Water & Environmental TECHNOLOGIES

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Remedial Investigation Work Plan for the Petroleum Release at the Former Sinclair Station 25003

2800 Harrison Ave, Butte, Montana, Facility ID 47-02089, TID (28358), Release 4367, Work Plan 35013

Prepared for:
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DEQ Montana Department of Environmental Quality

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1 EXECUTIVE SUMMARY

The Former Sinclair Station 25003 (Facility) was previously a fueling business with four underground storage tanks (USTs), including three gasoline and one diesel tank, and associated piping (Release #4367). All four tanks were removed in 2004, and all tanks and lines were cleared of fuel. Known previous investigation and cleanup actions include excavation of contaminated soil, soil boring and monitoring well installation, groundwater and surface water monitoring, vapor intrusion monitoring, and piezometer installation.

DEQ issued a workplan request letter (WPR) dated February 11, 2025, requesting additional corrective action at the Facility. The scope of work outlined in DEQ's WPR includes Optical Imagining Profiler with Hydraulic Profiling Tooling (OIHPT), confirmation soil sampling, maintenance and repairs on monitoring wells, drinking water monitoring, and groundwater monitoring to delineate magnitude and extent of contamination and evaluate remedial actions to bring the release to closure. These activities will be conducted in accordance with the Standard Operating Procedures (SOPs) listed below, and any site-specific clarifying notes or proposed deviations from the SOPs are provided in the subsequent sections of this work plan.

- WET SOP-1: Field Logbook and Field Sampling Forms
- WET SOP-2: Equipment decontamination
- WET SOP-3: Sample Package and Shipping
- WET SOP-4: Sample Nomenclature, Documentation, and Chain of Custody and
- WET SOP-5: Measurement of Fluid Levels
- WET SOP-8B: Groundwater Sampling – Low Flow Method
- WET SOP-9B: Soil, Sediment, and Rock Sampling
- WET SOP-9C: Soil Sampling
- WET SOP-11: Monitoring Well Installation with Direct Push Equipment
- WET SOP-16: Quality Control Sampling

Implementation of this work plan is proposed to begin summer 2025.

2 FACILITY HISTORY AND BACKGROUND

The Facility is located at 2800 Harrison Avenue, Butte, Silver Bow County, Montana. Kevin Tikka is the Facility Owner, and the Facility currently operates as a Dickey's Barbecue Pit restaurant. Leaky gasoline and diesel storage tanks and their associated piping were removed from the site in 2004 and appeared to be the cause of groundwater contamination at the site.

RAM Environmental, LLC conducted remedial investigation work from 2004 to 2007 including UST system removal, soil boring and monitoring well installation, quarterly groundwater sampling, and surface water sampling. These investigation activities identified dissolved petroleum constituents in groundwater.

WET has conducted vapor intrusion (VI) and groundwater monitoring at the Facility. Vapor intrusion sampling in 2018 indicated that VI is not occurring inside the Facility building. Groundwater monitoring in October 2018 indicated that groundwater at the site flows south-southeast. Groundwater has been documented to have concentrations of contaminants above risk-based screening levels (RBSLs) in samples collected from monitoring wells MW-2, MW-3, MW-4, MW-5, MW-7, MW-8, MW-9, and MW-12. Free product was encountered in MW-7 during the October 2018 event. An excavation of contaminated soil was performed at the Former Floral Park Service Station (north and upgradient of the Facility) in 2019. Piezometers were installed in a utility corridors between the sites during the utility investigation in 2020. Product was encountered in piezometer MW-15 during each set of liquid level measurements following installation.

LIF or OIHPT was recommended to fully delineate the extent of free product and the groundwater plume due to the data gaps in magnitude and extent of soil and groundwater contamination. Once the contamination has been delineated, appropriate remedial options can be recommended to bring the Release to closure.

DEQ issued a WPR dated February 11, 2025, requesting remedial investigation at the Facility. The scope of work outlined in DEQ's WPR includes:

- Investigate the extent and magnitude of petroleum contamination and the potential lateral and vertical extent of remedial actions that may be needed to clean up the release using a hydraulic profiling tool.
- Complete maintenance and repairs on monitoring wells as needed.
- Collect a drinking water sample and monitor groundwater at all facility monitoring wells. Analyze samples for petroleum constituents and intrinsic biodegradation indications (IBIs) and determine if samples need to be collected for analysis of lead scavengers.

These proposed actions will delineate the magnitude and extent of the petroleum contamination in soil and groundwater so that appropriate remedial action can be developed. The remaining sections of this WP detail WET's proposed approach to complete these tasks.

3 CURRENT FACILITY CONDITIONS

The Facility is currently operational as Dickey's Barbecue Pit. The business is housed in a one story building surrounded by a paved parking lot. Soils consist of silt, sand and clay with few gravels and the depth to groundwater is approximately 15 feet below ground surface (ft bgs). The site is supplied with drinking water by the City of Butte. Contaminants of concern include benzene, toluene, ethylbenzene, and xylenes. The Facility has a very shallow hydraulic gradient and is in proximity to numerous releases in the business district including one directly north of the Facility.

4 PURPOSE AND OBJECTIVES

The purpose of the proposed investigation work is to delineate the magnitude and extent of contamination both vertically and laterally and evaluate receptor pathways of exposure. The objectives for the investigation are to collect sufficient information and data needed to evaluate and recommend remedial actions to bring the release to closure.

5 MINIMUM WORK PLAN TASKS

5.1 WORK PLAN PREPARATION

This work plan was prepared in response to the Work Plan Request Letter dated February 11, 2025.

5.2 PROJECT MANAGEMENT

WET personnel will provide Kevin Tikka (Owner) and DEQ's project manager with updates on ongoing WP tasks and relevant results on an as-needed basis. Other duties associated with this task include scheduling field work, contractor administration, project reporting administration, monitoring the project budget and deliverables, and any submitted written agreed-upon WP modifications to complete the objectives.

5.3 MOBILIZATION

Up to eight mobilizations for a staff engineer (located in Butte) are estimated to be required for implementation of this workplan. Additionally, one mobilization for a surveyor (located in Butte) is required. Staff engineer mobilizations (from the Butte office) include up to four daily mobilizations for investigation oversite, two mobilizations for well repairs, one mobilization for groundwater monitoring, and one mobilization to assist with repaired well surveying. Loading/unloading time is included for each mobilization.

5.4 WELL REPAIRS

The following wells have monuments beyond repair and will have their monuments replaced: MW-2, MW-4, MW-7, and MW-10. MW-11 will have the PVC casing cut down and lid replaced. New bolts will be installed for MW-6.

It is suspected that wells MW-1, MW-3, and MW-5 have been paved over. The wells will be located using a metal detector, and the asphalt surrounding them will be saw cut. The asphalt will be removed, and the monuments will be raised to be flush with the surrounding surface then cemented in place.

Due to the high cost of maintenance and location in high traffic areas, WET plans to abandon the following piezometers: MW-13, MW-14, and MW-15. The casing will be pulled, and the annulus will be filled with hydrated bentonite chips, and the last three feet shall be filled with naturally occurring soils. Abandonment shall comply with AWWA A100 and well abandonment procedures outlined in ARM 36.21.670. The surface will be returned to its original condition (asphalt).

5.5 SURVEY

One survey event is planned to complete the scope of work. Any well which was repaired in such a way that the casing was adjusted will be surveyed for location and top of casing elevation by a licensed surveyor. In a previous groundwater monitoring event, the well casing in some wells was cut down so that the well monument lid could be closed (MW-4, MW-9, MW-11). It is necessary for repaired wells to be re-surveyed to develop an accurate groundwater contour map. The location coordinates will be presented in the 1983 North American Datum (NAD83), Montana State Plane with units of international feet. Elevations will be expressed in units of feet above sea level (AMSL) relative to the 1988 North American Vertical Datum (NAVD88).

