PONDERAY UNDERCROSSING TECHNICAL ANALYSIS
LAND CAPABILITY SUMMARY REPORT

PONDERAY, IDAHO

Prepared for:

Idaho Department of Environmental Quality
2110 Ironwood Parkway
Coeur d'Alene, Idaho

The Trust for Public Land
690 S. Highway 89
Jackson, Wyoming

Prepared by:

AECOM
400 South Broadway Avenue
Boise, ID 83702

PROFESSIONAL ENGINEER REGISTERED 11202 STATE OF IDAHO GREG GRIFFIN
9-16-2015

September 2015

TABLE OF CONTENTS

EXECUTIVE SUMMARY

The Pend d'Oreille Bay Trail (POBT) is a scenic pathway that connects three communities along the shoreline of Lake Pend Oreille (Figure 1). Due to the location of the Burlington Northern Santa Fe Railway Company and the Montana Rail Link Railroad mainline tracks on the west shoreline, direct pedestrian access is prevented from the City of Ponderay to the POBT. Previous studies have indicated that providing vehicular and pedestrian access to the POBT could be a potential economic benefit to the municipal area. As a result, the Idaho Department of Environmental Quality and the Trust for Public Land has retained AECOM to conduct a technical analysis for improved access from Ponderay, Idaho to the west shore of Lake Pend Oreille, a popular recreation destination for the bordering communities of Sandpoint, Ponderay, and Kootenai, Idaho.

The purpose of this report has been to gather existing data on geotechnical, GIS, previous environmental site assessments, topography and soil, hydrology, biological resources, archeology, and erosion control and stormwater management to evaluate the feasibility of a railroad crossing. The results of this report will be used as the basis for a future study to design vehicular and pedestrian access from SH-200 to the POBT. The study area (Figure 2) incorporates portions of Brownfields Zones 4 and 5 and the adjoining parcels located between SH-200 and the west shoreline of Lake Pend Oreille. AECOM reviewed relevant existing data pertinent to the study area. Based on the compiled information, anticipated conditions and possible constraints have been identified as follows:

- Long-term settlement issues may be possible due to thick clay layers and the presence of a high water-table.
- Concentrations of arsenic, mercury, cadmium and lead have been found in the top soil layers in Zone 4 and would require clean-up activities.
- No properties outside of Brownfields Zones 1 through 5, including the Harbison property and the railroad right-of-way have documented or reported outstanding environmental issues and remediation is not anticipated on local parcels.
- Long-term drainage systems will most likely need to be engineered to manage the release of stormwater in the presence of the high water table.
- Wetlands are not expected to be impacted near the Harbison property but may be encountered near the proposed undercrossing near the end of 3rd Street.
- A site-specific cultural resource inventory should be conducted in the future once the preferred alignments have been selected.
- Impacts to seeps or the seep-fed stream feature at the pedestrian crossing location would require a joint stream channel alteration permit from the Idaho Department of Water Resources, Idaho Department of Lands and the U.S. Army Corps of Engineers.

1.0 INTRODUCTION

AECOM was retained by the Idaho Department of Environmental Quality (IDEQ) and the Trust for Public Land to conduct technical analysis for improved access from Ponderay, Idaho to the west shoreline of Lake Pend Oreille, a popular recreation destination for the bordering communities of Sandpoint, Ponderay, and Kootenai, Idaho (Figure 1). Currently, the Pend d'Oreille Bay Trail (POBT), which follows 1.4 miles of shoreline between the three communities, is not accessible from the City of Ponderay due to presence of railroad tracks operated by the Burlington Northern Santa Fe Railway Company (BNSF) and the Montana Rail Link (MRL) Railroad, located between the City of Ponderay and the POBT. Providing a safe and authorized connection between the City of Ponderay and the POBT has been identified as a high priority for this area (Harmony, 2015). Connectivity between the City of Ponderay and the POBT has also been identified as a potential economic benefit for the municipal area (Harmony, 2015).

This land capability summary report evaluates the feasibility of two potential railroad crossing locations and future pending development of the area below the railroad grade. For the purposes of this project, the study area is defined as portions of Brownfields Zones 4 and 5 along the west shoreline of Lake Pend Oreille and the west adjoining private parcel located between SH-200 and the railroad (Figure 2). The potential crossing options are located in the following areas within the City of Ponderay (Figure 3):

- Near the intersection of Oak Avenue and 3rd Street (potential pedestrian/bicycle underpass or overpass) in the area of an existing seep-fed stream swale; and

- Near the south end of the Harbison Property (potential roadway underpass or overpass with bicycle and pedestrian facilities).

Since 2005, through the support of a Brownfields Assessment Coalition Community-Wide Hazardous Substance and Petroleum Brownfields Assessment Grant from the U.S. Environmental Protection Agency, several environmental studies have been conducted along the west shoreline of Lake Pend Oreille near the POBT. Based on historic industrial activities along the shoreline, IDEQ divided the 2-mile stretch of shoreline along the POBT into 5 zones (Figure 2). Proposed crossing locations are situated within portions of Zone 4 (near the south end of the Harbison Property) and Zone 5 (near the intersection of Oak Avenue and 3rd Street).

The current-day setting of the study area consists of residential neighborhoods directly north of Zone 4 and near the west end of Zone 5, along Ash, Birch, Cedar, and Oak Avenues. The Emerald Industrial Park is located directly northwest of Zone 3 and Zone 4, between Highway 200 and the BNSF/MRL corridor. Businesses listed in the industrial park include: Diedrich Coffee Roasters, Cygnus Incorporated (metal fabricator), Selkirk CNC (machine shop); Johnson Excavating, Darigold, and Burnett Transmission Repair.

To the northeast of the industrial park is a vacant 9.05-acre private parcel zoned residential; the adjoining 1.25 acre parcel is under the same ownership (the Harbisons) and also zoned residential. Directly north of the Harbison property and west of Ash Avenue is an 8.97-acre parcel owned by Idaho Transportation Department (ITD) and used as equipment and materials storage.

This report documents existing geotechnical and environmental data AECOM has collected for use in the technical feasibility analysis of potential railroad crossing options for this project. The following subsections provide a summary of geotechnical and environmental considerations associated with the proposed project.

2.0 RESOURCE CONSIDERATIONS

2.1 GEOTECHNICAL INFORMATION

AECOM reviewed several past and current projects in the vicinity of the study area, including geotechnical information from well logs. The following is a summary of the information presented from the Sandpoint Byway and Goodwill Industries building projects near SH-200.

Sandpoint Byway Project

A review of the US 95 Sandpoint N/S drill logs, general soil conditions and bridge piling was completed.

Project Overview: The project is 2 miles in overall length and located approximately 1 mile south of the proposed POBT development. This project included 6 bridges, 65 retaining walls and extensive geotechnical exploration and pile testing due to poor soil conditions.

General Soil Conditions: Typical soil profile consists of the top 30 feet being medium stiff sandy silt to clay (blow counts vary from 9 to 15). Intermediate layer from 30 feet to 128 feet consists of very soft to soft clay with thin layers of loose to medium dense sandy silt (blow counts vary from 0 to 5). Lower layer from 128 feet to 220 feet consists of alternating soft to medium silt and clay (blow counts vary from 7 to 13).

Settlement Issues: Wick drains were installed along the length of the corridor. This technique does not change the overall settlement but relieves the pore pressure within the clay to increase the rate at which the settlement occurs.

Bridge Piling: The Sand Creek Bridge, Ramp Bridge, the Bridge Street Bridge and the North Interchange Bridge were reviewed.

