FINAL DRAFT

RECLAMATION PLAN REPORT
TECK AMERICAN INCORPORATED
PEND OREILLE MINE

Prepared for
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TABLE OF CONTENTS

TABLE OF CONTENTS

Tables

Figures

Appendices

Acronyms

amsl	above mean sea level
Ecology	Washington State Department of Ecology
FEIS	final environmental impact statement
FS	feasibility study
HASP	health and safety plan
ICMM	International Council on Mining and Metals
ISWGP	Industrial Stormwater General Permit
NPDES	National Pollutant Discharge Elimination System
Plan	Reclamation Plan Report
POM	Pend Oreille Mine
RCW	Revised Code of Washington
RI	remedial investigation
SWPPP	stormwater pollution prevention plan
Teck	Teck Washington Incorporated and Teck American Incorporated
TDF	Tailings Disposal Facility

This document forms the Reclamation Plan Report (Plan) for the underground Pend Oreille Mine (POM) and associated aboveground facilities. This Plan has been prepared for Teck Washington Incorporated and Teck American Incorporated, collectively referred to in this Plan as Teck. This Plan has been developed and prepared by a reclamation team consisting of Teck operational and management staff and URS Corporation mine reclamation specialists. Reclamation associated with TDFs 1 and 2 is considered under a separate remedial investigation/feasibility study. The draft remedial investigation/feasibility study is included as Appendix C to this report. A separate reclamation plan has been developed for TDF3 and is included as Appendix D to this report. Surface reclamation of the Grandview Mine is considered under a separate non-time critical action. This Plan recognizes that certain reclamation activities contained herein need to consider and be integrated into the reclamation of the TDFs and Grandview Mine. For example, this Plan assumes that waste rock from the Waste Rock Pile will be used in the reclamation of TDF3.

A risk-based approach to reclamation planning has been employed to include a range of issues (engineering, environmental, social and financial) that will facilitate effective, sustainable solutions to mining while optimizing reclamation costs. This Plan provides the reclamation process background, presents the outcome of that process, and details the work that will be undertaken to complete reclamation of the mine when economic ore reserves are exhausted. An important aspect of the Plan is the recommended further actions that will continue to improve the Plan prior to implementation.

The POM is an underground lead-zinc mine located approximately two miles north of Metaline Falls in Pend Oreille County, Washington, on the eastern bank of the Pend Oreille River about eight miles south of the Canadian border. The mine site property comprises approximately 433 acres, although only a portion of this is developed. Early mining in the vicinity of the site began about 1906 on the west side of the Pend Oreille River. Mining on the east side of the river, at the current site, took place from 1952 until the original mine ceased operations in 1977. Various entities owned the facility until it was purchased by Teck in 1996. In 2004, Teck reopened the mine. Major site features/reclamation elements are as follows:

- Surface facilities and infrastructure
- Processing facilities
- Waste Rock Pile
- Historic Debris Area
- Underground operations
- Former trap range
- Water-related structures

Primary reclamation requirements were established by Teck in accordance with Washington State Department of Ecology requirements. In addition, Teck operates under several primary sustainability policies, including a Charter of Corporate Responsibility (Teck 2007a), Code of Sustainable Conduct (Teck 2007b), Code of Ethics (Teck 2008a), and Environment, Health, Safety and Community Management Standards (Teck 2008b). Supplementary to these policies is the 2008 Draft Biodiversity Guide – Integrating Biodiversity Considerations into Teck Operations (Teck 2008c).

To assist with mine closure planning, the International Council on Mining and Metals has developed the Planning for Integrated Mine Closure: Toolkit (ICMM 2008). This toolkit, along with Teck's sustainability policies and the 2008 Draft Biodiversity Guide (Teck 2008c), has been incorporated into the development of this Plan.

To address community concerns throughout the life of mining operations, Teck has initiated numerous programs including newsletters, meetings, public events, contributions and sponsorships, and is committed to maturing or expanding these programs between now and the anticipated mine reclamation. The community surrounding the POM has often initiated community organization for decisions regarding the mine's economic and other impacts on the area. Teck supports this effort.

During a Reclamation Planning Workshop, the Base Case (current) Reclamation Plan and underlying assumptions were confirmed. For the Base Case Reclamation Plan, risks associated with reclamation execution and post-reclamation monitoring and maintenance were identified, evaluated and recorded in a risk register. Through a screening and qualitative assessment performed at the Reclamation Planning Workshop, risks were identified and rated on a relative scale. Fifty-seven risks were identified, 19 of which were key risks (i.e., risks with a risk rating of high or very high). The Preferred Reclamation Plan (Preferred Plan) improves the Base Case Reclamation Plan by mitigating key risks to an acceptable risk level using risk control measures, as practicable.

The Preferred Plan, which is a central component of this Plan, identifies the key activities that will need to be undertaken to achieve reclamation objectives and respond to significant risks. Details for some activities of the Preferred Plan will need to be refined as reclamation approaches. Cost estimates for the Preferred Reclamation Plan are presented in the associated Reclamation Cost Estimate Report.

Post-reclamation land use will be developed pending stakeholder input. The Preferred Reclamation Plan assumes that the post-reclamation land use is industrial. Pending stakeholder input that assumption could change in the future.

The Preferred Plan consists of the following reclamation activities:

General Practices

- Work will be performed under applicable local, state, and federal regulations for safety and environmental protection.
- All POM mine reclamation and post-reclamation activities will be conducted in a manner consistent with Teck environment, sustainability, health, safety and community management standards.
- In accordance with Teck corporate policy, a specific health and safety plan (HASP) for mine reclamation will be developed. In addition, all contractors and subcontractors will need to provide a HASP for their activities on site.
- Specific contractor selection criteria will be developed for reclamation activities to help ensure qualified contractors are selected who will reduce risks for typical reclamation and demolition activities. Other things being equal, preference will be given to qualified local contractors.

- In accordance with Washington State Department of Ecology requirements, a Stormwater Pollution Prevention Plan (SWPPP) will address reclamation activities. The SWPPP may be covered under the existing Industrial Stormwater General Permit (ISWGP) or under a new permit application for stormwater for construction activities associated with the reclamation completed at the time of reclamation.
- Subcontractors will develop and implement practices to prevent any potential contaminant migration during reclamation activities.
- Labor necessary to complete mine reclamation activities will be obtained from skilled local sources if available. Also, if possible, the existing equipment/vehicle fleet will be used to complete mine reclamation activities. Contractors hired to assist with reclamation and monitoring activities will be experienced and qualified to minimize the risks of incidents occurring during activities.

Surface Facilities, Infrastructure, and Processing Facilities

- It is assumed that all surface facilities and infrastructure, as well as processing facilities located at the POM, will be decommissioned and demolished. The actual final disposition of infrastructure will take stakeholder input into consideration.
- Inventories will be reduced prior to decommissioning and demolishing. Equipment will be cleaned, decommissioned, and reused off site if economically viable. Demolition of facilities will involve the complete removal of all buildings and support structures.
- Where practical, concrete foundations beneath most structures will be removed to a depth of three feet to facilitate post-reclamation land use. Concrete foundations and floors of processing facilities will be left in place except where removal is needed or as practicable.
- Construction and demolition debris will be disposed of in compliance with applicable solid waste regulations. Options include on-site disposal of inert construction debris with off-site disposal of non-inert debris, or off-site disposal of all debris. Any hazardous material encountered will be removed according to applicable regulations.
- After the foundations have been demolished and the soils have been tested and cleared for the presence of any contamination, the area will be graded to promote drainage.
- Areas will then be covered with a thickness of cover materials, scarified, and vegetated. Fencing and signage will be installed within reclaimed areas.
- About 2,400 cubic yards of tailings are located near the concentrator building. There are a number of potential options for addressing these tailings; a recommended option will be developed in the future. The Preferred Plan assumes that the tailings will be removed to TDF 3. The disturbed area will then be covered with a thickness of cover materials, scarified, and vegetated.

Roads and Parking Lot

- Roads will be reclaimed except for those needed for environmental sampling or those that will remain open for community use.

- Natural drainages will be restored unless re-establishment does not enhance environmental values.
- Excess culverts will be removed and either salvaged or disposed of at an appropriate facility.
- Waste rock used as a road base at some of the existing roadways will be removed, hauled, and placed on the regraded Waste Rock Pile. Any other contaminated materials will be removed from roads and other operational areas and will be disposed of at an appropriate facility.
- Roadbeds designated for reclamation will be ripped, scarified, covered with a thickness of cover materials, and revegetated with an approved seed mix.
- Erosion control structures will be constructed as necessary to prevent excessive erosion and to provide long-term stability.
- The existing main parking lot will be reclaimed in a manner similar to the roadways.

Waste Rock Pile

- The preferred option includes removing material on the lower portion of the existing pile to the upper portion of the pile and to TDF3. The existing pile will be regraded to achieve sideslopes of 3H:1V (horizontal to vertical) that generally remain within the current footprint.
- Approximately 43,000 cubic yards of waste rock material will be moved to TDF3 (approximately 0.8 mile from the existing Waste Rock Pile) for use in its reclamation. Excess material from regrading the Waste Rock Pile also may be placed in the two ventilation raises (VR-1 and VR-2) that have a combined estimated capacity of 8,000 cubic yards. Excess material could also be used to buttress impoundment dams of existing tailing disposal facilities.
- The regrading plan will incorporate selective placement of any Ledbetter slate encountered to address stability issues.
- Any materials encountered during the regrading of the Waste Rock Pile that has potential to be an environmental hazard, such as hazardous waste, will be disposed of appropriately or mitigated.
- Once the pile is graded, cover materials will be placed on the pile to a thickness of approximately 12 inches. Cover materials are assumed to be obtained from borrow sources at TDF3.
- Cover materials may be amended with fertilizer, wood chips, or other materials to improve soil fertility and water-holding capacity.
- The regraded area will be vegetated with a specified seed mix free of invasive/noxious plant species and planted with Douglas fir and Ponderosa pine.
- Stormwater management controls, including surface water run-on and run-off features, will be installed.

Historic Debris Area

- The area will be selectively cleared and grubbed, taking into account the role vegetation plays in the stability of the area.
- Waste will be removed from the Historic Debris Area and disposed of according to applicable regulations. Any potentially dangerous and extremely hazardous waste encountered will also be characterized and managed according to applicable regulations.
- Once waste has been removed, the disturbed area will be regraded and revegetated to reduce the potential for erosion and enhance slope stability.

Underground Operations

- Reclamation of the underground mine will consist of decommissioning mine equipment and facilities, allowing the mine to flood, and sealing all mine openings. Reclamation of wire and electrical facilities may be considered depending on market conditions.

Former Trap Range

- All waste generated from shooting (shot, shell casings, wads, and clay targets) will be removed from the former trap range. Waste removal will consist of removing the upper six inches of soil in contaminated areas where practicable. Trees within range of shot that were present during the period of trap range operation will be removed and disposed if found to contain accumulations of shot pellets.
- Waste will be removed according to applicable regulations.
- Once waste has been removed, the disturbed area will be regraded, scarified, and revegetated.

Water-Related Structures

- Sewage treatment drain fields will be reclaimed.
- Stormwater infiltration areas and wetlands will remain.
- The mine water treatment system in the underground mine will be decommissioned after mining. Metering devices, pumps, tubing, and the ethanol holding tank will be removed. The rest of the underground mine water treatment system will remain in the mine upon reclamation.
- The potable water system including pressure tank, pumps, and controls will be removed from the site and recycled, if economic.

Reclamation activities are anticipated to cover a two-year period. Once reclamation has been completed, post-reclamation monitoring will be performed for those disturbed areas that are reclaimed. Post-reclamation monitoring is anticipated to last for two to five years, with noxious weed monitoring and socioeconomic issues monitoring continuing for five years.

Revegetation failure will be corrected by reseeding or inter-seeding with an approved seed mixture during the next approved seeding window. Noxious weed control measures will be implemented if noxious weeds are found in disturbed areas. Site appurtenances, such as fences and gates, will be repaired in conjunction with the site security inspections.

In addition to the identified activities forming the Preferred Plan there are a number of specific actions that are recommended to further reduce residual risks. These actions will help reduce the uncertainty associated with the Preferred Plan and should be completed prior to the next update of the Preferred Plan. The activities, from higher priority/urgency to lower priority are as follows:

- For the Waste Rock Pile and other site-wide features requiring cover materials, perform a materials balance and borrow investigation for cover materials.
- For the Historic Debris Area: recognizing that a site characterization was completed in 2005 that addressed many uncertainties/risks, perform physical site characterization to address remaining risks, including type of waste present (solid versus hazardous) and quantity of waste, as well as assess responsibility of Seattle City Light for remediation within its property boundary.
- For the former trap range: identify and implement actions to narrow uncertainty associated with greater debris quantity than estimated. Two recommended actions include:
    1. Perform physical site characterization of soil contaminated by lead pellets and from polycyclic aromatic hydrocarbons from sporting clays and
    2. Investigate other potential remediation technologies (e.g., soil screening) that may be less expensive than hauling to an off-site waste management facility.
- For surface facilities, infrastructure, processing facilities, and underground mine facilities: identify and implement actions to narrow uncertainty associated with greater debris quantity than estimated. Three recommended actions include:
    1. Perform a more thorough and detailed review of all existing facility plans/as-built drawings in order to define specific building types of construction and dimensions to create a refined quantity take-off.
    2. Perform a more thorough field investigation of the structures (potentially including destructive/intrusive investigation) in order to better define specific structure types of construction and dimensions to create a refined quantity take-off. At a minimum, this would be necessary for those structures where adequate as-built drawings are not available or are too general in nature.
    3. Evaluate extent of soil impacts related to mining activities to define quantities of soil requiring management.
    4. Define what is to be remaining and on-site at the time of demolition to eliminate inclusion in the quantity take-off those items that will truly not be there (i.e. supplies, stock, equipment to be moved out, etc.).
    5. Evaluate options for management of tailings near the concentrator/loadout building.
- For the Waste Rock Pile: perform a record search, physical site characterization of any hazardous materials, geotechnical analyses, and evaluation of suitability of waste rock materials for use in site reclamation activities, e.g., for reclamation of TDFs.

1.1 INTRODUCTION

This document forms the Reclamation Plan Report (Plan) for the underground Pend Oreille Mine (POM) and associated aboveground facilities. The Plan has been prepared for Teck Washington Incorporated and Teck American Incorporated, collectively referred to as Teck in this Plan. This Plan has been developed and prepared by a reclamation team consisting of Teck operational and management staff and URS Corporation mine reclamation specialists. This Plan has been prepared under the terms and conditions of an agreement executed between Teck and URS dated January 20, 2006, and Work Order 0828 executed October 21, 2008. The primary objectives of Work Order 0828 are:

- Prepare a comprehensive mine reclamation plan document for the entire POM site.
- Prepare a detailed, defensible, and comprehensive mine reclamation cost estimate that meets the financial provision requirements of Teck and Sarbanes-Oxley.
- Prepare a recommended implementation schedule of identified reclamation activities. This will include identifying reclamation activities that can be implemented and completed prior to mine closure (progressive reclamation) to reduce residual liabilities during the reclamation and post-reclamation phases.
- Develop a framework for stakeholder engagement. This objective was revised during the reclamation planning process to provide consultation to the local community to assist with post-mine closure economic development planning.

A risk-based approach to reclamation planning has been employed to include a range of issues (engineering, environmental, social and financial) that will facilitate effective, sustainable solutions to mining while optimizing reclamation costs. In addition to providing assistance to the local community with post-mine closure economic development planning, the project includes seven tasks to successfully execute the reclamation planning process as follows:

1. ***Review available data.*** This was completed early in the project and was conducted by reviewing files for the POM located at the POM and Teck's Spokane, Washington offices.
2. ***Perform assessment of reclamation elements.*** This task included conducting a detailed site inventory of physical surface and subsurface structures at the POM in March 2009.
3. ***Conduct Reclamation Planning Workshop.*** This included a two-day workshop at Teck's Spokane, Washington offices on November 20 and 21, 2008. Participants included Teck POM and Environment and Public Affairs senior management and URS mine reclamation specialists. A summary of workshop findings were memorialized in the Reclamation Planning Workshop Summary, Teck American Incorporated, Pend Oreille Mine Reclamation Plan, November 20-21 (URS 2008). This task included identifying risks associated with reclamation activities. A risk register developed at the workshop is included in Appendix A.
4. ***Develop reclamation concepts.*** This task developed reclamation concepts that served as the basis for developing the Plan. The reclamation concepts address key risks identified during the Reclamation Planning Workshop. Findings of this task are presented in the

Reclamation Concepts, Teck American Incorporated Pend Oreille Mine Reclamation Plan (URS 2009a).

5. ***Develop reclamation plan and designs.*** The current reclamation plan for the Waste Rock Pile includes regrading the pile toward the Pend Oreille River; however, this may not be feasible with the Seattle City Light right-of-way along the river and possible State of Washington/Pend Oreille County shoreline setbacks. This task included a preliminary assessment of various alternatives to the current Waste Rock Pile reclamation plan that maintain the footprint of the regraded pile on POM property and outside shoreline setbacks. The resulting report, Waste Rock Pile Reclamation Alternatives Evaluation, Pend Oreille Mine Comprehensive Reclamation Plan (URS 2009b), is included as Appendix B.
6. ***Prepare Reclamation Plan report.*** This document constitutes the Plan. Specifically, Section 7 of this report describes the preferred reclamation plan, which improves the current (Base) plan by addressing risks associated with that reclamation plan.
7. ***Prepare reclamation cost estimate and report.*** Accompanying the Plan is a cost estimate and report that presents a range of costs based on uncertainty associated with the Plan (URS 2009c). The cost estimate includes construction activities needed to accomplish the reclamation and post-reclamation monitoring and maintenance.

This Plan provides background of the reclamation process, presents the outcome of that process, and details the work that will be undertaken to complete reclamation of the mine following exhaustion of economic ore reserves. Cost estimates for reclamation of the POM site are presented in a separate risk-based Reclamation Cost Estimate Report (URS 2009c).

