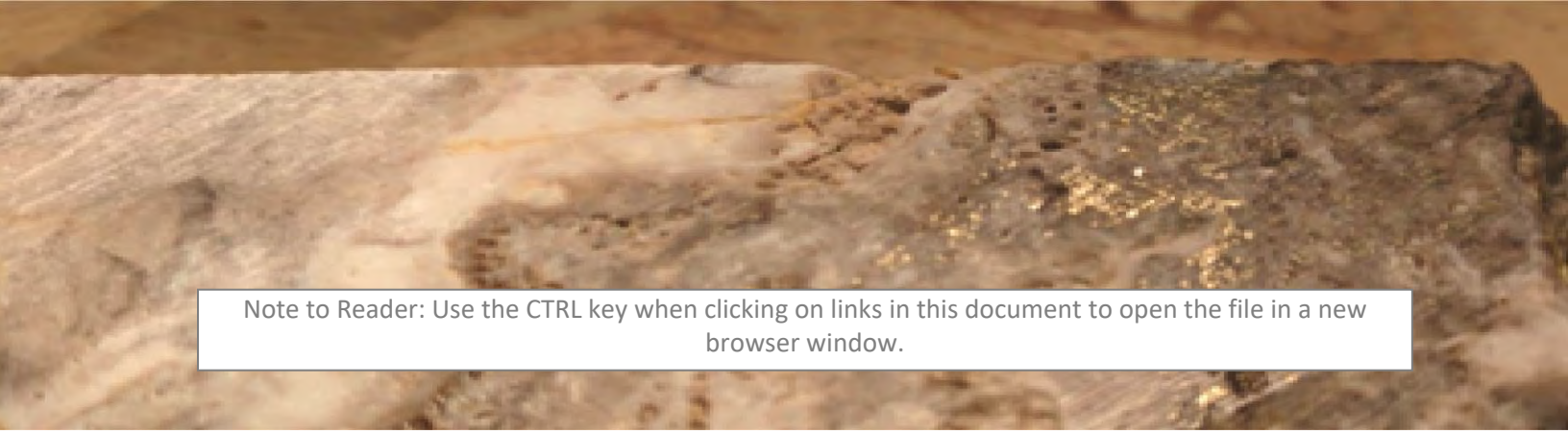

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GRASSY MOUNTAIN MINE PROJECT

Consolidated Permit Application

Submitted to:

Department of Geology and Mineral Industries
229 Broadalbin St. SW
Albany, Oregon 97321 USA

Prepared by:

Calico Resources USA Corp.
665 Anderson Street
Winnemucca, Nevada 89445

December 2021
Revised October 2023

CALICO RESOURCES

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1. GENERAL INFORMATION

1.1 ORGANIZATIONAL INFORMATION

1.1.1 APPLICANT INFORMATION – 43 CFR 3809.401(b)(1), OAR 632-037-0050(1), ORS 517.971(2)

Operator Name:	Calico Resources USA Corp.
Mailing Address:	665 Anderson Street Winnemucca, Nevada 89445
Phone Number:	(775) 625-3600
Taxpayer Identification Number	45-2188867
Registered Agent:	CT Corporation System 780 Commercial St SE, Ste 100 Salem, Oregon 97301-3465

1.1.2 LEGAL STRUCTURE AND RESIDENCE – OAR 632-037-0050(3), ORS 517.971(3)

Calico Resources USA Corp.
665 Anderson Street
Winnemucca, Nevada 89445

Registry Number: 78127694

Principal Place of Business:
665 Anderson Street
Winnemucca, Nevada 89445

Mailing Address:
665 Anderson Street
Winnemucca, Nevada 89445

President:
Glen van Treek
665 Anderson Street
Winnemucca, Nevada 89445

Secretary:
Glen van Treek
665 Anderson Street
Winnemucca, Nevada 89445

Registered Agent:
CT Corporation System
780 Commercial St. SE, Ste 100
Salem, Oregon 77301-3465

1.1.3 PROJECT NAME, LOCATION, AND ACCESS – 43 CFR 3809.401(b)(2)(i), OAR 340-093-0130(1)(a), OAR 632-037-0050(5), OAR 632-037-0050(6), ORS 517.971(1)

The Project is located in Malheur County, Oregon, approximately 22 miles south-southwest of Vale, Oregon, and consists of two areas: the Mine and Process Plant Area and the Project Access Area (Permit Area) (Map 1 and Map 2). The Permit Area shown in all maps and text shows and describes the boundary of the proposed Project. The Mine and Process Plant Area extends north to the Water Supply Wells where the Project Access Area extends north along the Malheur County road named Dripping Springs Road, to the Malheur County road named Cow Hollow Road, and north to the Malheur County road named Russell Road.

The Mine and Process Area is located on three patented lode mining claims and unpatented lode mining claims that cover an estimated 886 acres (Map 3). These patented and unpatented lode mining claims are part of a larger land position that includes 455 unpatented lode mining claims and 9 Mill Site claims on lands administered by the U.S. Bureau of Land Management (BLM) Vale District Office (Map 3). All proposed mining would occur on the patented claims, with some Mine facilities on unpatented claims. The Project Area subject to the permitting process includes 90 lode mining claims, 9 Mill Site claims, and 3 patented claims. Eleven of the 90 lode mining claims are subject to a lease by Calico Resources USA Corp. (Calico) from Cryla, LLC (Map 3). The Mine and Process Plant Area is in all or portions of Sections 5 through 8, T22S, R44E, Willamette Base & Meridian (WB&M).

Russell Road is a Malheur County road that is used as part of the main access route from the city of Vale. Russell Road connects from U.S. Highway 20 to Cow Hollow Road. Cow Hollow Road is part of the main access route connecting Russell Road to Twin Spring Road. Cow Hollow Road is also a Malheur County road that crosses through undeveloped land, which is privately owned.

Land ownership is denoted in the tax lot and ownership information in Table 1 and in Map 3. The Project Access Area is located on public land administered by the BLM, and private land controlled by others. A portion of the Project Access Area is a Malheur County road named Twin Springs Road. The Project Access Area extends north from the Mine and Process Plant Area to Russell Road, a paved Malheur County road. The Project Access Area is in portions of Section 5, T22S, R44E; Sections 3, 10, 11, 14, 15, 21 through 23, 28, 29, and 32, T21S, R44E; Sections 1, 12 through 14, 23, 26, 27, and 34, T20S, R44E; Sections 6 and 7, T20S, R45E; and Sections 22, 23, 26, 35, and 36, T19S, R44E (WB&M).

Table 1. Tax Lots and Ownership of Permit Area

Tax Lot	Reference Number	Ownership	Permit Area
100	17021	USA (BLM)	Within
100	17090	USA (BLM)	Within
101	19743	CALICO RESOURCES USA CORP	Within
200	17091	USA (BLM)	Adjacent
300	16951	USA (BLM)	Within
100	9387	WEGNER, DANIEL P TRUST ET AL	Adjacent
200	10089	WEGNER, DANIEL P TRUST ET AL	Adjacent
1005	14354	WEGNER, DANIEL P TRUST ET AL	Adjacent
901	14339	WEGNER, DANIEL P TRUST ET AL	Adjacent

Tax Lot	Reference Number	Ownership	Permit Area
400	14334	BLAKE, JONATHAN M & LACY A	Adjacent
600	14336	KEZNO FUKIAGE BYPASS TRUST 47%	Adjacent
6200	14432	KEZNO FUKIAGE BYPASS TRUST 47%	Adjacent
500	15604	STANDAGE ENTERPRISES LLC	Adjacent

The width of the Project Access Area is 300 feet (ft; 150 ft on either side of the Access Road centerline) to accommodate possible minor widening or rerouting, and a powerline adjacent to the Access Road, as presented in the *Road Design Report* (HDR, 2019; Appendix C1). There are several areas shown that are significantly wider than 300 ft on the Permit Area Map (Map 2), which are areas where the final alignment has not yet been determined. The final engineering of the road will be consistent throughout and within the Permit Area. The Project Access Area also includes a buffer on either side of the proposed road width for the collection of environmental baseline data.

The road corridor will be approximately 30 ft wide, which includes a 20-ft-wide road travel width (10 ft on either side of the road centerline), 2-ft-wide shoulders on each side of the road, minimum 1-ft-wide ditches on each side of the road, and appropriate cut and fill. All existing and planned roads are shown in Maps 1 and 2.

The study area is defined as the geographical area in which the potential direct and indirect socioeconomic effects of the Project are realized. The purpose of documenting the socioeconomic setting of the study area is to provide an understanding of the social and economic forces that have shaped the area and to provide a frame of reference necessary to estimate the social and economic effects of the Project, as well as understanding potential effects on low-income and minority populations.

Malheur County (County) is Oregon's second largest county in the area but is largely undeveloped. The County is in the southeastern corner of the State of Oregon and is crossed by three major rivers – the Snake River, the Owyhee River, and the Malheur River. Ninety-four percent of the County is undeveloped rangeland, most of which is federally owned and administered by the BLM. Developed areas along the Snake and Malheur rivers support agricultural production areas and agriculture-focused communities.

1.1.4 NAME(S) AND ADDRESS(ES) OF ALL LANDOWNERS OF THE SURFACE AND MINERAL ESTATE – 43 CFR 3809.401(b)(1), OAR 632-037-0050(2)

Surface Rights

U.S. Bureau of Land Management Vale District Office
100 Oregon Street
Vale, Oregon 97918
(541) 473-3144

Calico Resources USA Corp.
665 Anderson Street
Winnemucca, Nevada 89445
(775) 625-3600

Mineral Rights

Calico Resources USA Corp.
665 Anderson Street
Winnemucca, Nevada 89445
(775) 625-3600

Cryla, LLC
14505 North Tongass Highway
Ketchikan, Alaska 99901-8954
(907) 617-5157

1.1.5 AUTHORIZED FIELD REPRESENTATIVE – 43 CFR 3809.401(b)(1)

Calico personnel, or their agents, will be on site during all Project-related activities and will be responsible for implementing and ensuring that all activities are completed in accordance with this Permit.

Point of Contact for this Permit

Glen van Treek
665 Anderson Street
Winnemucca, Nevada 89445
Phone (775) 625-3600

Corporate Point of Contact

Carlo Buffone
665 Anderson Street
Winnemucca, Nevada 89445
Phone (775) 625-3600

1.2 SURFACE OWNERSHIP AND DISTURBANCE – ORS 517.971(4)

1.2.1 LAND STATUS – OAR 340-095-0010(3)

Calico holdings at the Grassy Mountain property consist of 455 unpatented lode claims, 9 unpatented Mill Site claims, 3 patented claims, and a land lease for 28 unpatented lode mining claims covering all or portions of Sections 11 through 15 and 24 of T22S, R43E; portions of Sections 3 through 10 and 16 through 20, T22S, R44E; Sections 31 through 34, T21S, R44E; and Section 36, T21S, R43E, as shown in Map 3. Patented claims were individually surveyed at the time of location. Unpatented claim and Fee land boundaries were established initially by Global Positioning System (GPS) handheld units and in 2011 by onsite survey work. Mining claim information is shown in Appendix A.

The Project Area subject to the permitting process includes 90 lode mining claims, 9 Mill Site claims and 3 patented claims. Within the 90 lode mining claims, 11 claims are subject to a lease by Calico from Cryla, LLC (Cryla).

Paramount Gold Nevada Corp. (Paramount) owns the surface rights in the Grassy Mountain deposit area. The deposit is located within three patented mining claims. The surrounding surface rights associated with the locations of the planned Project surface facilities belong to the Federal government and are managed by the Vale District office of the Bureau of Land Management. The surface rights controlled by Calico are subject to applicable Federal and State environmental regulations and the agreements outlined below.

The facility is not sited in the 100-year floodplains or wetlands. Map 6 depicts the floodplains hazard area from the Federal Emergency Management Agency's (FEMA) 2017 and 1984 flood mitigation assessment, last updated April 27, 2021 (FEMA, 2017).

1.2.2 AGREEMENTS AND ENCUMBRANCES

Paramount's 100-percent ownership of the Project is subject to the underlying agreements and royalties summarized in the following subsections.

Seabridge Gold Corporation (Seabridge): Seabridge retains a 10 percent Net Profits Interest (NPI) in the Project pursuant to the Deed of Royalties between Calico and Seabridge dated February 5, 2013, and modified in 2015. Pursuant to the Deed of Royalties, within 30 days following the day that Calico makes a

production decision and construction financing is secured, Seabridge may elect to cause Calico to purchase the 10 percent NPI for $10 million Canadian. Otherwise, Seabridge will retain the 10 percent NPI.

Sherry & Yates Inc. (Sherry & Yates): On February 14, 2018, Calico exercised their option to purchase, whereby Sherry & Yates agreed to sell to Calico all right, title, and interest in the 3 patented and 37 unpatented mining claims. The 2004 lease and agreement with Sherry & Yates was terminated. The royalty attributed to Sherry & Yates has decreased from 6 percent to 1.5 percent.

Exploration and Option to Purchase Agreement Cryla Project (Cryla Agreement): In 2018, Calico signed a lease agreement with Cryla that applies to 28 unpatented lode mining claims located to the west of the Grassy Mountain deposit (Figure 4-3 in Ausenco, 2020). Calico is required to make an annual lease payment of $60,000. After June 2020, Calico may elect to acquire the property for $560,000 plus $3/ounce (oz) of gold reserves, as defined by a pre-feasibility or higher confidence-level study. Additionally, Cryla retains a royalty for mineral produced from their claims.

The Project covers a portion of the Calico land holdings. The Permit Area, which is the basis of this permit application is shown in Map 2 (Section 1.1.3). The legal description of the Mine and Process Area includes all or portions of the following:

T22S, R44E
SW ¼ OF SECTION 5
S ½ OF SE ¼ OF SECTION 5 NW ¼ OF SECTION 5
SE ¼ OF SE ¼ OF SECTION 6 SE ¼ OF SECTION 7
S ½ OF NE ¼ OF SECTION 7 NE ¼ OF NE ¼ OF SECTION 7
NW ¼ OF SECTION 8
NE ¼ OF SECTION 8
SW ¼ OF SECTION 8
SE ¼ OF SECTION 8

T21S, R44E
W ½ OF SE ¼ OF SECTION 32
E ½ OF SW ¼ OF SECTION 32
W ½ OF NE ¼ OF SECTION 32
E ½ OF NW ¼ OF SECTION 32
SW ¼ OF SE ¼ OF SECTION 29

1.3 PROJECT OVERVIEW – OAR 632-037-0050(4), 632-037-0050(7), OAR 340-095-0020(2)(b), OAR 340-095-0020(2)(c), OAR 340-095-0020(3)(a)

Calico Resources USA Corp. (Calico), a wholly-owned subsidiary of Paramount Gold Nevada Corp. (Paramount), owns and controls 100 percent of the mineral tenure of the unpatented mining claims, patented mining claims, and mining leases that comprise the Project. The Project consists of two claims groups that are situated near the western edge of the Snake River Plain in eastern Oregon, 22 miles south-southwest of Vale, Oregon, and about 70 miles west of Boise, Idaho. The Project site location is presented in Map 1.

Calico proposes to mine approximately 2.07 million short tons (US) (Mst) of mill-grade ore and 0.27 Mst of waste rock for a Mine life of approximately 8 years; however, the Tailings Storage Facility (TSF) has been sized to contain 3.64 Mst should additional reserves be identified. The material (both ore and waste) will be extracted from an underground mine using conventional underground mining techniques, including drilling, blasting, mucking, loading, and hauling at a rate of approximately 1,200 short tons per

day (stpd), four days per week. Calico will use hydraulic loaders to load the ore and waste into haul trucks. The haul trucks will transport the waste rock to the Temporary Waste Rock Storage Facility (TWRSF) near the TSF and transport the ore to the Run of Mine (ROM) ore stockpile adjacent to the crushing and milling facilities. The ore will be crushed and leached in a carbon-in-leach (CIL) processing plant at a rate of 750 stpd, seven days per week. The leached tailings will go through a detoxification process, then be pumped in a slurry to the TSF, with supernatant solution recovered and pumped back to the Mill.

In general, the proposed mining and metal processing operations will consist of an underground mine and ore processing facilities, including a conventional mill and TSF, a TWRSF, and other support facilities. The Project will include the following major components:

- An underground mine, with Mine Portal, decline, and ventilation shaft;
- TSF with Tailings Embankment, Tailings Impoundment, and Reclaim Pond;
- TWRSF;
- Process Plant Area, which includes the Process Plant building, control room, crushing facilities, conveyors, ore bins, control rooms, CIL processing plant, reagent storage building (including chemical and reagent storage), gold room, and Collection Pond;
- Infrastructure and ancillary facilities that include Project site main gate and guard house, administration office and change house, assay laboratory and sample preparation area, truckshop and warehouse, wash pads, Process Plant workshop and warehouse, meteorological station, explosive magazines, parking areas, ore stockpiles, solid and liquid hazardous waste storage, and fuel storage and dispensing area;
- Roads, including upgrades to the Twin Springs and Cow Hollow roads, and construction of the Mine access, internal access, and Mine haul roads;
- Yards and laydown areas;
- Growth Media Stockpiles;
- Water supply, including Production Well Field, water pipeline, raw water storage tank, and Potable Water Treatment Plant;
- Power supply that includes a power substation, upgraded 14.4 kilovolt (kV) overland power transmission system, new 14.4 kV overland power transmission system, onsite powerlines, and generators;
- Permanent and temporary Stormwater Diversion Channels;
- Other areas, including the exploration areas, septic system, and Perimeter Fence;
- Quarry; and
- Reclamation Borrow Areas.

1.4 RECLAMATION ASSURANCE – OAR 632-037-0070, OAR 632-030-0027

The mineral and surface rights on the Mine and Process Area portion of the Permit Area are controlled by Calico Resources USA Corp.

The surface rights on the public land portion of the Mine and Process Area portion of the Permit Area are controlled by the BLM, Vale District Office.

Mining Claims are provided in Appendix A.

The *Reclamation Plan* (Calico, 2023c), required under the *Mine Plan of Operations* (Calico, 2022b) and approval process with BLM, and the State of Oregon for new chemical mining projects, for expansions of existing operations, and for quarries, is provided in Appendix D1. The *Reclamation Plan* includes the objectives, implementation for each facility, post-closure care and maintenance, cost estimate and schedule.

1.5 CROSS-REFERENCE TO SOLID WASTE RULES – OAR 340-093-0100 TO OAR 340-093-0130, OAR 340-095-0010 TO OAR 340-095-0095, AND OAR 340-097-0110 TO 340-097-0120

A cross-reference, Table 2, was developed to identify where details are provided to satisfy applicable solid waste rules found in OAR 340-093 to OAR 349-097. Parts of the solid waste rule that are not applicable are noted accordingly in Table 2.

Table 2. Solid Waste Rules Cross-Reference Table

Regulatory Citation	Description	Location in the Consolidated Permit Application (CPA)
340-093-0100 Public Notice and Participation Requirements Regarding Permit Actions	Public notice required for Category 3 landfills where a Category 3 landfill includes a captive industrial facility permit defined in 340-097-0120(1)(c) as *an industrial solid waste disposal site where the permittee is the owner and operator of the site and is the generator of all the solid waste received at the site.*	N/A – Department will provide public notice of the proposed permit action and a minimum of 35 days to submit written comments. The department will provide a minimum of 30 days' notice for a hearing if one is scheduled.
340-093-0130, Site Characterization Report	The purpose of the site characterization report(s) required by OAR 340-093-0070(3)(e) is to demonstrate that the proposed facility will be located in a suitable site and will use appropriate technology in design, construction and operation. The site characterization report(s) must describe existing site conditions and a conceptual engineering proposal in sufficient detail to determine whether the facility is feasible and protects the environment. Except as provided in OAR 340-093-0070(4), the site characterization report(s) must include, but not be limited to, the following: (1) Information on site location and existing site conditions, including: (a) A site location description, including a location map and list of adjacent landowners; (b) An Existing Conditions Map of the area showing land use and zoning within ¼ mile of the disposal site; and (c) Identification of any siting limitations and how those limitations will be addressed.	340-093-0130 (1)(a) Site location and existing conditions and list of adjacent landowners: CPA Section 1.1.3 and Table 1; Maps 1 and 2. (1)(b) Existing conditions map showing land use and zoning with ¼ mile of disposal site: CPA Section 2.10 and Appendix B10, *Land Use Baseline Report,* Figure 4. (1)(c) Siting limitations: CPA Section 2.10.
	(2) A description of the scope, magnitude, type, and purpose of the proposed facility, including but not limited to the following: (a) Estimated capacity and projected life of the site; (b) Identification of the communities, industries and/or markets to be served; (c) Anticipated types and quantities of solid wastes to be received, disposed of and/or processed by the facility; (d) Summary of general design criteria and submittal of conceptual engineering plans; (e) Description of how the proposed technology compares to current technological practices, or to similar proven technology, including references to where similar technology has been effectively implemented;	(2)(a) Estimated capacity and projected life of site: CPA Section 3.5. (2)(b) Communities, industries and/or markets to be served: Not Applicable. The TSF and TWRSF will serve only the Grassy Mountain Mine Project. (2)(c) Types and quantities of solid wastes to be received, disposed of and/or processed: CPA Sections 2.6.2, 3.6.2 and 3.7 and Appendix B6, *Baseline Geochemical Characterization Report,* Section 6.1 (2)(d) General design criteria and conceptual engineering plans: CPA Sections 2.9.3, 3.6 and 3.7 and Appendix C4, *TSF Design Report,*

Regulatory Citation	Description	Location in the Consolidated Permit Application (CPA)
	(f) Demonstration that the proposed facility is compatible with the local solid waste management plan and the state solid waste management plan; (g) Planned future use of the disposal site after closure; (h) Key assumptions used to calculate the economic viability of the proposed facility; and (i) The public involvement process that has been and will be implemented.	Section 2 and Design Drawings (see PDF pages 48-91). (2)(e) Description of proposed technology and where it has been effectively implemented: TSF dam was approved by Oregon Water Resources Department in July 2020 (OWRD, 2020; Appendix E6). (2)(f) Demonstrate proposed facility is compatible with local solid waste management and state solid waste management plans: This cross-reference table. (2)(g) Future use of disposal site after closure: CPA Section 4 and Appendix D1, *Reclamation Plan*, Section 2.2 (2)(h) Assumptions used to calculate economic viability: Appendix D1, *Reclamation Plan*, Section 8.3 (2)(i) Public involvement process: Via the Technical Review Team and the public meeting process during development of the Consolidated Permit Application.
340-093-0130, Site Characterization Report	(3) A proposal for protection and conservation of the air, water and land environment surrounding the disposal site, including control and/or treatment of leachate, methane gas, litter and vectors, and control of other discharges, emissions and activities which may result in a public health hazard, a public nuisance or environmental degradation	Protection and conservation of air, water, land: CPA Sections 3.9.2, 3.9.4, 3.9.6, 3.10.6, 3.12, 3.13.3, 3.13.6, 3.13.8, 4, and Appendix D14 *Wildlife Protection Plan* and Appendix D1 *Reclamation Plan.* Control and/or treatment of leachate: CPA Sections 2.6 and 3.6.2 Waste management: CPA Sections 3.8.3, 3.9.8, and Appendix D3 *Waste Management Plan,* and Appendix D9 *Petroleum-Contaminated Soils Management Plan*
	(4) For a landfill, the following must be included:	(4)(a): Detailed soils and geology report: Appendix B7 *Geology and Soils Baseline Report*

Regulatory Citation	Description	Location in the Consolidated Permit Application (CPA)
	(a) A detailed soils, geologic, and groundwater report of the site prepared and stamped by a professional Engineer, Geologist or Engineering Geologist with current Oregon registration. The report must include consideration of surface features, geologic formations, soil boring data, water table profile, direction of groundwater flow, background quality of water resources in the anticipated zone of influence of the landfill, need and availability of cover material, climate, average rates of precipitation, evapotranspiration, runoff, and infiltration (preliminary water balance calculations); (b) Information on soil borings to a minimum depth of 20 feet below the deepest proposed excavation and lowest elevation of the site or to the permanent groundwater table if encountered within 20 feet. A minimum of one boring per representative landform at the site and an overall minimum of one boring per each ten acres must be provided. Soil boring data must include the location, depth, surface elevation and water level measurements of all borings, the textural classification (Unified Soil Classification System), permeability and cation exchange capacity of the subsurface materials and a preliminary soil balance; (c) For all water wells located within the anticipated zone of influence of the disposal site, the depth, static level and current use must be identified; (d) Background groundwater quality must be determined by laboratory analysis and must include at least each of the constituents specified by the department. 5) Any other information the department may deem necessary to determine whether the proposed disposal site is feasible and will comply with all applicable rules of the department.	and Appendix C4 *TSF Design Report*, Appendix A Detailed groundwater report: Appendix B9 *Grassy Mountain Gold Project Baseline Groundwater Reports* and Appendix C4 *TSF Design Report,* Appendices F and G (4)(b): Information on soil borings: Appendix B7 *Geology and Soils Baseline Report* and Appendix C4 *TSF Design Report,* Appendix A *(Geotechnical Data Report)* (4)(c): Depth, static level and current use of water wells within anticipated zone of influence: CPA Section 3.6.4.1, Appendix B9 *Grassy Mountain Gold Project Baseline Groundwater Reports, Vol II,* Sections 4.4.2, 4.6, Figures 26 and 31, Appendix E: Cross Sections, and *Vol III.* (4)(d): Background groundwater quality: Appendix B9 *Grassy Mountain Gold Project Baseline Groundwater Reports, Vol I* Section 10 and Appendix F 5): Any other requested info: This cross-reference table is provided.
340-095-0010, Location Restrictions	1) Except as otherwise provided in OAR 340 division 95, any person who designs, constructs, maintains, or operates any non-municipal land disposal site must do so in conformance with the location requirements of this rule. (2) Endangered Species. No person shall establish, expand or modify a non-municipal land disposal site in a manner that will cause or contribute to the actual or attempted: (a) Harassing, harming, pursuing, hunting, wounding, killing, trapping, capturing or collecting of any endangered or threatened species of plants, fish, or wildlife; (b) Direct or indirect alteration of critical habitat which appreciably diminishes the likelihood of the survival and recovery of threatened or endangered species using that habitat.	(1) No reference required. (2)(a) Endangered Species: CPA Sections 2.10 and 2.17, Appendix B2 *Aquatic Resources Baseline Report*, Appendix B3 *Areas of Critical Environmental Concern Baseline Report*, and Appendix B22 *Wildlife Resources Baseline Report* (2)(b) Critical Habitat: CPA Sections 2.2 and 2.22, Appendix B22 *Grassy Mountain Mine Project Wildlife Resources Baseline* Report, Section 5.1 and Appendix B.

Regulatory Citation	Description	Location in the Consolidated Permit Application (CPA)
	(3) Floodplains. No person shall establish, expand or modify a non-municipal land disposal site in a floodplain in a manner that will allow the facility to restrict the flow of the base flood, reduce the temporary water storage capacity of the floodplain, or result in washout of solid waste so as to pose a hazard to human life, wildlife or land or water resources. (4) Sensitive Hydrogeological Environments. No person shall establish or expand a non-municipal land disposal site in a gravel pit excavated into or above a water table aquifer or other sole source aquifer, or in a wellhead protection area, where the Department has determined that: (a) Groundwater must be protected from pollution because it has existing or potential beneficial uses (OAR 340-040-0020); and (b) Existing natural protection is insufficient or inadequate to minimize the risk of polluting groundwater	(3) Floodplains: CPA Section 1.2.1 and Map 6. (4)(a) and (b) Sensitive Hydrogeological Environments: None found. See Appendix B9 *Grassy Mountain Gold Project Baseline Groundwater Reports*
340-095-0020, Operating Criteria	(1) Except as otherwise provided in OAR 340 division 95, any person who maintains or operates any non-municipal land disposal site must do so in conformance with the operating requirements of this rule. (2) Permitted Wastes. Only the waste types listed in the solid waste permit or the operations plan, or wastes previously approved by the Department in writing, may be accepted for disposal. In certain cases the Department may also require approval of the source(s) of the waste. Written requests for authorization to accept additional waste types shall be submitted to and approved by the Department prior to disposal of such waste. Approval of requests for authorization for one-time disposal may be granted by the Department in writing. Requests for authorization for more than one-time disposal shall require a permit modification by the Department. Requests for authorization to accept additional waste types shall include the following information: (a) Waste characterization with detailed physical and chemical characteristics of the waste type such as percent solids, results of the paint filter test, Toxicity Characteristic Leaching Procedure ("TCLP") results, polychlorinated biphenyl content, and test results for ignitability, reactivity, corrosivity, etc., as appropriate; (b) The approximate volume of waste to be disposed of on a daily and yearly basis; (c) The source of the wastes and a description of the processes which generated the waste;	(2) Permitted Wastes. No wastes, other than those described in the CPA Sections 2.6 and 3.7 and Appendix C4 *TSF Design Report* are planned for disposal. (2)(a) Waste characterization (% solids, paint filter test, TCLP, PCB, etc.): CPA Sections 2.6.1, 3.6.4.5, 3.10.2, and Appendix C4 *TSF Design Report Appendix D* (2)(b) Approximate volume of waste disposed on daily and yearly basis: CPA Sections 1.3 and 3.6.2. (2)(c): Source of waste and processes which generate waste: CPA Sections 1.3 and 3.3. (2)(d) Special handling and disposal procedures: Not applicable. (3) Operations Plan, (a) Types and quantities – See CPA Sections 1.3, 2.6 and 3.7 and Appendix C4 *TSF Design Report,* Section 5 (b) Haz waste detection and management – See Appendix D3 *Waste Management Plan,* Section 6

Regulatory Citation	Description	Location in the Consolidated Permit Application (CPA)
	(d) Special handling and disposal procedures, to be incorporated into the Special Waste Management Plan pursuant to subsection (3)(j) of this rule. (3) Operations Plan. Each permittee shall maintain a detailed operations plan which describes the proposed method of operation and progressive development of trenches and/or landfill lifts or cells. Said plan shall include at least the following: (a) A description of the types and quantities of waste materials that will be received (estimated maximum daily and average annual quantities); (b) A program for detecting and preventing the disposal at the facility of regulated hazardous wastes and polychlorinated biphenyl wastes and any other unacceptable wastes as determined by the Department; (c) Methods of waste unloading, placement, compaction and covering; (d) Areas and/or procedures to be used for disposal of waste materials during inclement weather; (e) Types and weights of equipment to be used for site operation; (f) Detailed description of any salvaging or resource recovery operations to take place at the facility; (g) Such measures for the collection, containment, treatment or disposal of leachate as may be required; (h) Provisions for managing surface drainage; (i) Measures to be used for the control of fire, dust, decomposition gases, birds, disease vectors, scavenging, access, flooding, erosion, and blowing debris, as pertinent; and (j) A Special Waste Management Plan if certain wastes are received, which due to their unique characteristics, require special handling. Such wastes may present personnel safety hazards, create odor and vector problems, generate excessive leachate, lead to excessive settlement, puncture or tear the landfill liner, pose a fire hazard, or increase the toxicity of landfill leachate. The Special Waste Management Plan shall describe special acceptance, waste characterization, handling, storage, recordkeeping and disposal procedures for those materials. Wastes to be included in a special Waste Management Plan include: (A) Cleanup materials contaminated with hazardous substances pursuant to OAR 340-093-0170;	(c) Waste unloading, placement, compaction and covering: See CPA Section 3.3.9, Figure 9, and Sections 3.6 (details in 3.6.4.5 and 3.7) and Appendix C3 *Mill Design Report*, Section 8.4. (d) Procedures for disposal during inclement weather Procedures described in CPA Section 3.6.4.5 will not likely be impacted by inclement weather. (e) Types/weights of equipment: See CPA Section 3.4 (f) Salvage/resource recovery plans: Not applicable. If the mined material has mineral quality, it will be processed in the Mill. If it does not, the rock will be disposed of in the TSF or TWRSF. (g) Leachate recovery and disposal: See CPA Section 3.6.4.5 and Appendix C3 *Mill Design Report*, Sections 8.4 and 10.1 (h) Surface drainage management: See CPA Section 3.6.4.5, Appendix C3 *Mill Design Report* Section 12.2, Appendix C4 *TSF Design Report* Sections 3.0 and 4.0, and Appendix D4 *Stormwater Pollution Control Plan* (i) Fire, dust, erosion, etc. control process: See CPA Sections 3.10.7, 3.9.5, 3.9.7.2, 3.10.2, 3.9.6, and 3.9.4. (j) Special Waste Management Plan: Not applicable – these materials, if any are generated on site, will be disposed of off site as described in Appendix D3, *Waste Management Plan*. (4) Not applicable. No open burning is planned. (5) Leachate. CPA Sections 2.6 and 3.6.2

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	(B) Wastes requiring special management pursuant to OAR 340-093-0190(1); (C) Additional wastes authorized for disposal by the Department pursuant to section (2) of this rule; and (D) Large dead animals, sewage sludges and grit, septage, industrial solid wastes and other materials which may be hazardous or difficult to manage by virtue of their character or large volume, unless special provisions for such disposal are otherwise approved by the Department. (4) Open Burning. No person shall conduct the open burning of solid waste at a non-municipal land disposal site. The Department may authorize the infrequent burning of land-clearing debris such as tree stumps and limbs, brush and other wood waste, except that open burning of industrial wood waste is prohibited. (5) Leachate. Any person constructing, operating or maintaining a non-municipal land disposal site shall ensure that leachate production is minimized. Where required by the Department, leachate shall be collected and treated or otherwise controlled in a manner approved by the Department. (6) Surface Water: (a) No person shall cause a discharge of pollutants from a non-municipal land disposal site into public waters including wetlands, in violation of any applicable state or federal water quality rules or regulations; (b) Each non-municipal land disposal site permittee shall ensure that surface runoff and leachate seeps are controlled so as to minimize discharges of pollutants into public waters. (7) Surface Drainage Control. Each permittee shall ensure that: (a) The non-municipal land disposal site is maintained so that drainage will be diverted around or away from active and completed operational areas; (b) The surface contours of the non-municipal land disposal site are maintained such that ponding of surface water is minimized. (8) Endangered Species. No person shall operate a non-municipal land disposal site in a manner that will affect endangered species in any of the ways specified in OAR 340-095-0010(2). (9) Gas Control:	(6) Surface Water Discharges. Zero discharge facility as described in Appendix C4, *TSF Design Report*, Section 6.0. (7) Surface Drainage Control. See CPA Section 3.6.4.5, Appendix C3 *Mill Design Report* Section 12.2, Appendix C4 *TSF Design Report* Sections 3.0 and 4.0, and Appendix D4 *Stormwater Pollution Control Plan* (8) Endangered Species. CPA Sections 2.10, 2.17, Appendix B2 *Aquatic Resources Baseline Report*, Appendix B3 *Areas of Critical Environmental Concern Baseline Report*, and Appendix B22 *Wildlife Resources Baseline Report*. (9) Gas Control. Not applicable. (10) Floodplains. Not applicable. Facilities are not located in a floodplain. Diversions of upstream runoff have been designed to manage the selected design flood event. (11) Cover material. Not applicable. (12) Cover frequency. Not applicable. (13) Access road maintenance. See CPA Section 3.9.1 and Appendix C1 *Road Design Report*, Appendix A (BLM MS9113 – Roads, Chapter 6-Maintenance). (14) Access control. See CPA Sections 3.9.6 and 4.4. (15) Site screening from public view. Provided via perimeter fencing. See CPA Sections 3.9.6 and 4.4. (16) Fire Protection. See CPA Section 3.10.7 (17) Signs. Not applicable – the facility is not open to the public.

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	(a) No person shall operate or maintain a non-municipal land disposal site except in conformance with the provisions for gas control in OAR 340-095-0030(4); (b) Monitoring: (A) Where the Department finds that a non-municipal land disposal site's location and geophysical condition indicate that there is a reasonable probability of potential adverse effects on public health or the environment, the Department may require a permittee to provide monitoring wells to determine the effects of the site on the concentration of methane gas in the soil; (B) If the Department determines that monitoring wells are required at a non-municipal land disposal site, the permittee shall provide and maintain the wells at the locations specified by the Department and shall submit a copy of the geologic log and record of well construction to the Department within 30 days of completion of construction; (C) Where the Department determines that self-monitoring is practicable, the Department may require that the permittee collect and analyze samples of gas, at intervals specified and in a manner approved by the Department, and submit the results in a format and within a time frame specified by the Department; (D) The Department may require permittees who do self-monitoring to periodically split samples with the Department for the purpose of quality control. (10) Floodplains. No permittee of a non-municipal land disposal site located in a floodplain shall allow the facility to restrict the flow of the base flood, reduce the temporary water storage capacity of the floodplain, or result in washout of solid waste so as to pose a hazard to human life, wildlife or land or water resources. (11) Cover Material. Each permittee shall provide adequate quantities of cover material of a type approved by the Department for the covering of deposited solid waste at a non-municipal land disposal site in accordance with the approved operations plan, and permit conditions and OAR 340 divisions 93 and 95. (12) Cover Frequency. Each permittee shall place a compacted layer of at least six inches of approved cover material over the compacted wastes in a non-municipal land disposal site at intervals specified in the permit. An applicant may propose and the Department may approve alternative cover designs or procedures which are equally protective. In evaluating such a proposal for alternative cover design, procedures or frequency, the Department may consider such factors as the volume and types of waste received, hydrogeologic setting of the facility, climate, proximity	(18) Truck Washing Facilities. See CPA Section 3.9.7.1. (19) Sewage Disposal. See Appendix C7 *Wastewater Facilities Preliminary Engineering Report* for large soil absorption system (LSAS) details. (20) Salvage. Not applicable. (21) Litter. See Appendix D4 *Stormwater Pollution Control Plan*, Table 7 in Section 2.1.1, Section 3.5, and Appendix C. (22) Vector and Bird Control. Vector control is not applicable due to nature of waste. Bird control is covered in Appendix C3 *Mill Design Report,* Section 8.4 (23) Weighing. Not applicable. Waste is not being accepted from public. (24) Records Facility will comply with record retention requirements to be provided via the permitting process, anticipated to include: (a) Daily listing of the volume or weight of solid waste disposed; and (b) Monthly and quarterly accumulations of amounts of daily waste disposed. (25) Modifications in Name or Address: Modifications will be submitted to DEQ within 10 days of change.

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	of residences or other occupied buildings, site screening, availability of equipment and cover material, any past operational problems and any other relevant factor. (13) Access Roads. Each permittee shall ensure that roads from the non-municipal land disposal site property line to the active operational area and roads within the operational area are constructed and maintained so as to minimize traffic hazards, dust and mud and to provide reasonable all-weather access for vehicles using the site. (14) Access Control. Each permittee shall insure that the non-municipal land disposal site has a perimeter barrier or topographic constraints adequate to restrict unauthorized entry. (15) Site Screening. To the extent practicable, each permittee shall screen the active non-municipal land disposal site area from public view by trees, shrubbery, fence, stockpiled cover material, earthen berm, or other appropriate means. (16) Fire Protection: (a) Each non-municipal land disposal site permittee shall make arrangements with the local fire control agency to immediately acquire their services when needed and shall provide adequate onsite fire protection as determined by the local fire control agency; (b) In case of accidental fires at the site, the operator shall be responsible for initiating and continuing appropriate fire-fighting methods until all smoldering, smoking and burning ceases; (c) No operator shall permit the dumping of combustible materials within the immediate vicinity of any smoldering, smoking or burning conditions at a non-municipal land disposal site, or allow dumping activities to interfere with fire-fighting efforts. (17) Signs. Each permittee of a non-municipal land disposal site open to the public shall post a clearly visible and legible sign or signs at the entrance to the disposal site specifying the name of the facility, the hours and days the site is open to the public, an emergency phone number and listing the general types of materials which either will be accepted or will not be accepted. (18) Truck Washing Facilities. Each permittee shall ensure that any truck washing areas at a non-municipal land disposal site are hard surfaced and that any onsite disposal of wash waters is accomplished in a manner approved by the Department.	

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	(19) Sewage Disposal. Each non-municipal land disposal site permittee shall ensure that any onsite disposal of sewage is accomplished in a manner approved by the Department. (20) Salvage: A permittee may conduct or allow the recovery of materials such as metal, paper and glass from the non-municipal land disposal site only when such recovery is conducted in a planned and controlled manner approved by the Department in the facility's operations plan. (21) Litter: (a) Each permittee shall ensure that effective measures such as compaction, the periodic application of cover material or the use of portable fencing or other devices are taken to minimize the blowing of litter from the active working area of the non-municipal land disposal site; (b) Each non-municipal land disposal site operator shall collect windblown materials from the disposal site and adjacent property and properly dispose of same at sufficient frequency to prevent aesthetically objectionable accumulations. (22) Vector and Bird Control: (a) Each permittee shall ensure that effective means such as the periodic application of earth cover material or other techniques as appropriate are taken at the non-municipal land disposal site to control or prevent the propagation, harborage, or attraction of flies, rodents, or other vectors and to minimize bird attraction; (b) No permittee of a non-municipal land disposal site disposing of putrescible wastes that may attract birds and which is located within 10,000 feet (3,048 meters) of any airport runway used by turbojet aircraft or within 5,000 feet (1,524 meters) of any airport used by only piston-type aircraft shall allow the operation of the landfill to increase the likelihood of bird/aircraft collisions. (23) Weighing. The Department may require that non-municipal land disposal site permittees provide scales and weigh incoming loads of solid waste, to facilitate solid waste management planning and decision making and accurate reporting. (24) Records. The Department may require records and reports it considers reasonably necessary to ensure compliance with conditions of a permit, OAR 340 divisions 93 through 97 or provisions of OAR 340, divisions 90 and 91. All records must be kept for a minimum of five years. In the case of a change in ownership of the permitted facility, the new permittee is responsible for ensuring that the records are transferred from the previous permittee and maintained for the required five years. At a minimum, the following records are required:	

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	(a) Daily listing by load of the volume or weight of solid waste received; and (b) Monthly and quarterly accumulations of amounts of daily waste received. (25) Modifications in Name or Address. The permittee or registrant shall notify the Department of any name or address change of the owner or operator of the facility within ten days of the change.	
340-095-0030, Design Criteria	(1) Except as otherwise provided in OAR 340, division 95, any person who designs, constructs, expands or modifies any non-municipal land disposal site must do so in conformance with the design requirements of this rule. (2) Plan Design Requirements. Unless an exemption has been granted under OAR 340-093-0070(4), in addition to the requirements of OAR 340-093-0070, detailed plans and specifications for non-municipal land disposal sites shall include but not be limited to: (a) Topographic maps which show natural features of the site; the location and design of all pertinent existing and proposed structures, such as berms, dikes, surface drainage control devices, access and onsite roads, water and wastewater facilities, gas control devices, monitoring wells, fences, utilities, maintenance facilities, shelter and buildings; legal boundaries and property lines, and existing contours and projected finish grades. Unless otherwise approved by the Department, the scale of the plan drawings shall be no greater than one inch equals 200 feet, with contour intervals not to exceed five feet. Horizontal and vertical controls shall be established and tied to an established bench mark located on or near the site. Where the Department deems it essential to ensure compliance with OAR 340, divisions 93 and 95, the bench mark shall be referenced to the Oregon State Plane Coordinate System, Lambert Projection; (b) If a landfill, a minimum of two perpendicular cross section drawings through the non-municipal land disposal site. Each cross section shall illustrate existing grade, excavation grade, proposed final grade, any additions for groundwater protection, water table profile and soil profile. Additional cross sections shall be provided as necessary to adequately depict underlying soils, geology and landfill contours, and to display the design of environmental protection devices or structures; (c) A description of the design assumptions and methods used to forecast flows and to determine the sizing of pumps, pipes, ditches, culverts and other hydraulic equipment used for the collection, treatment and disposal of leachate and for the control of surface drainage;	(2)(a) Topo maps – See Appendix C4 *TSF Design Report*, Figure 1. (b) Perpendicular cross sections – See Appendix C4 *TSF Design Report,* Appendix A (*Geotechnical Data Report*), Figures 2A, 2B, 2C (c) Design flows and surface drainage features – See Appendix C4 *TSF Design Report*, Section 6.4, Appendix E and Appendix G Section 4.1.1. (d) Detailed Operations Plan – To be developed. See CPA Sections 2.6.2.2 and 3.7 for initial operation information. (3) Leachate – See CPA Sections 2.6 and 3.6.2, Appendix C4 *TSF Design Report,* Section 6.4 and Appendix C3 *Mill Design Report*, Section 10.1. (4) Gas Control – Because the waste is minerals and water, methane or malodorous gas production is not a concern. (5) Surface Drainage Control – See CPA Section 3.6.4.5, Appendix C3 *Mill Design Report* Section 12.2, Appendix C4 *TSF Design Report* Sections 3.0 and 4.0, and Appendix D4 *Stormwater Pollution Control Plan*.

