Additional Remedial Investigation Work Plan

Town Pump Whitefish 1

6600 Highway 93 South

Whitefish, MT 59937

Facility ID# 15-10105, Release# 192 & 4155

Prepared for:

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WCEC Project No. 2506-0989

TABLE OF CONTENTS

List of Figures

Cost Estimates

1.0 Introduction

West Central Environmental Consultants (WCEC) has prepared this Additional Remedial Investigation Work Plan for the Town Pump Whitefish #1 located at 6600 Hwy 93 South in Whitefish, Montana [Figure 1]. The purpose of the scope of work included in this Work Plan is to evaluate constituent concentrations in groundwater and surface water, followed by testing and implementation of an active remedial strategy to progress towards resolution of the release. The intent of the Work Plan is to provide a framework for progression of the included scope through an iterative process beginning with initial well condition assessment, surface water sampling, and groundwater monitoring events. Data and observations from the initial events will be used to finalize the specifics related to additional investigation required to eliminate data gaps and implement a High-Vacuum Dual-Phase Extraction (HVDPE) remediation pilot-scale test.

The estimated costs presented in this work plan include only the completion of the initial sampling and well condition assessment events. WCEC will prepare an Interim Data Submittal following the initial events that will include a summary of the results and observations, any revisions to the scope of additional investigation, well abandonment, and the pilot-scale HVDPE remediation test. The IDS will also include a detailed estimated cost sheet for completion of the revised scope of the Work Plan.

1.1 Site Location & Setting

The Site is located in Section 36, T31N, R22W of Flathead County, Montana [Figure 1]. The facility is an active Town Pump gasoline service station, food store, and casino located within the city of Whitefish. Site features are shown on Figure 2. The Town Pump facility maintains a total of five petroleum underground storage tanks (USTs) which consist of three 12,000 gallon gasoline USTs, one 20,000 gallon gasoline UST, and one 12,000 gallon diesel UST. The tank basin is located on the south side of the facility building and the fuel dispensers are located on the east side of the facility building. The Whitefish River is located approximately 200 feet north of the facility and flows in a general southeasterly direction through the city of Whitefish.

Main underground utility corridors in the immediate area are aligned north-south within and adjacent to US Highway 93 South, which borders the east side of the Site, and along West 10th Street, which borders the west side of the Site. The water service connection to the facility building is located on the east side of the Site and a water service connection to the hydrogen peroxide remediation system is located on the west side of the Site. Sewer and natural gas mains are located along West 10th Street. Fiber optic and a storm water drainage system parallels US Highway 93 South on the east side of the Site.

The groundwater monitoring wells installed on the Site property include 25, two-inch diameter wells installed in flush grade monuments cemented in place, and 4 one-inch diameter stick-up wells installed in the seep area adjacent to the river. Some groundwater monitoring wells were abandoned over the course of Site investigation as better understanding of the complex hydrogeology emerged and it was apparent that some wells bridged the perched and regional aquifers. The well locations are shown on Figure 2. The groundwater monitoring wells completed in the seep area are installed to a depth of approximately 6 feet to 12 feet below ground surface (bgs). The groundwater monitoring wells completed in the perched aquifer are installed to depths that range from 24 feet bgs to 34 feet BGS, and the groundwater monitoring wells completed in the regional aquifer are installed to depths that range from 38 feet to 50 feet bgs.

2.0 Soil Lithology, Hydrogeology & Site History

The following site history, soil lithology, and hydrogeology sections were obtained from various reports prepared and submitted by Olympus Technical Services. WCEC began working on the site in June 2025.

2.1 Soil Lithology

The general soil lithology at the Site consists of a five-foot surface layer of silty sand and gravel that overlies unconsolidated sediments deposited in glacial lake and near-shore glacial lake environments. The uppermost sediments are glacial lake silts and clays with interbedded sand lenses that vary in thickness from less than one inch to up to six inches thick. This unit extends to depths of 25 to at least 40 feet below ground surface and overlies a more permeable sand unit that contains some interbedded silt and clay. The contact between these units dips to the east and may represent a transgressive surface as the glacial lake overrode beach and dune sands. Petroleum hydrocarbon impacts occur in both units.

2.2 Hydrogeology

The uppermost groundwater occurs in water bearing sand stringers interbedded within the glacial lake sediments at about 15 feet to 25 feet bgs in a perched aquifer system that extends approximately 75 feet laterally around the dispenser area. Groundwater mounding has been reported to occur in the perched aquifer near monitoring well MW-4, which is in the dispenser area. The source of the alleged mounding is unknown but could be the result of surface water infiltration through cracks in the pavement, recharge from a storm water drainage system along the east side of the Site, or inaccurate well casing elevation survey data. Groundwater in the perched aquifer system has been reported to flow radially away from the dispenser area at a hydraulic gradient of about 0.13 ft/ft. Groundwater levels in the perched aquifer have varied as much as 10 feet in well MW-4, which is located near groundwater mounding source(s), or as little as ½ foot in well MW-1, which is located along the fringe of the perched aquifer.

A "regional aquifer" is present in the underlying sand unit at about 35 feet BGS. Groundwater in this aquifer flows north to the Whitefish River at a relatively flat hydraulic gradient of approximately 7.0E-4 ft/ft. Both the regional and the perched aquifer systems are impacted with petroleum from historical releases at the Site.