1.2 SITE DESCRIPTION

The POM is an underground lead-zinc mine located approximately two miles north of Metaline Falls in Pend Oreille County, Washington, on the eastern bank of the Pend Oreille River about eight miles south of the Canadian border. The mine site surface property comprises approximately 433 acres, although only a portion of this is developed. The underground portions of the mine extend north of Teck's surface ownership and are mined under a lease with Metaline Contact Mines. Early mining in the vicinity of the site began about 1906 on the west side of the Pend Oreille River. Mining on the east side of the river, at the current site, took place from 1952 until the original mine ceased operations in 1977. Various entities owned the facility until it was purchased by Teck in 1996. In 2004, Teck reopened the mine. Approximately 210 people were employed at the mine in late 2008, although by mid-February 2009 the staff was reduced to about 55 employees and mining operations were suspended due to a downturn in the price of zinc. During operation, concentrate from the mine was transported by truck and trailer combinations to Teck's smelter located approximately 50 miles to the northwest in Trail, British Columbia, Canada. Approximately five to six years of ore reserves remain at full mine operation extraction levels. Reclamation execution and post-reclamation monitoring will take place following cessation of mining operations.

Figure 1.1 shows the general site area, including the site permit boundary. Figure 1.2 shows surface facilities and roads in the immediate vicinity of the mine.

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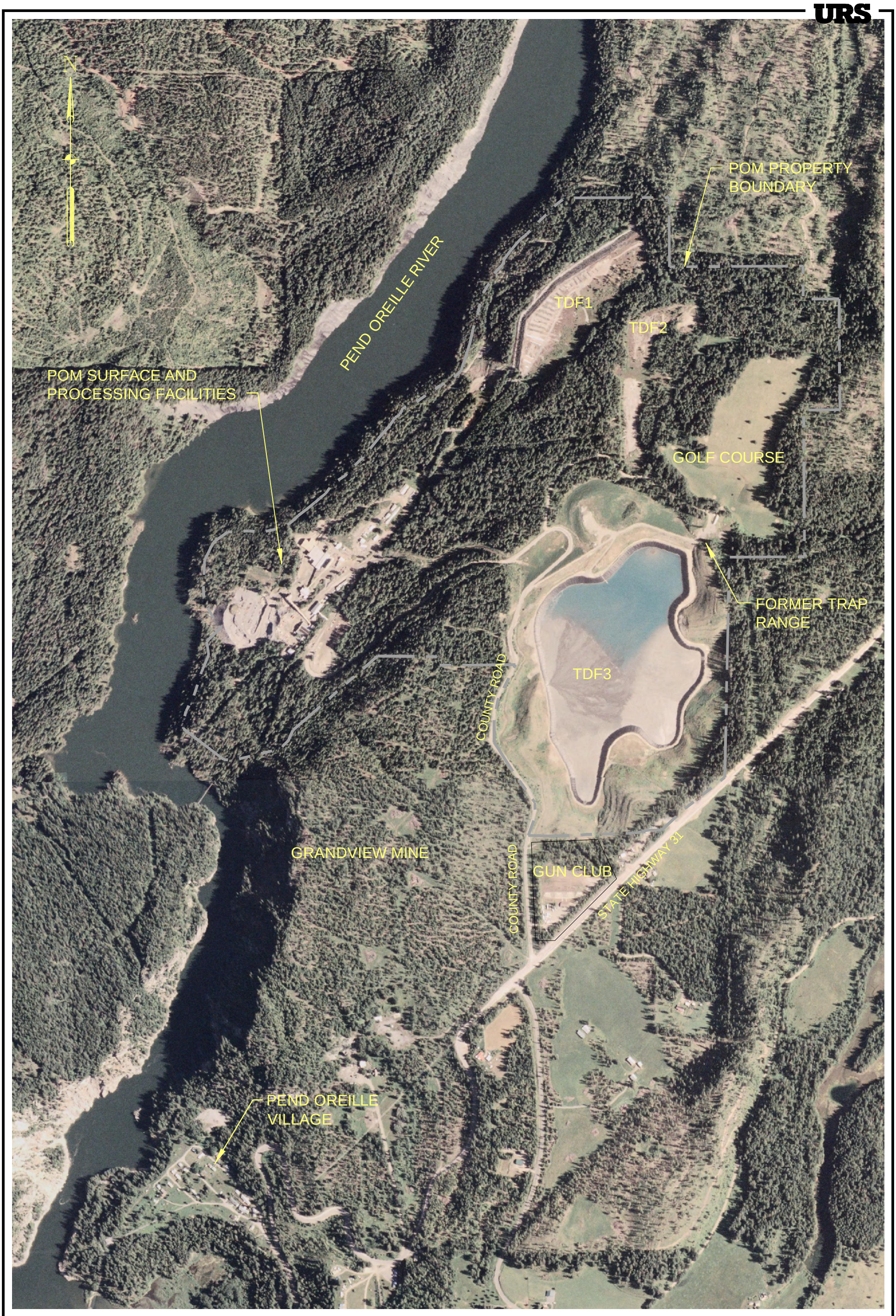

0 400 800 1600

SCALE IN FEET

GENERAL SITE AREA

FIG. 1.1

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PEND OREILLE RIVER

WATER TREATMENT SYSTEM NPDES DISCHARGE

EXISTING VENT (VR-1)

FROG CREEK

PEND OREILLE MINE PROPERTY

STORAGE BUILDING

CORE SHED

HISTORIC DEBRIS AREA

OLD CEMENT PAD

PROCESS TANK

WATER TANKS

PAD

GEOLOGY BUILDING

SLURRY LINE

MAIN SUBSTA.

TAILINGS PIPELINES

EXISTING VENT (VR-2)

TAILINGS AREA

CONCENTRATOR LOADOUT BUILDING

MINE PORTAL

DRAIN BED No. 3

DRAIN BED No. 2

DRAIN BED No. 1

SUBSTA.

OVERHEAD CONVEYOR

LOADING DOCK PAD

SEPTIC TANKS AND PUMP STATION

CRUSHER BUILDING

STORAGE BLDG

LUBE STORAGE

POTABLE WATER SYSTEM WELL HEAD

COARSE ORE BINS

ADMIN SUBSTATION

WASTE ROCK PILE

U/G CONVEYOR EXIT

(4) SEPTIC TANKS

OFFICE & DRY BLDG.

SECURITY GATE

WEIGH STA. & GATE

SHOP BUILDING

HEAD HOUSE

STORAGE BLDG

OLD SUBSTA.

DIESEL FUEL STATION

SUBSTATION

PARKING LOT

PARKING LOT SUBSTATION

CAP MAGAZINE

UTILITY (SWINGING) BRIDGE (NOT SHOWN)

0 125 250 500

SCALE IN FEET

LEGEND

- SURFACE BUILDING
- FUEL/LUBE/ELECTRICAL
- CONVEYOR/ORE STORAGE
- WATER/PROCESS TANK
- SEPTIC
- ROAD/PARKING
- MINE PROPERTY BOUNDARY

SITE FACILITIES AND ROADS

FIG. 1.2

W:\Projects\36298272_POM_Reclamation_Plan\8.0_GIS_CAD\Reclamation Plan Report\REC FIG 22R1.dwg

Current mining operations are conducted under financial assurances of a Metals and Mining Operation Environmental Protection and Performance Security, as required by Chapter 78.56 of the Revised Code of Washington (RCW). Requirements of the Metals and Mining Operation Environmental Protection and Performance Security at the POM include the following reclamation elements:

- Tailings pond cover
- Long-term operations and maintenance
- Ancillary roads removal
- Vent raise removal and plugging
- Tailings pipeline removal
- Surface tank removal
- Concentrate storage building removal and spillage remediation
- Surface air pollution control devices removal
- Electrical substation removal
- Underground equipment decommissioning
- Subsequent spills or releases excavation and removal
- Removal of buildings not used in economic development plan

Three areas have been used to store mine tailings at the site: Tailings Disposal Facility (TDF) 1, TDF2, and TDF3. TDF1 and TDF2 are inactive and cover approximately 49 acres and are located northwest of the POM Golf Course and east of the Pend Oreille River. TDF3 is about 84 acres in size and is currently covered by a new facility where tailings are stored (Figure 1.1). TDF1 and TDF2 comprise an area where a remedial investigation/ feasibility study (RI/FS) is being conducted under an Agreed Order between Teck and the Washington State Department of Ecology (Ecology). The draft remedial investigation/feasibility study is included as Appendix C to this report. A separate reclamation plan has been developed for TDF3 and is included as Appendix D to this report. Surface reclamation of the Grandview Mine is considered under a separate non-time critical action.

As shown in Figures 1.1 and 1.2, and consistent with requirements of the Metals and Mining Operation Environmental Protection and Performance Security, major site features/reclamation elements are as follows:

- Surface facilities and infrastructure
- Processing facilities
- Waste Rock Pile
- Historic Debris Area
- Underground operations
- Former trap range
- Water-related structures

This section describes the various reclamation elements.

2.1 SURFACE FACILITIES AND INFRASTRUCTURE

Surface facilities and infrastructure include surface buildings, surface diesel fueling station, a laydown area (located on top of the Waste Rock Pile), power lines/substations, a tailings distribution system, a former utility bridge (swinging bridge), and roadways. Surface buildings include an office/administration building, a shop/maintenance building, a geology building, and miscellaneous other buildings.

The mine area includes a network of both gravel and asphalt roads, as well as a gravel-surfaced parking lot located southeast of the office/administration building. The length of gravel roads within the permit boundary is approximately 23,200 feet. The length of asphalt roads is approximately 2,000 feet. On average, the roadways are 20 feet wide and the asphalt pavement roadway section is approximately 3 inches thick. Waste rock material has been used as a source for some of the surface road materials. The area of the parking lot is approximately 2.0 acres.

2.2 PROCESSING FACILITIES

Mineral processing facilities employ conventional crushing, grinding, and flotation methods to produce high-quality zinc and lead concentrates. Ore extracted from the underground mine undergoes primary and secondary crushing, grinding, and concentration by sulfide flotation and thickening processes. The zinc and lead concentrates are hauled by truck to Teck's Trail Operations located in British Columbia, Canada. Processing facilities include ore hoppers, a crushing plant, conveyors, a mill, and concentrate storage buildings.

2.3 WASTE ROCK PILE

The Waste Rock Pile consists of waste rock material resulting from historic underground mining at the POM. The Waste Rock Pile is along the hillside southwest of the mill and extends to within 100 feet of the Pend Oreille River. The pile contains approximately 386,000 cubic yards of material (ENSR 2001a) and has a footprint of approximately seven acres. The top surface is

relatively flat and serves as a staging area for mine supplies. It is known as the laydown area. The side slopes of the pile generally rest at a slope of 1.4H:1V (horizontal to vertical).

The Waste Rock Pile consists of waste from the Josephine and Yellowhead horizons of the underground workings. The pile also contains Ledbetter slate, a "black, fine grained, non-limy, generally homogenous rock in which individual grains can rarely be distinguished" (Shenon and Full 1951). Quantities of the slate are unknown, but the material is believed to have low strength and durability properties and to be an infrequent source of sulfides. The waste rock material is assumed to be non-acid generating and non-hazardous, but does contain elevated levels of radionuclides based on studies performed to evaluate the condition of waste rock excavated during current mining operations (ENSR 2001a).

2.4 HISTORIC DEBRIS AREA

The Historic Debris Area is an area approximately 200 feet wide by 300 feet long located on a vegetated hillslope northwest of and below the concentrator and loadout building and above the Pend Oreille River. Portions of the Historic Debris Area are located on property owned and managed by Seattle City Light. Vegetation consists of small to medium diameter trees and dense underbrush. Of the Historic Debris Area's upper, middle and lower slopes, the middle slope is the steepest and ranges between about 70 to 90 percent.

A 2005 field assessment revealed drums, wood, metal debris, and other waste partially buried in the Historic Debris Area, as well as seepage from the base of the area (GeoEngineers 2005). Seeps are generally thought to be seasonal. Soil samples collected during the 2005 assessment indicated that soil impacted with environmental contaminants was present in several areas.

2.5 UNDERGROUND OPERATIONS

The underground mine uses an irregular room and pillar method that involves removing ore in a "honey-combed" network of underground rooms up to 30 feet wide and 43 feet high. Where the ore is thicker than 15 feet, multiple benches are completed. Mining of each area involves drilling a drift/opening around the perimeter of the area to be mined, then removing the ore remaining within the ore block using room and pillar mining. Ground support is provided by the pillars with secondary support by a variety of techniques, including rock and cable bolting, wire meshing, steel sets, and cribbing. As a normal course of the mining process, ground support is analyzed and changed as needed to insure safety.

As part of the underground work, definition drilling is conducted from a ventilation/drill drift located approximately 200 to 250 feet above the ore body. Definition drilling is used to locate the ore targets ahead of the mining and involves the use of long-hole diamond drills or their equivalent to bore holes into potential mineralized zones.

Underground drilling machines are used to drill a pattern of blast holes. These holes are then loaded with explosives and blasted. Ore is transported by haul trucks to a primary and secondary crushing and screening plant in the Josephine Horizon before being conveyed to the surface crushing and milling plant.

Waste rock is hauled to storage areas in the extensive mined-out drifts, or to newly excavated drifts. Most waste rock consists of limestone and dolomite rock types that exhibit acid-consuming geochemical characteristics.

The mine is served by two ventilation raises: VR-1 and VR-2. VR-2 is located near the mine portal; VR-1 is located approximately 1,300 feet to the north (Figure 1.2).

Underground mine ancillary facilities include a screen and conveyance system, underground diesel tank and fueling area, shop area, and a number of electrical substations.

2.6 FORMER TRAP RANGE

The former trap range is located between TDF3 and the Metaline Falls Golf Course. The range consisted of four trap launchers. Launcher 1 fired southwest towards the eastern boundary of TDF3. Launchers 2 and 3 fired to the west towards TDF3, while Launcher 4 fired to the east. Launcher 1 launched traps into a rocky gully tangent to the eastern boundary of TDF3. Most of the contamination associated with Launchers 2 and 3 was likely removed/covered during the construction of TDF3. The valley at the toe of the TDF3 impoundment may have some soil impacted by these two launchers.

2.7 WATER-RELATED STRUCTURES

Water-related structures include sewage treatment drain fields (design flow exceeding 3,500 gallons per day), wetlands, stormwater infiltration areas, an underground water treatment system that treats water prior to being pumped to the surface and discharged to the Pend Oreille River, and a potable drinking water well and distribution system.

Wetlands have been identified at five locations within the permitted area (Ecology 2000a). These included natural wetlands associated with Threemile Creek, Metaline Falls Golf Course and Gun Club, Frog Creek, and three artificially created wetlands associated with TDF1.

The Frog Creek wetland is in the immediate vicinity of the processing and surface facilities. Springs downslope from TDF3 are the source of most of the water for Frog Creek and associated wetlands. Water from the Frog Creek wetland eventually collects in channels and flows to the Pend Oreille River (Ecology 2000a).

Wetland monitoring for Frog Creek began with a baseline survey conducted in 2002. Monitoring is to occur every three years in the spring during mine operation and reclamation (Teck 2007c). Since the baseline survey, monitoring has occurred during 2006 and 2009. Additionally, the wetland is to be monitored for five years after TDF3 closure.

Stormwater from the site is routed to one of two infiltration areas. Surface water runoff is routed to the infiltration areas via drainage ditches.

Groundwater that seeps into the mine is collected from multiple points underground. During typical dewatering, the collected mine water is pumped to the A4 sump where ethanol is added to the mine water from a 1,000-gallon tank. The A4 sump is located at about the 900 foot level of the mine, and consists of a network of abandoned tunnels with an estimated volume of 25 million gallons. The A4 sump is used for precipitation of metals by sulfate reducing bacteria and as a settling basin for the precipitates.

From the A4 sump, the water is pumped to the 1700 sump (at the 1,700 foot level on the mine). The 1700 sump is a 60,000-gallon concrete settling basin with several baffled sections providing additional suspended solids removal. Water from the 1700 sump is pumped directly to the surface and is discharged to the Pend Oreille River through National Pollutant Discharge Elimination System (NPDES) Outfall 001.

Potable water for the mine site is provided by one groundwater supply well located in the western portion of the mine site downslope of the Waste Rock Pile. The well is 126 feet deep and is equipped with a submersible pump. Water from the well is directed to a pressure tank via underground piping and distributed to mine surface facilities. The well is permitted as a Group A, transient, non-community water system.

This section provides an overview of Federal and State statutory and other business requirements as they pertain to mining and reclamation activities at the POM. In addition, this section presents other requirements and considerations, such as contractual agreements; corporate policies, procedures and guidelines; and stakeholder commitments.

3.1 REGULATIONS

The POM is subject to a number of regulations and requirements pertaining to reclamation. Reclamation of TDF1, TDF2 and TDF3, and surface features of the Grandview Mine are being addressed separately from the other mine elements and therefore the documentation of the regulations and requirements pertaining to these facilities is not included in this Plan.

Activities proposed for the POM were submitted prior to June 30, 1999. Because activities at the POM were proposed previous to this date, reclamation activities are dictated by the RCW 78.56 under Ecology.

Primary reclamation requirements were established by Teck in accordance with Ecology requirements as defined in the following documents:

- Environmental Protection Performance and Security Pend Oreille Mine (Teck and Ecology 2004)
- NPDES Permit No. WA-0001317 (Ecology 2004)
- Waste Rock Management Plan, Pend Oreille Mine Project, Pend Oreille County, Washington (ENSR 2001a)
- Reclamation Plan for Construction-Related Activities, Pend Oreille Mine Project, Pend Oreille County, Washington (ENSR 2000) and Addendum No. 1: Reclamation Plan for Construction-Related Activities, Pend Oreille Mine Project, Pend Oreille County, Washington (ENSR 2001b)
- Conditional Exemption for TDF3 (Ecology 2000b).

According to Attachment A of the Metal Mining Operation Environmental Protection and Performance Security (i.e., the Performance Security Nos. Letter of Credit P311823V02286 and Letter of Confirmation SLCSSEA01573), the following are required as part of the POM reclamation activities for security release.

- Establish tailings pond cover
- Invest funds for long-term operations and maintenance as per preliminary tailings closure plan
- Remove ancillary roads constructed since 1999
- Remove vent raises along with equipment and plug
- Remove tailings pipelines and revegetate pipeline location
- Remove surface tanks and remediate any spillage
- Remove concentrate storage building and remediate any spillage
- Remove surface air pollution control devices

- Remove electrical substations
- Decommission underground equipment
- Excavate and remove any subsequent spills or releases
- Remove any building not utilized in economic development plan

Requirements listed in the current NPDES permit held by the POM relating to reclamation include:

- The permittee shall notify Ecology in writing of all permanent or temporary closures
- Upon permanent closure, the approved reclamation plan shall be carried out expeditiously
- Surface water quality monitoring shall continue for two years after completion of final reclamation work is approved by Ecology

The waste rock management plan (ENSR 2001a) was submitted to Ecology to address applicable requirements of the Metals Mining and Milling Operations Act and RCW Chapter 78.56. Findings of the Reclamation Planning Workshop (URS 2008) included discovery that final reclamation elements of the existing Waste Rock Pile as discussed in the waste rock management plan (ENSR 2001a) did not address the presence of waste rock located past the property line towards the river. This Plan incorporates ideas presented in the waste rock management plan (ENSR 2001a) with an option to move the material back to within the property boundary.