- *Sand Creek Bridge*: Designed using AASHTO (American Association of State and Highway Transportation Officials) Standard Specifications for Bridge Design, 17th Ed. Piles used were 24-inch diameter driven steel pipe piles approximately 148 feet long having a required capacity of 125 tons at the abutments and a required capacity of 220 tons at the piers.

  The top 17-foot soil layer was comprised of sand/silt/clay and the underlying layer was approximately 70 feet deep and was silty clay.

- *Ramp Bridge*: Designed using AASHTO LRFD (Load and Resistance Factor Design) Bridge Design Specifications, 2nd Ed. Piles used were 24-inch diameter driven steel pipe piles approximately 95 feet long at the abutments having a required capacity of 108 tons and 177 feet long at the piers having a required capacity of 183 tons to 254 tons.

  The top 29-foot soil layer was comprised of sand/silt/clay and the underlying layer was approximately 100 feet deep and was silty clay.

- *Bridge Street Bridge*: Designed using AASHTO LRFD Bridge Design Specifications, 2nd Ed. Piles used were 24-inch diameter driven steel pipe piles approximately 115 feet long at the abutments having a required capacity of 160 tons.

  The top 13-foot soil layer was comprised of sand/silt/clay and the underlying layer was an approximately 120-foot deep clay layer with a 15-foot to 20-foot layer of sandy clay layer.

- *North Interchange Bridge*: Designed using AASHTO LRFD Bridge Design Specifications, 2nd Ed. Abutment piles used were 16-inch diameter driven steel pipe piles approximately 100 feet long having a required capacity of 99 tons. Pier piles used were 24-inch diameter steel pipe piles and were approximately 117 feet long with a required capacity of 140 tons.

<u>Goodwill Industries near SH-200</u>

Project site is located approximately 0.5 miles from the proposed undercrossing along SH-200. Five test pits were dug at the site varying in depths from 8 feet to 10 feet. The top silty sand layer was approximately 2 feet deep and the next layer encountered was soft, moist clay. In all instances, the test pits were terminated due to caving. The water table was noted at 2 to 3 feet below ground surface at the time of digging the test pit. In one instance, the water table was noted at 1 foot below ground surface 24 hours after digging the test pit.

Expected Site Conditions

Based on available information, the following conditions can be expected for this project:

- *Soils*: Based on the Sandpoint Byway and the Goodwill Industries projects, it is expected that the soft, deep clay layer will be encountered. It was noted at the Goodwill site, the top layer was approximately 2 feet in thickness as compared to 20 feet thick at the Sandpoint Byway project and it is not known how deep the top silty sand layer may be; it could vary from several feet to twenty feet thick.

- *Groundwater*: Based on the exploration at the Goodwill site, it is expected that the water table is shallow and could be encountered within 5 feet of the ground surface. A high water table is noted for soils at the location (Section 2.4; Table 1). An undercrossing will most likely require dewatering during construction and long-term drainage that would not be necessary for an overcrossing.

- *Settlement Issues*: Due to the high water table and thick clay layer expected at this site, long-term settlements may become an issue depending on the magnitude of the settlement, time to dissipate the settlement, and cost to mitigate the settlement. Issues due to settlement can be reduced or eliminated using an undercrossing because a smaller embankment will reduce the amount of overburden as compared to an overcrossing. Lightweight fill (expanded polystyrene block) could be studied as a cost-effective means to minimize or eliminate settlements.

- *Bridge Piling*: Large-diameter driven steel pipe piles were used on the Sandpoint Byway project. It would be expected to use comparable piling with similar capacities but it should be noted that this particular project undertook a special in-situ static testing program to allow higher design values. Without this type of in-situ testing, the design values will be less and longer piles may be required. For a project the size of the Ponderay crossing, it is cost prohibitive to undergo a testing program similar to the Sandpoint Byway project and the design pile capacities will be less with all else being equal. A cost comparison should be done in the preliminary design to compare pile requirements using a concrete superstructure and pile requirements using a steel superstructure. An example steel superstructure with architectural treatments is the Bridge Street Bridge.

2.2 GIS INFORMATION

AECOM reviewed existing survey, base mapping, utilities, and right-of-way files provided by the City of Ponderay. The following is a brief summary of the information provided:

Shape Files

Shape files showing exiting parcel information were provided for the area between SH-200 and the Lake Pend Oreille shoreline, and between US-2 and Kootenai Bay Road along the BSNF/MRL corridor. The parcels show existing commercial and residential lots as well as the BSNF/MRL right-of-way. This information can be used to evaluate and estimate impacts to existing properties.

Topographic Files

Computer-aided drafting (CAD) files labeled as Zones 1 through 5 showing two-foot contours were provided for an area bound by the northern BSNF/MRL right-of-way line to the shoreline and between US-2 and Kootenai Bay Road along the BSNF/MRL corridor. These files show 2-foot contours only and do not represent any buildings, wells, roadways, walls, structures or any other similar features.

A CAD file labeled "Zone 4" was also provided showing a greater level of detail of an area south of Cedar Lane between the southern BNSF/MRL right-of way line and the shoreline within the Brownfields site. This file shows one-foot contours, retaining wall locations, and other structural elements such as pilings, slabs and footings.

No topographic information for the area between SH-200 and the northern limit of the BSNF/MRL right-of-way has been provided. Ground information in this area is important for the development of access to SH-200 and the surrounding neighborhood.

The topographic information provided should be considered as the absolute minimum to develop concept level alignments and quantities for access alternatives. More detailed survey information will be needed for any preliminary and final design efforts.

Utilities

No utility files were provided. It is anticipated that there will be fiber optic communications lines associated with the railroad. These lines will need to be located to determine the degree of impacts associated with earthwork. A number of other utilities may be present within the area such as power (above ground and underground), water, sewer, and gas. There does not appear to be any manholes or evidence of a storm sewer system in the Ponderay study area. Overhead power lines are located on the northwest side of the BNSF/MRL corridor but ownership has not been established.

Base Mapping

CAD files showing the BSNF/MRL railroad right-of-way limits and horizontal alignment, and the existing POBT were provided. Some of the provided CAD files identified historical data

associated with the Brownfields site including old building locations, soil sample locations, and the slag dump.

Base mapping provided should be considered as the absolute minimum to develop concept level access, alignments, and quantities for alternatives. More detailed base mapping information will be needed for any preliminary design efforts.

2.3 PREVIOUS ENVIRONMENTAL SITE ASSESSMENTS

Site Background Information

Historic industrial uses dating back to the early 1900s occurred along the west shore of Lake Pend Oreille and include the former Humbird Lumber Mill operations in Sandpoint, the former Panhandle Smelting and Refining Company (PSRC) smelter facility in Ponderay, and the former Northern Pacific railcar maintenance and lumber mill operations in Kootenai.

The City of Ponderay was originally platted during the early 1900s as part of the smelter development supporting Bunker Hill Smelter in the Silver Valley. The PSRC operated along the west shoreline of Lake Pend Oreille from 1907 to 1909. Over the smelter's short period of operation, approximately 10,000 tons of primarily lead/silver ores were smelted, resulting in a trace to heavy concentration of metals at the site. Soils in the vicinity have high lead concentrations and residual ore deposits are present (IDEQ, 2009). Smelter slag was deposited south of the operating buildings on what was dry land at the time. The lake level was raised during the summer months after 1954 by the Albeni Falls Dam and the current summer pool level allows wave action to erode the smelter slag. Metals-contaminated smelter slag is eroded each year to Lake Pend Oreille (IDEQ, 2009).

Existing Environmental Site Assessment Information

AECOM reviewed existing environmental reports and past collected data to evaluate project alternatives for feasibility determination based on potential human and environmental risk. The following is a summary of the reviewed data with focus on past environmental studies and documented environmental contamination within Zones 4 and 5.

