WCEC
ENVIRONMENTAL CONSULTANTS

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June 20, 2025

Mr. Reed Miner
MT Department of Environmental Quality
655 Timberwolf Parkway, Suite 3
Kalispell, MT 59901-1215

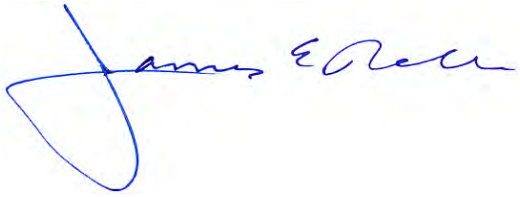
Re: **Corrective Action Plan 35028** for Moore Oil Bulk Facility, Libby, MT, Facility ID# 27-10131, Release# 3287, WPID# 35028.

Dear Mr. Miner:

Enclosed for your review is the **Corrective Action Plan 35028** for the Moore Oil Bulk Facility on Highway 2, Libby, Montana.

Thank you for your time and consideration of this corrective action plan. If you have any questions or concerns, please call or contact me via e-mail at jrolle@wcec.com.

Sincerely,



Jim Rolle
Director, Environmental Services

Enclosure

ec: Bary Moore, Moore Oil, Inc., bary2mooreoil@blackfoot.net

Corrective Action Plan 35028

Moore Oil Bulk Facility

1328 Highway 2 South

Libby, MT 59923

Facility ID# 27-10131, Release# 3287, WPID# 35028

Prepared for:

Mr. Bary Moore

Moore Oil, Inc.

2718 Tradewinds Way

Thompson Falls, MT 59873

Prepared by:

West Central Environmental Consultants, Inc.

1030 South Ave. W.

Missoula, MT 59801

June 20, 2025

WCEC Project No. 2401-0679

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1.0 Introduction

West Central Environmental Consultants (WCEC) has prepared this Corrective Action Plan (CAP_AC-07) for the at the Moore Oil Bulk Facility, 1328 Highway 2 South, Libby, Montana, Facility ID# 27-10131, Release# 3287, WPID# 35028) as requested by the Montana Department of Environmental Quality (MTDEQ) on March 25, 2024.

1.1 Site Location

The Moore Oil Bulk Facility is located on an industrial lot bordered by Highway 2 to the east, a clay embankment on the west, a machine shop to the south, and a private residence on the north. A site location map and orthophoto are included as Figures 1 and 2. The Public Land Survey System (PLSS) description for the site is the SW/4, SE/4, SE/4 of Sec. 10, T30N, R31W. The approximate geographic coordinates are N 48.372437°, W 115.544662°. The site has been operating as a bulk distributor of gasoline, diesel, oil, and other petroleum products for at least 40 years. The site currently consists of a retail cardtrol dispenser system and a bulk petroleum facility with four aboveground storage tanks (ASTs) containing unleaded, premium unleaded gasoline, and No. 1 and No. 2 diesel. The facility also handles waste oil, lube oil, and used oil drum storage.

1.2 Required Scope of Work

The Scope of Work requested by the MTDEQ consists of:

- Install additional well as necessary to fully define the extent of COCs in groundwater and determine if the plume is confined to the facility property for assessment of a PMZ closure.
- Sample newly installed monitoring wells and MW2, MW8, MW9, and MW10 should be conducted on a semiannual basis during seasonal low and high groundwater conditions.
- Complete an assessment of drinking water wells to determine compliance with [ARM 17.56.607 (10)(j)]. This ARM states that all drinking water wells and surface water must be more than 500 feet from the location of an established edge of the PMZ
- Validate all laboratory analytical data using DEQ's Data Validation Summary Form (DVSF).
- Discuss ongoing WP tasks and results with DEQ's project manager; submit written agreed-upon WP modifications as required to complete the WP objectives.
- Prepare a Release Closure Plan (RCP); discuss results with DEQ's project manager.
- Prepare and submit a Cleanup Report detailing the results of the investigation. The Report is expected to include all the content outlined in the Cleanup Report format.

