



Environmental Resources, LLC

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January 23, 2026, revised October 6, 2026

Mr. Edvard Melesh
DEQ-PTCS
P.O. Box 200901
Helena, MT 59620

Subject: Cleanup Work Plan
Herman Oil Co., Homestead, Montana
DEQ Facility ID No. 46-11342, (TID 28300)
DEQ Release No. 4615, Work Plan 35119

Responsible Party: Robert E. Herman Q-Tip Trust
c/o Wells Fargo Bank
P.O. Box 5953
Sioux Falls, SD 57117-5953
Attn: Andrew Heinrich

Dear Mr. Melesh:

Environmental Resources, LLC is pleased to submit this Cleanup Work Plan to outline activities associated with site remediation, groundwater monitoring and reporting at the above referenced petroleum release site. Submittal of this work plan was requested by the Montana Department of Environmental Quality (DEQ) in a letter dated January 9, 2026.

Submitted by
Environmental Resources, LLC

Robert H. Waller, Principal Geologist

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1.0 Executive Summary

Environmental Resources, LLC has been retained by Herman Oil Co. to investigate and remediate petroleum contaminated soil and groundwater discovered at the Herman Oil bulk fuel storage facility in Homestead, Montana. The project site is underlain by silty clay and sandy clay loam. Groundwater occurs at approximately 6-9 feet below ground surface.

The project site has historically been used as bulk fuel storage facility along with retail key pumps. A petroleum release was discovered on November 10, 1999 during closure of an underground storage tank (UST) system. Previous excavation work has resulted in the removal of the majority of the petroleum contaminated source area. Dissolved petroleum concentrations are elevated in groundwater beneath the project site and warrant active remediation.

Previous groundwater monitoring data collected in March 2017 indicate that nitrogen is being consumed in the aquifer beneath the project site. Background nitrogen concentrations in uncontaminated groundwater are measured at around 50 mg/L. Nitrogen concentrations are less than 1.0 mg/L in the downgradient dissolved petroleum contaminant plume. Due to the indicated nitrogen demand in the aquifer, nitrogen addition is indicated as a potential remediation solution to reduce petroleum concentrations in soil and groundwater beneath the project site. Other biodegradation processes occurring in the aquifer beneath the project site include iron reduction, sulfate reduction and, to a minor degree, methanogenesis. Sulfate concentrations range from 9.36 mg/L background to 3893 mg/L in petroleum contaminated downgradient groundwater. The aquifer beneath the project site is deficient in nitrogen, an important electron acceptor. Nutrient addition of nitrogen in the form of ammonium sulfate has been identified as a potential remediation technology to mitigate the petroleum release. Pilot testing is recommended to determine if nutrient addition would be beneficial to move this petroleum release site towards closure.

2.0 Facility Summary and Current Conditions

The Herman Oil project site is situated in Homestead, Montana as shown on Figure 1. The project site is situated in the southwest quarter of the southwest quarter of Section 23, Township 31 North, Range 55 East, MPM. The site occupies a commercial property along the west side of the BNSF railroad and is bordered to the north by a residential property, to the south by a small corral and pasture and to the west by agricultural land.

The petroleum storage and dispensing facility used at the former Herman Oil refueling facility consisted of two 2000-gallon USTs used for storing gasoline and diesel fuel and a dispenser island served by underground piping. The system was installed in 1990

and was operated as a keylock facility to provide automotive fuel to the rural community of Homestead, MT.

A petroleum release was reported to DEQ on November 14, 2007 by Mr. Tom Pointer of Tank Management Services upon receipt of soil sample analytical results following UST and piping removal activities in September 2007. Soil contamination was not noted during removal of the UST system. Soil samples collected from beneath the USTs indicated the presence of 0.10-0.22 mg/kg benzene. Both of the 2000-gallon USTs and associated piping were observed to be tight upon removal. No further action was taken until April 3, 2012 when DEQ requested a Remedial Investigation consisting of soil borings and groundwater monitoring well installation.

Fourteen groundwater monitoring wells and seventeen soil borings were installed within and around the project site as shown on Figure 2 during several phases of investigation from July 2012 through September 2015 resulting in delineation of a dissolved petroleum contaminant plume and an area of soil contamination that extends at least 300 feet to the southwest. The highest concentrations of dissolved petroleum compounds have been found in the furthest downgradient monitoring wells.

DEQ requested remedial action consisting of excavation and disposal of petroleum contaminated soil. Excavation and disposal of approximately 4400 cubic yards of petroleum contaminated soil was conducted during October 2017 and October 2018. Soil was excavated to approximately 16 feet below ground surface as shown on Figure 3.

DEQ requested additional site work consisting of installing and sampling six soil test pits along the Dry Prairie municipal water main and conducting a groundwater monitoring event. The additional work was completed in October 2020 through April 2021. Six soil test pits were installed within the project site as shown on Figure 4 to document soil conditions along the Dry Prairie municipal water main.

Petroleum contamination was found in the soil sample obtained from test pit TP-5 at eight feet with C5-C8 aliphatics exceeding Risk Based Screening Levels (RBSLs). No petroleum compounds were found in soil samples collected from the remaining five test pits. Based on the soil sample results, it appears that the Dry Prairie municipal water main is in minimal contact with petroleum contaminated soil at this time. High groundwater conditions could cause additional contact with petroleum compounds.