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	(d) A detailed operations plan pursuant to OAR 340-095-0020(3) and timetable which describes the proposed method of operation and progressive development of the non-municipal land disposal site, such as trenches and/or landfill lifts or cells. (3) Leachate. Any person designing or constructing a non-municipal land disposal site shall ensure that leachate production is minimized. Where required by the Department, leachate shall be collected and treated or otherwise controlled in a manner approved by the Department. Leachate storage treatment impoundments shall be located, designed, constructed and monitored, at a minimum, to the same level of environmental protection as the land disposal site. (4) Gas Control. No person shall establish, expand or modify a non-municipal land disposal site such that: (a) The concentration of methane (CH4) gas at the landfill exceeds 25 percent of its lower explosive limit in facility structures (excluding gas control or gas recovery system components) or its lower explosive limit at the property boundary; (b) Malodorous decomposition gases become a public nuisance. (5) Surface Drainage Control. Each permittee shall ensure that the non-municipal land disposal site is designed and constructed so that drainage will be diverted around or away from active and completed operational areas.	
340-095-0040, Groundwater Monitoring and Corrective Action	(1) Groundwater: (a) Each non-municipal land disposal site permittee shall ensure that: (A) The introduction of any substance from the land disposal site into an underground drinking water source does not result in a violation of any applicable federal or state drinking water rules or regulations beyond the solid waste boundary of the land disposal site or an alternative boundary specified by the Department; (B) The introduction of any substance from the land disposal site into an aquifer does not impair the aquifer's recognized beneficial uses, beyond the solid waste boundary of the land disposal site or an alternative boundary specified by the Department, consistent with OAR 340, division 40 and any applicable federal or state rules or regulations. (b) Where monitoring is required, monitoring wells shall be placed at Department-approved locations between the solid waste boundary and the property line if adequate room exists;	(1)(a)(A) and (B): TSF and TWRSF design include barriers to groundwater and leachate collection and reclaim systems. See Appendix C4 *TSF Design Report* and Appendix C3 *Mill Design Report*. (b) Monitoring wells between solid waste boundary and property line: Monitoring well locations will be approved by Department and maintained by permittee. (c) Alternate boundary: not applicable (2)(a) Monitoring well locations will be approved by Department and maintained by permittee.

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	(c) The Department may specify an alternative boundary based on a consideration of all of the following factors: (A) The hydrogeological characteristics of the facility and surrounding land; (B) The volume and physical and chemical characteristics of the leachate; (C) The quantity and directions of flow of groundwater; (D) The proximity and withdrawal rates of groundwater users; (E) The availability of alternative drinking water supplies; (F) The existing quality of the groundwater including other sources of contamination and their cumulative impacts on the groundwater; and (G) Public health, safety, and welfare effects. (2) Monitoring: (a) Where the Department finds that a non-municipal land disposal site's location and geophysical condition indicate that there is a reasonable probability of potential adverse effects on public health or the environment, the Department may require a permittee to provide monitoring wells at Department-approved locations and depths to determine the effects of the non-municipal land disposal site on groundwater; (b) If the Department determines that monitoring wells are required at a non-municipal land disposal site, the permittee shall provide and maintain the wells at the locations specified by the Department and shall submit a copy of the geologic log and record of well construction to the Department within 30 days of completion of construction; (c) Where the Department determines that self-monitoring is practicable, the Department may require that the permittee collect and analyze samples of surface water and/or groundwater, at intervals specified and in a manner approved by the Department, and submit the results in a format and within a time frame specified by the Department; (d) The Department may require permittees who do self-monitoring to periodically split samples with the Department for the purpose of quality control. (3) Corrective action. Notwithstanding OAR 340-093-0030(22), the Department may require action to remediate releases of constituents above the levels specified in OAR 340 division 40. This authority is in addition to any other authority granted by law.	(b) Well logs and record of well construction will be submitted to Department within 30 days. (c) Sampling and submittal of data requirements will be determined by Department. (d) Periodic split sampling may be required. (3) Monitoring well sampling results may initiate corrective action request by Department.

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340-095-0050, Closure and Post-Closure Care: Closure Permits	(1) Closure Permit: (a) At least 5 years prior to anticipated final closure of a non-municipal land disposal site, the person holding the disposal site permit shall apply to renew the permit to cover the period of time remaining for site operations, closure of the site, and all or part of the time that active post-closure site maintenance is required by the Department. This last permit issued before final closure of the landfill is scheduled to occur shall be called a "closure permit;" (b) The person who holds or last held the non-municipal land disposal site permit, or, if that person fails to comply, then the person owning or controlling a non-municipal land disposal site that is closed and no longer receiving solid waste after January 1, 1980, must continue or renew the disposal site permit after the site is closed for the duration of the period in which the Department continues to actively supervise the site, even though solid waste is no longer received at the site. (2) Applications for closure permits must include but are not limited to: (a) A Final Engineered Site Closure Plan prepared in accordance with OAR 340-095-0060. In lieu of requiring the Final Engineered Site Closure Plan as a part of the application for a closure permit, the Department may specify a date in the closure permit for submission of the Final Engineered Site Closure Plan; (b) A Final Engineered Post-closure Plan prepared in accordance with OAR 340-095-0065. In lieu of requiring the Final Engineered Site Closure Plan as a part of the application for a closure permit, the Department may specify a date in the closure permit for submission of the Final Engineered Site Closure Plan; (c) If the permittee does not own and control the property, a demonstration to the Department that the permittee has access to the non-municipal land disposal site property after closure to monitor and maintain the site and operate any environmental control facilities; (d) If any person other than the permittee assumes any responsibility for any closure or post-closure activities, that responsibility shall be evidenced by a written contract between the permittee and each person assuming any responsibility. (3) While a closure permit is in effect, the permittee shall submit a report to the Department within 90 days of the end of the permittee's fiscal year or as otherwise required in writing by the Department, which contains but is not limited to: (a) An evaluation of the approved closure or post-closure plan as applicable discussing current status, unanticipated occurrences, revised closure date projections, necessary changes, etc.;	Not applicable at this time – request for closure via a Closure Permit must occur within 5 years of anticipated site closure. This is not applicable. (2) The reclamation plan meets OAR 340-095-0060(1)(a)(A) as a "worst-case" conceptual closure plan. The Final Engineering Site Closure Plan for the closure of the TSF will be submitted to Oregon Department of Geology and Minerals Industries (DOGAMI) for approval prior to construction, five years in advance if that is what DOGAMI requires. This is not applicable. The reclamation plan includes the commitment to develop a Post-closure monitoring plan that will be submitted to DOGAMI for approval prior to execution. Annual inspections are anticipated for the operation which would result in an update of financial assurances per OAR 632-030-0024.

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	(b) A copy of the annual update of financial assurance as required by OAR 340-095-0090(6)(d). If the financial mechanism used is a trust fund, the permittee shall include an evaluation of the financial assurance plan documenting an accounting of amounts deposited and expenses drawn from the fund, as well as its current balance. This evaluation must also assess the adequacy of the financial assurance and justify any changes in the plan; (c) Other information requested by the Department to determine compliance with the rules of the Department. (4) The Department shall terminate closure permits for non-municipal land disposal sites not later than 30 years after the site is closed unless the Department finds there is a need to protect against a significant hazard or risk to public health or safety or the environment. (5) Any time after a non-municipal land disposal site is closed, the permit holder may apply for a termination of the permit, a release from one or more of the permit requirements or termination of any applicable permit fee. Before the Department grants a termination or release under this section, the permittee must demonstrate and the Department must find that human health and the environment will be protected and there is no longer a need for: (a) Active supervision of the site; (b) Maintenance of the site; or (c) Maintenance or operation of any system or facility on the site. (6) The closure permit remains in effect and is a binding obligation of the permittee until the Department terminates the permit according to section (4) or (5) of this rule or upon issuance of a new closure permit for the site to another person following receipt of a complete and acceptable application.	
340-095-0060, Closure and Post-Closure Care: Closure Plans	To comply with the financial assurance requirements of OAR 340-095-0090(1)(a): (1) Two types of written closure plans shall be prepared: (a) The two types of closure plan are: (A) A conceptual "worst-case" closure plan, for closing the site at its maximum capacity. The plan shall contain sufficient detail to allow a reasonable estimate of the cost of closing the non-municipal land disposal site as required by OAR 340-095-0090(1)(a); and subsequently	Not applicable at this time This is not applicable. (2) The reclamation plan meets OAR 340-095-0060(1)(a)(A) as a "worst-case" conceptual closure plan. The Final Engineering Site Closure Plan for the closure of the TSF will be submitted to DOGAMI for approval prior to construction, five years in advance if that is what DOGAMI requires.

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	(B) A Final Engineered Site Closure Plan, as required by OAR 340-095-0050(2)(a), which shall replace the conceptual "worst-case" closure plan. (b) Schedule for preparation of closure plans: (A) The conceptual "worst-case" closure plan shall be prepared and placed in the facility operations office or other location approved by the Department, and the Director shall be notified of that action no later than April 9, 1995, or by the initial receipt of waste, whichever is later; (B) The Final Engineered Site Closure Plan shall be prepared and submitted to the Department five years before the anticipated final closure date, or at a date specified in the permittee's closure permit pursuant to OAR 340-095-0050(2)(a). (2) Requirements for closure plans. A closure plan shall specify the procedures necessary to completely close the non-municipal land disposal site at the end of its intended operating life: (a) Requirements for the conceptual "worst-case" closure plan shall consist of at least the following: (A) A description of the steps necessary to close all non-municipal land disposal units at any point during their active life; (B) A description of the final cover system that is designed to minimize infiltration and erosion; (C) An estimate of the largest area of the non-municipal land disposal unit ever requiring a final cover; and (D) An estimate of the maximum inventory of wastes ever on site over the active life of the facility. (b) Requirements for the Final Engineered Site Closure Plan. In addition to the requirements for the conceptual "worst-case" closure plan, the Final Engineered Site Closure Plan shall consist of at least the following elements: (A) Detailed plans and specifications consistent with the applicable requirements of OAR 340-093-0140 and 340-095-0030(2), unless an exemption is granted as provided in OAR 340-093-0070(5); NOTE: If some of this information has been previously submitted, the permittee shall review and update it to reflect current conditions and any proposed changes in closure activities.	

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	(B) A description of how and when the non-municipal land disposal site will be closed. If a landfill, the description shall, to the extent practicable, show how the landfill will be closed as filling progresses to minimize the area remaining to be closed at the time that the site stops receiving waste. A time schedule for completion of closure shall be included; (C) Details of final closure. If a landfill, details of final cover including soil texture, depth and slope; (D) Details of surface water drainage diversion; and (E) Other information requested by the Department necessary to determine whether the non-municipal land disposal site will comply with all applicable rules of the Department. (3) Department approval. The Final Engineered Site Closure Plan is subject to written approval by the Department. After approval by the Department, the permittee shall implement the Final Engineered Site Closure Plan within the approved time schedule. (4) Amendment of Plan. The approved Final Engineered Site Closure Plan may be amended at any time as follows: (a) The permittee must amend the plan whenever changes in operating plans or facility design, or changes in OAR 340 divisions 93 through 97, or events which occur during the active life of the landfill significantly affect the plan. The permittee must also amend the plan whenever there is a change in the expected year of closure. The permittee must submit the necessary plan amendments to the Department for approval within 60 days after such changes or as otherwise required by the Department; (b) The permittee may request to amend the plan to alter the closure requirements based on cause. The request must include evidence demonstrating to the satisfaction of the Department that: (A) The nature of the non-municipal land disposal site makes the closure requirements unnecessary; or (B) The requested alteration of closure requirements is necessary to prevent threat of adverse impact on public health, safety or the environment. (c) The Department may amend a permit to require the permittee to modify the plan if it is necessary to prevent the threat of adverse impact on public health, safety or the environment. Also, the Department may alter the closure requirements based on cause.	

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340-095-0065, Closure and Post-Closure Care: Post-Closure Plans	To comply with the financial assurance requirements of OAR 340-095-0090(1)(b): (1) Two types of written post-closure plans shall be prepared: (a) A "conceptual" post-closure plan; and subsequently (b) A Final Engineered Post-closure Plan as required by OAR 340-095-0050(2)(b). When prepared, this shall include all requirements of and replace the "conceptual" post-closure plan. (2) Schedule for preparation of post-closure plans: (a) The "conceptual" post-closure plan shall be placed in the facility operations office or other location approved by the Department and the Director shall be notified of that action no later than April 9, 1995, or by the initial receipt of waste, whichever is later; (b) The Final Engineered Post-closure Plan shall be prepared in conjunction with and submitted to the Department together with the Final Engineered Site Closure Plan required by OAR 340-095-0050(2)(b). (3) Requirements for post-closure plans. Post-closure plans shall identify the post-closure activities which will be carried on to properly monitor and maintain the closed non-municipal land disposal site: (a) Requirements for the "conceptual" post-closure plan shall consist of at least the following: (A) Maintaining the integrity and effectiveness of any final cover; (B) Maintaining and operating the leachate collection system, if required pursuant to OAR 340-095-0020(5); (C) Monitoring the groundwater, if required pursuant to OAR 340-095-0040; (D) Maintaining and operating the gas monitoring system if required pursuant to OAR 340-095-0020(9); (E) Monitoring and providing security for the landfill site; and (F) Description of the planned uses of the property during the post-closure care period. (b) Requirements for the Final Engineered Post-closure Plan. In addition to the requirements for the "conceptual" post-closure plan, the Final Engineered Post-closure Plan shall consist of at least the following elements:	Not applicable at this time This is not applicable. (2) The reclamation plan meets OAR 340-095-0065(1)(a)(A) as a "worst-case" conceptual closure plan. The Final Engineering Site Closure Plan for the closure of the TSF will be submitted to DOGAMI for approval prior to construction, five years in advance if that is what DOGAMI requires. The reclamation plan includes the commitment to develop a Post-closure monitoring plan that will be submitted to DOGAMI for approval prior to execution. Annual inspections are anticipated for the operation which would result in an update of financial assurances per OAR 632-030-0024.

Regulatory Citation	Description	Location in the Consolidated Permit Application (CPA)
	(A) Detailed plans and specifications consistent with the applicable requirements of OAR 340-093-0140 and 340-095-0030(2), unless an exemption is granted as provided in OAR 340-093-0070(5); NOTE: If some of this information has been previously submitted, the permittee shall review and update it to reflect current conditions and any proposed changes in closure or post-closure activities. (B) Details of how leachate discharges will be minimized and controlled and treated if necessary; (C) Details of any landfill gas control facilities, their operation and frequency of monitoring; (D) A schedule of monitoring the site after closure; (E) A projected frequency of anticipated inspection and maintenance activities at the site after closure, including but not limited to repairing, recovering and regrading settlement areas, cleaning out surface water diversion ditches, and re-establishing vegetation; and (F) Any other information requested by the Department necessary to determine whether the disposal site will comply with all applicable rules of the Department. (c) Department approval. The Final Engineered Post-closure Plan is subject to written approval by the Department. After approval by the Department, the permittee shall implement the Final Engineered Post-closure Plan within the approved time schedule; (d) Amendment. The approved Final Engineered Post-closure Plan may be amended at any time as follows: (A) The permittee must amend the Plan whenever changes in operating plans or facility design, or changes in OAR 340 divisions 93 through 97, or events which occur during the active life of the landfill or during the post-closure care period, significantly affect the Plan. The permittee must submit the necessary plan amendments to the Department for approval within 60 days after such changes or as otherwise required by the Department; (B) The permittee may request to amend the Plan to alter the post-closure care requirements, or to extend or reduce the post-closure care period based on cause. The request must include evidence demonstrating to the satisfaction of the Department that:	

Regulatory Citation	Description	Location in the Consolidated Permit Application (CPA)
	(i) The nature of the landfill makes the post-closure care requirements unnecessary; or (ii) The nature of the landfill supports reduction of the post-closure care period; or (iii) The requested extension in the post-closure care period or alteration of post-closure care requirements is necessary to prevent threat of adverse impact on public health, safety or the environment. (C) The Department may amend a permit to require the permittee to modify the Plan if it is necessary to prevent the threat of adverse impact on public health, safety or the environment. Also, the Department may extend or reduce the post-closure care period or alter the post-closure care requirements based on cause.	
340-095-0070, Closure Requirements	Each permittee of a non-municipal land disposal site that closes after January 1, 1980 shall comply with this rule. (1) When solid waste is no longer received at a non-municipal land disposal site, the person who holds or last held the permit issued under ORS 459.205 or, if the person who holds or last held the permit fails to comply with this section, the person owning or controlling the property on which the disposal site is located, shall close and maintain the site according to the requirements of ORS Chapter 459, all applicable rules adopted by the Commission under ORS 459.045 and all requirements imposed by the Department as a condition to renewing or issuing a non-municipal land disposal site permit. (2) Unless otherwise approved or required in writing by the Department, no person shall permanently close or abandon a non-municipal land disposal site, except in the following manner: (a) All areas containing solid waste not already closed in a manner approved by the Department shall be covered with at least three feet of compacted soil of a type approved by the Department graded to a minimum two percent and maximum 30 percent slope unless the Department authorizes a lesser depth or an alternative final cover design. In applying this standard, the Department will consider the potential for adverse impact from the disposal site on public health, safety or the environment, and the ability for the permittee to generate the funds necessary to comply with this standard before the disposal site closes. A permittee may request that the Department approve a lesser depth of cover material or an alternative final cover design based on the type of waste, climate, geological setting, degree of environmental impact;	Not applicable at this time. This is not applicable to the TSF. The closure plan describes cover thickness and the use of liners, final slopes, final cover material, reclamation activities timeline, stormwater management and diversion, discharge control and containment, and the development and submittal of a post-closure monitoring plan to DOGAMI for approval prior to execution.

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	(b) Final cover material shall be applied to each portion of a landfill within 60 days after said portion reaches approved maximum fill elevation, except in the event of inclement weather, in which case final cover shall be applied as soon as practicable; (c) The finished surface of the closed areas shall consist of soils of a type or types consistent with the planned future use and approved by the Department. Unless otherwise approved by the Department, a vegetative cover of native grasses shall be promptly established over the finished surface of the closed site; (d) All surface water must be diverted around the area of the non-municipal land disposal site used for waste disposal or in some other way prevented from contacting the waste material; (e) All systems required by the Department to control or contain discharges to the environment must be completed and operational. (3) Closure of non-municipal land disposal sites shall be in accordance with the detailed Final Engineered Site Closure Plan approved in writing by the Department pursuant to OAR 340-095-0060. (4) Closure approval: (a) When closure is completed, the permittee shall submit a written request to the Department for approval of the closure; (b) Within 30 days of receipt of a written request for closure approval, the Department shall inspect the facility to verify that closure has been effected in accordance with the approved closure plan and the provisions of OAR 340, divisions 93 and 95; (c) If the Department determines that closure has been properly completed, the Department shall approve the closure in writing. Closure shall not be considered complete until such approval has been made. The date of approval notice shall be the date of commencement of the post-closure period.	
340-095-0080, Post Closure Care Requirements	(1) Post-closure requirements: (a) Upon completion or closure of any non-municipal land disposal site where waste remains on site, a detailed description of the site including a plat should be filed with the appropriate county land recording authority by the permittee. The description should include the general types and location of wastes deposited, depth of waste and other information of probable interest to future land owners; (b) During the post-closure care period, the permittee must, at a minimum:	Not applicable at this time. Appendix D1, *Reclamation Plan,* has been developed for the facility. The *Reclamation Plan* includes the commitment to develop a Post-closure monitoring plan that will be submitted to

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	(A) Maintain the approved final contours and drainage system of the site; (B) Consistent with final use, ensure that a healthy vegetative cover is established and maintained over the site; (C) Operate and maintain each leachate and gas collection, removal and treatment system present at the site; (D) Operate and maintain each groundwater and surface water monitoring system present at the site; (E) Comply with all conditions of the closure permit issued by the Department. (2) Post-closure care period. Post-closure care must continue for 30 years after the date of completion of closure of any non-municipal land disposal site where waste remains on site, unless otherwise approved or required by the Department according to OAR 340-095-0050(4) and (5).	DOGAMI for approval prior to execution. The post-closure monitoring plan will include (b)(A)-(E). The post-closure monitoring period is 30 years.
340-095-0090, Financial Assurance Criteria	(1) Financial Assurance Required. The owner or operator of a non-municipal land disposal site shall maintain a financial assurance plan with detailed written cost estimates of the amount of financial assurance that is necessary and shall provide evidence of financial assurance for the costs of: (a) Closure of the non-municipal land disposal site; (b) Post-closure maintenance of the non-municipal land disposal site; and (c) Any corrective action required by the Department to be taken at the non-municipal land disposal site, pursuant to OAR 340-095-0040(3). (2) Exemptions. The Department may exempt from the financial assurance requirements any non-municipal land disposal site including but not limited to construction and demolition waste sites, composting facilities and industrial waste sites: (a) Exemption criteria. To be eligible for this exemption, the applicant shall demonstrate to the satisfaction of the Department that the site meets all of the following criteria and that the site is likely to continue to meet all of these criteria until the site is closed in a manner approved by the Department: (A) The non-municipal land disposal site poses no significant threat of adverse impact on groundwater or surface water; (B) The non-municipal land disposal site poses no significant threat of adverse impact on public health or safety;	See Appendix D1, *Reclamation Plan*. (1) Financial Assurance See Section 8. (2) Exemptions – Presumed not applicable (3)(a) Provide costs associated with "worst case" closure plan and conceptual post-closure plan (A) prior to receipt of first waste – Evidence of financial assurance to be provided prior to receipt of first waste in new non-municipal landfill. See Appendix D1, *Reclamation Plan*, Section 8. (3)(b) Provide evidence of financial assurance for Site Closure Plan and the Final Engineered Post-Closure Plan when plans are due to Department – Evidence of financial assurance to be provided with submittal of Closure Plan and Post-Closure Plan. (c) Evidence of financial assurance for corrective action shall be provided before beginning corrective action. (d) Continuous financial assurance shall be maintained for the facility until the permittee

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	(C) No system requiring active operation and maintenance is necessary for controlling or stopping discharges to the environment; (D) The area of the non-municipal land disposal site that has been used for waste disposal and has not yet been properly closed in a manner acceptable to the Department is less than and remains less than two acres or complies with a closure schedule approved by the Department. (b) In determining if the applicant has demonstrated that a non-municipal land disposal site meets the financial assurance exemption criteria, the Department will consider existing available information including, but not limited to, geology, soils, hydrology, waste type and volume, proximity to and uses of adjacent properties, history of site operation and construction, previous compliance inspection reports, existing monitoring data, the proposed method of closure and the information submitted by the applicant. The Department may request additional information if needed; (c) An exemption from the financial assurance requirement granted by the Department will remain valid only so long as the non-municipal land disposal site continues to meet the exemption criteria in subsection (2)(a) of this rule. If the site fails to continue to meet the exemption criteria, the Department may modify the permit to require financial assurance. (3) Schedule for provision of financial assurance: (a) For costs associated with the conceptual "worst-case" closure plan and the conceptual post-closure plan prepared pursuant to OAR 340-095-0060(1)(a)(A) and OAR 340-095-0065(1)(a), respectively: Evidence of the required financial assurance for closure and post-closure maintenance of the non-municipal land disposal site shall be provided on the following schedule: (A) For a new non-municipal land disposal site: no later than the time the solid waste permit is issued by the Department and prior to first receiving waste; or (B) For a non-municipal land disposal site operating under a solid waste permit on November 4, 1993: by April 9, 1997. (b) For costs associated with the Final Engineered Site Closure Plan and the Final Engineered Post-closure Plan prepared pursuant to OAR 340-095-0060(1)(a)(B) and OAR 340-095-0065(1)(b) respectively: Evidence of the required financial assurance for closure and post-closure maintenance of the land disposal site shall be provided at the same time those two Plans are due to the Department;	or other person owning or controlling the site is no longer required to demonstrate financial responsibility for closure, post-closure care or corrective action (if required). (4) Financial Assurance Plan Provided in conjunction with Closure Plans (due 5 years prior to facility closure) (5)(a) Amount of Financial Assurance Required: To be determined in conjunction with development of Closure Plan (due 5 years prior to facility closure). (5)(b) Post Closure Care To be determined (5)(c) Corrective Action To be determined (5)(d) More than one landfill Not applicable (6)(a) Requirements for Annual Review and Update to Financial Assurance (6)(b) Place a copy of the applicable financial assurance plan(s) in the facility operations office (6)(c) Certify that the financial assurance mechanism meets all state requirements. (6)(d) Annually review and update the financial assurance during the operating life and post-closure care period, or corrective action, if required. (7) Department reserves right to request different frequency of review. (8) Monies to be placed in a trust fund to cover Closure, Post Closure care, etc. .

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	(c) Evidence of financial assurance for corrective action shall be provided before beginning corrective action; (d) Continuous financial assurance shall be maintained for the facility until the permittee or other person owning or controlling the site is no longer required to demonstrate financial responsibility for closure, post-closure care or corrective action (if required). (4) Financial assurance plans. The financial assurance plan is a vehicle for determining the amount of financial assurance necessary and demonstrating that financial assurance is being provided. A financial assurance plan shall include but not be limited to the following, as applicable: (a) Cost Estimates. A detailed written estimate of the third-party costs in current dollars (as calculated using a discount rate equal to the current yield of a 5-year U.S. Treasury Note as published in the Federal Reserve's H.15 (519) Selected Interest Rates for the week in which the calculation is done), prepared by a Registered Professional Engineer, of: (A) Closing the non-municipal land disposal site; (B) Providing post-closure care, including installing, operating and maintaining any environmental control system required on the non-municipal land disposal site; (C) Performing required corrective action activities; and (D) Complying with any other requirement the Department may impose as a condition of issuing a closure permit, closing the site, maintaining a closed facility, or implementing corrective action. (b) The source of the cost estimates; (c) A detailed description of the form of the financial assurance and a copy of the financial assurance mechanism; (d) A method and schedule for providing for or accumulating any required amount of funds which may be necessary to meet the financial assurance requirement; (e) A proposal with provisions satisfactory to the Department for disposing of any excess moneys received or interest earned on moneys received for financial assurance, if applicable: (A) To the extent practicable and to the extent allowed by any franchise agreement, the applicant's provisions for disposing of the excess moneys received or interest earned on moneys shall provide for:	

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	(i) A reduction of the rates a person within the area served by the non-municipal land disposal site is charged for solid waste collection service as defined by ORS 459.005; or (ii) Enhancing present or future solid waste disposal facilities within the area from which the excess moneys were received. (B) If the non-municipal land disposal site is owned and operated by a private entity not regulated by a unit of local government, excess moneys and interest remaining in any financial assurance reserve shall be released to that business entity after post-closure care has been completed and the permittee is released from permit requirements by the Department. (f) The financial assurance plan shall contain adequate accounting procedures to insure that the permittee does not collect or set aside funds in excess of the amount specified in the financial assurance plan or any updates thereto or use the funds for any purpose other than required by paragraph (8)(a) of this rule; (g) The certification required by subsection (6)(c) of this rule; and (h) The annual updates required by subsection (6)(d) of this rule. (5) Amount of Financial Assurance Required. The amount of financial assurance required shall be established as follows: (a) Closure. Detailed cost estimates for closure shall be based on the conceptual "worst-case" closure plan or the final Engineered Site Closure Plan, as applicable. Cost estimates for the Final Engineered Site Closure plan shall take into consideration at least the following: (A) Amount and type of solid waste deposited in the site; (B) Amount and type of buffer from adjacent land and from drinking water sources; (C) Amount, type, availability and cost of required cover; (D) Seeding, grading, erosion control and surface water diversion required; (E) Planned future use of the disposal site property; (F) The portion of the site property closed before final closure of the entire site; and (G) Any other conditions imposed on the permit relating to closure of the site. (b) Post-closure care. Detailed cost estimates for post-closure care shall be based on the conceptual post-closure plan or the Final Engineered Post-closure Plan, as	

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	applicable. Cost estimates for the Final Engineered Post-closure Plan shall also take into consideration at least the following: (A) Type, duration of use, initial cost and maintenance cost of any active system necessary for controlling or stopping discharges; and (B) Any other conditions imposed on the permit relating to post-closure care of the site. (c) Corrective action. Estimated total costs of required corrective action activities for the entire corrective action period, as described in a corrective action report pursuant to requirements of OAR 340-095-0040(3); (d) If a permittee is responsible for providing financial assurance for closure, post-closure care and/or corrective action activities at more than one non-municipal land disposal site, the amount of financial assurance required is equal to the sum of all cost estimates for each activity at each facility. (6) How Financial Assurance Is to Be Provided and Updated: (a) The permittee shall submit to the Department a copy of the first financial assurance mechanism prepared in association with a conceptual "worst-case" closure plan, a Final Engineered Site Closure Plan, a conceptual post-closure plan, a Final Engineered Post-closure Plan, and a corrective action report; (b) The permittee shall also place a copy of the applicable financial assurance plan(s) in the facility operations office or another location approved by the Department on the schedule specified in Section (3) of this rule; (c) The permittee shall certify to the Director at the time a financial assurance plan is placed in the facility operations office or other approved location that the financial assurance mechanism meets all state requirements. This date becomes the "annual review date" of the provision of financial assurance, unless a corporate guarantee is used, in which case the annual review date is 90 days after the end of the corporation's fiscal year; (d) Annual update. The permittee shall annually review and update the financial assurance during the operating life and post-closure care period, or until the corrective action is completed, as applicable: (A) The annual review shall include: (i) An adjustment to the cost estimate(s) for inflation and in the discount rate as specified in subsection (4)(a) of this rule;	

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	(ii) A review of the closure, post-closure and corrective action (if required) plans and facility conditions to assess whether any changes have occurred which would increase or decrease the estimated maximum costs of closure, post-closure care or corrective action since the previous review; (iii) If a trust fund or other pay-in financial mechanism is being used, an accounting of amounts deposited and expenses drawn from the fund, as well as its current balance. (B) The financial assurance mechanism(s) shall be increased or may be reduced to take into consideration any adjustments in cost estimates identified in the annual review; (C) The annual update shall consist of a certification from the permittee submitted to the Department and placed in the facility operations office or other approved location. The certification shall state that the financial assurance plans(s) and financial assurance mechanism(s) have been reviewed, updated and found adequate, and that the updated documents have been placed at the facility operations office or other approved location. The annual update shall be no later than: (i) The facility's annual review date; or (ii) For a facility operating under a closure permit, by the date specified in OAR 340-095-0050(3). (7) Department Review of Financial Assurance and Third-Party Certification: (a) The Department may at any time select a permittee to submit financial assurance plan(s) and financial assurance mechanism(s) for Department review. Selection for review will not occur more frequently than once every five years, unless the Department has reasonable cause for more frequent selection. The Department may, however, review such plans and mechanisms in conjunction with a site inspection at any time; (b) A permittee who wants to provide "alternative financial assurance" pursuant to OAR 340-095-0095(6)(g) shall submit its financial assurance plan and proposed financial assurance mechanism for Department review and approval on the schedule specified in section (3) of this rule. The submittal shall include certification from a qualified third party that the financial assurance mechanism meets all state requirements for financial assurance, and is reasonably designed to provide the required amount of financial assurance. The third-party certification shall be submitted in a format acceptable to the Department;	

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	(c) The Department will review the financial assurance and the third-party certification, if applicable, for compliance with state laws. (8) Accumulation of any financial assurance funds: (a) The financial assurance mechanisms for closure, post-closure care and corrective action shall ensure the funds will be available in a timely fashion when needed. The permittee shall pay moneys into a trust fund in the amount and at the frequency specified in the financial assurance plan or obtain other financial assurance mechanisms as specified in the financial assurance plan, on the schedule specified in section (3) of this rule: (A) Closure. The total amount of financial assurance required for closure shall be available in the form specified in the financial assurance plan or any updates thereto, whenever final closure of a non-municipal land disposal site unit is scheduled to occur in the conceptual "worst case" closure plan or in the Final Engineered Site Closure Plan; (B) Post-closure care. The total amount of financial assurance required for post-closure care shall be available in the form specified in the financial assurance plan or any updates thereto, whenever post-closure care is scheduled to begin for a non-municipal land disposal site unit in the conceptual post-closure plan or in the Final Engineered Post-closure Plan; (C) Corrective action. The total amount of financial assurance required for corrective action shall be available in the form specified in the financial assurance plan or any updates thereto on the schedule specified in the corrective action selected pursuant to OAR 340 Division 40. (b) The permittee is subject to audit by the Department (or Secretary of State) and shall allow the Department access to all records during normal business hours for the purpose of determining compliance with this rule and OAR 340-095-0095; (c) If the Department determines that the permittee did not set aside the required amount of funds for financial assurance in the form and at the frequency required by the applicable financial assurance plan, or if the Department determines that the financial assurance funds were used for any purpose other than as required in section (1) of this rule, the permittee shall, within 30 days after notification by the Department, deposit a sufficient amount of financial assurance in the form required by the applicable financial assurance plan along with an additional amount of financial assurance equal to the amount of interest that would have been earned, had the required amount of financial assurance been deposited on time or had it not been withdrawn for unauthorized use;	

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	(d) If financial assurance is provided under OAR 340-095-0095(6)(a), (b) or (g), upon successful closure and release from permit requirements by the Department, any excess money in the financial assurance account must be used in a manner consistent with subsection (4)(e) of this rule.	
340-095-0095, Form of Financial Assurance	(1) The financial assurance mechanism shall restrict the use of the financial assurance so that the financial resources may be used only to guarantee that closure, post-closure or corrective action activities will be performed, or that the financial resources can be used only to finance closure, post-closure or corrective action activities. (2) The financial assurance mechanism shall provide that the Department or a party approved by the Department is the beneficiary of the financial assurance. (3) A permittee may use one financial assurance mechanism for closure, post-closure and corrective action activities, but the amount of funds assured for each activity must be specified. (4) A permittee may demonstrate financial assurance for closure, post-closure and corrective action by establishing more than one mechanism per facility, except that mechanisms guaranteeing performance rather than payment may not be combined with other instruments. (5) The financial assurance mechanism shall be worded as specified by the Department, unless a permittee uses an alternative financial assurance mechanism pursuant to subsection (6)(g) of this rule. The Department retains the authority to approve the wording of an alternative financial assurance mechanism. (6) Allowable Financial Assurance Mechanisms. A permittee shall provide only the following forms of financial assurance for closure and post-closure activities: (a) A trust fund established with an entity which has the authority to act as a trustee and whose trust operations are regulated and examined by a federal or state agency. The purpose of the trust fund is to receive and manage any funds that may be paid by the permittee and to disburse those funds only for closure, post-closure maintenance or corrective action activities which are authorized by the Department. The permittee shall notify the Department, in writing, before any expenditure of trust fund moneys is made, describing and justifying the activities for which the expenditure is to be made. If the Department does not respond to the trustee within 30 days after receiving such notification, the expenditure is deemed authorized and the trustee may make the requested reimbursements; (b) A surety bond guaranteeing payment into a standby closure or post-closure trust fund issued by a surety company listed as acceptable in Circular 570 of the U.S.	This information is not in the *Reclamation Plan*; however, it shouldn't be. The FA provided by Calico for this project will meet these requirements and the requirements of the BLM. The specific FA method has yet to be determined.

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	Department of the Treasury. The standby closure or post-closure trust fund must be established by the permittee. The purpose of the standby trust fund is to receive any funds that may be paid by the permittee or surety company. The penal sum of the bond must be in an amount at least equal to the current closure or post-closure care cost estimate, as applicable. The bond must guarantee that the permittee will either fund the standby trust fund in an amount equal to the penal sum of the bond before the site stops receiving waste or within 15 days after an order to begin closure is issued by the Department or by a court of competent jurisdiction; or that the permittee will provide alternate financial assurance acceptable to the Department within 90 days after receipt of a notice of cancellation of the bond from the surety. The surety shall become liable on the bond obligation if the permittee fails to perform as guaranteed by the bond. The surety may not cancel the bond until at least 120 days after the notice of cancellation has been received by both the permittee and the Department. If the permittee has not provided alternate financial assurance acceptable to the Department within 90 days of the cancellation notice, the surety must pay the amount of the bond into the standby trust account; (c) A surety bond guaranteeing performance of closure, post-closure or corrective action activities issued by a surety company listed as acceptable in Circular 570 of the U.S. Department of the Treasury. A standby trust fund must also be established by the permittee. The purpose of the standby trust fund is to receive any funds that may be paid by the surety company. The bond must guarantee that the permittee will either perform final closure, post-closure maintenance or corrective action activities, as applicable, or provide alternate financial assurance acceptable to the Department within 90 days after receipt of a notice of cancellation of the bond from the surety. The surety shall become liable on the bond obligation if the permittee fails to perform as guaranteed by the bond. The surety may not cancel the bond until at least 120 days after the notice of cancellation has been received by both the permittee and the Department. If the permittee has not provided alternate financial assurance acceptable to the Department within 90 days of the cancellation notice, the surety must pay the amount of the bond into the standby trust account; (d) An irrevocable letter of credit issued by an entity which has the authority to issue letters of credit and whose letter-of-credit operations are regulated and examined by a federal or state agency. A standby trust fund must also be established by the permittee. The purpose of the standby trust fund is to receive any funds deposited by the issuing institution resulting from a draw on the letter of credit. The letter of credit must be irrevocable and issued for a period of at least one year and shall be automatically extended for at least one year on each successive expiration date unless the issuing institution notifies both the permittee and the Department at least 120 days before the current expiration date. If the permittee fails to perform closure	

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	and post-closure activities according to the closure plan and permit requirements, or to perform the selected remedy described in the corrective action report, or if the permittee fails to provide alternate financial assurance acceptable to the Department within 90 days after notification that the letter of credit will not be extended, the Department may draw on the letter of credit; (e) A closure or post-closure insurance policy issued by an insurer who is licensed to transact the business of insurance or is eligible as an excess or surplus lines insurer in one or more states. The insurance policy must guarantee that funds will be available to complete final closure and post-closure maintenance of the site. The policy must also guarantee that the insurer will be responsible for paying out funds for reimbursement of closure and post-closure expenditures that are in accordance with the closure or post-closure plan or otherwise justified. The permittee shall notify the Department, in writing, before any expenditure of insurance policy moneys is made, describing and justifying the activities for which the expenditure is to be made. If the Department does not respond to the insurer within 30 days after receiving such notification, the expenditure is deemed authorized and the insurer may make the requested reimbursements. The policy must provide that the insurance is automatically renewable and that the insurer may not cancel, terminate or fail to renew the policy except for failure to pay the premium. If there is a failure to pay the premium, the insurer may not terminate the policy until at least 120 days after the notice of cancellation has been received by both the permittee and the Department. Termination of the policy may not occur and the policy must remain in full force and effect if: the Department determines that the land disposal site has been abandoned; or the Department has commenced a proceeding to modify the permit to require immediate closure; or closure has been ordered by the Department, Commission or a court of competent jurisdiction; or the permittee is named as debtor in a voluntary or involuntary proceeding under Title 11 (Bankruptcy), U.S. Code; or the premium due is paid. The permittee is required to maintain the policy in full force and effect until the Department consents to termination of the policy when alternative financial assurance is provided or when the permit is terminated; (f) Corporate guarantee. A private corporation meeting the financial test may provide a corporate guarantee that funds are available for closure, post-closure or corrective action activities, and that those activities will be completed according to the closure or post-closure plan, permit requirements or selected remedy described in the corrective action report, as applicable. A qualifying private corporation may guarantee its own obligations, the obligations of a corporate parent, sibling or subsidiary, and the obligations of a firm with which it has a substantial business relationship. A corporation guaranteeing the obligations of a firm with which it has a substantial business relationship must certify that it possesses such relationship and	

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	that it is issuing the guarantee as an act incident to that relationship, and must specify any compensation received for its issuance of such guarantee. To qualify, a private corporation must meet the criteria of either paragraph (A) or (B) of this subsection: (A) Financial Test. To pass the financial test, the permittee must have: (i) Two of the following three ratios: A ratio of total liabilities to tangible net worth less than 1.5; a ratio of the [(sum of net income plus depreciation, depletion, and amortization) minus $10 million] to total liabilities greater than 0.1; or a ratio of current assets to current liabilities greater than 1.5; (ii) Net working capital equal to at least four times and tangible net worth equal to at least six times the sum of the current cost estimates covered by the test; (iii) Tangible net worth of at least $10 million exclusive of the costs being guaranteed; and (iv) Assets in the United States amounting to at least the sum of the current closure, post-closure and corrective action cost estimates covered by the test, plus any other environmental obligations guaranteed by permittee. (B) Alternative Financial Test. To pass the alternative financial test, the permittee must have: (i) Tangible net worth of at least $10 million exclusive of the costs being guaranteed; and (ii) Two of the following three ratios: (I) Times Interest Earned ([earnings before interest and taxes] divided by interest) of 2.0 or higher; (II) Beaver's Ratio of 0.2 or higher ([internally generated cash] divided by [total liabilities]). Internally generated cash is obtained from taxable income before net operating loss, plus credits for fuel tax and investment in regulated investment companies, plus depreciation plus amortization plus depletion, plus any income on the books not required to be reported for tax purposes if it is likely to be recurring, minus income tax expenses. Total liabilities includes all long- and short-term debt; or (III) Altman's Z-Score of 2.9 or higher. (C) The permittee shall demonstrate that it passes the financial test at the time the financial assurance plan is filed and reconfirm that annually 90 days after the end of the corporation's fiscal year by submitting the following items to the Department:	

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	(i) A letter signed by the permittee's chief financial officer that provides the information necessary to document that the permittee passes the financial test; that guarantees that the funds are available to finance closure, post-closure or corrective action activities according to the closure or post-closure plan, permit requirements or selected remedy described in the corrective action report, as applicable; that guarantees that the closure, post-closure or corrective action activities will be completed according to the closure or post-closure plan, permit requirements or selected remedy described in the corrective action report, as applicable; that guarantees that a substitute financial mechanism acceptable to the Department will be fully funded within 30 days after either service of a Final Order assessing a civil penalty from the Department for failure to adequately perform closure or post-closure activities according to the closure or post-closure plan and permit, or the selected remedy described in the corrective action report, as applicable, or service of a written notice from the Department that the permittee no longer meets the criteria of the financial test; that guarantees that the permittee's chief financial officer will notify the Department within 15 days any time that the permittee no longer meets the criteria of the financial test or is named as debtor is a voluntary or involuntary proceeding under Title 11 (Bankruptcy), U.S. Code; and that acknowledges that the corporate guarantee is a binding obligation on the corporation and that the chief financial officer has the authority to bind the corporation to the guarantee; (ii) A copy of the independent certified public accountant's (CPA) report on examination of the permittee's financial statements for the latest completed fiscal year; (iii) An agreed-upon procedures letter prepared in accordance with standards established by the American Institute of Certified Public Accountants from the permittee's independent CPA in which the CPA either specifies that the figures used in determining that the corporation meets the requirements of the corporate financial test are the same as the figures in the corporation's independently audited year-end financial statements for the latest fiscal year or explains any deviation therein to the satisfaction of the Department; (iv) A list of any facilities in Oregon or elsewhere for which the permittee is using a similar financial means test to demonstrate financial assurance. (D) The Department may, based on a reasonable belief that the permittee no longer meets the criteria of the financial test, require reports of the financial condition at any time from the permittee in addition to the annual report. If the Department	

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	finds, on the basis of such reports or other information, that the permittee no longer meets the criteria of the financial test, the permittee shall fully fund a substitute financial assurance mechanism acceptable to the Department within 30 days after notification by the Department. (g) Alternative Financial Assurance. Alternative forms of financial assurance may be proposed by the permittee, subject to the review and approval of the Director. The applicant must be able to prove to the satisfaction of the Department that the level of security is equivalent to subsections (a) through (f) of this section and that the criteria of OAR 340-095-0090(4)(e) and sections (1) through (4) of this rule are met. Submittal of an alternative financial assurance mechanism to the Department for review and approval shall include third-party certification as specified in OAR 340-095-0090(7). (7) Allowable Financial Assurance Mechanisms for Corrective Action. A permittee shall provide one of the following forms of financial assurance for corrective action: a trust fund, a surety bond guaranteeing performance of corrective action, an irrevocable letter of credit, a corporate guarantee, or alternative forms of financial assurance, pursuant to subsections (6)(a), (c), (d), (f) or (g) of this rule, respectively. Unless specifically required by a mutual agreement and order pursuant to ORS 465.325, the surcharge provisions of ORS 459.311 shall not be used to meet the financial assurance requirements of this rule for financial assurance for corrective action.	
340-097-0110, Solid Waste Permit and Disposal Fees	(1) Each person required to have a solid waste disposal permit is subject to the following fees: (a) An application processing fee for new facilities which must be submitted with the application for a new permit as specified in OAR 340-097-0120(2); and (b) A solid waste permit compliance fee as listed in OAR 340-097-0120(6). (2) Each disposal site receiving domestic solid waste for final disposal or destruction must pay the per-ton solid waste disposal fees on solid waste as specified in OAR 340-097-0120(7). Beginning April 1, 2019, and first payable beginning July 1, 2019, land disposal sites receiving construction and demolition wastes, land clearing debris, or tires for final disposal or destruction must also pay this fee. (3) Oregon solid waste disposed of out-of-state. A person who transports solid waste, generated in Oregon, for final disposal or destruction at a disposal site located outside of Oregon that receives domestic solid waste, or beginning April 1, 2019, a land disposal site that receives construction and demolition waste, land clearing	Solid Waste Disposal permit is not required for the TSF and TWRSF. Therefore, these fees do not apply to the Project.

