



## Environmental Resources

P.O. Box 5305, Bozeman, Montana 59717 Phone (406) 582-8491 email: ruwaller@gmail.com

---

October 2, 2019

Mr. Stan Green  
Green's Sales, Inc.  
P.O. Box 1091  
Malta, Montana 59538

Subject: Corrective Action Work Plan  
Green's Exxon, Malta, Montana  
Facility ID No. 36-02371, DEQ Leak No. 1830  
Work Plan ID No. 33820

Dear Mr. Green:

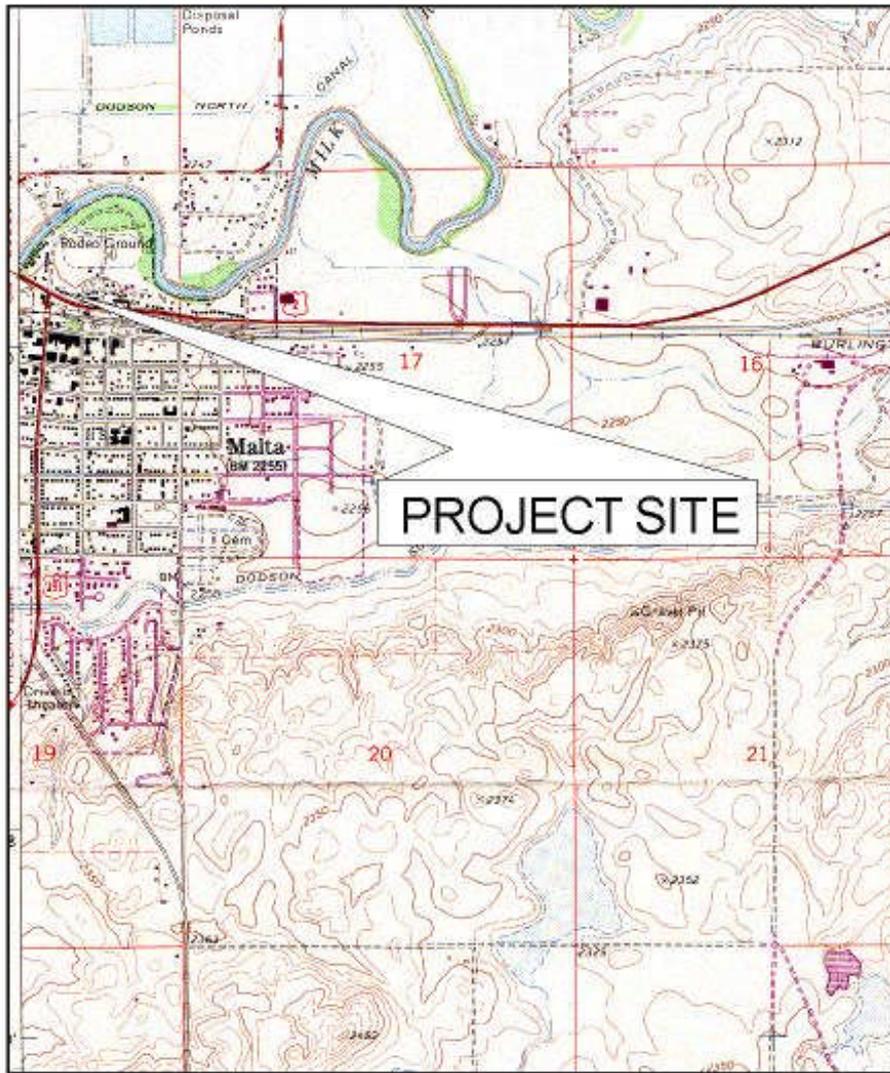
Environmental Resources is pleased to submit this document to outline activities associated with pilot testing to determine the radius of influence of a remediation system intended to mitigate subsurface petroleum contamination at the above referenced petroleum release site. Pilot testing will consist of installing an air injection (AI) well and a soil vapor extraction (SVE) well and connecting the wells to pilot test SVE/AI equipment.

### **Site Location**

The Green's Exxon refueling facility is located at 3 North 1st Street East in Malta, Montana. The project site is situated in the southwest quarter of the northwest quarter of Section 18, Township 30 North, Range 30 East, MPM as shown in Figure 1. The site is bounded by a city park to the north, U.S. Highway 2 to the south, Central Avenue to the west and Farmer's and Rancher's Lumber Co. to the east. The Milk River is situated approximately 600 feet to the northwest of the project site.

### **Site Geology**

Subsurface geology at the project site is characterized by Quaternary alluvium deposited by the Milk River overlain by silty clay and sandy clay fill. Groundwater is encountered at approximately 20-22 feet below ground surface at the project site and generally moves toward the Milk River exhibiting varying flow directions in response to river stage levels.