Aquifer tests were performed by Olympus in 2009 at five Site monitoring wells to measure the hydraulic conductivity of both the perched and the regional aquifers at the Site. Monitoring wells MW-4 and MW-29, which were completed in the perched aquifer, and monitoring wells MW-15, MW-19, and MW-27, which were completed in the regional aquifer, were selected for testing based on soil lithologies representing the range of Site conditions. Slug testing was performed by lowering (slug in or falling head) and raising (slug out or rising head) a weighted cylinder constructed with Schedule 40 PVC piping of known volume, recording water level displacements with a pressure transducer, and saving the water level displacement data with an electronic data-logger. Two to three slug-in and slug-out tests were performed in each well. Hydraulic conductivity (K) values in the perched aquifer wells ranged from 0.1 to 1.3 gpd/ft^2 and K values in the regional aquifer wells ranged from 4 gpd/ft2 to 1,045 gpd/ft^2. Based on the K values, the seepage velocity in the perched aquifer system is estimated to be in the range of 0.01 to 0.06 ft/day and the seepage velocity in the regional aquifer system is estimated to be in the range of 0.002 to 1 ft/day.

2.3 Site History

Town Pump purchased the Roundup Country Store property in 1989 and discovered petroleum impacted soil (Release 192) in the historical tank basin during upgrades to the fueling structures. Impacted soil removal was conducted during the upgrade and petroleum impacted soil was removed from the tank basin and the dispenser area to up 22 feet bgs (depth limit of the excavator). Petroleum impacted soil was left in place along the floor and walls of the excavation; however, standards for petroleum concentrations in soil had not yet been developed so the release was closed by the DEQ, then the Department of Health and Environmental Science. In January 2003, a second petroleum release (Release 4155) was detected by the facility's tank monitoring system which resulted from a 0.1 gallon per hour gasoline leak from a fuel line in the dispenser area.

Site investigations were conducted by Integrated Geosciences, Inc. and subsequently by Olympus to evaluate the extent and magnitude of impacts to soil and groundwater resulting from historical petroleum releases at the Site. Investigation results indicated that petroleum impacts to soil and groundwater were site wide and that worst case impacts were located near the tank basins (historical and existing) and the fuel dispenser area where petroleum analyte concentrations in soil and groundwater exceeded Human Health Standards (HHS) and Risk Based Screening Levels (RBSLs). Site investigation and corrective action results have been presented in reports submitted to the DEQ.

In 2007, Olympus installed an air sparge (AS) remediation system in a petroleum impacted seep area discovered in 2005 near the Whitefish River [Figure 2]. The AS system consisted of 13 vertical well points installed in bank soil near the river, which are plumbed to an air compressor housed in an equipment shed located at the top of the riverbank. Monitoring wells ASMW-1 through ASMW-4 were installed in the seep area to evaluate the effectiveness of remediation system operations. The AS system has operated almost continuously since its startup and the results of maintenance and operations monitoring have been presented in reports submitted to the DEQ.

In 2011, Olympus installed Soil Vapor Extraction (SVE) and hydrogen peroxide injection systems at the facility to treat worst case source areas. The purpose of the hydrogen peroxide injection system is to enhance aerobic biodegradation of petroleum hydrocarbons, and specifically benzene, in the regional and perched aquifers. The SVE system consists of five, 4-inch diameter wells which are plumbed to two blowers housed in an equipment shed located north of the facility. The hydrogen peroxide fluid injection system consists of 17 one-inch diameter wells and 2 two-inch diameter wells which are individually plumbed to injection equipment housed in a shed located north of the facility. A hydrogen peroxide solution at a concentration of 1,000 ppm to 1,250 ppm is injected into the aquifer system at a total flow rate of about 2 gallons per minute. The hydrogen peroxide injection system became operational in April 2011, and by the end of 2016, approximately 7,285 pounds of oxygen had been injected into the aquifers. At DEQ's request, the system operations were discontinued in 2017 while an LNAPL investigation and remedial alternatives analysis was conducted.

Since 2011, remediation system operations have been reducing petroleum analyte concentrations in source areas at the Site; however, remediation efforts have been hampered by NAPL present in the aquifer systems and the limited area of influence of the existing injection wells. Remediation in the down-gradient portion of the dissolved phase plume is slow and benzene remains a COC in the seep area near the river. In 2015, a Remedial Alternatives Analyses (RAA) report prepared by Olympus was submitted to the DEQ which presents options to accelerate remediation at the Site. The RAA included technologies to treat the downgradient plume area, and technologies to treat source areas, which could significantly shorten remediation time frames and reduce costs associated with long term remediation operations. In response, the DEQ requested the collection of site-wide dissolved oxygen (DO) concentration data for two consecutive months and intrinsic biodegradation indicator (IBI) data in select areas of the Site to evaluate the effectiveness of current remediation efforts, and to assess the viability of recommended technologies in the RAA. Groundwater monitoring was conducted at the Site in May 2016 and June 2016 to measure DO concentrations and collect IBI data and the results were presented in a report submitted to the DEQ in 2017.