5.6 SUBSURFACE INVESTIGATION

Data gaps, including the magnitude and extent of soil and groundwater contamination, inhibit a complete evaluation of remedial alternatives. Attempts to determine what, if any, interaction was occurring between the Facility and an upgradient release have been inconclusive. To address this data gap, we will install soil borings with optical imagery across a grid, starting at the source area and stepping outward from it. Suggested boring locations are presented in Figure 1.

Three bids were solicited for this subsurface investigation work; Wiley Drilling, Dakota Technologies and WCEC Environmental Consultants submitted bids. Wiley Drilling submitted the lowest bid and will be awarded the work. Bids are attached in Appendix B. Wiley Drilling will advance Optical Imaging Profiler and Hydraulic Profiling Tooling (OIHPT) equipment in up to 30 locations to delineate the horizontal and vertical magnitude and extent of soil and groundwater contamination at the site. Groundwater is expected at 8 feet to 15 feet below ground surface (ft bgs), boreholes will be advanced to 20 ft bgs or 5 ft below the water table (whichever comes first) to properly evaluate the vadose zone and groundwater interface. Total number of borings will depend on results of the initial borings and the extent of evidence of contamination. If OIHPT evidence is noted, step-out soil borings will be completed in the approximate locations depicted on Figure 1. Harrison Ave. is a heavily trafficked thoroughfare to the west of the Facility; delineation may be limited in that direction. To the north of the Facility is Cornell Ave, which is a lower traffic area. Based on initial OIHPT results, borings in Cornell Ave may be necessary. In this case, traffic controls will be installed to protect activity in Cornell Ave.

Three confirmation soil borings will be installed using direct push methodology to verify OIHPT results, as described in SOP-11 (Appendix A). The locations of confirmation borings will be selected in the field to correlate to low, medium, and high OIHPT response. Soil cores will be logged and continuously screened for evidence of contamination using a PID and the heated headspace method as outlined in SOP 9C: Soil Sampling (Appendix A). Soil samples will be collected from the most impacted 2-foot interval as indicated by OIHPT to verify the validity of OIHPT results and support development of the conceptual site model, as outlined by SOP-9B (Appendix A). Once soil borings are completed, the surface will be returned to it's previous condition with an asphalt patch.

5.7 GROUNDWATER MONITORING

WET will conduct one groundwater monitoring event of all existing Facility wells (MW-1, MW-2, MW-3, MW-4, MW-5 and MW-7). Monitoring wells will be purged and sampled using a peristaltic pump (with new tubing for each well) and following procedures specified in this workplan and WET SOP-8B: Groundwater Sampling – Low Flow Method (Appendix A) and DEQ's Groundwater Sampling Guidance (2018). Fluid levels will be measured with an oil-water interface meter prior to purging the well in accordance with WET standard operating procedure (SOP) SOP-5: Measurement of Fluid Levels and recorded on the WET Groundwater Sampling Form in accordance with WET SOP-1: Field Logbook and Field Sampling Forms. SOPs are included as Appendix A. Any monitoring well containing free product will not be sampled.

Groundwater field parameters for each well will be measured during purging using a YSI® Professional Plus Quatro Cable multi-meter, HACH turbidity meter, and an oil/water interface probe. Field parameter measurements consist of recording initial depth to water, temperature, specific conductivity (SC), dissolved oxygen (DO), pH, oxidation reduction potential (ORP), turbidity, final depth to water, and volume during purging. Temperature and drawdown will be monitored but are not subject to stabilization criteria. Field parameter readings should be recorded every 3-5 minutes until three consecutive readings are within stabilization range. Once parameters stabilize according to the criteria in Table 1, a groundwater sample will be collected in laboratory-supplied bottles.

Table 1. Stabilization Parameters

Water Quality Parameter	Unit	Stabilization Range	Exception
pH	standard units (s.u.)	±0.1 s.u.	
Specific Conductance (SC)	microsiemens per centimeter (µS/cm)	±3%	
Dissolved Oxygen (DO)	milligrams per liter (mg/L)	±10%	<0.50 mg/L
Turbidity	nephelometric turbidity units (NTU)	±10%	<5 NTU
Oxidation/Reduction Potential (ORP)	millivolts (mV)	±10 mV	

Reusable equipment (oil/water interface probe) will be decontaminated in accordance with SOP-2: Equipment decontamination (Appendix A).

WET personnel will collect a sample of drinking water from the onsite building to be submitted for laboratory analysis alongside the groundwater samples.

5.8 FIELD WORK

WET personnel will direct and oversee subsurface investigation which is expected to last 5 days. During soil boring installation, soils will be classified according to the unified soil classification system (USCS). All pertinent field investigation and sampling information will be recorded on field sheets or in a field notebook, as described in the WET SOP-1: Field Logbook and Field Sampling Forms (Appendix A).

5.9 LABORATORY ANALYSIS

Soil samples will be analyzed for volatile petroleum hydrocarbons (VPH) and extractable petroleum hydrocarbons (EPH). The soil sample collected from the boring representing the highest OIHPT response will be analyzed for EPH fractions with polycyclic aromatic hydrocarbon if the result of the EPH screen is above 200 milligrams per kilogram. Groundwater samples will be analyzed for extractable petroleum hydrocarbons (EPH), VPH, the IBI indicators (sulfate, sulfite, nitrate, nitrite, nitrate+nitrite, dissolved iron, dissolved manganese, and methane), and lead scavengers 1,2-Dichloroethane (1,2-DCA) and Ethylene dibromide (EDB) in accordance with the Montana Tier 1 Risk-Based Corrective Action Guidance for Petroleum Release Sites. Lead scavengers were analyzed in two samples 2018, and since then, the RBSLs have changed. Results in 2018 were reported with elevated detection limits so confirmation is needed to ensure lead scavengers are not present.

Soil and groundwater samples will be sent for laboratory analysis following the procedures outlined in WET SOP-4: Sample Nomenclature, Documentation, and Chain of Custody and WET SOP-3: Sample Package and Shipping (Appendix A).

5.10 QUALITY ASSURANCE/QUALITY CONTROL

Quality assurance/quality control (QA/QC) samples including duplicates (soil and water) and field blanks (water) will be collected at a minimum frequency of 1 per 20 natural samples (5%) as outlined in the relevant sections of WET SOP-16: Quality Control Sampling. One duplicate soil sample will be collected as a split sample with a natural sample. One duplicate groundwater sample and one field blank sample will be collected in conjunction with natural groundwater samples. The duplicate will be collected from a well that has historically exhibited detectable concentrations of petroleum constituents and will be collected simultaneously with its parent sample. The field blank will be collected during representative sampling conditions at the Facility by pouring laboratory provided organic-free deionized water into laboratory provided sample containers. QA/QC samples will be analyzed for the same constituents as the natural samples.

Energy Laboratories will conduct all analyses of collected soil and groundwater samples and provide a laboratory QC report for each analysis. WET personnel will validate all laboratory analytical data using DEQ's Data Validation Summary Form (DVSF). This summary form will be included in the final report.

5.11 INVESTIGATION DERIVED WASTE (IDW) MANAGEMENT, CHARACTERIZATION, AND DISPOSAL

Work plan implementation will generate groundwater IDW from low-flow purging, soil cuttings from confirmation borings and non-indigenous IDW including worker trash, personal protective equipment, and disposable sample tubing. If results of field screening indicate concentrations of volatile organic compounds in excess of 100 parts per million, that soil will be containerized and sampled for appropriate disposal, The entirety of the impacted soil cutting volume is expected to be submitted for soil sampling. Un-impacted soil cuttings will be used for backfill. Following the DEQ disposal of untreated purge water from monitoring guidance dated July 15, 2015, the purge water originates from the shallowest aquifer, is not likely to result in an exceedance of soil screening levels, is not discharged to a surface water, and is not from a mine audit or long-term pumping test. Therefore, the purge water from the groundwater sampling event will be discharged to pervious Facility ground. Non-indigenous IDW such as disposable sampling scoops, bailers, nitrile gloves, ziplock bags will be bagged and placed in a trash receptacle for disposal in a landfill.