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	debris, or waste tires for final disposal or destruction, must pay the per-ton solid waste disposal fees as specified in OAR 340-097-0120(7). (a) For purposes of this rule and OAR 340-097-0120(7), a person is the transporter if the person transports or arranges for the transport of solid waste out of Oregon for final disposal or destruction at a disposal site that receives domestic solid waste, or beginning April 1, 2019, a land disposal site that receives construction and demolition waste, land clearing debris, or waste tires for final disposal or destruction, and is: (A) A solid waste collection service or any other person who hauls, under an agreement, solid waste out of Oregon; (B) A person who hauls his or her own industrial, commercial or institutional waste or other waste such as cleanup materials contaminated with hazardous substances; (C) An operator of a transfer station, when Oregon waste is delivered to a transfer station located in Oregon and from there is transported out of Oregon for final disposal or destruction; (D) A person who authorizes or retains the services of another person for disposal of cleanup materials contaminated with hazardous substances; or (E) A person who transports infectious waste. (b) Notification requirement: (A) Before transporting or arranging for transport of solid waste for final disposal or destruction out of Oregon to a disposal site that receives domestic solid waste, or beginning April 1, 2019, to a land disposal site that receives construction and demolition wastes, land clearing debris, or waste tires, the person identified in subsection (3)(a) must notify DEQ in writing on a form DEQ provides. (B) The notification must state whether the person will transport the waste on an on-going basis. (c) As used in this section, "person" does not include an individual transporting only the individual's own residential solid waste to a disposal site located out of the state. (4) Fees. The solid waste permit compliance fee must be paid for each year a disposal site requiring a solid waste permit is in operation or under permit. The fee period is prospective and is as follows: (a) New sites requiring a solid waste permit:	

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	(A) Any new disposal site must pay a solid waste permit compliance fee 30 days after the end of the calendar quarter in which solid waste is received at the facility, except as specified in paragraph (4)(a)(B), (C) and (D); (B) A new disposal site that receives less than 1,000 tons of solid waste per year, other than a transfer station, material recovery facility or composting facility, must pay the entire permit compliance fee for the first year's operation if the facility is placed into operation on or before September 1. A new facility placed into operation after September 1 will not owe a permit compliance fee until the following January 31. An application for a new disposal site receiving less than 1,000 tons of solid waste a year must include the applicable permit compliance fee for the first year of operation; (C) A new industrial solid waste disposal site, sludge or land application disposal site or solid waste treatment facility receiving more than 1,000 but less than 20,000 tons of solid waste a year must pay a solid waste permit compliance fee on January 31 following the calendar year in which the facility is placed into operation; (D) A new transfer station, material recovery facility or composting facility must pay the entire permit compliance fee for the first fiscal year's operation, based on the state's fiscal year, if the facility is placed into operation on or before April 1. Any new facility placed into operation after April 1 will not owe a permit compliance fee until DEQ's annual billing for the next fiscal year. An application for a new transfer station, material recovery facility or composting facility must include the applicable permit compliance fee for the first year of operation. (b) Existing permitted sites. Any existing disposal site that is in operation and is permitted to receive or receives solid waste in a calendar year must pay the solid waste permit compliance fee for that year as specified in OAR 340-097-0120(6)(a), (b), and (c). A facility is deemed to be an "existing permitted site" from the time of permit issuance; (c) Closed sites. If a land disposal site stops receiving waste before April 1 of the fiscal year in which the site permanently ceases active operations, based on the state's fiscal year, the permittee must pay the solid waste permit compliance fee for the "year of closure" OAR 340-097-0120(6)(d)(A) specifies as well as the permit compliance fee the permittee pays quarterly based on the waste received in the previous calendar quarters. If a land disposal site has permanently ceased receiving waste and the site is closed, a solid waste permittee must pay the solid waste permit compliance fee for closed sites as specified in OAR 340-097-0120(6)(d);	

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	(d) DEQ may alter the due date for the solid waste permit compliance fee upon receipt of a justifiable request from a permittee. (5) Tonnage reporting. The permit compliance fee and per-ton solid waste disposal fees, if applicable, must be submitted together with a form DEQ approves. Information reported must include the amount and type of solid waste and any other information DEQ requires to substantiate the tonnage or to calculate the state material recovery rate. (6) Calculation of tonnage. Permittees and registrants are responsible for accurately calculating solid waste tonnage. For purposes of determining appropriate fees under OAR 340-097-0120(6) and (7), annual tonnage of solid waste received must be calculated as follows: (a) Municipal solid waste facilities. Annual tonnage of solid waste received at municipal solid waste facilities, including construction and demolition sites and municipal solid waste composting facilities, receiving 50,000 or more tons annually must be based on weight from certified scales. When certified scales are required, all solid waste received at the facility for disposal must be weighed at the facility's scales, except as DEQ otherwise approves in writing. If certified scales are required but are temporarily not functioning, all solid waste received at the facility must either use other certified scales in the area or estimate tonnage as specified in this section. If certified scales are not required, estimated annual tonnage for municipal solid waste, including that at municipal solid waste composting facilities, will be based upon 300 pounds per cubic yard of uncompacted waste received, and 700 pounds per cubic yard of compacted waste received. If yardage is not known, the solid waste facility may use one ton per resident in the service area of the disposal site, unless the permittee demonstrates a more accurate estimate. For other types of wastes received at municipal solid waste sites and where certified scales are not required or not available, the conversions and provisions in subsection (b) must be used; (b) Industrial facilities. Annual tonnage of solid waste received at industrial facilities receiving 50,000 or more tons annually must be based on weight from certified scales. When certified scales are required, all solid waste received at the facility must be weighed at the facility's scales, except as DEQ otherwise approves in writing. If certified scales are required but are temporarily not functioning, all solid waste received at the facility must either use other certified scales in the area or estimate tonnage as specified in this section. If certified scales are not required, industrial sites must use the following conversion factors to determine tonnage of solid waste	

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	disposed. Composting facilities must use the following conversion factors for those materials appropriate for composting: (A) Asbestos: 500 pounds per cubic yard; (B) Pulp and paper waste other than sludge: 1,000 pounds per cubic yard; (C) Construction, demolition and land clearing wastes: 1,100 pounds per cubic yard; (D) Wood waste: (i) Wood waste, mixed, including log sort waste (as defined in OAR 340-093-0030): 1,200 pounds per cubic yard; (ii) Wood waste including scrap lumber, pallets, wood from construction and demolition activities: 250 pounds per cubic yard; (iii) Wood chips, green: 473 pounds per cubic yard; (iv) Wood chips, dry: 243 pounds per cubic yard; (v) Sawdust, wet: 530 pounds per cubic yard; (vi) Sawdust, bone dry: 275 pounds per cubic yard. (E) Yard debris: (i) Grass clippings: 950 pounds per cubic yard; (ii) Leaves: 375 pounds per cubic yard; (iii) Compacted yard debris: 640 pounds per cubic yard; and (iv) Uncompacted yard debris: 250 pounds per cubic yard. (F) Manure, sludge, septage, grits, screenings and other wet wastes: 1,600 pounds per cubic yard; (G) Food waste: 700 pounds per cubic yard; (H) Ash and slag: 2,000 pounds per cubic yard; (I) Contaminated soils: 2,400 pounds per cubic yard; (J) Asphalt, mining and milling wastes, foundry sand, silica: 2,500 pounds per cubic yard; (K) For wastes other than the above, the permittee or registrant must determine the density of the wastes subject to DEQ's written approval;	

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	(L) As an alternative to the above conversion factors, the permittee or registrant may determine the density of their own waste, subject to DEQ's written approval. (7) DEQ may refund the application processing fee, in whole or in part, after taking into consideration any costs DEQ may have incurred in processing the application, when submitted with an application if either of the following conditions exists: (a) DEQ determines that no permit is required; (b) The applicant withdraws the application before DEQ has granted or denied preliminary approval or, if no preliminary approval has been granted or denied, DEQ has approved or denied the application. (8) Exemptions: (a) Persons treating petroleum contaminated soils are exempt from the application processing and renewal fees for a Letter Authorization if the following conditions are met: (A) The soil is being treated as part of a site cleanup authorized under ORS Chapters 465 or 466; and (B) DEQ and the applicant for the Letter Authorization have entered into a written agreement under which the applicant must pay for costs DEQ incurred for oversight of the cleanup and for processing of the Letter Authorization. (b) Persons to whom a Letter Authorization has been issued are not subject to the solid waste permit compliance fee. (9) All fees must be made payable to the Department of Environmental Quality. (10) Submittal schedule: (a) DEQ bills the solid waste permit compliance fee to the holder of the following permits: transfer station, material recovery facility, composting facility and closed solid waste disposal site. The fee period is the state's fiscal year, July 1 through June 30, and the fee is due annually by the date indicated on the invoice. Any "year of closure" pro-rated fee will be billed to the permittee of a closed site together with the site's first regular billing as a closed site; (b) For solid waste disposal site permit holders other than those in subsection (10)(a), DEQ does not bill the solid waste permit compliance fee to the permittee. The permittee must self-report these fees to DEQ, under sections (4) and (5). The fee period is either the calendar quarter or the calendar year, and the fees are due to DEQ as follows:	

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	(A) For any disposal site required to pay the per-ton fee on any solid waste as specified in OAR 340-097-0120(7) (e.g., landfills, municipal waste incinerators, municipal energy recovery facilities, conversion technology facilities, and solid waste treatment facilities that receive domestic solid waste for final disposal or destruction), plus construction and demolition and tire landfills: on the same schedule as specified in subsection (10)(c); (B) For industrial solid waste disposal sites, sludge or land application disposal sites and other disposal sites not required to pay the per-ton fee on solid waste as specified in OAR 340-097-0120(7), except construction and demolition and tire landfills: (i) For sites receiving over 20,000 tons of waste a year: quarterly, on the 30th day of the month following the end of the calendar quarter; or (ii) For sites receiving 20,000 tons of waste a year or less: annually, on the 31st day of January; (iii) For a site that has received less than 20,000 tons of waste in past years but exceeds that amount in a given year, DEQ will in general grant a one-year delay before the site is required to begin submitting permit fees on a quarterly basis. If the site appears likely to continue to exceed the 20,000 annual ton limit, then DEQ will require the site to report tonnage and submit applicable permit fees on a quarterly basis. (c) DEQ does not bill the per-ton solid waste disposal fees on solid waste and the Orphan Site Account fee. They must be paid on the following schedule: (A) Quarterly, on the 30th day of the month following the end of the calendar quarter; or (B) Annually, on the 31st day of January, for solid waste disposal site permit holders for sites receiving less than 1,000 tons of solid waste a year. (d) The fees on Oregon solid waste disposed of out-of-state must be paid to DEQ quarterly on the 30th day of the month following the end of the calendar quarter or on the schedule specified in OAR 340-097-0120(7)(d)(C). The fees must be submitted together with a form DEQ approves, which must include the amount of solid waste, type, county of origin of the solid waste, and state to which the solid waste is being transported for final disposal.	
340-097-0120, Permit/Registration Categories and Fee Schedule	(1) For purposes of OAR chapter 340, division 97:	This is not applicable because the facility is not a landfill and therefore no fees apply.

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	(a) A "new facility" means a facility at a location not previously used or permitted, and does not include an expansion to an existing permitted site; (b) An "off-site industrial facility" means all industrial solid waste disposal sites other than a "captive industrial facility;" (c) A "captive industrial facility" means an industrial solid waste disposal site where the permittee is the owner and operator of the site and is the generator of all the solid waste received at the site. (d) As used in this rule, the term "mixed solid waste" means solid wastes that include paper, plastic, and other materials at least partly made up of domestic waste, where the materials have not been separated from each other. (2) **Application Processing Fee**. Except as provided in sections (3), (4), and (5) with respect to composting facilities, an application processing fee must be submitted with each application for a new facility, including application for preliminary approval pursuant to OAR 340-093-0090. The amount of the fee depends on the type of facility and the required action as follows: (a) A new municipal solid waste landfill facility, construction and demolition landfill, incinerator, energy recovery facility, solid waste treatment facility, off-site industrial facility or sludge disposal facility: (A) Designed to receive over 7,500 tons of solid waste per year: $10,000; (B) Designed to receive 7,500 tons and less of solid waste per year: $5,000. (b) A new captive industrial facility, other than a transfer station or material recovery facility: $1,000; (c) A new transfer station or material recovery facility: (A) Receiving over 50,000 tons of solid waste per year: $500; (B) Receiving over 10,000 and less than or equal to 50,000 tons of solid waste per year: $200; (C) Receiving 10,000 tons and less of solid waste per year: $100. (d) Letter Authorization under OAR 340-093-0060: (A) New site: $500; (B) Renewal: $500. (e) Permit Exemption Determination under OAR 340-093-0080(2): $500.	

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	(f) Beneficial use of solid waste application and reporting fees under OAR 340-093-0260 through 340-093-0290: (A) The review of an annual or other report required under a beneficial use determination: $250; (B) A Tier One beneficial use determination: $1,000; (C) A Tier Two beneficial use determination: $2,000; (D) A Tier Three beneficial use determination: $5,000; (E) Annual extension to a demonstration project authorization: $1,000. (g) A new conversion technology facility: (A) Designed to receive over 7,500 tons of feedstocks per year: $2,000; (B) Designed to receive 7,500 tons or less of feedstocks per year: $1,500. (3) **Composting Facility Screening Fee**. Every composting facility that is required to comply with OAR 340-096-0080 must pay a screening fee of $150. The fee must be submitted with the application for screening, as provided in AR 340-096-0080(1). (4) **Facility Plan Review and Approval Fee**. (a) Every composting facility that is required to comply with OAR 340-096-0090 must pay an Operations Plan Approval fee as provided below. The fee must be submitted with the proposed Operations Plan, as provided in OAR 340-096-0090(1). Agricultural composting facilities for which the Oregon Department of Agriculture is providing facility plan review and approval are not required to pay this fee. (A) For facilities composting over 100 tons and less than or equal to 3,500 tons of feedstocks per year: $500; (B) For facilities composting over 3,500 tons and less than or equal to 7,500 tons of feedstocks per year: $750; (C) For facilities composting over 7,500 tons and less than or equal to 10,000 tons of feedstocks per year: $1000; (D) For facilities composting over 10,000 tons and less than or equal to 50,000 tons of feedstocks per year: $2,000; (E) For facilities composting over 50,000 tons of feedstocks per year: $5,000.	

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	(b) Every conversion technology facility that is required to comply with OAR 340-096-0180 must pay a fee as provided below. The fee must be submitted with the proposed Operations Plan, as provided in OAR 340-096-0180. (A) For facilities designed to receive 3,500 tons of feedstocks or less per year: $1,000; (B) For facilities designed to receive over 3,500 tons but no more than 7,500 tons of feedstocks per year: $1,500; (C) For facilities designed to receive over 7,500 tons but no more than 20,000 tons of feedstocks per year: $2,200; (D) For facilities designed to receive over 20,000 tons but no more than 50,000 tons of feedstocks per year: $3,000; (E) For facilities designed to receive over 50,000 tons of feedstocks per year: $5,000. (5) **Composting Facility Engineering Review Fee**. Every composting facility that requires DEQ review of engineering plans and specifications under OAR 340-096-0130 must pay a fee of $500. This fee is in addition to the fee required by section (4). Agricultural composting facilities for which the Oregon Department of Agriculture provides review of engineering plans and specifications are not required to pay this fee. (6) **Solid Waste Permit Compliance Fee**. The following is the fee schedule including base per-ton rates to be used to determine the solid waste permit compliance fee. The per-ton rates are based on the estimated solid waste to be received at all permitted solid waste disposal sites and on DEQ's Legislatively Approved Budget. DEQ reviews annually the amount of revenue generated by this fee schedule. To determine the solid waste permit compliance fee, DEQ may use the base per-ton rates or any lower rates if the rates generate more revenue than provided in DEQ's Legislatively Approved Budget. Any increase in the base rates must be established by rule. **In any case where a facility fits into more than one category, the permittee must pay only the highest fee**: (a) All facilities accepting or permitted to accept solid waste for final disposal or destruction, excluding transfer stations, material recovery facilities and composting facilities: (A) The greater of $200; or (B) A solid waste permit compliance fee based on the total amount of solid waste received at the facility in the previous calendar quarter or year, as applicable, at the following rate:	

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	(i) All municipal landfills, construction and demolition landfills, industrial landfills, sludge disposal facilities, incinerators and solid waste treatment facilities: $.21 per ton through June 30, 2016, and **$.58 per ton beginning July 1, 2016**; (ii) Energy recovery facilities. $.13 per ton through June 30, 2016, and $.58 per ton beginning July 1, 2016; and (iii) Conversion technology facilities: $.10 per ton through June 30, 2016, and $.58 per ton beginning July 1, 2016. (C) **If DEQ does not require a disposal site, other than a municipal solid waste facility, to monitor and report volumes of solid waste collected, the solid waste permit compliance fee may be based on the estimated tonnage received in the previous quarter or year**. (D) Ash or residue received by a landfill from an energy recovery facility, incinerator, or conversion technology facility is not subject to the solid waste permit compliance fee paid on a per-ton basis under paragraph (B) if the energy recovery facility, incinerator, or conversion technology facility has paid this fee on all incoming waste. Alternatively, DEQ can make arrangements to split this fee between a landfill and an energy recovery facility, incinerator, or conversion technology facility, based on the proportion by weight of the ash and residue received by the landfill and the total weight of incoming waste received by the energy recovery facility, incinerator, or conversion technology facility. (b) Transfer stations and material recovery facilities: (A) Facilities accepting over 50,000 tons of solid waste per year: $1,000; (B) Facilities accepting over 10,000 and less than or equal to 50,000 tons of solid waste per year: $500; (C) Facilities accepting 10,000 tons or less of solid waste per year: $50. (c) Composting facilities with a composting permit, except agricultural composting facilities for which the Oregon Department of Agriculture is providing facility oversight: (A) Utilizing over 50,000 tons of feedstocks for composting per year: $5,000; (B) Utilizing over 7,500 and less than or equal to 50,000 tons of feedstocks for composting per year: $1,000; (C) Utilizing over 3,500 and less than or equal to 7,500 tons of feedstocks for composting per year: $500;	

Regulatory Citation	Description	Location in the Consolidated Permit Application (CPA)
	(D) Utilizing over 100 tons and less than or equal to 3,500 tons of feedstocks for composting per year: $100. (d) Closed Disposal Sites: (A) Year of closure. If a land disposal site stops receiving waste before April 1 of the fiscal year in which the site permanently ceases active operations, DEQ will determine a pro-rated permit compliance fee for those quarters of the fiscal year not covered by the permit compliance fee paid on solid waste received at the site. The pro-rated fee for the quarters the site was closed is based on the calculation in paragraph (B); (B) Each land disposal site that closes after July 1, 1984: $150 or the average tonnage of solid waste received in the three most active years of site operation multiplied by $.025 per ton, whichever is greater; but the maximum permit compliance fee is $2,500. (7) Per-ton solid waste disposal fees on solid waste. Each solid waste disposal site that receives domestic solid waste for final disposal or destruction, and each person transporting solid waste out of Oregon for disposal at a disposal site that receives domestic solid waste, except as excluded under OAR 340-097-0110(3)(c), must submit fees to DEQ for solid waste received at the disposal site or transported out of Oregon. Beginning April 1, 2019, each solid waste land disposal site that receives construction or demolition waste, land clearing debris, or tires for final disposal or destruction, and each person transporting solid waste out of Oregon for disposal at a land disposal site that receives construction or demolition waste, land clearing debris, or tires for final disposal or destruction, except as excluded under OAR 340-097-0110(3)(c), must also submit fees to DEQ for solid waste received at the disposal site or transported out of Oregon. (a) These fees include: (A) A fee of $.81 per ton through March 31, 2016, raised to $1.11 per ton beginning April 1, 2016, through March 31, 2019, and raised to $1.18 per ton beginning April 1, 2019; (B) An additional per-ton fee of $.13 for the Orphan Site Account. (b) Tons subject to these fees include: (A) All solid wastes landfilled, incinerated without energy recovery or treated for disposal by an Oregon disposal site that receives domestic solid waste, except as excluded in subsections (c) and (f);	

Regulatory Citation	Description	Location in the Consolidated Permit Application (CPA)
	(B) All Oregon solid wastes that are transported out-of-state for disposal or destruction at a disposal site that receives domestic solid waste, except as excluded under OAR 340-097-0110(3)(c) and subsections (c) and (f); (C) Mixed solid wastes that are processed by a conversion technology facility, burned for energy recovery, or composted by an Oregon disposal site that receives domestic waste; (D) Mixed solid waste that includes at least some domestic solid waste, that has been processed into refuse-derived fuel to be burned for energy recovery by a facility that does not have a solid waste permit, or that does not pay per-ton fees as specified in this section; (E) Beginning April 1, 2019, all solid wastes landfilled at an Oregon land disposal site that receives construction or demolition waste, land clearing debris, or tires for final disposal or destruction, except as excluded in subsections (c) and (f); and (F) Beginning April 1, 2019, all Oregon solid wastes that are transported out-of-state for disposal at a land disposal site that receives construction or demolition waste, land clearing debris, or tires for final disposal or destruction, except as excluded in subsections (c) and (f). (c) **Tons <u>not</u> subject to these fees include:** (A) Through March 31, 2019, all solid wastes received at a facility that does not receive domestic solid waste; (B) **Beginning April 1, 2019, all solid wastes received at a facility that does not receive domestic solid waste or construction or demolition waste, land clearing debris, or tires**; (C) Source-separated recyclables or other materials separated and recycled from mixed solid waste, including separated organics that are composted; (D) Construction and demolition wastes and industrial wastes that are processed by a material recovery facility or a conversion technology facility to make a fuel to be burned off-site for energy recovery (e.g., in a wood fuel boiler); (E) All solid wastes sent by a disposal site to another disposal site, where the per-ton fees are paid by a disposal site that subsequently receives that waste; (F) Solid waste used as daily cover at a landfill as described in subsection (f); (G) Ash from an energy recovery facility or incinerator that has paid these fees; and	

Regulatory Citation	Description	Location in the Consolidated Permit Application (CPA)
	(H) Sewage sludge or septic tank and cesspool pumpings. (d) **Submittal schedule:** (A) **These per-ton fees must be submitted to DEQ quarterly**. Quarterly remittals are due on the 30th day of the month following the end of the calendar quarter; (B) Disposal sites receiving less than 1,000 tons of solid waste per year must submit the fees annually on January 31. If DEQ does not require the disposal site to monitor and report volumes of solid waste collected, the disposal site must submit with the fees an estimate of the population the disposal site serves; (C) For solid waste transported out-of-state for disposal, the per-ton fees must be paid to DEQ quarterly. Quarterly remittals are due on the 30th day of the month following the end of the calendar quarter in which the disposal occurred. If the transportation is not on-going, the fee must be paid to DEQ within 60 days after the disposal occurs. (e) Solid waste that is used as daily cover at a landfill in place of virgin soil is not subject to the per-ton solid waste fees in this section, provided that: (A) The amount of solid waste used as daily cover does not exceed the amount needed to provide the equivalent of six inches of soil used as daily cover; (B) If disposed of in Oregon, the solid waste is not being used on a trial basis, but instead has received necessary approvals from DEQ for use as daily cover; and (C) If disposed of in a landfill outside of Oregon, the solid waste has received final approval from the appropriate state or local regulatory agency that regulates the landfill. (f) For solid waste delivered to disposal facilities owned or operated by a Metropolitan Service District, the fees established in this section are levied on the district, not on the disposal site. (8) 1991 Recycling Act Permit Fee	

Regulatory Citation	Description	Location in the Consolidated Permit Application (CPA)
	(a) Through June 30, 2016, a 1991 Recycling Act permit fee of $.09 per ton must be submitted by each solid waste permittee which received solid waste in the previous calendar quarter or year, as applicable, except transfer stations, material recovery facilities, composting facilities, conversion technology facilities that process only separated solid wastes, industrial facilities that do not receive wastes from off-site, and persons with letter authorizations. The fee must be paid along with the solid waste permit compliance fee as specified in OAR 340-097-0110. Disposal sites that receive less than 1,000 tons per year of solid waste for final disposal are exempt from paying the 1991 Recycling Act permit fee for 2016. (b) Effective July 1, 2016, the 1991 Recycling Act permit fee is eliminated.	

1.6 FREQUENTLY USED ACRONYMS, ABBREVIATIONS, DEFINITIONS, AND UNITS OF MEASURE

<	less than
>	greater than
±	plus or minus
≤	less than or equal to
≥	greater than or equal to
°C	degrees Celsius
°F	degrees Fahrenheit
µg/m^3	micrograms per cubic meter
µm	micrometers
µmhos/cm	micromhos per centimeter
µS/cm	microSiemens per centimeter
AADT	average annual daily traffic
ABA	acid-base accounting
ACEC	Area of Critical Environmental Concern
ACDP	Air Contaminant Discharge Permit
ADR	absorption, desorption, and refining
Ag	silver
AGP	acid-generating potential
amsl	above mean sea level
ANFO	ammonium nitrate/fuel oil
ATV	all-terrain vehicle
Au	gold
Ausenco	Ausenco Engineering Canada Inc.
bcy	bank cubic yards
bgs	below ground surface
Bison	Bison Engineering, Inc.
BLM	United States Bureau of Land Management
BMP	best management practices
BP	barometric pressure
BV	bed volume
$CaCO_3$	calcium carbonate
Ca-HCO_3	calcium bicarbonate
$Ca(OH)_2$	calcium hydroxide
Calico	Calico Resources USA Corp.
CaO	calcium oxide

CAO	Cleaner Air Oregon
CES	Cascade Earth Sciences
CCC	Criterion Continuous Concentration
CES	Cascade Earth Sciences
cfm	cubic feet per minute
CFR	Code of Federal Regulations
cfs	cubic feet per second
CIL	carbon-in-leach
Clemow	Clemow Associates LLC
cm/sec	centimeters per second
CN_{WAD}	weak-acid dissociable cyanide
cm/sec	centimeters per second
CMC	Criterion Maximum Concentration
CO	carbon monoxide
COOP	Cooperative Observer Network
County	Malheur County
CPA	Consolidated Permit Application
CPE	corrugated polyethylene
CPT	cone penetration test
CRF	cemented rock fill
Cryla	Cryla, LLC
Cryla Agreement	Exploration and Option to Purchase Agreement Cryla Project
Cu	copper
$CuSO_2.5H_2O$	copper sulfate (pentahydrate)
d x EGL	diameter by effective grinding length
dB	decibel
dBA	A-weighted decibel
De	equivalent dimension
DO	dissolved oxygen
DOGAMI	Oregon Department of Geology and Minerals Industries
dS/m	deciSiemens per meter
DSHA	deterministic seismic hazard analysis
DSL	Department of State Lands
EC	electrical conductivity
EFU	Exclusive Farm Use
EGL	effective grinding length
EM Strategies	EM Strategies, Inc.
EOU	Eastern Oregon University

EPA	United States Environmental Protection Agency
ERA	Ecological Risk Assessment
ERU	Exclusive Range Use
ESD	Education Service District
ESR	excavation support ratio
FEMA	Federal Emergency Management Agency
FOS	factors of safety
ft	feet
ft/d	feet per day
ft/hr	feet per hour
ft^2	square feet
ft^3	cubic feet
g	gravity
GCL	geosynthetic clay liner
gpm	gallons per minute
Golder	Golder Associates, Inc.
GPS	Global Positioning System
H:V	horizontal to vertical
H_2SO_4	sulfuric acid
HCl	hydrochloric acid
HCT	humidity cell test
HDPE	high-density polyethylene liner
HDR	HDR Engineering, Inc.
HFI	hydrofluoric acid
Hg	mercury
HHC	Human health criteria
HLP	heap leach pad
hp	horsepower
HSEC	Health, Safety, and Environmental Compliance
Hz	hertz
ILR	intensive-leach reactor
IMS	IMS, Inc.
in.	inch
k	seismic coefficient
K-Factor	Soil Erodibility Factor
kg	kilogram
kg $CaCO_3$/t	kilograms calcium carbonate per ton
kg/t	kilogram per ton

km	kilometer
KOP	key observation point
kV	kilovolt
kW	kilowatt
kWh	kilowatt hour
L_1	noise levels exceeded for 1 percent of each hour
L_{10}	noise levels exceeded for 10 percent of each hour
L_{50}	noise levels exceeded for 50 percent of each hour
Lb	length of the bolts
lb	pound
LCRS	leak collection and recovery system
L_{dn}	day-night noise levels
L_{eq}	hourly average levels
LHD	Load-haul-dump vehicle
L_{max}	hourly maximum levels
L_{min}	hourly minimum levels
LOM	Life of Mine
Lorax	Lorax Environmental Services
LSAS	large soil absorption system
LUCS	Land Use Compatibility Statement
m	meters
M	magnitude
M&I	measured and indicated
MCC	Malheur County Code
MCE	Maximum Credible Earthquake
MCL	maximum contaminant level
MDA	Mine Development Associates
MDL	minimum detection limit
MEK	methyl ethyl ketone
mg/L	milligrams per liter
mm	millimeter
mph	miles per hour
MRA	Malheur Resource Area
MSHA	Mine Safety and Health Administration
Mst	million short tons (US)
MW	megawatt
MWMP	Meteoric Water Mobility Procedure
N/A	not applicable

$Na/K\text{-}HCO_3$	sodium-potassium bicarbonate
$Na/K\text{-}SO_4$	sodium-potassium sulfate
NaCN	sodium cyanide
NAG	net acid generation
NaOH	sodium hydroxide
$NaNO_3$	Niter
ng/L	nanograms per liter
NNP	net neutralization potential
NO_2	nitrogen dioxide
NP	neutralization potential
NPDES	National Pollutant Discharge Elimination System
NPI	net profits interest
NPR	neutralization potential ratio
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSHM	National Seismic Hazard Model
NWC	Northwest Wildlife Consultants, Inc.
NWI	National Wetland Inventory
O_3	ozone
OAR	Oregon Administrative Rule
OBE	operational basis earthquake
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
OED	Oregon Employment Department
ODT	Oregon Department of Transportation
OHA	Oregon Health Authority
ONA	Outstanding Natural Area
OPDR	Oregon Partnership for Disaster Resilience
ORS	Oregon Revised Statute
OSP	Oregon State Police
OWRD	Oregon Water Resources Department
oz	ounce
Paramount	Paramount Gold Nevada Corp.
$PbNO_3$	lead nitrate
Permit Area	Mine and Process Area and the Project Access Area
PFD	Process Flow Diagram
PGA	peak ground acceleration
$PM_{2.5}$	particulate matter less than 2.5 microns in aerodynamic diameter

PM_{10}	particulate matter less than 10 microns in aerodynamic diameter
ppb	parts per billion
ppm	parts per million
PRISM	PRISM Climate Group
Project	Grassy Mountain Mine Project
PSHA	probabilistic seismic hazard analysis
PUBH	palustrine, unconsolidated bottom, permanently flooded)
PUSCh	palustrine, unconsolidated shore, seasonally flooded, diked/impounded
PUSCx	palustrine, unconsolidated shore, excavated
PVC	polyvinyl chloride
Q	quarter
Q	rock mass quality
QA/QC	quality assurance and quality control
Qal	unconsolidated alluvial and colluvial deposits
RAWS	Remote Automated Weather Stations
RCE	Reclamation Cost Estimate
RCRA	Resource Conservation and Recovery Act
RF	rockfill
RMR	Rock Mass Rating
RNA	Research Natural Area
ROM	Run of Mine
ROS	Recreation Opportunity Spectrum
ROW	right of way
S.U.	significant unit
SC	specific conductance
Seabridge	Seabridge Gold Corporation
SEM	Scanning Electron Microscopy
SEORMP	Southeastern Oregon Resource Management Plan and Record of Decision
SHA	seismic hazard analysis
Sherry & Yates	Sherry & Yates Inc.
SHPO	State Historic Preservation Office
SiO_2	silica
SLM	sound level meter
SLR	SLR International Corporation
SMBS	sodium metabisulfite
SMCL	secondary maximum contaminant level
SO_2	sulfur dioxide
SPLP	Synthetic Precipitation Leaching Procedure

SRCE	Nevada Standardized Reclamation Cost Estimator
SRK	SRK Consulting
SSI	Supplemental Security Income
st	short ton, equivalent to 907.2 kg
st/hr	short tons per hour
stpd	short tons per day
TDS	total dissolved solids
Tgb	Grassy Mountain Basalt
Tgs	Grassy Mountain Formation – undifferentiated arkose, siltstone, conglomerate
Tgsn	Grassy Mountain Formation - Hot spring sinter deposits
TIC	total inorganic carbon
ton/hr	tons per hour
tonne	metric ton, equivalent to 1000 kg
TRT	Technical Review Team
TSF	Tailings Storage Facility
TWRSF	Temporary Waste Rock Storage Facility
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
V	volt
VHF	very high frequency
VRM	Visual Resources Management
VWP	vibrating wire piezometer
w/w	weight per weight
WB&M	Willamette Base & Meridian
WEG	Wind Erodibility Group
Wm^2	watts per square meter
WPCF-N	New Water Pollution Control Facilities Individual Permit
WPCF-OS	New Water Pollution Control Facilities Individual Onsite Permit
WRSF	Waste Rock Storage Facility
XRD	X-Ray Diffraction Analysis
yd^3	cubic yard

2. EXISTING ENVIRONMENT

The following are summaries of the baseline studies, which describe the existing environment. The baseline studies are incorporated in this application as Appendices B1 through B22. The full baseline studies in Appendices B1 through B22 should be referenced for the methodologies used, study areas, and data collected for each of the respective resources. Appendix B23 also includes the *Environmental Baseline Study Work Plans* (EM Strategies, 2017a).

2.1 AIR QUALITY RESOURCES – OAR 632-037-0055(1)(c)

The *Grassy Mountain Mine Project Air Quality Resources Baseline Report* (EM Strategies, 2018a) was submitted to the Oregon Department of Geology and Minerals Industries (DOGAMI) on January 18, 2018, and is provided in Appendix B1. The report was accepted by the Technical Review Team (TRT) on February 28, 2018, as conforming to the *Environmental Baseline Study Work Plans* (EM Strategies, 2017a; Appendix B23), which were accepted by the TRT on December 7, 2017. An air quality monitoring station was established by HDR Engineering, Inc. (HDR) in July 2014 west of the Mine and Process Area portion of the Permit Area to monitor particulates (i.e., particulate matter less than 2.5 microns in aerodynamic diameter [$PM_{2.5}$] and particulate matter less than 10 microns in aerodynamic diameter [PM_{10}]). A meteorological station was installed in August 2014 to monitor wind speed, wind direction, standard deviation of wind direction, temperature at 9 and 2 meters (m), delta temperature, relative humidity, barometric pressure, solar radiation, and precipitation. Data collection occurred between October 2014 and September 2015.

A Standard Air Contaminant Discharge Permit (ACDP), including an approved Cleaner Air Oregon (CAO) risk assessment, will be obtained from the Oregon Department of Environmental Quality (ODEQ) for the Project prior to commencing construction and operation. The ACDP application was submitted to DOGAMI on August 31, 2022, and includes the required elements, including application forms, list of emission units and associated control devices, emissions inventory, New Source Review modeling analysis, and CAO risk assessment (ASI, 2022). The ACDP application is currently undergoing review by DOGAMI and ODEQ. Once the ACDP is issued, emission units and associated control equipment will be installed, operated, and maintained in good working order to minimize emissions. The application package is provided in Appendix E1.

No monitoring has been performed within the Local Air Quality Study Area for ambient concentrations of carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), or sulfur dioxide (SO_2), nor do regulatory agencies specify background concentrations for these pollutants. In the absence of major population centers, commercial activity, or highways near the proposed Mine, the background concentrations of CO, NO_2, and SO_2 at the Permit Area boundary are expected to be very low. Taking into consideration the surrounding settings (terrain, land use, and proximity of sources), the ambient monitoring data collected at the St. Luke's Meridian station (16-001-0010) in Meridian, Idaho, were used to provide conservative background concentrations for the Project. This station is the closest monitoring station by proximity to the Local Air Quality Study Area. Due to its semi-urban location and proximity to the city of Boise, the data collected at this station were used as extremely conservative values as compared to the isolated and rural

setting of the Local Air Quality Study Area. The background concentrations are shown in Table 3, and the meteorological station data are shown in Table 4.

Table 3. Ambient Pollutant Concentration Summary

Standard	Concentration	Source	Method
Carbon Monoxide 8-Hour	0.244 ppm	16-001-0010 Meridian, ID	2014-2016 (annual mean)
Carbon Monoxide 1-Hour	0.244 ppm	16-001-0010 Meridian, ID	2014-2016 (annual mean)
Lead 3-Month Average	1.99E-04 µg/m^3	16-001-0010 Meridian, ID	2014-2016 (annual mean divided by 4)
Nitrogen Dioxide 1-Hour	43.63 ppb	16-001-0010 Meridian, ID	2014-2016 (average 98th percentile)
Nitrogen Dioxide Annual	10.72 ppb	16-001-0010 Meridian, ID	2014-2016 (annual mean)
Ozone 8-Hour	0.063 ppm	16-001-0010 Meridian, ID	2014-2016 (Annual Fourth High Average)
$PM_{2.5}$ 24-Hours	21 µg/m^3	Site Collected Data	Oct.2014-Sept.2015 Second High (less dates affected by wildfire smoke)
$PM_{2.5}$ Primary Annual	4.6 µg/m^3	Site Collected Data	Oct.2014-Sept.2015 Adjusted Annual Average (less dates affected by wildfire smoke)
PM_{10} 24-Hours	23 µg/m^3	Site Collected Data	Oct.2014-Sept.2015 Second High (less dates affected by wildfire smoke)
Sulfur Dioxide 1-Hour	4.17 ppb	16-001-0010 Meridian, ID	2014-2016 (average 99th percentile)
Sulfur Dioxide 3-Hours	0.623 ppb	16-001-0010 Meridian, ID	2014-2016 (annual mean)

Source: U.S. Environmental Protection Agency (EPA), 2017; Bison Engineering, Inc. (Bison), 2015
ppb = parts per billion; ppm = parts per million; µg/m^3 = micrograms per cubic meter

Table 4. Quarterly and Annual Means for Meteorological Parameters

Quarter	Wind Speed (mph)	Wind Direction (Degrees)	Temp 9 m (°F)	Temp 2 m (° F)	Relative Humidity	BP (in Hg)	Solar Radiation (W/m^2)	Total Precipitation (in.)
2014 3rd	7.0	340	68.1	68.0	38.2	26.48	224	0.85
2014 4th	7.3	284	41.7	41.2	68.9	26.56	91	3.22
2015 1st	6.6	300	39.4	39.0	74.2	26.65	116	2.18
2015 2nd	7.7	344	60.9	60.9	43.6	26.45	274	2.22
2015 3rd	7.2	295	71.9	71.8	33.9	26.48	254	1.64
Oct. 1, 2014 – Sept. 30, 2015	7.2	311	53.6	53.3	54.8	26.53	184	9.26

Source: Bison, 2015
mph = miles per hour; °F = degrees Fahrenheit; BP = barometric pressure; in. = inches; Hg = mercury; Wm^2 = watts per square meter

2.2 AQUATIC RESOURCES – OAR 632-037-0055(1)(d), OAR 340-095-0010(2)(b)

The *Grassy Mountain Mine Project Aquatic Resources Baseline Report* (EM Strategies, 2018b) was originally submitted to DOGAMI on January 11, 2018, then again on August 24, 2018, and is provided in Appendix B2. The report was accepted by the TRT on December 14, 2018, as conforming to the *Environmental Baseline Study Work Plans* (EM Strategies, 2017a; Appendix B23), which were accepted by the TRT on December 7, 2017. A review of existing information from Oregon Department of Fish and Wildlife (ODFW) indicated that fish are unlikely to occur within the Aquatic Resources Study Area, partially due to a fish barrier downstream at Rye Field Reservoir and the ephemeral nature of the drainages in the Aquatic Resources Study Area. The information review yielded a list of five special status amphibian species that occur in southeastern Oregon: blotched tiger salamander (*Ambystoma tigrinum melanosticum*), a BLM special status species; Columbia spotted frog (*Rana luteiventris*), a U.S. Fish and Wildlife Service (USFWS) Species of Concern and Sensitive-Critical ODFW species; northern leopard frog (*Rana pipiens*), a BLM sensitive species; western toad (*Anaxyrus boreas*), a BLM special status and ODFW sensitive species; and woodhouse toad (*Bufo woodhousii*), a BLM special status species.

Field surveys were conducted in May and October 2014 by HDR in the Aquatic Resources Study Area. Habitat suitable for fish was limited, and the 18 sites visited showed no connection to perennial streams. Electrofishing in May 2014 was only feasible in limited reaches of Negro Rock Canyon; no fish were captured. Fish surveys were not conducted in October 2014 because there was no flowing water observed.

Only 10 of the 18 sites included standing or flowing water during the May 2014 field surveys; therefore, only the 10 sites were surveyed for amphibians. No special status amphibian species were observed; however, the Pacific treefrog (*Pseudacris regilla*), a common species in Oregon, was observed at several sites in May 2014. The presence of treefrogs may be indicative of habitat suitability for other species with similar breeding requirements, which may have limited populations in the Aquatic Resources Study Area.

2.3 AREAS OF CRITICAL ENVIRONMENTAL CONCERN/RESEARCH NATURAL AREAS – OAR 632-037-0055(1)(q), ORS 517.971(7)(o)

The *Grassy Mountain Mine Project Areas of Critical Environmental Concern/Research Natural Areas Baseline Report* (EM Strategies, 2018c) was submitted to DOGAMI on May 30, 2018, and is provided in Appendix B3. The report was accepted by the TRT on July 19, 2018, as conforming to the *Environmental Baseline Study Work Plans* (EM Strategies, 2017a; Appendix B23), which were accepted by the TRT on December 7, 2017. The Permit Area is in the Malheur Resource Area (MRA). There are 17 combined Areas of Critical Environmental Concern (ACECs)/Research Natural Areas (RNAs) and 11 ACECs in the MRA. There are no ACECs/RNAs or ACECs in the Permit Area. The closest ACEC or ACEC/RNA to the Permit Area is the Owyhee River below the dam ACEC.

2.4 CULTURAL RESOURCES – OAR 632-037-0055(1)(m)

A cultural resource inventory was conducted for the Permit Area in 2017, and the report, *A Cultural Resource Inventory of 830 Acres for the Grassy Mountain Mine Project, Malheur County, Oregon* (EM Strategies, 2018d), was filed with the BLM in November 2018 and was subsequently shared with the

Oregon State Historic Preservation Office (SHPO). This report was revised in December 2019. The SHPO reviewed this report and submitted its findings to the BLM in a letter dated March 12, 2020. SHPO and the Grassy Mountain Project's TRT determined that the Cultural Resource Inventory Report did not conform to the Calico *Environmental Baseline Study Work Plans* (EM Strategies, 2017a; Appendix B23), Section 3.13, Cultural Resources. Based on the baseline report findings, consultation with SHPO, and consultation with the Burns Paiute Tribe, the BLM is developing a work plan with the Tribe to assess National Register of Historic Places (NRHP) eligibility, assess effects, and develop mitigation measures for cultural resources (Theisen, 2021).

In January 2023, Calico submitted a memorandum (Calico, 2023a) to the TRT requesting modifications to Section 3.13 of the Calico *Environmental Baseline Work Plans*. On February 2, 2023, the TRT approved the requested changes to the Work Plan. On recommendation from SHPO, the TRT agreed that the December 2019 revised Cultural Resources Baseline Data Report is complete, accurate, and conforms to the 2017 Work Plan, as amended and approved by the TRT on February 2, 2023. DOGAMI communicated this approval in a February 13, 2023, letter to Calico (DOGAMI, 2023).

The 2017 cultural resource inventory included an examination of previous research and identified resources and a cultural resource field survey. This effort concentrated on the Project's Area of Potential Effect, which consists of a total of 1,762 acres; 932 acres were previously inventoried during previous iterations of the Project. In November 2017, a cultural resource field inventory survey was conducted in the remaining 830 acres.