2.0 Site History

2.1 Initial Soil Boring and Remedial Excavation

In September 1997, during installation of underground piping for the ASTs, petroleum impacted soils were discovered around the old piping. Soil borings were advanced in June 1998 to determine the extent and magnitude of the contamination. A maximum sampling depth of 10 feet was obtained due to large cobbles that prevented further vertical characterization. An area near the bulk loading rack was identified for excavation based on the soil borings results. An excavation to remove the impacted soils was conducted in the area around the loading rack in August 2000. The boundary of the August 2000 excavation is shown on Figure 7. Site stratigraphy and product piping limited the extent of the excavation, and residual soil contamination was left in place under the concrete bulk loading pad.

2.2 Monitoring Well Installation and Drinking Water Well Filtration System

To assess any impacts to the groundwater at the site, a groundwater monitoring well (MW1) was installed on April 11, 2001, ten feet downgradient of the worst case contamination found at the dispenser island. Analysis of groundwater sampled from MW1 verified impacts to the shallow aquifer beneath the facility. A site details map showing the location of MW1 is included as Figure 3. Four additional monitoring wells were placed at the site on October 25 and 26, 2001 to further delineate the impacts to groundwater and migration of the contaminant plume. The locations of these wells (MW2-MW5) are shown in Figure 3.

On March 7, 2002, WCEC supervised the installation of a carbon filter system on the downgradient domestic supply well (Johnston Well). Installation of the system was recommended by WCEC to address potential health risks associated with low levels of methyl-tert-butyl ether (MTBE) detected in the well. Culligan Water of Kalispell, Montana performed the system installation.

2.3 SVE/AS System and Additional Monitoring Well Installation

During the week of April 21, 2003, WCEC completed the installation of a soil vapor extraction/air sparge (SVE/AS) remedial system at the site. Four vapor extraction wells (VEWs) and four air sparging wells (ASWs) were installed on site. The locations of the system wells and piping are shown in Figure 6. The SVE/AS system is monitored on a bi-monthly basis to ensure optimal performance and to minimize downtime resulting from routine malfunctions of system components.

In addition to the SVE/AS system installation, WCEC supervised the installation of two monitoring wells at the site on April 21, 2003. Monitoring well MW6 was installed in a downgradient location to further evaluate

offsite contaminant migration. Monitoring well MW7 was installed upgradient of the source location to provide unaffected or "baseline" groundwater data for the site. The locations of MW6 and MW7 are shown in Figure 2.

2.4 LIF Soil Boring Investigation

WCEC conducted a laser-induced fluorescence (LIF) soil boring investigation at the facility on July 14 through 16, 2010 to further define the horizontal and vertical extent and magnitude of petroleum impacted soil. A total of 30 LIF boreholes were completed in those portions of the site suspected to contain hydrocarbon impacts based on historical soil and groundwater analytical data. Eight traditional direct-push soil borings were advanced with a dual-tube sampling string at selected LIF borehole locations to obtain field screening information and soil samples for laboratory analysis which correlated with the LIF data. For complete details of the LIF soil boring investigation, refer to the *July 2010 Laser-Induced Fluorescence (LIF) Soil Boring Investigation Report* which was submitted to the MTDEQ on September 9, 2010 [WCEC, 2010].

The presence of residual hydrocarbons was noted in soils at 16 of the 30 LIF boring locations completed during the July 2010 soil boring investigation. The strongest fluorescence responses were noted in soils at or surrounding the soil/groundwater interface which was present at approximately 15 feet below ground surface (bgs) at the time of the investigation. The borings with the strongest hydrocarbon responses were in the area immediately surrounding the bulk loading rack and concrete loading pad [Figure 3].

The data collected during the LIF investigation indicates that the SVE/AS system has been effective in reducing hydrocarbon concentrations in soils in the areas within the associated radius of influence. This is evidenced by the results of the LIF investigation which indicate an absence of hydrocarbons within the vadose zone at the site. It appears that the source of ongoing impacts to groundwater is the deeper, sorbed phase NAPL detected in soils within the smear zone. Based on the results of the LIF investigation, it was determined that an expansion of the SVE/AS system in conjunction with a limited remedial excavation was the most appropriate remedial strategy for the site.