The Reclamation Plan for Construction-Related Activities (ENSR 2000) and its Addendum No. 1 (ENSR 2001b) were submitted to Ecology to obtain a General Permit to Discharge Stormwater Associated with Construction Activities. That plan addressed reclamation activities that would be needed if the mine project was terminated before operations began. Reclamation concepts presented in that reclamation plan include:

- Site preparation activities during construction, including vegetation clearing and topsoil removal and storage
- Grading, ripping, soil replacement, fertilization, revegetation, mulch application and noxious weed control for TDF3
- Ripping compacted areas 12 inches, applying mulch, and revegetating the soils
- Reclaiming diversion ditches and sediment collection traps
- Installing a new diversion channel on the west side of the revised POM road
- Plugging of new ventilation raises
- Performing water quality monitoring for two years following the completion of final reclamation
- Establishing revegetation success standards
- Monitoring noxious weeds for five years
- Estimating reclamation costs

3.2 STANDARDS

Teck operates under four primary sustainability policies. Standards set forth in these documents apply to all business aspects at Teck and will be followed during execution of the reclamation plan:

- Charter of Corporate Responsibility (Teck 2007a)
- Code of Sustainable Conduct (Teck 2007b)
- Code of Ethics (Teck 2008a)
- Environment, Health, Safety and Community Management Standards (Teck 2008b), which includes 20 distinct standards to assist with compliance of Teck's corporate policy on environment, health, safety, and community

The Draft Biodiversity Guide – Integrating Biodiversity Considerations into Teck Operations (Teck 2008c) is supplementary to these policies. In addition to these internal documents, The International Council on Mining and Metals (ICMM) (of which Teck is a current member) has developed the Planning for Integrated Mine Closure: Toolkit (ICMM 2008) to assist with mine closure planning. This toolkit, along with Teck's sustainability policies and the 2008 Draft Biodiversity Guide (Teck 2008), has been incorporated into the development of this Plan.

Incorporating biodiversity into the Plan is essential. The following list summarizes biodiversity practices incorporated into this Plan (Jacques Whitford AXYS Ltd. 2008):

- Develop arrangements to control access, as needed and appropriate, on mine roads and transmission lines.
- Remove and reclaim roads that are no longer needed.
- Where possible, leave remnant vegetation, including in the form of islands, in the mine footprint. This can facilitate natural regeneration following mining activities.
- Train staff in aspects of the biodiversity guidance relevant to their responsibilities.
- Prohibit staff from directly harassing or feeding wildlife, keeping pets, introducing foreign plants, or carrying firearms.
- Design a comprehensive reclamation program for operations and post-mining that considers biodiversity. ICMM suggests that an example of a good objective is *"To establish a sustainable native ecosystem that is as similar to the pre-existing ecosystem as can be achieved within the limits of recognized good practice rehabilitation techniques and the post-mining environment."* (ICMM 2006)
- Where possible, reclaim disturbed sites using native vegetation. Using local seed sources with proper provenance will help ensure local adaptation of the vegetation.
- Implement progressive reclamation to return functional ecosystems and maximize use of biologically active materials. This implies beginning investigations into methods for re-establishing ecosystem components (particularly vegetation species) early in the mining process, so that these techniques are adequately developed for reclamation and closure.
- Monitor affected areas throughout the mining process, developing a baseline for reclamation and allowing for adaptive management during the reclamation process.

- Maximize use of direct placement techniques through the mine planning process (minimize stockpiling), so that loss of biological activity in reclamation capping materials is minimized.
- Form strategic partnerships with outside organizations that can help refine biodiversity strategies and approaches and address concerns of a variety of stakeholders about biodiversity issues.
- Consider biodiversity offsets (also called habitat compensation programs or set-asides) to compensate for the residual effects on biodiversity that cannot be mitigated on site.
- Consider supporting applied research to improve understanding of biodiversity conservation within the context of mining operations.
- Use the Environmental Management System to manage biodiversity effectively. This implies, among other things, developing clear objectives and appropriate actions, monitoring their success, and taking corrective action as needed.
- Communicate your successes effectively. Partnerships can facilitate this process.

The Planning for Integrated Mine Closure: Toolkit (ICMM 2008) provides guidance for developing and maintaining closure plans beginning with the exploration activities and continuing through to relinquishment. Aspects of the tool kit were incorporated into the development of this Plan.

4.1 SOCIAL SETTING

The management of social and stakeholder impacts is one of the most challenging and complex aspects of reclamation planning. The stakeholder impacts of the reclamation planning process are often both a cause of community concern and a source of business risk. To address community concerns throughout the life of mining operations, Teck has initiated numerous programs including newsletters, meetings, public events, contributions, and sponsorships, and is committed to maturing or expanding these programs between now and the anticipated mine reclamation. The community surrounding the POM has often initiated community organization for decisions regarding the mine's economic and other impacts on the area. Teck supports this effort.

Pend Oreille County covers approximately 1,400 square miles and has a population of approximately 12,900, representing less than 1% of the total population of the state of Washington. The county population has grown an estimated 9.6% since 2000, but the Selkirk communities of Ione, Metaline, and Metaline Falls have been declining. The median household income for the county was estimated to be approximately US$39,400 in 2007. Sixteen percent of the population was estimated to be living in poverty. Newport is the largest city in the county with a population of approximately 2,000 (Census 2008). The Colville National Forest covers over half of Pend Oreille County.

Approximately 4,511 people over the age of 16 were estimated to be employed in Pend Oreille County in 2000. The three largest occupation groups were:

- Management, professional and related occupations
- Sales and office
- Production, transportation, and material moving

As of 2000, an estimated 225 people are employed in the agriculture, forestry, fishing and hunting, and mining sectors. This is the most detailed level for which mining information is available.

The racial makeup of the county is approximately 93% white, 3% Native American, 3% Latino, and 1% other races.

4.2 STAKEHOLDER CONSULTATION

The consultation of stakeholders is intended to operate in a transparent and equitable manner to ensure the confidence and support of all key stakeholders. The strategy is to ensure that the neighboring communities are fully informed about the objectives, scopes, and processes of the reclamation planning process, while identifying and assessing all potential benefits, risks and opportunities. The reclamation planning consultation program includes stakeholder identification, the development of either a communications strategy created by Teck or by the Selkirk Teck Community Planning Committee (STC PC) with Teck's support, and briefing materials.

Key stakeholder interviews in the areas of education, health, real estate, telecommunications, tourism, workforce and local government were conducted in the summer of 2000. In the fall of

2000, a survey of 30 out of the approximately 100 businesses was conducted to determine the current business climate, prospects for the future, and ideas for future development in the community. Approximately 120 people attended a public meeting in September 2000 to identify goals and objectives for maximizing positive effects and minimizing negative impacts of the POM. Forty of those attendees volunteered to work on six different task forces to work on the North Pend Oreille Action Plan.

Teck has developed an Engagement Handbook for guidance at the local level. Several resources contributed to the handbook; for example, the AccountAbility1000 Stakeholder Engagement Standard, ICMM Community Development Toolkit, and the International Finance Corporation's Performance Standards for Social and Environmental Sustainability.

Teck has identified potential stakeholders—those who are likely to be directly affected by reclamation and those who might be indirectly affected but have a legitimate interest in the reclamation planning process.

4.3 FINDINGS

Teck has taken the initial steps to establish a stakeholder consultation program. As reclamation approaches, Teck will develop these initial efforts. Stakeholder actions completed to date include:

- Developed a list of major stakeholders for engagement at the November 2008 Reclamation Planning Workshop (URS 2008)
- Participated in development of the North Pend Oreille Community Action Plan (SCCP 2001) that outlines the outcome of initial stakeholder consultation
- Participated in regular community meetings discussing the mine operations and future closure from 2000 through 2009
- Provided support to the STC PC

In addition, Teck has participated in a range of socioeconomic and academic programs in place that include:

- Pend Oreille Environmental Team
- Center for Science and Public Participation
- National Young Leaders Conference
- People to People
- Boy Scouts of America
- North Pend Oreille Net Pen Project
- Pend Oreille County Hunter Education
- Selkirk High School: Booster and Science Clubs
- Career Preparation Class
- Selkirk Special Olympics

- Pend Oreille Valley Foundation
- Dollars for Scholars

Teck will continue the existing stakeholder program that includes supporting the local community and establishing and maintaining good relationship with regulators and agencies prior to and during reclamation activities. The North Pend Oreille Community Action Plan (SCCP 2001) identified the area's primary assets and liabilities:

> ***Assets:*** The area has breathtaking views, good access to outdoor recreation, low power rates, a new fiber optic line providing redundant high speed bandwidth, and industrial sites that are served with infrastructure.
>
> ***Liabilities:*** The primary liability for economic growth is the remote location and distance to urban markets and transportation networks. There is a plentiful work force available, but the skills and education levels are low. The low density of the population results in limited offering of programs within the school system and limited range of health care services.

As identified in the North Pend Oreille Community Action Plan (SCCP 2001) and from recent stakeholder outreach, the following observations can be made:

> ***Community Relations Management:*** Overall, community relations would benefit from a more clearly defined strategic direction regarding the future of the site operations and site reclamation. When economic conditions are right, a regular meeting of a committee to plan the future of the site would be beneficial.
>
> ***Stakeholder Communications:*** Communication with local stakeholders was evident, with community members expressing understanding and trust in the mine operators.
>
> ***Community Dependency:*** Mining is a mainstay of the local economy and the impact of closing the mine may be somewhat mitigated by efforts the community is making to diversify and promote development of new business startups among existing and new residents.
>
> ***Policy Environment:*** Although there are high levels of commitment and strategic vision for the future of the Selkirk communities, there remain some weaknesses. The Pend Oreille River Tourism Alliance and Economic Development Council are currently working with the communities to assist in this effort.
>
> ***Community Vitality:*** Health care services and the education system lack resources and there are transportation issues in rural areas.
>
> ***Community Organization:*** The community is well organized and supports each other. However, they have limited development planning capacity.
>
> ***Regional Infrastructure:*** The physical infrastructure in the communities is above average compared to other rural areas of the state. Rural areas have less access to services and infrastructure and are isolated.

5.1 INTRODUCTION

This section discusses the environmental setting, including ecology, geology, hydrology, and site impacts. The main source of information for this section is the Final Environmental Impact Statement, Pend Oreille Mine Project (FEIS) (Ecology 2000a).

5.2 VEGETATION RESOURCES

Elevations at the site range from about 2,030 to just over 2,500 feet above mean sea level (amsl). With the exception of areas disturbed from previous mining activities and the golf course, the POM property is mostly forested. The dominant tree species are coniferous with a mix of western red cedar, western larch, white pine, lodgepole pine and Douglas fir. Baseline surveys of vegetation at the mine were conducted in September 1998 and in January, June, and September 1999 (Ecology 2000a). The FEIS discusses vegetation conditions in greater depth, including a description of deciduous tree species, forbs, shrubs, and grasses commonly found on the property. As described in the FEIS, the Washington State Department of Natural Resources and Ecology will be consulted to determine appropriate species for replanting during reclamation revegetation.

5.3 SOIL RESOURCES

Soils in the general area of study consist of glacial drift that have been locally reworked by fluvial processes or by man. Glacial outwash and lake sediments deposited during Pleistocene glaciation cover the Paleozoic rocks found along the Pend Oreille River in the vicinity of the mine. The soil can generally be described as deep, moderately to well-drained soils formed in glacial outwash or glacial lake sediments

The area in the immediate vicinity of the mine is lacking in surplus cover materials. Cover materials will be required to reclaim the Waste Rock Pile, roads and parking areas, removed buildings, and TDFs. Approximately 85,000 cubic yards of cover materials were stockpiled when TDF3 was retrofitted for the current mining operations. Additional other small stockpiles of cover materials are likely present near areas disturbed during preparation of the mine for recent operations. It is unlikely that the volume of stockpiled cover materials will be sufficient for all mine reclamation activities.

5.4 GEOLOGY

The site is located within the Pend Oreille River valley in an area consisting of Cambrian through Silurian/Devonian aged sedimentary carbonate and slate bedrock that has been folded and faulted to create a prominent mountainous topography. Pleistocene glaciations further shaped the land into dissected highlands and glacial valleys. The Pend Oreille River follows a former glacial valley. Glacial kame terraces exist near the site at two prominent elevations of about 2,100 feet and 2,575 feet amsl.

Economic mineralization of the POM ore is thought to have occurred when metal-containing hydrothermal fluids ascended along faults within the Metaline Limestone. This fluid was impeded by the overlying Ledbetter Slate, allowing metallic minerals to crystalize. The two ore-

bearing horizons within the Metaline Limestone are the Josephine Horizon and the Yellowhead Horizon. The principal minerals found within the ore bodies include sphalerite, galena, calcite, dolomite, and jasperoid. Other minerals are encountered in oxidized portions of the ore zone.

5.5 HYDROLOGY

5.5.1 Groundwater

Unconfined groundwater typically exists in the glacial sediments overlying Paleozoic bedrock. Surface water from rainfall and snowmelt infiltrates into the sedimentary deposits and eventually surfaces as springs, seeps, creeks, and streams near the Pend Oreille River. Some groundwater likely penetrates through eroded surfaces and fractures in the bedrock. Water seeps into the mine and is removed. Groundwater is pumped out from the mine workings, treated, and discharged to the Pend Oreille River. Groundwater in the vicinity generally flows towards the Pend Oreille River. Groundwater beneath TDF3 flows from south to north before it changes to a northwesterly direction towards the Pend Oreille River.

There are currently 11 existing monitoring wells and nine piezometers on site. These monitoring wells and piezometers characterize the hydrogeology surrounding TDF1, TDF2, and TDF3. There also is an on-site potable water well. Monitoring wells are sampled regularly, while the mine water discharge is monitored through the NPDES permit. The potable water well is tested regularly under an operating permit with the Washington State Department of Health. Water quality information is retained in POM, Ecology, and Washington State Department of Health files.

5.5.2 Surface Water

West of the mine site, the Pend Oreille River flows northeast into Canada. Near the mine property, two existing dams have been constructed across the river. The Box Canyon Dam is constructed approximately eight miles upstream of the POM, while the Boundary Dam is located about 7.5 miles downstream. Construction of the Boundary Dam created the Boundary Reservoir between the two dams, which stores water at approximately 1,990 feet amsl.

The Pend Oreille Mine is located within the Metaline Falls Watershed, which is approximately 11,585 acres and primarily drained by Threemile Creek (Ecology 2000a). Threemile Creek is located near the northern edge of the property boundary and cascades year-round into the Pend Oreille River. Four additional creeks transect the property boundaries:

- A small creek flowing primarily from east to west just north of the three tailings disposal areas and into the Pend Oreille River (Creek #1).
- A creek originating near the northwestern toe of TDF1 that flows west towards the river (Creek #2).
- A stream originating from a wetland off the property boundary southeast of the Metaline Falls Golf Course (Creek #3). This stream flows overland for a short distance and then becomes subterranean within the limits of the golf course.

- Frog Creek, originating in a wetland called Frog Pond northeast of the existing exhaust shaft. Frog Creek flows northwest across the property and into the Pend Oreille River (Figure 1.2).

Small localized wetlands exist near the southwest toe of TDF1 and along the northeastern surface of TDF1, extending to the area between TDF1 and TDF2. Water quality parameters are available in the FEIS for Flume Creek (west side of Pend Oreille River, near the southwestern property boundary), Pend Oreille River at Flume Creek, Pend Oreille River downstream of Threemile Creek, Pend Oreille River upstream of Threemile Creek, Threemile Creek, and Frog Creek east and west of the wetland at the toe of TDF1 (Ecology 2000a). In addition, the POM collects periodic surface water quality data from Frog Creek east and west of the wetland, decant line discharge from TDF-1, Threemile Creek, and Pend Oreille River at Flume Creek.

When the mine was reopened in 2004, surface features were constructed to manage stormwater at the site. Stormwater runoff from the surface of the mine property is routed via silt fences and channels to one of two small infiltration areas either southwest or northwest of the mill facility.

5.6 SITE DISTURBANCE IMPACTS

Since mine reopening, additional surface disturbances have been minimal. Surface disturbances from reopening the mine are primarily limited to filling and increasing the size of TDF3, installing additional roads, and erecting the concentrate storage building adjacent to the existing mill building. Smaller site impacts include installing site support features such as upgrading the power distribution system and installing an intake ventilation fan and shaft (VR-2) and small storage buildings.

Historic site disturbances include construction of most of the mining support buildings, portal, conveyor, mine water discharge pipe, and one vertical shaft. Historically, tailings were deposited in three primary separate areas although a relatively small quantity of tailings were deposited west of the concentrator/loadout building. The current tailings deposition facility (TDF3) was constructed over a historic tailings disposal area. North of TDF3 and south of the golf course clubhouse is an unused trap range. Site impacts to this area include the down-range presence of lead shot, pieces of sporting clays, and plastic shell and wad debris. Waste rock from historic mining operations is stockpiled in the southwestern portion of the site. Waste rock from recent (post-2003) underground mining operations has been stored underground in historic workings.

Underground mining activities should not create surface disturbances (other than disturbances related to vent raises). Subsidence is unlikely to occur, because mined zones are relatively deep and subsidence has not been documented at this mine in over 50 years of mining.

6.1 INTRODUCTION

This section describes the risk assessment methodology and the risks derived using the methodology. The process described is consistent with the ICMM Planning for Integrated Mine Closure: Toolkit (ICMM 2008).

6.2 RISK ASSESSMENT METHODOLOGY

A Reclamation Planning Workshop was held on November 20 and 21, 2008 at Teck offices in Spokane, Washington. The workshop attendees were personnel from Teck and URS. Prior to the workshop, a list of issues was developed to initiate reclamation discussions during the workshop.

