where excavation had been limited due to the water main. Additionally, impacts persisted over a wide area northeast of the former excavation. The results of this investigation were documented in the *Remedial Investigation Report; Former Rapley Property, 205 31st Avenue South; Great Falls, Cascade County, Montana,* dated September 27, 2024.

On the basis of that report, RTI recommended in-situ treatment along the water-main line using a chemical oxidizer injected using a direct-push soil boring rig. The recommendations were discussed with Daphne Ryan at the MDEQ Petroleum Tank Cleanup Division on several occasions via email and call to further specify the scope of work.

SCOPE OF WORK

The scope of this proposed workplan includes the following tasks:

- Inject a chemical ORC along the water-main line using a direct-push soil boring rig;
- Install up to ten soil boreholes in the northeast area of the site to delineate residual soil impacts;
- Submit soil samples for volatile petroleum hydrocarbon (VPH) and 1,2 DCA analysis;
- Collect groundwater samples from site well MW-7AS three months and one year after injection;
- Submit groundwater samples for VPH, 1,2 DCA, and IBIs;
- Collect two sub-slab vapor samples from the edge of the southeast corner of the house and two vapor samples from the existing soil vapor probes SV-5 and SV-6;
- Submit air samples for TO-15 and APH analysis;
- Following the second round of groundwater sampling, prepare Cleanup Report discussing results of pilot test and effectiveness of the ORC;
- Validate all laboratory analytical data using MDEQ's Data Validation Summary Form (DVSF);
- Prepare updated site Release Closure Plan;
- Following discussion with MDEQ project manager, design and implement full scale design for in-situ treatment of soil and groundwater in the larger northeastern impacted area of the site;

Work tasks are described in the following sections.

Project Management

RTI will manage and coordinate all aspects of the project including planning, collection of samples, analysis of data, and reporting. Work plan tasks and laboratory reports will be discussed with MDEQ's project manager; agreed upon work plan modifications will be submitted in writing as required to complete the work plan objectives. RTI will update the Site Health & Safety Plan for planned field activities as necessary. RTI will call in utility locations in accordance with Montana State law within 3 days prior to the start of drilling.

Chemical Oxidizer Injection

RTI discussed the site objectives with Regenesis® technicians to determine the most suitable ORC product type, product quantity, and injection locations for the site. The proposed solution calls for the application of 1,360 lbs of ORC Advanced® and 440 lbs RegenOx® to address petroleum hydrocarbon and 1,2 DCA impacts. The solutions will be co-mixed with a total of 380 gallons of water to generate an injectable 30% slurry. Water will be stored in a 250-gallon poly tank and chemical oxidizer solution will be mixed in a 250-gallon slurry mixing tank. The slurry will be injected through direct push methods using a high pressure, low flow Geoprobe GP-350 grout pump.

The treatment area along the water line is approximately 1,100 square feet and incorporates 17 injection points oriented on a grid with 8-foot spacing (Figure 2). Each injection point will receive slurry in three intervals to include 11-13 feet below ground surface (bgs), 9-11 feet bgs, and 6-9 feet bgs. A work zone will be established around the drill rig and support vehicles to reroute any on-site traffic.

Soil Borehole Drilling

Up to ten investigative soil borings will be installed in the northeast area of the site to delineate residual soil impacts. The proposed drilling area is shown in Figure 2, but specific drill locations may change depending on field observations while drilling. An estimated three boreholes will be placed in the property north of the alleyway. Historical soil and groundwater data shows the contaminated plume may extend to this area. Drilling cannot take place in the alleyway due to the presence of underground sewer and gas lines and overhead electrical lines. Multiple attempts have been made to gain access to the neighboring property (around MW-3); however, the owner has not responded to inquiries. If we can gain an access agreement before the time of drilling, several additional borings will be placed on that property.