2.5 October 2011 Remedial Excavation

WCEC completed a remedial excavation of petroleum-sorbed soils located underneath the bulk loading rack on October 18, 2011. The existing bulk rack concrete pad was demolished to allow access to the impacted soils identified during the August 2000 excavation and the July 2010 LIF investigation. The excavation was advanced to a terminal depth of 18 feet bgs and was limited in its horizontal extent by current site features such as the AST containment basin and underground product piping, as well as the August 2000 excavation boundary. Approximately 180 cubic yards of contaminated soil were removed from the site during the

excavation. For complete details of the remedial excavation, refer to the *2011 Remedial Excavation and SVE/AS System Expansion Report* which was submitted to the MTDEQ on February 10, 2012 [WCEC, 2012].

Analytical results from excavation confirmation samples indicate that residual soil contamination remains in the smear zone at the soil/groundwater interface and along the base of the AST containment basin wall. Following the excavation, the owner/operator of the facility incorporated an upgraded containment design into the new bulk rack pad construction which complies with all Spill Prevention Control & Countermeasure (SPCC) regulations.

2.6 SVE/AS System Expansion

WCEC expanded the SVE/AS system in November 2011 by installing four additional ASWs and VEWs and upgrading system components. Start-up testing of the expanded system was initiated on November 30, 2011 and SVE effluent samples were collected for contaminant removal calculations. During the system start-up, it was discovered that the four VEWs installed in 2003 (VEW-1 through VEW-4) were damaged and no longer fully functional, leaving only the four new wells (VEW-5 through VEW-8) available for the SVE system. Operation of the four new VEWs is rotated on a bi-monthly basis. All eight of the ASWs are functioning as designed and operate continuously. The locations of all SVE/AS system wells and trenches can be seen on Figure 6.

2.7 SVE/AS System Shutdown

The MTDEQ requested that the SVE/AS system be shut down in correspondence dated March 28, 2014. WCEC performed system shut down activities on April 2, 2014. The system will remain in shut down mode for a period of at least 1 year to evaluate the influence that intermittent system operation has on groundwater constituent concentrations and natural attenuation parameters.

2.8 3D LNAPL Site Conceptual Model (3D LSCM) Development

WCEC developed a 3-Dimensional Light Non-Aqueous Phase Liquid Site Conceptual Model (3D LSCM) based on data obtained during the 2010 LIF investigation conducted at the site and other relevant subsurface data. The 3D LSCM provides insight regarding the spatial distribution and intensity of the remaining petroleum source mass at the facility. The results from the LSCM process, including 2D and 3D representations of the LNAPL plume present at the facility as defined during the 2010 LIF investigation, can be found in the *May 2014 Semiannual Groundwater Monitoring Report* [WCEC, 2014b].

2.9 September 2015 Remedial Excavation

WCEC completed a remedial excavation of petroleum-sorbed soils located underneath the retail petroleum dispensing island and associated piping on September 3, 2015. The existing retail petroleum dispensing island concrete pad was demolished to allow access to the impacted soils identified during the July 2010 LIF investigation and visually represented in the 3D LSCM [WCEC, 2014b]. The presence of groundwater at 22 feet bgs limited the vertical extent of the excavation. The longest segment of the north-south trending axis of the excavation measured approximately 85 feet and the terminal width of the excavation in the east west-direction was approximately 40 feet. Monitoring well MW1 and various components of the SVE and AS system and well network were destroyed during the excavation. Approximately 440.46 tons of contaminated soil was removed from the site during the excavation and delivered to Treasure State Concrete facility for recycling.

Analytical results of sidewall soil samples indicated that the impacts to the shallow subsurface (less than 18 feet bgs) were effectively removed. Various VPH and EPH constituents were detected in soil samples collected from the excavation pit bottom at a depth of approximately 22 feet bgs indicating that residual soil contamination remains beneath the water table. For complete details of the remedial excavation, refer to the *Remedial Excavation Report* which was submitted to the MTDEQ on December 22, 2015 [WCEC, 2015].

2.10 July 2020 UVOST-LIF Investigation

The AST and bulk fueling storage and dispensing equipment to the south of the facility building was removed from the site in 2019 allowing for access to previously uninvestigated areas near the known source area. WCEC completed an additional UVOST soil boring investigation at the site during July 2020 to quantify impacts in the vicinity of the AST containment and former bulk fueling rack. A total of 12 UVOST borings and four confirmation borings were completed during the July 2020 investigation. Additional groundwater monitoring was conducted in November 2020 during seasonal low groundwater conditions. The data from the July 2020 and November 2020 events was evaluated in conjunction with historic site data in preparation of a Release Closure Plan (RCP) for the facility and various remedial options were presented in the *2020 UVOST Investigation & Groundwater Monitoring Report* [WCEC, 2020].