During the workshop, the Base Case (current) Reclamation Plan and underlying assumptions were confirmed. For the Base Case Reclamation Plan, risks associated with reclamation execution and post-reclamation monitoring and maintenance were identified, evaluated, and recorded in a risk register. Through a screening and qualitative assessment performed at the workshop, risks were identified and designated as being key risks (i.e., having a risk rating of high or very high). The Preferred Plan presented in Section 7 of this document improves the Base Case Reclamation Plan by mitigating key risks to an acceptable risk level using risk control measures, as practicable.

6.3 RECLAMATION PLAN OBJECTIVES

At the beginning of the Reclamation Planning Workshop, the Reclamation Plan objectives were established. These objectives focused on the core values of Teck and highlight the individuality of the POM operations. The objectives are:

- Comply with all legislative requirements
- Comply with all relevant Teck corporate requirements
- Provide a well-managed site in terms of physical appearance and attitude of being the best
- Protect public health and safety
- Eliminate or mitigate adverse environmental effects to an acceptable risk-based level
- Optimize cost savings and minimize long-term liabilities to the corporation, the customer, the government, and the public
- Consider the relevant expectations of stakeholders for post-reclamation land use, including biodiversity and sustainable development
- Minimize negative socioeconomic impacts in the area
- Minimize the need for long-term site maintenance and monitoring
- Ensure that the reputation of Teck as a responsible corporate citizen is maintained and enhanced

- Capture the history of community enhancements provided by Teck
- Record previous commitments (e.g., Metals and Mining Operation Environmental Protection and Performance Security, FEIS, community outreach) as they apply to reclamation
- Achieve Teck's stated goal to be part of the Dow Jones Sustainability World Index (carbon footprint, energy use, community interaction, safety, supervisory training, complaints, and fines)

6.4 RECLAMATION PLAN ASSUMPTIONS

To assist with the development of the reclamation process and the necessary supporting elements, initial assumptions were developed to provide a common basis with which to assess the potential risks to the reclamation process. These assumptions do not include application of risk management strategies. The assumptions are:

- Mining complete: 2014 (to be revised as necessary).
- Reclamation execution period of two years: 2015 – 2016 (to be revised as necessary).
- Post-reclamation monitoring and maintenance period of five years: 2017 – 2021 (to be revised as necessary).
- Reclamation plan valuation period is 50 years from cessation of mining: 2014 – 2063 (to be revised as necessary).
- Reclamation relates to disturbance at the time of closure.
- Post-reclamation land use options include transfer site to another interested party, industrial, and public access.
- Historic Debris Area includes removal of all waste, limited impacted soil removal, and regrading and revegetation of area.
- Surface and processing facilities will be decommissioned and demolished, and below-grade foundations will be removed.
- Roads will be ripped and revegetated except for those needed for long-term monitoring.
- The Waste Rock Pile will be regraded, covered with one foot of cover materials, and revegetated.
- Recreational facilities include the former trap range only (not the golf course). It is assumed that the area will be cleared and the top six inches of soil will be removed.
- Underground operations will remove all mobile equipment, hazardous materials, etc. The mine will then be flooded and all openings will be sealed.
- Failure rate on revegetation is assumed to be 10%.
- Suitable root zone and top soil cover defined by permits.
- Demolition debris and waste will be disposed of on site or at appropriate off-site facility.
- All hazardous waste will be disposed of off site.

- No salvage value is assumed for demolition.
- Fencing will be removed at release if requested or required.
- Cost basis is January 2009.
- Environment, Health, Safety, and Community Management System will remain in place during reclamation period.

6.5 RISK IDENTIFICATION AND ASSESSMENT

A major product of the November 20 and 21, 2008 Reclamation Planning Workshop was the development of a risk register for the POM Base Case reclamation plan. The register identifies the risk, a description of the risk event, causes/background, and a risk rating based on the ICMM scale (ICMM 2008). Identification and assessment of the risk issues is based on a two-phase process:

- A screening assessment where risks are brainstormed and then assigned a likelihood and consequence using qualitative scales based on the Planning for Integrated Mine Closure: Toolkit (ICMM 2008)
- A quantitative assessment of key risks (those risks that are rated as "high" during the screening assessment) where probabilities and monetary impacts are assessed

The screening assessment was conducted during the workshop. The quantitative assessment of key risks is incorporated into the reclamation cost estimate (URS, 2009c).

6.6 RISK ELEMENTS

Nine categories or elements were identified as relevant to the POM reclamation activities, and 57 risks were identified for these elements.[1] The elements are:

- Historic Debris Area (7 risk events identified)
  - These risks relate to the Historic Debris Area and how issues such as unanticipated hazardous wastes could delay reclamation and increase costs.
- Processing Facilities (6 risk events identified)
  - Risks in this category address issues such as increased demolition costs or unanticipated hazardous wastes that could delay reclamation and increase costs.
- Recreational Facilities (5 risk events identified)
  - These risks are associated with the former trap range adjacent to the mine.
- Regulatory (6 risk events identified)
  - Risks in this category address the regulatory structure under which the mine operates and how changes to the structure could affect the entire reclamation process.

[1] Fifty eight risks were originally identified at the Risk Workshop, but a risk associated with land availability for reclamation of the Waste Rock Pile was removed as it is not an issue with the updated Waste Rock Pile reclamation plan.

- Stakeholders (7 risk events identified)
  - These risks relate to the stakeholders formed by the local and regional community and include risks such as the socioeconomic impacts resulting from the reclamation process that would be presented to the community.
- Surface Facilities and Infrastructure (7 risk events identified)
  - Risks in the category address issues such as increased demolition costs or unanticipated hazardous wastes that could delay reclamation and increase costs.
- Underground Operations (3 risk events identified)
  - Underground risks deal with the impact of issues such as subsidence and potential water contamination on reclamation.
- Waste Rock Pile (15 risk events identified)
  - Risks from this element deal with impacts from the engineering of the Waste Rock Pile.
- Water (1 risk events identified)
  - The risk from this element deals with the impact of decommissioning the TDF slurry lines to the water supply.

6.7 RISK SCREENING

The risk assessment is performed in two phases, consisting of a screening assessment and a quantitative assessment. During the Reclamation Planning Workshop, the Reclamation Planning Team developed a risk register based on the nine elements listed above (Appendix A). The individual risks were then screened or qualitatively assessed according to ICMM likelihood and consequence scales. The likelihood scales are listed in Table 6.1 and the consequence scales in Table 6.2. Risk ratings were then developed using the risk matrix shown in Table 6.3.

Table 6.1
ICMM Likelihood Scale

Scale	Descriptor	Description
1	Improbable	It would require a substantial change in circumstances to create an environment for this to occur, and even then this is a rare occurrence in the mining and metals industry.
2	Unlikely	There are no specific circumstances to suggest this could happen, but it has happened before at least once in the metals and mining industry.
3	Possible	There is at least a 5 per cent chance it could happen, or it has happened occasionally in other areas before, or it has occurred [albeit infrequently] in the mining and metals industry in the recorded past or risk mitigation treatment.
4	Likely	There is at least a 50 per cent chance it could happen, or it has happened several times in similar areas before, or this consequence is not uncommon in the mining and metals industry or any risk mitigation treatment cannot reduce the inherent likelihood further.
5	Almost Certain	Has happened/will probably happen during mine life and there is no reason to suspect it will not happen again or it has occurred in this area before.

Source: ICMM (2008)

Table 6.2
ICMM Consequence Scale

Scale		Negative Consequence	Positive Consequence
C	Consequential	Related to, in consequence of. Not inconsequential, but no more severe that that.	Related to, in consequence of. Not inconsequential, but no more substantial than that.
L	Limited	Some consequence, generally reversible in the short term and/or with modest application of resources	Some consequence, not sustainable without ongoing application of resources.
O	Overt	Consequence may be reversible, usually requiring some time and/or significant application of resources.	Consequences may be reversible but will generally be sustainable with only modest application of resources.
S	Significant	Generally irreversible consequences, with impacts apparent for a prolonged period of time.	Generally sustainable consequences over a prolonged period of time, with little or no ongoing application of resources.
W	Extreme	Irreversible consequences, impacts exceeding period similar to life of mine.	Generally sustainable consequences exceeding period similar to life of mine.

Source: ICMM (2008)

Table 6.3
ICMM Risk Rating Matrix

		Consequence Scale				
		Consequential	Limited	Overt	Significant	Extreme
Likelihood Scale		C	L	O	S	W
Improbable	1	Low	Low	Medium	Medium	High
Unlikely	2	Low	Low	Medium	Medium	High
Possible	3	Low	Medium	High	High	High
Likely	4	Medium	Medium	High	High	Very High
Almost Certain	5	Medium	High	High	Very High	Very High

Source: ICMM (2008)

The identified risks are rated on a four-category scale ranging from a "Low" risk to a "Very High" risk. For the purpose of this analysis, risks were separated into three categories:

- ***Non-Material Risks:*** Risks with potential for a negative outcome that are rated low or medium on the ICMM Risk Rating Matrix. Risks associated with these events are considered to be sufficiently low as to be tolerable, and thus no risk controls are required.
- ***Key Risks:*** Risks that have a potential for a negative outcome that are rated "High" or "Very High" in the ICMM Risk Rating Matrix. These risks have higher potential for significant negative consequences; thus, they are carried forward into the quantitative assessment phase to quantify potential liabilities and controls to mitigate the risk to a more tolerable level.
- ***Opportunity Risks***: Risks that have the potential for a positive outcome. Four opportunity risks were identified in the Reclamation Planning Workshop.

Two additional risks were identified during the workshop, but were not evaluated:

- Environment, health, and safety fatality during reclamation of the surface facilities and infrastructure
- Environment, health, and safety fatality during reclamation of the processing facilities

These two risks will be addressed prior to construction using corporate involvement, health and safety training, careful contractor selection, and job controls.

6.8 KEY RISKS

Using the threshold criteria discussed above (i.e., risks that have a potential for a negative outcome that are rated "High" or "Very High" in the ICMM Risk Rating Matrix) 19 of the risks were designated as key risks from the POM risk register. The key risks are listed by risk element, risk number and name in Table 6.4.

Table 6.4
Key Risks

Risk ID Element - Risk # - Risk Name	Risk Event Description	Likelihood	Consequence	Risk Rating
Waste Rock Pile - 3 - Cover availability	Insufficient cover material on site	5	O	High
Waste Rock Pile - 4 - Land availability[a]	Insufficient land area with which to do reclamation	5	O	High
Waste Rock Pile - 12 - Atmospheric Alteration	Accident/fatality related to confined space sampling area	2	W	High
Waste Rock Pile - 13 - Slope Stability	Erosion of Waste Rock Pile cover	2	W	High
Waste Rock Pile - 15 - Historic Disposal	Hazardous materials disposed of in Waste Rock Pile	4	O	High
Waste Rock Pile - 16 - Geotechnical	Variability in waste rock material affects slope stability (i.e. Ledbetter Shale)	3	O	High
Historic Debris Area - 19 - Waste Characterization	Discovery of extremely hazardous waste materials	2	W	High
Historic Debris Area - 23 - Incidental release during reclamation	Hazardous materials release to environment during reclamation	3	W	High
Surface Facilities and Infrastructure - 25 - Decommissioning Management Plan	Safety incident due to unfamiliarity with management system or occurrence of a spill	3	O	High
Surface Facilities and Infrastructure - 26 - Debris	Debris quantity 25% greater than estimated amount or significantly different character	4	O	High
Recreational Facilities - 31 - Cleanup volume	Waste volume greater than estimated	3	O	High
Recreational Facilities - 32 - Sporting Clays	Soil contaminated from polycyclic aromatic hydrocarbons from sporting clays	3	S	High
Underground Operations - 37 - Environmental Health and Safety	Safety incident during decommissioning	2	W	High
Regulatory - 38 - Changing Goal Posts	Standards and/or agency staff change impacting Metals and Mining Operation Environmental Protection and Performance Security release	5	O	High
Regulatory - 39 - Agency Relations	Compliance becomes impossible because of poor agency relationships	3	O	High
Stakeholder - 45 - Site Security	Public trespass into mine	5	S	Very High

Table 6.4
Key Risks

Risk ID Element - Risk # - Risk Name	Risk Event Description	Likelihood	Consequence	Risk Rating
Stakeholder - 48 - Legal Impediment	Reclamation plan is not defensible and achievable	3	O	High
Processing Facilities - 53 – Management Plan	Safety incident due to unfamiliarity with management system or there is a spill	3	O	High
Processing Facilities - 54 - Debris	Debris quantity 25% greater than estimated amount or significantly different character	4	O	High

a. At the Reclamation Planning Workshop, the initial assumption for reclamation of the Waste Rock Pile involved pushing waste rock material towards the Pend Oreille River. However, that plan was deemed unacceptable at the workshop, and a plan that will involve moving materials from the base of the Waste Rock Pile to the upper portion of the Waste Rock Pile and a second area was subsequently adopted (see Section 7 and Appendix B). Under that adopted plan, insufficient land area to do reclamation is not a key risk.

6.9 RISK CONTROLS

A number of controls have been identified for the key risks. Controls were selected that reduced the risk rating from a "High" or "Very High" without controls to a "Medium" or "Low" with controls. The controls are listed below in Table 6.5. The risks will be addressed prior to reclamation as well as after the conclusion of mining.

Table 6.5
Key Risk Controls

Risk ID Element - Risk # - Risk Name	Risk Event Description	Risk Rating		Risk Control / Further Actions
		Without Risk Control	With Risk Control	
Waste Rock Pile - 3 - Cover Availability	Insufficient cover material on site	High	Med	Identify cost-effective cover materials from an off-site source.
Waste Rock Pile - 12 - Atmospheric Alteration	Accident/fatality related to confined space sampling area	High	Med	Review HASP to incorporate confined space safety measures. Ensure compliance with confined space safety procedures.
Waste Rock Pile - 13 - Slope Stability	Erosion of Waste Rock Pile cover	High	Low	Complete engineering design that addresses soils, slopes, vegetation, and minimizes operations and maintenance.
Waste Rock Pile - 15 - Historic Disposal	Hazardous materials disposed in Waste Rock Pile	High	Med	Include amount to remediate in reclamation plan. Perform record search, physical site characterization based on preferred Waste Rock Pile reclamation design.

Table 6.5
Key Risk Controls

Risk ID Element - Risk # - Risk Name	Risk Event Description	Risk Rating		Risk Control / Further Actions
		Without Risk Control	With Risk Control	
Waste Rock Pile - 16 - Geotechnical	Variability in waste rock material affects slope stability (i.e. Ledbetter Shale)	High	Low	Include allowance for selective placement of Ledbetter shale based on preferred Waste Rock Pile reclamation design. Perform physical site characterization and geotechnical and stability analysis.
Historic Debris Area - 19 - Waste Characterization	Discovery of extremely hazardous waste materials	High	Low	Include amount to remediate in reclamation plan. Perform record search and conduct additional site characterization based on preferred reclamation design.
Historic Debris Area - 23 - Incidental Release during Reclamation	Hazardous materials release to environment during reclamation	High	Low	Develop scope of work for remediation addressing potential for encountering liquid and other mobile wastes. Also prepare HASP for specific risks associated with the Historic Debris Area. Ensure contractor compliance with scope of work.
Surface Facilities and Infrastructure - 25 - Decommissioning Management Plan	Safety incident due to unfamiliarity with management system or occurrence of a spill	High	Med	Develop and incorporate contractor selection criteria that address experience with similar decommissioning activities. Review D&D HASP and approve in accordance with Teck EHSC Management standards.
Surface Facilities and Infrastructure - 26 - Debris	Debris quantity 25% greater than estimated amount or significantly different character	High	Low	Capture in reclamation range analysis. Identify actions to narrow uncertainty.
Recreational Facilities - 31 - Cleanup Volume	Waste volume greater than estimated	High	Low	Capture in reclamation range analysis. Identify actions to narrow uncertainty.
Recreational Facilities - 32 - Sporting Clays	Soil contaminated from polycyclic aromatic hydrocarbons from sporting clays	High	Med	Include amount to remediate in reclamation plan. Perform record search and conduct site characterization based on preferred reclamation design.

Table 6.5
Key Risk Controls

Risk ID Element - Risk # - Risk Name	Risk Event Description	Risk Rating		Risk Control / Further Actions
		Without Risk Control	With Risk Control	
Underground Operations - 37 - Environmental Health and Safety	Safety incident during decommissioning	High	Med	Develop and incorporate contractor selection criteria that address experience with similar decommissioning activities. Review D&D HASP and approve in accordance with Teck EHSC Management standards.
Regulatory - 38 - Changing Goal Posts	Standards and/or agency staff change impacting Metals and Mining Operation Environmental Protection and Performance Security release	High	Med	Establish and maintain good relationships with regulators/ agencies prior to and during reclamation activities.
Regulatory - 39 - Agency Relations	Compliance becomes impossible because of poor agency relationships	High	Low	Establish and maintain good relationships with regulators/ agencies prior to and during reclamation activities.
Stakeholder - 45 - Site Security	Public trespass into mine	Very High	High	Incorporate institutional controls (fence, signs, guards, etc.) to limit liability. Perform public outreach and communication.
Stakeholder - 48 - Legal Impediment	Reclamation plan is not defensible and achievable	High	Low	Establish and maintain good relationships with regulators/ agencies prior to development of reclamation plan and during reclamation activities.
Processing Facilities - 53 - Management Plan	Safety incident due to unfamiliarity with management system or there is a spill	High	Med	Develop and incorporate contractor selection criteria that address experience with similar decommissioning activities. Review D&D HASP and approve in accordance with Teck EHSC Management standards.
Processing Facilities - 54 – Debris	Debris quantity 25% greater than estimated amount or significantly different character	High	Low	Capture in reclamation range analysis. Identify actions to narrow uncertainty.

D&D – decommissioning and demolition
EHSC – Environment, Health, Safety, and Community
HASP – Health and Safety Plan

Three of the key risks reflect uncertainties that will be handled by the range of costs developed for the reclamation plan:

- Risk 26, Surface Facilities and Infrastructure, Debris
- Risk 31, Recreational Facilities, Cleanup Volume

- Risk 54, Processing Facilities, Debris

The uncertainties of these risks may be reduced by gathering more information on the issue in question. If the cost range associated with the risk is significantly high, it may be prudent to conduct further studies/work in an attempt to narrow the cost range.