The IBI data indicated that both aerobic and anaerobic biodegradation processes were actively degrading petroleum hydrocarbons at the Site. DO concentrations measured in groundwater wells in 2016 ranged from super saturated concentrations to less than 1.0 mg/L and varied in different plume and remediation affected areas of the Site. DO concentrations have generally increased in source areas since the commencement of remediation operations and fluctuate in response to injection activities and biodegradation processes that consume oxygen. DO concentrations are low in some Site areas and may remain low in areas that are not directly affected by remediation system operations.

Olympus directed an Ultra-Violet Optical Screening Tool (UVOST) investigation at the site in October 2018 with data and a remedial alternatives analysis (RAA) presented in the subsequent *LIF Geoprobe Investigation, Groundwater Monitoring, and Remedial Alternatives Analysis Report* dated May 23, 2019 [Olympus, 2019].

Based on the various investigations performed to date and the RAA evaluation, Olympus presented the following conclusions and recommendations:

1. Conclusions

- The general soil lithology at the Site consists of an up to five-foot surface layer of silty sand and gravel that overlies unconsolidated sediments deposited in glacial lake and near-shore glacial lake environments. The uppermost sediments are glacial lake silts and clays with interbedded sand lenses that vary in thickness from less than one inch to up to six inches thick. This unit extends to depths of 25 to at least 40 feet below ground surface and overlies a more permeable sand unit that contains some interbedded silt and clay. The contact between these units dips to the east and may represent a transgressive surface as the glacial lake overrode beach and dune sands.

- The uppermost groundwater occurs in water bearing sand stringers interbedded within the glacial lake sediments at about 15 feet to 25 feet BGS in a perched aquifer system that extends approximately 75 feet laterally around the dispenser area. Groundwater mounding occurs in the perched aquifer. A regional aquifer is present in the underlying sand unit at about 35 to 40 feet BGS. Groundwater in this aquifer flows north-northwest to the Whitefish River at a relatively flat hydraulic gradient of approximately 7.0E-4 ft/ft.

- NAPL, including mobile and residual phases, is present in the sediments beneath the Site at depths of 17 to 37 feet BGS. NAPL occurs primarily in the area beneath the store and between the store and the pump island canopy to the east of the store. Mobile NAPL, as measured in Site wells, occurs over an area of at least 1,500 square feet and residual NAPL occurs over an area of approximately 20,000 square feet. Mobile NAPL is expressed as accumulating NAPL in several wells; however, it does not appear to be migrating.

- Petroleum hydrocarbons are present in groundwater in both the perched and regional aquifers at concentrations above RBSLs over an area of approximately 70,000 square feet.

- Impacted groundwater is discharging from the regional aquifer into a seep located on the south bank of the Whitefish River. An air sparging system located in the seep is reducing hydrocarbon concentrations, although the benzene HHS is typically exceeded in samples collected from one of the seep monitoring wells.

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- Site investigation data, including subsurface soil sample results, groundwater monitoring results, and LIF investigation results, indicate that the remaining plume is associated with release number 192 and that further corrective actions should be assigned to that release.

2. Recommendations:
   - Continue operating the air sparging system in the seep until petroleum hydrocarbon concentrations in groundwater at the seep are below RBSLs and HHS.
   - Utilize HVDPE technology in the area of the NAPL plume for source reduction.
   - Evaluate the effectiveness of HVDPE in reducing petroleum hydrocarbon concentrations in groundwater and evaluate further remedial action based on those results.
   - Maintain the water service supply connection to the injection system at the Site should in situ enhanced bioremediation be utilized following HVDPE.

In 2022, MTDEQ contracted an independent 3rd Party, North Wind Portage, Inc, to perform a data summary and analysis which also included updating the Release Closure Plan (RCP). Recommendations in the 2022 RCP were generally in alignment with the recommendations presented by Olympus in the 2019 report. The recommended actions include implementation of HVDPE to reduce source mass and concentrations followed by additional remedial actions to address discharge of constituents at the seep location.

WCEC reviewed existing site data, recommendations, and cleanup strategies during development of this work plan. The included scope of work is intended to provide updated groundwater and surface water data, test and evaluate the HVDPE cleanup strategy, and design additional remedial alternatives to mitigate the potential discharge of petroleum constituents at the seep location and into the Whitefish River.

3.0 Scope of Work

3.1 Scope of Work Overview

The scope of work proposed by WCEC includes the following:

1. Conduct a site inspection, groundwater monitoring, and surface water sampling within 30 days of work plan approval by MTDEQ.

   a. **Event 1:**

      i. Perform a site inspection to determine the status of existing monitoring wells and remediation system components.

      ii. Perform a survey of all monitoring well casing elevations.

      iii. If possible, identify the locations of previously abandoned monitoring wells and the abandonment method used.

      iv. Conduct surface water sampling at the seep and seep well locations.

      v. Conduct surface water sampling of the Whitefish River at three locations:
         1. Immediately upstream of the facility.
         2. At the point of discharge from the seep.
         3. Immediately downstream of the facility.

   b. **Event 2:**

      i. Conduct groundwater monitoring of all accessible site wells.

      ii. Coordinate and oversee professional survey of all site wells and features

2. Following the site inspection and initial sampling events, compile a well inventory and status spreadsheet. The data in the spreadsheet will be used to make recommendations regarding the monitoring well network as follows:

   a. Abandon all monitoring wells that are screened across the upper (perched) and lower hydrologic units. Abandonment should be completed using the over-drilling method to ensure removal of the well screen, casing, and sand pack, which will eliminate the vertical connection of the two water bearing units.