The results of this inventory were discussed in a Cultural Resource Inventory Report submitted to the BLM on November 21, 2018. The BLM provided comments on the draft report on February 8, 2019. A revised draft was submitted on April 26, 2019; the BLM accepted the revised draft and submitted the draft to the SHPO on June 28, 2019. On August 9, 2019, the SHPO sent a letter to the BLM stating they finished their review of the built environment portion of the report, and subsequently provided preliminary comments on the archaeological portion of the report in a letter sent to the BLM on August 14, 2019. A final report was completed in December 2019, and submitted to the SHPO in January 2020 (EM Strategies, 2019 [Appendix B4 withheld from public review]). The BLM accepted this report as final (Theisen, 2021). In a letter dated March 12, 2020, the SHPO responded to the BLM. In all but a few cases, the SHPO concurred with the report's recommendations regarding NRHP eligibility of the resources discussed in the report (Griffin, 2020).

A total of 8 new archaeological resources, 14 built resources, and 20 isolated finds were identified during the inventory of the survey area. Additionally, 5 previously recorded archaeological resources within the survey area were visited and inventoried. Of the 8 newly identified archaeological resources, 5 are prehistoric simple flaked stone sites, 2 are prehistoric complex flaked stone sites, and 1 is a historic berm and ditch site associated with the historic Lowe Reservoir. SHPO concurred with the eligibility recommendations for 45 of the 47 cultural resources discussed in the report.

The Cultural Resource Inventory Report recommended the historic berm and ditch site (35ML2229) as not eligible for listing in the NRHP under any evaluation criteria; however, the SHPO did not concur with this recommendation, stating that too little information was presented in the report to support that finding. SHPO noted that the site, as a segment of a larger linear resource, needed to be evaluated with respect to the entire resource. One of the newly recorded prehistoric sites (35ML2222) was recommended as

eligible for listing in the NRHP under Criterion D. Similar with the case of 35ML2229, SHPO stated there was too little data to support the eligibility recommendation. The SHPO considers sites such as 35ML2222 as "unevaluated and treated as eligible" and stated that if the Project cannot avoid this, site testing of the portion of site that would be impacted would be necessary.

The SHPO did not concur with the interpretation of JS-ISO-09, one of the 20 isolates presented in the report. At this locale, 5 prehistoric flakes from 4 different source materials were collected and interpreted as an isolated find of simple core reduction activities in an area of limited soil depth. SHPO found the report provided insufficient information supporting the description that the area had little chance of soil depth, and that subsurface testing was needed to determine whether this is an isolated find or a buried archaeological site.

SHPO concurred with the following recommendations in the report. The remaining 6 newly recorded prehistoric sites were recommended to be considered unevaluated for listing in the NRHP. Of the 14 newly recorded built resources, 12 are historic road segments, 1 is a segment of a historic canal, and 1 is the historic Grassy Mountain Reservoir. All 14 built resources were recommended as not eligible for listing in the NRHP under any evaluation criteria. Of the 6 previously recorded archaeological sites, 1 is a prehistoric simple flaked stone sites, 2 are prehistoric basic habitation sites, and 1 is a multicomponent site, including prehistoric complex flaked stone and historic prospecting components. One of the previously recorded prehistoric sites was recommended as eligible for listing in the NRHP under Criterion D, while the historic component of the previously recorded multicomponent site was recommended as not eligible for the NRHP under any evaluation criteria. The prehistoric component of the multicomponent site and the remaining 4 previously recorded prehistoric sites were recommended to be considered unevaluated for the listing in the NRHP until further subsurface investigations are completed. The 19 remaining isolated artifacts identified were recommended as not eligible for listing in the NRHP under any evaluation criteria. These isolates consist of 6 prehistoric, 12 historic, and 1 multicomponent find.

Through Section 106 of the NRHP consultation, BLM is working with the Burns Paiute Tribe to develop a Tribal Study. The study would help address the SHPO's eligibility concerns for precontact cultural resources and assist in assessing effects and associated mitigation measures for these resources. While in the March 2020 letter, SHPO advocated for further testing of precontact sites, through consultation, the Tribe has advocated for no testing and no artifact collection. These acts are considered adverse effects.

2.5 ENVIRONMENTAL JUSTICE – OAR 632-037-0055(1)(o)

The *Grassy Mountain Mine Project Environmental Justice Baseline Report* (EM Strategies, 2018e) was submitted to DOGAMI on February 23, 2018, and is provided in Appendix B5. The report was accepted by the TRT on July 20, 2018, as conforming to the *Environmental Baseline Study Work Plans* (EM Strategies, 2017a; Appendix B23), which were accepted by the TRT on December 7, 2017. The Environmental Justice Study Area includes Malheur County and incorporates census tracts 9702, 9703, 9704, 9705, 9706, 9707, 9709, and 9400. Census tracts 9702, 9703, and 9704 include portions of the city of Ontario. Census Tract 9705 includes the city of Nyssa and community of Cairo. Census Tract 9706 includes the city of Vale and smaller communities of Willowcreek and Jamieson. The city of Adrian, and the communities of Kingman and Owyhee are included in Census Tract 9707. Census Tract 9709 encompasses the majority of the remainder of Malheur County, except for a small portion of the Fort McDermitt Indian Reservation (Census Tract 9400) at the southern border of the County that is shared with Nevada.

Table 5 summarizes information about race and ethnicity for the Environmental Justice Study Area from the U.S. Census Bureau. The table includes data for Malheur County and Oregon as a whole for comparison. Malheur County is a very large geographic area, and its statistics do not necessarily provide good measures of income and poverty for the Environmental Justice Study Area.

Table 5. Race and Ethnicity for Oregon, Malheur County, and the Environmental Justice Study Area

Race or Ethnicity	Percent of Population								
	Oregon	Malheur County	9702	9703	9704	9705	9706	9707	9709
Race									
White Alone	85.1	85.7	80.9	89.8	78.9	89.1	91.5	90.5	82.6
Black or African American Alone	1.8	1.2	0.4	0.8	0.6	1.4	0.2	0	3.7
American Indian and Alaska Native Alone	1.2	0.8	0.7	0.6	0.2	0.2	0.7	1.5	1.8
Asian Alone	4.0	1.6	2.5	1.7	1.5	1.2	0.9	2.3	1.8
Native Hawaiian and Other Pacific Islander Alone	0.4	0	0.2	0	0	0	0	0	0
Some other race alone	3.4	6.6	9.2	3.7	14.2	5.6	5.6	3.1	4.0
Two or more races	4.1	4.0	6.0	3.4	4.7	2.6	1.3	2.6	6.0
Ethnicity									
Hispanic or Latino (of any race)	12.3	32.7	37.1	30.8	49.9	48.3	20.9	14.4	18.0
Not Hispanic or Latino	87.7	67.3	62.9	69.2	50.1	51.7	79.1	85.6	82.0

Source: U.S. Census Bureau, 2016a

The American Community Survey (U.S. Census Bureau, 2016a) data show that people living in all geographies are predominantly white alone. The U.S. Census Bureau collects information about Hispanic and Latino ethnicity separately from information about race. People of Hispanic or Latino origin might not feel like they belong in any of the race categories and thus identify with *some other race alone* or *two or more races*. Together these other categories comprise most of the racial minorities in the Study Area. All the communities in the Environmental Justice Study Area, except for Jordan Valley, have higher proportions of Hispanic or Latino residents when compared to the state as a whole. The cities of Vale and Adrian have lower proportions of Hispanic or Latino residents when compared to the entire County.

Census data and information available from the State of Oregon indicate that there are minority populations living in Census Tract 9709, the tract that contains the Project, as well as in adjacent census tracts. Census Tract 9709 contains the largest percentage of Black or African American persons; however, Census Tract 9709 is also the largest tract by size in the Environmental Justice Study Area, so the minority population could be spread throughout the Census Tract. The largest percentage of Asian persons live near the city of Ontario.

Table 6 summarizes the information about household income for the Environmental Justice Study Area from the U.S. Census Bureau. The table includes data for Malheur County and Oregon as a whole for comparison.

Table 6. Income Summary for Oregon, Malheur County, and the Environmental Justice Study Area

Income Type	Oregon	Malheur County	9702	9703	9704	9705	9706	9707	9709
Mean Income (dollars)	69,040	48,070	51,620	45,779	35,172	51,738	47,130	62,615	54,382
Median Income (dollars)	51,243	35,418	42,132	28,831	26,399	44,597	37,033	42,434	42,826
People with Earnings (percent of population)	75.6	71.6	67.4	61.7	70.7	78.3	72.9	73.6	81.7

Source: U.S. Census Bureau, 2016b

Using the mean and median incomes for the Environmental Justice Study Area shown in Table 6, the U.S. Census Bureau income data suggest that the mean and median incomes for the Environmental Justice Study Area are above the U.S. Census Bureau poverty threshold for a five-person household and primarily above the U.S. Department of Health and Human Services poverty guidelines; however, the mean income in Census Tract 9704 is above the threshold for a six-person household, the median income in Census Tract 9703 is above the threshold for a six-person household, and the median income in Census Tract 9706 is above the threshold for a seven-person household.

Table 7 summarizes poverty information for the Environmental Justice Study Area from the U.S. Census Bureau. The table includes data for Malheur County and Oregon as a whole for comparison. The average family size is from the U.S. 2010 Census because there are no current data available.

Table 7. Poverty Summary for Oregon, Malheur County, and the Environmental Justice Study Area

Income Type	Oregon	Malheur County	9702	9703	9704	9705	9706	9707	9709
Families									
Average Family Size (number of people)	3.0	3.24	3.13	3.03	3.60	3.52	3.17	3.09	2.93
Families Living in Poverty in the Last 12 Months (percent of population)	11.2	18.1	12.4	29.2	27.0	17.7	13.5	8.4	13.0
Individuals									
Average Household Size (number of people)	2.51	2.62	2.63	2.46	2.43	2.99	2.70	2.57	2.51
Individuals living in poverty in the last 12 months (percent of population)	16.5	25.5	25.2	31.9	36.2	24.4	21.4	11.8	15.4
People receiving Supplemental Security Income (SSI) (percent of population)	4.6	8.4	7.4	11.6	12.1	4.1	8.4	3.9	8.0
People Receiving Food Stamps in Last 12 Months (percent of population)	19.2	27.6	15.0	42.6	43.3	33.5	18.1	17.0	8.7

Source: U.S. Census Bureau 2010, 2016b, 2016c, 2016d

Table 8 summarizes employment information for the Environmental Justice Study Area for persons living in poverty from the U.S. Census Bureau. The table includes data for Malheur County and Oregon as a whole for comparison.

Table 8. Employment Summary for People Living in Poverty in Oregon, Malheur County, and the Environmental Justice Study Area

Employment Type	Oregon	Malheur County	9702	9703	9704	9705	9706	9707	9709
Individuals living in poverty in the last 12 months (percent of population for whom poverty is determined)	16.5	25.5	25.2	31.9	36.2	24.4	21.4	11.8	15.4
Individuals who worked full time in the last 12 months (percent of population in poverty)	3.1	7.6	10.3	6.3	7.8	8.5	2.9	4.3	11.5
Individuals who did not work in the last 12 months (percent of population in poverty)	22.5	30.6	31.8	36.2	41.8	27.1	26.5	16.5	21.0

Source: U.S. Census Bureau, 2016c

In general, the Census data suggest that the Environmental Justice Study Area could support low-income populations. Mean and median incomes in the Environmental Justice Study Area are the lowest in Census Tract 9704, which mainly encompasses the urban center of the city of Ontario. The proportions of families and individuals living in poverty are higher in the Census Tracts surrounding the city of Ontario than the rest of the Environmental Justice Study Area. The rate of individuals that did not work in the last 12 months is also highest in the city of Ontario.

2.6 GEOCHEMISTRY – OAR 340-043-0140, OAR 340-093-0130(3), OAR 340-095-0020(2), OAR 340-095-0020(3)(a), OAR 340-095-0020(5), OAR 632-037-0055(1)(i), OAR 632-037-0055(j)

The geochemical baseline characterization studies were developed to define the potential geochemical reactivity and chemical stability of mined materials that will be produced by the proposed Project (i.e., ore, waste rock, quarry rock, and tailings). The results of the geochemical characterization program assist in determining the potential for acid rock drainage and metal leaching associated with the Project. Data produced during this study were also used in the Project design process and as an operational tool for identifying material types that require special handling during operations.

The most recent version of the *Baseline Geochemical Characterization Report* (SRK, 2022a) is included in Appendix B6. The study addresses the Geochemistry Study Area, which was established to encompass the Mine area and Project facilities, as well as to provide background data, and includes an area encompassing the Permit Area. The subsections below summarize the approach and results of the Geochemistry Baseline Study.

The *Baseline Geochemical Characterization Report* includes all data collected to date for this Project relevant to baseline geochemistry. The study conforms to the *Environmental Baseline Study Work Plans* (EM Strategies, 2017a; Appendix B23), which were accepted by the TRT on December 7, 2017, and addresses subsequent requests regarding geochemistry from the TRT. The *Baseline Geochemical*

Characterization Report has also been revised pursuant to comments received with the Completeness Review by DOGAMI. The baseline report was accepted by the TRT on June 30, 2022 (DOGAMI, 2022a).

The Geochemistry Baseline Study meets the following regulatory requirements:

- Oregon DOGAMI Division 37 Chemical Process Mining;
- Oregon Administrative Rule (OAR) 632-037-0055 and OAR 632-037-0085 (Environmental Evaluation); and
- ODEQ Division 43 Chemical Mining Rules, OAR 340-043.

In addition, the geochemical characterization program follows guidelines set forth in the BLM Instruction Memorandum NV-2013-046, *Nevada Bureau of Land Management Rock Characterization Resources and Water Analysis Guidance for Mining Activities* (BLM, 2013).

The geologic setting, groundwater, surface water, and Mine plan are critical to selection of geologic samples to test and types of testing to be performed. SRK Consulting (SRK) developed a conceptual geochemical model based on the deposit geology, local hydrogeology, and the proposed mining and processing plans to develop the field characterization program. The conceptual model is refined as data are gathered and provides a basis for decision-making throughout the process.

The study addresses geologic materials that will be used for construction (i.e., borrow for fill, Mine backfill, or exposed cuts access and haul roads), mined ore, and Mine wastes (tailings and waste rock). The Mine backfill materials are noteworthy because the Project includes using cemented rock fill (CRF) as structural support in the underground Mine. For a variety of reasons, waste rock is typically used in cement rock backfill. However, because backfilling the Mine fundamentally returns the waste rock to the underground environment where it will remain in perpetuity, the geochemical reactivity of the cement backfill is important to characterize for understanding potential future impacts due to mining.

A supplemental geochemical study was performed to characterize cemented rock backfill made with waste rock and other materials. The *Grassy Mountain Cemented Rock Fill Characterization Report* (SRK, 2022b; Appendix F) was submitted to DOGAMI in 2022 and documents the activities and results. While the backfill is not an element of the baseline characterization, the characterization of cemented waste rock (and cemented basalt) for backfill is used in assessing potential impacts due to operations of the Mine.

There are six general geologic material types that will be mined at the Grassy Mountain site. The term "material type" typically denotes a unique combination of lithology, alteration, and oxidation state. Silicic alteration is pervasive in the Grassy Mountain deposit and is essentially the only type of alteration at this site. Also, the area to be mined is mostly oxidized; therefore, material types are delineated solely based on lithology. The six material types that were characterized are siltstone/mudstone, sandstone, sinter, soils (clay/mud/silt/sand/sediment), breccia, and basalt. The basalt is primarily taken from the Quarry and will be used as backfill and/or construction material. The soils are primarily produced as a result of cut-and-fill activities during construction. All material types are present in the area of the deposit. There are other general material types (e.g., tuff) that are present at the site but will not be mined or disturbed.

2.6.1 SAMPLING AND TESTING – OAR 340-095-0020(2)(a)

The Geochemical Baseline Study included testing of a representative number of samples for each material type. The samples were collected by a geologist selecting from exploration drill core material at the site. The number and types of samples collected are based primarily on the occurrence and abundance of each material type expected within the Mine. Professional judgment and sound geological knowledge of the deposit were used to determine the number and types of samples selected.

For characterization of tailings, samples were collected from tailings generated from metallurgical testing programs. Samples of the tailings water (supernatant) were also collected and analyzed.

Tailings characterization also included testing of tailings material treated to render the tailings non-acid generating. To treat the tailings, hydrated lime was added to the tailings samples to generate material representative of amended tailings. The results of the acid-base accounting (ABA) tests from the original samples were used to determine the quantity of hydrated lime to be added to meet the criteria specified in OAR 340-043-0130(2).

The samples of each material type were subjected variously to the following analyses:

- ABA/TIC - Acid base accounting/total inorganic carbon testing is used to determine the acid-generating potential (AGP) and neutralization potential (NP) of the material. The AGP and NP are then used to calculate the net neutralization potential (NNP = NP – AGP) and the neutralization potential ratio (NPR = NP/AGP). The NNP and NPR are compared against guidelines to characterize the material as potentially acid generating, non-acid generating, or uncertain. The analytical method measures the concentrations of the different forms of sulfur in the rock, as well as the abundance of neutralizing minerals, such as carbonates.
- MWMP – The Meteoric Water Mobility Procedure is one of several “leaching” tests used to characterize the potential for the material to leach metals by contact with surface or groundwater. This test uses water passed through a column of crushed material with a solids-to-liquids ratio of 1:1 weight per weight (w/w).
- Modified SPLP – Synthetic Precipitation Leaching Procedure is another leaching test where the material is mixed with water in a solids-to-liquids ratio of 1:20 w/w and shaken for a period of time.
- Multi-element analysis – used to determine total metal and metalloid concentrations in the material (for both solids and liquids).
- Mineralogy – Minerals present and their abundance are determined using X-Ray Diffraction Analysis (XRD), petrography, and Scanning Electron Microscopy (SEM).
- HCT – Humidity Cell Tests are performed on an as-needed basis, usually to confirm a material is acid generating or non-acid generating, or to further characterize material in the uncertain category. The HCT evaluates temporal changes in leachate chemistry through the sequential leaching of the rock weathered in a regular cycle of exposure to dry and wet air in a controlled laboratory environment. These cycles simulate and accelerate the chemical weathering rates observed under field conditions using test conditions that are specifically designed to target oxidation of sulfide minerals.
- NAG Test – Net Acid Generation is an alternative static test for establishing if a material will be acid generating, non-acid generating, or uncertain.

As is typical of geochemical characterization testing for mining projects, not all samples are subjected to all test methods. In particular, samples were selected for MWMP, SPLP, mineralogy, and HCT testing based on the results of the ABA/TIC and NAG test results, the abundance of the particular rock type in the mined material, and the professional judgement and experience of the geochemist performing the test.

2.6.2 SUMMARY OF RESULTS – OAR 340-043-0030(2)(h), OAR 340-093-0130(2)(c)

This subsection summarizes the most salient findings of the geochemical characterization. The *Baseline Geochemical Characterization Report* (SRK, 2022a; Appendix B6) presents a detailed discussion of the results of the geochemical characterization, including tables of analytical results and meaningful charts showing relationships between different parameters measured. The report in the appendix also presents comparisons of the results with contextual criteria, such as BLM guidelines (BLM, 2004) for acid generation, Oregon Groundwater Quality Guidelines for concentrations in leachate and supernatant water, and average crustal abundances for trace metals concentrations in the bulk rock.

2.6.2.1 Waste Rock and Ore

- The characterization results for the ore grade material are comparable to the waste rock material.
- The results of the geochemical characterization program indicate that the majority of the waste rock and unprocessed ore material will generate acid and leach metals under long-term weathering conditions. The exception is the sinter material that shows the lowest sulfide concentration and a low potential for acid generation.
- The most likely constituents to be elevated in acidic mine water and leachate are sulfate, arsenic, copper, iron, and manganese.
- Each material type has a wide range of sulfide content and predicted acid generation from the static (ABA/TIC and NAG) test results. Mudstone was the highest and sinter was the lowest.
- The waste rock and ore materials have a low TIC content and very limited NP.
- With the very limited neutralizing capacity, the potential for NAG is directly related to AGP (i.e., the concentration of sulfide minerals).
- The waste rock and ore are not so much acid generating as they are non-neutralizing.
- Eight of the nine HCTs for waste rock and ore generated acidic leachate throughout the test and indicate that samples with an uncertain potential for acid generation from the ABA will generate acid under long-term weathering conditions.

2.6.2.2 Tailings – OAR 340-043-0130, OAR 340-095-0030(2)(d)

- The untreated (no lime treatment for neutralization) tailings material has a potential to generate acid. As with the waste rock and ore, the AGP is mostly due to a very low NP; the sulfide sulfur concentration in the tailings is relatively low.
- Under low pH conditions, iron, manganese, and copper concentrations were greater than the contextual values. Results of HCTs indicate there was an initial flush of several other constituents, including sulfate, aluminum, cadmium, fluoride, nickel, selenium, sulfate, and zinc, which likely reflects the dissolution of soluble oxidation products from the tailings.
- The tailings supernatant water samples had slightly alkaline pH, and concentrations exceeded the contextual values for arsenic, selenium, sulfate, and total dissolved solids (TDS).

- The Oregon Chemical Mining regulations [OAR 340-043-0130(2)] require tailings to be treated so that both the NPR > 3 and the NNP > 20 kilograms calcium carbonate per ton (kg $CaCO_3$/t). Because of the low acid generation and NPs indicated by the ABA results for the tailings, the requirement to reach the NNP > 20 kg $CaCO_3$/t requires significantly more treatment reagent (lime in this case) than the requirement for NPR > 3. Because of the excess of lime, the results of leach testing indicate very alkaline (pH ~ 12) conditions in the leachate.
- It is important to note that the very alkaline leachate is partly due to the regulatory requirement to meet both the NPR > 3 and NNP > 20 kg $CaCO_3$/t criteria. If the regulatory requirement was to meet one or the other criteria, the treated tailings would still be non-acid generating but less lime would need to be added, and the leachate would not be as alkaline.
- The tailings require treatment with lime or some other source of acid neutralization to achieve non-acid generating characteristics. Further testing and evaluation will be performed to identify an approach that will neutralize the tailings but not produce the very alkaline tailings water. Also, a tailings management plan will need to be developed that presents the design, construction, operations, closure, and post-closure monitoring requirements for the TSF. The tailings management plan will consider activities to mitigate risk, such as corporate policies, planning, and performance objectives, including protocols to monitor the geochemistry of the tailings during operations and to assure proper treatment/neutralization. The tailings management plan will be routinely reviewed and updated, as necessary, based on monitoring results. A *Tailings Chemical Monitoring Plan* (Calico, 2023h) is provided in Appendix D2.
- Leach test results for the treated tailings samples indicate that selenium is leached under alkaline conditions at concentrations above the contextual values. Sulfate and chromium were also slightly elevated above their respective values in one sample.

2.6.2.3 Road Cut and Borrow Material

- The borrow material from the proposed basalt quarry has no potential for acid generation, with total sulfur values below the detection limit of 0.01 percent for all samples.
- All samples were classified as near-neutral, low metal waters in the MWMP tests and all parameters were below contextual values.
- The results for the road cut materials (soils and basalt) were similar to the borrow material, and total sulfur values were below the detection limit of 0.01 percent.
- All road cut samples were classified as near-neutral, low metal waters in the MWMP tests, and all parameters were below the contextual values.
- Based on these results, the basalt and soil are considered non-acid generating and very inert (i.e., little potential to cause water quality impacts due to release of metals or metalloids).

2.6.2.4 Cemented Rock Fill

The Mine plan for the Grassy Mountain Project requires backfilling production drifts with CRF to provide stability. CRF is binder (i.e., Portland Cement and Fly Ash) mixed with aggregate, and test data to date indicate the mix of binder will be 5 percent to 7 percent.

Sources of aggregate for the CRF include the borrow material (i.e., basalt) and waste rock. The Feasibility Study (Ausenco et al., 2020) indicates there will be approximately 2.07 Mst of ore processed (which

becomes tailings that are permanently disposed of in the Tailings Storage Facility [TSF]) and approximately 0.27 Mst of waste rock produced. Considering the bulking of volume caused by mining and removing the waste rock and ore (typically on the order of 30 percent), and assuming that all the waste rock would be used as CRF with the remaining required volume being filled by CRF made with basalt generated from the Quarry (or sometimes basalt without cement), the waste rock CRF would be on the order of 10 percent to 15 percent of the total backfill volume (the remainder being basalt CRF or straight basalt).

As indicated by the results of the *Baseline Geochemical Characterization Report* (SRK, 2022a; Appendix B6), the basalt from the Quarry is geochemically inert. Basalt CRF placed back in the Mine is not anticipated to cause any environmental impacts. Based on the waste rock characterization program described herein, the majority of the waste rock associated with the Project has a potential to generate acid and leach metals.

Additional testing was performed to determine the geochemical characteristics of CRF made with waste rock. The testing program and results are described in detail in the *Grassy Mountain Cemented Rock Fill Characterization Report* (SRK, 2022b; Appendix F). The testing program included preparing a variety of samples representative of CRF using waste rock, basalt, and binder material (Portland Cement and Fly Ash), and then subjecting the samples to a number of geochemical characterization tests, including ABA, mineralogical analysis, whole rock metals analysis, and two specialized leaching tests.

The results of geochemical characterization of the CRF can be summarized as follows:

- All the CRF samples have significant buffering capacity due to the addition of the binder material. Based on the test results, the CRF is not expected to generate acid.
- Cementation of the waste rock results in overall lower metal releases under higher pH conditions (in comparison to testing results of waste rock with no binders).
- There are no appreciable differences in the results for the types of binders or the amount mixed in (i.e., varying from 3 percent to 7 percent):
  - Fly ash is comparable to cement, and
  - Additional binder does not change the results in terms of potential for acid generation and/or metal leaching.
- The specialized leaching tests indicated concentrations of several constituents (i.e., arsenic, chloride, fluoride, mercury, and sulfate) are lower in leachate than in the lixiviant (groundwater from the site), indicating the potential for attenuation of some naturally occurring constituents in groundwater due to interaction with CRF.
- Release of metals and sulfate was low in the leach tests involving intact CRF samples (some of the leach tests are performed on crushed CRF).

The reduction in the mobility of soluble constituents in the CRF occurs for several reasons:

- The hydraulic conductivity and exposed surface area of the material is greatly diminished due to the solidification process.
- The alkaline nature of the binders reduces solubility of most metals.
- Some metals become less soluble due to their inclusion in the mineral structure of the calcium silicate hydrate gels resulting from cementation.

- The mobility of most trace constituents in water contacting CRF will be controlled by diffusion rather than solubility reactions.

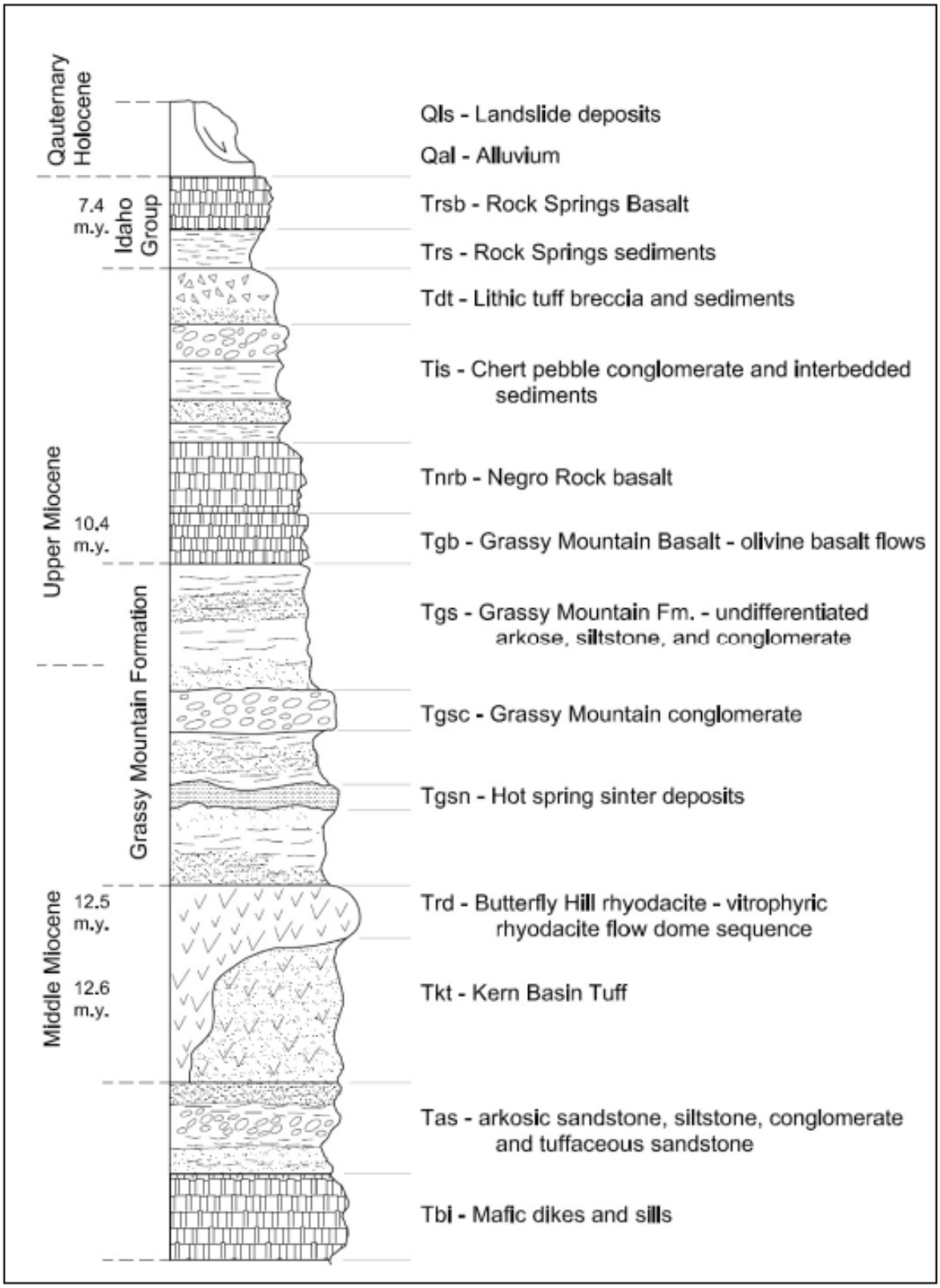
Overall, based on the results of the CRF characterization program, the CRF made with basalt or waste rock does not show a significant potential to degrade groundwater quality, with most constituents leached at low levels for all tests. The results of the testing will be used to establish backfill plans to mitigate potential impacts, if necessary.

2.7 GEOLOGY AND SOILS – OAR 632-037-0055(1)(b), OAR 632-037-0055(1)(h), OAR 632-037-0055(1)(i), OAR 340-043-0030(2)(b)

The Grassy Mountain Mine Project *Geology and Soils Baseline Report* (Abrams, 2018; Appendix B7) was originally submitted to DOGAMI on October 18, 2018. The report was accepted by the TRT on December 17, 2018, as conforming to the *Environmental Baseline Study Work Plans* (EM Strategies, 2017a; Appendix B23), which were accepted by the TRT on December 7, 2017. The Geology Study Area includes the Mine and Process Area, with a 4,000-m buffer, and the entire Access Road. The Soils Study Area includes the entire Permit Area (Mine and Process Area and Access Area).

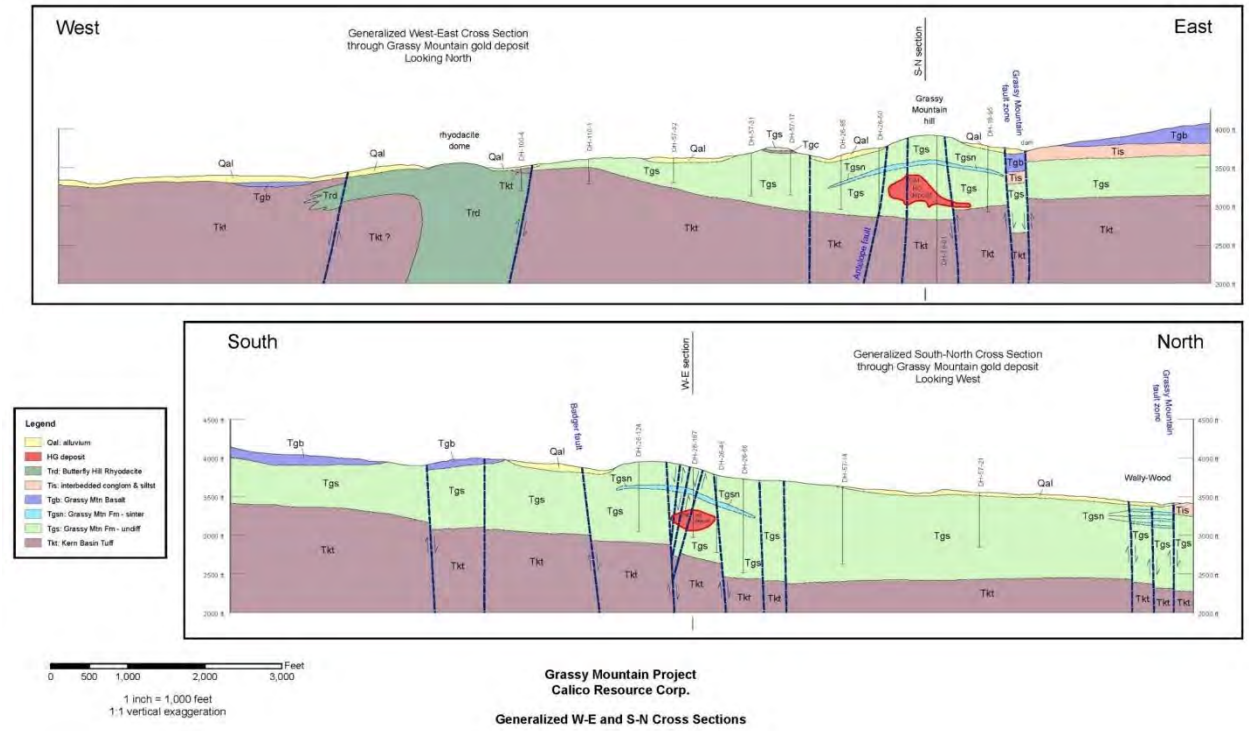
Grassy Mountain is the largest of 12 recognized epithermal hot spring precious metal deposits of the Lake Owyhee volcanic field. The Lake Owyhee volcanic field occurs at the intersection of three tectonic provinces: the buried cratonic margin; the northern basin and range; and the Snake River Plain. During the mid-Miocene, large volume, peralkaline, caldera volcanism occurred in response to large, silicic magma chambers emplaced in the shallow crust throughout the region. The volcanic field includes several caldera-sourced ash-flow sheets and rhyolite tuff cones that were deposited from 15.5 to 15 million years ago. Volcanism during the mid to late Miocene is evidenced by small-volume, metaluminous, high-silica rhyolite domes and flows, and small-volume basalt flows and mafic vent complexes in north- and northwest-trending basin and range-type fracture zones and ring structures related to resurgent calderas. Regional extension and subsidence facilitated the formation of through-going fluvial systems and extensive lacustrine basins. Large volumes of fluvial sediments, sourced from the exhumed Idaho Batholith to the southeast, were deposited in conjunction with volcanism and hot spring activity during the waning stages of volcanic field development. The resulting regional stratigraphic section is a thick sequence of mid-Miocene volcanic rocks and coeval-to-Pliocene age non-marine lacustrine, volcaniclastic, and fluvial sedimentary rocks.

Figure 1 is the stratigraphic column at Grassy Mountain, and Figure 2 illustrates North-South and East-West cross sections showing the local geology and mineralization. Bedrock outcrops near the Mine and Process Area are typically composed of olivine-rich basalt and siltstones, sandstones, and conglomerates of the late Miocene Grassy Mountain Formation (Tgb, Tgsn, and Tgs). These rocks are locally covered with relatively thin, unconsolidated alluvial and colluvial deposits (Qal). Erosion-resistant basalts cap local topographic highs. Arkosic sandstones have been encountered at the surface and at depth but have not been correlated across the vicinity of the Mine and Process Area, in part due to lateral discontinuity associated with sedimentary facies changes and structural offset. Surface and drill-defined stratigraphy near the Mine and Process Area reveals complex facies that were produced during the waning stages of deposition of the Lake Owyhee volcanic field.



Source: Ausenco, et al., 2020.

Figure 1. Stratigraphic Column of the Mine and Process Area Geology



Source: Abrams (2018)

Figure 2. Geologic Cross Sections

The Grassy Mountain gold-silver deposit is located within an interpreted horst block that has been raised 50 to 200 ft in a region of complex block faulting and rotation. Faults at the Grassy Mountain deposit are mainly post-mineral 30 degrees west of north (N30°W) to 10 degrees east of north (N10°E), striking normal faults developed during basin and range extension. On the northeast side of the deposit, these faults progressively downdrop mineralization beneath post-mineral cover. These offsets are suggested by interpreted offsets of a prominent white sinter bed in drill holes, as well as drill intersections with fault gouge. Silicification in the form of sinters and disseminated quartz is a prominent alteration type at Grassy Mountain and is largely controlled by hot-spring vents. Silicification occurs both pervasively as silica flooding, and as cross-cutting veins and stockworks. The silicified envelope has plan dimensions up to 3,000 ft (north-south) by 2,500 ft (east-west). Silicification is surrounded by widespread, barren, clay-rich (20- to 40-percent montmorillonite), tuffaceous siltstone and arkose with minor disseminated pyrite. Many of the sinters occur as sheets instead of mounds, which suggest that they are related to vents along faults rather than point sources. Potassic alteration occurs as adularia flooding with destruction of biotite. Orthoclase is unaffected by potassic alteration, and plagioclase is replaced by adularia.

Mineralization of the Grassy Mountain deposit includes: 1) low-grade gold associated with hot springs silicification; 2) high-grade gold associated with multi-stage quartz-adularia-gold-silver veins and stockworks; and 3) late remobilization within sub-vertical rubble zones defined by clay matrix breccias. The deposit is characterized by stacked sinter terraces capping acid-leached sediments and multiple generations of quartz veins, which suggest repeated eruption, brecciation, breeching, and sealing of the hydrothermal system. Ore minerals include native gold (50 to 600 microns), electrum, and minor pyrite (up to 80 microns). Gangue minerals include quartz, calcite, chlorite, epidote, orthoclase, plagioclase, illite, sericite, chalcedony, montmorillonite, goethite, and jarosite.

At a local scale and within the immediate vicinity of the Grassy Mountain gold deposit, fault orientations can be grouped into two major sets: 20 degrees west of north to 10 degrees east of north (N20°W to N10°E) striking faults, and 70 degrees east of north (N70°E) striking faults. Joint and fractures orientations fall into three major groups: 1) strikes of north to 20 degrees east of north (N to N20°E) dipping to the east-southeast; 2) strikes of a general south direction with dips to the west; and 3) strikes with a general west direction dipping to the north.

Geologic hazards evaluated in this study include seismicity/earthquake hazards, slope failures/landslides, volcanic eruptions and unsuitable soil/soil erosion. The Geology Study Area is located in a region of low seismic risk. No active or potentially active faults are known in the Geology Study Area. The closest fault with historic surface rupture, the Lost River Fault, is located near Challis, Idaho, approximately 110 miles northeast of the Geology Study Area. The closest potential Holocene age faults are located over 20 miles north of the Geology Study Area. The probability of the occurrence of an earthquake with a magnitude greater than 5.0 over the next ten years is less than 0.03 percent.

Only a few earthquakes have been recorded since 1900 (USGS, 2018) within a 50-mile radius of the Geology Study Area. Only two earthquakes within a 50-mile radius of the Geology Study Area were associated with known fault systems: a magnitude 3.2 earthquake associated with the Squaw Creek Fault in April 1978 (approximately 47 miles from the Permit Area); and a magnitude 3.2 earthquake associated with the Cottonwood Mountain fault in July 2009 (approximately 31 miles from the Permit Area). Approximately 27 miles southeast of the Permit Area, there was a magnitude 2.9 earthquake in November 2012, and in close proximity to the Owyhee Mountains fault system. There were three other earthquakes that occurred within 50 miles of the Geology Study Area since 1900 that were not associated with any known faults or fault systems.

Using the United States Geological Survey (USGS) National Seismic Hazard Mapping Database, the peak ground acceleration at the facility resulting from a seismic event from one of the seismic sources was calculated. The peak ground acceleration for the maximum probable earthquake and the maximum considered earthquake were used in the design bases for facilities at the Grassy Mountain Mine. An earthquake that has a 10-percent probability of exceedance in 50 years (a nominal 500-year recurrence interval) is the maximum probable earthquake. An earthquake with a nominal 2,500-year recurrence interval (a 2-percent probability of exceedance in 50 years) is the maximum considered earthquake.

There are no known existing active landslides in the Geology Study Area.

Numerous volcanoes exist in the Cascade Range located approximately 200 to 250 miles west and northwest of the Geology Study Area. The recently active volcanoes are Mount Hood, Mount Jefferson, and Mount Mazama (Crater Lake). Mount Hood has erupted three times over the past 2,000 years and has been active as recently as 400 years ago. Within the Geology Study Area, the most recent volcanic activity is dated at 7.4 million years before present. The most likely volcanic hazard that could occur in the Geology Study Area would be from effects of a volcanic eruption from one of the Cascade volcanos. The Geology Study Area could possibly be covered by volcanic ash if the prevailing winds were directed toward the area.

Soil surveys were performed by IMS, Inc. (IMS) near the Mine and Process Area and southern portion of the Access Area in 1989 and 1991. Eleven map units, comprised of seven soil types and one

undifferentiated soil group, were identified in the soil surveys performed by IMS (1989 and 1991). Soil surveys were performed in June 2018 by Cascade Earth Sciences (CES) in the remainder of the Permit Area/Soils Study Area. Six additional soil types were identified during the June 2018 surveys. All 17 map unit descriptions are presented in Table 9, and shown on Map 5. Each map unit description provides basic information about the map unit, such as predominant soil or soils of the unit, slope, and rock fragment content.

Table 9. Soil Survey Map Legend

Map Unit	Name - Description
1[1]	Farmell-Rock outcrop complex, 8% to 30% slopes
2[1]	Farmell-Chardoton very cobbly soil, 15% to 30% slopes
3[1]	Farmell-Chardoton very cobbly soil, 4% to 15% slopes
4[1]	Farmell-Chardoton extremely stony soil, 4% to 15% slopes
5[1]	Farmell-Chardoton soil, 8% to 15% slopes
6[1]	Ruckles very stony loam, 8% to 30% slopes
7[1]	Shano silt loam, 2% to 6% slopes
8[1]	Soil A extremely gravelly sandy loam, 15- to 30% slopes
9[1]	Virtue loam, 2% to 8% slopes
10[1]	Xeric Torriorthents, 8% to 30% slopes
11[1]	Soil B very gravelly sandy loam, 8% to 30% slopes
12[2]	Nyssa silt loam, 2% to 6% slopes
13[2]	Drewsey very fine sandy loam, 2% to 6% slopes
14[2]	Ruclick cobbly loam, 4% to 15% slopes
15[2]	Drewsey-Quincy-Solarview complex, 8% to 30% slopes
16[2]	Owsel silt loam, 2% to 6% slopes
17[2]	Powder silt loam, 0% to 3% slopes

Source: [1]IMS, 1989, 1991; [2]CES, 2018

Erionite is a fibrous zeolite-group mineral often occurring as microscopic acicular, prismatic crystals in altered volcanic tuffs of late Cenozoic age. Erionite can also occur as bedded zeolites within a lacustrine environment containing sediments high in calcium and magnesium. Less commonly erionite occurs in vesicles or cavities within volcanic rocks such as basalt, andesite or rhyolite. Numerous studies have been conducted concerning the occurrence of zeolites in Oregon. Not all zeolite minerals are considered hazardous. A December 2011 report, *Naturally Occurring Hazardous Materials,* Final Report SPR 686 (DOGAMI, 2011), identifies numerous occurrences of zeolites and erionite in Oregon. The erionite localities closest to the Project are Durkee in Baker County, and Rome in southern Malheur County. Durkee is approximately 65 miles north of the Project, while Rome is approximately 60 miles to the south-southwest. The erionite study was carried out by SRK and is incorporated in the *Baseline Geochemical Characterization Report* (SRK, 2022a; Appendix B6).

The Wind Erodibility Group (WEG) is an arbitrary grouping of soils based on texture, structure, and carbonate content. WEG values range from 1 to 8, with the lower values indicating greater susceptibility to wind erosion. The WEG is typically applied only to the surface layer of a soil. Classes are defined by the Natural Resources Conservation Service's (NRCS) *National Soil Survey Handbook*, Part 618, Subpart B (NRCS, 2017). Table 10 shows the calculated K-factors and WEG values for each soil type.