6 COST, SCHEDULE, AND REPORTING

6.1 COST

Work effort level has been estimated using best professional judgement and typical scenarios related to work of this type. A detailed cost estimate for the required work is provided in Appendix B.

6.2 SCHEDULE

WET will begin implementation of the WP immediately upon DEQ approval. Notification for each event will also be sent to the Facility Owner and the DEQ Project Manager prior to conducting field work.

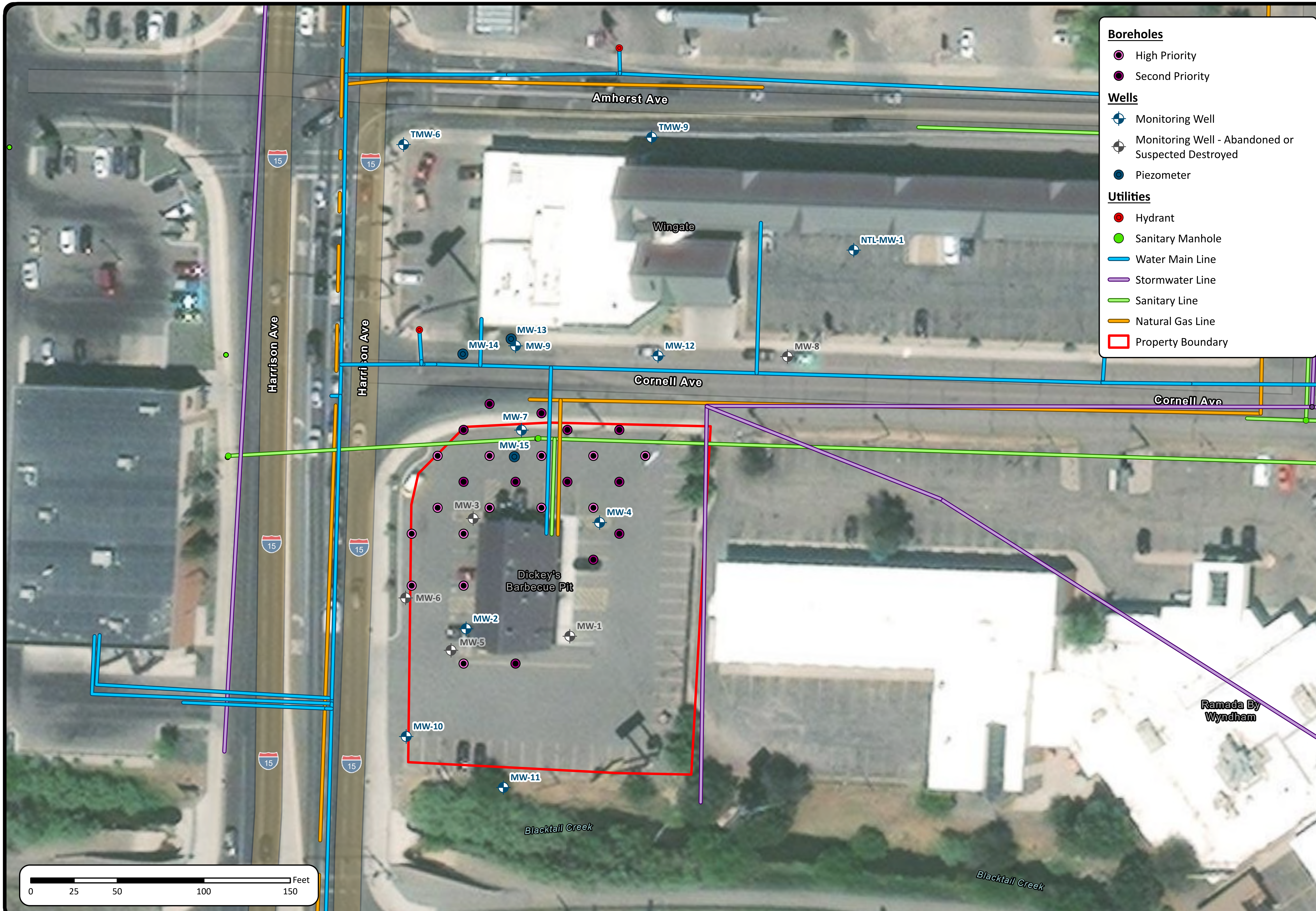
6.3 REPORTING

WET will submit an RI report which will contain all of the content outlined in the RI Guidance document as well as the following:

- Laboratory analytical data and field data.
- DVSF and RCP.

Figure 1

Proposed OIHPT Locations



NO.	DESCRIPTION	DATE	DRAFT	REVIEW
1	MAP CREATION	2/25/25	LG	IS
2				
3				
4				
5				

NOTES

BOREHOLE WORKPLAN

FORMER SINCLAIR FACILITY - BUTTE, MT

JOB#: AMIINCM03

DATE:3/4/2025

FIGURE

Path: M:\AMIINCM03\2023\GIS\ProjectFigures_AMIINCM03\ProjectFigures_AMIINCM03.aprx, Author: lgeorge

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Appendix A

Standard Operating Procedures

SOP-1

FIELD LOGBOOK AND FORMS

All pertinent field investigation and sampling information will be recorded in a field logbook, field form, or a Daily Activity Log (DAL) during each day of the field effort and at each sample site. The field crew leader will be responsible for ensuring that sufficient detail is recorded in the field logbook or DAL. No general rules can specify the extent of information that must be entered in the field logbook or form. However, field logbooks, field forms, or DALs must contain sufficient information such that someone could reconstruct all field activities without relying on the memory of the field crew. All entries shall be made in indelible ink, weather conditions permitting. Each day's or site's entries will be initialed and dated at the end by the author.

At a minimum, entries on the field sheet or in field notebook must include:

- Project information and location
- Project and task number
- Date and applicable times
- Name(s) of field personnel
- Environmental, site, or weather conditions
- Safety briefing attendance
- Details of actual work effort, particularly any deviations from the field work plan or standard operating procedures
- Comments or observations regarding any unusual circumstances
- Any field measurements made (e.g., PID readings, pH, temperature)

For sampling efforts, specific details for each sample should be recorded using a standardized field form designed specifically for the sampling activity being conducted (e.g., low-flow groundwater monitoring, soil gas sampling). Sampling field forms contain fill-in-the-blank type information to ensure that all pertinent information will be recorded. In addition to the items listed above, the following information is recorded on field forms during sampling efforts:

- Sample identification
- Date and time samples were collected
- Sampling methods, particularly any deviations from field work plan or standard operating procedures
- Field data and measurements
- Containers used to collect samples
- Sample preparation (filtration, preservation)
- Analyses and methods requested
- Note any QA/QC samples collected (duplicates, blanks)

Strict custody procedures will be maintained with the field forms. Field forms must always remain with the field team while being used in the field. Upon completion of the field effort, the original field forms will be scanned and copied to the project folder. Original field forms will be filed in an appropriately secure manner.

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SOP-2

EQUIPMENT DECONTAMINATION

INTRODUCTION

The purpose of this section is to describe general decontamination procedures for field equipment. Decontamination will be performed on all non-dedicated and non-disposable sampling equipment that may contact potentially contaminated media. Field personnel must wear disposable latex or nitrile gloves while decontaminating equipment at the project site and change gloves between every sample. Personnel must take every precaution to prevent contaminating themselves with the wash water and rinse water used in the decontamination process.