SCALE: 1" = 2000'



**ENVIRONMENTAL RESOURCE  
MANAGEMENT, INC.**  
Consulting Geologists and Environmental Scientists

**GREEN'S EXXON  
MALTA, MONTANA  
SITE INVESTIGATION**  
FIGURE 1, REGIONAL SITE LOCATION MAP

### **Scope of Work**

Proposed tasks to be performed include installing one additional groundwater monitoring well, installing and operating a pilot scale (SVE/ AS) system, data collection, system design and reporting. These tasks are designed to gain further knowledge regarding the expected radius of influence of a SVE/ AI system that may be used to mitigate the petroleum release at the project site.

### **Groundwater Monitoring Well Installation**

One groundwater monitoring well will be installed at the location shown on Figure 2 using a hollow-stem auger drilling rig to further define the extent and magnitude of soil and groundwater contamination. The groundwater monitoring well will be installed to approximately 30 feet below ground surface and all will be completed with two-inch diameter Schedule 40 flush-threaded well screen and casing. The well will be screened from 30-15 feet below ground surface and completed with a flush mounted access cover.

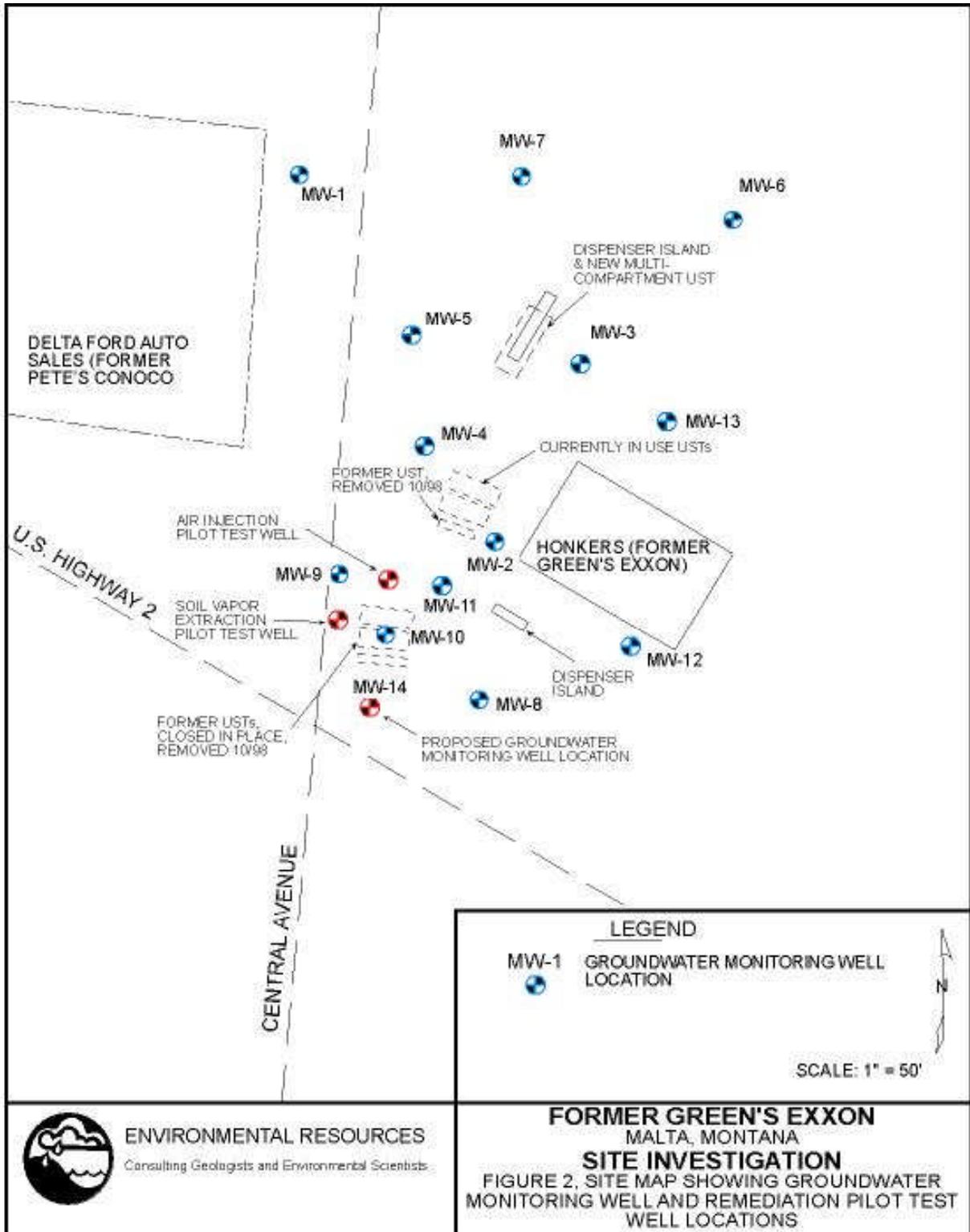
### **Well Development/Surveying**

Each well will be developed for a minimum of one hour using a submersible pump until at least ten well volumes of groundwater are removed and no further improvements in water clarity are noted. Static water levels will be measured in all of the newly installed monitoring wells following a 24 hour equilibration period after development. Water level measurements will be obtained using a Keck ET-89 electronic water level indicator.

All newly installed and existing monitoring wells will be surveyed for elevation within  $\pm 0.01$  feet by a Montana Registered Land Surveyor and referenced to a local USGS benchmark.

### **Material Sampling**

Drill cores will be logged for lithology, texture, color, moisture and volatile petroleum content. All soil samples will be visually classified for texture using the Unified Soil Classification System (USCS) according to ASTM-D-2488. Soil samples from two foot intervals and from obvious areas of petroleum discoloration will be analyzed for volatile petroleum hydrocarbons using a Photovac 2020 photo ionization detector (PID) with a standard heated jar headspace method. One soil sample corresponding to the interval that exhibits the highest headspace reading and/or one sample from the air-water interface will be analyzed for VPH at Alpine Analytical in Helena, Montana.



### **Remediation Well Installation**

One air injection well and one soil vapor extraction well will be installed at the locations shown on Figure 2 using a hollow-stem auger drilling rig.

The air injection well will be completed at 30 feet below ground surface with one foot of two-inch diameter 0.020" slotted Schedule 40 PVC screen and 29 feet of blank casing. The soil vapor extraction well will be completed at 20 feet below ground surface with ten feet of four-inch diameter 0.020" slotted Schedule 40 PVC screen and ten feet of blank casing.