Fourteen of the key risks were mitigated using risk controls to lower the risk ratings to acceptable levels, such as low or medium. Mitigation of key risks to acceptable levels assumes that identified risk controls will be in place and effective. Several key risks were due to the lack of waste characterization (Risks 15, 16, 19, and 32). These risks were addressed by assuming the remediation of an amount of waste as part of the reclamation plan and/or by the range of costs developed for the reclamation plan.

Risk 45, Public Trespass onto the Mine Site, was identified as a key risk that could not be mitigated to acceptable levels. Institutional controls such as fencing and signage combined with public outreach and communication programs will be part of the reclamation plan; however, even with such controls human trespass onto the mine site during and after reclamation resulting in overt consequences to Teck was estimated to be possible.

6.10 OPPORTUNITY RISKS

To reiterate, opportunity risks are events that provide a benefit to the operation, such as a positive cash flow or other beneficial use. Five opportunity risks for POM were identified during the Reclamation Planning Workshop (Table 6.6).

Table 6.6
Opportunity Risks

Risk ID Element - Risk # - Risk Name	Risk Event Description
Surface Facilities and Infrastructure - 27 - Historical Preservation	Preserve some of the surface facilities as a museum or historical structures
Recreational Facilities - 29 - Good Neighbor Cleanup	Cleanup of recreational facilities yields community goodwill
Recreational Facilities - 30 - Reprocessing Shot	Lead shot collected from shooting range to be reprocessed
Underground Operations - 35 - Safe Repository	Use underground as a safe storage facility
Processing Facilities - 55 -Historical Preservation	Preserve some of the processing facilities as a museum or historical structures

7.1 INTRODUCTION

The Preferred Reclamation Plan (Preferred Plan), which is a central component of this Plan, identifies the key activities that will need to be undertaken to achieve reclamation objectives and respond to significant risks. To develop the Preferred Plan, the first step was to review, synthesize, and refine existing relevant information (i.e., mine permits, reclamation plans, and related documents). During the Reclamation Planning Workshop, the Base Case (Current) Reclamation Plan and underlying assumptions were confirmed. Risks associated with reclamation execution and post-reclamation monitoring and maintenance were identified, evaluated, and recorded in the risk register at the Reclamation Planning Workshop. Fifty-seven risks were identified, 19 of which were identified as key risks (i.e., risks with a risk rating of high or very high). The Preferred Plan improves the Current Reclamation Plan by mitigating key risks to an acceptable risk level using risk control measures. Details for some activities of the Preferred Plan will need to be refined as reclamation approaches.

This section presents the Preferred Plan for the POM. It identifies the key activities that will need to be undertaken to achieve the reclamation objectives stated in Section 3, and incorporates a number of risk controls that were identified to either eliminate or reduce the risks discussed in Section 6. Cost estimates for the Preferred Reclamation Plan are presented in the associated Reclamation Cost Estimate Report.

As noted in Section 2, the facilities included in reclamation planning are as follows:

- Surface facilities and infrastructure
- Processing facilities
- Waste Rock Pile
- Historic Debris Area
- Underground operations
- Former trap range
- Water-related structures (sewage treatment system, stormwater infiltration areas, wetlands, water treatment system)

For the purposes of developing the Preferred Plan, the following conditions are assumed at the cessation of operations:

- Surface facilities area is intact
- Infrastructure, including utilities, roads, conveyor, and the tailings distribution system, are intact
- All economic lead-zinc deposits within the permit area are depleted

Figures 7.1 and 7.2 show the locations of POM facilities that will undergo reclamation. Post-reclamation land use will be developed pending stakeholder input. The Preferred Reclamation Plan assumes that the post-reclamation land use is industrial. This assumption could change in the future pending stakeholder input.

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PEND OREILLE RIVER

WATER TREATMENT SYSTEM NPDES DISCHARGE

EXISTING VENT (VR-1)

PEND OREILLE MINE PROPERTY

FROG CREEK

STORAGE BUILDING

CORE SHED

HISTORIC DEBRIS AREA (SEE NOTE 1)

OLD CEMENT PAD

PROCESS TANK

WATER TANKS

PAD

GEOLOGY BUILDING

SLURRY LINE

MAIN SUBSTA.

TAILING PIPELINES (TO BE REMOVED)

TAILINGS PIPELINES

EXISTING VENT (VR-2)

MINE PORTAL

TAILINGS AREA

CONCENTRATOR - LOADOUT BUILDING

DRAIN BED No. 3
DRAIN BED No. 2
DRAIN BED No. 1

SUBSTA.

OVERHEAD CONVEYOR

LOADING DOCK PAD

SEPTIC TANKS AND PUMP STATION

POTABLE WATER SYSTEM WELL HEAD (SEE NOTE 2)

CRUSHER BUILDING

STORAGE BLDG

LUBE STORAGE

COARSE ORE BINS

WASTE ROCK PILE

U/G CONVEYOR EXIT

(4) SEPTIC TANKS

OFFICE & DRY BLDG.

ADMIN SUBSTATION

SECURITY GATE

WEIGH STA. & GATE

HEAD HOUSE

SHOP BUILDING

STORAGE BLDG.

OLD SUBSTA.

DIESEL FUEL STATION

SUBSTATION

PARKING LOT

PARKING LOT SUBSTATION

CAP MAGAZINE

UTILITY (SWINGING) BRIDGE (NOT SHOWN) (SEE NOTE 2)

NOTES:

1. HISTORIC DEBRIS AREA OUTLINE FROM 2005 FIELD INVESTIGATION BY GEOENGINEERS.
2. TO BE DECOMMISSIONED/CLOSED.
3. FORMER TRAP RANGE TO BE RECLAIMED (NOT SHOWN – TO EAST OF FACILITIES SHOWN).

LEGEND

- SURFACE FACITITIES, INFRASTRUCTURE, AND PROCESSING FACILITIES DECOMMISSIONING/DEMOLITION
- SURFACE FACILITIES, INFRASTRUCTURE, AND PROCESSING FACILITIES REMAIN OPEN
- RECLAMATION
- ROAD/PARKING
- MINE PROPERTY BOUNDARY

0 125 250 500

SCALE IN FEET

FACILITIES UNDERGOING RECLAMATION

W:\Projects\36298272_POM_Reclamation_Plan\8.0_GIS_CAD\Reclamation Plan Report\REC FIG 71R1.dwg

FIG. 7.1

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PEND OREILLE
MINE PROPERTY

LOCKED GATE

PEND OREILLE RIVER

TDF1

TDF2

GOLF COURSE

LOCKED GATE

POM SURFACE AND
PROCESSING FACILITIES

FROG
CREEK

TAILINGS PIPELINE

HISTORIC
DEBRIS AREA

UPPER GATE

FORMER TRAP RANGE

WASTE ROCK PILE

TDF3

COUNTY ROAD

GRANDVIEW MINE

LEGEND

ROADS TO BE RECLAIMED

ROADS TO REMAIN SEASONALLY OPEN (SEE NOTE)

ROAD/PARKING

MINE PROPERTY BOUNDARY

NOTE:

ROADS DESIGNATED TO REMAIN SEASONALLY OPEN, MAY BE SHUT DOWN AS AN OPTION

0 250 500 1000

SCALE IN FEET

ROADS UNDERGOING RECLAMATION

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FIG. 7.2

7.2 GENERAL PRACTICES

This section describes general practices regarding reclamation activities. There are a number of general practices that will be implemented as part of the Preferred Plan. These practices are common to all the reclamation activities:

- Work will be performed under applicable local, state, and federal regulations for safety and environmental protection.
- All POM mine reclamation and post-reclamation activities will be conducted in a manner consistent with Teck management standards for environment, health, safety, community, and sustainability.
- In accordance with Teck corporate policy, a specific health and safety plan (HASP) for mine reclamation will be developed. The HASP should specifically address individual reclamation activities and include confined space entry precautions. It may be necessary to divide the HASP into multiple volumes pertaining to separate reclamation elements. In addition, all contractors and subcontractors will need to provide a HASP for their on-site activities. These HASPs will be subject to Teck review and approval before work commences and all on-site workers will be required to comply with the HASP. It might be necessary to designate an on-site health and safety coordinator during reclamation activities to assist with HASP compliance.
- Specific contractor selection criteria will be developed for reclamation activities. Identification of contractor selection criteria will help to ensure qualified contractors are selected who will reduce risks for typical reclamation and demolition activities. Other things being equal, preference will be given to qualified local contractors.
- In accordance with Ecology requirements, a Stormwater Pollution Prevention Plan (SWPPP) will address reclamation activities. The SWPPP may be covered under the existing Industrial Stormwater General Permit (ISWGP) or under a new permit application for stormwater for construction activities associated with the reclamation completed at the time of reclamation.
- Subcontractors will develop and implement practices to prevent any potential contaminant migration during reclamation activities.
- Labor necessary to complete mine reclamation activities will be obtained from skilled local sources if available. Also, if possible, the existing equipment/vehicle fleet will be used to complete mine reclamation activities. Contractors hired to assist with reclamation and monitoring activities will be experienced and qualified to minimize the risks of incidents occurring during activities.

7.3 SURFACE FACILITIES, INFRASTRUCTURE, AND PROCESSING FACILITIES

It is assumed that all surface facilities and infrastructure and processing facilities located at the POM will be decommissioned and demolished. Table 7.1 lists facilities that will be demolished and decommissioned, and Figure 7.1 shows the locations. The actual final disposition of infrastructure will consider stakeholder input.

Table 7.1
Pend Orielle Mine Infrastructure

Building / Structure	Remain Open/Closed	Footprint[a]	
		Sq Feet	Linear Feet
Surface Facilities and Infrastructure			
Storage Building	Closed	10,000	
Core Shed	Closed	17,000	
Geology Building	Closed	6,000	
Old Cement Pad	Closed	12,000	
Loading Dock Pad	Closed	3,000	
Storage Building/Lube Storage	Closed	14,000	
Admin Substation	Closed	4,000	
Office Dry Building	Closed	15,000	
Security Gate/Weigh Station	Closed	5,000	
Shop Building	Closed	31,000	
Diesel Fuel Station	Closed	6,000	
Swinging Bridge	Closed		200
Potable Water System/Well Head	Closed		
Main Substation	Closed	16,000	
Water Lines	Closed		2,000
Sewer Lines	Closed		1,000
Substation	Closed	5,000	
Septic Tanks and Pump Station and Drain Beds	Closed	20,000	
Substations	Closed	16,000	
Cap Magazine	Closed	4,000	
Powder Magazine	Closed	5,000	
Processing Facilities			
Process Tank, Water Tanks, and Pad	Closed	24,000	
Tailings Pipeline	Closed		4,000
Mill Building	Closed	56,000	
Overhead Conveyor	Closed	22,000	
Crusher Building	Closed	12,000	
Coarse Ore Bins, Conveyor and Head House	Closed	25,000	
U/C Conveyor Exit	Closed	3,000	

a. Footprint area includes 20-foot buffer around facility to account for total disturbance.

Inventories will be reduced prior to decommissioning and demolition. Equipment will be cleaned, decommissioned, and reused off site if economically viable. Demolition of facilities will involve the complete removal of all buildings and support structures, including power lines. For surface facilities, where practical, concrete foundations beneath structures will be removed to a depth of three feet to facilitate vegetation of post-reclamation land. Concrete foundations and floors of processing facilities will be left in place, except where removal is needed or as practicable.

Construction and demolition debris will be disposed of in compliance with applicable solid waste regulations. Options include on-site disposal of inert construction debris with off-site disposal of non-inert debris, or off-site disposal of all debris. If disposed of on site, inert waste must meet certain criteria (WAC 173-350-990). If more than 250 cubic yards of inert waste will be disposed of on site, the requirements of an inert waste landfill need to be met (WAC 173-350-410). If off-site disposal is conducted, broken concrete will be hauled to a local concrete recycler and/or solid waste landfill. Other clean demolition and decommissioning materials (i.e. soft debris such as wood, drywall, roofing materials, etc.) will be hauled to the Waste Management Graham Road Landfill in Medical Lake, Washington or other local disposal facility, as available. Any hazardous material encountered will be removed according to applicable regulations. After the foundations have been removed and the soils have been tested and cleared for the presence of any contamination, the area will be graded to promote drainage. The areas will then be covered with cover materials, scarified, and vegetated. Fencing and signage will be installed within reclaimed areas.

About 2,400 cubic yards of tailings are located near the concentrator building. There are a number of potential options for addressing these tailings; a recommended option will be developed in the future. The Preferred Plan assumes that the tailings will be removed to TDF 3. The disturbed area will then be covered with a thickness of cover materials, scarified, and vegetated.

7.4 ROADS AND PARKING AREA

Roads will be reclaimed, except for those needed for environmental sampling or to remain open for community use. Figure 7.2 shows those roads that will be reclaimed and those that will be remain open. Road reclamation will generally include the following:

- Natural drainages will be restored unless re-establishment does not enhance environmental values.
- Excess culverts will be removed and either salvaged or disposed of at an appropriate facility.
- Waste rock used as a road base at some of the existing roadways will be removed, hauled, and placed on the regraded Waste Rock Pile. Any other contaminated materials will be removed from the road to an appropriate facility.
- Roadbeds designated for reclamation will be ripped, scarified, covered with cover materials, and revegetated with an approved seed mix.
- Fill slopes will be shaped to conform to the surrounding terrain; restoring natural drainage.

- Cut slopes will be shaped to blend with the regraded or natural contour.
- Erosion control structures will be constructed as necessary to prevent excessive erosion and to provide long-term stability.

The total length of identified roads within the permit boundary is 25,200 linear feet, of which approximately 2,000 feet of roadway is estimated to be paved. The length of road to be reclaimed is 7,300 linear feet (all gravel). The length of road to remain open is 17,900 linear feet. Based on an assumed average road width of 20 feet, approximately 3.4 acres of gravel roads will be reclaimed.

The existing main parking lot (approximately 2.0 acres) will be reclaimed in a manner similar to the roadways.

7.5 WASTE ROCK PILE

Appendix B contains an alternatives evaluation performed for the Waste Rock Pile that investigated several options for grading the pile (URS 2009b). Alternative 2 of the alternatives evaluation involves relocating materials within the pile and to a second area (the existing parking lot) as shown in Figure 7.3. The preferred option is a variation of Alternative 2 that includes removing material on the lower portion of the existing pile to the upper portion of the pile and to TDF3 (rather than to the existing parking lot). The existing pile will be regraded to achieve sideslopes of 3H:1V that generally remain within the current footprint. Excess material produced as a result of regrading will be relocated to TDF3 (approximately 0.8 mile by road from the existing Waste Rock Pile). Approximately 43,000 cubic yards of material will be moved to TDF3 for use in its reclamation. Excess material from regrading the Waste Rock Pile may be placed in the two ventilation raises (VR-1 and VR-2) that have a combined estimated capacity of 8,000 cubic yards. Also, excess material may be used to buttress historic and current TDFs. The total amount of material moved either through regrading, placement at TDF3, and/or buttressing the TDFs is approximately 145,000 cubic yards. Waste rock regrading will be performed using an equipment complement consisting of dozers, backhoes/excavators, and dump trucks. The regrading plan will incorporate selective placement of any Ledbetter Slate encountered, to address stability issues. Any materials encountered during the regrading of the Waste Rock Pile that has potential to be an environmental hazard, such as hazardous waste, will be disposed of appropriately or mitigated. An amount of hazardous waste is assumed as part of the reclamation plan.

Once the pile is graded, cover materials will be placed on the pile to a thickness of approximately 12 inches. Approximately 16,300 cubic yards of cover materials will be required for reclamation of the Waste Rock Pile. Cover materials are assumed to be obtained from borrow sources at TDF3 using backhoes/excavators and dump trucks. Once placed, cover materials will be graded to meet the minimum thickness requirement of 12 inches. Cover materials may be amended with fertilizer, wood chips, or other materials to improve soil fertility and water-holding capacity. The regraded area will be vegetated with a specified seed mix and planted with Douglas fir and Ponderosa pine. Finally, stormwater management controls, including surface water run-on and run-off features, will be installed.