EQUIPMENT

- Liquinox (or equivalent laboratory-grade detergent)
- Sufficient volume of tap water
- Sufficient volume of deionized water
- Sufficient volume of methanol or pesticide-grade acetone for organics
- Sufficient volume of any other decontamination solutions specifically required by the project work plan.
- Necessary containers for each decontamination station (totes or tubs, graduated cylinders or similar tubes, spray bottles, etc.)
- Tarp or other platform to form barrier between decontamination stations and ground (if necessary)
- Applicable brushes (if necessary)
- Aluminum foil (for soil sampling devices)
- Latex or nitrile gloves
- Paper towels
- Garbage bags

PROCEDURES

The following should be done in order to complete thorough decontamination:

1. Set up the decontamination zone downwind from the sampling area to reduce the chances of windborne contamination.
2. Visually inspect sampling equipment for contamination; use brush to remove visible material.
3. The general decontamination sequence for field equipment includes washing with Liquinox (or equivalent laboratory-grade detergent), deionized water rinse, additional solution rinse specified by project work plan, and triple deionized water rinse.
4. Store equipment in clean containment or according to project work plan if not used immediately.
5. All disposable items (e.g., paper towels, latex gloves), as well as rinse and wash water generated during decontamination, should be disposed of in accordance with SOP-17 (Management of Investigation-Derived Waste).

SOP-3

SAMPLE NOMENCLATURE, DOCUMENTATION, AND CHAIN OF CUSTODY

INTRODUCTION

Sample documentation is an important step to ensure the laboratory, project manager, and field personnel are informed on the status of field samples. Depending on the specifics required for each project, several forms will need to be filled out. Most sample documentation forms are pre-printed carbonless triplicates, enabling copies to be filed or mailed from labs or offices. The forms will be completed by field personnel, who have custody of the samples. The office copy will be kept in the project file and subsequent copies sent to the laboratory, or other designated parties.

Responsibility for completing the forms will be with each field crew leader. It is important that the field crew leader is familiar with the completion process for filling out forms, and the expected information is included.

Potential documents to be completed clearly in indelible ink for each sample generated include:

- Field form(s) or field logbook
- Chain-of-custody forms
- Custody seal(s)

A chain-of-custody form will be generated for all samples collected in the field for laboratory analysis. The sampler may use a project-specific chain-of-custody form or a chain-of-custody form provided by the laboratory. It is of the upmost importance that the chain-of-custody form be filled out correctly. This form is the first thing that third parties and regulators verify when assessing the quality of the job.

FIELD EQUIPMENT

- Indelible ink pen(s)
- Field form(s) or field logbook
- Chain-of-custody form(s)
- Custody seal(s)

PROCEDURES

Sample custody records must be maintained from the time of sample collection until the time of sample delivery to the analytical laboratory and should accompany the sample through analysis and final disposition. The information to be included on the chain-of¬-custody form will include, but is not limited to:

- Accounting and reporting information
- Project number and/or site name (If there are any questions about this, contact the project manager)
- Sampler’s name, information, and signature
- Unique sample identification number or name
- Date and time of sample collection

- Number of containers
- Sample media (e.g., soil, water, vapor, etc.)
- Sample preservative (if applicable)
- Requested analyses
- Comments or special instructions to the laboratory

Each sample will be assigned a unique sample identification number or name. The information on the chain-of-custody form, including the sample identification number or name, must correspond to the information recorded by the sampler on the field forms (refer to SOP-01) and the label on the sample container.

A sample is considered under a person's control when it is in their possession such that tampering is prevented. This includes placing the samples in an area of controlled access such as a building or locking the samples in a vehicle. When custody of a sample is relinquished by the sampler, the sampler will sign and date the chain-of-custody form and note the time that custody was relinquished. The person receiving custody of the sample will also sign and date the form and note the time that the sample was accepted into custody. Samples will be shipped to the analytical laboratory following the procedures in SOP-04. If an overnight shipping service is used to transport the samples to the laboratory, custody of the samples will be relinquished to the shipping service. The shipping service will not sign the chain-of-custody form; however, the samples can be tracked while in the custody of the shipping service. More than one sample may be included on a chain-of-custody form, if all the samples are for the same project. Copies of the chain-of-custody form will be maintained in the project file, in accordance with standardized or project-specific data management procedures.

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SOP-4

SAMPLE PACKAGE AND SHIPPING

PACKAGING

All environmental samples collected should be packaged and shipped using the following procedures:

1. Label all sample containers with indelible ink (on the label, on the side, not on the cap or lid). Place labeled sample bottles in a high-quality cooler containing an adequate amount of ice (sealed inside two Ziploc bags) to maintain a temperature of 4°C or less inside the cooler. Freeze packs, or "Blue Ice" are NOT to be used. Ensure the cooler drain plug is taped shut.
2. Place the samples in an upright position and wrap the samples with absorbent, cushioning material for stability during transport. Samples should not be loose; the cooler should be able to withstand tough handling during shipment without sample breakage.
3. A temperature blank is to be included in each cooler.
4. When sampling for volatile organic compounds, a trip blank supplied by the lab must be included in each cooler.
5. Fill out the appropriate shipping forms and place in a Ziploc bag then tape it to the inside lid of the shipping container. Shipping forms usually consist of a chain-of-custody form, which documents the samples included in the shipment and specifies the laboratory analyses for each sample. *Note: There should be one chain-of-custody form per cooler, which only lists the samples that are present in that cooler. For large sample efforts requiring samples be shipped in two or more coolers, DO NOT fill out a single chain-of-custody form for the entire set of samples and place multiple copies of the same form in multiple coolers.*
6. Close and seal the cooler using packing tape.
7. Place completed custody seals on the cooler such that the seals will be broken when the cooler is opened. The custody seal must contain, at minimum, the signature of the person relinquishing custody of the samples and the date the cooler is sealed. Secure the custody seals on the cooler with clear packing tape.
8. Secure the shipping label with address, phone number, and return address clearly visible. If carrier labels (UPS or FedEx) were provided by the laboratory, affix the label(s) to the top of the cooler(s) and get a receipt from the carrier when dropping off the cooler(s) for shipment.
9. Plan ahead for shipping. If holding times are likely to be exceeded when using a carrier, the samples may need to be hand-delivered. Similarly, if outdoor temperatures are extremely hot or extremely cold, which could result in freezing of samples or cooler temperatures exceeding 4 degrees C during transit, samples may also need to be hand-delivered

SHIPPING HAZARDOUS MATERIALS/WASTE

Hazardous materials need to be shipped using procedures specified under Federal Law. Samples need to be shipped in Ziploc bags or paint cans filled with packing material, depending on the level of hazard. Special package labeling may be needed. Consult the project manager for specific shipping procedures.

SHIPPING AIR AND SOIL VAPOR SAMPLES

Hazardous materials need to be shipped using procedures specified under Federal Law. Samples need to be shipped in Ziploc bags or paint cans filled with packing material, depending on the level of hazard. Special package labeling may be needed. Consult the project manager for specific shipping procedures.

SOP-5

FIELD MEASUREMENT OF GROUND-WATER LEVELS/LIGHT NON-AQUEOUS PHASE LIQUID LEVELS

INTRODUCTION

In general, groundwater levels (and LNAPL levels, if applicable) in wells will be measured prior to commencing development, purging, sampling, pumping tests, or other activities that disturb the fluid pressure relationships in the well. Measurements may be taken during such events for purposes other than determining static conditions and may also be taken to determine static conditions after such activities if an appropriate period has elapsed to allow steady-state conditions to return.

EQUIPMENT

- Electronic water level monitoring probe (for water levels only),
- Electronic multi-phase interface monitoring probe (for measuring water levels and LNAPL levels)
- Keys for well locks
- Tools to open well covers (e.g., socket wrench, spanner wrench, etc.)
- Watch or stopwatch
- Pens and field logbook or other appropriate field forms (e.g., groundwater purge and sample forms)
- Monitoring well construction data (for total depth and screen intervals of well)
- Personnel and equipment decontamination supplies (refer to SOP-2)

PROCEDURES

1. If more than one well will be measured, conduct measurements in the order of lowest to highest chemical concentrations previously detected in samples from the monitoring wells.
2. Allow the well to equilibrate by removing the protective cap and leaving the well open for a period before beginning taking measurements. Generally, removing all site well caps prior to collecting the first liquid level measurement provides sufficient time to reach equilibrium.
3. Examine the monitoring well for any structural damage, poorly fitting caps, and leaks into the inner casing. Record all well maintenance issues on the appropriate field sampling form or field log book.
4. If LNAPL is not present, use a pre-cleaned water level probe or equivalent to measure depth to water from the indicated survey mark on the well casing. If a mark is not present, measure from the top of the northern side of the well casing.
5. If LNAPL may be present, use a pre-cleaned, electric, multi-phase interface probe to measure depth of the LNAPL and depth to water. Record both measurements on the sampling form or field logbook. Unless otherwise instructed, always measure depths to LNAPL layer and groundwater from the indicated survey mark. If a mark is not present, measure from the top of the northern side of the well casing.
6. Repeat measurements at least once by lifting the probe tape at least one foot out of the well, allowing the measurer to confirm the accurate foot, tenth-of-a-foot, and hundredth-of-a-foot mark on the tape.
7. Follow personnel and equipment decontamination procedures outlined in SOP-2.