- During 2005, IDEQ contracted for services to survey potential hazardous materials within each of the five zones along the POBT area and a preliminary assessment of the site was conducted. At the time of the 2005 assessment, concrete foundations of the smelter, some bricks, residual ore, and the slag deposit were the only remnants of the smelter operation. The preliminary assessment determined that the site had surface soil lead contamination well in excess of accepted human health criteria. Local residents have a history of using the site as a swimming, camping and picnic area during the summer months. The assessment also determined that contamination of groundwater was likely minimal due to

the fine soils and low transmissivity of groundwater in these soils. Impacts to surface water were less apparent, but likely limited (IDEQ, 2009).

- In 2009, IDEQ entered into a cooperative agreement with the U.S. Environmental Protection Agency (EPA) for the POBT Brownfields Assessment Coalition Community-Wide Hazardous Substance and Petroleum Brownfields Assessment Grant under the American Recovery and Reinvestment Act (ARRA). Coalition Assessment partners include IDEQ, the Cities of Sandpoint, Ponderay, Kootenai, and Bonner County. Through this grant project, the coalition assessed the nature and level of contamination within the POBT and developed a cleanup plan to address confirmed contamination (TerraGraphics, 2013).

- During 2011, URS conducted a Phase I Environmental Site Assessment (ESA) for Zone 4 of the POBT. Findings identified three Recognized Environmental Concerns (RECs) associated with railroad right-of-way hazardous substances, PSRC hazardous substances, and fill and debris areas (Delco Dump hazardous substances). Prior environmental assessment and human health reviews confirmed that metals-contaminated soil was present on Zone 4. It was reported that the potential exists for soil metals contamination to leach to shallow groundwater and emerge in surface water seeps, and possibly discharge to Lake Pend Oreille (URS, 2011).

- During 2012, seep sampling Phase II ESA investigations were conducted by Strata, A Professional Services Corporation (STRATA) on POBT Zones 1, 2, 3, and 4. The purpose of the sampling was to evaluate whether groundwater seeps were impacted from contaminants leaching to groundwater pathways. Analytical results revealed slightly elevated concentrations of the metal cadmium above IDTL/MCL (initial default target level/maximum contaminant level) in Zone 4 and arsenic in Zone 2; PCOCs (potential chemicals of concern) were not identified above IDTLs/RUSLs (residential use screening levels) in Zone 1 and Zone 3 (STRATA, 2012). Seep locations within Zone 4 are presented on Figure 3.

- Also during 2012, TerraGraphics Environmental Engineering, Inc. (TerraGraphics) completed test pit soil sampling of eleven test pits excavated within Zone 4. The report described test methods with laboratory results for 10 soil samples collected from seven test pits. Laboratory analysis detected the following: arsenic concentrations ranging from 3.28 mg/kg to 734 mg/kg (background arsenic measurements from several control sites across North Idaho demonstrate a background arsenic level of 15 mg/kg.); cadmium concentrations ranging from <0.2 mg/kg (less than the laboratory reporting limit) to 3.82 mg/kg; lead concentrations ranging from 24.1 mg/kg to 94,400 mg/kg; mercury concentrations ranging from 0.0193 mg/kg to 1.73 mg/kg; and zinc concentrations ranging from 45.4 mg/kg to 9,390 mg/kg. Soil IDTLs for cadmium, mercury, and zinc are

based on protection of groundwater, while the soil IDTL for arsenic is based on protection of humans who come in direct contact with soil. The soil lead IDTL is based on protection of groundwater and the soil lead EPA Regional Screening Level for Industrial and Residential Soil (EPA RSL) is based on protection of humans who come in direct contact with soil. All soil samples exceeded the respective IDTL for arsenic and mercury. Two samples exceeded the IDTL for cadmium and two samples exceeded the IDTL for zinc. All but one sample exceeded the IDTL for lead; however, only five of the samples exceeded the respective EPA RSL for lead (TerraGraphics, 2012a).

The 2012 TerraGraphics assessment also included sampling and analysis of three groundwater monitoring wells located within Zone 4 (Figure 3 provides locations of the groundwater monitoring wells). A total of four groundwater samples were collected (one from each well and one field duplicate). Of the three wells, MW-1 was the only well with a metal detection above the IDTL; total lead was measured at 0.0179 milligrams per liter (mg/L). All other detected analytes were below the IDTLs. This suggests that the amount of metals found in the soil at the site have either not leached into the groundwater sampled or they have leached out of groundwater sampled (TerraGraphics, 2012a).

In conjunction with the characterization of waste piles and groundwater within Zone 4, TerraGraphics summarized the data collected during the Phase II ESA and conducted an initial risk screening of the soil data from Zone 4 (TerraGraphics, 2012b). The report states there are no known drinking water wells within a 4-mile radius of the site. Findings of the report showed the site is contaminated with levels of both lead and arsenic that represent excessive risk to human health at current conditions. The report states that "Unrestricted access to recreational users and unprotected construction, salvage, or development activities could result in dangerous exposures, even for short-term activities. As such, this site, if not responsibly managed, could represent a significant hazard to the public and, particularly, any trespassers that would explore or exploit the current property. Potential remediation options that would reduce risk would incorporate site-specific risk-based remedial action criteria for lead and arsenic in soil. These remedial action criteria would be based on current and projected land uses at the site and would result in an average soil concentration expected to be protective of site visitors and workers. Remedial action criteria can trigger the removal, replacement, or capping of soil and waste materials in select areas of the site to reduce overall soil concentrations to be protective of all site users. In addition, the slag pile must be addressed as it is visibly eroding and is a source of continuing contamination at the site with lead and arsenic concentrations as high as 20,500 mg/kg and 125 mg/kg, respectively. By addressing these key areas, the resultant concentrations would be protective of all central tendency and reasonable maximum exposure to lead and arsenic expected to occur at the site (TerraGraphics, 2012b)."

- In 2013, URS completed a Phase I ESA for POBT Zone 2 that also included attachments describing conditions for Zones 3 and 4 with historic smelter operations that produced slag from lead and silver ores. As was previously stated, the former PSRC facility is located within Zone 4 of the POBT. The facility was constructed in approximately 1904 and ceased operations in approximately 1910 to 1911. The PSRC received and refined primarily lead and silver ores from local mines. The facility disposed smelter wastes to Lake Pend Oreille including smelter slag. The local landmark "Black Rock" is located within Zone 4 and is a deposit of smelter slag remaining from PSRC operations (URS, 2013). Those conditions were previously described above by the STRATA and TerraGraphics 2012 reports.

- In 2013, TerraGraphics completed a Draft Analysis of Brownfields Cleanup Alternatives (ABCA) and Workplan for Zone 4 of the POBT. The goal of the ABCA was to adequately address potential exposure pathways to the identified site COPCs (chemical of potential concern). Risk-based cleanup objectives (i.e., soil exposure concentrations) were developed in the Risk Management Plan based on the potential future uses of and activities at the site. Acceptable soil exposure concentrations were generated for those exposures expected to occur at the site using the EPA Integrated Exposure Uptake Biokinetic Model (IEUBK), Adult Lead Model (ALM), the Idaho Risk Evaluation Manual (REM), and the EPA's Guidance for Risk Characterization. Of the four COPCs assessed using the REM, arsenic was by far the greatest contributor to cumulative cancer and non-cancer risks. Cadmium, mercury, and zinc posed minimal risk to recreational and occupational receptors at the site. Therefore, only lead and arsenic risks were calculated for each site exposure scenario (TerraGraphics, 2013). The following clean-up activities were identified in the preferred alternative (Alternative 5) of the ABCA:

    - A combination of on-site and off-site disposal and institutional controls would be recommended. Selected mine waste and contaminated soils with contaminant concentrations above site-specific risk-based remedial action criteria would be excavated and shipped offsite for disposal or re-processing and metals recovery. The remaining mine waste and contaminated soils, including the slag pile, would be consolidated in an on-site repository or capped in place.