The bentonite seals in both of the pilot test wells will be allowed to hydrate for at least five days prior to operation of the pilot test.

### **SVE/AI Pilot Testing**

Service piping will be connected to the pilot test wells aboveground. The pilot test will be operated for a total period of one week. During the initial SVE operation, negative pressure will be measured in monitoring wells MW-2, MW-9, MW-10 and MW-11 using a set of magnehelic gauges. Volatile petroleum hydrocarbon production will be measured using a Photovac 2020 photo ionization detector (PID). Airflow will be measured using a TSI handheld air velocity meter. Data collection will be conducted every hour for the first eight hours, then daily for three days and at the end of the week testing period.

If, after the SVE pilot test is considered successful, the AI component will be activated. Volatile petroleum hydrocarbon production will be measured in the system effluent and dissolved oxygen content will be measured in the surrounding monitoring wells. Data collection will be conducted every hour for the first eight hours and then daily for three days.

### **Data Collection**

Groundwater samples will be collected from monitoring wells MW-1-14 prior to conducting the pilot testing and again 30 days following completion of the pilot testing. Prior to sample collection, data will be collected from the newly installed wells and from all thirteen existing monitoring wells (MW-1-13). All of the well covers will be opened and the locking compression caps will be removed upon arrival at the project site. The wells will be allowed to equilibrate to the atmosphere for at least 30 minutes prior to measuring static water levels. Following the equilibration period, a thoroughly decontaminated electronic water level indicator will be used to measure the static water level in each well casing. The water level indicator tip will be scrubbed in an Alconox or similar wash solution and triple rinsed with de-ionized water prior to and following each measurement. All of the depth to water measurements will be collected from a reference point used to determine the casing elevation for each well.

### **Groundwater Sample Collection and Analysis**

Following collection of all of the static water level measurements, groundwater sample purging will commence using a low flow submersible pump. Purge water from each monitoring well will be constantly monitored for ORP, pH, conductivity, temperature and dissolved oxygen content using Hanna Instruments field meters. Indicator parameter values will be recorded on field data collection sheets. Groundwater sample collection will begin when the all or the majority of the indicator parameter values stabilize and at least three well casing volumes of groundwater have been removed.

Groundwater samples will be analyzed for VPH and for 1,2 ethylene dibromide (EDB) using EPA Method 8011. Groundwater samples will be properly preserved and placed on ice while awaiting shipment to the analytical laboratory. Sample shipment will occur through Fed Ex originating from the Bozeman, Montana. All of the collected groundwater samples will be analyzed at Alpine Analytical in Helena, Montana.