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b. Remove well screen, casing, and sand pack from previously abandoned wells that spanned the upper and lower hydrologic units if these components were left in place. Filling the well casing with bentonite or concrete slurry, while a legal abandonment method, does not prevent the well sand pack from acting as a vertical conduit for infiltration of impacted groundwater from the upper to the lower aquifer.

c. Install an adequate number of monitoring wells to eliminate any data gaps and / or replace abandoned wells as needed. Well construction will include screened intervals within a single hydrologic unit. Co-located well pairs should be used as appropriate to obtain groundwater data from the upper and lower hydrologic units.
   i. It may be possible to install properly screened and constructed replacement wells in the over-drilled abandonment borings.

d. Conduct a pilot-scale HVDPE remediation study. The pilot-scale event will consist of the following:
   i. Install four HVDPE extraction wells within the source area at the facility.
      1. Two wells will be installed in the vicinity of the active UST system in a manner that targets the heavily impacted perched zone.
      2. Two wells will be installed immediately north of the facility store building in a manner that targets impacts to the deeper, regional aquifer.
   ii. Operation of an HVDPE remediation system for a period of up to 10 days.
   iii. Amend and reinject extracted groundwater in a manner that facilitates an extraction / flushing cycle through the treatment zones. If possible, existing SVE wells will be used for re-injection of the amended groundwater.
      1. Wells SVE 4 and SVE 5 will be used for reinjection during the HVDPE test in the vicinity of the active UST system.
      2. Wells SVE 2 and SVE 3 will be used for reinjection during the HVDPE test of wells located to the north of the facility store building.
   iv. Conduct pre-event and post-event groundwater monitoring events.
   v. Collect pertinent data from the HVDPE system and site monitoring wells periodically during system operation.

3. Prepare a Remedial Investigation Report which follows the MTDEQ PTCS guidance and includes:
    a. Presentation and discussion of all data collected during completion of the scope or work included in this work plan.
    b. Detailed discussion and evaluation of the pilot-scale HVDPE remediation study.
    c. Presentation of 2-dimensional and 3-dimensional conceptual site models that depict LNAPL and petroleum constituent distribution within various environmental media, lithologic conditions, hydrologic conditions, site features, and receptors.
    d. Recommendations for additional investigation and remedial actions necessary to mitigate impacts to receptors and progress the releases towards closure.

3.2 Site Inspection, Groundwater & Surface Water Sampling

The initial site inspection, groundwater monitoring, and surface water monitoring events will be conducted within 30 days of MTDEQ approval of the Work Plan. During the site inspection event, WCEC will identify, inspect, log, and map all existing monitoring wells, system wells, and surface water sampling locations. Data and observations from the site inspection will be compiled in a spreadsheet and used to make recommendations related to well rehabilitation, abandonment, and installation which will be included in the forthcoming IDS.

The sampling events will include collection of surface water samples from three locations on the Whitefish River and two seep locations, and groundwater monitoring and sampling of up to 29 monitoring wells. Depth to water measurements will be recorded from all viable site monitoring wells to construct an estimated potentiometric surface plot, groundwater flow direction, and gradient for each hydrologic unit. If present, any accumulations of light nonaqueous phase liquid (LNAPL) in the monitoring wells will be noted and its thickness documented. Groundwater samples will not be collected from any wells that contain a measurable thickness of FP.

Monitoring well sampling will be conducted according to WCEC Standard Operating Procedures (SOPs) and MTDEQ Guidance for low-flow sampling using a peristaltic pump or bladder pump for purging and sample collection. Groundwater quality parameter data (conductivity, pH, salinity, dissolved oxygen, temperature, turbidity, and ORP) will be acquired from all site wells during each event during well purging using an inline flowthrough cell. Purge water will be managed according to the MTDEQ Guidance for Disposal of Untreated Purge Water from Monitoring Wells flow chart.

Groundwater sample collection from each well will be completed following stabilization of water quality parameters. Water quality parameter, purge volume, and stabilization data for each well will be recorded on WCEC's Well Sampling Form. A duplicate sample will be collected from the monitoring well exhibiting the highest level of petroleum impacts.

All surface water and groundwater samples will be collected in the appropriate method-specific containers, placed on ice, and shipped to Energy Laboratories (Energy) in Helena, Montana for analysis of VPH.

WCEC's will coordinate and oversee elevation and geospatial surveys of all existing and additional monitoring wells by a licensed professional surveyor. WCEC will overlay the data obtained in the survey on the existing georeferenced orthophoto based figures.

3.3 Well Rehabilitation, Abandonment & Installation

Based on the findings of the initial inspection and events, WCEC will direct and supervise any recommended well rehabilitation, abandonment, and installation of monitoring wells to define the extent of petroleum hydrocarbon impacts within the two hydrologic units beneath the facility. The specific scope of the well rehabilitation, abandonment, and installations will be presented in detail in the forthcoming IDS.

3.4 HVDPE Pilot-Scale Study

WCEC will coordinate and conduct a high-vacuum dual-phase extraction (HVDPE) pilot study utilizing four newly installed HVDPE extraction wells to evaluate the use of this remedial technology at the facility. WCEC will obtain the necessary access and permits prior to initiation of the HVDPE pilot study. Any modifications to the following general scope will be presented in the IDS for review and approval by MTDEQ prior to implementation.