    - The waste removal areas and any temporary access roads and staging areas would be reclaimed by ripping and grading the areas to blend with the surrounding topography. The areas would be seeded with a native seed mix and erosion control Best Management Practices would be installed. The lakeshore/beach at the slag pile would be stabilized and reclaimed to prevent erosion (TerraGraphics, 2013).

- In 2014, TerraGraphics completed a Phase I ESA for POBT Zone 4 (TerraGraphics, 2014). Similar to the 2011 Phase I ESA, TerraGraphics identified RECs associated with past operations conducted at the PSRC facility and debris at the Delco Dump area. Based on on-site assessment activities, historic smelting operations, the presence of the railway, and the debris site have resulted in COCs (contaminants of concern) above acceptable risk-based concentrations. TerraGraphics recommended controlling access to the site in conjunction with informational and warning signage and/or moving forward with remediation activities as presented in the Draft ABCA (TerraGraphics, 2013).

In summary, concentrations of arsenic, mercury, cadmium, and lead are elevated in soil in Zone 4. These soil contaminants may have potential to impact shallow groundwater and surface water seeps or to discharge into Lake Pend Oreille. Current concentrations of both lead and arsenic in Zone 4 represent excessive risk to human health. Site clean-up would need to occur before development of this area. Preferred clean-up activities would consist of a combination of on-site and off-site disposal and institutional controls. Selected mine waste and contaminated soils would need to be excavated and shipped offsite for disposal or re-processing and metals recovery. The remaining mine waste and contaminated soils, including the slag pile, would need to be consolidated in an on-site repository or capped in place. Access to the site would need to be controlled in conjunction with informational and warning signage.

In conjunction with review of previous environmental documents, AECOM accessed current information provided by the IDEQ on-line database, Terradex Mapper (IDEQ, 2015). The following businesses were identified by the database with regulatory listings: Cygnus is listed as a small quantity generator of hazardous waste with no record of violations; ITD is listed on the leaking underground storage tank database with closed status; and POBT Zones 1, 2, 3, and 4 are listed as Brownfields sites. No other properties within the vicinity of the study area were listed on the database and no outstanding environmental issues were reported on the database. Review of the current database listings did not identify activities on adjoining property that potentially represents environmental concern, beyond the previously described historical industrial activities conducted in the area.

2.4 TOPOGRAPHY AND SOIL

The average elevation on the shoreline is 2,000 feet above mean sea level (Lake Pend Oreille summer pool elevation) to 2,100 feet above mean sea level (Lake Pend Oreille winter pool elevation) (USGS, 1996). The ground surface is relatively flat along the western upland shoreline and along the railroad. However, between the POBT and the railroad, the slope drops steeply downward in some places approximately 30 feet toward Lake Pend Oreille (refer to Figure 3 for topographic representation).

Two soil types are mapped in the study area (USDA-NRCS, 2014). The area above the railroad grade is predominantly classified as Mission silt loam, with 0 to 2 percent slopes, and the area below the railroad grade is predominantly classified as Haploxeralfs and Xerochrepts, with 30 to 55 percent slopes (Figure 3). Recently deposited beach sediments consisting of sands and poorly-graded gravels are present along the waterfront portion of the POBT (URS, 2013). Silt and silty-fine-sand were observed emerging below the U.S. Army Corps of Engineers (USACE) rip-rap during seep sampling activities conducted in 2012 (STRATA, 2012).

The mapping unit Mission silt loam is comprised of weathered vegetation near the surface underlain by silty loam with interbeds of fine sand to depth. The mapping unit Haploxeralfs consists of well-drained silt loam over interbedded silty clay loams and fine sand horizons. Soil strata detail was collected at three monitoring well locations in the area below the railroad grade (Figure 3). Soils at the site range from silty sand to clay with areas of large gravel and cobbles (TerraGraphics, 2012a). Soils in these locations were generally moist to wet in soil layers approaching the water table. Shallow depths-to-groundwater and saturated soils in the study area may increase complexity of engineering and construction in these areas. Long-term drainage systems may need to be engineered to manage high water tables in construction areas. Characteristics of mapped soil types pertinent to the project are presented in Table 1.

Table 1. Soils types in the study area (USDA-NRCS, 2014).

Soil Type	General Location within the Study area	Composition	Parent Material	Natural Drainage Class	Depth to Water Table	Capacity of the most limiting layer to transmit water
Haploxeralfs and Xerochrepts, 30 to 55 percent slopes	Below railroad grade	Haploxeralfs (40%)	Volcanic ash and loess over silty glaciolacustrine deposits	Well-drained	More than 80 inches (actual recorded depths: 5 to 23 feet)	Moderately low to high
		Xerochrepts (30%)	Volcanic ash and/or loess over sandy glaciolacustrine deposits and/or outwash and/or till	Well-drained	More than 80 inches (actual recorded depths: 5 to 23 feet)	High
Mission silt loam, 0 to 2 percent slopes	Above railroad grade	Mission silt loam (75%)	Volcanic ash and loess over silty glaciolacustrine deposits	Somewhat poorly drained	About 6 to 18 inches	Very low to moderately low

2.5 HYDROLOGY

2.5.1 Lake Water Quality

Lake Pend Oreille is listed as 404(d) impaired for the following uses (EPA 2012):

- Cold water aquatic life due to mercury levels, flow regime alterations, and total phosphorus levels
- Salmonid spawning due to total phosphorus levels
- Contact recreation due to mercury levels

The lack of surface water conveyance from the potential railroad crossing locations to the lake minimizes risk of transport of materials directly into the lake. However, erosion during construction and increased stormwater runoff due to increased impervious surfaces (e.g., roads and sidewalks) in the study area could increase the risk of overland water flow that could impact water quality in the lake. IDEQ has stated that groundwater movements in the area are slow and that loading of contaminants into the groundwater and subsequent transport of contaminants to the lake is unlikely (IDEQ, 2009). Well-designed and implemented erosion control measures (including development of a Stormwater Pollution Prevention Plan, SWPPP) and engineered stormwater management features would minimize or eliminate the risk of project-related pollution being transported to the lake via overland flow or groundwater transport mechanisms.

2.5.2 Surface Water Conveyance

No surface waters are mapped in the National Hydrography Dataset (USDA-NRCS et al., 2015) or National Wetlands Inventory (USFWS, 2015a) in or near the potential crossing locations or the potential development area. A seep-fed stream feature with running water is present in the east side of the study area (Figure 3). This feature crosses under the railroad in the area at the end of 3rd Street via a culvert. Development of the pedestrian crossing in this area would require this stream feature to be surveyed and the Ordinary High Water Mark and any adjacent wetland features to be clearly delineated. Impact to this feature would require a joint stream channel alteration permit from the Idaho Department of Water Resources, Idaho Department of Lands, and the U.S. Army Corps of Engineers (USACE, 2015).

2.5.3 Groundwater

Soils mapped in the area below the railroad grade (Haploxeralfs and Xerochrepts, with 30 to 55 percent slopes; USDA-NRCS, 2014) are estimated to be greater than 80 inches from the water table. Depth-to-groundwater has been measured at between 6.5 feet and 23 feet in the area below the railroad grade, with shallower depths-to-groundwater reported closer to the water edge (TerraGraphics, 2012a). Groundwater monitoring well locations are shown in Figure 3. Reported

depth-to-groundwater for the soil type above the railroad grade (Mission Silt Loam; USDA-NRCS, 2014) is 6 to 18 inches. Groundwater depth in the City of Ponderay and nearby areas is highly variable and often close to the soil surface (Brubaker 2015). No drilling logs with depth-to-groundwater data are available for the immediate area of the potential crossing locations. Based on topography, groundwater flow along the POBT is inferred to be from west to east towards Lake Pend Oreille. Shallow depths-to-groundwater throughout the study area may increase the difficulty of construction in these areas. Long-term drainage systems would need to be engineered to manage high water tables in construction areas.