Soil borings will be completed using a Geoprobe direct-push sampling rig or equivalent. All downhole drilling and sampling equipment will be decontaminated prior to initiating the investigation and between locations to prevent possible cross-contamination. Soil characteristics and other relevant information will be documented by the RTI specialist supervising drilling activities using Unified Soil Classification System (USCS) descriptions on a soil borehole log. Soil samples will be collected continuously from each boring in a core barrel lined with an acetate sleeve. Soil will be field screened for the presence of organic vapors using a photoionization detector (PID) and standard headspace methods.

Laboratory Analysis. The soil sample exhibiting the highest PID reading, the sample from the soil-groundwater interface, and sample from the bottom of the borehole will be retained for laboratory analysis. The samples will be placed on ice and transported under chain-of-custody procedures to Energy Laboratories for analyses within the required holding times. All soil samples will be submitted for VPH analysis. Additionally, up to eight selected samples representing conditions across the investigation area will be submitted for 1,2 DCA analysis.

Groundwater Sampling
Groundwater samples will be collected from site monitoring well MW-7AS following performance of the pilot test. Monitoring well locations are shown in Figure 2. The sampling events will be conducted three months and one year following injection.

Groundwater samples will be collected using low flow collection methodologies. Monitoring wells will be purged and sampled with a 2-inch variable-speed, stainless steel submersible sampling pump and clean polytetrafluoroethylene (PTFE) tubing. The pump intake will be situated two to four feet below the measured water level within the screened interval. Prior to sampling, each well will be purged at the lowest sustainable pumping rate to assure minimal drawdown. Purge water will be discharged to a flow cell where water quality parameters including temperature, pH, conductivity, dissolved oxygen (DO), oxidation/reduction potential (ORP), and turbidity are continuously monitored. Water-quality-indicator parameters will be recorded every three to five minutes on a sampling log. An electronic water level sounder will be inserted in the well and suspended just above the static water level to facilitate water level monitoring throughout purging to determine drawdown. Purge volume will be measured in a graduated cylinder from the flow cell. When water quality parameters stabilize for two successive readings, the sample line will be diverted from the flow cell inlet for sample collection into laboratory provided containers. Groundwater samples will be submitted to Energy Laboratories for VPH and 1,2 DCA analysis. Additionally, IBIs including total iron, total manganese, sulfate, nitrate, and methane, will be analysed to measure ORC influence and biodegradation performance.

Decontamination
After each water level measurement, the probes will be decontaminated using a detergent wash followed by a distilled water rinse. Following sample collection, sampling pumps, and cables, will be decontaminated by cycling the pump in a detergent wash, tap water rinse and distilled water final rinse.

Purge water will be handled in accordance with the Options for Discharge of Hydrocarbon Contaminated Wastewater Technical Guidance Document. Disposable vinyl tubing and latex gloves will be disposed of properly.

Disposal of Investigation-Derived Waste
Obviously contaminated soil from the well installation will be segregated and placed in 55-gallon drums pending analysis and proper disposal of the material. The remaining clean soil will be spread on open surfaces within the property boundaries.

Vapor Sampling
Two soil vapor samples will be collected off the southeast exterior edge of the house at the locations shown in Figure 2. Soil vapor samples will be collected by drilling a hole approximately eight inches below the lawn surface; the hole will be plugged with a Cox-Calvin vapor pin. Two sub-slab vapor samples will be collected from the existing indoor soil vapor sampling probes (SV-5 and SV-6) (Figure 2). Soil vapor samples will be collected in six-liter summa canisters with flow regulators set by the laboratory to collect

the sample over a period of two hours. Soil vapor samples will be submitted to ALS Laboratories of Semi Valley, California for volatile organic compounds by Method TO15 and Air Petroleum Hydrocarbons (APH) analyses.

Data Validation
All laboratory data generated under this workplan will be validated using the MDEQ Data Validation Summary Form.