The general scope of the HVDPE pilot study consists of the following general scope elements:

- Installation of four HVDPE recovery wells;
- Conducting a pre-study groundwater monitoring event immediately prior to the study;
- Completion of an HVDPE study for a period of up to 10 days;
- Monthly, post-study well gauging and LNAPL assessment for a period of 3 months;
- Groundwater monitoring and sampling at intervals of approximately one-month and three-months after the conclusion of the HVDPE pilot-scale study.

3.4.1 HVDPE Technology & System Overview

Vacuum Enhanced Recovery (HVDPE) is the combination of two commonly used technologies, pump and treat and soil vapor extraction. The removal of water and free product (LNAPL) via high volume pumping depresses the water table to below levels that would occur naturally, while recovering and treating water and collecting free LNAPL if present. The depression of the water table is also intended to expose soils with adsorbed LNAPL to be addressed with soil vapor extraction. Application of vacuum to these exposed soil horizons can also facilitate LNAPL recovery. HVDPE is accomplished at a given well location by installation of a smaller diameter suction tube within a larger diameter monitoring or recovery well using a dual completion wellhead manifold. Fluids are recovered from the suction tube (high volume pumping) with simultaneous application of pneumatic vacuum to the monitoring or recovery well (soil vapor extraction). WCEC will conduct HVDPE at four newly installed wells during the pilot-scale test with specific locations to be presented in the IDS.

The HVDPE pilot test system components are housed within an enclosed trailer and the components are fully automatic. The pilot test trailer consists of the following above ground equipment: The system vacuum is developed by a rotary claw-style vacuum pump capable of up to 200 scfm and up to 24-inches mercury vacuum. Recovered fluids enter the system manifold and are processed by the vapor liquid separator (VLS), where liquids and vapors are separated. Liquids are pumped from the VLS into a treatment train including an oil water separator (OWS), air stripper, and granular activated carbon (if required by permitting authority) and then discharged from the system. Liquid pumps are controlled via float switches installed in each treatment unit. LNAPL separated within the OWS is gravity drained into an external collection tank. Recovered vapors are pulled from the VLS into a particulate filter then through the vacuum pump before discharged to the atmosphere (or emissions control device).

Each suction tube (installed within the HVDPE well) connects to a two-inch diameter flexible hose extending to an external camlock connection on the trailer. The camlock connection pipe penetrates the trailer wall and elbows into the rigid PVC manifold. Each leg of the four-point manifold consists of a flow control gate valve, vacuum indicator and sight tube. Within the HVDPE trailer, vapor conveyance lines are constructed of 2 inch diameter PVC pipe, and liquid conveyance lines are constructed of 1.5 inch diameter PVC pipe and flexible hose.

3.4.2 HVDPE Process Overview

Groundwater, soil gas, and LNAPL enter well screens under hydraulic and pneumatic gradients and are drawn into the suction drop tubes then flow through horizontal conveyance lines into the system manifold. Because the fluids are recovered under a turbulent, high vacuum process, LNAPL may be volatilized within the conveyance piping before it reaches the VLS, or within the VLS. Vapors and liquids enter the VLS where the liquid is separated by gravity in the inlet diffuser. The liquid falls to the bottom of the vessel, and the vapor is pulled upward through a de-entrainment mesh screen, then through a particulate filter and into the HVDPE vacuum pump. Vapor exiting the vacuum pump is discharged to the atmosphere or directed to an emission control unit.

The VLS, OWS, and air stripper transfer pumps are controlled by a series of three float switches. The high-level (HL) switch activates the transfer pump when the liquid level reaches the float, the low-level (LL) switch deactivates the transfer pump when liquids decrease to that level, and a high-level alarm (HLA) switch deactivates the entire HVDPE system when tripped. The high-level alarm switch prevents liquids from entering and damaging the HVDPE vacuum pump, because it is tripped when the VLS influent rate exceeds the VLS effluent rate.

A centrifugal pump transfers liquids (groundwater and LNAPL) from the VLS through check valves and into the oil water separator (OWS). Liquids enter the OWS through an influent diffusion chamber, where solids (sediment, precipitates, etc.) fall out of suspension and are channeled to a sludge collection chamber. Processed liquid is then evenly distributed to the separation chamber containing coalescing media. Liquid flows through the media in a cross-flow configuration, to allow for the LNAPL to rise without interfering with falling solids. The separated LNAPL is then collected at the end of the separation chamber via a rotary skimmer. The rotary skimmer is adjustable for optimum LNAPL collection, which gravity flows to an external collection tank (55-gallon drums). Separated water flows beneath the OWS underflow weir and over the overflow weir and accumulates into the clean water chamber. Liquid level float switches control operation of a centrifugal pump which transfers water from the chamber through a check valve and to the top of the air stripper tower. Total discharge volume (gallons) and flow rate (gallons per minute) are monitored between the OWS and air stripper.

The air stripper is designed to remove dissolved phase constituents by turbulent agitation caused by air flow opposite to the direction of water flow. The air stripper base acts as a sump and holds the treated water until it is pumped through the remaining stage of the system (controlled by float level switches). The base is equipped with a 2” removable sight glass tube which houses the float switches.