Previous groundwater monitoring data collected in March 2017 indicate that nitrogen is being consumed in the aquifer beneath the project site. Background nitrogen concentrations in uncontaminated groundwater are measured at around 50 mg/L. Nitrogen concentrations are less than 1.0 mg/L in the downgradient dissolved

petroleum contaminant plume. Due to the indicated nitrogen demand in the aquifer, nitrogen addition is indicated as a potential remediation solution to reduce petroleum concentrations in soil and groundwater beneath the project site. DEQ has requested additional investigation including pilot testing and groundwater monitoring. The following sections outline the methods that will be used to conduct the additional work.

3.0 Purpose and Objectives

The purpose of this investigation is to assess current groundwater quality beneath the project site and to design and complete a remediation pilot test utilizing introduction of urea as a source of nitrogen. Specific objectives of the investigation include:

- 1) Monitor groundwater utilizing low flow sampling methods prior to and during pilot testing on a quarterly schedule for one year and semi-annually for one year for a total of six monitoring events. Gauge fluid levels at all facility monitoring wells during each monitoring event.
- 2) Analyze samples at an analytical laboratory in accordance with Montana Tier 1 Risk-Based Corrective Action Guidance for Petroleum Releases. Also analyze groundwater samples for nitrogen (nitrate+nitrite as nitrogen).
- 3) Validate all laboratory data.
- 4) Design a pilot scale study for an enhanced bioremediation system utilizing urea as a soluble source of nitrogen.
- 5) Collect all parameters necessary to completely address all data requirements contained in the Cleanup Guidance.
- 6) Prepare an updated Release Closure Plan (RCP).
- 7) Prepare a Cleanup Report.

4.0 Scope of Work

4.1 Groundwater Sample Collection and Analysis

Groundwater samples will be collected from monitoring wells MW-1, MW-7, MW-12, MW-13 and MW-14 prior to the pilot test, on a quarterly schedule for one year and semi-annually for one year during the pilot test for a total of six groundwater monitoring events. Quarterly monitoring is necessary to monitor changes in nutrient concentrations during the testing period to determine success of the pilot project.

Groundwater elevations will be measured in all of the site monitoring wells prior to purging and sample collection. All of the well covers will be opened and the locking caps removed at least 30 minutes prior to obtaining water level measurements. Static water levels will be measured from a reference point on top of the north side of each well casing using a Keck ET-89 electronic water levels indicator. The water level indicator will be decontaminated prior to each measurement. Decontamination will be

accomplished by scrubbing the indicator tip in an *Alconox*® wash solution, rinsing with a 10% methanol solution and triple rinsing with distilled water.

Following measurement of the static water levels, sample collection will commence using a submersible pump or peristaltic pump and low flow sampling methods. Indicator parameters oxidation-reduction potential, dissolved oxygen, pH, specific conductance, turbidity and temperature will be measured during sample purging. Samples will be collected when the measured indicator parameters stabilize according to Section 2.5 of the DEQ Groundwater Sampling Guidance (2018). Samples will be decanted into appropriate sample containers, preserved and placed on ice while awaiting delivery to the analytical laboratory. Groundwater samples will be analyzed for Volatile Petroleum Hydrocarbons (VPH) and for nitrogen (nitrate+nitrite as nitrogen) at Energy Labs in Billings, MT. One QA/QC sample will also be collected from monitoring well MW-14 during each groundwater monitoring event and analyzed for VPH.

4.2 Enhanced Bioremediation Pilot Testing

Recent dissolved petroleum concentrations in groundwater beneath the project site were measured at 11,300-50,800 µg/L Total Petroleum Hydrocarbons (TPH) in the downgradient monitoring well network. Dissolved benzene concentrations were measured at 8340-17,200 µg/L. Dissolved TPH concentrations in the excavated area ranged from 31-121 µg/L with dissolved benzene measured at 0.79-22 µg/L.

The Release Closure Plan (RCP) identifies excavation and landfarming as the preferable remedial technology for use at this site. While excavation of the petroleum source area soil has been highly successful in reducing dissolved petroleum concentrations in the excavated area, additional soil excavation is not economically feasible going forward. One reason for this is that much of the remaining contaminated soil resides in a 2-3 feet thick smear zone covered with 8-10 feet of clean overburden in the vicinity of monitoring wells MW-7, MW-12, MW-13 and MW-14. Excavation and replacement of that quantity of uncontaminated soil required to access the relatively thin contaminated soil interval will result in an exorbitant cost per cubic yard to remove the impacted soil. Further complicating additional excavation work is that much of the petroleum contaminated soil is beneath a county road and a municipal water main corridor. Thus, in situ treatment options warrant further investigation. This pilot test will focus on enhanced bioremediation as a potential remediation solution.