Several seeps have been identified and sampled in the study area near the edge of Lake Pend Oreille (Figure 3). These seeps are groundwater-fed, though some seeps also may be hydrologically connected to perched water tables in up-gradient areas (STRATA, 2012). The seeps are at the water edge and emerge below the USACE rip-rap along the POBT. Seep locations will be important to consider for development of the shoreline area.

2.5.4 Floodplains

The Federal Emergency Management Administration (FEMA) has mapped flood hazard zones in the study area. The FEMA-mapped Flood Hazard Zone A/AE extends a few feet above the edge of Lake Pend Oreille (elevations from approximately 2,070 to 2,090 feet) but does not approach the railroad grade or the proposed crossing locations (Figure 3). Flood Hazard Zone A/AE areas are subject to inundation by 1-percent-annual-chance flood events. The rest of the study area, including the potential crossing locations, is mapped as Flood Hazard Zone X, meaning the site is at a minimal risk (less than 0.2-percent-annual-chance) for flooding.

If changes to the floodplain elevation greater than 1.0 foot would occur with proposed development of the shoreline area, a Conditional Letter of Map Revision (CLOMR) would be required from FEMA, which would include a comment on the effects that the proposed development would have on the Flood Insurance Rate Map for the area. To obtain a CLOMR, FEMA must be provided with the following:

1) Certification that no structures would be impacted by the base floodplain elevation increase;
2) An evaluation of alternatives that would not have caused the base floodplain elevation increase,
3) Individual legal notice to all impacted property owners (44 CFR Section 65.12)

At the conclusion of project development, a Letter of Map Revision (LOMR) would be required from FEMA. Obtaining CLOMR and LOMR letters can be an extensive process and requires early coordination with FEMA.

2.5.5 Wetlands

A single PEMC (palustrine emergent, seasonally flooded) wetland is documented in an area below the railroad grade west of the unmapped stream feature (USFWS, 2015a; Figure 3). The wetland is situated in an area that may be a relic stream or drainage channel running parallel to the edge of the lake. This wetland is outside the area of the potential railroad crossing locations but could be a consideration for the development of the area below the railroad grade. Other wetland areas may be present in the area below the railroad grade.

Development of this area would require formal wetland delineation to be performed and submitted to the USACE for verification. Any impacts to wetlands would require a Clean Water Act Section 404 permit to be submitted to the USACE. Aerial photos of the site and site visit notes do not give any indication that wetlands are found in proximity to the potential railroad crossing locations; however, wetland delineation likely would be required for all areas potentially impacted by development of the project.

2.6 BIOLOGICAL RESOURCES

2.6.1 Vegetation

Vegetation in the area of the potential railroad crossing locations is generally mixed conifer forest (USGS 2008). Smaller areas of vegetation mapped as riparian woodland and shrublands are also found (USGS, 2008).

Vegetation below the railroad grade has been identified as being mixed conifer and deciduous forests consisting of cottonwood (*Populus trichocarpa*), water birch (*Betula occidentalis*), western red cedar (*Thuja plicata*), and western hemlock (*Tsuga heterophylla*) in the interior of the forested areas and Douglas-fir (*Pseudotsuga mentziesii*), western larch (*Larix occidentalis*), western white pine (*Pinus monticola*), and lodgepole pine (*Pinus contorta*) in the more exposed, drier areas (USACE, 2003). Historical photos of the area show that much of this area was cleared of vegetation during the time of historic smelter operations. No federal threatened or endangered plant species are known in the study area (USFWS, 2015b).

No vegetation-related constraints have been identified in the study area. Noxious weed control would be required during the project construction period, which is likely to include inventories of noxious weeds and implementation of a noxious weed control plan to minimize the spread of noxious weeds to and from the project site during construction.

2.6.2 Wildlife

The bull trout (*Salvelinus confluentus*), a species listed as threatened under the Endangered Species Act, is present in Lake Pend Oreille (USFWS, 2015b). If impacts to lake water quality could occur as a result of the proposed railroad crossings and the future development of the

waterfront area, a Biological Assessment will be required to describe potential impacts on this species. If potential project development has the potential to result in measurable impacts to bull trout, formal consultation with the U.S. Fish and Wildlife Service under Section 7(a)(2) of the Endangered Species Act would be required. Careful implementation and design of stormwater management features and erosion control measures would be required by the U.S. Fish and Wildlife Service to minimize impacts to water quality and this species.

Several migratory bird species may use vegetation near the potential crossing area and the area below the railroad grade as habitat. Migratory birds are protected under the Migratory Bird Treaty act, and as such, impacts to these species are prohibited. Project construction in vegetated areas would need to avoid impacts to these species, either by constraining activities to outside the nesting period (generally, April through August) or ensuring that construction areas are free from migratory birds and active nests. Coordination with Idaho Department of Fish and Game biologists would be required to identify relevant avoidance and mitigation measures for migratory birds.

2.7 ARCHAEOLOGY

Through a records search conducted at the Idaho State Historic Preservation Office, it was determined that 12 previously recorded archaeological sites are present within 0.5 miles of the study area. Two of the sites are buildings within the city limits of Ponderay. Three are linear features: the Northern Pacific Railroad; the Spokane International Railway; and the old North and South Highway (US 95). Of the remaining seven sites, six are related to mining, railroad construction, or historic residential sites, and one is a prehistoric campsite.

The records search also revealed that 33 cultural resource inventories or monitoring projects have been conducted within the 0.5 miles of the study area. However, the actual footprint of the proposed project has not been inventoried for cultural resources and other unknown resources could be present. A site-specific cultural resource survey would be required to identify any cultural resources before design of the potential crossings and any subsequent development of the area.

Of the known cultural resources sites, only one historic mining-related site could potentially be affected by the proposed project: the Ponderay Smelter site (42BR539), also known locally as "Black Rock" for the pile of slag eroding along the beach just southeast of 2nd Street and Birch Street in Ponderay. It appears most likely that the foundation walls on the cut bank above the beach at the west end of the site are what could be impacted, if they are still present. This site was monitored during POBT soil sampling activities as recently as May of 2012 and found to still be eligible for the National Register of Historic Places. Monitoring was recommended during any subsequent ground-disturbing work in this area (Sappington and Longstaff, 2011).

2.8 EROSION CONTROL AND STORMWATER MANAGEMENT

Due to high water tables and low soil permeability in the area, stormwater management basins constructed in the City of Ponderay have demonstrated only limited capability for infiltration (Brubaker 2015). As such, the City of Ponderay has requested that the feasibility of alternative stormwater management features be assessed for this site.

Construction of the Sandpoint Byway project, which was designed by URS Corporation (now AECOM), was completed in 2012. Local municipalities have viewed the stormwater management system for this project, which features constructed impoundment areas that feed into wetland filtration swales through orifice controls, as an effective design. It is expected that a similar type of system could be engineered to meet the stormwater management needs of the Ponderay railroad crossing project. It is likely that individual systems would be required for each potential railroad crossing location (i.e., the vehicle/pedestrian crossing location near the Harbison property and the pedestrian crossing location near the end of 3rd Street).