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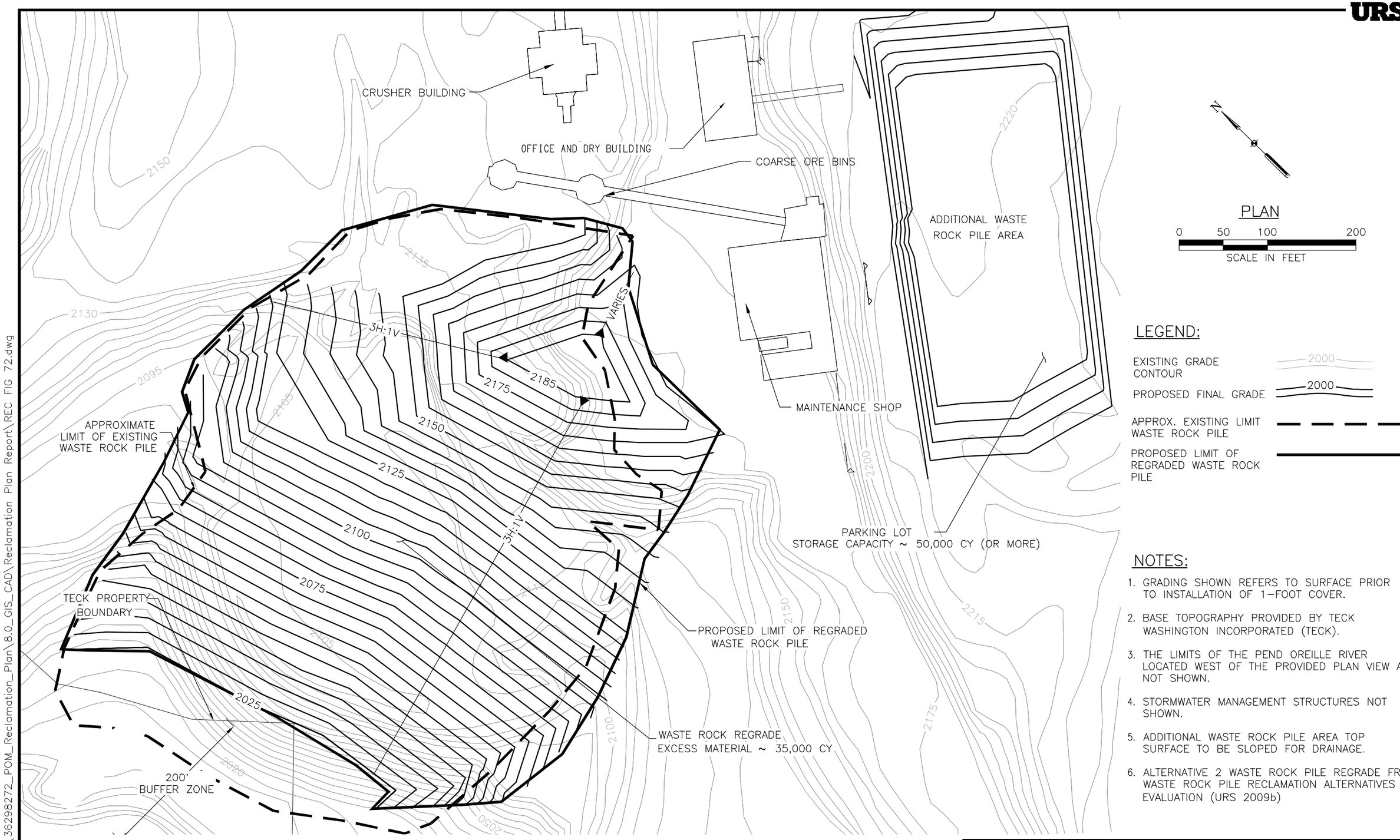

N

PLAN

0 50 100 200

SCALE IN FEET

LEGEND:

- EXISTING GRADE CONTOUR — 2000
- PROPOSED FINAL GRADE — 2000
- APPROX. EXISTING LIMIT WASTE ROCK PILE
- PROPOSED LIMIT OF REGRADED WASTE ROCK PILE

NOTES:

1. GRADING SHOWN REFERS TO SURFACE PRIOR TO INSTALLATION OF 1–FOOT COVER.
2. BASE TOPOGRAPHY PROVIDED BY TECK WASHINGTON INCORPORATED (TECK).
3. THE LIMITS OF THE PEND OREILLE RIVER LOCATED WEST OF THE PROVIDED PLAN VIEW ARE NOT SHOWN.
4. STORMWATER MANAGEMENT STRUCTURES NOT SHOWN.
5. ADDITIONAL WASTE ROCK PILE AREA TOP SURFACE TO BE SLOPED FOR DRAINAGE.
6. ALTERNATIVE 2 WASTE ROCK PILE REGRADE FROM WASTE ROCK PILE RECLAMATION ALTERNATIVES EVALUATION (URS 2009b)

Job No. : 36298272	WASTE ROCK PILE REGRADE ALTERNATIVE 2
Prepared By : BWG	
Date : 05/2009	

FIG. 7.3

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7.6 HISTORIC DEBRIS AREA

The Historic Debris Area will be cleared and grubbed selectively, taking into account the role vegetation plays in the stability of the area. Waste will be removed from the Historic Debris Area according to applicable regulations. The estimated aerial extent of the Historic Debris Area is approximately 1.2 acres containing an estimated 9,960 cubic yards of contaminated materials that will be removed. The aerial extent assumes that the portion of the area on Seattle City Light property is reclaimed by Teck. The estimated amount of contaminated materials is based on excavating to a depth of five feet. Any non-hazardous and hazardous wastes encountered will be removed according to applicable regulations. The Preferred Plan includes an allowance for any potentially dangerous and extremely hazardous materials, which will be characterized and managed according to applicable regulations. Once waste has been removed, the disturbed area will be regraded and revegetated to reduce the potential for erosion and enhance slope stability.

Due to the relatively steep terrain at the Historic Debris Area, special construction techniques will be necessary. Specialized equipment might include cranes, draglines, and operators with knowledge of specialized equipment operations. Engineering controls will likely be required to prevent accidental loss of debris into the Pend Oreille River.

7.7 UNDERGROUND OPERATIONS

Reclamation of the underground operations will consist of decommissioning mine equipment and facilities, allowing the mine to flood, and sealing all mine openings. All mobile equipment, the primary conveyor system, and electrical substations will be decommissioned or removed from the mine as necessary to prevent future environmental impacts. In addition, the underground hoist will be decommissioned or removed if economically viable. Reclamation of wire and electrical facilities may be considered depending on market conditions. The cone crusher will be left in place. All hazardous materials will be removed from the mine.

Once the mine has been decommissioned, it will be allowed to flood. Mine openings such as shafts and ventilation raises will be sealed with concrete and/or polyurethane expansive foam. Initially, the main portal will be sealed in a manner that is secure but allows access for water level monitoring during flooding of the mine. The final sealing method for the portal will be established at relinquishment.

7.8 FORMER TRAP RANGE

The four trap launchers and, as practicable, all waste generated from shooting (shot, shell casings, wads, and clay targets) will be removed from the former trap range. The estimated aerial extent of the impacted area is 11.5 acres. Waste removal will consist of removing the upper six inches of soil in contaminated areas where practicable. Trees within range of shot that were present during the period of trap range operation will be removed and disposed of if found to contain accumulations of shot pellets. Waste will be removed according to applicable regulations. Once waste has been removed, the disturbed area will be regraded, scarified, and revegetated.

7.9 WATER-RELATED STRUCTURES

Sewage treatment drain fields will be reclaimed. Stormwater infiltration areas and wetlands will remain. The mine water treatment system in the underground mine will be decommissioned after mining. Metering devices, pumps, tubing, and the ethanol holding tank will be removed. The rest of the underground mine water treatment system will remain in the mine upon reclamation.

The potable water system including pressure tank, pumps, and controls will be removed from the site and recycled, if economic. The potable water well will be abandoned in accordance with Washington State regulations, unless needed for groundwater monitoring of the Waste Rock Pile or for site reuse based on stakeholder input. Underground potable water system piping will be abandoned in place.

7.10 WASTE MANAGEMENT

Non-hazardous and hazardous wastes located at POM will be disposed of in compliance with applicable regulations. Salvageable material such as scrap metal will be removed for recycling. Any residual solid and liquid waste will be properly disposed of off site.

Removal of hazardous material will be confirmed through media sampling. Any contaminated soil areas will be remediated as required. Removal of contaminated soil will be confirmed through media sampling and groundwater will be assessed and monitored if required to obtain a no-further-action designation from regulatory agencies.

Any remaining lubricants and petroleum-type wastes will be placed in containers and removed as required and hauled off site for recycling. Lubricant and fuel transfer and temporary storage areas will be bermed as a measure of secondary containment and as required by spill prevention, control, and countermeasure rules.

7.11 SOCIOECONOMIC ISSUES MANAGEMENT

7.11.1 Human Resources and Employment

Human resources and employment will require careful management prior to and through mine reclamation activities. Premature loss of workers to other opportunities, poor employee moral, loss of productivity, increase in injuries and other health and safety events, and other undesirable impacts to operations might occur as the mine transitions from production to reclamation.

To address the human impacts of reclamation, Teck should consider the following measures:

- Notify employees strategically and periodically of Teck's long-term production and reclamation goals.
- Retain key employees necessary for reclamation, and provide the necessary training so that the reclamation team can effectively implement the Preferred Plan.
- Assess economic and employment market conditions in the area in the post-reclamation period, and conduct a skills audit of employees and contract staff against prevailing employment market conditions. This will enable Teck to suggest skills training,

development, and out-placement strategy to support staff retrenched through the reclamation process.

- Provide opportunities for internal worker relocation depending on the worker's goals and objectives, external influences such as metals prices, Teck's labor demands at other facilities, and worker performance. Such assistance might include retraining.
- Develop mechanisms for reducing employees near the time of reclamation.

7.11.2 Community Health and Safety

Teck will protect community health and safety through adherence to appropriate environmental regulations, by permit requirements, and by using safe and responsible reclamation practices. The following reclamation practices will help protect community health and safety:

- Unsafe mine features such as the swinging bridge, ore bins, ore conveyance systems, milling equipment, and other structures will be removed from the site.
- During site decommissioning and demolition, releases of airborne contaminants such as dust and asbestos fibers will be minimized through engineering controls. Surface water will be protected by implementation of a grading plan and construction stormwater permit.
- Equipment will be decommissioned to prevent unanticipated releases or exposures to hazardous materials. Impacted media including contaminated soil, water, and chemicals will be mitigated in accordance with Washington State cleanup regulations.
- Demolition debris will be disposed of in accordance with applicable regulations. Movement of trucks and other equipment through local communities will be defined through the preparation of a haul plan.
- Mine openings will be sealed to prevent accidental or intentional access to underground workings.
- Unsafe slopes will be regraded.
- Fire suppression infrastructure will be retained until near the end of reclamation.
- Site security measures will be implemented to minimize unauthorized access to the mine.
- Community leaders and emergency response personnel will be notified and informed of potentially unsafe conditions remaining at the mine site during and following reclamation.

7.11.3 Stakeholder Communications and Consultation

Consistent with stakeholder communication and consultation during mine development and operation, the POM mine manager will continue to conduct primary communications between Teck and community stakeholder groups during mine reclamation planning and implementation. Regulatory communication will be conducted jointly by POM and Teck Environment and Public Affairs staff. This approach builds on existing trust and credibility of Teck with the local community and regulatory agencies.

Further, the impacts of mine reclamation on the local communities (Metaline Falls, Metaline, Ione, and nearby unincorporated portions of Pend Oreille County) are significant. Reduced tax base, lessened demand on housing, primary education, infrastructure and services will change the local economic landscape. Community economic and governance leaders representing each of the affected districts will play an important role in determining the economic survivability of north Pend Oreille County after the mine operations have permanently ceased. Therefore, Teck will continue to commit resources to assist local leaders to:

- Identify post-mining uses of the POM site
- As practicable, develop strategies to transition service industries depending on mine-generated business to sustainable sources of income. An example could be to assist the community with identifying and marketing sustainable industries that might benefit from the region's labor, infrastructure, and natural environment.
- Identify alternative pathways toward economic revitalization

This will be accomplished by continuing to present mine status updates by the mine manager to local community gatherings on request; providing stakeholder engagement specialists to local governments and committees to assist with meeting planning, notifications, and other assistance; and providing reclamation technical experts for presentations and strategic planning sessions.

Post-reclamation land use will be developed pending stakeholder input. The Preferred Reclamation Plan assumes that the post-reclamation land use is industrial. For those disturbed areas that are reclaimed, post-reclamation monitoring will be performed. Post-reclamation monitoring is anticipated to last for two to five years, with noxious weed monitoring and socio-economic issues monitoring continuing for five years. Activities will include:

- Monitoring erosion and slope stability in reclaimed areas.
- Monitoring water quality at water management facilities such as erosion control structures.
- Monitoring vegetation success (including noxious weeds) and wildlife activity.
- Maintaining reclamation elements and remaining site appurtenances, such as fences, gates, as needed.
- Maintaining a HASP for the duration of post-reclamation monitoring. This plan should specify confined space entry procedures if warranted.

8.1 RECLAMATION MONITORING

Reclamation performance monitoring will begin during the first growing season after final reclamation has been completed. Monitoring will focus on revegetation success, water quality, and noxious weed control. Monitoring will continue until successful reclamation is achieved on all areas directly disturbed and reclaimed.

8.1.1 Revegetation Monitoring

The following revegetation standards must be met:

- At the end of the first growing season after revegetation of disturbed areas, 30 percent of the ground will be covered with vegetation
- At the end of the third growing season after revegetation, 60 percent of the ground will be covered with vegetation

Ground cover will be measured along random line transects. All line transects will be identified on a post-reclamation map and marked in the field to allow for use of the same transects during subsequent surveys. A suitable cover mapping methodology developed by Ecology and/or the Washington State Department of Natural Resources will be used to determine vegetative cover at each sampling plot. Should these standards not be met, additional revegetation will be conducted in areas not meeting the standards, in order to meet performance standards.

8.1.2 Noxious Weed Monitoring

The occurrence of noxious weeds on the reclaimed areas will be monitored for a period of five years or less, as determined by Ecology. Noxious weed surveys will be conducted annually during the growing season on reclaimed areas.

8.2 WATER MONITORING

Surface water and groundwater monitoring will be performed for a two-year period following the completion of reclamation and revegetation. Surface water and groundwater monitoring will be conducted in accordance with current permit requirements. Surface water monitoring requirements include monitoring five surface water stations and groundwater monitoring requirements include monitoring six groundwater monitoring wells.

8.3 SOCIOECONOMIC ISSUES MONITORING

Success of the socioeconomic programs implemented during reclamation will be measured by post-reclamation assessments conducted by Teck that evaluate progress toward meeting Teck/stakeholder goals. The first assessment will be conducted prior to final closure of the mine; the second will be conducted five years after reclamation of the mine site. During the first assessment, the following questions will be evaluated:

- Have regulators been provided the Preferred Plan and do they have buy-in?
- Have stakeholder groups been engaged?
- Have stakeholder groups assisted in preparation of post-mining land use strategies and is there a defined plan?
- Is there a community plan for business transition to sustainable economies and economic revitalization?
- Is there significant resistance or dissatisfaction to reclamation-related plans, approaches, and implementation?

This assessment will define the baseline prior to implementation of reclamation. Deficiencies in meeting socioeconomic goals identified during the initial assessment will be evaluated relative to Teck's sustainability goals and appropriate action will be developed, if necessary.

The second assessment will evaluate the success of socioeconomic programs after the five-year monitoring and maintenance period. Evaluation criteria for the second assessment will be developed using the insights gained during the first assessment and on-going stakeholder communications and consultation.

8.4 MAINTENANCE

Based on the revegetation monitoring results after the first and third growing seasons, vegetation establishment will be evaluated to determine whether reclamation success is probable. If areas of 0.25 acre and larger have failed or have no expectation of meeting the revegetation success standards, an evaluation will be initiated to determine the probable cause of failure. The evaluation will be conducted by Teck in consultation with Ecology. Revegetation failure will be corrected by reseeding or inter-seeding with an approved seed mixture during the next approved seeding window.

Noxious weed control measures will be implemented if noxious weeds are found in disturbed areas. Noxious weeds found during revegetation surveys will be removed by hand pulling, mowing, or chemical treatment. Herbicide applications will follow the manufacturer's

recommendation for application rates and will be applied at the time of year that produces the most effective results.

In addition to success of vegetative establishment, POM will implement the mine's SWPPP to meet NPDES requirements. The SWPPP requires maintenance of permanent impoundments and any sediment detention structures and erosion control practices until a time that vegetation establishment is deemed sufficient and the general landscape is stable.

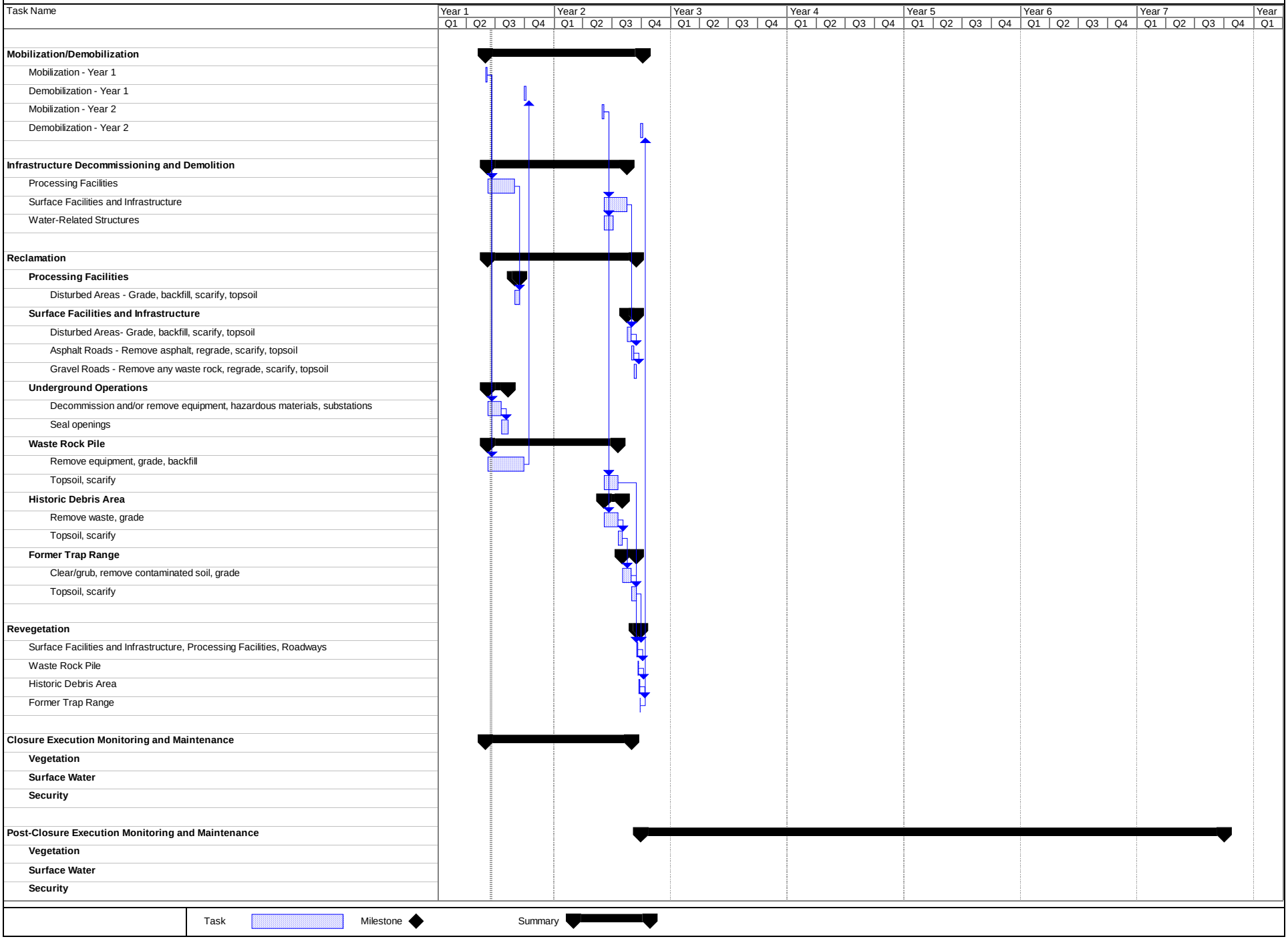
Site appurtenances, such as fences and gates, will be repaired in conjunction with the site security inspections. In addition, maintenance will include roads needed for post-reclamation monitoring and wellheads that are not abandoned.