Previous groundwater monitoring data collected in March 2017 indicate that nitrogen is being consumed in the aquifer beneath the project site. Background nitrogen concentrations in uncontaminated groundwater are measured at around 50 mg/L. Nitrogen concentrations are less than 1.0 mg/L in the downgradient dissolved petroleum contaminant plume. Therefore, nitrogen addition is indicated as a potential remediation solution to reduce petroleum concentrations in soil and groundwater beneath the project

site. Other biodegradation processes occurring in the aquifer beneath the project site include iron reduction, sulfate reduction and, to a minor degree, methanogenesis. Sulfate concentrations range from 9.36 mg/L background to 3893 mg/L in petroleum contaminated downgradient groundwater.

Nitrogen will be delivered in the form of ammonium sulfate pellets to the petroleum contaminated aquifer using screened nutrient delivery wells. Six delivery wells will be installed on a transect as shown on Figure 5 using a hollow-stem auger drilling rig. The wells will be spaced approximately 25 feet apart and approximately 20 feet upgradient from four of the most heavily contaminated downgradient monitoring wells (MW-7, MW-12, MW-13, MW-14). The delivery wells will be completed at 16 feet below ground surface (ten feet below static groundwater elevation) with ten feet of four-inch diameter 0.020" slotted Schedule 40 PVC screen and six feet of blank casing. All of the wells will be completed with 12-inch diameter flush mount steel bolt down well boxes.

Pilot testing will commence by adding ammonium sulfate to the delivery wells. Ammonium sulfate is commonly sold in pellet form and will be obtained from a local agricultural supply store. Each delivery well (ten feet of well screen) will require approximately 0.75 cubic feet of nutrient or approximately 34 pounds. Approximately 200 pounds of ammonium sulfate will be required to fill all six delivery wells to approximately 6-12 inches above the well screens.

Lateral groundwater flow will dissolve the ammonium nitrate pellets and transport nitrogen throughout the target area providing additional electron acceptors resulting in enhanced petroleum biodegradation. Replenishment of nutrients will occur as necessary on a schedule depending on the rate of dissolution as determined from site visits.

Hydraulic conductivity values for sandy clay-sandy clay loam are estimated at 1.78-9.8 feet per day with porosity estimated at 41 percent. Under a hydraulic gradient of 0.02 ft/ft, groundwater velocity is estimated at approximately 0.09-0.47 feet/day using Darcy's Law and the equation: " $V = K I / n$ " where " V " is the groundwater velocity, " K " is the hydraulic conductivity, " I " is the hydraulic gradient and " n " is the effective porosity.

Based on these values, it is estimated that it will take between 42-222 days for nutrients to travel 20 feet to reach the downgradient monitoring well network from the delivery well network. Nitrogen concentrations of 50-100 mg/L in the petroleum contaminated aquifer should be targeted to provide sufficient electron acceptors. Nitrogen concentrations in groundwater penetrated by monitoring wells MW-1, MW-7, MW-12, MW-13 and MW-14 will be measured in laboratory samples collected during scheduled groundwater monitoring events.

There are currently no potential receptors of nitrate contamination downgradient from the release site making this project site an ideal candidate for nitrogen addition. Downgradient property is currently used as an agricultural field that is fertilized with nitrogen to grow crops. No surface water is present within one mile downgradient from the project site and soil/groundwater beneath the agricultural field is likely already nitrogen enriched due to agricultural fertilization practices.

Success of the pilot testing will be measured by the net reduction in dissolved petroleum concentrations in the downgradient monitoring well network. Results from the pilot testing will determine if infilling with additional delivery wells to a full scale remediation system is feasible to achieve a satisfactory reduction in dissolved petroleum concentrations in the aquifer beneath the project site.

4.3 Investigation Derived Waste

Drill cuttings, excess sample materials, drilling fluids, and water removed from a well during installation, development, and sampling and all other investigation derived wastes will be disposed of according to all applicable local, state and federal laws and regulations governing the disposition of investigation derived wastes. Drill cuttings exhibiting PID heated headspace readings less than 100 PPM will be spread on the ground surface near each boring. Drill cuttings exhibiting PID heated headspace readings greater than 100 PPM will be placed in 55-gallon steel open head drums and will be stored in a secure location pending laboratory analysis. Composite soil samples will be collected from each boring from intervals exhibiting PID readings in excess of 100 PPM in order to characterize the drummed soil cuttings for disposal. Drill cuttings that exceed DEQ RBSLs for direct contact soil will be disposed at the Sheridan County Landfill in Plentywood, Montana.

Purge water resulting from sampling activities will be disposed according to DEQ's Purge Water Disposal Flowchart. Disposable sampling materials such as gloves, filters, tubing etc. will be disposed as household trash in the local landfill.

4.4 Reporting

A Cleanup Report will be prepared following completion of all site activities. The Release Closure Plan (RCP) will be updated based on the results of the pilot testing and included in the final report along with Data Validation Summary Forms (DVSF) and field data collection sheets.

4.5 Investigative Methods

Methods practiced during this investigation will follow generally accepted practices of similar consulting firms in the same geographical area. Quality Assurance/ Quality Control methods will be employed throughout all phases of this investigation to ensure meaningful and reproducible results and data. Standard Operating Procedures are enclosed in Appendix C.