Table 10. Erosion Factors of Surface Soils

Soil Series	WEG (Wind Erosion Group)	K-Factor (Soil Erodibility Factor)
Chardoton[1]	8	0.13
Farmell[1]	8	0.10
Ruckles[1]	8	0.10
Shano[1]	5	0.37
Soil A[1]	8	0.07
Soil B[1]	8	0.07
Virtue[1]	5	0.16
Nyssa[2]	5	0.61
Drewsey[2]	3	0.34
Ruclick[2]	8	0.37
Owsel[2]	5	0.46
Powder[2]	5	0.52

Source: [1]IMS, 1989, 1991; [2]CES, 2018

In all the areas where mining and processing will take place, suitable topsoil will be stripped and stockpiled for reclamation. A topsoil suitability rating table was developed by IMS (1991) for the three dominant soils within the Soils Study Area. The locations were selected to most accurately represent the Pedon sampled and its landscape position. (A Pedon is a three-dimensional body of soil with dimensions large enough to permit the study of individual soil horizons.) Topsoil suitability for the soil types identified during the June 2018 surveys were also tested. Laboratory analyses results for soil samples were compared to suitability criteria for topsoil developed at Colorado State University's soil testing laboratory (Soltanpour and Workman, 1981). These criteria are presented in Table 11.

Table 11. Soil Suitability Ratings

Parameter	Testing Method	Good Suitability	Marginal Suitability	Unsuitable
pH	S-2-10	6.0 to 8.4	5.5 to 6.0, 8.4 to 8.8	<5.5, >8.8
EC (dS/m)	S-2.10	<4.0	4.0 to 12.0	>12.0
Texture	S-14.10 ASTM D6913	Loamy sand, sandy loam, loam, silt; soil with <35% clay	Sand, loamy coarse sand; soil with <45% clay	Soils with >45% clay
Saturation %	S-10.20	25 to 80	25 to 80	<25 and/or >80
$CaCO_3$ %	Fizz	0 to 15	15 to 30	>30
Rock fragments %	Field Estimated	<35	35 to 60	>60
Erosion factor K	Calculated	<0.37	>0.37	
Organic Matter	S-9.10			

Source: IMS, 1989, 1991; CES, 2018

In general, the topsoil sampled in and near the Mine and Process Area during the IMS surveys (IMS 1989, 1991) has a higher clay content and is shallower in the soil profile. This soil generally meets the "Marginally Suitable" category. The topsoil throughout the June 2018 survey area appear generally suitable for reclamation. The primary limitation is surficial and subsurface coarse fragments, which were encountered on ridge sides and summits. The Ruclick soil and Drewsey-Quincy-Solarview Complex exhibited high surface and subsurface coarse fragments. Steep slopes also limit reclamation suitability. The Drewsey and Owsel soils, which generally occur on the valley floors, exhibited marginal limitations for reclamation due to pH level and/or soil erodibility. The Nyssa soil, also located on valley floors, has unsuitable subsurface soil horizons that are cemented and exhibit increased sodium and carbonate levels (CES, 2018).

Salvageable growth media from the Project surface disturbance will be stockpiled at three centralized locations, as shown on Map 3. Growth media will be salvaged for reclamation activities at the commencement of construction of each Project component. Soil will be salvaged to a depth of up to 0.5 ft. The properties of the soil stockpiles will be managed during the project to assist with assessing future use of the stockpiles. Growth media will consist of soils and alluvium stripped prior to surface-disturbance activities.

As outlined in Table 12, approximately 147,436 bank cubic yards (bcy) of growth media will be salvaged from the footprints of the Project facilities. Facilities on the ground surface or near surface within the soil horizon that will have growth media salvaged include: TSF, TWRSF, Quarry, and Stormwater Diversion Channels. Other facilities that will not have growth media salvaged include: the water supply production well field and pipeline, groundwater monitoring wells, Perimeter Fence, Growth Media Stockpiles, and exploration areas.

Two Growth Media Borrow Areas will also be developed to support the reclamation of the Project, encompassing approximately 55.9 acres and generating up to approximately 1,089,000 bcy of growth media. This volume could change based on actual field conditions encountered during growth media salvage. On sloped terrain, some soil may be salvaged by pushing available natural growth media cover downhill with a dozer to construct toe berms to prevent rocks from scattering on the hillside below the stockpile toes.

Based on the soil survey completed in the Project Area, the amounts of growth media, as outlined in Table 12, are available and will be salvaged from various Mine facilities prior to component construction.

Table 12. Growth Media Salvaged and Available

Facility	Area (acres)	Growth Media Depth (ft)[1]	Volume (cy^2)
Underground Mine	6.7	0	-
TSF	99.8	0.5	80,528
TWRSF	5.7	0.5	4,611
Process Plant	2.5	0	-
Infrastructure & Ancillary Facilities	17.8		-
Roads	34.9	0.5	28,190
Yards & Laydown Areas	10.0	0	-
Growth Media Stockpiles	7.7	0	-
Water Supply	7.9	0	-
Power Supply	61.1	0	-
Stormwater Diversion Channels	11.8	0.5	9,521
Quarry	48.2	0.5	38,842
Reclamation Borrow Areas	55.9	Variable	1,089,000
Monitoring	0.0	0	-
Exploration	10.0	0	-
Disturbed Areas	107.8	0	-
Total	**487.9**	**-**	**1,250,691**

Note: Rounding may cause apparent discrepancies.

[1] The growth media depth on the Perimeter Fence, water tank, water wells and pipeline, Growth Media Stockpiles, and the exploration is set at zero because the construction of these facilities will incorporate the soils into the construction and reclamation, and there will be no growth media applied. The diversion ditches and sediment basins and the borrow pit will be permanent features, and no growth media will be applied. Any remaining waste rock in the TWRSF would be moved to the TSF as part of reclamation and the Site reclaimed at the original grade.

[2] The maximum available growth media identified at the two Reclamation Borrow Areas.

Any growth media remaining in the stockpiles for one or more planting season will be seeded with an interim seed mix to stabilize the material to reduce erosion and minimize the establishment of undesirable weeds. The seed mix, application rate, and application method will be the same that is currently used for the reclamation of disturbances associated with exploration and the same as proposed for long-term reclamation and is detailed in the *Reclamation Plan* (Calico, 2023g; Appendix D1).

2.8 GRAZING MANAGEMENT – OAR-632-037-0055(l)

The *Grassy Mountain Mine Project Grazing Management Baseline Report* (EM Strategies, 2018f; Appendix B8) was submitted to DOGAMI on January 11, 2018. The report was accepted by the TRT on March 9, 2018, as conforming to the *Environmental Baseline Study Work Plans* (EM Strategies, 2017a; Appendix B23), which were accepted by the TRT on December 7, 2017. There are three grazing allotments in the Grazing Management Study Area: Nyssa (10403); Sourdough (10404); and Dry Creek (10411). The Nyssa Allotment includes four pastures and six enclosures or exclosures that occur partly or wholly within the Grazing Management Study Area. The Sourdough Allotment includes three pastures that occur partly or wholly within the Grazing Management Study Area. The Dry Creek Allotment includes three pastures and one exclosure that occur partly within the Grazing Management Study Area. These allotments and their pastures are shown in Table 13.

Table 13. Pasture Allotments in the Grazing Management Study Area

Allotment Number	Allotment Name	Pasture Number	Pasture Name	Grazing System	Management Strategy	Total Pasture Acres	Pasture Acres within Study Area
10403	Nyssa	4	Sagebrush	Deferred	Improve	11,877.2	544.5
10403	Nyssa	5	Ryefield Seeding	Deferred rotation	Improve	3,720.3	3,471.3
10403	Nyssa	6	Grassy Mountain Seeding	Deferred rotation	Improve	3,035.5	1,771.4
10403	Nyssa	7	Grassy Mountain	Deferred	Improve	29,764.2	8,099.1
10403	Nyssa	9	Ryefield Reservoir Exclosure	Riparian exclosure	Improve	19.7	19.7
10403	Nyssa	15	North Grassy Mountain Reservoir Exclosure	Reservoir enclosure	Improve	4.3	4.3
10403	Nyssa	30	Ryefield Seeding Test Plot	Management exclosure	Improve	2.4	2.4
10403	Nyssa	31	Owyhee Ridge Trough Exclosure	Reservoir enclosure	Improve	1.8	1.8
10403	Nyssa	32	Government corral	Reservoir enclosure	Improve	0.2	0.2
10403	Nyssa	34	Grassy Reservoir Exclosure	Reservoir enclosure	Improve	1.2	1.2
10404	Sourdough	4	Canyon	Deferred rotation	Maintain	21,121.1	624.9
10404	Sourdough	7	Freezeout Lake	Deferred rotation	Maintain	22,214.8	443.5
10404	Sourdough	10	Rye Field Fenced Federal Range	Custodial area	Maintain	1,439.7	372.4
10411	Dry Creek	1	Cow Hollow Seeding	Deferred rotation	Maintain	1,598.5	17.5
10411	Dry Creek	2	Double Mountain	Deferred rotation	Maintain	12,639.6	285.1
10411	Dry Creek	5	Russell Fenced Federal Range	Custodial area	Maintain	5,386.0	146.0
10411	Dry Creek	10	Little DM Spring Exclosure	Riparian exclosure	Maintain	3.1	1.3

2.9 GROUNDWATER – OAR 632-037-0055(1)(g), OAR 340-043-0030(2)(d), OAR 340-043-0030(2)(e), OAR 340-043-0030(2)(f)

The *Grassy Mountain Gold Project Groundwater Reports* (SPF, 2021a,b,c; Appendix B9) include all hydrogeological and water quality data relevant to the characterization of baseline conditions in the Groundwater Resources Study Area. The Groundwater Resources Study Area was established to develop an environmental baseline for assessing potential impacts from Project facilities and to provide background data. The Groundwater Resources Study Area encompasses the Mine and Process Area and surrounding areas in the vicinity of the Mine. All baseline well and spring sites are located within the Groundwater Resources Study Area.

The Groundwater Baseline Study conforms to the *Environmental Baseline Study Work Plans* (EM Strategies, 2017a; Appendix B23), which were accepted by the TRT on December 7, 2017. The baseline study also includes supplemental information and evaluations requested by DOGAMI and other stakeholder agencies and comments presented in the Completeness Review (DOGAMI, 2020) from all stakeholder agencies. Additional materials and revisions were submitted in December 2021, and the TRT accepted the baseline study on June 30, 2022 (DOGAMI, 2022b).

After acceptance of the Groundwater Baseline Study by the TRT on June 30, 2022, Calico commissioned Lorax Environmental Services (Lorax) to develop a more comprehensive, calibrated groundwater flow model using all the hydrogeologic data that have been gathered through 2021 (Lorax, 2022). The model was used to further evaluate the potential effects of the Mine on groundwater conditions in the area, including drawdown of the aquifer in the vicinity of the proposed Production Well Field and near the underground mine. The recovery of the aquifer after closure is also evaluated. The projections are based on updated estimates of water usage for mining that are presented in this Consolidated Permit Application (CPA). A description of the model, its calibration, and the results of projections and sensitivity analyses are presented in Lorax (2022), which is included in Appendix G. The results of this model supersede all previous groundwater modeling results.

The subsections below present summaries of the characterization activities, results, and interpretation of the groundwater baseline investigation, including the updated groundwater flow modeling. The details of the investigation are provided in the Groundwater Reports (SPF, 2021a, b, c) in Appendix B9 and the groundwater modeling report prepared by Lorax (2022) in Appendix G.

2.9.1 OVERVIEW OF FIELD INVESTIGATION ACTIVITIES

Groundwater levels were measured and groundwater quality samples were collected at new and existing monitoring wells within the Groundwater Resources Study Area. Existing production wells within the Groundwater Resources Study Area were also included in the investigation. The locations of the wells are shown in the SPF (2021a) figure titled "Grassy Mountain baseline monitoring wells and springs" in Appendix B9, and well construction details are presented in Table 14. There are shallow and deep wells, and wells within the silicified zone as well as in distal areas in the basin. Vibrating wire piezometers were also installed in boreholes within the area of the deposit to characterize groundwater levels in the deposit area.

Flow rates were measured and water quality samples were collected at springs in the vicinity of the Site. The locations of springs are shown in the SPF (2021b) figure titled, "Groundwater Elevation Contours in Feet (2017 Q1)" in Appendix B9, and the coordinates and elevations of the springs are presented in Table 15.

There were several sampling events performed as part of the baseline investigation. Historical water quality, spring flow, and groundwater level data from previous investigations were also assembled and included in the database as appropriate (i.e., when the earlier data meet current data quality objectives).

Hydrogeologic testing was also performed as part of the site characterization activities. The hydrogeologic testing included performing pumping tests at selected wells. In addition, the results of historical pumping and slug tests were reviewed and summarized.

Table 14. Well Completion Details

Calico Well ID	OWRD Well Tag Number	OWRD Name	Alternate Name	Drill Method	Depth of First Water (ft)	Well Const. Depth (ft)	Screened Interval (ft)	Well Casing Diameter (in)	TOC Elevation[4]	Elevation Screened Interval (ft)	Water Level Elevation (9/26/2018)	Production (gpm)[2]	Screened Lithology[1]
59760	107462	MALH 2974	Middle Sweizer, TW-1	air rotary	160	203	163-203	6	3762.1	3599-3559	3673.43	+10	fractured basalt
59761	109400	MALH 2993	Lower Sweizer, MW-2	air rotary	100	118	97-117	4	3762.2	3665-3645	3673.48	+50	fractured basalt
59762	109371	MALH 2976, 2985	MW-3	air rotary	626	700	550-660	4	3724.8	3175-3065	3103.4	<1	siltstone
59763	109356	MALH 2994	TW-4	air rotary	277	323	293-323	6	3519.4	3226-3196	3239.03	+5	fractured volcanics
59764	107466	MALH 2986	MW-5	air rotary	270	300	279-299	4	3511.9	3233-3213	3238.24	+10	fractured sandstone
59765		MALH 2979	MW-6	air rotary	29	36	28-36	4	3446.5	3418-3410	dry	dry	shallow sandstone
59766	107468	MALH 2980	MWS-8	air rotary	only damp when drilled	45	25-45	4	3459.7	3435-3415	3426.68	+10	shallow sandstone
59767		MALH 2995	MWS-9	air rotary	dry	40	20-40	4	3495.3	3475-3455	dry	dry	shallow sandstone
59768		MALH 54197	MWS-10	air rotary	21	25	10-25	4	3480.6	3471-3456	3463.46	0.5	shallow sandstone
59770		MALH 2983	MW-11	air rotary	dry when drilled	424	374-424	4	3389.0	3015-2965	3241.71	+0.5	volcanic tuff
59772	109352	MALH 2984	Upper Sweizer, MWS-13	air rotary	125	207	165-205	4	3768.2	3603-3563	3673.5	+50	fractured basalt
26-092-915	109354	MALH 54071		unknown	unknown	915	228-268	2	3710.0	3482-3442	3633.55	unk	unk
57-1		MALH 54195		unknown	unknown	765	108-138	1.25	3770.6	3663-3633	3699.1	unk	unk
57-10		MALH 54196		unknown	unknown	500	126-156	1	3681.1	3555-3525	3635.67	unk	unk
89-2	109360	MALH 54072		unknown	200	425	386-406	2	3293.5	2907-2887	3235.54	unk	unk
Bishop	None	MALH 54046	Rye Field	cable	unknown	482	135-145	12	3391.5	3257-3247	3281	50	coarse gravel
BLM	109398	MALH 2277	Owyhee Ridge	cable	unknown	175	159-166	6	3579.6	3421-3414	3423.95	+12	white sand
GMW17-31	125168	MALH 54404		air rotary	dry when drilled	498	458-498	5	3722.0	3262-3222	3222.6	0	siltstone, sinter, clay
GMW17-32	125169	MALH 54405		air rotary	244	718	678-718	5	3702.1	3026-2986	3082.1	<1	Arkose, siltstone, Clay
GMW17-33	125170	MALH 54406		air rotary	243	338	238-338	5	3702.7	3465-3365	3452.16	<30	sinter, siltstone, tuff
GMW18-34	130031	MALH 54437		air rotary	dry	950	830-890	5	3953.3	3127-3067	dry	dry	Arkose, siltstone, Clay
GW-1	107469	MALH 2281	47-1	air rotary	140	155.5	135.5-155.5	4	3709.1	3573.5-3553.5	3654.18	60	gravel
GW-2	109357	MALH 2279	47-2	air rotary	dry when drilled	325	290-320	4	3827.5	3537-3507	3662.91	0	blue and grey clay
GW-3	107467	MALH 2278	47-3	air rotary	dry when drilled	350	320-350	4	3633.6	3314-3284	3401.68	<1	blue and grey clay
GW-3A		MALH 2579		air rotary	dry	420	380-420	2	3655	3275-3235	dry	dry	silt and clay
GW-3B		MALH 2576		air rotary	dry	340	80-100	2	3626	3546-3526	dry	dry	clay
GW-4	107460	MALH 54073		unknown	50	370	280-350	4	3342.7	3063-2993	3260.85	100	sandstone, congl, clay
GW-5		MALH 54194		air rotary	unknown	265	204-224	2	3413.0	3209-3189	3221.45	<1	tuff, clay
GW-6	109368	MALH 2578		air rotary	145	340	300-340	2	3377.3	3077-3037	3236.16	3-4	sandstone, congl, clay
Prod 1	107457	MALH 2275, 2511		air rotary	145	425	145-255, 325-355, 380-420	6	3436.4	3291-3181, 3111-3081, 3056-3016	3436.41	30-100[3]	sandstone, blue clay, and hard sandstone
PW-1	109353	MALH 2276		air rotary	320	520	320-340, 400-420	6	3709.1	3389-3369, 3309-3289	3654.66	25-35[3]	brown clay and sand; coarse sandstone
PW-4	109351	MALH 2206		air rotary	280	375	280-300, 340-360	6	3341.4	3061-3041, 3001-2981	3261.39	175-250[3]	sandstone and conglomerate

1 - as reported on the drillers log
2 - based on short-term testing by driller during or following construction
3 - based on long-term test pumping
4 - surveyed with the exception of GW-3A, GW-3, GMW-17-31, GMW17-32, GMW17-33, and GMW18-34

Source: SPF (2021a) in Appendix B9.

Table 15. List of Springs with GPS Coordinates

Type	Site Name	Northing (ft, OR State Plane South)	Easting (ft, OR State Plane South)	MP Elevation (ft amsl)
Baseline Springs	Deposit Stock Tank	748376.460	5750879.694	3552 77
	Government Corral	756975.556	5757863.847	3456 01
	Grassy Spring	741738.614	5750275.765	3822 84
	Lowe Spring	761799.478	5753456.679	3278 96
	Poison Spring	759368.751	5740634.211	3213 85
	Sagebrush Spring	759029.757	5761380.835	3481 86
	Sourdough Lower	737582.250	5731598.434	3565 36
	Sourdough Upper	737587.997	5728058.732	3754 05
	Twin Springs North	726474.288	5737016.696	3240 02
	Twin Springs South	725277.033	5737632.836	3210 32
	Whiskey Spring	725895.946	5746824.847	3230 .04
	Bull Spring Tank	731798.684	5730323.895	3727
	Central Grassy Mountain Spring	737920.331	5756588.347	3489
	Dark Rock Well	756210.058	5732296.357	3391
	East Grassy Mountain Spring	738055.897	5757538.706	3489
	Flowing Well	761550.474	5727332.014	3532
	Negro Rock Canyon Spring	767800.835	5735633.314	3117
Background Springs and Wells (coordinates from non-survey grade GPS, elevations estimated using Google Earth)	Negro Rock Spring Tank	754844.533	5737277.024	3319
	Oxbow Spring Tank	729591.481	5756563.613	3065
	Oxyoke Spring Tank	726801.090	5757094.644	3029
	Red Tank #3	756212.707	5753206.759	3389
	Spring 1n Sec 13 T2 2S R44E	739203.805	5773378.134	3005
	Spring 1n Sec 23 T2 1S R43E	769162.951	5732244.787	3297
	Spring North of Lowe Reservoir	764826.923	5752193.554	3247
	Spring South of Poison Spring	758410.107	5741317.082	3232
	Tank E of Negro Rock	752204.327	5742408.207	3273
	West Grassy Mountain Spring	738802.552	5755880.217	3619
	West Whiskey Spring	757611.371	5728513.411	3547
	Wildcat Spring	757839 .970	5732821.848	3366

Source: SPF (2021b) in Appendix B9.

2.9.2 DATA INTERPRETATION AND HYDROGEOCHEMICAL CONCEPTUAL SITE MODEL

2.9.2.1 Site Setting

The Project is in the Sourdough Basin/Negro Rock Canyon watershed, which drains to the north. Grassy Mountain, located southeast of the Project, serves as the hydrologic divide between the Sourdough Basin/Negro Rock Canyon watershed and the watersheds draining south to the Owyhee River.

No perennial surface water features are located within the Groundwater Study Resources Area. However, there are numerous local springs and seeps, which range from seasonal wet areas to perennial flows that supply stock watering tanks. See the SPF (2021b) figure titled, "Groundwater Elevation Contours in Feet (2017 Q1)" in Appendix B9. There are also a couple of stock tanks/reservoirs in the area that contain water seasonally.

The Koppen Geiger climate classification for the area is *Bsk: Cold semi-arid.* This climate type is generally characterized as having warm-to-hot, dry summers, and cold winters with occasional snow. In the cold, semi-arid climate, the average annual precipitation is low, and monthly precipitation is spread evenly through the year. The average annual precipitation is estimated to be approximately 9.8 in. per year. The average annual lake evaporation rate is estimated to be approximately 45 in. per year.

2.9.2.2 Regional and Local Geology

The geologic setting of the Project and surrounding area is an important factor in the hydrogeologic baseline characterization. The regional and local geology and soils are discussed in Section 2.7 of this CPA and in the *Geology and Soils Baseline Report* (Abrams, 2018; Appendix B7).

The Grassy Mountain Formation is the main water-bearing zone within the Groundwater Resources Study Area. The Grassy Mountain Formation consists of undifferentiated sandstone, siltstone, conglomerates, and arkose. These lithified sedimentary rocks originated from lacustrine deposits. Within the lacustrine sediments, there are volcanic intrusions (basalt). Groundwater flow occurs primarily in fractures and areas that are less lithified. The various lithologic materials are discontinuous and heterogeneous.

Of key importance with regard to the hydrogeology of the Site is that the area within the immediate vicinity of the ore deposit that will be mined is strongly silicified with lenses of sinter and the occurrence of quartz veins and other silicic alteration (e.g., arkose). The silicified zones represent barriers to groundwater flow. There are other silicified zones within the Groundwater Resources Study Area, but silicification appears to be less extensive in the other areas.

Steeply-dipping faults have also been identified in the vicinity of the ore deposit, and these faults can be both conduits and barriers to groundwater flow within the silicified zone. There is a higher occurrence of faulting in the immediate area of the proposed Mine and the ore deposit. There are other faults and fault zones throughout the Groundwater Resources Study Area that also appear to influence baseline groundwater flow and quality.

2.9.2.3 Groundwater Occurrence and Flow

In general, the findings of the Groundwater Baseline Study support a single aquifer system on a basin-wide, regional scale. The heterogeneity of lithic facies and faulting in the area result in partially-connected local zones or compartments within the aquifer that are separated by negative barriers to flow.

Within the silicified zone in the immediate vicinity of the proposed Mine, the data support that there is little groundwater and very limited flow. Most of the boreholes and vibrating wire piezometers (VWPs) installed in the silicified zone did not encounter any water. Some of the wells installed in or near the silicified zone are dry or recover very slowly when pumped down. This is attributed to low connectivity of fracture sets within the silicified rocks, and also to two faults on the upgradient side of the silicified zone (the Schweizer and Badger faults) that appear to be barriers to groundwater flow and a fault zone originating near the mineralized deposit area and extending northwest through the area of the BLM Well and Well 59766 possibly acting as a preferred flow path that acts as a drain (see discussion below regarding the piezometric surface).

Surface recharge of precipitation is the principal source of groundwater. The low annual rainfall and relatively thick clayey and silty alluvium in the unsaturated zone result in low recharge rates, estimated to be between 0.5 and 1 in. per year. There are also small seasonal reservoirs/stock tanks within the Groundwater Resources Study Area (e.g., Schweizer Reservoir locations just east of the Mine area) that represent small sources of seasonal groundwater recharge.

Discharge from the aquifer occurs at the springs located throughout the Groundwater Resources Study Area. However, based on the balance of the approximate total combined annual flow of the springs (estimated to be 30 gallons per minute [gpm]) with the 0.5 to 1 in. per year throughout the approximately 40-square-mile basin that encompasses the springs, there must also be subsurface flow out of the basin occurring, probably along the northern boundary of the Groundwater Resources Study Area.

Wells with deep completions and comparison of water levels in wells in close proximity to each other that have screens at different elevations indicate generally downward vertical gradients. The downward gradient is supporting evidence that there is subsurface flow out of the basin, although regional data for deeper wells is sparse.

Water Level Trends

Water level monitoring data indicate that most of the shallow wells (<500 ft total depth) in the area have relatively stable water levels through any particular year (± 1 ft change); although water levels generally rose during the monitoring period of the baseline study (2013-2018). There are some exceptions to this general trend described in detail in the Groundwater Reports (SPF, 2021a,b,c; Appendix B9) that are attributed to specific conditions or activities (e.g., drawdown caused by nearby groundwater pumping, increases during excessive precipitation, and sometimes problems with the well).

Groundwater levels at wells within the silicified zone are highly correlated with elevation of the screened zone, supporting the lack of connectivity in this area caused by silicification.

Groundwater Elevation Contours

The Groundwater Reports (SPF, 2021a,b,c; Appendix B9) include maps with contours of groundwater elevations across the site (the piezometric surface or water table). Various maps were prepared using data collected during the baseline monitoring period (2014 through 2017), and they all have the same general appearance. See SPF (2021a) in Appendix B9. An example is provided in the SPF (2021b) figure titled, "Groundwater Elevation Contours in Feet (2017 Q1)" in Appendix B9. The contours generally follow the topography of the Groundwater Resources Study Area with higher groundwater elevations to the east and south on Grassy Mountain and lower groundwater elevations in the main drainage pathway through the middle of the watershed.

The piezometric surface indicates the groundwater elevation varies from over 3700 ft above mean sea level (amsl) on the east side of the Groundwater Resources Study Area to 3220 ft amsl to the west and northwest. The apparent horizontal groundwater gradients are much steeper on the east side of the Groundwater Resources Study Area, ranging from 5 to 10 percent in the vicinity of the deposit. On the west side, the apparent gradient is much lower and nearly flat near the center of the basin (e.g., 1 ft of difference in elevation between wells GW-6 and 89-2, which are approximately 0.75 mile apart).

The pattern of groundwater flow in the maps in SPF (2021a) in Appendix B9 suggest persistent local variations to the general southeast to northwest flow. Notably, there is a ridge of high groundwater in the vicinity of Well 57-1 located west of the deposit, a trough located in the vicinity of Well 59764/59763 and GW-6 located further to the west, and a trough extending into a ridge oriented northwest from the deposit in the vicinity of the deposit through GW-3, the BLM Well, and Well 59766. These variations are attributed to the presence of faults, fractures, lithologic facies changes, vertical gradients, or some combination of these influences. The locations of faults are shown on the figure titled, "Groundwater Elevation Contours in Feet (2017 Q1)" in SPF (2021b) in Appendix B9, and some cross or align with the features described above.

The trough extending into a ridge oriented northwest from the deposit is particularly noteworthy. SPF (2021a) Figure G5 in Appendix B9 presents a more detailed interpretation of the piezometric surface. Contours shown in SPF (2021b) figures titled, "Water Level Contours – 100 ft Intervals (2017 Mean)" and "Water Level Contours – 50 ft Intervals (2017 Mean)," in Appendix B9, consider all available water level data, including VWP and drill hole data (contour figures cited above in SPF [2021b] in Appendix B9, are based only on monitoring well data). The contours in SPF (2021b) in Appendix B9 indicate a groundwater depression in the silicified zone around the deposit. Discussion in the Groundwater Reports (SPF, 2021a,b,c; Appendix B9) hypothesizes that there may be deep fracturing of brittle silicified tuff beneath the deposit that was caused by fault movement. However, based on the spatial distribution of the water level measurements, the elevations of various screened intervals, and the general downward gradient, the depression could also be interpreted as a trough extending from the deposit area along a fault zone that extends northwest through the area near wells GW-3, BLM Well, and Well 59766 (i.e., the fault zone may be a preferred flow pathway that drains the deposit area).

2.9.2.4 Aquifer Hydraulic Properties

Aquifer hydraulic properties in the vicinity of the Project were estimated from aquifer pumping tests conducted during the late 1980s and early 1990s, and more recently on Well 59762, GMW17-32 and GMW17-33 in 2017. The latter wells are located near the Project. Detail of the historic and recent pumping tests are included in the Groundwater Reports (SPF, 2021a,b,c; Appendix B9). Overall, the historic and recent aquifer testing indicates that portions of the aquifer with higher transmissivity occur locally in the vicinity of the pumping wells and that, as testing progresses over time, lower transmissivity regions are encountered based on negative boundary effects. These results suggest the conductive portions of the aquifer system are either compartmentalized or limited, with flow provided to wells initially via permeable zones (i.e., sand, sandstone, fractured basalt, etc.) that are limited in spatial extent.

Hydraulic conductivity in the Groundwater Resources Study Area increases to the north away from the deposit, likely due to decreasing silicification with distance from the deposit area. Testing of the most northern well, PW-4, suggests a hydraulic conductivity of approximately 3 ft per day (ft/d). Testing of PW-1, near the deposit, suggests a hydraulic conductivity 100 times lower, approximately 0.03 ft/d. The deep wells Well 59762 and GMW17-32 exhibit low transmissivity and hydraulic conductivity assumed to be representative of the silicified sediments at or near the deposit area, with hydraulic conductivities ranging from 0.0004 ft/d (GMW17-32) to 0.02 ft/d (Well 59762). Estimates of hydraulic conductivity are sensitive to the assumed saturated aquifer thickness, with lower values obtained for thicker saturated aquifer extents. For the deep wells, the aquifer thickness is difficult to estimate because there is no information from drilling or lithology to develop an estimate. Based on previous investigations, aquifer thickness typically has been estimated on the order of 200 ft to 300 ft.

Drilling, test pumping, water level monitoring, and geophysical data all indicate that average hydraulic conductivities and corresponding aquifer transmissivities in the vicinity of the Project are very low. As a result, groundwater flow into the proposed Mine workings should also be low.

2.9.2.5 Water Quality

Well and spring water quality results were compared to both primary drinking water standards and secondary drinking water standards as part of the Groundwater Baseline Study (SPF, 2021a; Appendix B9). The primary drinking water standards are legally enforceable standards due to potential human health concerns and are expressed as maximum contaminant levels (MCLs). The MCL is the highest level of an analyte allowed in drinking water. Secondary drinking water standards are non-enforceable, recommended standards established to limit cosmetic or aesthetic effects (not health-related) in drinking water, expressed as secondary maximum contaminant levels (SMCLs). Spring water quality data are also compared to ODEQ water quality standards as described in OAR 340-041.

Arsenic is present in groundwater within the Grassy Mountain vicinity. Concentrations exceeded the MCL at all of the 15 well locations sampled and at 8 of the 10 sampled spring locations. Arsenic concentrations greater than three times the 0.010 milligram per liter (mg/L) MCL for arsenic are common in groundwater within the basin. Naturally occurring, elevated arsenic concentrations in groundwater are often associated with areas that have undergone hydrothermal alteration, which is well-documented to have occurred within the Groundwater Resources Study Area. (See Section 2.7 of this CPA and Appendix B7.)

Other exceedances of MCLs included antimony (two samples), chromium (GMW17-32 prior to additional development), and lead (three samples, including one from GMW17-32 prior to additional development). Numerous samples from wells and springs exceeded the drinking water SMCLs for aluminum, iron, manganese, TDS, and sulfate. Most, but not all, exceedances for aluminum and iron appear to be associated with sediment in groundwater samples.

Groundwater within the Grassy Mountain vicinity exhibits three different geochemical types: calcium bicarbonate (Ca-HCO_3), sodium-potassium bicarbonate (Na/K-HCO_3), or sodium-potassium sulfate (Na/K-SO_4). The spatial distribution of the different water quality types is presented in SPF (2021a) Figure G5 in Appendix B9. The predominant water types appear to have a spatial distribution attributed to local geologic conditions and areas of recharge/discharge. Predominantly, Ca-HCO_3 water types are noted at wells to the east of the proposed Grassy Mountain Mine that are generally completed in basalt and at springs to the northeast. Groundwater at wells located directly downgradient of the proposed Grassy Mountain Mine and near the highly silicified areas exhibit Na/K-SO_4 water types. The wells and springs located in the northern and western areas of the Groundwater Resources Study Area exhibit Na/K-HCO_3 water types. The presence of calcium may be attributed to areas with basalt deposits, and sodium may be associated with volcanic tuff and sedimentary deposits. Sulfate in the area immediately downgradient and in the immediate vicinity of the mineralized ore body is attributed to oxidation and leaching of sulfides in the mineralized zone.

The wells downgradient of, or within, the deposit area that have Na/K-SO4 geochemical type (BLM Well, Well 59766, GMW17-32, GMW17-33, Well 59763, and Well 59762) also exhibit elevated concentrations of arsenic, iron, manganese, boron, molybdenum, and nickel relative to other baseline monitoring locations. The results of the *Baseline Geochemical Characterization Report* (SRK, 2022a; Appendix B6) demonstrate that these constituents leach from ore and waste rock collected in the deposit area. The geochemical signature at these wells (the particular suite of elevated constituent concentrations) indicates the influence of the mineralized deposit area on water quality.

The pH at the BLM Well, and to a lesser degree at Well 59766, is also slightly depressed relative to other monitoring locations (6 to 7.9 versus typically >8). The BLM Well also has the highest arsenic concentrations in the Groundwater Resources Study Area (ranging from 1.46 to 4.54 mg/L; i.e., >100 times the MCL of 0.01 mg/L), as well as the highest dissolved iron and manganese, TDS, and sulfate levels. Well 59766 also has concentrations of these constituents significantly elevated above concentrations measured at locations away from the mineralized deposit area. The water chemistry conditions at these two wells support the hypothesis of a preferred groundwater flow path along a fault zone extending northwest from the deposit area described in Section 2.9.2.4 of this CPA.

Overall, the results of the Groundwater Baseline Study indicate that groundwater quality is poor throughout the Groundwater Resources Study Area (arsenic exceeds the MCL at nearly every location). The results also indicated degraded water quality downgradient of the mineralized zone (significantly higher sulfate, TDS, arsenic, manganese, and iron and, at two locations, slightly depressed pH) is a baseline condition.

2.9.3 MINE DEWATERING AND GROUNDWATER PRODUCTION – OAR 340-093-0130(2)(d)

Underground mine workings developed as part of the proposed Grassy Mountain Mine will intercept the regional water table and require dewatering. Pumping from wells outside the Mine area to supply Mine water demands will result in water table drawdown outside of the Mine. While they are not part of characterization of the existing environment or baseline conditions, the Lorax (2022) modeling study (Appendix G) includes an assessment of potential impacts due to production of groundwater for Mine use and estimates of dewatering rates for the proposed Mine using a three-dimensional groundwater flow model. The results of the 2022 modeling study by Lorax supersede all previous modeling studies that are described in SPF (2021c), *Grassy Mountain Gold Project Groundwater Reports, Volume III, Dewatering Projections and Evaluation of Potential Pumping Impacts*, in Appendix B9. The results are summarized below.

2.9.3.1 Mine Dewatering

Groundwater inflow rates into the mine workings are estimated to range from on the order of 15 gpm during mine construction to 115 gpm during the first year of mining. Sustained pumping after the first year drops considerably and the average pumping rate over the entire mine operations period averages 60 gpm. However, there may be periods of higher pumping for short-durations if larger water-bearing fracture sets are intercepted. Actual inflow rates of several tens to a few hundred gpm should be anticipated based on the complex hydrogeologic conditions in the vicinity of the deposit and the resulting uncertainty in hydrogeologic parameters used in the model as well as the difficulty in representing groundwater flow in discontinuous fractures in the bedrock with a numerical model.

The decreasing inflow rates during the period of mining represents longer-term predicted dewatering as steady-state conditions are approached. The higher inflow rates early in mining reflect shorter-duration flow rates resulting from initial dewatering of the bedrock (i.e., removing groundwater from storage).

2.9.3.2 Groundwater Production

The Mine will use primarily water recycled from the TSF and TWRSF, supplemented as available by surface contact water (industrial stormwater) and water produced by mine dewatering. A production well field located north of the Mine (in the vicinity of PW-4) will also be used for supplemental mine water. Potential water level impacts caused by groundwater pumping at the production well field were assessed using the model based on a projected average water demand over a 10-year Project life. The constant average rate used in model predictions was 72 gpm. This groundwater production rate is conservatively set at approximately 45 percent higher than the estimated average well field demand from the overall Project water balance (see Section 3.10 of this CPA). Actual demand and production will vary through the Mine life, both seasonally (higher in the dry season, lower in the wet season) and year-to-year. Early in mining, when mine dewatering rates are predicted to be highest, groundwater production from the wells will be lower. Later, as the dewatering rate decreases, production will increase.

2.9.4 GROUNDWATER DRAWDOWN AND RECOVERY

The drawdown predicted due to the underground mine dewatering is relatively limited to the area in the immediate vicinity of the Mine due to the compartmentalization evident in the field data. Much greater drawdown is predicted from the 10-year duration operation of the proposed Production Well Field.

Temporary drawdown of groundwater during the construction and operations period due to the combined effects of mine dewatering and well field production are predicted to be up to 42 ft in the immediate vicinity of the production wells but generally between 0.5 and 7 ft in other areas. The extent and development of groundwater drawdown is illustrated in Figure 5-2 of the updated groundwater monitoring report (Lorax, 2022; Appendix G), and shows, using a threshold of 0.5 ft, effects in the uppermost groundwater are predicted to occur approximately 2 miles from the Production Well Field.

The groundwater model also predicts effects on spring flows. Springs nearest the Production Well Field exhibit the greatest effects, with the groundwater level at Lowe Spring dropping during the period of mining to a maximum of 11 ft at the end of mining. Red Tank Spring, which only flows occasionally under baseline conditions, is predicted to experience a drawdown that increases to just under 10 ft by the end of Mine life. All other springs are predicted to have a drawdown of less than 2 ft, and most springs within the Groundwater Resources Study Area indicate a negligible drawdown (<0.05 ft) and drawdowns of less than 0.4 ft (e.g., Poison Spring).

The numerical modeling predicts that the water table in the Production Well Field area will recover rapidly at the end of mining. The residual drawdown 20 years after the end of mining in the Production Well Field area is predicted to be less than approximately 2 ft. The majority of springs included in the numerical model are not predicted to experience noticeable declines in flow following mining after the groundwater level has recovered. The *Grassy Mountain Mine Spring and Seep Monitoring and Mitigation Plan* (SLR, 2023b; Appendix D18) outlines monitoring and reporting procedures and initial response for mitigation measures should flow rates, water presence, or water quality change relative to ranges detected in the baseline characterization.

2.10 LAND USE – OAR 340-093-0130(1)(b), OAR 340-093-0130(1)(c), OAR 340-095-0010(2)(a), OAR 340-095-0020(8), OAR 632-037-0055(1), OAR 632-037-0077(11)

The *Grassy Mountain Mine Project Land Use Baseline Report* (EM Strategies, 2018g; Appendix B10) was submitted to DOGAMI on January 26, 2018. The report was accepted by the TRT on July 19, 2018, as conforming to the *Environmental Baseline Study Work Plans* (EM Strategies, 2017a; Appendix B23), which were accepted by the TRT on December 7, 2017. Seventy-one percent of the land in Malheur County is federal land that is administered by the BLM (Oregon Partnership for Disaster Resilience [OPDR], 2014). The 2002 Southeastern Oregon Resource Management Plan and Record of Decision (SEORMP) indicates that the Land Use Study Area does not include any BLM-administered land that the BLM has identified for disposal. The SEORMP shows that the Land Use Study Area supports the Oregon-Idaho Graben, which is an area that the USGS identifies as most likely to contain large gold deposits. A BLM-identified transportation and utility corridor passes along the southern limit of the Land Use Study Area. There is one recreation area near the Land Use Study Area, a primitive campground at Twin Springs. Dispersed recreation is allowed throughout the Land Use Study Area. The SEORMP indicates that the mining and processing proposed as part of the Project would be an allowable use of BLM-administered land.

The Land Use Study Area is zoned Exclusive Range Use (ERU) and Exclusive Farm Use (EFU) in the Malheur County Code (MCC). The County's land use zone maps reflect these designations (C-A1: EFU, and C-A2: ERU). The Oregon Revised Statutes 215.283 and 215.296 define the allowable uses on ERU-designated land; allowable uses are reiterated in the MCC. In some cases, the allowable uses are conditional and must receive a conditional use authorization from the County within which the ERU land is located. The County approved Calico's Conditional Use Permit on May 23, 2019 (Calico, 2021a; Appendix E2). Land in and near the Land Use Study Area is currently used for grazing and dispersed recreation and supports an existing road network that provides local access. Grazing is a farm use and is allowed by right in the Land Use Study Area. The state and local statutes do not address dispersed recreation (the MCC addresses developed recreation facilities, such as parks and playgrounds). Most of the land is administered by the BLM, so dispersed recreation is managed in accordance with BLM policies.

The BLM has not yet identified any potential issues with the SEORMP or other specific requirements for implementing the portions of the Project that are on BLM-administered land and subject to BLM authorization. Mining and accessory infrastructure proposed as part of the Project is an allowed use of BLM-administered land in and near the Land Use Study Area if the Project can be developed in a manner that protects other sensitive resources, per the SEORMP energy and mineral resource objectives. A review of the resource information and SEORMP indicates that the Land Use Study Area does not support any areas of critical environmental concern, wild and scenic rivers, wilderness study areas, sage grouse lek sites, or riparian conservation areas. Information in the SEORMP indicates that portions of the Land Use Study Area are in or near areas that are open to mining but subject to operational timing limitations. Factors that would affect the operational timing limitations include proximity to occurrences of special status plants and mule deer winter range. Surveys of the Permit Area and a 2-mile radius did not locate any threatened or endangered species.

OAR 632 Division 37 requires the Project proponent to receive an operating permit from DOGAMI to establish the Mine and related processing facilities. A baseline study is one of several studies that the proponent must complete as part of its application for an operating permit. As it reviews the proposed Project, DOGAMI will identify potential issues, and the proponent would work with DOGAMI and other state agencies to address such issues, such as ensuring the proposed uses are compatible with surrounding land uses and develop and implement mitigation for potential conflicts, if necessary.

DOGAMI can only issue a permit if the proposed Project also receives local approval. In the case of this Project, the local approval involves upgrades to county-maintained roads. By working closely with the state and Malheur County, the proponent will develop an operating and reclamation plan that avoids or minimizes land use conflicts at the time of Mine operation and in the years following closure.

The most substantial potential for conflict with local land use policies and regulation is related to how the proposed Project would affect ongoing grazing use that is a by-right use of ERU-zoned land upon which the Project is located. All potential Project conflicts with ERU use would be addressed through the Project's permitting processes.

As it considers the proposed Project, the County will apply guidance in the Comprehensive Plan (relate Project findings to County policy and ordinances) and evaluate whether the proposed Project would not interfere with current ranching practices, and that it complies with the County code. The County approved

the Conditional Use Permit on May 23, 2019, and issued the Land Use Compatibility Statement (LUCS) to Calico on July 30, 2019 (Calico, 2021a; Appendix E2).

2.11 NOISE – OAR 632-037-0055(1)(k)

The *Grassy Mountain Mine Project Noise Baseline Report* (Creative Acoustics, 2019; Appendix B11) was originally submitted to DOGAMI on October 5, 2018, then again on December 6, 2018, and February 13, 2019. The report was accepted by the TRT on March 1, 2019, as conforming to the *Environmental Baseline Study Work Plans* (EM Strategies, 2017a; Appendix B23), which were accepted by the TRT on December 7, 2017. The following four ambient noise monitoring sites were chosen to represent the ambient noise environment in the Noise Study Area: Site A – an undeveloped location on BLM land approximately 170 ft west of Twin Springs Road and approximately 3 miles south of the intersection of Twin Springs Road and Cow Hollow Road; Site B – Lake Owyhee State Park, approximately 250 ft west of Fisherman Road (the access road into Indian Creek Campground) and approximately 600 ft south of the gate entrance into Indian Creek Campground; Site C – a site within the Mine and Process Area, approximately 375 ft southwest of the entrance gate and 150 ft west of an unnamed access road; and Site D – a residence located at 2025 Bishop Road, approximately 250 ft east of Russell Road. Table 16 summarizes the ambient noise measurement results.