SOP-8B

GROUNDWATER SAMPLING—LOW FLOW METHOD

INTRODUCTION

These instructions are in general accordance with the United States Environmental Protection Agency (EPA) Region One Low-Stress (Low-Flow) Standard Operating Procedure (September 2017), and are applicable for using an adjustable rate submersible, peristaltic, or bladder pump with the pump's intake placed at the midpoint of a 10-foot or less well screen or an open interval. Field instruments are already calibrated. The equipment is set up according to the diagram at the end of these instructions.

EQUIPMENT

- Documentation Items:
  - Field sampling forms or field tablet with appropriate Survey123 sampling forms
  - Pens and indelible markers
- Sampling Items:
  - Sample bottle(s)
  - Preservative(s)
  - Coolers for sample bottle(s)
  - Ice for cooler(s)
  - Filter(s) (if required)
  - Laboratory-grade deionized (DI) water (for field blanks)
- Equipment/Instrumentation:
  - Water level or interface meter
  - Pump
  - Pump controller
  - Tubing (poly and silicone)
  - Appropriately sized t-splitter
  - Bailer(s) and rope
  - Multi-parameter meter (temperature, dissolved oxygen [DO], specific conductance [SC], pH, oxidation/reduction potential [ORP]) with low-flow cell
  - Turbidity meter
  - Graduated cup
- Power (if required)
  - Generator
  - Air compressor
  - Fuel
- Investigation-Derived Waste (IDW)
  - Sampling tote with elevated rack (if necessary)
  - Five-gallon bucket(s)
  - Purge water tank (if necessary)
  - 2L graduated cylinders (for decontamination)
  - Decontamination liquids (tap water, laboratory-grade detergent, distilled or DI water, acids, etc.)

All sampling equipment shall be inspected for damage and repaired, if necessary, prior to arriving on-site.

GENERAL PROCEDURES—PURGING

1. Review well installation information. Record well depth, length of screen or open interval, and depth to top of the well screen. Determine the pump's intake depth (e.g., mid-point of screen/ open interval).
2. On the day of sampling, check security of the well casing, perform any safety checks needed for the site, and set up the equipment.
3. Check well casing for a reference mark. If missing, make a reference mark on the northern side of the casing and notate in the field sampling form. Measure the water level (initial) to 0.01 ft. and record this information.
4. Measure product level, if present, and water level and record this information on the field sampling form. For wells of 2-inch diameter or less, the water level or interface meter will have to be removed from the well to install the pump, but then lowered back down the well after the pump is installed to monitor water level during the purge.
    a. If free product is present, the well is not to be sampled.
    b. If the water column is less than the length of the pump being used, or 12" if using a peristaltic pump, bailing the sample is the best option. See step 6c for bailing instructions.
5. Install the pump's intake to the appropriate depth (e.g., midpoint) of the well screen, which is often the midpoint of the screen interval for fully submerged well screens, or at the midpoint of the portion of screen penetrating the saturated zone for well screens straddling the water table.
    a. a. Attach the pump discharge line to the t-splitter.
    b. b. Attach tubing between the other side of the t-splitter to the lower stem of the multi-parameter meter low-flow cell.
    c. c. Attach tubing to the lower part of the t-splitter and either a valve end or a clamp on the end of the tubing. This is for turbidity readings, as they must be collected prior to entering the low-flow cell.
    d. d. Attach tubing from the upper stem of the multi-parameter meter low-flow cell and run it to a purge tank or bucket.
6. Start the pump and monitor the water level to assess if drawdown is occurring.
    a. a. Slow the rate if drawdown occurs until water level holds stable or is drawing down slowly enough that it will not exceed the 0.33 ft max or below the top of the well screen.
    b. b. If the rate cannot be lowered enough to avoid excess drawdown (>0.33 ft), then record this deviation in the sampling form. If the water level stabilizes after exceeding 0.33 ft, calculate the volume of water between the initial water level and the stabilized water level and purge at least that amount of water before collecting a sample.
    c. c. If the well runs dry or the water level gets to a point where the pump can no longer produce water, then a bailer can be used. Collect samples for containers in order of priority, and if enough water is left in the well, collect a sample for the multi-parameter storage cup for a single set of parameters.
    d. d. Once the water level is stable, record the pump settings and purge rate using a graduated cup and a timing device. *Note: Flow rate should not exceed 500 mL/min.*
7. After starting the pump, turn on the multi-parameter and turbidity meters and take readings every three to five minutes. Three consecutive readings must be within stabilization criteria before collecting a sample. Stabilization criteria may be set by the specific project, but otherwise, use the stabilization criteria defined in table 1 below.