4.6 Health and Safety

Health and safety issues will be addressed throughout this investigation to prevent exposure of site workers and other onsite personnel to potentially hazardous situations and chemical compounds. Several physical hazards will inherently be present throughout the field investigation while heavy equipment is being utilized for soil borings and monitoring well installation. Site specific health and safety precautions and information will be contained in a Health and Safety Plan which will remain onsite during all field activities.

5.0 Budget

Project costs are included in Appendix B.

6.0 Limitations

This work was performed in accordance with generally accepted practices of other consulting firms conducting similar studies. Environmental Resources, LLC observed that degree of care and skill generally exercised by other consultants under similar conditions. Our findings and conclusions must not be considered as scientific certainties, but as opinions based upon our professional judgment based upon the data gathered during the course of this investigation. Other than this, no warranty is implied or intended.

Submitted by
Environmental Resources, LLC

A handwritten signature in black ink, appearing to read "Robert H. Waller". The signature is fluid and cursive, with the first name "Robert" being more prominent than the last name "Waller".

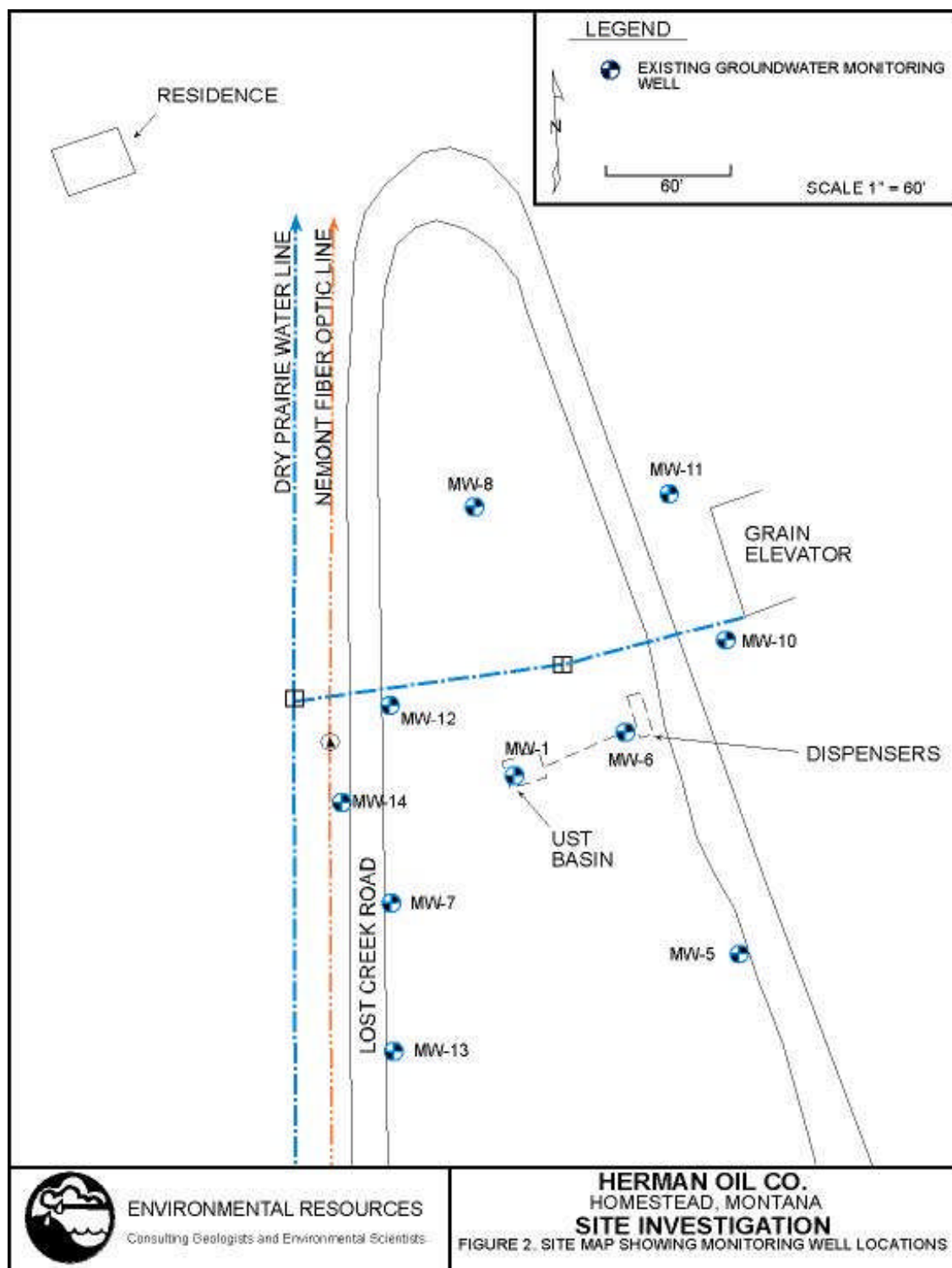
Robert H. Waller, Principal Geologist

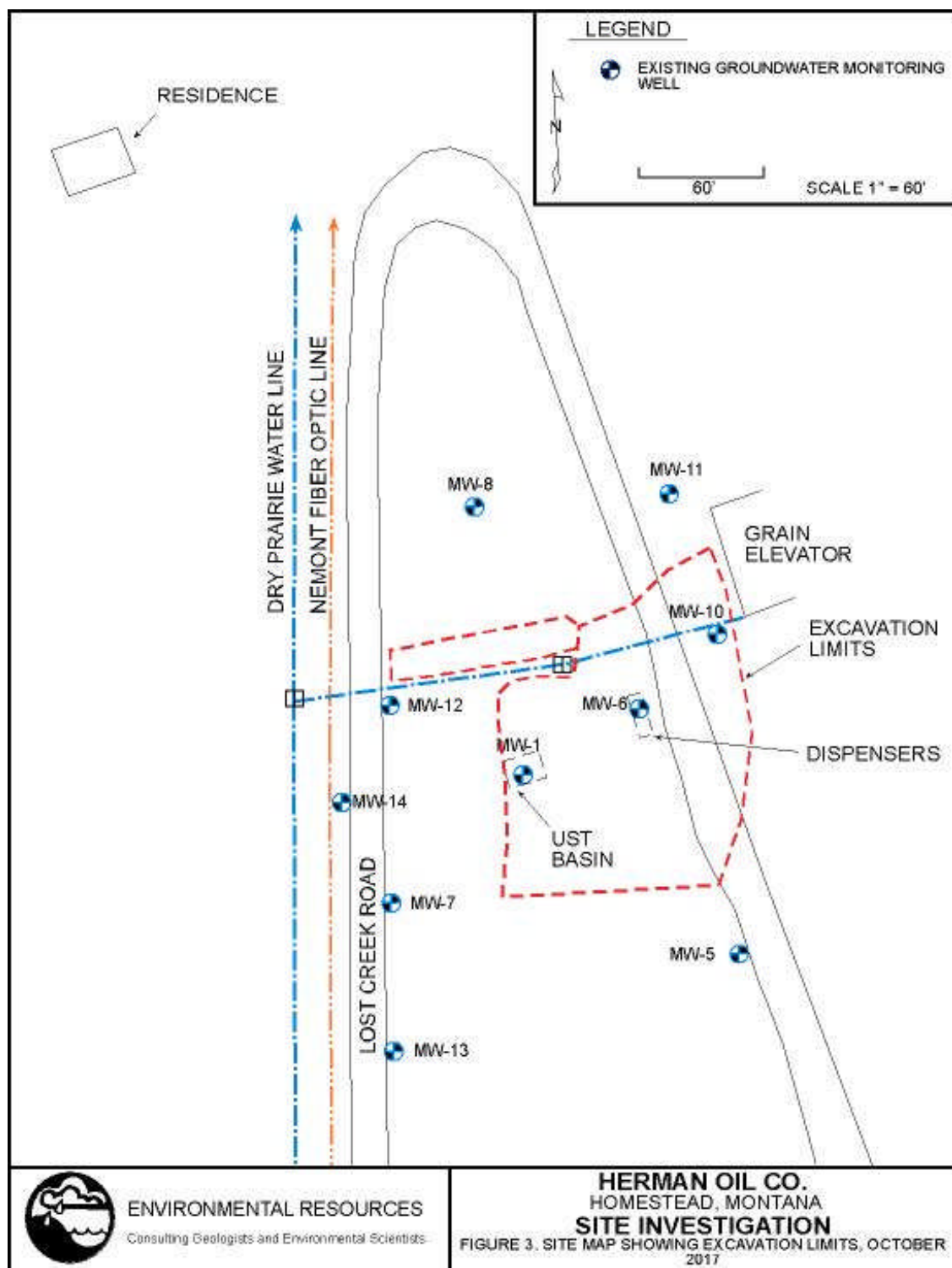
Appendix A

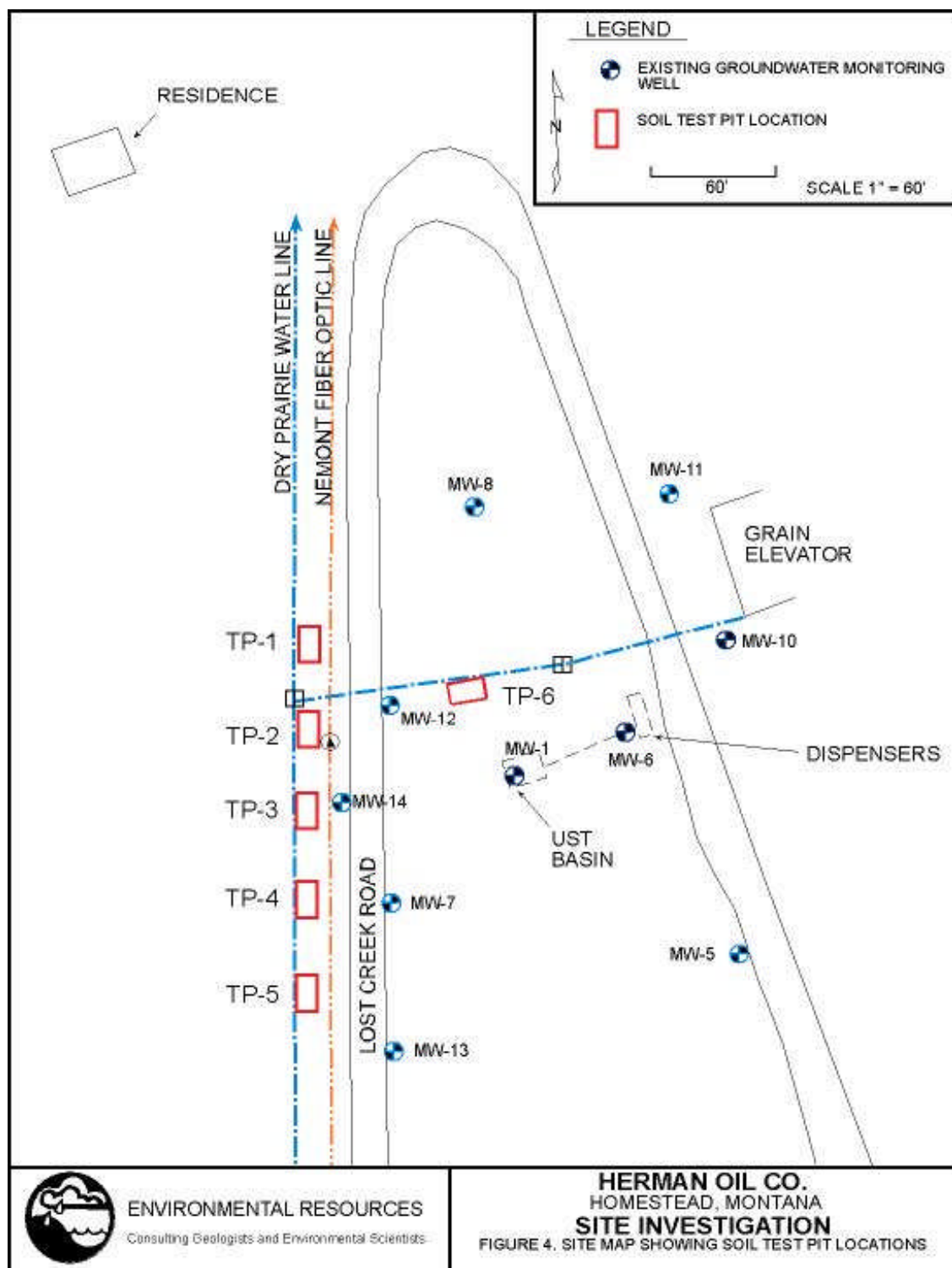
Figures

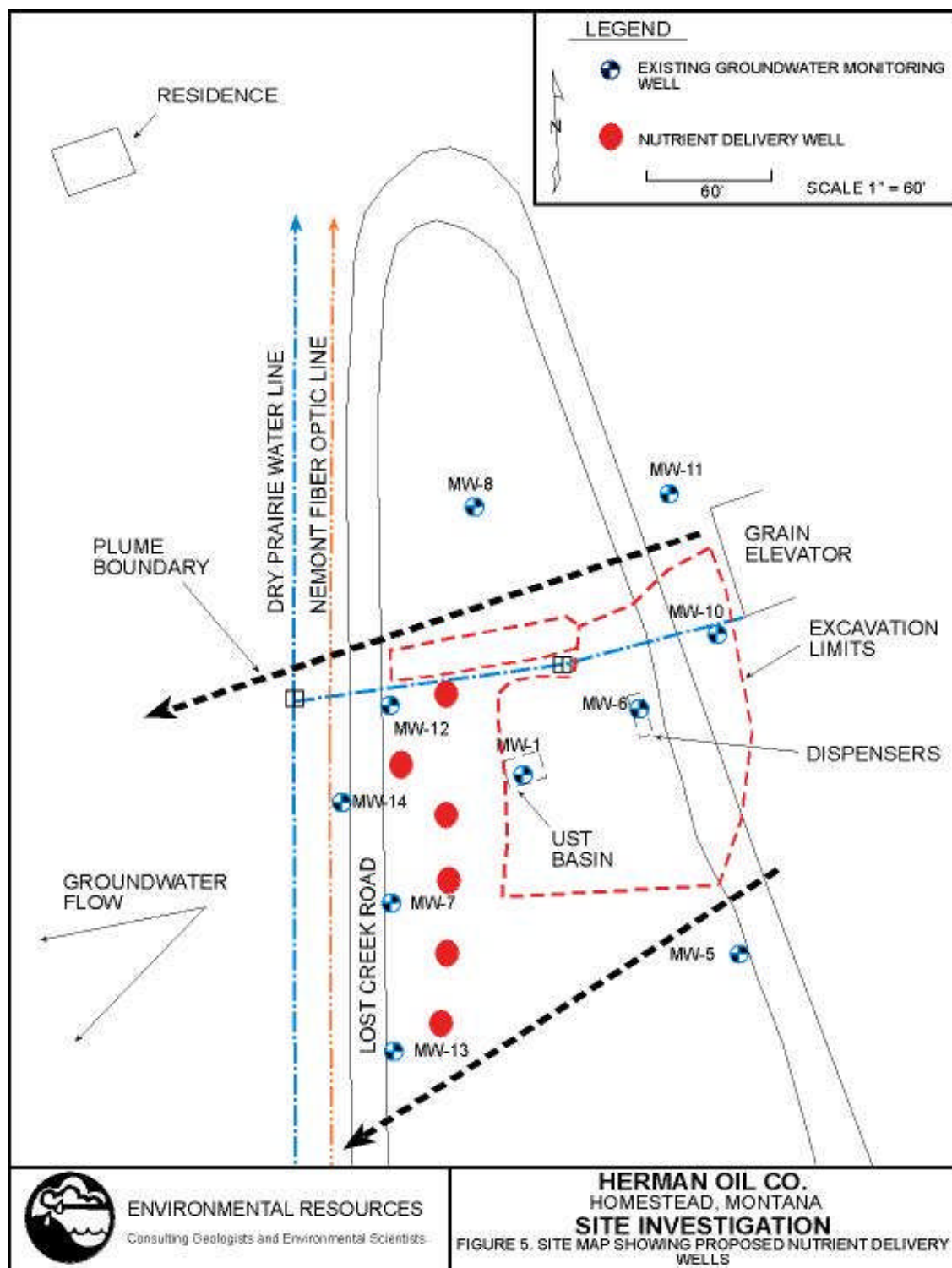


HERMAN OIL, INC.
HOMESTEAD, MONTANA
SITE INVESTIGATION
FIGURE 1, REGIONAL SITE LOCATION MAP









Appendix B

Project Budget

Project Costs

Note: Only two drill bids were received, Hansen Drilling declined to bid. Solicitation email from Hansen Drilling is attached along with two drill bids.

Task 1-Well Installation

Project management	6.0 hrs
Cleanup Work Plan preparation	12.0 hrs