Release Closure Plan
Following review of the sampling results, RTI will update the existing site Release Closure Plan (RCP) to evaluate potential corrective actions or site closure.

Evaluation and Reporting
RTI will discuss on going workplan tasks and results with MDEQ's project manager and submit written agreed-upon workplan modifications if necessary.

Upon completion of all work tasks described in the previous sections and receipt of analytical data, RTI will prepare and submit a Corrective Action Report detailing the ORC Injection, Soil Boring Installation, and Groundwater Sampling results.

The report will include the following:

- Discussion of methods employed and results of the completed work plan;
- Tabular presentation of soil boring sampling and groundwater sampling data;
- Updated site map, potentiometric surface maps, and contaminant distribution maps;
- Conclusion section that summarizes current site conditions;
- Updated RCP; and
- Recommendation section for future work to resolve the release, supported by the discussion and conclusions.

Schedule
Following approval of this work plan by the MDEQ, ORC injection and soil boring installation will be scheduled for the spring/summer of 2025. The time duration for ORC injection and soil boring installation is anticipated to be two to three days. Groundwater sampling will be conducted approximately three months following ORC injection (Fall 2025) and again in the summer of 2026. Soil and air vapor samples will be collected during the first groundwater sampling event.

Budget
The attached Cost Estimate Detail provides a breakdown of costs for all activities provided under the scope of work. Soil boring and ORC injection bids were requested from three qualified drillers including Olympus Technical Services, SK Geotechnical, and Wiley Drilling. Wiley Drilling was the lowest bidder. A cost estimate for ORC product provided by Regenesis® is included as an attachment. Costs associated with

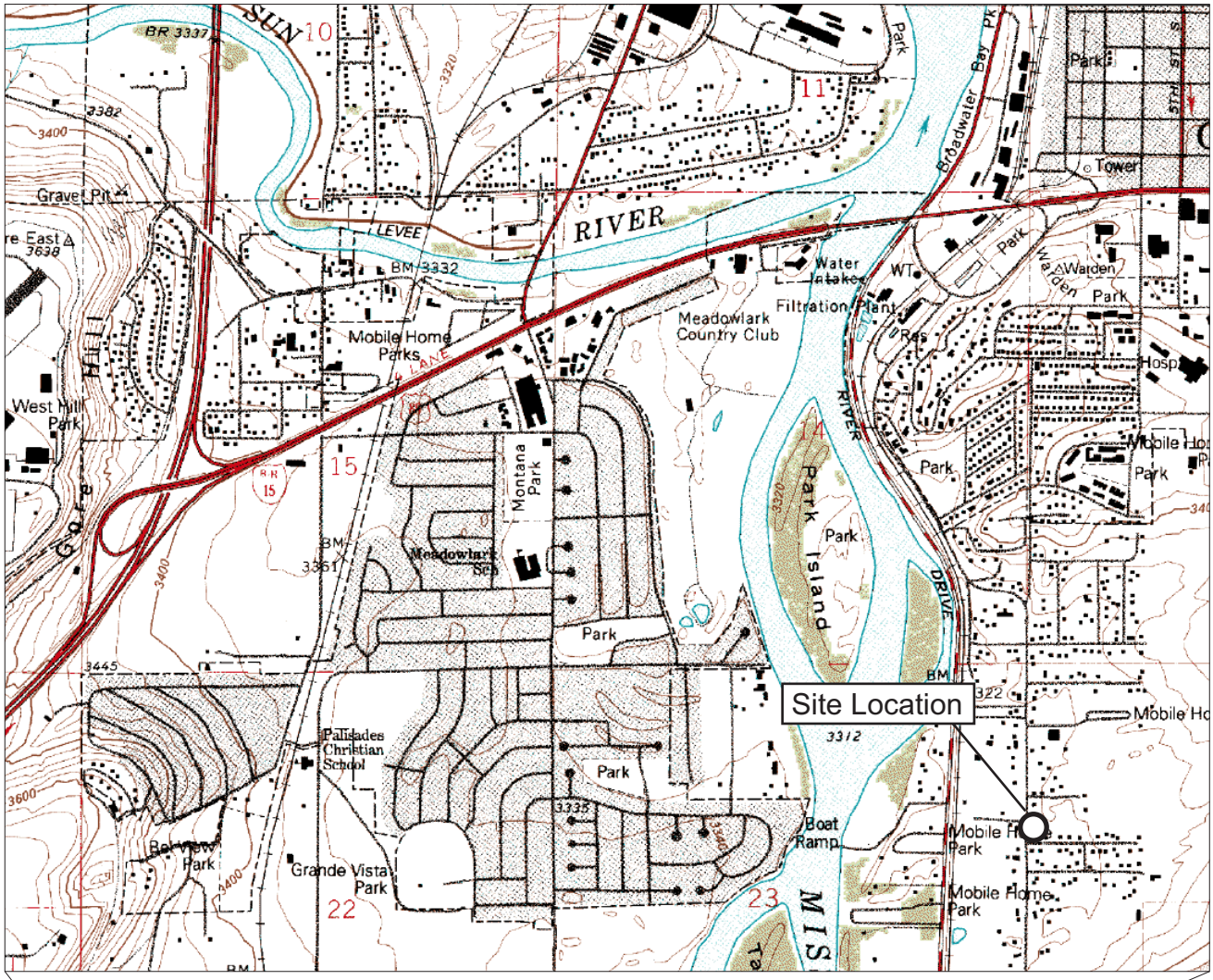
groundwater sampling are provided on a unit cost basis and are included in the attached Groundwater Monitoring Tool worksheet.