Table 16. Ambient Noise Summary (dBA)

Metric	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}
Site A: Undeveloped location along Twin Springs Road						
Daytime Minimum	27.2	49.4	17.4	35.8	26.6	19.2
Daytime Average	35.9	58.3	19.0	45.7	39.1	30.3
Daytime Maximum	49.0	73.8	24.8	59.8	53.2	40.0
Nighttime Minimum	20.6	40.2	17.1	27.7	19.7	17.8
Nighttime Average	29.1	51.4	19.0	38.2	31.0	24.8
Nighttime Maximum	39.8	65.4	22.3	50.1	43.5	37.5
Site B: Lake Owyhee State Park						
Daytime Minimum	22.4	37.9	17.3	29.4	25.0	20.3
Daytime Average	28.1	49.7	20.2	37.9	28.5	24.0
Daytime Maximum	41.6	71.9	26.3	54.7	37.3	35.2
Nighttime Minimum	19.3	32.1	17.2	23.4	20.3	18.1
Nighttime Average	29.9	45.4	23.6	34.9	32.1	28.3
Nighttime Maximum	38.1	55.8	31.4	48.6	43.7	37.0
Site C: Grassy Mountain Mine and Process Area						
Daytime Minimum	32.5	55.5	17.1	44.2	28.8	20.7
Daytime Average	40.4	67.3	20.6	51.7	40.7	31.2
Daytime Maximum	56.7	94.4	31.9	64.7	56.0	46.8
Nighttime Minimum	19.3	40.8	16.9	23.8	20.2	17.9
Nighttime Average	26.6	50.7	18.4	34.2	27.4	22.5
Nighttime Maximum	48.8	81.3	21.9	53.4	41.7	30.2
Site D: 2025 Bishop Road, Vale, Oregon						
Daytime Minimum	30.8	52.1	20.2	40.5	32.0	26.2
Daytime Average	37.8	60.0	24.5	47.1	39.8	33.2
Daytime Maximum	50.7	77.7	36.4	58.9	54.2	48.2
Nighttime Minimum	28.6	48.6	23.3	33.1	30.1	27.3
Nighttime Average	40.8	58.9	30.3	48.4	41.8	37.4
Nighttime Maximum	69.8	92.5	36.0	86.2	50.6	45.1

dBA = A-weighted decibel; L_{eq} = hourly average levels; L_{max} = hourly maximum levels; L_{min} = hourly minimum levels; L_1 = noise levels exceeded for 1 percent of each hour; L_{10} = noise levels exceeded for 10 percent of each hour; L_{50} = noise levels exceeded for 50 percent of each hour
Daytime = 7:00 A.M. to 10:00 P.M.
Nighttime = 10:00 P.M. to 7:00 A.M.

At Site A, the undeveloped location along Twin Springs Road, the primary noise contributors included atmospheric (wind) movement, vegetation movement caused by the wind, occasional vehicular traffic, and bird activity (song and movement).

At Site B, Lake Owyhee State Park, the primary noise contributors included atmospheric (wind) movement, vegetation movement caused by the wind, vehicular traffic, boating activity on the lake, occupied campground activity, and bird activity (song and movement). At night, an added contributor was insect activity around the lake and, although audible, was not excessive in loudness nor duration and should not have an impact on the proposed ambient noise limits.

At Site C, at the proposed Mine and Process Area (within the Permit Area), the primary noise contributors included atmospheric (wind) movement, vegetation movement caused by the wind, and bird activity (song and movement). Although not necessarily quantifiable by the weather data obtained at ground level, some fluctuations in the measurement data can be explained by upper atmospheric wind gusts/turbulence. There were no anthropogenic noise sources in the vicinity of Site C when the measurements were taken.

At Site D, the residential site along Russell Road, the primary noise contributors included atmospheric (wind) movement; vegetation movement caused by the wind; vehicular traffic along Russell Road and some along Bishop Road; and agricultural activity, including irrigation pumping equipment and field implements. On two separate occasions, an irrigation pump was in operation, at 6:00 A.M. on the second day and at 6:00 A.M. on the third day, and both instances occurred for less than a one-hour measurement interval. The noise contributions from the irrigation pump can be seen in the L_{10} data as a 3 decibel (dB) increase on the second day and a 5 dB increase on the third day; and in the L_{50} data, as a 1 dB increase on the second day and a 3 dB increase on the third day. At 4:00 P.M. and 5:00 P.M. on the third day, a tractor worked in a field to the southwest of the irrigation pump. These noise contributions can be seen in the L_{10} data as a 7 dB to 12 dB increase, and in the L_{50} data as an 8 dB to 10 dB increase. Over the course of 72 single-hour duration measurements at Site D, the irrigation pump only impacted two intervals, and the tractor activity also only impacted two intervals; therefore, noise from these two sources would only occur sporadically.

The results show that there is both diurnal variability and a reasonable amount of general variability from hour to hour within both the daytime and nighttime periods at all sites. L_{max} levels are typically higher during the daytime, indicating that the loudest noise sources are likely to be manmade sounds. Average daytime L_{eqs} are lowest at the Lake Owyhee State Park and highest in the proposed Mine and Process Area. Nighttime average L_{eqs} are lowest in the proposed Mine and Process Area and highest at the Bishop Road site. Average daytime and nighttime observed L_{50} levels at all sites, ranging from approximately 22 dBA in the proposed Mine and Process Area, to 37 dBA at the Bishop Road site.

Generally, noise levels in the Permit Area are low with L_{eq} levels at 57 dBA or below at all times, except for a nighttime spike at the residential site on Bishop Road, which occurred at 6:00 A.M. with the use of farming equipment near the road. The quietest site is at Lake Owyhee State Park, with the Mine and Process Area being the quietest during daytime hours, and the Bishop Road site being the loudest during nighttime hours. The calculated day-night noise levels (L_{dn}) at the residential site on Bishop Road was approximately 51 dBA for the first 48-hour period, with the calculated L_{dn} rising to 66 dBA on the third day due to the use of farming equipment.

A review of the lowest measured ambient noise levels indicates that only a few measured values approach the self-noise limits of the sound level meter (SLM). The SLM self-noise limit was measured at approximately 18 dBA. At three of the four monitoring locations (sites A, B, and C), the lowest nighttime L_{50} measured was between 17.8 dBA and 18.1 dBA. These values approach the self-noise limit of the SLM; therefore, actual ambient sound levels could have been quieter than the data indicate during those periods. However, at the two measurement locations that are near noise-sensitive properties (Sites B and D), there were only three measured nighttime L_{50} values below 20 dBA (18.1, 19.0, and 19.2 dBA), all of which occurred at Site B. Only one of those hours approached the self-noise limit of the SLM, so the measurements are deemed to provide a valid representation of the existing ambient noise levels for the Project.

The representative ambient noise levels measured at the only two identified noise-sensitive properties near the Noise Study Area are summarized in Table 17. The values in Table 17 were obtained using the statistical 5th percentile in each data category. The statistical 5th percentile was used rather than the L_{min} in each data category so that the representative levels would approach the lowest levels measured at each site without being biased by outlying quiet hours that occurred over the three-day measurement period. The proposed limits at the two sites (Table 18) are the representative ambient noise levels with the 10-dBA increase described in the ODEQ regulations.

Table 17. Representative Ambient Noise Levels Measured at Noise-Sensitive Properties

Site	Daytime		Nighttime	
	L_{10}	L_{50}	L_{10}	L_{50}
Site B	25.6	22.4	21.3	19.1
Site D	34.0	26.7	30.2	28.1

Table 18. Proposed Ambient Noise Limits for the Project

Site	Daytime		Nighttime	
	L_{10}	L_{50}	L_{10}	L_{50}
Site B	35.6	32.4	31.3	29.1
Site D	44.0	36.7	40.2	38.1

2.12 OREGON NATURAL HERITAGE AREAS – OAR 632-037-0055(1)(q)(D), ORS 517.971(7)(o)

The *Grassy Mountain Mine Project Oregon Natural Heritage Resources Baseline Report* (EM Strategies, 2018h; Appendix B12) was submitted to DOGAMI on May 30, 2018. The report was accepted by the TRT on August 15, 2018, as conforming to the *Environmental Baseline Study Work Plans* (EM Strategies, 2017a; Appendix B23), which were accepted by the TRT on December 7, 2017. There are no natural heritage resources in the Permit Area. The closest natural heritage resource to the Permit Area is the Succor Creek State Natural Area, approximately 16 miles from the Permit Area. The next closest is the Crooked Creek State Natural Area, approximately 61 miles from the Permit Area.

2.13 OUTSTANDING NATURAL AREAS – OAR 632-037-0055(1)(q)(C), ORS 517.971(7)(o)

The *Grassy Mountain Mine Project Outstanding Natural Areas Baseline Report* (EM Strategies, 2018i; Appendix B13) was submitted to DOGAMI on May 30, 2018. The report was accepted by the TRT on June 29, 2018, as conforming to the *Environmental Baseline Study Work Plans* (EM Strategies, 2017a; Appendix B23), which were accepted by the TRT on December 7, 2017. The BLM list identifies only one Outstanding Natural Area (ONA) in Oregon: the Yaquina Head ONA, located along the coast in Newport, Oregon (BLM, 2016). Additional internet searches also identified the Diamond Craters ONA (BLM, 2018). The Diamond Craters ONA is located approximately 77 miles southwest of the Permit Area.

2.14 RECREATION

The *Grassy Mountain Mine Project Recreation Baseline Report* (EM Strategies, 2018j; Appendix B14) was submitted to DOGAMI on January 11, 2018. The report was accepted by the TRT on March 15, 2018, as conforming to the *Environmental Baseline Study Work Plans* (EM Strategies, 2017a; Appendix B23), which were accepted by the TRT on December 7, 2017. The Recreation Opportunity Spectrum (ROS) is a BLM-created conceptual framework for recreation managers to inventory, plan, and manage recreation resources on BLM land. The ROS provides a way to characterize either the capability of a resource to provide an experience, or the demand for an experience, in terms of the activity opportunity and setting opportunity provided or demanded. There are two ROS classes in the Recreation Study Area: Rural and Semi-primitive Motorized. These classes are described in Table 19.

Table 19. Recreation Opportunity Spectrum Classifications in the Recreation Study Area

Classification	Description
Rural	This is a substantially modified environment. Resource modifications and utilization practices are to enhance specific recreation activities. Facilities are designed for use by a larger number of people. Motorized use and parking opportunities are available. The probability of user interaction is moderate to high, as is the convenience of sites and opportunities. These factors are generally more important than the physical setting. Wildland challenges and testing of outdoor skills are generally important. Activities may include interpretive services, swimming, bicycling, recreation cabin use, and skiing.
Semi-primitive Motorized	This is a predominately natural or natural-appearing environment of moderate to large size. User interaction is low, but there is evidence of other users. Minimum onsite controls and restrictions may be present. Use of motorized vehicles is permitted. There is a moderate probability of experiencing isolation, closeness to nature, and self-reliance in outdoor skills. Activities may include boating, motor biking, specialized landcraft use, mountain climbing, driving for pleasure, camping, and picnicking.

Resource-dependent recreation use, including driving for pleasure, camping, picnicking, hiking, hunting, scenery viewing, nature studies, rockhounding, and all-terrain vehicle (ATV) use are all popular activities occurring within the Recreation Study Area. Twin Springs Campground is the only designated recreation site in the vicinity of the Recreation Study Area, and it is commonly used for dispersed recreation activities, such as hunting, rockhounding, and ATV use; however, the campground is located outside the Recreation Study Area boundaries.

2.15 SOCIOECONOMICS – OAR-632-037-0055(1)(o)

The *Grassy Mountain Mine Project Socioeconomics Baseline Report* (EM Strategies, 2018k; Appendix B15) was submitted to DOGAMI on February 21, 2018. The report was accepted by the TRT on July 20, 2018, as conforming to the *Environmental Baseline Study Work Plans* (EM Strategies, 2017a; Appendix B23), which were accepted by the TRT on December 7, 2017. The Socioeconomics Study Area is Malheur County, which includes the cities of Vale, Nyssa, Ontario, Adrian, Jordan Valley, and other unincorporated communities. Malheur County is Oregon's second largest county in the area but is largely undeveloped. The County is in the southeastern corner of the State of Oregon and is crossed by two major rivers, the Snake River and the Malheur River. Ninety-four percent of the County is undeveloped rangeland, most of which is federally administered by the BLM. Developed areas along the Snake and Malheur rivers support agricultural production areas and agriculture-focused communities.

The County's population centers consist mostly of its incorporated cities (Ontario, Vale, Nyssa, Adrian, and Jordan Valley). Several unincorporated communities are also located within the County. Malheur County's population has grown slowly and includes periods of net population gain and loss.

Malheur County has a slightly higher percentage of people 18 years of age and younger than the state as a whole, but its proportion of residents aged 65 and older is about the same as the state. Females make up a smaller proportion of the population than the state as a whole. The County is not racially diverse; 86 percent of residents are white. Median household incomes are substantially lower in Malheur County than in the state as a whole, and median values of owner-occupied homes are lower in Malheur County than the state. Approximately 38 percent of residents have a high school diploma and approximately 34 percent have completed some college. The rates of residents having a high school diploma are higher than the state as a whole, but the rates of residents having completed some college are lower than the state as a whole. The rate of college graduates is lower than the state as a whole (U.S. Census Bureau, 2016e).

Most residents speak English at home. Approximately 24 percent of the County's residents primarily speak a foreign language, with Spanish the most prevalent. Approximately 32 percent of County residents identify themselves as being of Hispanic or Latino ethnicity (regardless of race). This rate is higher than the state, which reports a Hispanic or Latino proportion as approximately 12 percent of the total population.

The County has 11,629 housing units, with 88.5 percent occupied and 11.5 percent vacant. These rates are similar to those for the state as a whole. Of the occupied households in the County, 59.7 percent are owner-occupied, and 40.3 percent are renter-occupied. Owner-occupied homes have a slightly higher average household size than renter-occupied units. Approximately 40 percent of all housing units are in Ontario (U.S. Census Bureau, 2016f). Single-family housing units are the most common type of housing in the County, comprising approximately 65 percent of the total. Multifamily housing units make up approximately 17 percent, and mobile homes comprise approximately 18 percent of the total units in the County.

The median age of Malheur County real estate is 41 years, which is only 4 years older than the national median age of 37 (Sperling's Best Places, 2017). Over half of the householders in the County and statewide have been in the same home since the 2000 through 2009 period. When compared to the state, Malheur

County has a higher proportion of long-time householders in the same home (since 1980 or earlier) (U.S. Census Bureau, 2016f). The median home sale price peaked in February 2009 at $174,100 (Zillow, 2017). Most owner-occupied homes in the County are valued between $50,000 and $99,999, with the median home value being $127,000. These values are significantly lower than the same metrics for the state as a whole. The statewide median value is over $100,000 more at $237,300 (U.S. Census Bureau, 2016g).

The median rent for Malheur County ($604) is lower than the state median ($907). Most renters (approximately 63 percent) in the County pay between $500 and $999 per month. Statewide, most renters (about 51 percent) also pay between $500 and $999 per month. When compared to statewide renters, a larger proportion of Malheur County renters pay less than $500 per month (approximately 32 percent for County renters compared to approximately 9 percent of statewide renters) (U.S. Census Bureau, 2016f).

For 2016, the U.S. Census Bureau estimated that the total civilian labor force (people aged 16 years and older and able to work) in Malheur County was approximately 11,936 people. Of these people, most of the unemployed individuals were aged 16 to 19 years; approximately 28 percent of this population was estimated to be unemployed. People aged 20 to 24 years had the second highest unemployment rate, with approximately 18 percent of them being unemployed. For people living in poverty, the unemployment rate was approximately 31 percent in 2016. For disabled persons, approximately 21 percent were unemployed in 2016 (U.S. Census Bureau, 2016h).

Malheur County October 2017 labor market information from the Oregon Employment Department (OED) shows employment increasing for manufacturing, professional/business services, retail trade, and mining/logging/construction services. The trends show reductions in private education/health services and local government (OED, 2017a). In 2016, the average annual wage was $33,851, which is the lowest of the three southeastern Oregon counties (Grant, Harney, and Malheur) (OED, 2017b).

The County does not provide water and sewer services. For unincorporated areas of the County, the Environmental Health Department issues onsite septic system permits, runs the Licensed Facility Program and Drinking Water Program, and oversees the County Solid Waste Program. The cities of Ontario, Nyssa, and Vale provide specific services to their residents, such as domestic water, wastewater, storm drain, and/or garbage collection services.

Fire protection in Malheur County is provided by the following districts, departments, and agencies: Ontario Fire & Rescue, Nyssa Fire Department, Vale Fire & Ambulance, Adrian Rural Fire Protection District, Jordan Valley Volunteer Fire Department, and BLM. The BLM has been integrated with the U.S. Forest Service since 1995 for fire and aviation management in the Pacific Northwest and is managed cooperatively between the two agencies and in close collaboration with the Pacific Northwest Wildfire Coordinating Group.

The Malheur County Sherriff's Office is the primary provider of law enforcement services to residents of Malheur County. The Ontario Police Department and Nyssa Police Department also provide law enforcement services to residents in those jurisdictions. The Oregon State Police (OSP) is a multi-disciplined organization that enforces traffic laws on state roadways, investigates and solves crime, conducts post-mortem examinations and forensic analysis, and provides background checks and law enforcement data. The OSP also regulates gaming, the handling of hazardous materials and fire codes, and educates the public on fire safety and enforce fish, wildlife, and natural resource laws (OSP, 2016).

The Malheur Education Service District (ESD) provides a supporting infrastructure to the local school districts. The Malheur ESD supports 10 local school districts containing 27 schools. These include 8 high schools, 3 middle schools, 9 elementary schools, and 7 schools that service kindergarten through eighth grade (Malheur ESD, 2017).

2.16 SURFACE WATER – OAR 632-037-0055(1)(g), OAR 340-043-0030(2)(c), OAR 340-043-0030(2)(d), OAR 340-043-0030(2)(e)

The revised *Grassy Mountain Gold Project Surface Water Baseline Report* (SPF, 2018; Appendix B16) was submitted to DOGAMI on June 5, 2018, and again on August 14, 2018. The report was accepted by the TRT on January 14, 2019, as conforming to the *Environmental Baseline Study Work Plans* (EM Strategies, 2017a; Appendix B23), which were accepted by the TRT on December 7, 2017. The Surface Water Resources Study Area was established to develop an environmental baseline for assessing potential impacts from Project facilities, potential impacts of surface runoff from Project facilities, and to provide background data on the Owyhee River and Lake. The Surface Water Resources Study Area includes the Mine and Process Area and two separate and non-contiguous areas on the Owyhee River and Lake Owyhee. One location is on the Owyhee River, 4 miles downstream of Owyhee Dam, and the other location is upstream of the dam and Permit Area on the Owyhee River/Lake Owyhee at Leslie Gulch.

No perennial surface water features are located within the immediate vicinity of the Surface Water Resources Study Area; therefore, the following five surface water sampling sites were selected and consisted of the closest perennial surface water bodies:

- Dry Creek Arm of Lake Owyhee;
- Owyhee River, downstream of Owyhee Dam;
- Owyhee River/Lake Owyhee, upstream of Owyhee Dam at Leslie Gulch;
- Negro Rock Canyon Creek at the northern border of Surface Water Resources Study Area; and
- Twin Springs Creek, upstream of Dry Creek.

Lake Owyhee and the Owyhee River are the predominant drainage features for the region, flowing south to north and ultimately discharging to the Snake River near the Oregon-Idaho border. Lake Owyhee, created in 1932 with construction of the Owyhee River Dam, is approximately 6 miles southeast of the Project. Tributary stream flow is typically ephemeral or intermittent (Orr, Orr, and Baldwin, 1992; Baldwin, 1959). Drainages in the Project Area do not flow directly into the Owyhee River or Lake Owyhee.

The main Surface Water Resources Study Area boundary includes a sampling site on Dry Creek Arm of Lake Owyhee, downstream from where Dry Creek and Twin Springs Creek enter the lake. The Surface Water Resources Study Area also includes the two separate and non-contiguous areas on the Owyhee River/Lake Owyhee: Owyhee River downstream of Owyhee Dam and Owyhee River upstream of Owyhee Dam at Leslie Gulch.

The Owyhee River/Lake Owyhee sampling sites were selected to provide background surface water data in the vicinity of the Project. However, no impacts to Owyhee River/Lake Owyhee are anticipated from the proposed Project because the Owyhee River drainage is in a different watershed than the Project site.

The Project is in the Sourdough Basin/Negro Rock Canyon watershed, which drains to the north. Grassy Mountain, located southeast of the Project, serves as the hydrologic divide between the Sourdough Basin/Negro Rock Canyon watershed and the watersheds draining to the Owyhee River.

The five surface water sites located within the Surface Water Resources Study Area were visited bi-annually during the second and fourth quarters of 2013 and the second quarter of 2014. Water quality samples were collected from four of these five sites during the three sampling events. Samples were not collected at Twin Springs Creek, upstream of Dry Creek, because this site was dry during each visit.

Surface water conditions were considered steady state and only one set of field parameters (pH, electrical conductivity [EC], specific conductance [SC], dissolved oxygen [DO]) were collected. The sensors for the pH meter, conductivity meter, and DO meter were placed directly in the surface water for data collection. Readings were recorded once the measurements stabilized.

Water-quality samples collected from surface water were analyzed for the list of approved water quality analytes. Table 20 lists the approved analytes, as well as the laboratory testing method, the laboratory minimum detection limit (MDL), and the reporting limit (five times the MDL). For metals, samples for both total and dissolved metals were collected. For the other parameters, only total samples were collected.

Table 20. List of Water Quality Analytes

Parameter	Laboratory Method of Analyses	MDL	Reporting Limit	Sample Type
Aluminum	EPA 200.7	0.03 mg/L	0.15 mg/L	total and dissolved
Arsenic	EPA 200.8	0.0002 mg/L	0.001 mg/L	total and dissolved
Barium	EPA 200.7	0.003 mg/L	0.015 mg/L	total and dissolved
Cadmium	EPA 200.8	0.0001 mg/L	0.0005 mg/L	total and dissolved
Calcium	EPA 200.7	0.1 mg/L	0.5 mg/L	total and dissolved
Chromium	EPA 200.8	0.0005 mg/L	0.002 mg/L	total and dissolved
Copper	EPA 200.8	0.0005 mg/L	0.0025 mg/L	total and dissolved
Iron	EPA 200.7	0.02 mg/L	0.05 mg/L	total and dissolved
Lead	EPA 200.8	0.0001 mg/L	0.0005 mg/L	total and dissolved
Magnesium	EPA 200.7	0.2 mg/L	1 mg/L	total and dissolved
Manganese	EPA 200.8	0.0005 mg/L	0.0025 mg/L	total and dissolved
Mercury	1631E	0.2 ng/L	1.0 ng/L	total and dissolved
Nickel	EPA 200.8	0.0006 mg/L	0.003 mg/L	total and dissolved
Potassium	EPA 200.7	0.2 mg/L	1.0 mg/L	total and dissolved
Selenium	EPA 200.8	0.0001 mg/L	0.0005 mg/L	total and dissolved
Silver	EPA 200.8	0.00005 mg/L	0.00025 mg/L	total and dissolved

Parameter	Laboratory Method of Analyses	MDL	Reporting Limit	Sample Type
Sodium	EPA 200.7	0.2 mg/L	1.0 mg/L	total and dissolved
Zinc	EPA 200.7	0.01 mg/L	0.05 mg/L	total and dissolved
Antimony	EPA 200.8	0.0004 mg/L	0.002 mg/L	total and dissolved
Beryllium	EPA 200.8	0.00005 mg/L	0.00025 mg/L	total and dissolved
Bismuth	EPA 200.7	0.04 mg/L	0.2 mg/L	total and dissolved
Boron	EPA 200.8	0.01 mg/L	0.05 mg/L	total and dissolved
Cobalt	EPA 200.8	0.00005 mg/L	0.00025 mg/L	total and dissolved
Gallium	EPA 200.7	0.1 mg/L	0.5 mg/L	total and dissolved
Lithium	EPA 200.7	0.008 mg/L	0.04 mg/L	total and dissolved
Molybdenum	EPA 200.8	0.0005 mg/L	0.0025 mg/L	total and dissolved
Scandium	EPA 200.7	0.1 mg/L	0.5 mg/L	total and dissolved
Strontium	EPA 200.7	0.005 mg/L	0.03 mg/L	total and dissolved
Thallium	EPA 200.8	0.0001 mg/L	0.0005 mg/L	total and dissolved
Tin	EPA 200.8	0.0001 mg/L	0.0005 mg/L	total and dissolved
Titanium	EPA 200.7	0.005 mg/L	0.025 mg/L	total and dissolved
Vanadium	EPA 200.8	0.0002 mg/L	0.001 mg/L	total and dissolved
Uranium	EPA 200.8	0.0001 mg/L	0.0005 mg/L	total and dissolved
Nitrate+Nitrite (as N)	EPA 353.2	0.02 mg/L	0.1 mg/L	total
Ammonia Direct (as N)	EPA 350.1	0.05 mg/L	0.25 mg/L	total
Alkalinity	SM 2320B	2 mg/L	10 mg/L	total
Bicarbonate	SM 2320	2 mg/L	10 mg/L	total
Carbonate	SM 2320	2 mg/L	10 mg/L	total
Chloride	EPA 300.0	0.5 mg/L	2.5 mg/L	total
Conductivity	SM 2510B	1 µmhos/cm	5 µmhos/cm	total
Cyanide, Total	EPA 335.4	0.003 mg/L	0.015 mg/L	total
Cyanide, WAD	SM 4500	0.003 mg/L	0.015 mg/L	total
Fluoride	EPA 300.0	0.05 mg/L	0.25 mg/L	total
Hardness	SM 2340B	0.8 mg/L	4.0 mg/L	total
pH	SM 4500-H B	0.1	0.5	total
Sulfate	EPA 300.0	0.5 mg/L	2.5 mg/L	total

Parameter	Laboratory Method of Analyses	MDL	Reporting Limit	Sample Type
Total Dissolved Solids	SM 2540C	10 mg/L	50 mg/L	total
Total Suspended Solids	SM 2540D	5 mg/L	25 mg/L	total
Total Phosphorus	EPA 365.1	0.01 mg/L	0.05 mg/L	total

mg/L = milligrams per liter; ng/L = nanograms per liter; µmhos/cm = micromhos per centimeter

Of the five surface water sites that were visited bi-annually that serve as background water quality monitoring locations, flow was only directly measured at one site during the sampling period, Negro Rock Canyon Creek. At the three Owyhee River/Lake Owyhee sites, flow could not be directly measured. Instead, flow was estimated from available USGS gauging sites, and lake elevation was obtained for the Dry Creek Arm site above Owyhee Dam from the Bureau of Reclamation. Flow and lake elevation data are summarized in Table 21. Flow data for the Owyhee River, downstream of Owyhee Dam, was obtained from USGS gauge 13183000, located 0.8 mile downstream of the dam (located between the dam and the sampling site).

Table 21. Flow and Elevation Data from Surface Water Sites

Quarter (Q)	Parameter	Negro Rock Canyon Creek	Dry Creek Arm of Lake Owyhee	Owyhee River, Downstream of Owyhee Dam	Owyhee River, Upstream of Owyhee Dam at Leslie Gulch
Q2 2013	Date/Time	6/26/13 12:00	6/27/13 14:20	6/26/13 17:00	6/27/13 9:00
Q2 2013	Flow (cfs)	0.04	N/A	152	119
Q2 2013	Elevation (ft)	N/A	2,622.22	N/A	2,622.22
Q4 2013	Date/Time	11/21/13 14:55	11/23/13 15:50	11/20/13 15:10	11/20/13 11:00
Q4 2013	Flow (cfs)	0.01 – 0.02	N/A	21	141
Q4 2013	Elevation (ft)	N/A	2,597.13	N/A	N/A
Q2 2014	Date/Time	6/24/14 10:55	6/23/14 15:20	6/19/14 15:45	6/19/14 12:30
Q2 2014	Flow (cfs)	0.01 – 0.02	N/A	165	105
Q2 2014	Elevation (ft)	N/A	2,602.69	N/A	N/A

ft = feet; cfs = cubic feet per second; N/A = not applicable

Flow data for the Owyhee River, upstream of Owyhee Dam at Leslie Gulch, was obtained from USGS gauge 13181000, identified as Owyhee River near Rome, Oregon. This gauge is approximately 50 river miles upstream of the sampling location but is the closest gauge upstream of the dam. Flow data from this gauge, therefore, is not a reliable representation of flow at the sampling site. However, flow at this gauging location does provide a reference point to associate with the sampling event and may be used to identify relationships between flow and water quality data as additional flow and water quality are collected. The Owyhee Dam at Leslie Gulch sample site is within the pool of Lake Owyhee at high lake levels. At lower lake levels, the Owyhee River flows past the site. During the Q2 2013 event, the sample site was within the backwater of Lake Owyhee. During the Q4 2013 and Q2 2014 events, the Owyhee River was flowing at Leslie Gulch.

Field water quality data collected during surface water sampling are presented in Table 22 and represent the complete field water quality dataset because only one set of field parameters was measured.

Table 22. Field Water Quality

Site Name	Sampling Period	pH	EC	SC	Temperature	DO	DO Saturation
		S.U.	µS/cm	µS/cm at 25 °C	°C	mg/L	%
Dry Creek Arm of Lake Owyhee	Q2 2013	8.74	230	243	22	8.5	113
	Q4 2013	7.92	217	328	7.3	11.0	100
	Q2 2014	8.57	263	275	22.8	8.7	112
Negro Rock Canyon Creek	Q2 2013	6.86	395	482	15.4	4.2	49
	Q4 2013	7.23	ND	592	9.9	5.71	50
	Q2 2014	7.35	393	490	14.6	6.6	78
Owyhee River, Downstream of Owyhee Dam	Q2 2013	8.67	187	239	13.3	10.7	116
	Q4 2013	8.84	187	292	6.1	11.8	105
	Q2 2014	8.81	230	289	14.3	10.4	116
Owyhee River, Upstream of Owyhee Dam at Leslie Gulch	Q2 2013	8.08	330	349	22.1	8.0	99
	Q4 2013	8.43	239	357	7.7	10.2	95
	Q2 2014	8.59	306	351	18.2	8.00	99

µS/cm = microSiemens per centimeter; S.U. = significant unit; °C = degrees Celsius; ND = non-detect

The pH of the Owyhee River and Lake Owyhee sampling sites consistently ranged between 8.0 and 9.0. The pH of Negro Rock Canyon Creek was lower, ranging from 6.86 to 7.35.

The specific conductance of the Owyhee River and Lake Owyhee sites ranged between 239 and 357 µS/cm at 25 °C. Negro Rock Canyon Creek had consistently higher values, ranging from 482 to 592 µS/cm at 25 °C.

The DO concentration at the Dry Creek Arm of Lake Owyhee and Owyhee River, upstream of Owyhee Dam at Leslie Gulch, ranged between 8 and 11 mg/L, with values above 10 mg/L during the 4th Quarter of 2013 (November). The Owyhee River, downstream of Owyhee Dam, had higher DO concentrations, ranging from 10.4 to 11.8 mg/L, with the higher value measured during the 4th Quarter of 2013. DO is higher when water temperature is lower. The DO concentrations measured at Negro Rock Canyon Creek were lower than the Owyhee River sites, with values ranging from 4.2 to 6.6 mg/L. The percent oxygen saturation was consistently at or above 100 percent at the Owyhee River sites but ranged from 49 to 78 percent at Negro Rock Canyon Creek.

Surface water analytical results were compared to ODEQ water quality standards as described in OAR 340-041. Water quality in the Owyhee Basin is managed to protect the designated beneficial uses, including public and private domestic water supply, fish and aquatic life, and fishing.

For the aquatic life criteria, the standards are presented as Criterion Maximum Concentration (CMC) and Criterion Continuous Concentration (CCC), which indicate the maximum allowable average 1-hour and 96-hour average contaminant concentrations, respectively. Sampling results were compared to both the CMC and CCC values.

Human health criteria (HHC) are presented as "organism only" for areas in which fishing is the designated use and as "water + organism" for areas in which water supply and fishing are designated uses. In the Owyhee Basin, designated beneficial uses include water supply and fishing so the "water + organism" criteria apply.

The water quality results collected at each site for each parameter are included in the *Grassy Mountain Gold Project Surface Water Baseline Report* (SPF, 2018; Appendix B16). Table 23 displays the results that exceeded ODEQ's water quality standards.

Table 23. Water Quality Results

Sample Location	Arsenic, dissolved (mg/L) (CMC – 0.34, CCC – 0.15, HHC – 0.0021)			Arsenic, total (mg/L) (CCC – 0.34, CCC – 0.15, HHC – 0.0021)			Iron, total (mg/L) (CCC – 1.0)			Mercury, total (mg/L) (CMC – 2,400, CCC – 12.0)		
	Q2 2013	Q4 2013	Q2 2014	Q2 2013	Q4 2013	Q2 2014	Q2 2013	Q4 2013	Q2 2014	Q2 2013	Q4 2013	Q2 2014
Dry Creek Arm of Lake Owyhee	0.0057	0.0072	0.0063	0.0057	0.0076	0.0064	--	1.16	1.45	--	--	--
Negro Rock Canyon Creek	0.0246	0.0231	0.0258	0.0243	0.0237	0.0268	--	--	--	--	--	--
Owyhee River, downstream of Owyhee Dam	0.0059	0.0059	0.0063	0.0054	0.0059	0.0061	--	--	--	--	--	--
Owyhee River, upstream of the dam at Leslie Gulch	0.0111	0.01	0.011	0.0114	0.0102	0.0108	1.15	--	1.22	23	13.2	19.9

Arsenic was the only water quality parameter where the HHC standard was exceeded at any of the surface water sampling sites. Arsenic was detected above the HHC limit of 0.0021 mg/L at all four of the surface water sampling sites during each of the three sampling events. Negro Rock Canyon Creek and Owyhee River, upstream of the dam at Leslie Gulch, consistently had the highest arsenic concentrations. At Negro Rock Canyon Creek, the total arsenic concentrations were consistent, ranging from 0.0237 to 0.0268 mg/L. At Owyhee River, upstream of the dam at Leslie Gulch, the total arsenic concentrations were consistent but lower compared to Negro Rock Canyon Creek, ranging from 0.0102 to 0.0114 mg/L.

Total iron was detected above the aquatic life CCC standard of 1.0 mg/L on two occasions at both the Dry Creek Arm of Lake Owyhee and at the Owyhee River, upstream of the Owyhee Dam at Leslie Gulch. At Dry Creek Arm, the first exceedance was 1.16 mg/L during the 4th Quarter of 2013 and the second exceedance

was 1.45 mg/L during the 2nd Quarter of 2014. For the Owyhee River, upstream of the dam at Leslie Gulch sampling location, the total iron concentration was 1.15 mg/L during the 2nd Quarter of 2013 and 1.22 mg/L during the 2nd Quarter of 2014.

Total mercury was detected above the aquatic life CCC standard of 12.0 mg/L at Owyhee River, upstream of the dam at Leslie Gulch, during all three of the surface water sampling events. Mercury was detected at 23 mg/L during the 2nd Quarter of 2013, 13.2 mg/L during the 4th Quarter of 2013, and 19.9 mg/L during the 2nd Quarter of 2014.

2.17 TERRESTRIAL VEGETATION – OAR 632-037-0055(1)(a), OAR 340-095-0010(2)(a), OAR 340-095-0020(8)

The *Grassy Mountain Mine Project Terrestrial Vegetation Baseline Report* (EM Strategies, 2018l; Appendix B17) was originally submitted to DOGAMI on January 29, 2018, then again on October 2, 2018. The report was accepted by the TRT on October 23, 2018, as conforming to the *Environmental Baseline Study Work Plans* (EM Strategies, 2017a; Appendix B23), which were accepted by the TRT on December 7, 2017. Field surveys were conducted in a portion of the Terrestrial Vegetation Study Area by HDR in 2014 and 2015 (2014/2015 Survey Area). Additional field surveys were conducted in the remaining portion of the Terrestrial Vegetation Study Area by EM Strategies in 2017 (2017 Survey Area). Between the field surveys conducted in 2015 and 2017, there were six field-verified vegetation communities documented in the Terrestrial Vegetation Study Area: Agricultural; Bluebunch Wheatgrass/Cheatgrass/Annual; Burned Yellow Rabbitbrush/Bluebunch Wheatgrass; Crested Wheatgrass Seeding; Wyoming Big Sagebrush/Bluebunch Wheatgrass; and Wyoming Big Sagebrush/Crested Wheatgrass.

There were four transects established in the Wyoming Big Sagebrush/Crested Wheatgrass community during the 2014/2015 field surveys in the Terrestrial Vegetation Study Area, and three additional transects established during the 2017 field surveys, one each in the Bluebunch Wheatgrass/Cheatgrass/Annual community, the Crested Wheatgrass Seeding community, and the Wyoming Big Sagebrush/Crested Wheatgrass community. These transects were established to verify the mapped vegetation communities.

There were seven Daubenmire sampling locations established during the 2014/2015 field surveys in the Terrestrial Vegetation Study Area: six within the Wyoming Big Sagebrush/Bluebunch Wheatgrass community, and one within the Crested Wheatgrass Seeding community. Seven additional Daubenmire sampling locations were established during the 2017 field surveys: two within the Bluebunch Wheatgrass/Cheatgrass/Annual community, one within the Crested Wheatgrass Seeding community, two within the Wyoming Big Sagebrush/Bluebunch Wheatgrass community, one within the Burned Yellow Rabbitbrush/Bluebunch Wheatgrass community, and one within the Wyoming Big Sagebrush/Crested Wheatgrass community. These sampling locations were established to determine the dominant plant species within each community.

The USFWS Information for Planning and Consultation species list reported that no federally threatened or endangered plant species are known to occur within the 2017 Survey Area. No federally threatened or endangered plant species were observed during the 2017 field surveys, or during the HDR 2014/2015 surveys.

A list of rare, threatened, and endangered plants was obtained from the Oregon Biodiversity Information Center in April 2017 for the 2017 Survey Area. Two plant species were reported to occur within 2 miles of the Terrestrial Vegetation Study Area: Cronquist's stickweed (*Hackelia cronquistii*), a State Threatened species and a federal Species of Concern; and Mulford's milk-vetch (*Astragalus mulfordiae*), a State Endangered species and a federal Species of Concern. No State-listed species were observed during the 2017 or 2014/2015 field surveys.

The Final Oregon/Washington State Director's Special Status Species List, July 13, 2015, which lists BLM-sensitive plant species suspected or documented to occur with the Vale District was reviewed. No BLM-sensitive plant species were observed during the 2017 or 2014/2015 surveys.

A list of noxious weeds for Malheur County, Oregon, was obtained from the Malheur County Weed Advisory Board. Malheur County has prioritized control and/or eradication of noxious weeds by A, B, and C classes, with Class A having the highest priority. Two noxious weed species were observed during the 2017 surveys: nodding thistle (*Carduus nutans*), a Class B species observed along the northern portion of the 2017 Terrestrial Vegetation Study Area in the Access Area; and cheatgrass (*Bromus tectorum*), the most dominant species observed throughout the Terrestrial Vegetation Study Area. The following species were observed during the 2014/2015 surveys: Austrian peaweed (*Sphaerophysa salusula*), a Class A species observed adjacent to the Access Area; Canada thistle (*Cirsium arvense*), a Class B species observed near the northern portion of the Mine and Process Area; and three Class C species – cheatgrass, medusahead (*Taeniatherum caput-medusae*), and field bindweed (*Convoculus arvensis*). Class A species are subject to mandatory control/eradication where found. Class B species are required to be controlled within 50 ft of all property lines, easements, and rights-of-way. Class C species can be treated at the landowner's discretion.

2.18 TRANSPORTATION

The *Grassy Mountain Mine Project Transportation Baseline Report* (EM Strategies, 2018m; Appendix B18a) was originally submitted to DOGAMI on January 18, 2018, then again on July 12, 2018. The report was accepted by the TRT on July 19, 2018, as conforming to the *Environmental Baseline Study Work Plans* (EM Strategies, 2017a; Appendix B23), which were accepted by the TRT on December 7, 2017. The Main Access Road used for the Transportation Study Area includes portions of U.S. Highways 20 and 26, County-maintained Russell Road, and BLM-maintained Cow Hollow Road and Twin Springs Road.

Mine Development Associates (MDA) provided an estimate on November 13, 2018 (Dyer, 2018; Appendix B18b), for the amount of Mine traffic that would use the Access Road from Vale, Oregon, to the Mine site. This information was provided for use in a traffic study to determine the design requirements for the Access Road and to document the estimated Mine traffic along the Access Road. The estimate excludes any Mine traffic associated with the construction of the Mine and does not include any public traffic not related to the mining activities.

On January 25, 2019, Clemow Associates LLC provided a transportation analysis letter (Clemow, 2019; Appendix B18c) to support the Project, including: property description and background information, development trip generation, consideration of transportation policies, and summary of conclusions.

An emergency access route has been identified as a portion of Oregon State Route 201, and County-owned Mitchell Butte Road and Owyhee Avenue. Owyhee Avenue is part of the main access to Owyhee Reservoir, which is a popular destination for recreationists. The emergency access route would share approximately 4 miles of Owyhee Avenue with this type of recreation-focused traffic.

Oregon Department of Transportation (ODT) traffic count data from 2015 show that the average annual daily traffic (AADT) for U.S. 20 and U.S. 26 through Vale ranges between 2,501 and 5,000 vehicles. The volume decreases east and west of Vale and ranges between 1,001 to 2,500 AADT. An ODT traffic counter located west of the point where the main access route intersects U.S. 20 shows an AADT of approximately 1,900 for 2015 (ODT, 2017).

In coordination with the Malheur County surveyor, traffic counts (PicoCount 2500, Version 2.25) were taken at two locations in the Transportation Study Area in fall 2014 and again in spring 2015 to record existing two-way road and trail usage on Russell Road and Twin Springs Road. The traffic counters do not reliably record lighter vehicles like ATVs and dirt bikes, so the data can only be said to reflect full-size vehicles. Table 24 summarizes the data collected.

Table 24. Traffic Count Data in the Transportation Study Area

Counter Number	Location	X Coordinate	Y Coordinate	Data Gathering Start Date	Data Gathering End Date	Total Recorded Vehicles
1	Russell Road (fall 2014)	475475	4862111	9/21/14	10/22/14	2,591
	Russell Road (spring 2015)			4/7/15	4/16/15	413
2	Twin Springs Road (fall 2014)	471910	4840599	9/21/14	10/22/14	564
	Twin Springs Road (spring 2015)			4/7/15	4/16/15	27

Note: coordinates are in NAD 83, UTM Zone 11 North, meters

2.19 VISUAL RESOURCES

The *Grassy Mountain Mine Project Visual Resources Baseline Report* (EM Strategies, 2017b; Appendix B19) was submitted to DOGAMI on December 22, 2017. The report was accepted by the TRT on February 28, 2018, as conforming to the *Environmental Baseline Study Work Plans* (EM Strategies, 2017a; Appendix B23), which were accepted by the TRT on December 7, 2017. The BLM's Visual Resources Management (VRM) system provides a method to identify visual resource values, establishes objectives for managing these values, and provides information to evaluate the visual effects of the proposed projects on public lands. The inventory of visual values combines evaluations of scenic quality, sensitivity levels, and distance zones to establish visual resource inventory classes, which are "informational in nature and provide the basis for considering visual values in the land use planning process. They do not establish management direction and should not be used as a basis for constraining or limiting surface disturbing activities." (BLM, 1986)

VRM classes are typically assigned to public land units through the use of the visual resource inventory classes in the BLM's land use planning process. Two out of four VRM classes occur in the Visual Resources Study Area. Table 25 displays the two classes and the objectives of each class.

Table 25. BLM Visual Resources Management Classes in the Visual Resources Study Area

VRM Class	Description
III	The objective of this class is to partially retain the existing character of the landscape. The level of change to the character should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
IV	The objective of this class is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. Management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

Four key observation points (KOPs) were chosen to describe the existing visual elements within the Visual Resources Study Area in the context of form, line, color, and texture associated with the characteristic landscape, and to capture views that represent the existing landscape where Project activities are being proposed. Brief descriptions of the views at each KOP are provided in Table 26. Detailed descriptions of the form, line, color, and texture and photographs at each KOP are included in the *Grassy Mountain Mine Project Visual Resources Baseline Report* (EM Strategies, 2017b; Appendix B19).