Drillhole logging	30.0 hrs
PID rental	3 days
Mobilization to Homestead from Bozeman, round trip	15.0 hrs
Mileage, 4WD field pickup	946 miles
Per Diem	5 days
Lodging	4 nights
Drilling services	Boland Drilling bid
Drill cutting disposal	estimated, includes transportation
Drill cutting soil samples	2 VPH soil samples

Task 1 Subtotal

Task 2-Pilot Testing

Project management	12.0 hrs Nutrient
pickup at local ag supply store, delivery to site and placement in delivery wells	3.0 hrs
Pre-test groundwater sample collection	6 samples
Sampling fee	6 samples
Laboratory analysis	6 VPH water
	5 nitrogen water
Mobilization to Homestead from Bozeman, round trip	15.0 hrs
Mileage, 4WD field pickup	946 miles
Per Diem	2 days
Lodging	1 night
Ammonium sulfate	200 lbs

Task 2 Subtotal

Task 3-Pilot Test Groundwater Monitoring, Five Monitoring Events

Project management	12.0 hrs
Groundwater sample collection	30 samples
Sampling fee	30 samples
Laboratory analysis	30 VPH water
	25 nitrogen water
Mobilization to Homestead from Bozeman, 5 round trips	75.0 hrs
Mileage, 4WD field pickup	4730 miles
Per Diem	15 days
Lodging	10 nights

Task 3 Subtotal

Task 4-Reporting

Cleanup Report preparation	32.0 hrs
RCP update	3.0 hrs

Task 4 Subtotal

Project Total

Petroleum Tank Release Compensation Board
Soil Boring/Monitoring Well Installation Unit Cost Worksheet

Contractor Information

Company Name: Boland Drilling
 Address: 4701 N Star Blvd
 City, State, Zip: Great Falls, MT 59405
 Cost Estimator: Chris Boland
 Signature: 

Phone: 406-761-1063
 Date: mo/day/year
 1/16/2026
 Facility ID #
 Release #
 WP ID #

Project Information and Specifications
 Homestead, MT

Type of Drilling Equipment

Hollow-Stem Augers	x
Air Rotary	
Direct Push	
Other (please specify)	

Soil Boring

Number of Borings	6
Boring Diameter (inches)	10
Depth (per boring - ft)	16
Surface: Concrete Asphalt Barren	
Soil Disposal: <u>Onsite</u> Stockpile Drums	
Abandonment: Bentonite Soil Cuttings	