Evaluation of the data presented in the RCP indicates that the overall risk to human health and the environment is relatively low. Soil impacts exceeding RBSLs at the facility are limited to a small area at depths generally greater than two feet and do not appear to pose a significant risk via direct human contact. Impacted soils could be encountered during building upgrades or other utility excavations conducted on the facility property. The cumulative groundwater analytical data indicates that impacts from the release at the facility are confined to the shallow groundwater system beneath the site, primarily in the areas surrounding and immediately downgradient of the former product storage and dispensing equipment. The source of

ongoing groundwater impacts above RBSLs at MW2 and MW8 originate from the source areas identified in the 2010 and 2020 UVOST investigations which are located in the area immediately surrounding the former bulk dispensing rack.

2.11 October 2023 Monitoring Well Installation

Two additional monitoring wells (MW9 & MW10) were installed in October 2023 to determine the extent of petroleum contamination in the source area and downgradient of MW8.

3.0 Monitoring Well Installation & Groundwater Monitoring

3.1 Monitoring Well Installation

Boland Drilling company, Great Falls, MT, will be contracted to complete the installation of two new monitoring wells at the facility. These wells are necessary to fully define the extent of COCs in groundwater at the facility and determine if the plume is confined to the facility property. Both monitoring wells will be completed to a depth of 25 feet bgs and will be constructed with 10 feet of solid riser and 15 feet of 0.010 PVC screen. One well will be installed approximately 30 feet to the west of MW10. The second well will be installed approximately 35 feet to the east of MW8 near the property boundary on the adjoining Highway 2 right-of-way. Overhead powerlines will prevent the installation of this well on the subject property boundary. It is anticipated that this well will need to be installed on the shoulder of Highway 2, and that a lane closure will be required for a work zone for drilling and support equipment. Poteet Construction will be hired to complete traffic control during the monitoring well installation on Highway 2. Monitoring wells will be completed with flush mount monuments. All utilities will be located prior to monitoring well installation.

WCEC personnel will continuously field screen soils from the borings using a Rae Systems MiniRae™ 3000 photoionization detector (PID), as well as visual and olfactory evidence to determine which horizons may be impacted. The PID will be calibrated daily using fresh air and span gas calibration points. Isobutylene span gas at a concentration of 100 parts per million (ppm) will be used in the calibration procedure. Soil samples will be collected from the worst-case petroleum impacted horizon encountered in the boring and the groundwater interface. If no impacts are noted in soil screening a single sample will be collected from the groundwater interface.

Soil samples will be collected using WCEC standard sampling procedures and in accordance with DEQ requirements. Soil samples will be packed on ice and submitted under chain of custody to Energy Laboratories (Energy) in Helena, Montana. Requested analyses will include EPH screen and VPH using the Massachusetts Method, as required by the Montana Risk-Based Corrective Action (RBCA) Guidance for Petroleum Releases. Additionally, Total Extractable Hydrocarbon (TEH) fractions analysis will be conducted if the EPH screen of 200 mg/kg is exceeded.

Following monitoring well installation, WCEC will develop each well using a downhole submersible pump to remove approximately 20 well volumes. Purge water generated during the well development will be applied to the ground surface in the immediate vicinity of the monitoring well from which it was removed.

Soil cuttings from each soil boring will be field screed for the presence of hydrocarbon impacts. Soils which do not exhibit hydrocarbon impacts will be thin spread at the facility. Soils that exhibit petroleum odor or staining will be segregated and placed in 55-gallon steel drums. A sample will be submitted from these

drummed cuttings for analysis of VPH, EPH, and RCRA metals. A soil profiled will be completed for disposal of these soils at the Republic Services landfill in Missoula.

3.2 Groundwater Monitoring

Groundwater samples will be collected on a semiannual basis during seasonal low and high groundwater conditions typically present in November and May. Monitoring wells will be sampled no sooner than two weeks after the monitoring well installation event. Well sampling will be conducted using low flow sampling methodologies in accordance with MTDEQ requirements and WCEC SOPs. WCEC will use a peristaltic pump to purge and sample each monitoring well. Groundwater quality parameter data (conductivity, pH, salinity, dissolved oxygen, temperature, ORP, and turbidity) will be acquired from all site wells sampled during each event using a flow through cell. Groundwater sample collection from each well will be completed following stabilization of groundwater quality parameters. Static water levels, groundwater quality parameter, and purge rate for each well will be recorded in the field using WCEC's Well Sampling Form. Depth to water measurements will be used to calculate the potentiometric groundwater surface, flow direction, and gradient for each event.