### **Reporting**

A Release Closure Plan (RCP) will be prepared and included in a Standardized Abbreviated Generic Applications Report (AR-07).

### **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.

### **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.

### **Investigation Derived Waste**

Drill cuttings, excess sample materials, drilling fluids, and water removed from a well during installation, development, and aquifer testing and all other investigation derived wastes will be disposed of according to all applicable local, state and federal laws.

## Project Costs

### Task 1-Well Installation

Project management	4.0 hrs @ \$134/hr	\$536.00
Work plan prep	12.0 hrs @ \$134/hr	1608.00
Drillhole logging	20.0 hrs @ \$118/hr	2360.00
PID rental	2 days @ \$90/day	180.00
Laboratory analysis	2 VPH soil @ \$135 ea.	270.00
Sample handling fee	2 samples @ \$10 ea.	20.00
Mobilization, RT from Bozeman	11.0 hrs @ \$118/hr	1298.00
Mileage, 4WD	584 miles @ \$0.61/mile	356.24
Per Diem	4 days @ \$30.50/day	122.00
Lodging	3 nights @ \$120/night	360.00
Drilling services	Boland bid	6857.00
Surveying	estimated	900.00
Well development	3.0 hrs @ \$118/hr	354.00

### Task 1-Subtotal

**\$15,091.74**

### Task 2-SVE/AS Pilot Testing

Project management	10.0 hrs @ 118/hr	\$1180.00
SVE/AS equipment installation	10.0 hrs @ \$118/hr	1180.00
Groundwater sample collection	13 samples @ \$186/sample	2418.00
Sampling fee	13 samples @ \$10/sample	130.00
Laboratory analysis	13 VPH water @ \$135 ea.	1755.00
Laboratory analysis	13 EDB 8011 water @ \$150 ea.	1950.00
SVE system monitoring, data collection	40.0 hrs @ \$118/hr	4720.00
AI system monitoring, data collection	40.0 hrs @ \$118/hr	4720.00
PID rental	2 weeks @ \$360/week	720.00
Mobilization, RT from Bozeman	22.0 hrs @ \$118/hr	2596.00
Mileage, 4WD	1168 miles @ \$0.63/mile	735.84
Per Diem	10 days @ \$30.50/day	91.50
Lodging	8 nights @ \$100/night	300.00
Pilot test remediation equipment	TSD estimate	22,230.31
TO15/APH air sample	1 sample @ \$325 ea	325.00
Magnehelic gauge rental	2 weeks @ \$192/week	384.00
Air flow meter rental	2 weeks @ \$192/week	384.00
Electrical services		2500.00
Plumbing services and supplies		500.00
Backhoe services to bury piping		2000.00

### Task 2 Subtotal

**\$50,819.65**

### Task 3-Groundwater Monitoring

Groundwater sample collection	13 samples @ \$186/sample	\$2418.00
Sampling fee	13 samples @ \$10/sample	130.00
Laboratory analysis	13 VPH water @ \$135 ea.	1755.00
Laboratory analysis	13 EDB 8011 water @ \$150 ea.	1950.00
Mobilization, RT from Bozeman	11.0 hrs @ \$106/hr	1166.00
Mileage, 4WD	584 miles @ \$0.63/mile	367.92
Per Diem	2 days @ \$30.50/day	61.00
Lodging	1 night @ \$100/night	100.00

### Task 3 Subtotal

**\$7947.92**

Pilot Test Work Plan  
Green's Exxon, Malta, MT  
Facility ID No. 36-02371  
Page 8

Pilot Test Work Plan  
Green's Exxon, Malta, MT  
Facility ID No. 36-02371  
Page 9

**Task 4-Reporting**

AR-07 Report prep	40.0 hrs @ \$134/hr	\$5360.00
Review	2.0 hrs @ \$150/hr	300.00
RCP preparation	8.0 hrs @ \$134/hr	1072.00
Data validation	2.0 hrs @ \$134/hr	278.00

**Task 3-Subtotal** **\$7010.00**

**Project Total** **\$80,869.31**

## **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

Robert H. Waller  
Project Geologist

cc: DEQ-PTCS  
MPTRCB

attachments: Drilling bids

# Petroleum Tank Release Compensation Board

## Soil Boring/Monitoring Well Installation Unit Cost Worksheet

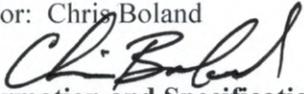
### Contractor Information

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

8/14/2019

### Project Information and Specifications

Malta 1830

Facility ID #

Release #

WP ID # 1830

### Type of Drilling Equipment

Hollow-Stem Augers

x

Air Rotary

Direct Push

Other (please specify)