Soil Sampling

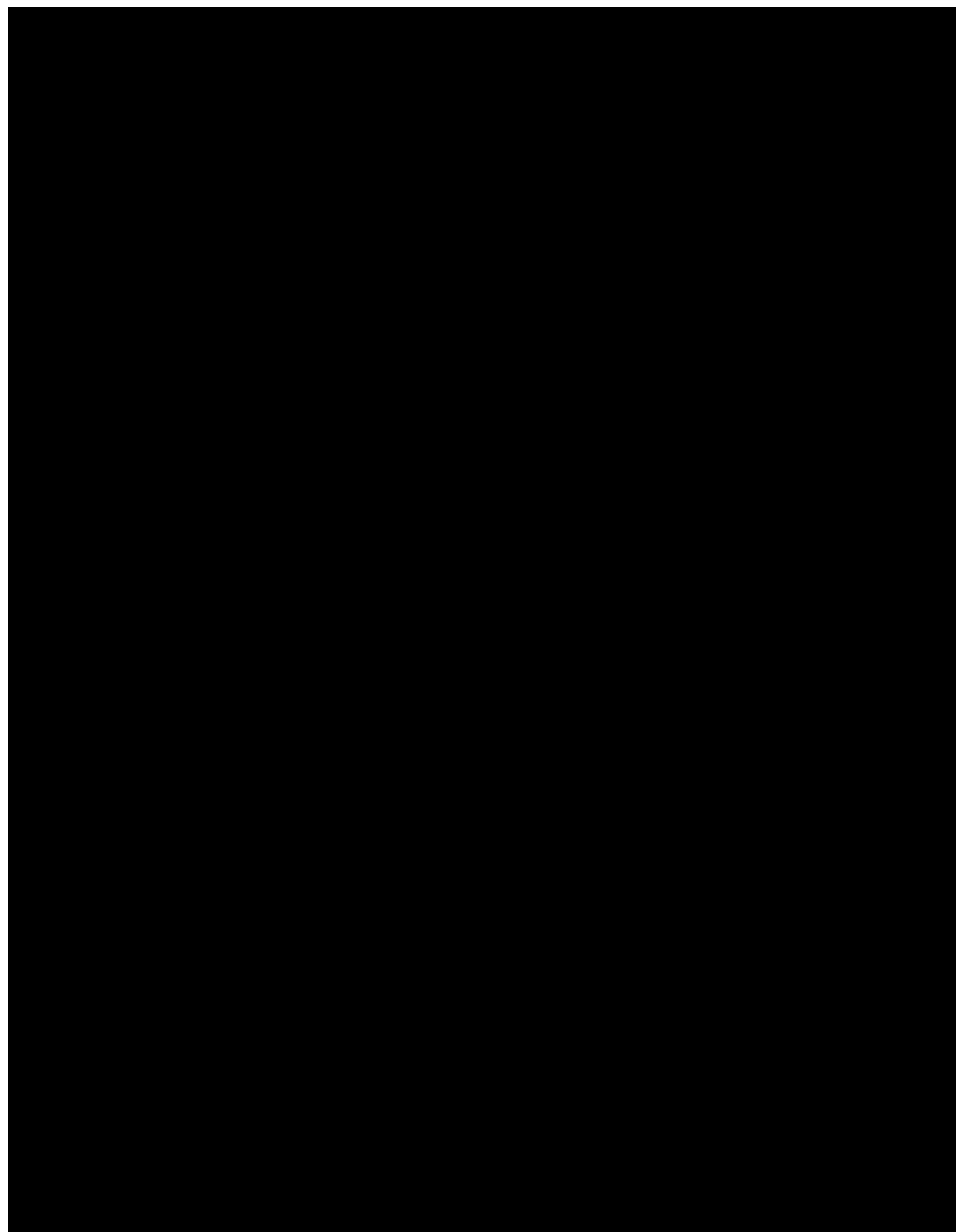
Continuous Soil Sampling	x
Interval Soil Sampling (specify interval)	
No Sampling	

Cost Estimate Explanation:

- (1) Mobilization/Demobilization: Includes all costs and mileage to transport equipment, materials, and personnel to and from the site location. More than one mobilization event of either the drilling rig or support vehicle will require justification and pre-approval by the DEQ-PRS and Board staffs. This item should be estimated on a per mile unit rate.
- (2) Soil Boring Installation: Includes all costs (labor, equipment, and materials) to drill, collect soil samples and abandon soil borings, as well as decontaminate equipment. Drilling costs should be estimated using a per foot unit rate. Unit cost should include handling of contaminated soil by stockpiling or placing in drums. Assume level "C" personal protective equipment.
- (3) Monitoring Well Installation: Includes all costs (labor, equipment, and materials) to drill, collect soil samples, and complete monitoring well to specifications and according to Montana Well Drillers Board rules, as well as decontaminate equipment. Drilling costs should be estimated using a per foot unit rate. Unit cost should include handling of contaminated soil by stockpiling or placing in drums. Assume level "C" personal protective equipment.
- (4) Drilling Standby: Drilling standby should be estimated on an hourly basis. Prior approval and justification for accumulating standby time is needed prior to billing.
- (5) Well Development: Includes all costs (labor, equipment, and materials) to develop monitoring wells. This task should be estimated using a per well unit rate.
- (6) Monitoring Well Abandonment: Includes all costs (labor, equipment, and materials) to properly abandon a well location according to the Montana Well Drillers Board rules. Abandonment costs should be estimated using a per well unit rate.

Monitoring Well Specifications

Number of Wells	6
Surface: Concrete Asphalt Barren	
Depth (per well)	16
Estimated Depth to Groundwater (ft)	
Boring Diameter (inches)	10
Casing Diameter and type (inches)	4" pvc
Surface Completion: <u>Flush Mount</u> Aboveground	



From: Bob Waller ruwaller@gmail.com
Subject: Drill Bid
Date: January 15, 2026 at 10:45 AM
To: hansenps@nemont.net



Hi Steve, I need a bid for the following work in Homestead, MT. Six four-inch diameter wells with ten feet of 0.020 slotted well screen, 16 feet total depth, flush mounts, continuous soil sampling, cuttings spread onsite. Thanks, Bob Waller 406-582-8491