Figure 9.1 shows the general schedule of reclamation activities. Once mining is concluded, the mine will enter into the reclamation execution phase, which is expected to occur over approximately two years. The two largest reclamation activities are infrastructure decommissioning and demolition and Waste Rock Pile grading, cover placement, and revegetation. Reclamation of the Historic Debris Area will follow processing plant decommissioning and demolition for safety and stability purposes.

The period to perform a specific reclamation activity is generally based on working an effective eight-hour shift per day. Productivities for major equipment can be found in the detailed cost estimates included as appendices to the Reclamation Cost Estimate Report (URS 2009c).

A post-reclamation monitoring and maintenance period will occur for two to three years after final reclamation with the exception of noxious weed monitoring and socioeconomic issues monitoring, which will continue for five years post-reclamation. Activities conducted during the post-reclamation period will include vegetation monitoring, surface water monitoring, and socioeconomic issues monitoring. Maintenance activities will include repairing areas where vegetation has not met established success criteria, controlling noxious weeds, and repairing fences.

Figure 9-1. Reclamation Implementation Schedule



In addition to the identified activities forming the Reclamation Plan, there are a number of specific actions that are recommended to further reduce residual risks. They are listed in Table 10.1 with their priority/urgency.

Table 10.1
Recommended Further Reclamation Actions

Reclamation Element	Action	Priority/Urgency (1 is highest priority)	Risk Addressed
Waste Rock Pile	▪ Perform record search, physical site characterization of any hazardous materials disposed of in Waste Rock Pile based on reclamation design.	5	Key Risk 15
	▪ Perform geotechnical analysis of Waste Rock Pile based on reclamation design.	5	Key Risk 16
	▪ Evaluate suitability of waste rock materials for use in site reclamation activities, e.g., for reclamation of TDFs.	1	Key Risk 3
	▪ Identify off-site borrow source for cover materials.		
	▪ For Waste Rock Pile and other site-wide features requiring cover materials, perform a materials balance and borrow investigation for cover materials.		
Historic Debris Area	▪ Recognizing that a site characterization was completed in 2005 that addressed many uncertainties/risks, perform physical site characterization of waste materials in Historic Debris Area based on reclamation design to address remaining risks, including type of waste present (solid versus hazardous) and quantity of waste, as well as assess responsibility of Seattle City Light for remediation within its property boundary.	2	Key Risk 19
Processing Facilities, Surface Facilities and Infrastructure	▪ Identify and implement actions to narrow uncertainty associated with greater debris quantity than estimated or significantly different character for underground mine facilities and surface facilities, infrastructure, and processing facilities. Three recommended actions include: 1) Perform a more thorough and detailed review of all existing facility plans/as-built drawings in order to define specific building types of construction and dimensions to create a refined quantity take-off. 2) Perform a more thorough field investigation of the structures (potentially including destructive/intrusive investigation) in order to better define specific structure types of construction	4	Key Risks 26 and 54

Reclamation Element	Action	Priority/Urgency (1 is highest priority)	Risk Addressed
	and dimensions to create a refined quantity take-off. At a minimum, this would be necessary for those structures where adequate as-built drawings are not available or are too general in nature. 3) Evaluate extent of soil impacts related to mining activities to define quantities of soil requiring management. 4) Define what is to be remaining and on-site at the time of demolition to eliminate inclusion in the quantity take-off those items that will truly not be there (i.e. supplies, stock, equipment to be moved out, etc.) 5) Evaluate options for the management of tailings located near the concentrator/loadout building.		
Recreational Facilities	▪ Identify and implement actions to narrow uncertainty associated with greater debris quantity than estimated. Two recommended actions include performing physical site characterization of any soil contaminated from polycylic aromatic hydrocarbons from sporting clays and investigating other potential remediation technologies (e.g., soil screening) that may be less expensive than hauling to an off-site waste management facility.	3	Key Risk 31 Key Risk 32

The above actions that address residual risks are suggested to be completed prior to the next Plan update. Completing these actions will help reduce the uncertainty associated with the Plan.

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Appendix A
Risk Register

Pend Oreille Mine Risk Register

					IMPACTS								SCREENING			
ELEMENT	RISK #	Risk Name	RISK EVENT DESCRIPTION	CAUSES / BACKGROUND	IMPACTS / CONSEQUENCES	Environment	Health & Safety	Social / Cultural	Media / Reputation	Regulatory	Financial	Legal	Likelihood	Consequence	Rating	COMMENTS
Waste Rock Pile	1	Lead Levels	High lead levels have human heatlh impacts		Additional worker safety training and PPE required		x						2	L	Low	Verify concentrations
Waste Rock Pile	2	Radionuclide	Radiation exposure from contaminated soils		Additional worker safety training and PPE required		x						2	L	Low	Verify concentrations
Waste Rock Pile	3	Cover availability	Insufficient cover material on site		Identify additional sources, increased costs						x		5	O	High	
Waste Rock Pile	4	Land availability	Insufficient land area with which to do reclamation	Regrade plan will put materials beyond PO boundary	Increased costs for regrade and potential legal action						x	x	5	O	High	
Waste Rock Pile	5	Ground water contam	Ground water comtamination from Waste Rock Pile			x										Split into Risks 5 and 6
Waste Rock Pile	6	GW - Public water supply well	Public water supply well adjacent to waste rock pile contaminated	Public water supply well adjacent to waste rock pile contamintated by Waste Rock Pile constituents		x	x						2	L	Low	
Waste Rock Pile	7	GW - Chemical contamination	Chemical contamination of groundwater from Waste Rock Pile			x							2	L	Low	
Waste Rock Pile	8	SW - Sediment loading	Sediment loading of surface water runoff from the Waste Rock Pile (Stormwater Pollution Prevention Plan)		Not an issue, will be addressed in design of the waste rock pile reclamation	x							2	C	Low	
Waste Rock Pile	9	SW - Chemical contamination	Chemical contamination of surface water from Waste Rock Pile runoff			x							2	C	Low	
Waste Rock Pile	10	SW - Cover material origin	Contaminated cover material adversely affects surface water	Source of cover material results in surface water contamination		x							2	C	Low	
Waste Rock Pile	11	WM - Surface water runoff	Problems in managing surface water runoff from Waste Rock Pile			x							2	L	Low	URS assigned value
Waste Rock Pile	12	Atmospheric Alteration	Accident/fatality related to confined space sampling area				x				x	x	2	W	High	Control - no confined space in design
Waste Rock Pile	13	Slope Stability	Erosion of Waste Rock Pile cover	3:1 slope ratio engineering inadequate	Need to regrade slope at future date					x	x	x	2	W	High	URS assigned value
Waste Rock Pile	14	Revegetation Failure	Revegetative cover fails to meet reclamation requirements			x		x					3	L	Medium	URS assigned value
Waste Rock Pile	15	Historic Disposal	Hazardous materials disposed in waste rock pile			x				x	x		4	O	High	
Waste Rock Pile	16	Geotechnical	Variability in Waste Rock material affects slope stability (i.e. Ledbetter Shale)	Different and unknown materials at the bottom of the waste rock pile		x							3	O	High	
Historic Debris Area	17	EHS Concerns	Site conditions and the potential to be exposed to unknown substances		Worker Injury	x	x						4	L	Medium	
Historic Debris Area	18	Waste Volume	Waste volume greater than estimated		Waste removal costs would increase						x		4	L	Medium	
Historic Debris Area	19	Waste Characterization	Discover of extremely hazardous waste materials	Unrecorded extremely hazardous waste disposed in debris area	Injury/fatality or significant environmental impact	x	x						2	W	High	
Historic Debris Area	20	Sedimentation	Water quality adversely affected from sedimentation from the historic debris area			x							2	C	Low	
Historic Debris Area	21	Revegetation Failure	Revegetative cover fails to meet reclamation requirements			x		x					3	L	Medium	
Historic Debris Area	22	Constructability	Steep slope potential leads to slope failure								x		2	L	Low	
Historic Debris Area	23	Incidental release during reclamation	Hazardous materials release to environment during reclamation		Increased financial impact due to uncertainty about amount and character of debris	x	x						3	W	High	
Surface Facilities and Infrastructure	24	Decommissioning Inventory	Added cost of removal and resale or disposal of chemicals, explosives and/or fuels		Added cost of removal and resale or disposal of chemicals, explosives and/or fuels		x		x		x		2	L	Low	
Surface Facilities and Infrastructure	25	Decommissioning mgmt plan	Safety incident due to unfamiliarity with management system or there is a spill	Familiarity with systems being decommissioned, Cross contamination		x	x				x		3	O	High	
Surface Facilities and Infrastructure	26	Debris	Debris quantity 25% greater than estimated amount or significantly different character		Increased financial impact due to uncertainty about amount and character of debris						x		4	O	High	
Surface Facilities and Infrastructure	27	Historical preservation	Preserve some of the surface facilities as museum or historical structures - Opportunity Risk					x	x		x		3	S	High	Opportunity Risk
Surface Facilities and Infrastructure	28	Restoration	Does not meet requirements of restoration plan			x				x	x		3	L	Medium	
Recreational Facilities	29	Good neighbor cleanup	Cleanup of recreational facilities yields community goodwill. - Opportunity Risk					x							#N/A	Opportunity Risk, not evaluated during workshop
Recreational Facilities	30	Reprocessing shot	Lead shot collected from shooting range to be reprocessed. - Opportunity Risk	Reprocessed shot reduces amount of lead that needs to be cleaned up		x									#N/A	Opportunity Risk, not evaluated during workshop
Recreational Facilities	31	Cleanup volume	Waste volume greater than estimated								x		3	O	High	
Recreational Facilities	32	Sporting Clays	Soil contaminated from polycyclic aromatic hydrocarbons (PAHs) from sporting clays	Clay pigeons made with PAH containing materials	Increased financial impact due to uncertainty about amount and character PAH in soil	x					x		3	S	High	
Recreational Facilities	33	Restoration	Does not meet requirements of restoration plan										3	L	Medium	
Water	34	Decommissioning of Tailings facility	Removal of distribution lines adversely affects the water supply			x							3	L	Medium	
Underground Operations	35	Safe repository	Use underground as a safe storage facility - Opportunity risk												#N/A	Opportunity Risk, not evaluated during workshop
Underground Operations	36	Flooding	Mine water discharges to river	Cessation of pumping after reclamation causes mine water to rise to 2010 elevation with resultant discharge to river	Potential environmental regulations violation and financial impact from fines and mitigation costs	x					x		1	S	Medium	
Underground Operations	37	Environmental Health and Safety	Safety incident during decommissioning				x						2	W	High	URS assigned value

Pend Oreille Mine Risk Register

					IMPACTS								SCREENING			
ELEMENT	RISK #	Risk Name	RISK EVENT DESCRIPTION	CAUSES / BACKGROUND	IMPACTS / CONSEQUENCES	Environment	Health & Safety	Social / Cultural	Media / Reputation	Regulatory	Financial	Legal	Likelihood	Consequence	Rating	COMMENTS
Regulatory	38	Changing Goal Posts	Standards and/or agency staff change impacting Bond release							x	x	x	5	O	High	
Regulatory	39	Agency relations	Compliance becomes impossible because of poor agency relationships							x	x	x	3	O	High	
Regulatory	40	HPA - Shoreline	Master Shoreline Plan change	More onerous regulations						x	x	x	2	L	Low	
Regulatory	41	Agency enforcement	Post closure site conditions result in some sort of cleanup action (CERCLA or MTCA)	Operate mine according to permit conditions to prevent adverse agency enforcement						x	x	x	2	S	Medium	
Regulatory	42	Decommissioning Permits	Do not release permit on time resulting in fine, etc.							x	x	x	2	L	Low	
Regulatory	43	Seattle City Light Agreement	Legal action with SCL for cleanup of material on their property	Arrange for agreement for cleanup						x	x	x	2	L	Low	
Stakeholder	44	Negative SEI	Negative socio-economic impact to community	Cessation of mine operations removes major employer from the area	Loss of jobs, lower tax base, etc.			x	x				5	C	Medium	
Stakeholder	45	Site security	Public trepass into mine		Trepass into mine results in injury, vandalism		x	x	x			x	5	S	Very High	
Stakeholder	46	Lack of involvement	Damage to reputation from lack of involvement					x	x				3	L	Medium	
Stakeholder	47	Failed expectations	Mine is not closed.	Market conditions and mine is not closed.				x	x				3	L	Medium	
Stakeholder	48	Legal Impediment	Reclamation plan is not defensible and achievable					x	x			x	3	O	High	
Stakeholder	49	Entitlement	Expect Teck to fully fund all post reclamation use					x	x				2	L	Low	
Stakeholder	50	Lack of funds	Lack of post reclamation development funds prevents preferred post-reclamation use from taking place.					x	x				3	C	Low	
Surface Facilities and Infrastructure	51	Swinging bridge	Collapses into river during reclamation		Worker injugy and/or environmental impact		x			x	x		2	O	Medium	
Processing Facilities	52	Decommissioning Inventory	Added cost of removal and resale or disposal of chemicals, explosives and/or fuels		Added cost of removal and resale or disposal of chemicals, explosives and/or fuels		x		x		x		2	L	Low	
Processing Facilities	53	Mgmt plan	Safety incident due to unfamiliarity with management system or there is a spill	Familiarity with systems being decommissioned, cross contamination		x	x				x		3	O	High	
Processing Facilities	54	Debris	Debris quantity 25% greater than estimated amount or significantly different character		Increased financial impact due to uncertainty about amount and character of debris						x		4	O	High	
Processing Facilities	55	Historical preservation	Preserve some of the processing facilities as museum or historical structures - Opportunity risk -					x	x		x		3	S	High	Opportunity Risk
Processing Facilities	56	Restoration	Does not meet requirements of restoration plan			x				x	x		3	L	Medium	
Surface Facilities and Infrastructure	57	EHS Fatality	Worker fatality during reclamation of the Surface Facilities and Infrastructure				x		x			x				Not evaluated, Teck to check with corporate EHS on this issue.
Processing Facilities	58	EHS Fatality	Worker fatality during reclamation of the Processing Facilities				x		x			x				Not evaluated, Teck to check with corporate EHS on this issue.
Total						23	16	12	13	11	27	13				

Appendix B
Waste Rock Pile Reclamation Alternatives Evaluation

URS

REVISED DRAFT

TECHNICAL MEMORANDUM

Pend Oreille Mine Comprehensive Reclamation Plan
Waste Rock Pile Reclamation Alternatives Evaluation

May, 2009

URS Corporation (URS) is assisting Teck American Incorporated and Teck Washington Incorporated (Teck) with developing a reclamation plan for various facilities at the Pend Oreille Mine (POM) in northeast Washington. Of the various facilities at POM, one of the reclamation features is the Waste Rock Pile. The current reclamation plan for the Waste Rock Pile includes a regrade of the pile towards the Pend Oreille River; however, this may not be feasible with the Seattle City Light (SCL) right-of-way along the river and State of Washington shoreline setbacks. This document provides a preliminary assessment of various alternatives to the current Waste Rock Pile reclamation plan that maintain the footprint of the regraded pile on POM property. The document is intended to facilitate discussion with Teck on potential alternatives and to help develop a preferred alternative for Waste Rock Pile reclamation.

The document first provides a description of the existing Waste Rock Pile and the current reclamation plan, followed by three potential alternatives that present descriptions with associated advantages and disadvantages.

Existing Waste Rock Pile

The Waste Rock Pile consists of waste rock material resulting from underground mining at the POM. The waste rock has been placed along the hillside southwest of the Mill and extending to within 100 feet of the Pend Oreille River. The Waste Rock Pile contains approximately 386,000 cubic yards of material (ENSR, 2001). The top surface of the Waste Rock Pile is relatively flat and serves as a staging area for mine supplies. The side slopes of the pile generally rest at a slope of 1.4H:1V (horizontal to vertical).

The Waste Rock Pile consists of waste from the Josephine and Yellowhead horizons of the underground workings. The pile also contains ledbetter slate, a “black, fine grained, non-limy, generally homogenous rock in which individual grains can rarely be distinguished” (Shenon and Full, 1951). Quantities of the slate are unknown, but the material is believed to have low strength and durability properties. The waste rock material is assumed to be non-acid generating and non-hazardous, but does contain elevated levels of radionuclides based on studies performed to evaluate the condition of waste rock excavated during current mining operations (ENSR, 2001).

Current Reclamation Plan

The current reclamation plan is described in the POM Draft Waste Rock Management Plan (ENSR, 2001). The current reclamation plan includes regrading the Waste Rock Pile downslope to establish a 3H:1V slope, which will extend the foot print of the existing Waste Rock Pile toward the Pend Oreille River by approximately 100 feet. The pile will be recontoured to blend in with the surrounding hillslopes. Cover soil will be placed on the pile to a thickness of approximately 12 inches. Cover soil may be amended with fertilizer, wood chips, or other materials to improve soil fertility and water-holding capacity. The regraded area will be vegetated with a specified seed mix and planted with Douglas fir and Ponderosa pine.

Alternatives to Current Reclamation Plan

Based on our current understanding of the site and Waste Rock Pile and discussions with Teck, regrading the Waste Rock Pile for each of the alternatives includes the following objectives:

- Maintain a footprint for the reclaimed Waste Rock Pile to within the POM property boundary so that it does not impact the Pend Oreille River and the surrounding forest. SCL owns an approximately 200-foot right-of-way along the Pend Oreille River. Care must be taken to minimize impacts to the right-of-way during reclamation.
- Construct a maximum slope of 3H:1V.
- Simplify construction.
- Meet regulatory requirements.
- Optimize costs.

To meet the stated objectives three reclamation alternatives were developed and evaluated for reclaiming the existing Waste Rock Pile. The final design and implementation of an alternative to the current reclamation plan may require updating the POM Draft Waste Rock Management Plan (ENSR, 2001). The following three alternatives were evaluated:

- Alternative 1: Regrade the existing pile by extending the upgradient footprint towards the Coarse Ore Bins and Maintenance Shop.
- Alternative 2: Move a portion of the existing pile to a second rock pile and regrade the remaining pile, generally within the existing footprint.
- Alternative 3: Install a retaining wall at the POM boundary and regrade the existing pile within the existing footprint.

Stormwater management controls and cover materials were not included in this evaluation, and are expected to be similar for the three alternatives. Stormwater management controls may require the extension of the existing footprint and modifications to the developed alternatives for regrading the pile.

Alternative 1 – Extend Existing Pile

As shown in Figure 1, this alternative includes the removal of material on the lower portion of the pile to upgradient of the pile. The pile would be regraded to achieve sideslopes of 3H:1V. Excess material produced as a result of regrading would be graded toward the Maintenance Shop, Conveyor Gallery and Coarse Ore Bins. The area of the regraded pile would be approximately nine (9) acres. This alternative includes the movement of approximately 150,000 cubic yards of material.