When enough water has accumulated within the base of the air stripper, a centrifugal pump transfers the water through the final stage of the treatment process. If granular activated carbon (GAC) is required, water will be pumped through particulate filtration bags and then through the GAC; otherwise water is pumped into the external discharge location (e.g. sewer, vessel, etc.).

Following the HVDPE event, WCEC will conduct monthly follow-up monitoring of LNAPL thicknesses in the pilot study wells for a period of 6 months. Data from the HVDPE event and follow-up monitoring including total product recovery, total fluids recovery, and post-HVDPE LNAPL thickness trends will be evaluated to determine effectiveness of HVDPE as a remedial alternative.

WCEC anticipates that the HVDPE pilot study will consist of a 2-day extraction period at each HVDPE extraction well. The extracted and processed water will be transferred to a holding tank for amendment via ozone sparging then reinjected in existing SVE wells located upgradient from the HVDPE extraction wells. Reinjection of the treated and amended groundwater is intended to create enhanced flushing through the source area, augmenting both recovery and biological attenuation. WCEC does not anticipate that the reinjection of extracted and amended groundwater will negatively affect constituent distribution as the injected volume will be less than the extracted volume and applied in proximally upgradient areas from which it was extracted. No disposal of extracted groundwater will be necessary. Any recovered LNAPL will be transported to WCEC's Missoula office for disposal with an oil / fuel recycler (Tri-State Oil). Due to the limited duration of the HVDPE pilot study, system off gases will not be treated prior to discharge from the system vent stack.

3.5 Report Preparation

WCEC will prepare and submit a comprehensive Interim Data Submittal (IDS) following the initial site inspection and monitoring events. Laboratory analytical data will be validated using DEQ's Data Validation Summary Form, with an individual Form appended for each laboratory analytical report. The IDS will include a summary of the results and observations, any revisions to the scope of additional investigation, well abandonment, and the pilot-scale HVDPE remediation test. The IDS will also include a detailed estimated cost sheet for the revised scope of the Work Plan including the Remedial Investigation Report.

Following receipt of results from the final groundwater monitoring event included in this work plan, WCEC will prepare and submit a Remedial Investigation Report detailing the results of all sampling, investigation, and HVDPE testing scope elements included in the Work Plan. The Remedial Investigation Report will follow the MTDEQ PTCS guidance and include:

a. Presentation and discussion of all data collected during completion of the scope or work included in this work plan.

b. Detailed discussion and evaluation of the pilot-scale HVDPE remediation study.

c. Presentation of 2-dimensional and 3-dimensional conceptual site models that depict LNAPL and petroleum constituent distribution within various environmental media, lithologic conditions, hydrologic conditions, site features, and receptors.

d. Recommendations for additional investigation and remedial actions necessary to mitigate impacts to receptors and progress the releases towards closure.

The report will include well logs, figures depicting historic, current, and planned site features, cumulative data tables for soil and groundwater. The Release Closure Plan (RCP) will be updated to include data collected during the additional investigation and a thorough evaluation and discussion regarding the remedial investigation with recommendations for further corrective actions will be presented in the RCP and Remedial Investigation Report.