The particular features of stormwater management systems for the Ponderay railroad crossing project would need to be designed through site-specific engineering. Generally speaking, however, these stormwater management systems would initially direct stormwater into sediment ponds where particulate matter would be allowed to settle out. Water in the ponds would then be slowly released into downslope wetland swales, which would likely be designed to incorporate multiple bank stabilization surface treatments and biotechnical plantings intended to stabilize slopes, support plant growth, and inhibit erosion. Stormwater would be released into Lake Pend Oreille after being filtered through the engineered wetland areas.

3.0 CONCLUSION SUMMARY OF THE SITE CONSTRAINTS

Based on our analysis, the following constraints were identified:

- Thick clay layers in conjunction with the high water table may lead to possible long-term settlement issues.

- High-water table may be encountered using an undercrossing and long-term drainage would need to be considered.

- Concentrations of arsenic, mercury, cadmium, and lead have been shown to be elevated in soil in Zone 4. These soil contaminants may have some potential to leach to and impact shallow groundwater and surface water seeps or to discharge into Lake Pend Oreille. Current concentrations of both lead and arsenic in Zone 4 have been shown in previous site risk and assessment reports to represent excessive risk to human health. Site clean-up may be required before development of this area. However, degree of clean-up will likely be dependent on degree and type of projected land use. Preferred clean-up

activities may consist of a combination of on- and off-site disposal and institutional controls. Selected mine waste and contaminated soil may need to be excavated and shipped offsite for disposal or re-processing and metals recovery. The remaining mine waste and contaminated soil, including the slag pile (Black Rock), may need to be consolidated in an on-site repository or capped in place. Access to the site may need to be controlled in conjunction with informational and warning signage.

- All five POBT zones identified by the IDEQ are Brownfield sites. Redevelopment on Brownfield sites is encouraged by the EPA but often requires varying levels of remediation or risk abatement as describe above.

- No properties outside the IDEQ Brownfields zones in or near the study area, including the Harbison property and the railroad right-of-way are listed as having outstanding environmental issues. Remediation of nearby properties is not anticipated to be required prior to project development.

- Depth to groundwater has been measured between 6.5 feet and 23 feet in the area below the railroad grade, with shallower depths to groundwater reported closer to the water edge. Groundwater depth in the City of Ponderay and nearby areas is highly variable and often close to the soil surface. Shallow depths to groundwater and saturated soils throughout the study area may increase complexity of engineering and construction. Long-term drainage systems may need to be engineered to manage high water tables in construction areas.

- The presence of seeps throughout the area below the railroad grade will require consideration during project engineering and design. Of note, a large seep-fed stream feature at the east end of the study area may be impacted by the construction of the potential pedestrian crossing in this area. Impacts to seeps or the seep-fed stream feature would require a joint-agency stream alteration permit.

- If changes to the floodplain elevation greater than 1.0 feet would occur with proposed development of the shoreline area, a CLOMR would be required from FEMA. Following construction, a LOMR would be required to document the final effects of project construction on the floodplain elevation. Early communication with FEMA should occur if development within the Flood Hazard Zone A/AE is anticipated.

- Wetlands are not likely to be located near the potential crossing location near the Harbison Property. Wetlands may occur near the proposed pedestrian undercrossing near the east end of 3rd Street, though no wetlands have been mapped in this location. A single NWI-mapped wetland is located in the study area below the railroad grade. It is likely that additional wetland features are present throughout this section of the study area. Wetland delineations would be required for all areas potentially impacted by

development of the project. Any impacts to wetlands would require a Clean Water Act Section 404 permit submitted to the USACE.

- No vegetation constraints were identified. Inventory and control of noxious weeds would be required at the site to meet state noxious weed management regulations.

- If project development has the potential to impact to bull trout, Section 7 consultation with the U.S. Fish and Wildlife Service would be required. Careful implementation and design of stormwater management features and erosion control measures would be required by the U.S. Fish and Wildlife Service to minimize impacts to water quality and this species.

- Project construction in vegetated areas would need to avoid impacts to migratory birds present in the area, either by constraining activities to outside the nesting period (generally, April through August) or ensuring that construction areas are free from migratory birds and active nests. Coordination with Idaho Department of Fish and Game would be required to identify relevant avoidance and mitigation measures for migratory birds.

- A records search conducted at the Idaho State Historic Preservation Office identified 12 previously recorded archaeological sites and 33 cultural resource inventories in the vicinity of the study area. Of the known cultural resource sites, only the Ponderay Smelter site could potentially be affected by the proposed project. This site was monitored during POBT soil sampling activities conducted in May of 2012 and found to still be eligible to the National Register of Historic Places. Monitoring of this site is recommended during ground-disturbing work in the area. The actual footprint of the proposed project has not been inventoried for cultural resources, and therefore other unknown resources could be present. A site-specific cultural resource survey would be required to identify any cultural resources before design of the potential crossings and any subsequent development of the area.

- A stormwater management system similar to what was designed for the Sandpoint Byway project (i.e., constructed impoundment areas that feed into wetland filtration swales through orifice controls) could be engineered to meet the stormwater management needs for this project. Site-specific details would need to be developed by qualified engineers.

4.0 REFERENCES

Brubaker, E. 2015. Personal Communication with Erik Brubaker, City of Ponderay, and Jan Reed, AECOM. August 6, 2015.

Environmental Protection Agency (EPA). 2012. Waterbody Report for Pend Oreille Lake. Accessed August 11, 2015.

Harmony Design & Engineering (Harmony). 2015. *Draft Pend d'Oreille Bay Trail Master Plan*. Prepared by Harmony Design & Engineering with Jane Rohling Communication Arts, Frontier Forward, Natural Dwellings Architecture, and Powder Mountain Press. Prepared for Friends of the Pend d'Oreille Bay Trail. June, 19, 2015.

Idaho Department of Environmental Quality (IDEQ). 2015. Department of Environmental Quality, Waste Management and Remediation Division Facility Mapper (Terradex Facility Mapper Database for record of environmental covenants). Website, IDEQ http://wastesites.deq.idaho.gov/. Accessed July 7, 2015.

____. 2009. *Draft Evaluation/Cost Analysis (EE/CA) Developed for Removal of Smelter Wastes at the Panhandle Smelter, Ponderay, Bonner County, Idaho*. May 27, 2009.

Sappington, R.L, and L.L. Longstaff. 2011. *Results of Archaeological Monitoring at the Panhandle Smelting and Refining Company Site (10br539) for the Pend Oreille Bay Trail Project, Near Ponderay, Idaho*. December 12, 2011.

STRATA Corporation (STRATA). 2012. *POBT Seep Sampling, North Shore of Lake Pend Oreille, within the Communities of Sandpoint, Ponderay, and Kootenai, Idaho*. Prepared for the Idaho Department of Environmental Quality.

URS Corporation (URS). 2013. *Phase I Environmental Site Assessment Update Report, Pend D' Oreille Bay Trail – Zone 2, Beach Shack Area, City of Ponderay, Bonner County, Idaho*. Prepared for the Idaho Department of Environmental Quality. September 27, 2013.

____. 2011. *Phase I Environmental Site Assessment Report Pend d'Oreille Bay Trail – Zone 4 Panhandle Smelting and Refining Company, City of Ponderay, Bonner County, Idaho.* Prepared for the Idaho Department of Environmental Quality on March 29, 2011.

TerraGraphics. 2014. *Phase I Environmental Site Assessment POBT Zone 4, Properties 11, 12, 13, 14, and 15 Ponderay, Idaho*. Conducted by TerraGraphics Environmental Engineering, Inc., Boise, Idaho and prepared for the Idaho Department of Environmental Quality on October 1, 2014.