Alternative 2 – Two Piles

As shown in Figure 2, this alternative includes the removal of material on the lower portion of the pile to a second pile. The existing pile would be regraded to achieve sideslopes of 3H:1V that generally remain within the current footprint. Excess material produced as a result of regrading would be relocated to a second pile located at the existing parking lot. The existing parking lot is relatively flat and has a storage capacity of about 50,000 cubic yards or more. The parking lot is about 0.25 mile by road from the existing Waste Rock Pile. It is estimated that approximately 35,000 cubic yards of material would be moved to the parking lot under this alternative. This alternative includes the movement of approximately 145,000 cubic yards of material, including the material to be deposited within the parking lot. Included with this alternative is the option of moving excess material into two ventilation raises (VR 1 and VR2) that will be sealed during reclamation. This would reduce the movement of material from the Waste Rock Pile to the Parking lot to approximately 27,000 cubic yards of material.

Alternative 3 – Retaining Wall

As shown in Figure 3, this alternative includes a retaining wall at the POM boundary. The retaining wall would be approximately 20-feet in height and extend along the entire toe of the regraded Waste Rock Pile. Retaining walls could include concrete cantilever, mechanically stabilized earth (MSE) or shored MSE. Waste rock would be placed behind the wall and then regraded to achieve sideslopes of 3H:1V slope that generally remain within the limits of the existing footprint. This alternative includes the movement of approximately 85,000 cubic yards of material.

Comparative Analysis

Table 1 presents the relative advantages and disadvantages of the existing reclamation plan and the three alternatives based on the following:

- Maintaining a footprint within the POM property boundary.
- Relative Ease of Construction.
- Overall Material Movement.
- Extent of Regrade (new boundary for the Waste Rock Pile).
- Relative Cost.

References

ENSR, 2001. Pend Oreille Mine Project, Draft Waste Rock Management Plan, July 5.

P.J. Shenon and R.P. Full, 1951, "Geology of the Russian Creek-Reeves McDonald Area, Kootenay District, British Columbia, February 1951.

Teck, 2003. Pend Oreille Mine Environmental Management System Section 4.6 Surface Waste Rock, November 4.

Attachments

Table 1. Comparative Analysis of Alternatives
Figure 1. Alternative 1 – Proposed Regrade: Extend Existing Pile
Figure 2. Alternative 2 – Proposed Regrade: Two Piles
Figure 3. Alternative 3 – Proposed Regrade: Retaining Wall

Table 1- Comparative Analysis of Alternative

	Advantages	Disadvantages
Current Reclamation Plan	➢ Lowest construction cost due to pushing materials downgradient during regrade.	➢ Regraded Waste Rock Pile not within POM property boundary. ➢ This is not an acceptable option for Teck.
Alternative 1	➢ Regraded Waste Rock Pile within POM property boundary. ➢ Less expensive and easier to construct than Alternatives 2 and 3.	➢ Regraded Waste Rock Pile beyond the limits of the existing pile. ➢ Requires using the existing Maintenance Shop area.
Alternative 2	➢ Regraded Waste Rock Pile within POM property boundary. ➢ Regraded Waste Rock Pile within the limits of the existing Waste Rock Pile (doesn't infringe upon existing site structures). ➢ Stabilizes hillside ➢ Excess material may be placed in two vent raises, capacity approximately 8,000 cubic yards.	➢ Requires two areas for material to be placed. ➢ Relatively higher construction cost versus Alternative 1 due to added distance required for hauling and placing portion of materials at Parking Lot.
Alternative 3	➢ Regraded Waste Rock Pile within POM property boundary. ➢ Increased capacity behind the constructed retaining wall reduces the extent of grading outside the existing Waste Rock Pile footprint. ➢ Lowest amount of material movement required.	➢ More complicated construction required with retaining walls. ➢ Relatively higher construction cost than Alternatives 1 and 2 due to construction of retaining wall. ➢ Additional government requirements may apply to retaining wall.

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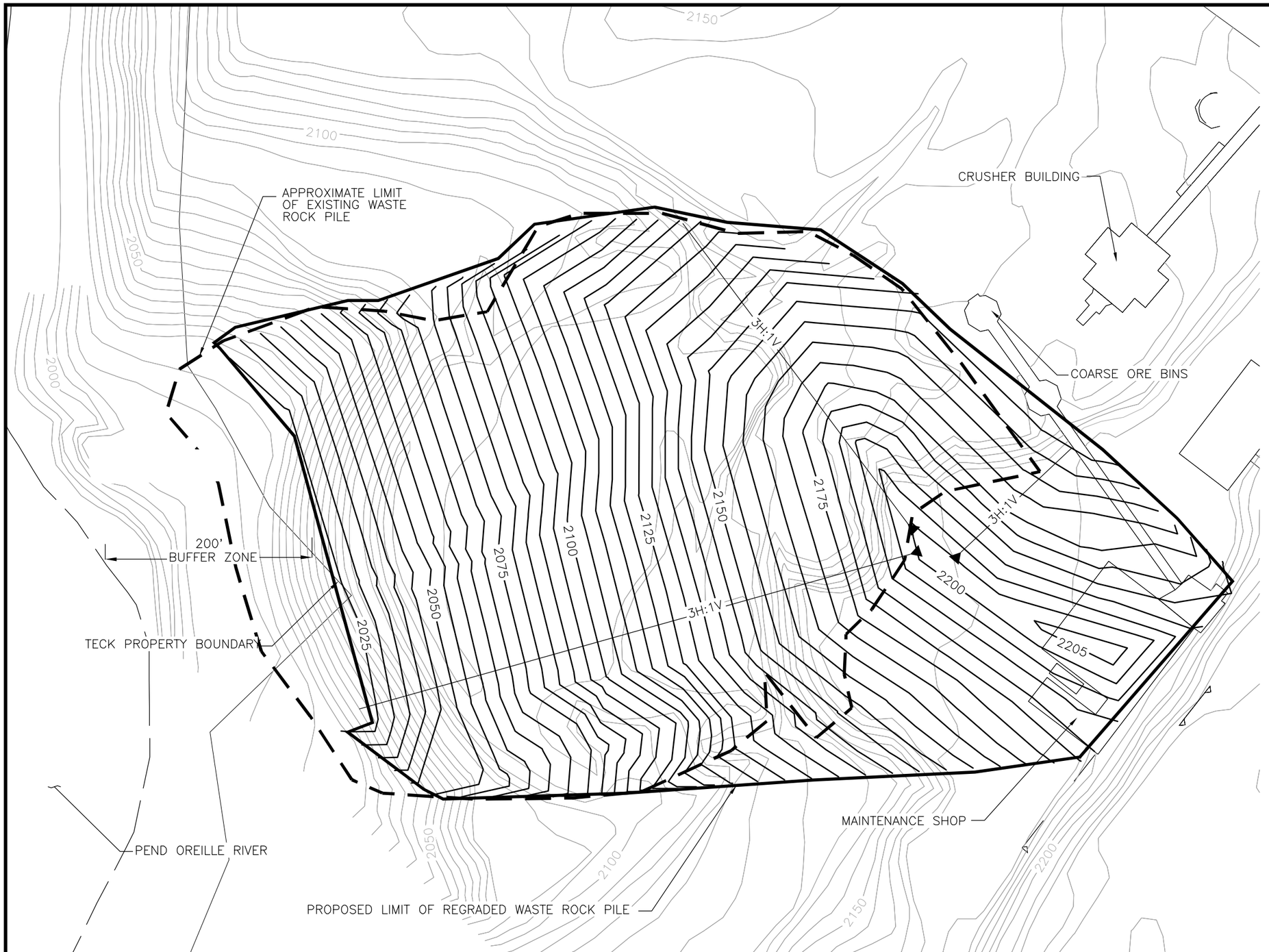

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PLAN

0 50 100 200

SCALE IN FEET

LEGEND:

- EXISTING GRADE CONTOUR — 2000
- PROPOSED FINAL GRADE — 2000
- APPROX. EXISTING LIMIT WASTE ROCK PILE
- PROPOSED LIMIT OF REGRADED WASTE ROCK PILE

NOTES:

1. GRADING SHOWN REFERS TO SURFACE PRIOR TO INSTALLATION OF 1–FOOT COVER.
2. BASE TOPOGRAPHY PROVIDED BY TECK WASHINGTON INCORPORATED (TECK).
3. STORMWATER MANAGEMENT STRUCTURES NOT SHOWN.

DRAFT

Job No. : 36298272	ALTERNATIVE 1 PROPOSED REGRADE EXTEND EXISTING PILE
Prepared By : BWG	
Date : 03/2009	

FIG. 1

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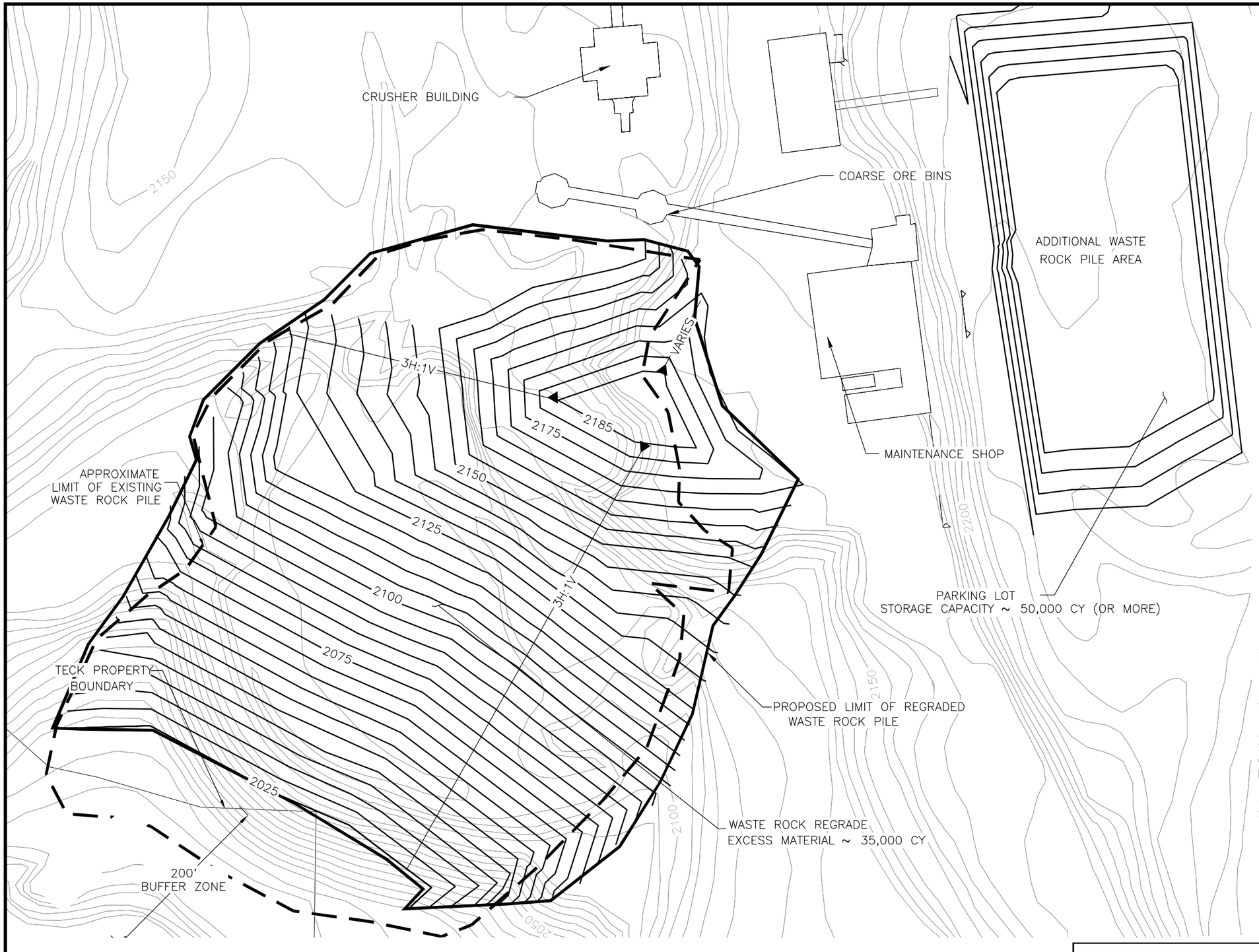

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PLAN

0 50 100 200

SCALE IN FEET

LEGEND:

- EXISTING GRADE CONTOUR — 2000
- PROPOSED FINAL GRADE — 2000
- APPROX. EXISTING LIMIT WASTE ROCK PILE
- PROPOSED LIMIT OF REGRADED WASTE ROCK PILE

NOTES:

1. GRADING SHOWN REFERS TO SURFACE PRIOR TO INSTALLATION OF 1–FOOT COVER.
2. BASE TOPOGRAPHY PROVIDED BY TECK WASHINGTON INCORPORATED (TECK).
3. LIMITS OF THE PEND OREILLE RIVER NOT SHOWN ON THE PROVIDED PLAN VIEW. THE LIMITS OF THE RIVER LOCATED WEST OF THE PROVIDED PLAN VIEW.
4. STORMWATER MANAGEMENT STRUCTURES NOT SHOWN.

DRAFT

Job No. : 36298272	ALTERNATIVE 2 PROPOSED REGRADE TWO PILES
Prepared By : BWG	
Date : 03/2009	

FIG. 2

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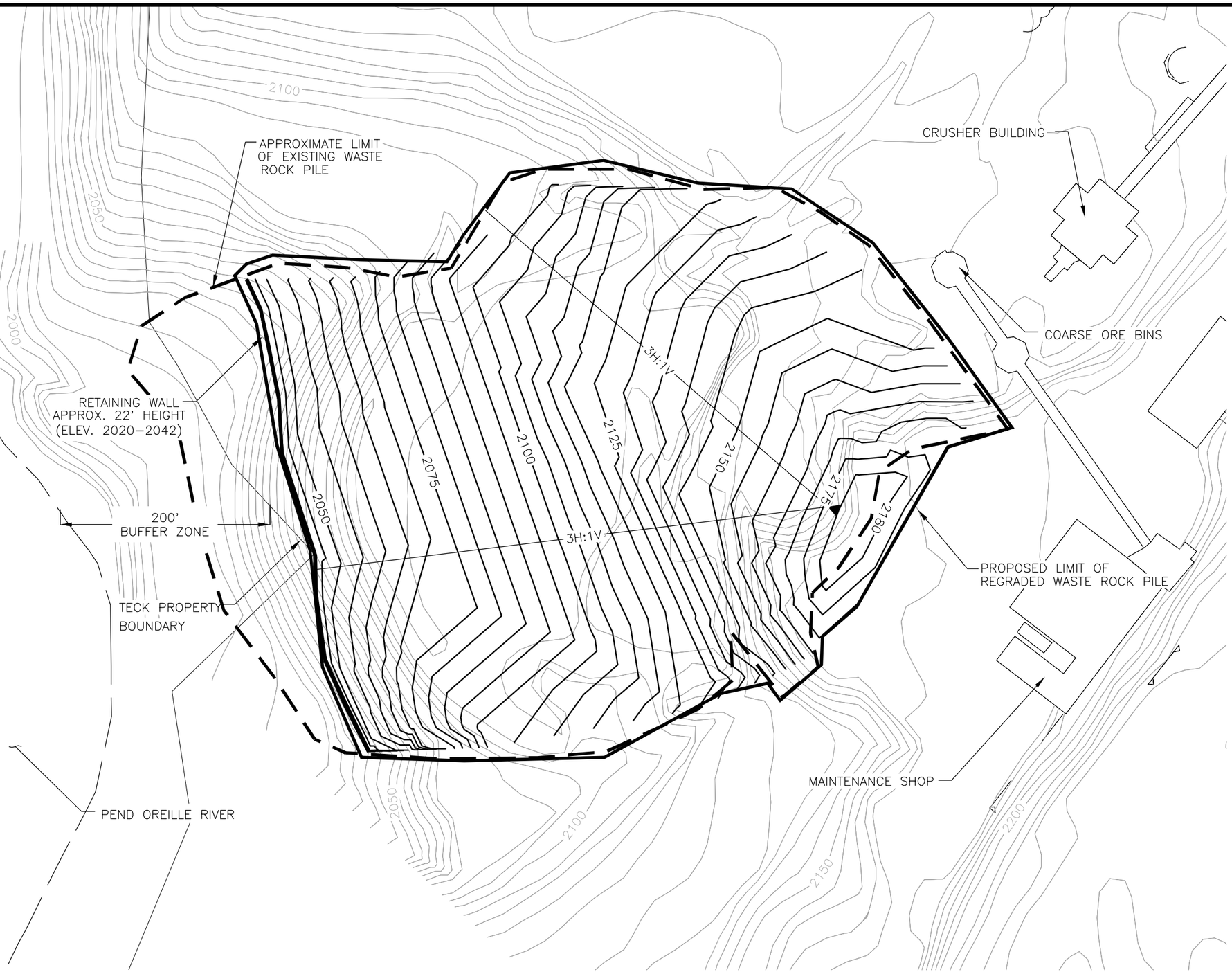

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PLAN

0 50 100 200

SCALE IN FEET

LEGEND:

EXISTING GRADE CONTOUR 2000

PROPOSED FINAL GRADE 2000

APPROX. EXISTING LIMIT WASTE ROCK PILE

PROPOSED LIMIT OF REGRADED WASTE ROCK PILE

NOTES:

1. GRADING SHOWN REFERS TO SURFACE PRIOR TO INSTALLATION OF 1–FOOT COVER.

2. BASE TOPOGRAHY PROVIDED BY TECK WASHINGTON INCORPORATED (TECK).

3. STORMWATER MANAGEMENT STRUCTURES NOT SHOWN.

DRAFT

Job No. : 36298272	ALTERNATIVE 3 PROPOSED REGRADE RETAINING WALL
Prepared By : BWG	
Date : 03/2009	

FIG. 3

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Appendix C

Draft Remedial Investigation/Feasibility Study Report for the Pend Oreille Mine Tailing Disposal Facilities TDF-1 and TDF-2

(included on CD only)

Appendix D

Pend Oreille Mine Tailings Disposal Facility #3 – Detailed Design of Tailings Cover

(included on CD only)