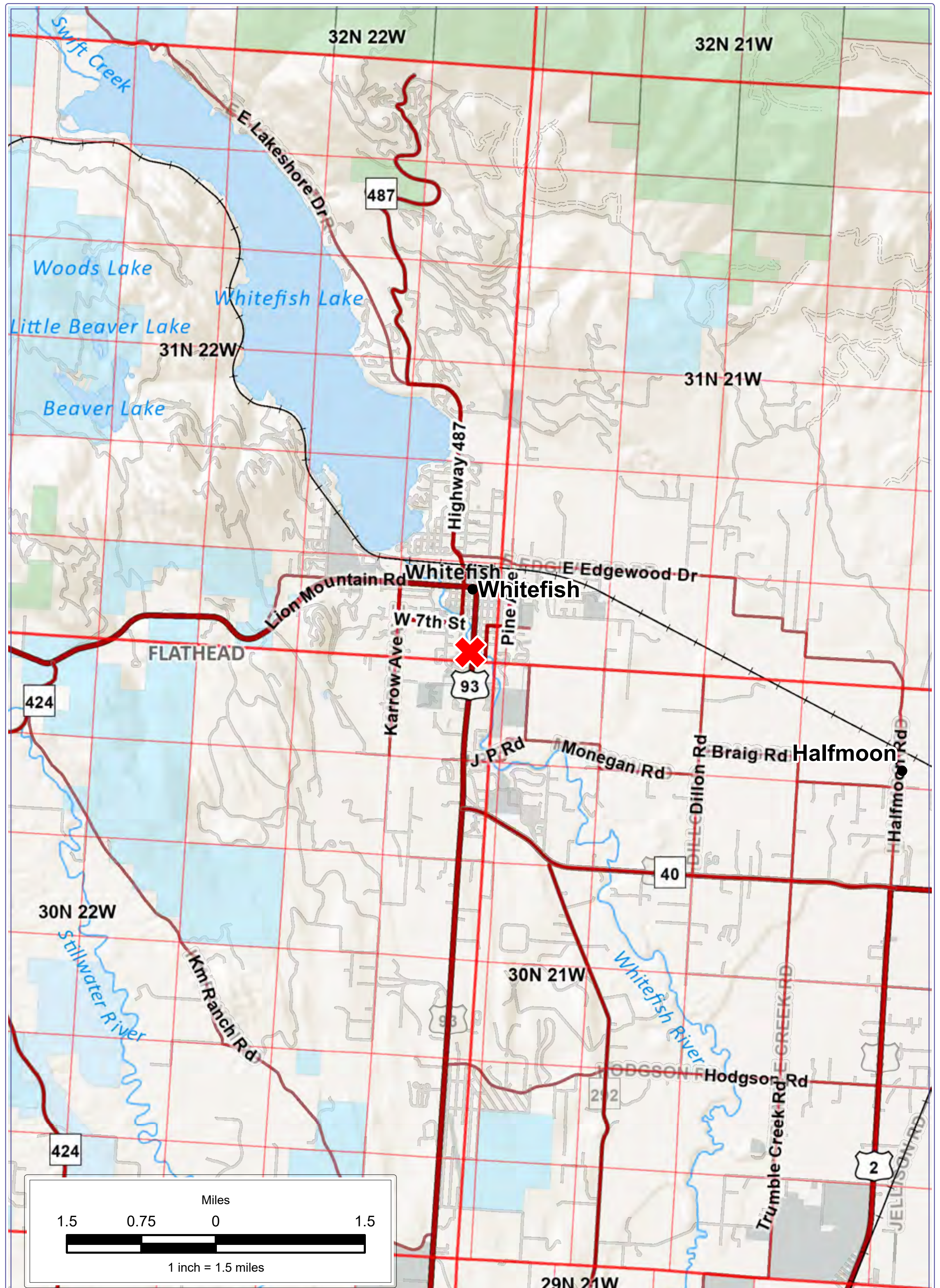
3.6 Cost Estimates

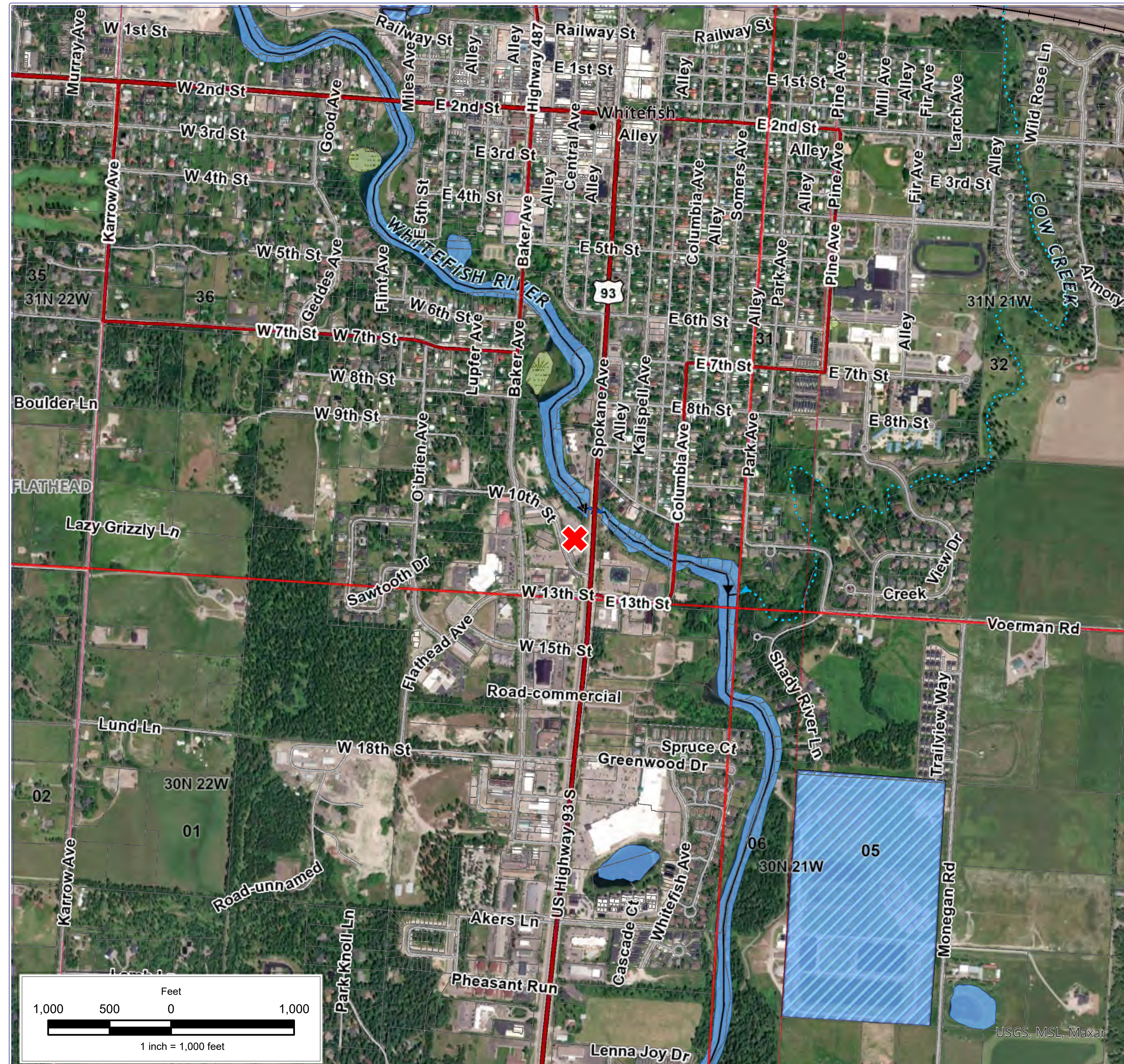
The scope of work outlined in this work plan is tentatively scheduled to begin in Summer 2025, pending approval from the MTDEQ. The attached *Estimated Initial Costs* spreadsheet and *PTRCB Groundwater Sampling & Unit Cost Worksheet* detail anticipated project costs for the initial site inspection and monitoring events. Costs to complete the remaining, final scope of work included in this work plan will be presented in the forthcoming IDS.