____. 2013. *Draft Analysis of Brownfields Cleanup Alternatives and Workplan for Zone 4 of the Proposed Pend d'Oreille Bay Trail*. Conducted by TerraGraphics Environmental Engineering, Inc., Boise, Idaho and prepared for the Idaho Department of Environmental Quality on March 14, 2013.

____. 2012a. *Final Site Investigation Report: Characterization of Waste Piles and Groundwater in Zone 4 of the Pend d'Oreille Bay Trail*. Conducted by TerraGraphics Environmental Engineering, Inc., Boise, Idaho and prepared for the Idaho Department of Environmental Quality on December 6, 2012.

____. 2012b. *Final Extended Phase II Environmental Site Assessment and Risk Assessment Report, Panhandle Smelting and Refining Company, Zone 4 of the Pend d'Oreille Bay Trail, Ponderay, Bonner County, Idaho*. Conducted by TerraGraphics Environmental Engineering, Inc., Boise, Idaho and prepared for the Idaho Department of Environmental Quality on December 6, 2012.

U.S. Geological Survey (USGS), 1996. Sandpoint, Idaho, 7.5-Minute Topographic Quadrangle Map.

____. 2008. Gap Analysis Program- Northwest Regional Gap Analysis Program (NWReGAP). Land Cover Data v2.2. GIS Data.

U. S. Fish and Wildlife Service (USFWS). 2015a. National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. [Online database]. Available at: http://www.fws.gov/wetlands/.

____. 2015b. Information Planning and Conservation Database (IPaC) Trust Resource Report. Accessed 07/25/2015.

U.S. Army Corps of Engineers (USACE). 2003. Albeni Falls Dam and Pend Oreille Lake Historic Property Inventory of Proposed Black Rock Bank Protection Project, Bonner County, Idaho. USACE Seattle District.

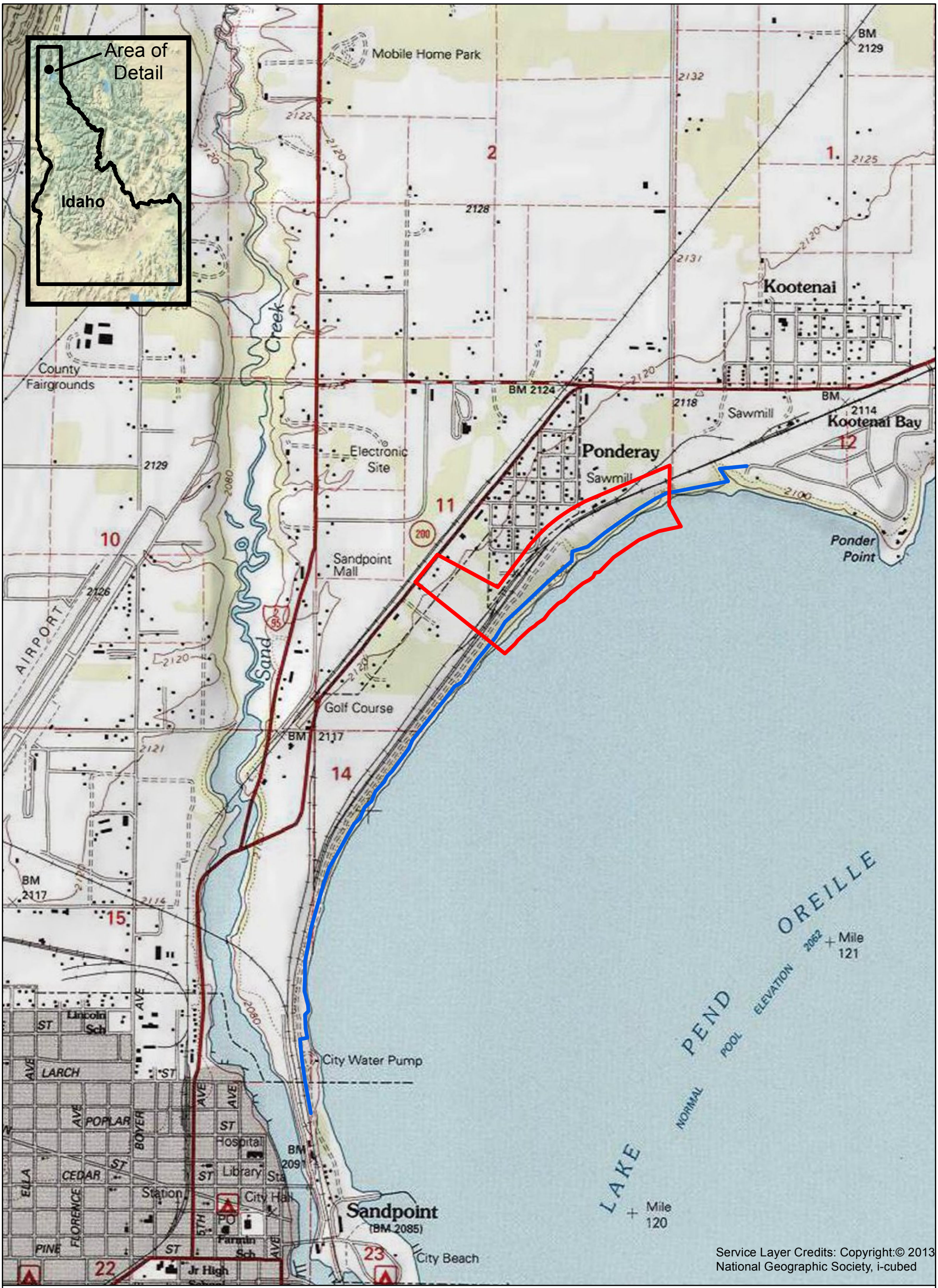
____. 2015. Personal Communication with Shane Slate, USACE Northern Idaho Field Office, and Jan Reed, AECOM. August 18, 2015.

U.S. Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS), U.S. Geological Survey (USGS), and the Environmental Protection Agency (EPA). 2015. The Watershed Boundary Dataset (WBD) for {county, state, or HUC#}, Idaho [Online database]. Available URL: http://datagateway.nrcs.usda.gov. Accessed 05/27/2015.

USDA-NRCS. 2014. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/. Accessed 07/25/2015.

Van Dyk, K. 2015. Personal Communication with Kody Van Dyk, City of Ponderay, and Jan Reed, AECOM. September 16, 2015.