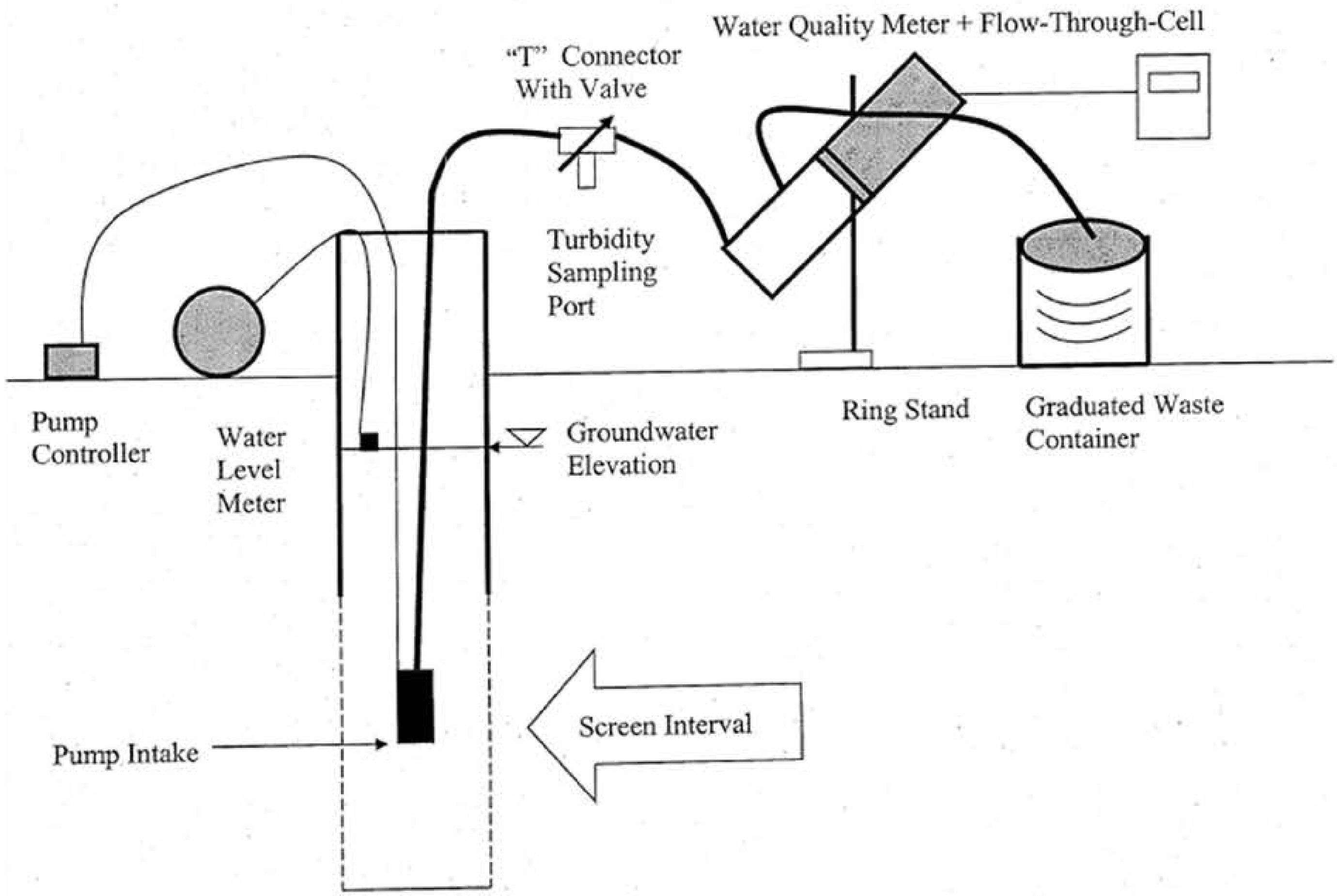
Table 1. Stabilization Criteria

Parameter	Unit	Stabilization Criteria	Exception
Dissolved Oxygen (DO)	milligrams per liter (mg/L	10%	<0.50 mg/L
Oxidation/Reduction Potential (ORP)	millivolts (mV)	±10 mV	
pH	standard units (s.u.)	±0.1 s.u.	
Specific Conductance (SC)	microsiemens per centimeter (μS/cm)	3%	
Turbidity	nephelometric turbidity units (NTU)	10%	<5 NTU

If these parameters do not stabilize by 30 minutes since start of purge, collect the sample and note a deviation of non-stabilized parameters and list which ones in field documentation.

8. Once criteria is met to collect a sample, turn off the multi-parameter and turbidity meters and disconnect the pump discharge tubing from the t-splitter and begin collecting water in the sample containers in order of priority. Collect, preserve, close, and store samples as soon as possible and according to the analytical method(s). *Note: Make sure sample collection takes place over a containerized area (sampling tote or bucket) so that spills are captured.*
    a. If collecting samples for organic compounds, including petroleum hydrocarbons, ensure that all engines (vehicles, generators, etc.) operate 20 feet downwind of the sampling area. Engines will be shut down prior to opening sample collection containers. During sample collection, pumps and meters should be powered using the vehicle battery or a portable battery. Use of disposable gloves will be used whenever fueling generators, to eliminate the possibility of cross-contamination of samples.
    b. Volatiles and dissolved gas analysis samples should be collected first, followed by semi-volatile organic compounds, then inorganic parameters, as required by the sampling and analysis plan.
    c. Field duplicate samples should be collected in conjunction with the natural/original/parent sample.
    d. Field equipment rinse samples should be collected in the same manner as a natural sample, after the decontamination process.
    e. Field blank samples are collected by pouring laboratory-grade DI water into sampling containers.
9. Once samples are collected, acquire a final depth-to-water measurement, and turn off the pump. Record the total purged volume by calculating the time from pump start to stop with the purge rate. Remove the pump from the well and decontaminate the sampling equipment.

Low-Flow Setup Diagram



SOP-9B

SOIL, SEDIMENT, AND ROCK SAMPLING

SUBSURFACE SOIL SAMPLING—Borehole and Excavation

The purpose of this section is to provide procedures which may be employed in a subsurface sampling program to obtain samples of materials that are representative of subsurface conditions at the site, appropriate to the types of analyses to be performed, and cost effective toward meeting goals of the project. Sampling may consist of either a general survey or detailed exploration and may often encompass both. A general survey is designed to obtain preliminary information about subsurface conditions such as depth to rock and soil classification.

Borehole Sampling

Equipment

- Drill rig and associated drilling and sampling equipment as specified in project specific work plans:
  - Hollow stem auger
  - Air-rotary casing hammer
  - Dual tube percussion hammer
  - Sonic
  - Cable tool
  - Mud rotary
  - Reverse rotary
  - Direct push technology
- Continuous-core barrels
- Split-spoon drive sampler
- Large capacity stainless steel borehole bailer
- Photoionization detector (PID) or flame ionization detector (FID)
- Sample containers (laboratory-supplied)
- Sample labels, pens, and field logbook or appropriate field forms (e.g., boring and well construction logs
- Personnel and equipment decontamination supplies
- Sample shipping and packaging supplies

Procedures

1. Obtain applicable drilling and well construction permits prior to mobilization.
2. Mark boring locations specified in the project-specific sampling and analysis plans (SAPs). Sampling locations may need to be relocated based on presence of underground utilities (see Procedure 3). Invasive activities may not begin until utility marking is complete or notification from the utility company has been received that marking is unnecessary.

3. Clear sample locations for underground utilities and structures by notifying Montana's one-call notification center (1-800-424-5555) (required) at least 2, but not more than 10 business days prior to commencement of field activities. In addition, contact knowledgeable site operations personnel and use a private utility locator service (if necessary) to identify possible underground utilities.
4. Select appropriate drilling technology. If placing conductor/isolation casing, select the appropriate construction methods based on lithologic conditions and chemicals of concern and using best industry practices. Methodologies will be addressed in site-specific work plans as needed.
5. Utilize pre-cleaned downhole equipment or decontaminate/steam clean downhole equipment prior to drilling each boring.
6. Collect soil samples for lithologic logging purposes with a split-spoon sampler, continuous coring system, or appropriate sampler as specified in the project-specific sampling and analysis plans (SAPs).
7. Collect soil samples for lithologic logging and chemical and physical analyses by driving the appropriate sampling device at the desired depth. If sampling is being conducted for geotechnical purposes, the appropriate sampling device, appurtenances, and procedures will be used (e.g., standard penetration testing, thin wall tube sampling, oriented coring, etc.).
8. When advancing borings with air-driven drilling rigs (e.g., air-rotary or reverse circulation percussion hammer), soil samples for lithologic observation and logging (not geotechnical or analytical testing) may be collected from the cyclone discharge.
9. Classify the soils in the field in general accordance with the visual-manual procedure of the Unified Soil Classification System (ASTM D-2488-90). The Munsell Color Classification may also be used.
10. Prior to collecting each sample, decontaminate the sampling equipment in accordance with the SOP-2.
11. At each sampling interval, place a sufficient volume of soil into laboratory-supplied sample containers (typically glass jars). The number and volume of the sample containers required for each sample is dependent on the analytical method(s).
12. Place completed sample label on the sample containers.
13. If the project sampling and analysis plan calls for field screening of VOCs using a photoionization detector, for each sampling interval, place soil not selected for chemical analysis in an airtight container (e.g., plastic bag) and collect headspace readings in accordance with SOP-12.
14. Record the headspace concentration in the field logbook or appropriate field forms.

Backhoe or Hand Dug Excavations

Equipment

- Backhoe with appropriately sized bucket (supplied by contractor)
- Stainless steel or plastic scoop
- Hand-driven split-spoon sampler
- Brass or stainless-steel liners
- Rubber mallet
- Stakes, flagging, or spray paint for sampling grid
- Measuring tape and/or measuring wheel
- Sample containers (laboratory-supplied)
- Sample labels, pens, field logbook and or other appropriate field forms (e.g., test pit log)
- Personnel and equipment decontamination supplies
- Sample shipping and packaging supplies

Procedures

1. Identify and mark the test pit location(s). Invasive activities may not begin until utility marking is complete or notification from the utility company has been received that marking is unnecessary.
2. Identify overhead obstructions and underground utilities that may interfere with the backhoe excavation.
3. Clear test pit locations for underground utilities and structures by notifying Montana's one-call notification center (1-800-424-5555) (required) at least 2 but not more than 10 business days prior to commencement of field activities. In addition, contact knowledgeable site operations personnel and use a private utility locator service (if necessary) to identify possible underground utilities.
4. Excavate the test pit to the desired depth and length using the backhoe. Excavator bucket will be decontaminated between test pit locations by either brushing off residual soil or steam cleaning. Actual sampling depths and locations will vary from test pit to test pit, as described in the project-specific sampling and analysis plans (SAPs).
5. Collect the sample by either driving a split-spoon sampler into the unearthed material, driving a brass or stainless-steel liner with a rubber mallet into the material, or collecting a representative sample using a stainless steel or plastic scoop. In any case, collect the sample in a way that will minimize headspace in the sample container. Where possible and practicable, subsurface soil samples will be collected from the test pit sidewalls or excavation floor using a hand auger or similar device without entering the excavation. If attempts to retrieve a sample using a hand auger or similar device fail, then a sample may be collected from the excavator bucket.