VPH and EPH Samples will be collected from the two newly installed wells (MW11 & MW12) and from existing monitoring wells MW2, MW8, MW9, and MW10 (6 wells per event). Depth to water measurements will be collected from monitoring wells MW1, MW3, MW5, MW6, and MW7 (5 wells per event).

Groundwater samples will be preserved in accordance with analytical methods, packed on ice, and delivered to Energy in Helena, Montana under chain of custody. All groundwater samples collected will be submitted for VPH and EPH analyses. Additionally, EPH fraction analysis will be performed for any samples which exceed the EPH screening limit of 1,000 µg/L.

3.3 Site Surveying

WCEC will survey the top of casing on all new monitoring wells at the facility to The Forth Order (0.10 feet times the square root of total distance of the level loop in miles) with a measurement precision of 0.01 feet. The latitude and longitude of all site wells will be surveyed using a Trimble Geo 7X GPS with 1-centimeter post processed accuracy. Site well casing elevations will be correlated to the North American Vertical Datum of 1988 (NAVD 88) using an onsite elevation control point which will be created using the Trimble Geo 7x GPS.

GPS locations will also be acquired for all wells that are used for drinking or irrigation purposes within 500 feet of the facility property boundary for assessment of PMZ closure. The location of all wells within this radius of the facility will be included as a map in the report.

4.0 Report Preparation

Following the completion of the monitoring well installation and one year of groundwater monitoring, WCEC will prepare a remedial activities report summarizing the findings of the monitoring well installation and groundwater monitoring events. The report will include analysis of release closure using a petroleum mixing zone (PMZ). This PMZ analysis will include discussion of historical remedial actions that addressed source area removal, maps depicting the extent of petroleum contamination, and assessment of natural attenuation trends within the plume. Additional discussion will be included about any drinking wells that are within 500 feet of the potential PMZ. Maps depicting the locations of all monitoring points associated with the release and property boundaries will be included in the report. Potentiometric surface plots of groundwater flow and gradient will also be included. Cumulative analytical data tables for all past monitoring events will also be presented in the report. This report will be submitted within 60 days of receipt of all analytical results from the final sampling event conducted under this corrective action plan.

5.0 Time Line and Cost

The scope of work outlined in this corrective action plan is tentatively scheduled to begin in fall 2025. The attached Estimated Costs Spreadsheet for Corrective Action Plan #35028 [Appendix A] and PTRCB Groundwater Monitoring and Sampling Unit Cost Worksheet [Appendix B] details the anticipated cost to complete monitoring well installation and groundwater monitoring included in the MTDEQ required scope of work. The initial groundwater monitoring event is anticipated to occur in May 2026 with the second monitoring event occurring in November 2026.