### Soil Boring

Number of Borings

3

Boring Diameter (inches)

8

Depth (per boring - ft)

21-30

Surface: Concrete Asphalt Barren

Soil Disposal: Onsite Stockpile Drums

Abandonment: Bentonite Soil Cuttings

### Soil Sampling

Continuous Soil Sampling

X

Interval Soil Sampling (specify interval)

No Sampling

### Monitoring Well Specifications

Number of Wells

3

Surface: Concrete Asphalt Barren

Depth (per well)

21-30

Estimated Depth to Groundwater (ft)

Boring Diameter (inches)

8

Casing Diameter and type (inches)

2" pvc

Surface Completion: Flush Mount Aboveground

### 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.

### Soil Boring/Monitoring Well Installation Unit Cost Worksheet

TASK		UNIT COST	NUMBER OF UNITS	TOTAL COST
<b>Mobilization/Demobilization (1)</b>				
Mobilization/Demobilization: Drilling Rig	\$	2.00 /mile	410	\$ 820.00
Mobilization/Demobilization: Support Vehicle	\$	1.50 /mile	410	\$ 615.00
<b>Soil Boring Installation (2)</b>				
Drilling (0'-50' range per boring)	\$	30.00 /foot	81	\$ 2,430.00
Drilling (50'-100' range per boring)		/foot		\$ -
Other (please specify) _____				\$ -
<b>Monitoring Well Installation (3)</b>				
Drilling (0'-50' range per well)	\$	30.00 /foot	81	\$ 2,430.00
Drilling (50'-100' range per well)		/foot		\$ -
Other (please specify) _____				\$ -
<b>Drilling Standby (4)</b>				
-prior approval needed	\$	125.00 /hour		\$ -
<b>Well Development (5)</b>				
Well Development	\$	150.00 /hour		\$ -
<b>Monitoring Well Abandonment (6)</b>				
Abandonment	\$	350.00 /well		\$ -
<b>Lodging may only be paid at actual costs when documented by receipts.</b>				
<b>Per Diem</b>				
Lodging: number of individuals =	2	\$ 110.00 /person per day	2	\$ 440.00
Food: number of individuals =	2	\$ 30.50 /person per day	2	\$ 122.00
(Breakfast 5.00, Lunch 6.00, Dinner 12.00)				
<b>TOTAL PROJECT EXPENSE</b>				<b>\$ 6,857.00</b>

D.O.T. Drums

\$95.00

Additional Conditions/Comments/Costs:

Drill, sample and construct 3 monitor wells (1 -21' and 2- 30') at Malta projwct # 1830

If you require assistance, call 406-841-5090.

Submit completed form to:

Petroleum Tank Release Compensation Board PO Box 200902, Helena MT 59620-0902

# HAZTECH Drilling, Inc.



P.O. Box 30622  
 2910 Hannon Road, Suite #6  
 Billings, MT 59107  
 Phone: 406-896-1164 or 800-359-1502  
 Fax: 406-896-1462

## Proposal

TO: Environmental Resource Management, Inc.  
 ATTN: Bob Waller  
 P.O. Box 5305  
 Bozeman, MT 59717  
 Ph-406-582-8491-Cell

DATE: 8/18/2019  
 PROJECT: Project 1830  
 Malta, MT

**Description:**

1-30' well with 15' of .020 screen, 1-21' well with 10' of .020 screen, 1-30' well with 1' of .020 screen. All wells will have flush mounts.

TERMS: Net 30 Days

\*\*\*\*\*

	UNITS EST.	UNIT PRICE	AMOUNT EST.
	*****	*****	*****
Mob/ Demob, Per Mile	440	\$3.25	\$1,430.00
Support Truck, Per Day	3	\$150.00	\$450.00
Perdiem, Per Crew Day	3	\$46.00	\$138.00
Lodging, Per Night, Estimated	2	\$200.00	\$400.00
Auger Drilling, Per Ft	81	\$20.00	\$1,620.00
Well Installation, Per Ft	81	\$29.50	\$2,389.50
Flush Mount Vaults, Each	3	\$100.00	\$300.00
Standby, Per Hr	0	\$150.00	\$0.00

\*\*\*\*\*

ESTIMATED TOTAL: \$6,727.50

**Notes:**

- 1) Client is responsible to clear location of utilities.
- 2) Client is responsible for disposal of drill cuttings.
- 3) Client will be invoiced only the amounts used.
- 4) We assume that site is accessible by truck mount drill rig.

Proposal By: Paul Bray