NOTE: Field personnel will not enter a test pit unless a detailed hazard assessment has been conducted and adequate safety equipment is used during excavation.

1. Record the physical and lithologic conditions of the test pit and sampling location within the test pit in the field logbook or other appropriate field forms (i.e., test pit log).
2. If no visible indications of contamination are present, backfill the excavation with the material removed or backfill and compact with imported clean fill. If visible indications of contamination are present, cover or otherwise secure the test pit pending decisions from project manager regarding appropriate backfilling procedures.
3. Contaminated soil from an excavation will be placed on an appropriate liner, bermed, and covered with an impermeable cover pending decisions from the Project Manager regarding appropriate sampling/handling/disposal.

SOP-9C

SOIL, SEDIMENT, AND ROCK SAMPLING ROCK CORING

Although rock samples are not generally analyzed for chemical contaminants, quality assurance procedures are still important because rock coring is often performed in aquifer zones. Monitoring wells, however, are commonly installed in cored holes. Therefore, adequate decontamination of equipment is required. Contamination of the aquifer or water bearing unit either vertically or between boreholes is undesired.

Boreholes in rock are most often drilled utilizing a rotary hydraulic or compressed air, percussion rig (or combination). Rigs can be truck-mounted, skid-type, etc. depending on accessibility of a borehole location.

Core barrels for rock sampling are available in a variety of designs and sizes, and typically provided by the drill contractor. In general, subsurface conditions dictate selection of the method and such determinations are routinely made by geologists and geotechnical engineers.

Equipment

- Drill Rig (Contractor Provided)
- Appropriate Tooling for Drill Method Chosen (Contractor Provided)
- Stakes, Flagging, or Spray Paint (Site Dependent) to Mark Sampling Locations
- Rock Core Boxes—Must Be Ordered Specifically
- Pens, Field Logbook, Plog Tablet, Protractor, Wax Pencils, Measuring Tape, White Board, and Appropriate Field Forms (E.g., Boring Logs)
- Personnel And Equipment Decontamination Supplies
- Spt Sampling Supplies And Equipment—Driller Provided
- Sample Shipping and Packaging Supplies
- Proper Containment for Waste

Procedures

1. Mark sampling locations as specified in the project-specific sampling and analysis plans (SAPs). If sampling locations are based on a grid pattern, use stakes, or flagging to define the grid layout as needed.
2. Spray paint should be avoided unless known to not contain site chemicals of concern.
3. Sampling locations may need to be relocated based on presence of underground utilities.
4. Clear sample locations for underground utilities and structures by notifying Montana's one-call notification center (1-800-424-5555) (required) at least 2 but not more than 10 business days prior to commencement of field activities.
5. In addition, contact knowledgeable site operations personnel and use a private utility locator service (if necessary) to identify possible underground utilities. Locators typically use spray paint as marking, so request flagging for marking if possible, or collect samples away from markings.
6. Because project goals (e.g., hazardous waste site investigations vs well installation), site

conditions, and sampling requirements vary it is important to make sure use the appropriate pLog form (or paper form if pLog is unavailable) for the project.

7. The project sampling and analysis plan (SAP) will contain all the information needed to determine which log is best.
8. If the SAP specifies additional/custom logging criteria custom forms can be created but must be approved by the Project Manager.
    - Bore hole logs should include (but are not limited to) the following information:
    - Borehole identification (ID) (e.g., name or number of the borehole)
    - Borehole location information (coordinates, elevation, site name, boundaries)
    - Borehole orientation and inclination
    - Date/Time drilling begins
    - Date/Time drilling ends
    - Name/affiliation of driller, driller helper and logger
    - Owner/client name and/or project number
    - Method of drilling, and sampling, and drill rig type
    - Record of drilling progress (location of drilling runs, samples, in situ tests)
    - Use, extent and diameter of casing
    - Detailed information on drilling rate vs depth, changes in drilling speed, drill chatter and circulation (if using water) are useful to take note of.
    - Detailed description of groundwater level, changes in standing water level, loss of drilling fluids (rotary hydraulic), or gain of water (percussion)
    - Inspector's signature, dates of drilling and completion
    - Method and description of borehole closure (if applicable)
    - Well Completion Information (if applicable)
    - ID, Location, Date, Time, and Number of SPT Samples Collected (if applicable). SPT samples are uncommon but can be used for density determinations.
    - ID, Location, Date, Time, and Number other Cores Collected for Laboratory analysis or later reference (if applicable)
    - Detailed geologic/engineering classification/characterization of materials vs depth. The information from properly classified/characterized boreholes should include:
        - Rock/soil classified in general accordance with the visual-manual procedure of the Unified Soil Classification System (ASTM D 2488-90)
        - Color descriptions (the Munsell Color Classification is a helpful tool)
        - Degree of Weathering
        - Micro-structure or Fabric
        - Grain Size
        - Primary Features
        - Core Recovery
        - RQD
        - Fracture Frequency, Spacing, Width and Orientation
        - Fracture filling material (mineralization, breccia, gouge, sediment infillings)
9. Cores that are collected should be stored in core boxes labelled with the appropriate borehole ID, run number, project number, and date and time of collection
10. Cores delivered to a laboratory should be packed to ensure the integrity of the sample is maintained
11. Waste materials generated from coring activities should be stored and/or disposed of according to the project SAP and in accordance with the Water & Environmental Technologies (WET) SOP-17 for Management of IDW
12. Between boreholes proper equipment decontamination procedures should be followed as detailed in the project SAP

Water & Environmental TECHNOLOGIES

SOP-11

MONITORING WELL INSTALLATION WITH DIRECT PUSH EQUIPMENT

1. Arrive on-site with the appropriate drilling equipment and materials for site conditions. The driller shall properly decontaminate all drilling equipment and materials prior to arrival on-site. Decontamination usually includes steam or hot water cleaning methods.
2. A detailed lithologic log shall be completed during drilling activities. Water bearing characteristics of the formations should be denoted on the log. In addition, details of monitoring well construction should also be described on the well log including total depth, perforated interval, sizes and types of construction materials, etc.
3. Advance the direct push drill rods to the desired depth for monitoring well installation. Soil samples may be collected in new, disposable acetate sleeves during drilling.
4. The monitoring well shall be constructed of Schedule 40 or 80 PVC casing and factory-slotted well screen up to 1-inch in diameter. Once the drill rods are at the desired depth, lower the well screen and casing through the drill rods.
5. Begin retracting the drill rods out of the borehole while placing a chemically-inert silica sand around the screen interval to one foot above the well screen.
6. Install a bentonite plug above the sand at least 2 feet in thickness. Above the bentonite, back fill the remaining well annulus with a bentonite slurry or grout to ground surface.
7. Place locking protective well cover over the well casing after the drill rods have been removed from the borehole.
8. Place bentonite plug below bottom of well cover; grout the cover in place and lock with high quality lock.
9. Safety equipment required on-site is mandatory. Personal protective equipment includes (at a minimum): hard hat, safety glasses, steel toed boots, gloves, first aid kit, and site safety plan-with routes to hospitals known by all personnel on-site.