5.1 Planned Workflow & Cost Explanations

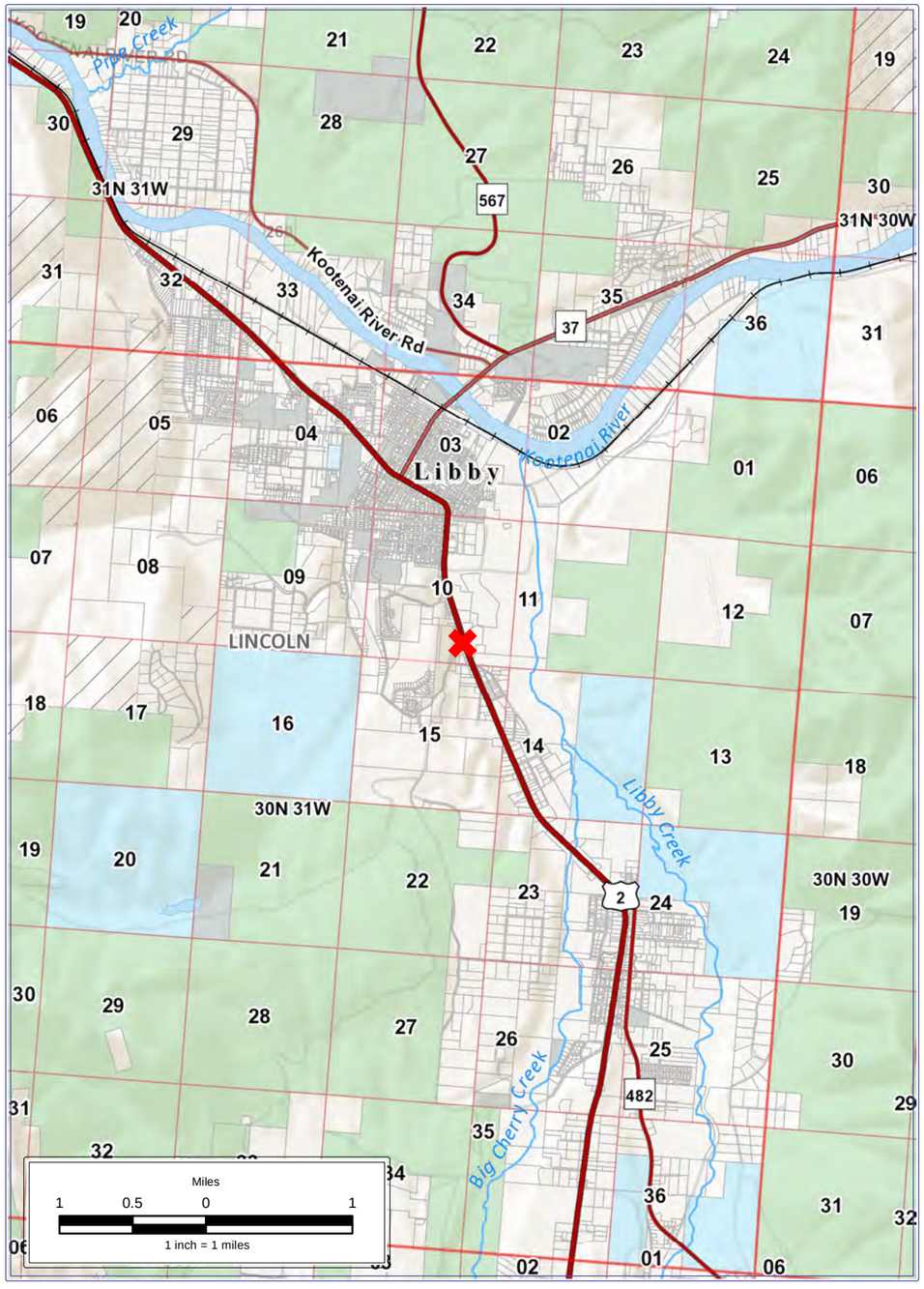
The estimated costs presented in Appendix A and B detail the tasks included in this work plan. WCEC will complete these tasks during three individual field events as follows:

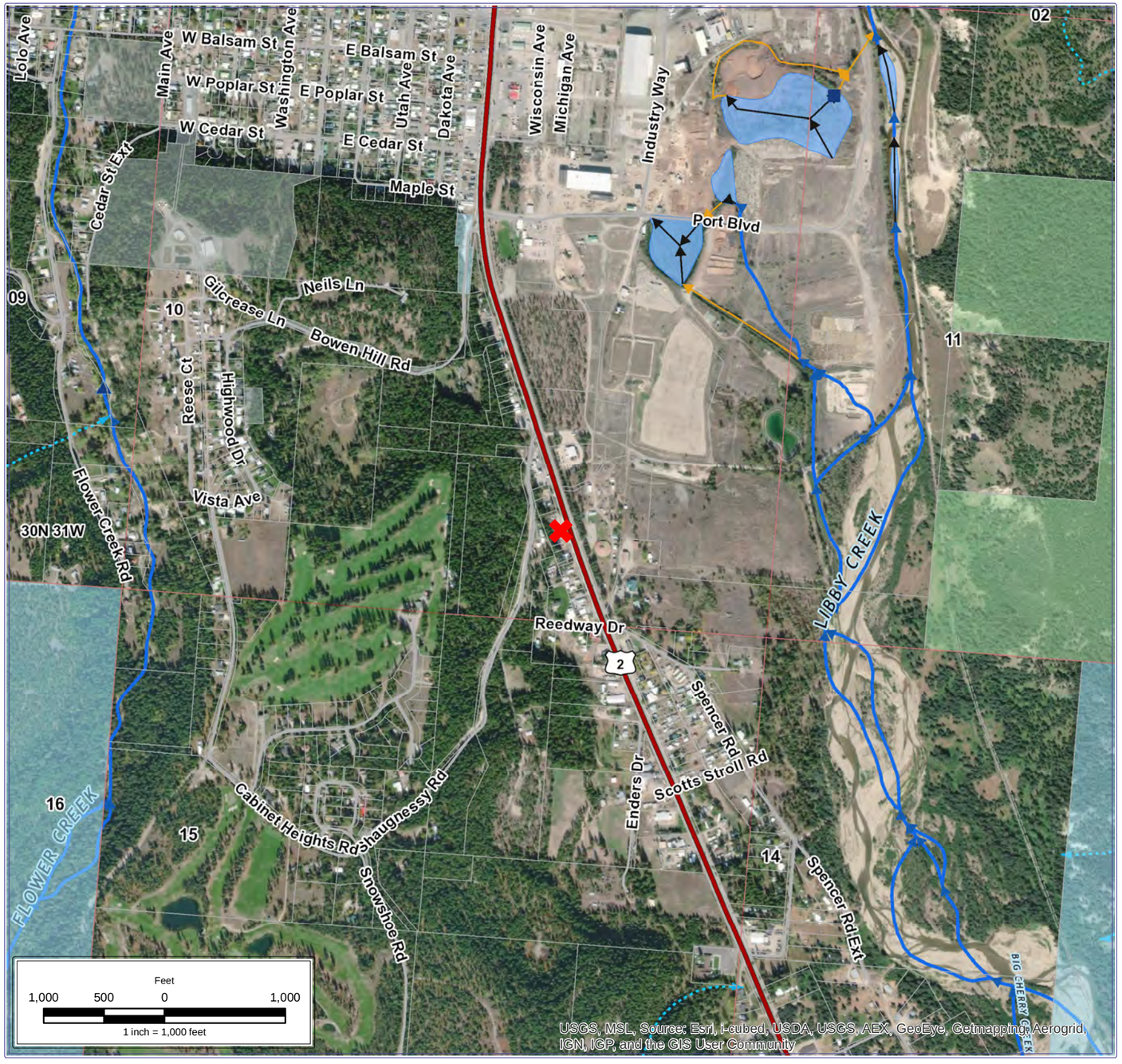
Event 1: Groundwater monitoring well installation and well development **(1 staff, 1 vehicle)**. Mobilization costs included in *Estimated Costs Spreadsheet for Corrective Action Plan #35028*.

Event 2: Site surveying, drinking water well assessment, and groundwater sampling **(2 staff, 1 vehicle).** Mobilization costs for two staff and vehicle included in *PTRCB Groundwater Monitoring & Sampling Unit Cost Worksheet* (PTRCB GWM Tool).

Event 3: Groundwater monitoring and sampling **(1 staff, 1 vehicle)**. Mobilization costs included in *PTRCB Groundwater Monitoring & Sampling Unit Cost Worksheet* (PTRCB GWM Tool).

List of Figures





LEGEND

✖ Site Location

N

Site Location Maps

Moore Oil Bulk Facility
1328 Highway 2 South
Libby, MT 59923

DRAWN BY: MM
DATE: 09/10/20
SCALE: 1:12,000

PROJECT NUMBER: 2401-0679

IMAGE SOURCE: ESRI BASEMAPS

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FIGURE 1

MW5

MW4

MW3

MW9

MW8

MW6

MW10

MW2

SB1

MW7

Legend

- Monitoring Well
- Proposed Well Location
- Soil boring
- Excavation Boundary
- Vapor Extraction Wells
- Air Sparge Wells
- System Trench

N

Feet 1 in = 40 ft

40 20 0 40

Moore Oil Bulk Facility
1328 Highway 2 South
Libby, MT 59923

Site Details & Proposed Monitoring Well Installation Map

JOB NO.: 2401-0679 | DATE: 06/11/24 | DRAWN BY: TCP | IMAGE SOURCE: ESRI

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FIGURE 2