The total cost for workplan preparation, ORC and soil boring installation, soil vapor sampling, and groundwater sampling, and report preparation is $54,158.09. If you have any questions or comments regarding this workplan, please do not hesitate to call.

Respectfully Submitted,
Resource Technologies, Inc.

Cole Histon
Environmental Geologist

Figures



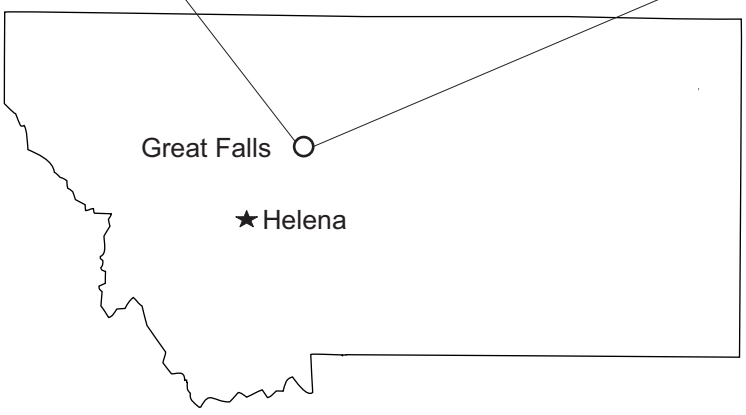
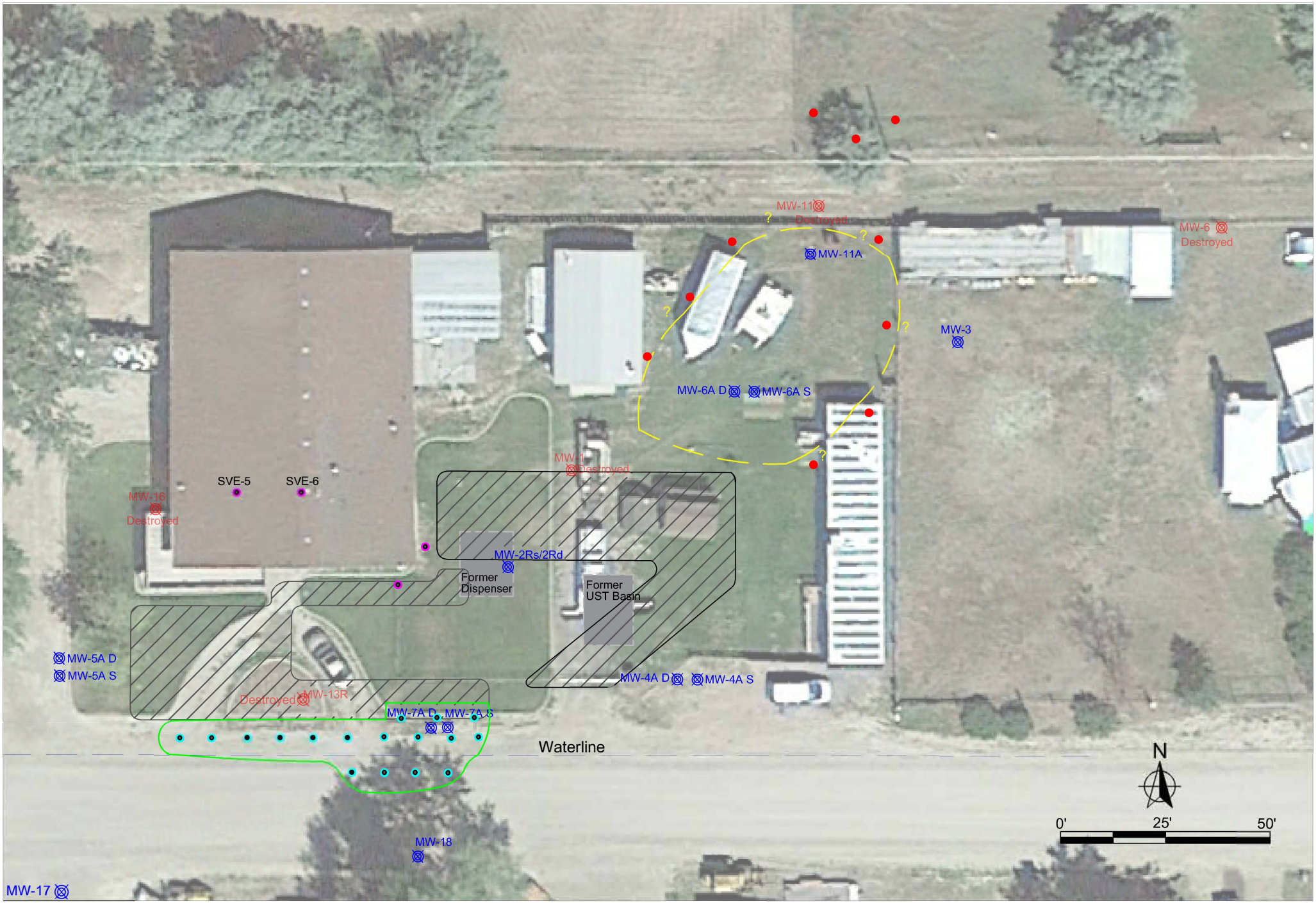


Figure 1

Site Location Map
Former Rapley Property
Great Falls, Montana

Resource Technologies Inc.

Base Map: U.S.G.S Southwest Great Falls Quadrangle,1965, 7.5 minute Series - Scale 1:24,000



Legend

Extent of RTI Excavation (July, 2020)

MW-17 Groundwater Monitoring Well

Proposed Geoprobe Soil Borings

Proposed Soil Vapor Sample

Target Treatment Area

Impacted Soil Investigation Area

Figure 2

ORC Injection, Soil Boring, and Vapor Sampling Locations
205 31st Avenue South
Great Falls, Montana

RESOURCE TECHNOLOGIES, INC.
1050 EAST MAIN STREET, SUITE 4
BOZEMAN, MT 59715
(406) 585-8005 FAX: (406) 585-0069