Table 26. Key Observation Points

KOP	Location Description	VRM Class	View Description
1	End of Access Road facing south in Mine and Process Area	IV	Gently rolling hills with rock outcroppings in middleground and background. Sagebrush/bunchgrass vegetation has fine to medium texture. Linear elements include Access Road tire tracks.
2	Western portion of Mine and Process Area facing northeast	IV	Gently rolling hills. Sagebrush/bunchgrass vegetation creates a mottled, fine to medium texture across the landscape. Linear elements include Access Road tire tracks.
3	Intersection of Access Area and Twin Springs Road facing south toward Mine and Process Area	IV	Relatively flat valley bottom. Gently rolling hills are visible in the middleground and background near the Mine and Process Area. Vegetation is relatively homogeneous. The color and texture of the Access Road contrasts sharply with the adjacent, undisturbed landscape.
4	Along Twin Springs Road facing south toward Mine and Process Area	IV	Terrain slopes gently toward the south toward the Mine and Process Area. Slightly undulating landforms are visible in the middleground and background. Landscape is mottled with fine textured grass species. The color and texture of Twin Springs Road contrasts sharply with the adjacent, undisturbed landscape.

2.20 WETLANDS – OAR 632-037-0055(1)(e)

The *Grassy Mountain Mine Project Wetland Delineation Report* (EM Strategies, 2018n; Appendix B20) was submitted to the Oregon Department of State Lands (DSL) on March 1, 2018, and DSL concurrence was received May 3, 2018. On July 24, 2018, the TRT accepted the DSL concurrence as conforming to the *Environmental Baseline Study Work Plans* (EM Strategies, 2017a; Appendix B23), which were accepted by the TRT on December 7, 2017. An additional letter from DOGAMI was received February 11, 2019, which repeated the acceptance by the TRT. The report was finalized and is included in Appendix B20. Existing literature was reviewed to evaluate the physical features of the Wetland Study Area, including USGS maps, aerial imagery, National Wetland Inventory (NWI) maps, and the National Hydrography Dataset. The data review facilitated the identification of potential wetland areas and prioritization of field survey areas.

NWI mapping indicated the presence of two emergent wetlands and three ponds within or partially within the Wetland Study Area. The NWI describes the wetlands as PEM1Ch (palustrine, emergent, persistent, seasonally flooded, diked/impounded) and PEM1B (palustrine, emergent, persistent, saturated). The ponds are described as PUBH (palustrine, unconsolidated bottom, permanently flooded), PUSCx (palustrine, unconsolidated shore, excavated), and PUSCh (palustrine, unconsolidated shore, seasonally flooded, diked/impounded). The third pond, designated PUSCh, corresponds to Schweizer Reservoir on USGS maps. Two palustrine emergent wetlands, two springs, and one impounded area (Schweizer Reservoir) were identified during the 2015 and 2017 field investigations.

HDR surveyed a portion of the Wetland Study Area in 2012 (identified as Tax Lot 101), and an additional area in 2015. EM Strategies surveyed another portion in 2017. There were no surface waters observed during the 2012 surveys in Tax Lot 101. Between the 2015 and 2017 surveys, a total of two wetlands, two springs, one pond, one artificial waterway, and ten tributary drainages were observed in the Wetland Study Area. Three tributary drainages and one pond (Schweizer Reservoir) were observed within the area surveyed in 2015. Two wetlands, two springs, one artificial waterway (J-H Canal), and ten tributary drainages were observed within the area surveyed in 2017. The three tributary drainages surveyed in 2015 were contiguous with three of the ten drainages surveyed in 2017.

The Oregon DSL concurred with the findings on May 3, 2018. The purpose of the concurrence was to evaluate the features for the state Removal-Fill Law, which determined that the two wetlands and artificial waterway (J-H Canal) are subject to the permit requirements of the Removal-Fill Law. A separate determination by the Army Corps of Engineers may be conducted for purposes of complying with the Clean Water Act.

2.21 WILD, SCENIC, OR RECREATIONAL RIVERS – OAR 632-037-0055(1)(p)

The *Grassy Mountain Mine Project Wild, Scenic, or Recreational Rivers Baseline Report* (EM Strategies, 2018o; Appendix B21) was submitted to DOGAMI on May 30, 2018. The report was accepted by the TRT on July 19, 2018, as conforming to the *Environmental Baseline Study Work Plans* (EM Strategies, 2017a; Appendix B23), which were accepted by the TRT on December 7, 2017. There are no designated wild, scenic, or recreational rivers in the Permit Area. The closest nationally designated wild, scenic, or recreational river is the Owyhee River, located approximately 31 miles to the south of the southernmost tip of the Permit Area. There are two portions of the Owyhee River included in the Oregon Scenic Waterway system: a portion of the main stem of the river, from Crooked Creek to Birch Creek, and a

portion of the South Fork, from the Idaho border to the Three Forks area. These two segments total approximately 26 miles.

2.22 WILDLIFE RESOURCES – OAR 632-037-0055(1)(e), OAR 340-095-0010(2)(b)

The *Grassy Mountain Mine Project Wildlife Resources Baseline Report* was originally submitted to DOGAMI on April 18, 2018, October 16, 2018, and January 30, 2019. The TRT determined that the January 2019 report needed additional information to conform to the Calico *Environmental Baseline Study Work Plans* (EM Strategies, 2017a; Appendix B23); a request for additional information and a revised baseline report were provided to Calico in a letter on February 19, 2020. On October 20, 2020, DOGAMI received a revised report titled *Calico Resources USA Corp., Grassy Mountain Mine Project, Malheur County, Oregon, Wildlife Resources Baseline Report* (EM Strategies, 2020; Appendix B22). The TRT Wildlife Subcommittee reviewed the revised report and confirmed that it contains all the information required by the 2017 Work Plans and that the accuracy and completeness of the data are satisfactory. On February 2, 2021, the TRT voted to approve the final report and DOGAMI accepted the final report.

Field surveys were conducted in a portion of the Wildlife Study Area by Northwest Wildlife Consultants, Inc. (NWC) between June 24, 2013, and May 30, 2014, and in the remaining portion of the Wildlife Study Area by EM Strategies between April 18, 2017, and February 6, 2018. Based on comments from the TRT, additional aerial surveys were conducted in 2020 by Wildlife Resource Consultants LLC. Surveys were conducted in a 0.5-Mile Buffer Study Area or a 2-Mile Buffer Study Area, dependent on the species. In the 0.5-Mile Buffer Study Area, the following species were surveyed: pygmy rabbits (*Brachylagus idahoensis*) and white-tailed jackrabbit (*Lepus townsendii*); bats; burrowing owls (*Athene cunicularia hypugaea*); landbirds; and general wildlife encounters were documented. In the 2-Mile Buffer Study Area studies included a greater sage-grouse (*Centrocercus urophasianus*) habitat assessment and lek surveys, a golden eagle (*Aquila chrysaetos*) nest survey, a nesting raptor survey, and general observations of special status species and nonlisted species.

2.22.1 LARGE- AND SMALL-PLOT AVIAN SURVEYS

Seventeen avian species were detected during large-plot avian surveys conducted by NWC at five plots between June 2013 and May 2014. Three of these species, horned lark (*Eremophila alpestris*), western meadowlark (*Sturnella neglecta*), and common raven (*Corvus corax*), were found during all seasons and accounted for 137 of the 171 individuals detected. Golden eagles were detected during all seasons. Ferruginous hawks (*Buteo regalis*), a BLM-sensitive species, were detected during summer and spring (and found nesting during the 2014 raptor nest survey). The burrowing owl, also a BLM-sensitive species, was detected in the summer and fall of 2013 but was not found during any subsequent surveys. Other raptors detected outside of the large-plot surveys were northern harrier (*Circus cyaneus*), red-tailed hawk (*Buteo jamaicensis*), rough-legged hawk (*Buteo lagopus*), short-eared owl (*Asio flammeus*), long-eared owl (*Asio otus*), and prairie falcon (*Falco mexicanus*). The prairie falcon was confirmed nesting within the 2-Mile Buffer Study Area; northern harrier was believed to be nesting within the 2-Mile Buffer Study Area in 2014, and long-eared owl was estimated to have bred successfully in 2013.

Forty-seven avian species were detected during small-plot avian surveys conducted by NWC at eight plots between June 2013 and May 2014. Of these, 25 were found only at Plot 6, which was more than a mile

from the Permit Area and contained habitats not found in the Permit Area. Together, the pond, marsh, and riparian trees at Plot 6 constituted an oasis that attracted not only waterfowl, marsh birds, and riparian obligates (some of which nested there) but also migrants (including passerines) that used this taller, denser vegetation for cover and foraging during stopovers. Twenty-two species were detected at the other seven plots in habitat that is found within the Permit Area. Horned lark and western meadowlark were each found at six of the seven small plots, the only species found during all four survey seasons, and the most commonly detected species. Rock wren (*Salpinctes obsoletus*) was detected during spring, summer, and fall seasons (at the three plots containing a small amount of exposed rock). Six species were detected multiple times during spring and summer seasons; these were Brewer's sparrow (*Spizella breweri*), lark sparrow (*Chondestes grammacus*), loggerhead shrike (*Lanius ludovicianus*), Say's phoebe (*Sayornis saya*), sagebrush sparrow (*Artemisiospiza nevadensis*), and sage thrasher (*Oreoscoptes montanus*). All these birds are presumed to breed in or near the Permit Area, and active nests of horned lark, lark sparrow, and common nighthawk (*Chordeiles minor*) were found incidentally during other surveys. Mountain bluebirds (*Sialia currucoides*) were detected at two plots, but these detections occurred on a single fall survey day. Nine other species were detected on a single occasion and at a single plot: ferruginous hawk, California quail (*Callipepla californica*), northern flicker, greater yellowlegs, canyon wren (*Catherpes mexicanus*), American robin, black-throated sparrow (*Amphispiza bilineata*), dark-eyed junco (*Junco hyemalis*), and lazuli bunting.

2.22.2 RAPTOR NEST SURVEYS

Three raptor nests were active in 2013. One of these, a common raven nest, was active again in 2014. A burrowing owl nest was identified by the presence of an adult owl and an abundance at the burrow entrance of pellets and excrement of this species. Only a single individual was ever seen at any one time, however, so whether a breeding attempt occurred remains uncertain. (Surveys did not begin in 2013 until after breeding would be expected to be complete.) A successful breeding attempt by long-eared owls was documented by the presence at the pond of three young of this species and a stick nest in a tree with pellets and excrement in and beneath it. This nest was likely originally built by black-billed magpies (*Pica hudsonia*).

One active ferruginous hawk nest was observed within the 2-Mile Buffer Study Area during the April 27, 2014, aerial raptor nesting survey performed by NWC (NWC, 2014). Within 10 m of the active ferruginous hawk nest, there was an inactive alternate nest. There were also two older inactive nests built by ferruginous hawks approximately 2 and 3 kilometers (km) to the northeast and east-northeast of the active nest. These nests likely represented a separate ferruginous hawk breeding territory from the past. Three active common raven nests were also located during the aerial survey. These nests could be used in future years by raptors, especially by great horned owl (*Bubo virginianus*) or prairie falcon, both of which will use stick nests constructed by other species. There were two other inactive stick nests (besides those of ferruginous hawk) identified during the aerial survey.

Raptor nest surveys were flown within the 2-Mile Buffer Study Area on April 21 and 28, 2017, in conjunction with the greater sage-grouse lek surveys. Potential nesting sites for raptors were surveyed from 100 ft to 350 ft from the aircraft. Nest site transect routes were flown along likely habitat on rock outcroppings, cliff faces, trees, and powerline structures. No occupied raptor nests were recorded during the aerial survey. A single red-tailed hawk was observed on two occasions during the surveys south of Grassy Mountain along the rimrock. Although there were many perch sites, no nests were found in the

area. It is suspected the hawk may be resident of the Owyhee Canyon cliff faces immediately south of Grassy Mountain because both times the hawk departed the area in the direction of the canyon to the south. A red-tailed hawk was also observed perched on a power transmission pole southeast of the Permit Area.

Seven raptor nests were recorded during the June 21 through 23, 2017, ground surveys. Two stick raptor nests were recorded on a southeast-oriented rock outcrop in Sagebrush Gulch: a large raptor nest was approximately 25 ft from the ground on an approximately 35-ft-high outcrop; and a small raptor nest is situated east of the larger nest at approximately the same height. No raptors were observed at or near the nests during visits on June 21 and 22, 2017. No evidence of occupancy, such as recent whitewash and/or feathers, was observed at the larger nest. However, one old pellet, possibly from a red-tailed hawk, as well as a few old, bleached rabbit bones were found below the nest. The small raptor nest had abundant whitewash on the rock face below the nest and a few dark downy feathers were visible in sticks above the nest bowl. It is possible a common raven used the nest at one time; however, no raven pellets or feathers were found below the nest.

A pair of red-tailed hawks was observed perched and flying near the golden eagle nest OR GE 1327. The birds were observed in courtship behavior during the May 27, 2017, survey. Numerous perch sites were found on several rocks and sagebrush on the ridge line approximately 750 ft southeast of the nest location with abundant whitewash, molted feathers, and prey remains of rabbits. No further breeding activity at this nest was observed during the June and July 2017 surveys. A female Cooper's hawk (*Accipiter cooperii*) was recorded on June 23, 2017, in the cottonwood trees that surround the pond below Sagebrush Spring. At least three small stick nests were observed in the trees. The hawk gave an alarm call but remained in the cover of the trees while the biologist surveyed the site for sage-grouse broods from approximately 100 m away. No Cooper's hawks were observed during site visits on July 4 and 5, 2017, and it is unlikely any of the nests were used by Cooper's hawks.

On June 22, 2017, an inactive large raptor nest was recorded in a cottonwood tree at No Name Springs. Two adult red-tailed hawks were observed soaring approximately 0.25 mile south of the nest tree. No raptors were observed perched in or near the tree during a one-hour observation period. No sign (e.g., whitewash, scat, feathers, prey remains, pellets) was found below or near the nest.

On June 23, 2017, an inactive prairie falcon nest was recorded on a rock outcrop at the south end of Double Mountain. No falcons were observed during a 1.5-hour monitoring session. Molted feathers, old eggshells, and pellets were present beneath the nest ledge. No downy feathers, recent prey remains, or scat, which could suggest use in 2017, were found. Two pairs of rock doves (*Columbia livia*) were nesting in a horizontal ledge in the outcrop. A hive of bees occupied a pothole in the outcrop. Two closed-leghold trap sets were also located along the base of the outcrop.

No burrowing owls or burrowing owl nests were found during the three broadcast surveys conducted in 2017. No evidence of burrowing owl presence within the 0.5-Mile Buffer Study Area, such as pellets, feathers, tracks, and scat, were found during surveys conducted for other wildlife species. Potentially suitable breeding habitat is present along the Access Road in locations dominated by grass and low shrubs. Numerous burrows dug by ground squirrels (*Urocitellus* spp.), badgers (*Taxidea taxus*), and coyotes (*Canis latrans*), which could provide potential nest sites, are found throughout the 0.5-Mile Buffer Study Area.

Observations of raptors and raptor nests were recorded January 25 and February 6, 2018, while flying aerial winter greater sage-grouse surveys in the 2-Mile Buffer Study Area. A red-tailed hawk was observed perched at a large raptor nest in a cottonwood tree along the Malheur River. A second red-tailed hawk was observed perched at a large raptor nest in a cottonwood tree next to a farmhouse. A pair of ferruginous hawks was recorded at a platform nest in the foothills south of the J H Canal. One bird was perched on the platform, and the other bird flushed from the ground near the platform. A ferruginous hawk nest was recorded upslope of Cow Hollow on a low relief rock outcrop approximately 10 ft above the ground. A pair of prairie falcons was recorded at the nest identified in 2017 on a rock outcrop at the south end of Double Mountain.

Aerial surveys for raptor nests were flown May 7 and June 12, 2020. The surveys encompassed a 2-mile buffer of the Permit Area. On the first aerial survey, an intensive nest search was conducted to locate all golden eagle and raptor nests. The aerial surveys focused on potential nesting habitats, including rock outcrops, cliffs, patches of riparian woodlands, cottonwood trees, and manmade structures, such as powerline poles. All nests encountered during the intensive nest search were recorded, including common raven nests. In addition, the 2018 nest inventory was used to navigate to previously recorded nests. During the first aerial survey, all nests were closely inspected for evidence of occupation, including repair and decoration, or extensive mutes (whitewash or droppings). All raptor nests were visited on the second survey.

Red-tailed hawks, prairie falcons, barn owls (*Tyto alba*), long-eared owls, turkey vultures (*Cathartes aura*), and northern harriers were observed during the aerial surveys. The long-eared owl was observed in two locations and both were flushed from cover. The northern harrier was a female flushed from the margin of a pond; no male harrier was observed.

2.22.3 GOLDEN EAGLE NEST MONITORING

The golden eagle nests located and monitored by NWC in the 2014 aerial survey are outside of the 2-Mile Buffer Study Area, and therefore, are not discussed in the *Grassy Mountain Mine Project Wildlife Resources Baseline Report* (EM Strategies, 2020; Appendix B22). An aerial survey was conducted of the 2-Mile Buffer Study Area on April 21 and 28, 2017, in conjunction with the greater sage-grouse lek survey. No occupied golden eagle nests were observed. Golden eagle nest OR GE 1327, which is within the 2-Mile Buffer Study Area, was observed from the ground for a 4-hour period on May 27, 2017. A pair of red-tailed hawks was engaged in courtship behavior near the nest; however, no golden eagles were observed.

Observations of golden eagles were recorded during the aerial survey for winter use by greater sage-grouse in the 2-Mile Buffer Study Area. Golden eagle nest OR GE 1327 was observed from the air on both January 24 and February 6, 2018; no golden eagles were observed near the nest, nor were recent greens present in the nest. Two golden eagle nests were recorded on a pinnacle rock outcrop approximately 0.75 mile upslope of Sagebrush Gulch. An adult golden eagle flushed from the rock outcrop. One nest is approximately 30 ft above the ground while the other nest is approximately 40 ft above the ground on a 60-ft rock outcrop. Both nests are located on ledges. One eagle was observed perched on the outcrop on January 24, 2018, while a pair of eagles was observed at the outcrop during the February 6, 2018, survey. The eagles were variously seen flying together or perched on the outcrop with nests. In addition, observations of four adults and one immature golden eagle were recorded during both the January 24 and February 6, 2018, flights at locations that were not associated with nest sites.

Aerial surveys for golden eagles were conducted on May 7 and June 12, 2020. The primary objective of this survey was to determine nest occupancy status and territory (or breeding area) distribution. Forty-nine stick nests were observed in or near the 2-mile buffer survey area, and 18 of these were classified as occupied. In order to be classified as occupied, a nest must contain eggs, young, or an incubating bird; or the nest has a pair of birds on or near it or has been recently repaired or decorated (Postupalsky, 1974; Millsap, et al., 2015). One nest was occupied by golden eagles, five were occupied by ferruginous hawks, five were occupied by red-tailed hawks, one was occupied by prairie falcons, and one was occupied by barn owls. There were also five occupied common raven nests in the survey area.

Based on aerial survey data, it is estimated that there are five golden eagle nesting territories that contain nests within the survey area. In order to be classified as occupied, a territory had to meet one or more of the following conditions: Contain a nest where a breeding attempt occurred; contain an occupied nest; or have eagle presence observed at or near a nest within the territory (Steenhof and Newton, 2007). According to these criteria, two nesting territories were designated as occupied. The remaining three golden eagle nesting territories were unclassified, as surveys were conducted too late in the breeding season to detect territory occupancy by eagles that did not breed or had a failed nesting attempt.

2.22.4 GREATER SAGE-GROUSE SURVEYS

Greater sage-grouse brood-rearing surveys were conducted on June 25, 2013, and July 25, 2013. No sign of use of the 2-Mile Buffer Study Area by greater sage-grouse was detected. No birds were encountered, nor were any feathers, tracks, or scat found. No greater sage-grouse or their sign were encountered during any other field surveys. Scat of this species can persist for many months and even years; therefore, the lack of such sign is indicative of little or no use of the 2-Mile Buffer Study Area by this species in recent years. Winter-use surveys were conducted on December 20, 2013, and January 14 and 15, 2014; the latter were done under ideal conditions, clear days with a covering of snow on the ground. No sign of use of the survey area by greater sage-grouse was detected. No birds were encountered, nor were any feathers, tracks, or scat found. No greater sage-grouse leks are known to exist within the 2-Mile Buffer Study Area (Milburn, 2014). No sign of this species was found during any surveys prior to the April 2014 lekking season; therefore, there were no areas of potential concentration to be checked for leks. Listening for drumming males during the hour before and after sunset (on April 10 and April 28, 2014) yielded no detections of greater sage-grouse or their leks.

No sage-grouse hens and chicks or evidence of sage-grouse presence (e.g., scat, tracks, feathers) were found in any of the surveyed spring locations during the June and July 2017 surveys. No greater sage-grouse were detected during the two aerial winter-use surveys in January and February 2018. No leks were found during ten hours of aerial transect surveys in April 2017.

2.22.5 LEPORID SURVEYS

No potentially suitable pygmy rabbit habitat was identified within the 0.5-Mile Buffer Study Area. The most nearly suitable areas were surveyed on November 26, 2013, and May 30, 2014. No pygmy rabbits or their sign (scat or burrows) were detected. No pygmy rabbits or their sign were detected during any of the other surveys conducted within the 2-Mile Buffer Study Area. No potentially suitable white-tailed jackrabbit habitat was identified within the 0.5-Mile Buffer Study Area. The most nearly suitable areas

were surveyed on November 26, 2013, and May 30, 2014. No white-tailed jackrabbits were encountered, and all jackrabbit pellets found were in habitat more characteristic of the widespread congeneric black-tailed jackrabbit (*Lepus americanus)*. No white-tailed jackrabbits were detected during any of the surveys conducted within 2-Mile Buffer Study Area.

No pygmy rabbits or their sign (e.g., burrows, scat, tracks) were found in the 0.5-Mile Buffer Study Area along the Access Road during the May and July 2017 surveys. Potentially suitable habitat is present in the extensive patch of sagebrush that extends from DM Spring south approximately 2.5 miles. Within this area, surveys focused on patches of sagebrush that were uneven in height and density and in drainages. The sagebrush habitat in the other mapped patches lacks the shrub density and canopy cover characteristic of occupied pygmy rabbit habitat as described by Ulmschneider, et al. (2004). Small scats produced by juvenile cottontail rabbits (*Sylvilagus nuttallii*) in summer can be similar in size to those of pygmy rabbits. To confirm species attribution of these scats, three samples were collected and submitted for species identification via DNA analysis to the University of Idaho Laboratory for Ecological, Evolutionary and Conservation Genetics. The scats were from mountain cottontails, not pygmy rabbits. During the 2017 surveys, no white-tailed jackrabbits were observed in any of the survey areas. The large lagomorph scats found were typical of black-tailed jackrabbit not the larger scats produced by white-tailed jackrabbits. This species can also be readily observed during aerial surveys, but none were detected during the low-elevation 2018 winter aerial surveys conducted for sage-grouse. Potential habitat is present in the sagebrush steppe habitat in the southern portion of the 0.5-Mile Buffer Study Area along the Access Road.

2.22.6 ACOUSTIC BAT SURVEYS

No caves or Mine adits were found during the 2013-2014 field surveys, and no areas with potential to concentrate bat roosting or maternal colonies were identified within the Permit Area. Bat detectors were operational from before sunset to after sunrise at each of five detector locations during a total of 21 nights between June 24 and October 25, 2013, and between April 8 and May 30, 2014. Ten species of bats were detected over the course of the study. Small-footed myotis (*Myotis ciliolabrum*) appears to be present near the Permit Area from at least April through September. Canyon bat (*Parastrellus merican*) and California myotis (*Myotis californicus*) are also likely present in the Permit Area through a majority of the survey season, with the latter having a slightly more protracted period of presence. Silver-haired bat (*Lasiomycteris noctivagans*) appears to move through the area during spring and late summer migration with some regularity. The other species detected are uncommon or rare, with the possible exception of pallid bat (*Antrozous pallidus*), for which there were detections at three locations and on several nights in July and August 2013.

Three bat species were detected during the 2017 acoustic surveys: California myotis, small-footed myotis, and silver-haired bat. Three of the six survey locations did not have any recordings. All equipment was working. Fewer species were detected in 2017 as compared to 2014, likely due to only five survey nights. In addition, the 0.5-Mile Buffer Study Area along the access road provides little structural diversity that can provide day-roosting habitat for bats. Potential day-roosting habitat consists of a few rock outcrops and the deciduous trees at DM Spring. The three sites with recordings had water that probably attracted bats for foraging and drinking.

2.22.7 GENERAL WILDLIFE OBSERVATIONS

Wildlife species and habitats occurring within and adjacent to the 0.5-Mile Buffer Study Area are consistent with desert areas of the Great Basin and consist of desert-rangeland type habitat where sagebrush and grasses are the dominant species. Mule deer and pronghorn antelope (*Antilocapra americana*) are present in the 0.5-Mile Buffer Study Area year-round, but in low densities. ODFW-designated mule deer winter range is bisected by approximately 5 miles of the north end of the Permit Area. There is no other big game winter range that intersects the Permit Area (ODFW, 2015). During the NWC surveys in 2014, the largest herds of mule deer and pronghorn antelope were observed at the northern end of the Permit Area along the access road where they presumably feed in the alfalfa fields. During the 2017 EM Strategies, Inc. (EM Strategies) surveys, mule deer and pronghorn antelope were observed primarily in the vicinity of springs. Elk (*Cervus canadensis*) scat was noted in a few locations near springs and one bull elk was observed near an unnamed spring east of Sagebrush Gulch. During the 2018 aerial winter sage-grouse surveys, groups of mule deer were recorded throughout the 2-Mile Buffer Study Area, while a herd of 30 pronghorn antelope was observed in Cow Hollow. No elk were observed.

Use of the 0.5-Mile Buffer Study Area is low by water-dependent species, such as the migratory waterfowl and shorebirds that travel within the Pacific Flyway. Lake Owyhee, located 6 miles to the southeast of the site, attracts several species of migrating waterfowl, shorebirds, and passerines. Many of these birds cross the 0.5-Mile Buffer Study Area in transit. Sagebrush-dependent species, like the sagebrush sparrow, occur in the 0.5-Mile Buffer Study Area, but in low numbers due to the high degree of disturbance to the existing habitat and the dominance of cheatgrass. Raptor use is common.

During the NWC surveys, the Pacific chorus frog (*Pseudacris regilla*) was detected numerous times at the single pond within the Permit Area and at DM Spring. The sagebrush lizard (*Sceloporus graciosus*) and western fence lizard (*Sceloporus occidentalis*) were generally associated with small rock outcrops, like those at Small Avian Plots 1 through 3. The long-nosed leopard lizard (*Gambelia wislizenii*), Great Basin collared lizard (*Crotaphytus bicinctores*), western whiptail (*Cnemidophorus tigris*), desert horned lizard (*Phrynosoma platyrhinos*), and pygmy short-horned lizard (*Phrynosoma douglasi*) were encountered primarily in sagebrush shrub steppe and in sandy soil types.

Ground squirrels, especially Merriam's (*Urocitellus canus*), were extremely abundant in the 0.5-Mile Buffer Study Area. They provide an important source of prey for the raptor species that breed in the area. Both badger and coyote were present; these species prey on the abundant ground squirrels, create their own burrows and expand those of their prey, and provide potential burrows for burrowing owls and other wildlife. A bobcat (*Lynx rufus*) was encountered on one occasion during the NWC survey, and tracks were found during winter surveys. Porcupines (*Erethizon dorsatum*) were observed in several locations within the 0.5-Mile Buffer Study Area.

3. OPERATING PLAN

An abbreviated operating permit application limited to the Project's Basalt Borrow Quarry is provided in Appendix E3 while the abbreviated operating permit application limited to the Project's Closure Cover Borrow Areas Quarry is provided in Appendix E4.

3.1 PROJECT SUMMARY

Calico proposes to mine approximately 2.07 Mst of mill-grade ore and 0.27 Mst of waste rock for a Mine life of approximately 8 years; however, the TSF has been sized to contain 3.64 Mst should additional reserves be identified. The material (both ore and waste) will be extracted from an underground mine using conventional underground mining techniques, including drilling, blasting, mucking, loading, and hauling at a rate of approximately 1,200 stpd, four days per week. Calico will use hydraulic loaders to load the ore and waste into haul trucks. The haul trucks will transport the waste rock to the TWRSF near the TSF and transport the ore to the ROM ore stockpile adjacent to the crushing and milling facilities. The ore will be crushed and leached in a CIL processing plant at a rate of 750 stpd, seven days per week. The leached tailings will go through a cyanide detoxification process, amended with lime, then be pumped in a slurry to the TSF, with supernatant solution recovered and pumped back to the Mill.

The crushed ore will be ground by a ball mill in closed circuit with a hydro-cyclone cluster. The hydro-cyclone overflow flows to a CIL recovery circuit via a pre-aeration tank. Gold and silver leached in the CIL circuit will be recovered on activated carbon and eluted in a pressurized Zadra-style elution circuit and then recovered by electrowinning in the gold room. The gold–silver precipitate will be dried in a mercury retort oven and then mixed with fluxes and smelted in a furnace to pour doré bars. Carbon will be re-activated in a carbon regeneration kiln before being returned to the CIL circuit. CIL tails will be treated for cyanide destruction prior to pumping to the TSF for disposal.

Leach pads will not be constructed or operated at the Site [OAR 632-037-0060(4)(a)].

3.1.1 ESTIMATED DISTURBANCE ACREAGE

The Project would result in approximately 487.9 acres of proposed surface disturbance comprised of 18.9 acres of private land and 469 acres of public land. Table 27 describes the Project proposed surface disturbance, by disturbance component, and the land ownership is presented in Map 3.

Table 27. Proposed Surface Disturbance

Component	Public Acres	Private Acres	Total Acres
Underground Mine	0.5	6.2	6.7
TSF	99.8	0.0	99.8
TWRSF	5.7	0.0	5.7
Process Plant[1]	2.5	0.0	2.5
Infrastructure & Ancillary Facilities[2]	17.8	0.0	17.8
Roads	31.6	3.3	34.9
Yards & Laydown Areas	9.9	0.1	10.0
Growth Media Stockpiles	7.7	0.0	7.7
Water Supply[3]	7.9	0.0	7.9
Power Supply[4]	61.1	0.0	61.1
Stormwater Diversion Channels	11.6	0.2	11.8
Quarry	48.2	0.0	48.2
Reclamation Borrow Areas[5]	55.9	0.0	55.9
Monitoring	0.0	0.0	0.0
Exploration[6]	10.0	0.0	10.0
Disturbed Areas[7]	98.6	9.1	107.8
Total	469.0	18.9	487.9

Note: Rounding may cause apparent discrepancies.

[1] This includes the Mill, refining plant, administrative building, parking lot, security building, mining contractor yard, reagent storage, assay laboratory, and substation.

[2] Includes the Perimeter Fence at 22,176 ft with a 20-ft construction disturbance width.

[3] Includes the water supply pipeline at 16,164 ft with a 20-ft construction disturbance width and well locations each at 0.25 acre.

[4] Includes 20-ft area of disturbance for the 25.2 miles of new powerline.

[5] The area of disturbance for the Reclamation Borrow Area is the maximum area of disturbance.

[6] The actual location of the exploration activities within the Project Area is currently unknown and is assumed to be equally on public and private lands. Annual exploration work plans will be submitted and reviewed by BLM and DOGAMI as defined at 43 CFR 3809.0-5.

[7] Disturbed Area is a 50-ft buffer on the mining facilities, excluding the Reclamation Borrow Areas.

3.2 MINE DESIGN AND MINING METHODS – OAR 632-037-0050(4), OAR 632-037-0060(1), OAR 340-043-0040(2)(a), ORS 517.971(6)(a)

3.2.1 GEOTECHNICAL CONSIDERATIONS – OAR 632-037-0060(10)

Ausenco Engineering Canada Inc. (Ausenco) conducted an overview of the geotechnical data analysis and underground support recommendations that is presented in the feasibility study (Ausenco et al., 2020). Ausenco confirms the presence of rock mass varying from Poor to Fair quality, which is considered suitable for selective underground mining methods and limited sizes, such as mechanized cut and fill. The ground support designs considered industry-standard empirical guidelines and the experience of qualified professionals in variable ground conditions. There will likely be geotechnical optimization of some aspects of the extraction sequence based on actual conditions observed during mining. Additional analysis or design may be required, as is typical for projects like this, for future design stages and facility operation.

The Grassy Mountain deposit is situated in a horst block, which has been raised 50 ft to 200 ft in a region of complex block faulting and rotation. Faulting is dominated by post-mineral N30W to N10E striking

normal faults developed during Basin and Range extension. On the northeast side of the deposit, these faults progressively down-drop mineralization beneath post-mineral cover. The North and Grassy faults are significant fault structures that pose a risk to the stability of mining methods, such as open stoping. The proposed mining method of mechanized cut and fill, where conditions can be well-controlled and the backfill provides stability, is suitable for the conditions at Grassy Mountain.

Time-dependent drill core degradation has previously been identified at Grassy Mountain. In general, degraded zones are contained within siliceous sinter bodies, conglomerates, and interbedded tuff beds within the Grassy Mountain Formation. Degradation is strongest in intervals that are observed or interpreted as having contained silicic and potassic alteration. Degradation of Grassy Mountain Formation lithologic units results in difficult mining conditions that can be mitigated through additional ground support. The principal ground support measures proposed are fiber-reinforced shotcrete with rock bolts.

Stress measurements are not currently available. In the absence of this information, a stress regime based on the World Stress Map was used to obtain a range of estimates. Based on the shallow depth, ground stress is relatively low, and rock damage due to higher mining-induced stress concentrations is only anticipated in high-extraction or sequence closure areas and weaker rock mass areas. However, a reduction in the mining stresses around excavations is likely to adversely affect the stability of large open-span areas. Tensile failure and gravity-induced unraveling are foreseen as the main failure mechanisms. Enhanced ground support is included for these areas. Enhanced ground support includes thicker shotcrete with a smaller bolt spacing and Swellex-type bolting. Cable bolts will be considered in certain over-stressed areas.

The Grassy Mountain deposit is in a structurally complex, clay-altered, epithermal environment. Rock mass conditions in the infrastructure and production areas vary from Poor to Fair quality (Rock Mass Rating [RMR] 20–45; RMR mean 40–45) with the poorest conditions within major structures that run longitudinally through and bound the deposit. Outside of these fault areas, rock mass conditions are generally Fair. However, localized zones of Poor rock mass potentially associated with secondary structures or locally elevated alteration intensity are present throughout the planned mining area.

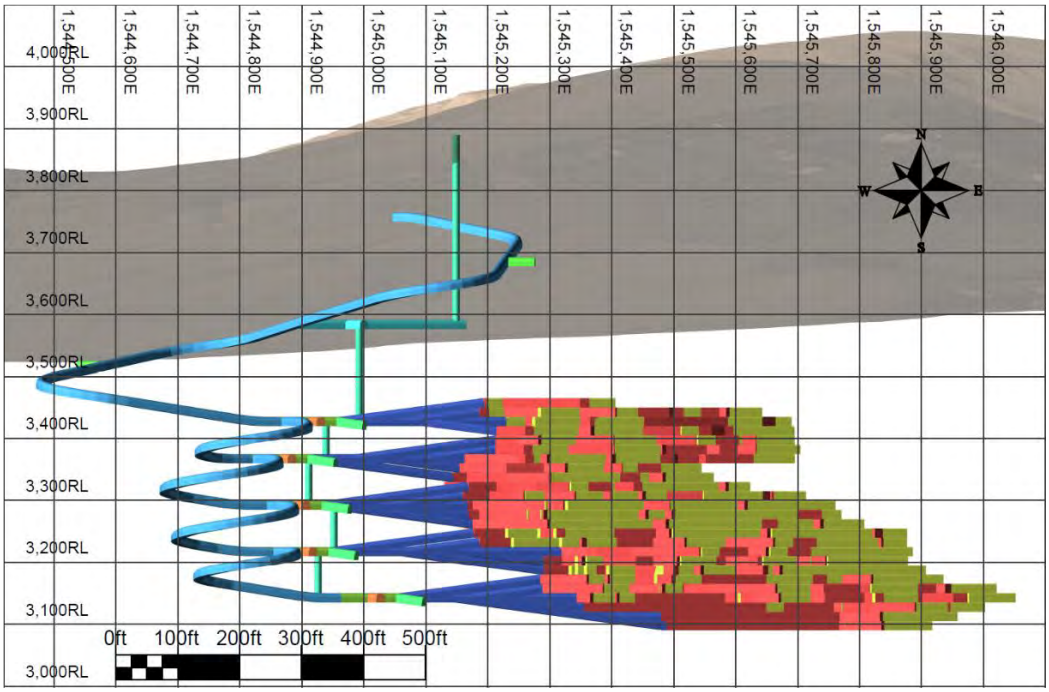
Excavation stability assessments were completed using industry-accepted empirical relationships, with reference to analog operational mines where possible. The rock mass conditions (Poor to Fair) are considered suitable only for selective underground mining methods and limited sizes, such as mechanized cut and fill.

Subsidence caused by extraction could cause dilation or fracturing above the deposit and an increase in hydraulic conductivities and water inflows to the Mine. Some level of dilation of fault and joint systems within the Grassy Mountain Formation can be expected as a result of mining. Under the current extraction sequence, this is expected to occur during the initial stages of mining. The ground surface presents contour displacements of around 0.4 to 9.8 in. from Year 1 to Year 5 (increasing in lineal proportion), but from Year 5 to Year 8, the contour displacements are projected to stabilize at around 9.8 in.

The degree of subsidence occurs directly above the Mine where there is no mine infrastructure. Because of the small amount of subsidence predicted, plus the lack of a consequence from subsidence, no subsidence control plan is necessary.

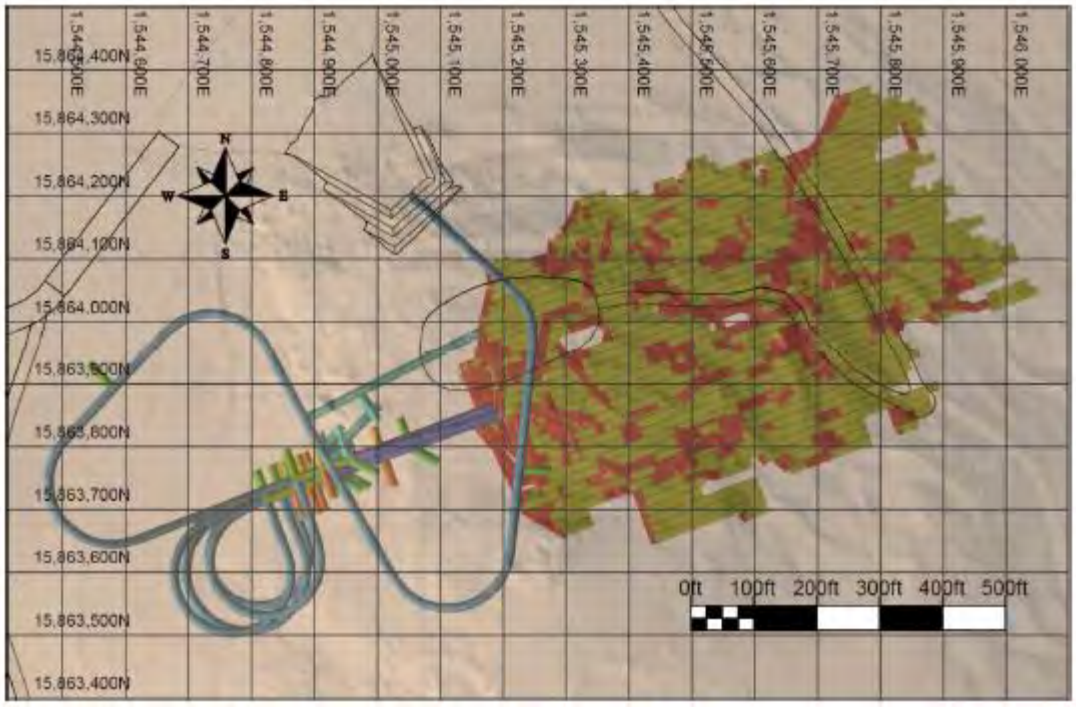
3.2.2 UNDERGROUND MINING METHOD

The Grassy Mountain Mine will be an underground mechanized cut-and-fill mining operation in which ore will be accessed via a decline and a system of internal stopes. From the decline, which is a spiral-shaped tunnel built adjacent to the deposit area, there will be five Level Stations that are at a defined elevation (elevations 3420, 3360, 3285, 3210, and 3135) or levels. Access from each Level Station to each Production Drift will be via Level Access Ramps, with a maximum gradient of 12.5 percent. Ventilation will be provided through a series of vent raises, which connect each level to a ventilation shaft that daylights on surface, and also provides for a secondary means of egress. The proposed Grassy Mountain Mine is shown in Figures 3 and 4.



Note: Mining activity types shown by the same colors used in Figures 4 and 5.
Source: Ausenco, et al., 2020.

Figure 3. Grassy Mountain Mine Cross Section Looking North



Note: Mining activity types of workings shown by the same colors used in Figures 3 and 5.
Source: Ausenco, et al., 2020.

Figure 4. Proposed Grassy Mountain Mine Plan (plan view)

The mechanized cut-and-fill method involves accessing the ore from a main ramp or decline to the mineralized area, generally in a 15 ft by 15 ft stope. Mining of the ore in the Production Levels will be performed using topcuts and undercuts that are typically 15 ft high and vary from 15 ft to 30 ft wide. The Production Levels will be backfilled with a CRF and/or rock fill (RF) that provides structural integrity of that backfilled void while the mineralized zone under that area is mined out, backfilled, and the process repeated.

The current Mine plan includes approximately 2.07 Mst of ore and 0.27 Mst of waste, with approximately 1.5 Mst of CRF and RF being placed back underground. The underground Mine design was based on an average production rate of 1,200 tons per day for approximately 8 years, using a four-day-on and three-day-off schedule, and operating on two 12-hour shifts per day. This will provide sufficient material to feed 750 stpd to the Mill on a seven-day-per-week basis.

3.2.2.1 Mine Access

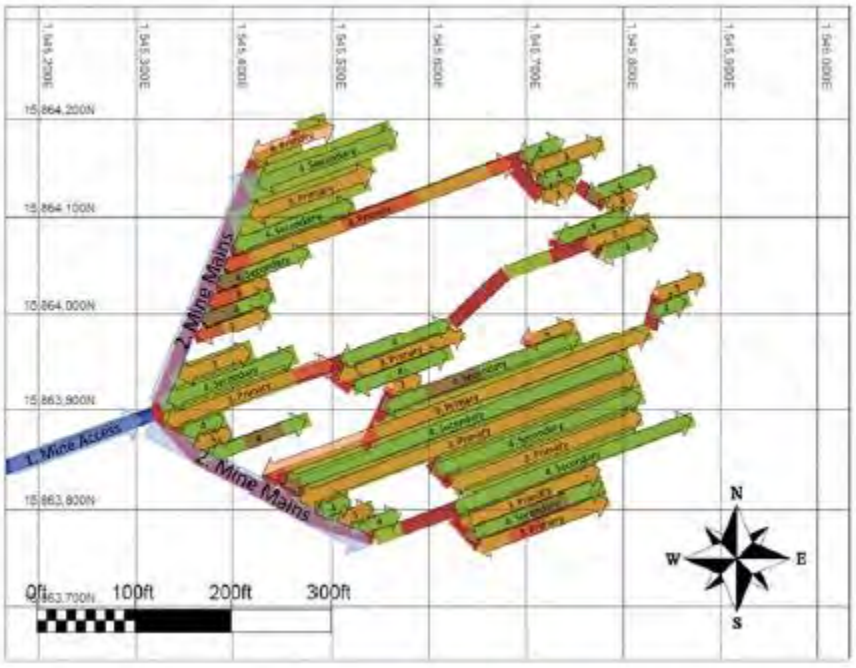
The main access portal will be located approximately 750 ft south of the primary crusher, at an approximate elevation of 3,749 ft, as presented in the *Portal Design Report* (GMS, 2022; Appendix C2). The portal pad was designed with a 1-percent inclination away from the tunnel opening to allow storm water to flow away from the portal and toward the storm water drainage ditches. The portal pad will have sufficient space to install the required ventilator infrastructure to be used during the excavation of the decline ramp and construction facilities, and to allow safe transit of the development equipment. The pad area was expanded from the initial area designed during the Consolidated Permits process to allow more

space for facilities. In addition, the general cut design was updated, increasing the total area of the portal and the excavation volume.

The portal is designed to allow access to the underground Mine facilities while providing adequate space for equipment and vehicles. Additional work is proposed to bring the design to construction level, including numerical modeling of the excavation sequence and site investigation such as geotechnical mapping, portal slope re-design (if necessary) followed by a second numerical model of the excavation.