SOP-16

QUALITY CONTROL SAMPLING

Quality Control (QC) samples are submitted along with natural samples to provide supporting laboratory data to validate laboratory results. QC samples are submitted blind except for matrix spikes and trip blanks, and do not have any unique identifying codes that would enable the lab or others to bias these samples in any way. Usually, the time or sampling location is modified in a way which will separate blank and standard samples from the rest of the sample train. QC samples are identified only on field forms and in field notebooks. The following codes are typically used:

N	Natural Sample	Soil, water, air, or other of interest material from a field site
SP	Split Sample	A portion of a natural sample collected for independent analysis; used in calculating laboratory precision
D	Duplicate Sample	Two samples taken from the same media under similar conditions; also used to calculate precision Two samples taken from the same media under similar conditions; also used to calculate precision
FB	Field Blank	Deionized water collected in sample bottle; used to detect contamination introduced during the sampling process.
RB	Rinsate Blank	Deionized water run through or over decontaminated equipment; used to verify the effectiveness of equipment decontamination procedures
MS/MSD	Matrix Spike/Matrix Spike Duplicate	Certified materials of known concentration; used to assess Spike Duplicate laboratory precision and accuracy
TB	Trip Blank	Inert material (deionized water or diatomaceous earth) included in sample cooler; sent by the lab, the sample is used to detect any contamination or cross-contamination during handling and transportation.

In general, selected QC samples will be inserted into the sample train within a group of twenty samples. QC samples will be prepared in the field, apart from trip blanks. Trip blanks will be supplied by the laboratory and will accompany each sample cooler containing samples for analysis of volatile organic compounds.

Typical QC sample collection frequencies are presented in the table below. However, at some sites, especially ones where streams or ponds are sampled, QC samples may need to be taken at a higher frequency. Refer to the project-specific sampling and analysis plan or quality assurance plan for the appropriate QC sample frequency. Each field crew leader will be responsible for all QC samples prepared by that crew.

QC Sample	Purpose	Collection Frequency
Field Duplicate	Measure analytical precision	1 per every 20 samples
Matrix Spike/ Matrix Spike Duplicate	Measure analytical accuracy	1 per every 20 samples
Equipment Rinse Blanks	Evaluate effectiveness of equipment decontamination and sample handling procedures.	1 per sampling event per media type
Field Blank	Assess possible cross-contamination of samples due to ambient conditions during sample collection	1 per sampling event
Trip Blank	Evaluate sample preservation, packing, shipping, and storage	1 per cooler containing samples with volatile constituents

Methods for computing data validation statements can be found in EPA documents or obtained from Geomatrix.

Appendix B

Project Cost Estimate and Contractor Bids

March 20, 2025

Attn: Iris Smith
Water & Environmental Technologies
480 East Park Street
Butte, MT 59701

RE: Project: WD-250320
OIHPT Drilling and Confirmation Soil Borings
Butte, MT

Dear Iris:

Wiley Drilling has developed this Proposal for Water & Environmental Technologies (WET) to provide Subsurface Exploration Services for the above-mentioned project. This Proposal was developed based on information provided by WET which included a site location map and general scope of work. The purpose of this project is to provide drilling services for an environmental investigation.

Scope of Services

Wiley has developed this proposal to include scope, costs and assumptions based on the information provided by WET. The Scope of Services is broken down into the tasks listed below.

Task 1: Project Preparation and Mobilization

Wiley will call in utility locations in accordance with Montana State law within 3 days prior to the start of drilling. WET will provide Wiley with a site map identifying the borehole locations to be used to call in locates. Wiley will subcontract private utility locate services for this project. Wiley will mobilize the drill rig, materials, and crew from their drill shop in Belgrade, MT to the project site.

Task 2: Soil Boring Installation

The soil borings will be advanced using a truck mounted Geoprobe 3100 drill rig with DT22 direct push drilling methods. Three (3) soil borings will be advanced to twenty (20) feet below ground surface (bgs) to collect environmental data. For costing purposes, we have assumed that each borehole will be advanced to 20 feet bgs totaling 60 feet of direct push drilling.

Task 3: OIHPT Drilling

Wiley will provide the equipment, materials, and personnel to advance the Optical Imaging Profiler and Hydraulic Profiling Tooling (OIHPT) equipment as part of this project. For costing purposes, we have assumed that OIHPT profiles will be collected to a maximum depth of 20 feet below ground surface (bgs) at 30 locations. The OIHPT will be advanced using a truck mounted Geoprobe 3100 direct push drill rig. Wiley will provide a 2-person drill crew and an OIHPT equipment operator as part of this scope. For costing purposes, we have assumed that each borehole will be advanced to 20 feet bgs totaling 600 feet of drilling. Upon completion, the OIHPT borehole will be backfilled with bentonite chips as needed. The surface will be patched will asphalt cold patch.

Cost Estimate and Assumptions

The total not to exceed cost estimate for this project is **$28,900.00**. A breakdown of these costs is provided in Table 1 attached to this Proposal. These costs are based on our project understanding, schedule, and the following assumptions:

- Wiley will call in public utility locations in accordance with Montana State law.
- Access to borehole locations for a truck mounted drill rig and support equipment is available.
- We will do our best to minimize impacts to curbs and lawns, however, any damage to landscaping associated with borehole access will be the responsibility of others.
- Drill cuttings will be backfilled in the borehole or spread on the ground surface at the Site.
- No decontamination of the drill tooling will be required between the soil borings.
- Work can be performed in Level-D Personal Protective Equipment including hard hat, safety toe boots, safety glasses, hearing protection, and hand protection.
- No air space monitoring is required.
- Any delays that are not the responsibility of Wiley will be charged to the project at a Standby Rate of $365/hour.
- Any changes to the scope outlined in this proposal will require an updated cost estimate and proposal.

Schedule

Wiley will be available after May 5, 2025. Wiley anticipates the work will be completed in five 8-hour business day. Wiley will reach out to you to schedule this project upon receiving this signed Proposal.

Closing

We appreciate the opportunity to provide WET with this Proposal. Your authorization for Wiley to proceed in accordance with this Proposal can be issued by signing and returning this Proposal (Project: WD-250320). The costs associated with this Proposal are valid for 90-days.

AGREED TO:

____
CLIENT

____
TITLE

____
DATE

From:	Tyler DeBoo
To:	Raye Surratt
Cc:	Iris Smith
Subject:	RE: Well recovery and monument replacement
Date:	Friday, March 28, 2025 10:18:37 AM
Attachments:	image007.png image008.png image001.png

Raye,

Here is the estimate for well recovery and rehab. Please let me know if you have any questions or concerns. I can put it into a different format if you prefer.

Geoprobe 3100 Services	Quantity	Unit	Unit Price	Total
Drilling				
Well Rehabilitation	1	Lump Sum	$ 2,150.00	$ 2,150.00
			Total:	$ 2,150.00
			Total Cost:	**$ 2,150.00**

Thanks,

WILEY DRILLING

Ty DeBoo

Operator/Project Engineer

C: (406) 533-8656

wiley-drilling.com

From: Raye Surratt <rsurratt@waterenvtech.com>
Sent: Thursday, March 27, 2025 2:59 PM
To: Tyler DeBoo <tdeboo@wiley-drilling.com>
Cc: Iris Smith <ismith@waterenvtech.com>
Subject: RE: Well recovery and monument replacement

Make that recovering 3 wells and replacing 4 monuments for a total of 7.

From: Raye Surratt
Sent: Thursday, March 27, 2025 2:52 PM
To: Tyler DeBoo <tdeboo@wiley-drilling.com>
Cc: Iris Smith <ismith@waterenvtech.com>
Subject: Well recovery and monument replacement

Hey Ty,

Would you please give us a cost estimate for recovering 3 wells that have been paved over and replacement of 3 well monuments (six total locations)?

- Saw cut and remove 6 monuments (assume all 6 will need to be replaced)
- Provide and install new monuments at each location and cement or asphalt in place

Let me know if you have any questions.

Thanks!

Raye

Water & Environmental TECHNOLOGIES

Raye A. Surratt, MS

Senior Engineer

C: (406) 431-2447

waterenvtech.com