Figures



Legend

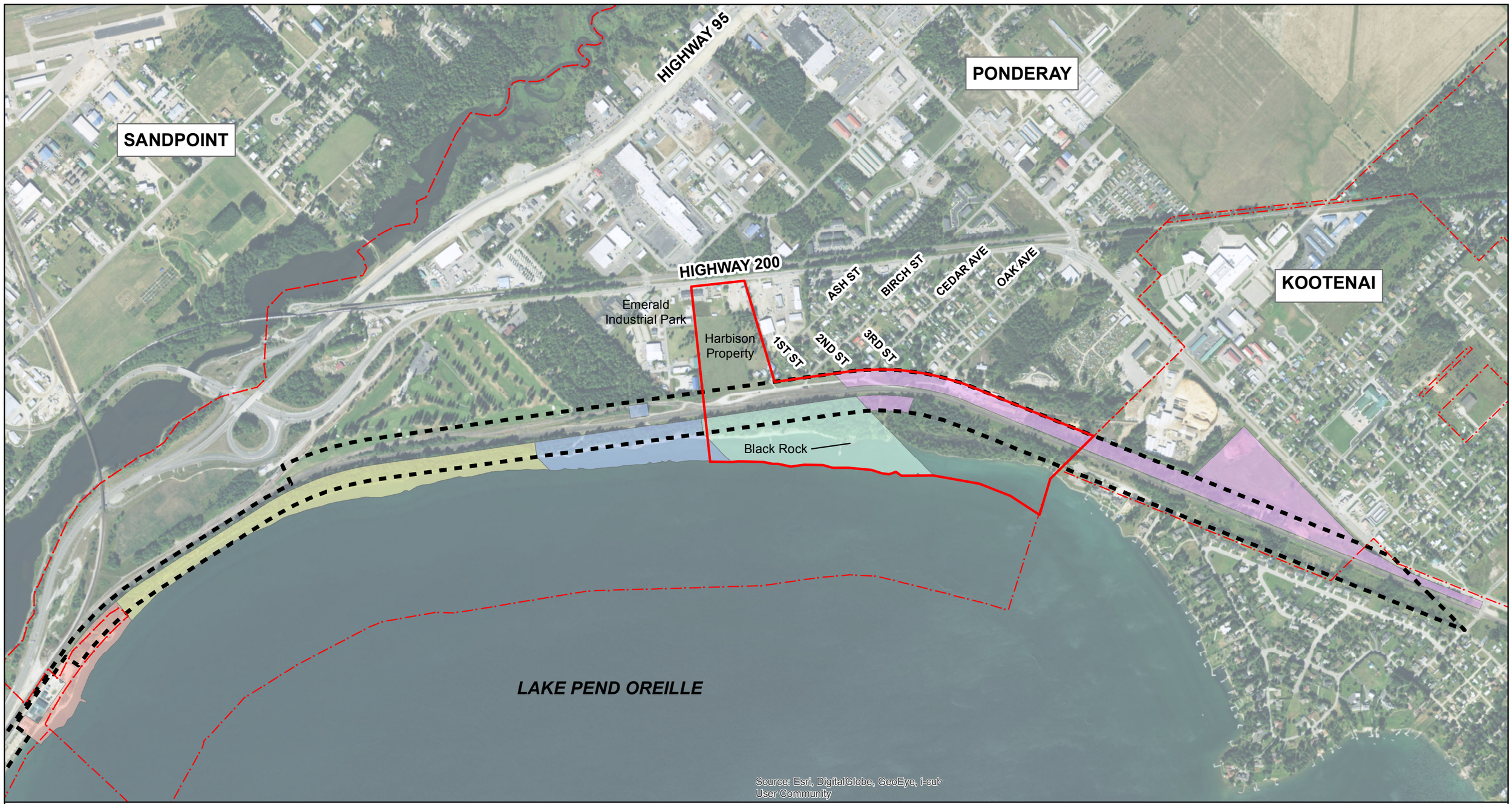
- Pend d'Oreille Bay Trail
- Study Area

0 0.25 0.5 1 Miles

Figure 1. Project Location Map

Ponderay Undercrossing Technical Analysis
Draft Land Capability Summary Report
Ponderay, ID

August 2015



Legend

- Study Area
- City Boundaries
- Railroad Right-of-Way

IDEQ Brownfields Zone

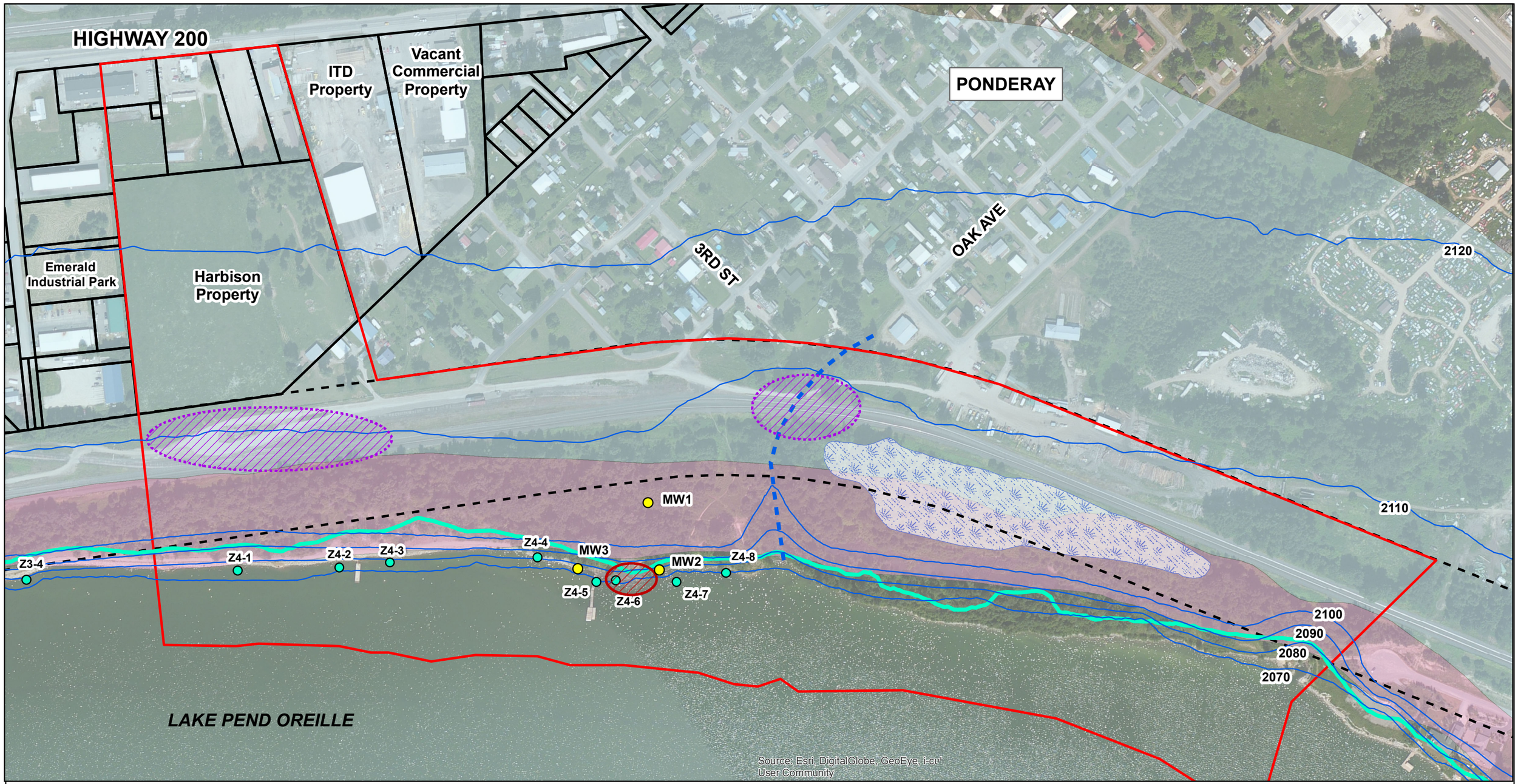
- ZONE 1 Humbird Landing
- ZONE 2 Beach Shack Area
- ZONE 3 Ponderay Coal Dock
- ZONE 4 Panhandle Smelting & Refining Company
- ZONE 5 Kootenai Access Area

0 750 1,500 3,000 Feet

Figure 2. Study Area Map

Ponderay Undercrossing Technical Analysis
Draft Land Capability Summary Report
Ponderay, ID

August 2015



Legend

- Study Area
- Parcel Boundaries
- BNSF/MRL Corridor
- Seep-fed Stream
- Elevation (10 Foot Interval)
- Flood Hazard Zone A/AE
- Wetlands
- Seep Sample Location
- Monitoring Well Location
- Potential Railroad Crossing Location
- Black Rock Slag Dump

Soil Type

- Haploxeralfs and Xerochrepts
- Mission Silt Loam

0 230 460 920 Feet

Figure 3. Site Considerations

Ponderay Undercrossing Technical Analysis
Draft Land Capability Summary Report
Ponderay, ID

August 2015