4.0 References

Olympus Technical Services, Inc (Olympus, 2019). *LIF Geoprobe Investigation, Groundwater Monitoring, and Remedial Alternatives Analysis Report*. May 23, 2019

List of Figures





Site Location

✖ Site Location	**Site Location**	Town Pump Whitefish 1 6600 Highway 93 South Whitefish, MT	DRAWN BY: MM DATE: 07/14/25 SCALE: 1:12,000
		PROJECT NUMBER: 2506-0989	IMAGE SOURCE: ESRI BASEMAPS

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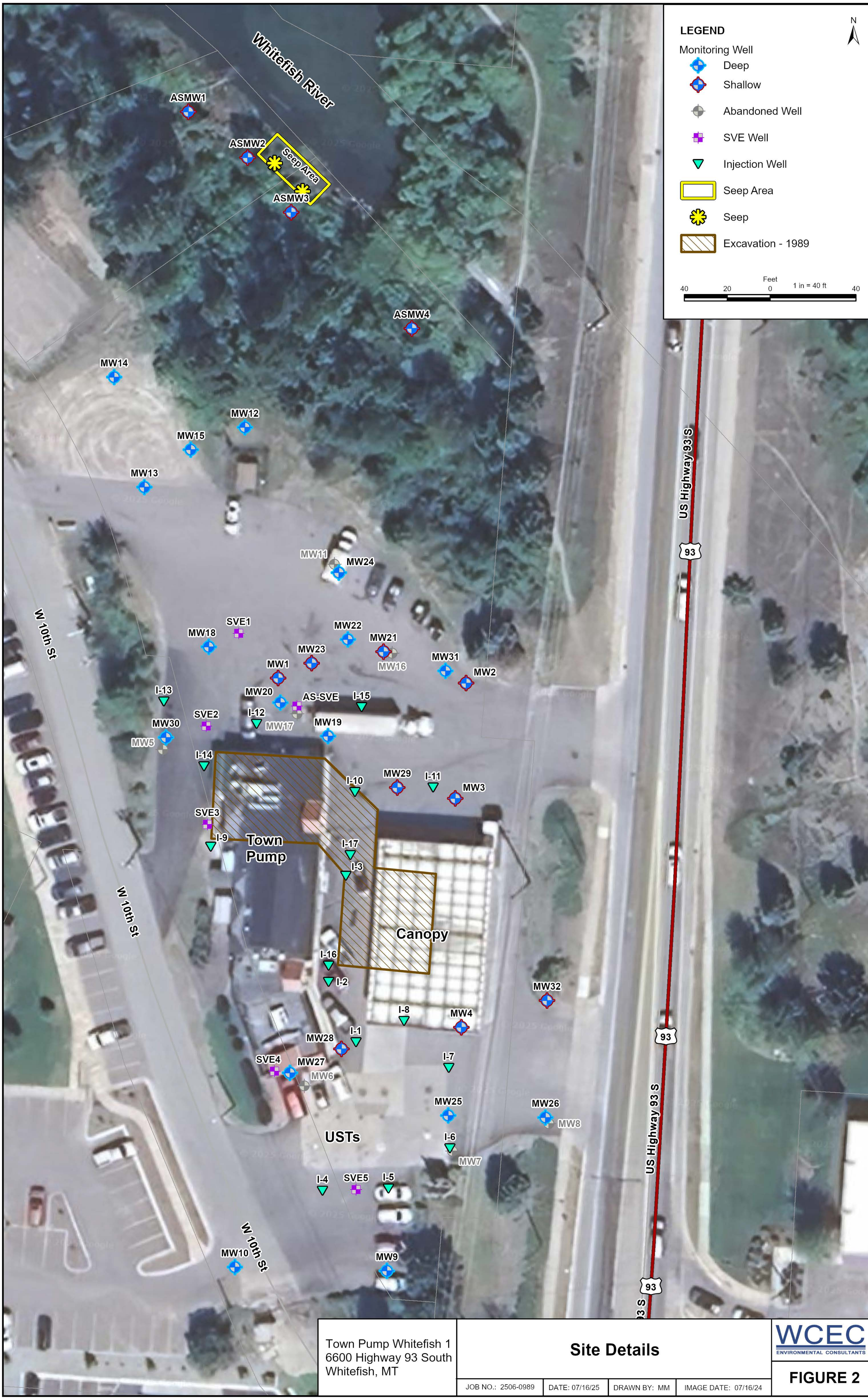
FIGURE 1



Town Pump Whitefish 1
6600 Highway 93 South
Whitefish, MT

Site Details

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FIGURE 2

JOB NO.: 2506-0989 | DATE: 07/16/25 | DRAWN BY: MM | IMAGE DATE: 07/16/24