3.2.2.2 Mining Method Sequence

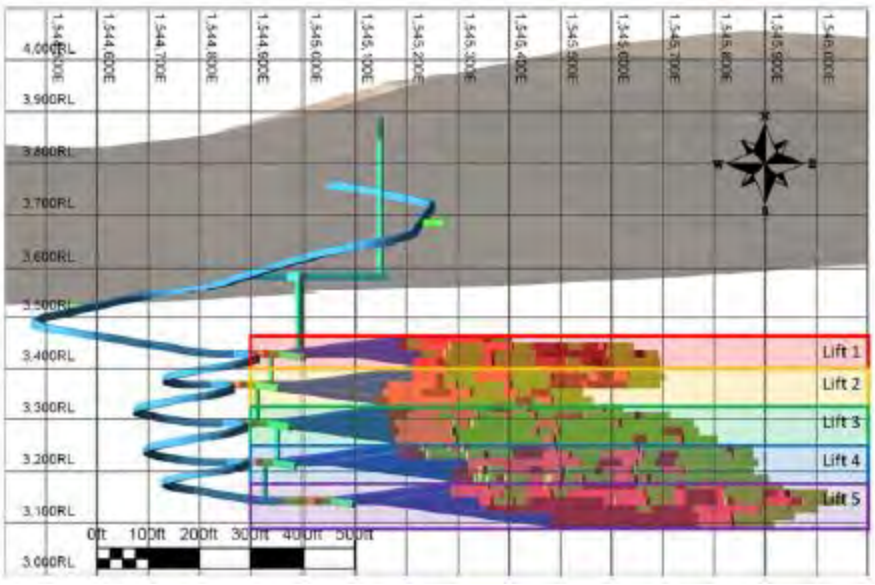
From the decline, the Level Station will be mined first, followed by the Level Access Ramps. Typically, two Level Access Ramps will be mined at the same time, providing multiple mining locations for a level. After the Level Access Ramps are mined, the Production Drifts will be mined in an underhand sequence. The Production Drifts will be sequenced with primaries and secondaries. The primaries will be mined and backfilled first, allowing for a backfill minimum cure time of 14 days between the primaries and secondaries. This will continue until the entire level is complete. After the entire level is complete, the level access will be backfilled and a 28-day delay for the cure time applied. After the cure time is complete, the level below will start. A detailed level sequence for a typical level is shown in Figure 5.



Source: Ausenco, et al., 2020.

Figure 5. Detailed Level Sequence for a Typical Level

The underhand sequence starts at the top and works down in elevation and is grouped into lifts as shown in Figure 6.



Source: Ausenco, et al., 2020.

Figure 6. Mining Lifts

3.2.2.3 Mining Description and Mining Equipment Selection

The mining cycle involves drilling, blasting, and mucking for the development and production access. The final part of the mining cycle is to backfill the stopes.

Once the drilling cycle is complete, the emulsion blasting agent will be loaded into the holes with the respective nonel blasting cap and booster. Emulsion will be used for most production blasting and development rounds. Boosters, primers, detonators, detonation cord, and other ancillary blasting supplies will also be required. Bulk explosives will be stored in a secure powder magazine. The storage of explosives is discussed in Section 3.8.4.

Blasting will occur on-demand throughout the shift. Before blasting occurs, any affected areas will be cleared of personnel and the blasting location will be announced over the Mine communication system. After the blast, an appropriate amount of time must pass to provide adequate ventilation to any affected areas before mining can resume.

The blasted material will be transported to the underground stockpile located on the Level Station using a loader. The material will then be loaded into haul trucks at the truck loading bay using the same loader. The material will then be transported to surface. The truck loading bay section will be excavated to a height of 16 ft to provide clearance to load the trucks.

The underground truck haulage fleet will be conventional load-haul-dump (LHD), low-profile, underground-mining trucks with a nominal 22-ton capacity and equipped with ejector beds. The LHDs will be loaded with ore material underground and haul the material to surface. After the underground haul truck dumps the ore on surface in a stockpile near the Mine Portal, the underground haul truck will be loaded on surface with CRF. The underground haul truck will then haul the CRF underground and place it in a backfilling location.

Ground support will be provided with sprayed concrete lining (fiber-reinforced shotcrete) with bolts installed through the concrete.

The estimate of the fleet size was based on first principles and equipment running-time requirements to achieve the Mine production plan. Maximum permanent equipment quantities are summarized in Section 3.4, including underground and surface operations. Table 28 provides a list of underground mining equipment.

Table 28. Underground Mining Equipment

Underground Mining Equipment	Model	Quantity
Dual (drill + bolter)	Resemin Troidon 88 Dual	3
LHD 5.2 cubic yards	CAT R1600	4
Front-end loader	CAT 962H	1
Truck with ejector bed	CAT AD22	3
Emulsion loader	CAT 440	1
Telehandler	JCB 540-170	2
Dozer	CAT D6T	1
Motor grader	Paus PG5HA	1
4WD twin cab truck	Ford F-150	1
Mine rescue truck	Ford F-150	1
Diamond drilling	Hydracore Gopher	1
Shotcrete sprayer	Normet Spraymec 8100 VC	1
Shotcrete truck	Normet Utimec SF 300	1
Lube truck	Normet Multimec MF 100	1
Water truck	Normet Multimec MF 100	1
Van man-transport	Ford F150 Van	3

3.2.2.4 Backfill

The underground workings will be backfilled with CRF and RF to provide stability to the drifts and to control dilution associated with ore extraction. It is assumed that the underground truck haulage fleet will be loaded with ore material underground and haul the material to surface. After the underground haul truck dumps the ore on surface in a stockpile near the Mine Portal, the underground haul truck will be loaded on surface with CRF or RF. The underground haul truck will haul the CRF or RF underground and place it in a backfilling location.

Rock from the Quarry will be processed as aggregate and used as RF. The basalt generated from the Quarry will also be used as CRF. Waste rock generated from the underground operations, temporarily stored on the TWRSF will also be used as CRF. A small stockpile of rock (basalt from the Quarry and/or waste rock from the TWRSF) will be located adjacent to the backfill plant near the underground Mine Portal to feed the plant and provide basalt from the Quarry for RF.

3.2.2.5 Cemented Rockfill

An Eagle 4000 backfill plant will be constructed near the portal. The basalt generated from the Quarry and waste rock from underground operations will be used for CRF. The plant will produce approximately 3,000 tons of CRF per day. The maximum amount of backfill required on a single day in the Mine is 1,200 tons. The plant is oversized to ensure that the backfill plant will not be a bottle neck in the mining operation. Laboratory tests were conducted to define CRF strength. Based on geotechnical tests, Calico selected the following CRF mix design:

- Cement: 7 percent;
- Water / Cement (ratio): 0.70 to 0.85;
- Basalt / Waste Rock: 85 percent to 90 percent; and
- Nominal Size: 6 in.

However, future work will be performed to assess samples composed of 3 percent cement and 2 percent fly ash, and 4 percent cement and 3 percent fly ash.

3.2.2.6 Rockfill

RF will only be used for areas that will not be accessible from below or besides, and CRF will be the primary means of backfilling. Only basalt material from the Quarry on the east side of the Project will be used, which is not acid generating (SRK, 2022a; Appendix B6).

RF material will be hauled and placed at the ROM size, approximate nominal size of 6 in. During initial construction where more material is needed, the borrow mining will use larger equipment, while smaller equipment will be used during production when the amount of material required is reduced.

3.2.3 MINE DRAINAGE/SEEPAGE

Any Mine drainage will be collected and used in the drilling and mining process, with water not used underground being pumped to the surface to be used in the backfill preparation and in the milling process. The dewatering system was designed for 200 gpm, which will accommodate both the maximum inflow rates (78 gpm) and the underground Mine water requirements (76 gpm for equipment [e.g., drilling], CRF and shotcrete preparation, dust control, etc.) in the event that water is not recirculated to the equipment. The water management activities and site water balance are described in Section 3.10.

3.2.3.1 Underground Infrastructure and Services

Ventilation

The ventilation network was designed to comply with US ventilation standards for underground mines to control air quality for worker safety. Airflow of 100,000 cubic feet per minute (cfm) was selected as a minimum reference for the ventilation design of each level in order to meet the Mine Safety and Health Administration (MSHA) ventilation standards.

Required airflows were determined at multiple stages during the Mine life using equipment numbers and utilization rates, specific engine types and exhaust output, and the number of personnel expected to be working underground.

The planned ventilation will use a push/pull system and will require two exhaust fans on the surface. A raise bore will be used to construct ventilation raises between Level Stations and connecting to the surface fans.

Each vent raise will have a diameter of 12 ft, will be steel lined, and have an escape ladder. Auxiliary fans will take air from the main circuit and push the air to the working face on the level using vent ducting and vent bag. Each level will have an auxiliary fan at the Level Station.

Underground Dewatering

Water at the working face will be pumped to the station sump. From the station sump, the water will either be used for equipment water supply or pumped out to the plant for use in the process circuit. When used for equipment water supply, the sediments will be removed at the station sump. Excess water at the station sump will be pumped up to the next station sump. The water will continue to be pumped up to the next station until it is pumped out of the underground Mine.

Underground Power

An underground 480-volt (V) transformer will be placed near the entrance to the Mine Portal at the start of mining. This will supply power to electrical equipment used to develop the main decline and to portable fans. A main powerline will be installed along the rib of the decline to carry 1.4 kV when development has advanced far enough that carrying power at 480 V becomes too inefficient. This line will be connected to a transformer that will be moved underground. Upon completion of the decline to the 3420 elevation level, a second transformer will be installed.

Line power will extend to the ventilation shaft to supply power to the ventilation fans.

Underground Communications

Inside the Mine, a leaky-feeder very high frequency (VHF) radio system will be used as the primary means of communication. The system will allow for communications between the underground Mine and surface operations.

Underground Refuge and Escape Ways

Two emergency refuge stations will be necessary in case of fire or rockfalls that would block access and prevent full evacuation of personnel. These refuge stations will allow the staff to remain safe in the underground Mine for 48 hours. The refuges are mobile, each can accommodate up to 20 people within the protected chamber, and they will be located so that they are always within 1,000 ft of areas where the Mine operation personnel are located.

The primary route for evacuation will be the decline. The secondary route for evacuation will be the vent raises. All vent raises will be steel lined and equipped with an escape way ladder for secondary evacuation.

3.2.4 AGGREGATE MINING

The Quarry will be developed in single benches that will consist of 40 ft vertical faces separated by 60 ft horizontal benches. The maximum vertical depth to be mined below existing ground is approximately 125 ft and the lowest elevation will be no lower than 3,800 ft amsl. The mining method will be drill and blast as an open-cut mining system, and mining equipment will be typical of any surface mine or quarry for a small mine that will provide material for the RF of the underground mine.

3.2.5 MINING RATE

The following discussion of the Mining Rate is taken from the 2020 Feasibility Study commissioned by Paramount (Ausenco et al., 2020). The Qualified Person used the Proven and Probable mineral reserves to create a Mine production schedule using Deswik Scheduler (version 2019.4), which allows for the scheduling of both underground development and production. The primary inputs used to develop the schedule include:

- The resource block model with defined material types;
- Development centerlines drawn in the direction of mining;
- Solids representing the stopes or production areas to be mined;
- Attributes to define activity types, material types, profiles, etc.;
- Mining sequence among developments and production areas;
- Development and production rates by location; and
- Definition of the periods to be used.

The naming convention for material types considered either ore or waste. Ore was assigned to two categories based on grade: high-grade or low-grade. High-grade is material that is above the economic cut-off grade. Low-grade is material that is below the mining economic cut-off grade, but above the resource cut-off grade. The basic assumption is that a stope that is economic to be mined will be processed in its entirety. Thus, if internal waste in an economic stope is classified as Measured and Indicated (M&I) Mineral Resources, these resources will be converted to Proven or Probable Mineral Reserves, respectively, and will contribute to the revenue stream.

Waste comprises:

- Material classified as M&I Mineral Resources that is below both the mining cut-off grade and the resource cut-off grade;
- Material classified as Inferred Mineral Resources.

Waste is considered to be internal dilution within a stope, which would be mined and sent to the Process Plant. Waste material is considered to have zero grade and therefore does not contribute to the revenue stream.

The final production scheduled was calculated in Deswik Scheduler and then summarized in Excel. The Mine production summary is presented in Table 29. The material to be sent to the Mill is summarized in Table 30. The development schedule is summarized in Table 31.

Table 29. Mine Production Summary

Year	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
Mined M&I Resource Above Cut-off Grade										
Tons (tons x 1,000)	—	158	203	198	201	205	235	205	126	**1,532**
Grade (oz Au/ton)	—	0.26	0.22	0.23	0.26	0.22	0.22	0.22	0.24	**0.23**
Ounces (oz Au x 1,000)	—	42	44	46	53	45	51	45	30	**356**
Grade (oz Ag/ton)	—	0.35	0.28	0.29	0.33	0.32	0.30	0.32	0.34	**0.31**
Ounces (oz Ag x 1,000)	—	56	57	57	66	66	71	65	43	**481**
Mined M&I Resource Subgrade										
Tons (tons x 1,000)	—	52	61	51	59	55	45	37	19	**380**
Grade (oz Au/ton)	—	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07	**0.06**
Ounces (oz Au x 1,000)	—	3	4	3	4	4	3	3	1	**24**
Grade (oz Ag/ton)	—	0.21	0.18	0.17	0.18	0.19	0.20	0.21	0.20	**0.19**
Ounces (oz Ag x 1,000)	—	11	11	9	11	11	9	8	4	**72**
Total Mined to Stockpile										
Tons (tons x 1,000)	—	210	265	249	260	260	281	242	144	**1,911**
Grade (oz Au/ton)	—	0.21	0.18	0.20	0.22	0.19	0.19	0.19	0.22	**0.20**
Ounces (oz Au x 1,000)	—	45	48	49	57	48	54	47	31	**380**
Grade (oz Ag/ton)	—	0.32	0.26	0.26	0.30	0.29	0.29	0.30	0.32	**0.29**
Ounces (oz Ag x 1,000)	—	67	68	66	77	76	80	73	47	**554**
Total with Ore Loss & Dilution										
Tons (tons x 1,000)	—	230	288	267	281	278	304	266	156	**2,070**
Grade (oz Au/ton)	—	0.20	0.17	0.19	0.21	0.18	0.18	0.18	0.21	**0.19**
Ounces (oz Au x 1,000)	—	46	50	51	58	50	56	48	32	**390**
Grade (oz Ag/ton)	—	0.30	0.25	0.26	0.29	0.29	0.28	0.29	0.31	**0.28**
Ounces (oz Ag x 1,000)	—	70	71	68	80	80	84	76	49	**578**
Waste										
Waste tons (tons x 1,000)	62	65	31	17	28	28	6	17	17	**272**
Backfill										
Cemented rockfill tons (tons x 1,000)	—	136	174	210	199	204	200	194	144	**1,463**
Footage										
Lateral footage (ft)	3,800	17,400	18,100	15,300	15,900	15,400	15,600	14,200	9,000	**124,700**
Vertical footage (ft)	500	200	100							**800**
Total footage (ft)	4,300	17,600	18,200	15,300	15,900	15,400	15,600	14,200	9,000	**125,500**

Note:
Rounding may cause apparent discrepancies.
Subgrade refers to Measured and Indicated (M&I) Mineral Resources with grades greater than the resource cut-off grade, but lower than the stope economic cut-off grade.
Au = gold; Ag = silver

Table 30. Material to the Mill

Year	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
Low-Grade Material										
Tons (tons x 1,000)	—	56	66	55	64	59	50	40	21	**411**
Grade (oz Au/ton)	—	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07	**0.06**
Ounces (oz Au x 1,000)	—	3	4	3	4	4	3	3	1	**26**
Grade (oz Ag/ton)	—	0.20	0.17	0.17	0.18	0.19	0.20	0.20	0.19	**0.19**
Ounces (oz Ag x 1,000)	—	11	11	9	11	11	10	8	4	**76**
High-Grade Material										
Tons (tons x 1,000)	—	174	222	212	217	219	255	226	135	**1,659**
Grade (oz Au/ton)	—	0.24	0.20	0.22	0.25	0.21	0.21	0.20	0.23	**0.22**
Ounces (oz Au x 1,000)	—	43	45	47	54	46	53	46	31	**364**
Grade (oz Ag/ton)	—	0.33	0.27	0.28	0.32	0.31	0.29	0.30	0.33	**0.30**
Ounces (oz Ag x 1,000)	—	58	60	59	69	69	74	68	45	**502**
Total to Plant										
Tons (tons x 1,000)	—	230	288	267	281	278	304	266	156	**2,070**
Grade (oz Au/ton)	—	0.20	0.17	0.19	0.21	0.18	0.18	0.18	0.21	**0.19**
Ounces (oz Au x 1,000)	—	46	50	51	58	50	56	48	32	**390**
Grade (oz Ag/ton)	—	0.30	0.25	0.26	0.29	0.29	0.28	0.29	0.31	**0.28**
Ounces (oz Ag x 1,000)	—	70	71	68	80	80	84	76	49	**578**

Note: Rounding may cause apparent discrepancies.
Au = gold; Ag = silver

Table 31. Development Schedule

Year	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
Development Type										
Main Decline (ft)	3,000	1,890	250							5,140
Level Station (ft)	260	760	260							1,280
Level Development Waste (ft)	60	1,170	1,270	1,000	1,670	1,630	350	1,040	1,000	9,190
Level Development Ore (ft)		13,280	16,190	14,290	14,230	13,820	15,270	13,130	7,990	108,200
Vent Drift (ft)	490	330	100							920
Vent Raise (ft)	470	210	70							750
Total Development (ft)	***4,280***	***17,640***	***18,140***	***15,290***	***15,900***	***15,450***	***15,620***	***14,170***	***8,990***	***125,480***

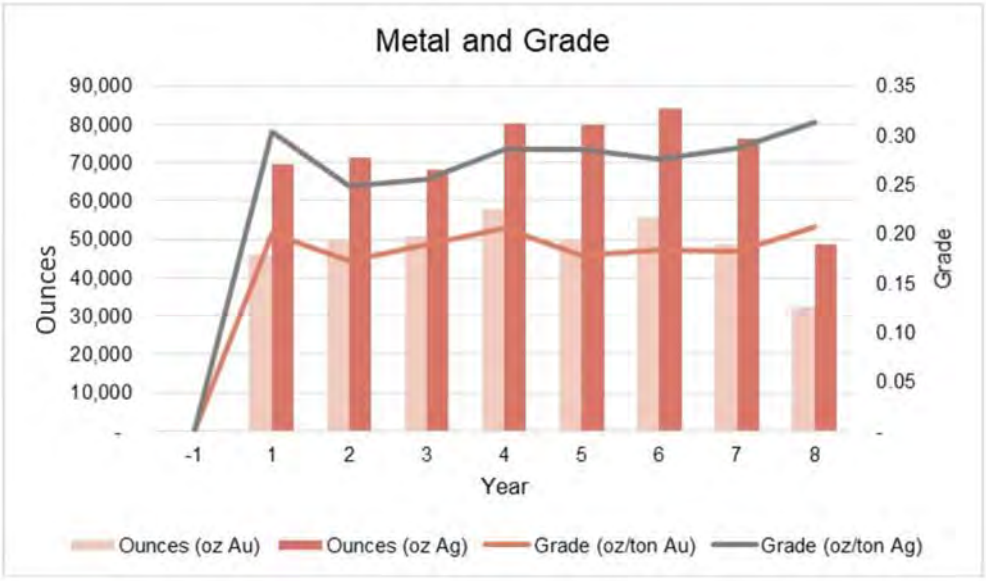
Note: Rounding may cause apparent discrepancies.

3.2.6 UNDERGROUND PRODUCTION SCHEDULE

Figures 7 and 8 show the proposed yearly production schedule in terms of tons and gold and silver ounces for the Life of Mine (LOM).

Note: Figure prepared by MDA, 2020.

Figure 7. Mine Production Schedule (tons by period)



Note: Figure prepared by MDA, 2020.

Figure 8. Mine Production Schedule (ounces by period)

3.3 MILLING AND PROCESSING METHODS – OAR 632-037-0060(1), OAR 340-043-0100, OAR 340-095-0020(2)(c), ORS 517.971(7)(b)

3.3.1 GENERAL FOUNDATION RECOMMENDATIONS FOR ORE PROCESS FACILITIES

Mine process and support facilities are situated directly north of the proposed Mine Portal as shown on the Design Drawings in the *Mill Design Report* (Ausenco, 2022; Appendix C3). These facilities will include office buildings, truck maintenance facilities, crushers, mill, and additional structures. Based on the subsurface exploration, the subsurface beneath the proposed location for the Mine facilities can generally be separated into two areas, as summarized below:

- East portion: Approximately 5 ft to 20 ft of Quaternary deposits comprising lean-to-fat clay soils and clayey sands overlying lacustrine clays.
- West portion: About 3 ft to 10 ft of Quaternary deposits comprising lean-to-fat clays and poorly graded gravel to silty sand overlying sandstone bedrock encountered at depths ranging from 3.5 ft to 10 ft below ground surface (bgs).

In general, planned structures may be founded on conventional, shallow foundations. Foundations may be supported by undisturbed medium dense to very dense granular, native alluvium/colluvium or weathered sandstone, or properly placed engineered fill. Lacustrine and overburden clay soils are not suitable to support foundations.

Topsoil, soil supporting plant growth, or loose soils are not considered suitable for the support of floor slabs, footings, or mat foundations, and should be removed from the site prior to grading.

Due to the presence of clay with a high potential for swelling, a minimum of 4 ft of separation between the bottom of foundations and the clay soils is recommended. If clay soils are located within 4 ft of the base of foundations and slabs-on-grade, the clays are to be over-excavated and replaced with granular engineered fill.

The extent of over-excavation will depend on final grades established for the area. Maintaining positive site drainage away from foundations will be imperative to reduce the potential for swelling of the clays that may affect performance of the foundations. This is particularly important for the truck wash and other areas where water is likely to be present with an increased risk of ponding.

3.3.2 OVERVIEW OF THE ORE PROCESSING CIRCUIT

The following is a summary of the *Mill Design Report* (Ausenco, 2022), which is included with all drawings in Appendix C3.

The intent of this section is to summarize the processes proposed for Grassy Mountain. It will address the following items from Chapter 340, Division 43 – Chemical Mining, by the ODEQ:

- Description of the facilities to be constructed, including tanks, pipes, and other storage and conveyance means for processing chemicals, solutions, and wastewaters;

- Description of all chemical process and facilities for mixing, distribution, and application of chemicals associated with onsite mining operations, ore preparation, and beneficiation facilities; and
- Description of all chemical conveyances (ditches, troughs, pipes, etc.) and the requisite equipment with secondary containment and leak detection means for preventing and detecting release of chemicals to surface water, groundwater, and soils.

The Process Plant will consist of a 750 stpd, two-stage crushing, ball mill, CIL, elution and electrowinning circuit, all of which are well known, conventional, processing unit operations. The plant will operate with two shifts per day, 365 days per year, and will produce doré bars.

The process flowsheet is comprised of the following:

- Two-stage crushing circuit,
- Grinding circuit,
- Hybrid leach-CIL circuit with pre-aeration,
- Mercury removal circuit,
- Cyanide destruction, and
- Lime addition.

The simplified overall flowsheet is shown in Figure 9. The Process Plant Area is shown in Map 4.

The ore will be hauled from the underground Mine to a stockpile near the Mine Portal, and then trammed to the mobile crushing facility that includes a jaw crusher as the primary stage and a cone crusher for secondary size reduction. The crushed ore will then be ground in a ball mill in closed circuit with a hydro-cyclone cluster. The hydro-cyclone overflow with P80 of 150 mesh (106 micrometers [µm]) will flow to a leach–CIL recovery circuit via a pre-aeration tank.

Gold and silver leached in the CIL circuit is adsorbed onto activated carbon, which is recovered and conveyed to the elution circuit. A pressure Zadra-style elution circuit strips the gold and silver from the activated carbon and is then precipitated by electrowinning in the gold room. The gold–silver precipitate will be dried in a mercury retort oven and then mixed with fluxes and smelted in a furnace to pour doré bars. Carbon will be re-activated in a carbon regeneration kiln before being returned to the CIL circuit. Mercury is collected and shipped off site.

CIL tailings will be treated for cyanide destruction prior to pumping in slurry to the TSF for disposal. Supernatant water collected at the TSF and underflow from the Reclaim Pond will be pumped back to the Mill for reuse.

Figure 9 also shows the key Process Plant facility components.

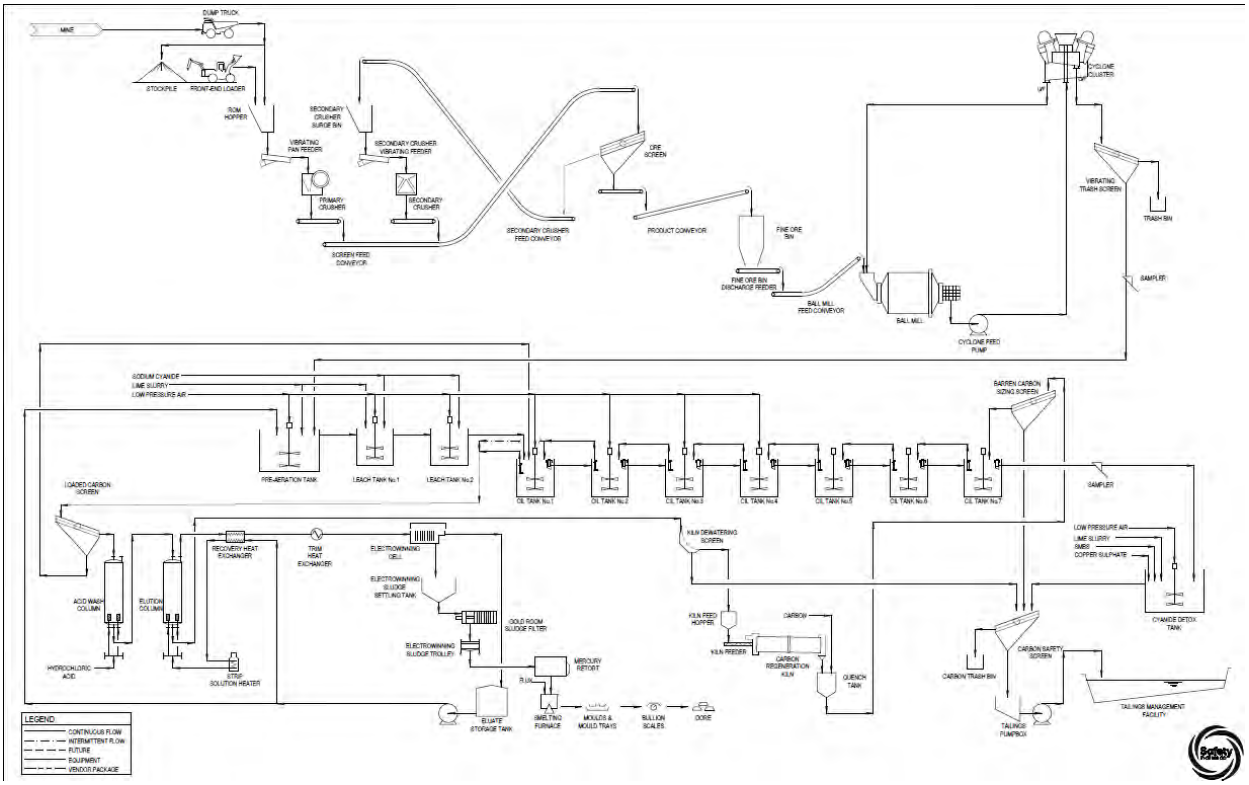


Figure 9. Grassy Mountain Process Flowsheet

3.3.3 KEY DESIGN CRITERIA

The key criteria selected for the plant design are:

- Average plant treatment rate of 770 stpd on a solids basis,
- Design crushing plant operating time of 70 percent (crushing/screening/conveying), and
- Design Process Plant operating time of 91.3 percent (milling/leaching and adsorption/detoxification/elution/refining).

Drawing 101768-0000-F-001 in the *Mill Design Report* (Ausenco, 2022; Appendix C3) shows the basic process design circuits and the selection of major equipment for the Process Plant.

The major process design criteria developed for the Project are outlined in Table 32.

Table 32. Grassy Mountain Process Design Criteria

Description	Units	Value
Ore Throughput, LOM average	short tons/year	248,365
Design Grade – Au	oz/short ton	0.266
Design Grade – Ag	oz/short ton	0.280
Operating Schedule		
Crusher Availability	%	70
Plant Availability	%	91.3
Throughput, Daily	stpd	750
Plant capacity, Hourly	short ton/hour	34.2
Crushing (Two Stage)		
Primary Crusher	type	Single Toggle Jaw Crusher
Secondary Crusher	type	Cone Crusher
Fine Ore Bin Residence Time – Live	hour	8
Grinding		
Circuit Type		Ball mill
Bond Ball Mill Work Index	kWh/short ton	26.9
Ball Mill, Dimensions	ft x ft	12 x 16
Ball Mill Required Power	hp	1,021
Ball Mill Installed Power	hp	1,341
Feed Particle Size, F80	in.	0.26
Product Particle Size, P80	U.S. mesh	150
Carbon-in-Leach		
Total Leach Time Required	hour	24
Number of Tanks	#	1 pre-aeration + 2 leaching + 7 adsorption
Cyanide Addition	lb/short ton	0.68
Lime Addition	lb/short ton	2.1
Carbon Concentration	lb/gal	0.21
Carbon Loading (Au + Ag)	oz/short ton	187
Carbon consumption	lb/short ton	0.06
Desorption		
Carbon batch size	short ton	2.2
Elution CIL strips per week	#	7
Furnace capacity, Au + Ag	lb/smelt	57.5
Cyanide Destruction		
Method	-	SO_2 / Air
Residence time, max for design	minute	90
CN_{WAD} in feed, max for design	ppm	200
CN_{WAD} not-to-exceed value	ppm	30

Description	Units	Value
CN_{WAD} discharge target for design	ppm	<15
SO_2 addition	lb/lb CN_{WAD}	6.4
Hydrated lime addition	lb/lb CN_{WAD}	10.8
Cu addition	lb/lb CN_{WAD}	0.11
Tailings Neutralization Potential Augmentation		
Hydrated lime addition	g $Ca(OH)_2$/kg	19

The descriptions in the following sections include references to Process Flow Diagrams (PFDs), which are included in Appendix B of the *Mill Design Report* (Ausenco, 2022; Appendix C3).

3.3.4 CRUSHING CIRCUIT

The crushing facility will be a two-stage crushing circuit that will process the ROM ore at an average rate of 45 short tons/hour. The major equipment and facilities at the ROM receiving and crushing areas will include:

- Ore stockpile,
- ROM hopper,
- Vibrating pan feeder,
- Primary jaw crusher,
- Coarse ore screen,
- Secondary crusher surge bin,
- Secondary crusher vibrating feeder,
- Secondary cone crusher,
- Fine ore bin, and
- Feed and product conveyors.

Ore will be trucked from underground and dumped directly into the ROM hopper or onto the outdoor stockpile during crushing circuit downtime. A front-end loader will move ore from the stockpile to the ROM hopper as necessary.

The ROM hopper will continuously feed a vibrating pan feeder, which will discharge into the primary jaw crusher. After primary crushing, the ore conveyor will bring the ore to a coarse ore screen.

Oversize material from the screen will be transferred by conveyor to the secondary crusher surge bin. Ore from the secondary crusher surge bin will pass over the second crusher vibrating feeder and into the secondary crusher. After secondary crushing, the ore will be recirculated to the coarse ore screen in combination with ore from the primary jaw crusher.

Undersize from the coarse ore screen will be taken by the product conveyor to the fine ore bin. The product conveyor will have a weightometer to monitor the crushing circuit throughput.

The fine ore bin discharge feeder will feed ore from the fine ore bin onto the ball mill feed conveyor and over to the grinding circuit. The feed conveyor will also have a weightometer to provide data for feed-rate control to the grinding circuit.

The crushing plant is skid-mounted and anchored on concrete foundations. The crushing plant includes a primary jaw crusher – Metso Outotec Model C80, which weighs approximately 16,870 lbs, and a secondary cone crusher – Metso Outotec HP200, which weighs approximately 26,800 lbs. The crushing plant will be assembled and disassembled with a crane. A similar crushing plant is presented in Figure 10.

Figure 10. Similar Crushing Plant

3.3.5 GRINDING CIRCUIT

The grinding circuit will have an average feed rate of 34.2 short tons/hour and will consist of a ball mill and a cyclone cluster in a closed circuit. The grinding circuit will be designed for a product size P80 of 150 mesh. The major equipment in the primary grinding circuit will include:

- One 12-ft diameter (inside shell) by 16-ft effective grinding length (EGL) single-pinion ball mill driven by a single 1,341 horsepower (hp) fixed-speed drive motor; and
- One hydro-cyclone cluster.

As necessary, steel balls will be added into the ball mill using a ball bucket and ball charging chute to maintain grinding efficiency.

Crushed ore will travel along the ball mill feed conveyor and discharge directly into the ball mill via the mill feed chute. Process water will be added to reach a pulp density of 72 percent solids (by weight) through the ball mill, which will then discharge to the cyclone feed pump box. Additional process water will be added to the cyclone feed pump box to achieve a density of 63.5 percent solids, which will then be pumped to the hydro-cyclone cluster. The cyclone underflow will recirculate to the mill feed chute. The cyclone overflow will discharge at 45 percent solids and report to a trash screen. Trash screen oversize will be sent to a trash bin. The slurry will then flow by gravity to the pre-aeration tank.

The ball mill weighs approximately 132 short tons and will be constructed on a concrete foundation. An example of the ball mill is presented in Figure 11.

Figure 11. Example Ball Mill

The cyclone cluster is an arrangement consisting of four operating and two standby, 250-millimeter cyclones approximately 12 ft in height and weighing approximately 6,615 lbs. The cyclone cluster will be constructed on a concrete foundation. An example of the cyclone is presented in Figure 12.

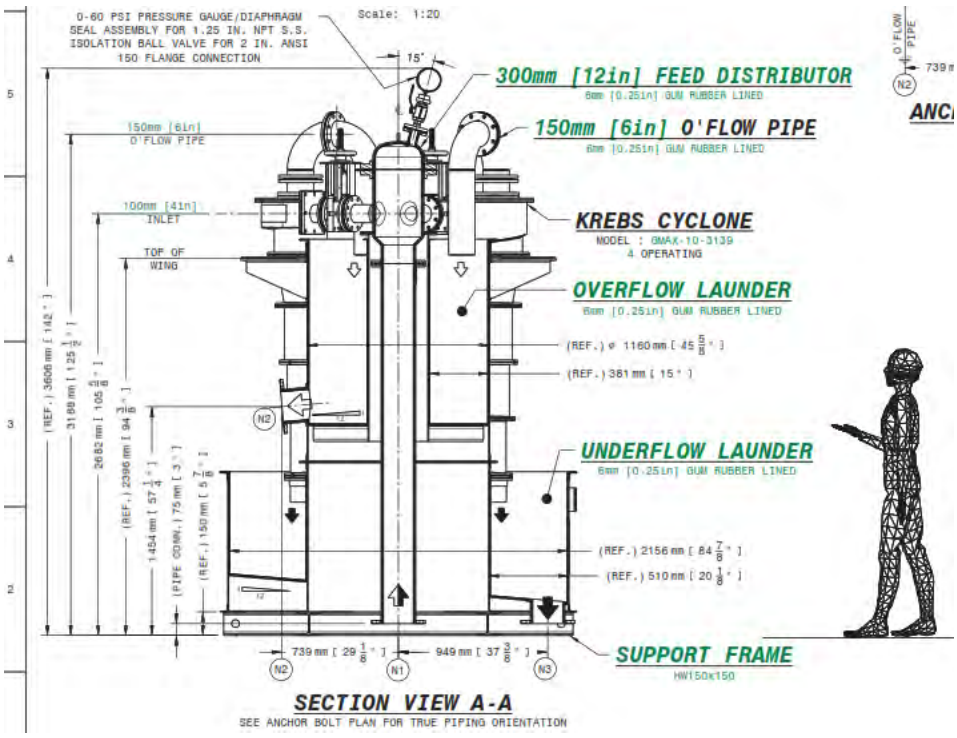


Figure 12. Example Cyclone

3.3.6 CIL LEACHING

A pre-aeration tank will be ahead of the leach circuit. The pre-aeration tank reduces consumption of cyanide and improves gold recovery. Low-pressure air is bubbled through the ground ore slurry in the pre-aeration tank. Slurry will overflow the pre-aeration tank to the first leach tank, where lime will be added at a rate of 2.1 lb/ton of feed. Cyanide is added to both leach tanks at a rate of 0.68 lb/ton of feed, together with low-pressure air.

The slurry will then overflow from the leach tanks into a series of seven CIL tanks. The first four CIL tanks will also be fed low-pressure air. Barren activated carbon is added to the last CIL tank and will travel up through the circuit in the opposite direction from the slurry flow (counter-current flow). Loaded carbon will be pumped from the first CIL tank to the elution loaded-carbon screen, which will separate the carbon from slurry.

Leached tails will overflow the last tank to the detox tank (described below), which in turn will overflow to the carbon safety screen. The safety screen collects carbon that would otherwise be lost to the tailings in the event of a hole in one of the inter-stage screens.

3.3.7 CARBON ELUTION

Gold and silver are stripped from the carbon in the elution circuit. A pressure Zadra circuit has been designated. Strip solution (eluate) is made up in the strip-solution tank using raw water dosed with 2 percent sodium hydroxide and 0.2 percent cyanide to form an electrolyte for the electrowinning process. This solution is circulated through the elution column via an eluate heater, which heats the solution, the carbon, and the column to 275°F. The elution system is pressurized to keep the solution from flashing to steam in the heater or elution column. The eluent is cooled in a heat exchanger and then sent to the electrowinning circuit. The stripped/barren carbon is sent to a kiln for reactivation and recycled through the CIL circuit.

3.3.8 GOLD ROOM

The gold room houses the electrowinning cell, smelting furnace, and associated support equipment within a secured area.

One day per week, the electrowinning cell will be opened so that gold-bearing sludge can be cleaned out manually with a high-pressure water hose. Sludge from the clean-up will gravity flow to the sludge settling tank and into the gold room sludge filter press to be dewatered. Dewatered sludge will then be transported manually to the mercury retort oven for mercury removal and simultaneous drying. Mercury collected will be sent off site as detailed in the *Waste Management Plan* (Calico, 2023b; Appendix D3).

Dried sludge is removed from the oven the following day and combined with fluxes in a flux mixer before reporting to the smelt furnace. Once the mixture has fully melted, the slag is poured into a conical slag pot. The liquid metal is then poured into doré molds. Cooled doré is then cleaned, weighed, and stamped. The doré is stored in a vault to await shipment to a refinery.

3.3.9 CYANIDE DETOXIFICATION AND TAILINGS DEPOSITION – OAR 340-095-0020(3)(c)

A cyanide-destruction circuit reduces the cyanide concentration of the tailings slurry prior to disposal in the TSF. The sulfur dioxide (SO_2)/air process is the proposed detoxification method. The objective of detoxification is to reduce weak-acid dissociable (WAD) cyanide levels initially to less than 15 mg/L; not to exceed the 30 mg/L maximum.

Laboratory testing has demonstrated that the detoxification process can achieve a level of 1 mg/L or less. However, it is typically not possible nor practicable for the operations-scale process to achieve the same levels of performance as what can be achieved in the laboratory. Therefore, during startup, the cyanide detoxification circuit will be optimized to establish the lowest practicable level at the discharge point to the tailings pond that is less than 15 mg/L.

Further, the *Ecological Risk Assessment for Proposed Tailings Storage Facility* (ERA) prepared for this project (SLR, 2023b; CPA Appendix H) identifies birds drinking supernatant pond water (in the TSF, where the detoxified tailings are discharged) containing cyanide appears to represent the greatest potential risk to wildlife. The ERA establishes that an average cyanide concentration of 1 mg/L in the supernatant pond will be protective of wildlife. Therefore the optimization of the cyanide detoxification process will also use this value (1 mg/L WAD cyanide, six-month average, in the supernatant pond of the TSF) as a target level. The optimization procedure is described in the *Tailings Chemical Monitoring Plan* (Calico 2023h; Appendix D2) and is designed to rapidly establish and achieve cyanide concentrations that are protective of wildlife at the site.

The CIL tailings are pumped to the cyanide detoxification tank, where lime is added to buffer pH, then copper sulfate is added as a reaction catalyst, and sodium metabisulfite (SMBS) is added as an SO_2 source.

Detoxified slurry will overflow to the tailings pump box and is mixed with lime and then pumped to the TSF. At the TSF, the tailings will be deposited using spigot manifolds positioned along the rim of the impoundment. The position of the spigot manifolds will be moved periodically to produce an even beach and to push the pool towards the decant system. A pontoon-mounted decant-return water pump will be provided to pump decant water back to the process-water tank for reuse in the plant. The *Cyanide Management Plan* (Ausenco, 2023; Appendix D8), includes details on operations.

3.3.10 REAGENT HANDLING AND STORAGE

Reagents will be prepared and stored in separate self-contained areas within the Process Plant and delivered to the required addition points through piping by individual metering pumps or centrifugal pumps. See Section 3.8 for details of chemical storage and use.

3.3.11 SURFACE CONTACT WATER – 43 CFR 3809.401(b)(2)(iii), OAR-632-037-0060(4)(c), OAR 632-037-0060(8), OAR 632-037-0120(1), ORS 517.971(7)(g)

The *Stormwater Pollution Control Plan* (WSP, 2023; Appendix D4) provides a detailed description of contact water management and the design of water management structures. The stormwater permit application (Calico, 2021f) is in Appendix E5.

Stormwater Diversion ditches will be constructed above plant infrastructure, where required, to prevent runoff from entering the Process Plant areas. Precipitation that falls directly on the pad will be collected in a system of ditches and culverts and directed by gravity towards the Collection Pond. The ditches and culverts located within the Process Plant areas are sized to contain the 100-year, 24-hour storm event.

The Collection Pond is also sized to contain the runoff from a 100-year, 24-hour storm event. Additionally, a 2-ft dead storage allowance for siltation and pump suction at the bottom of the pond and a 2-ft freeboard allowance, measured from the top of the high-water level to the pond crest have been included, external to the indicated pond capacity.

The pond will have a minimum 14-ft-wide crest around the outside with internal and external batter slopes of 3 horizontal to 1 vertical (3H:1V). The liner system is composed of two liners, an upper liner of 80-mil high-density polyethylene liner (HDPE) and Geonet, and a lower liner of 60-mil HDPE over non-woven geotextile. Sand bedding below the lower liner is included where necessary to create a smooth base.

A leak detection zone of drainage gravel is included between the liners. The leak detection system is found on the pond base and sides and is connected to down-batter leak monitoring wells and sumps, provided with sensors and the capacity to recover the leaked solution.

No spillway is designed for the Collection Pond as overflow is not permitted.

3.4 LIST OF EQUIPMENT – OAR 632-037-0060(2), OAR 340-095-0020(3)(e)

Mine operations at Grassy Mountain will use mobile mining equipment suitable for underground mines as specified in Table 33. The estimate of the fleet size was based on equipment running-time requirements to achieve the Mine production plan.

Table 33. Mine Mobile Equipment Requirements

Equipment	Model	Quantity
4WD twin cab truck	Ford F-150 - diesel	1
4wd twin cab utility	Light Vehicle 4WD Twin Cab Utility 1/2 ton	1
All Terrain Crane	Terex RT 35-1 or equivalent	1
Articulated haul trucks	Cat 745C	1
Blast hole drill	CAT MD5150C	1
Crushing Area Bobcat	Bobcat S7 or equivalent	1
Diamond drilling	Hydracore Gopher	1
Dozer	CAT D6T	1
Dual (drill + bolter)	Resemin Troidon 88 Dual	3
Elevated Work Platform	ZX-135/70 Genie, or equivalent	1
Emulsion loader	CAT 440	1
Forklift	CAT DP30NM	1
Front-end loader	CAT 962H	2
Hiab Truck	SINOTRUK Small Truck Mounted Crane, 5-10 tons	1
LHD 5.2 cubic yards	CAT R1600	4

Equipment	Model	Quantity
Lube truck	Normet Multimec MF 100	1
Mine rescue truck	Ford F-150	1
Mine rescue truck	Ford F-150 - diesel	1
Motor grader	Paus PG5HA	1
Motor Grader	Cat 160M	1
Pipe Fusing Machine	McElroy TRACSTAR® 28 SERIES 2 or equivalent	1
Shotcrete sprayer	Normet Spraymec 8100 VC	1
Shotcrete truck	Normet Utimec SF 300	1
Telehandler	JCB 540-170	2
Truck with ejector bed	CAT AD22	3
Van man-transport	Ford SPLODER - diesel	3
Water truck	Normet Multimec MF 100	1
Water Truck	CAT 777G	1

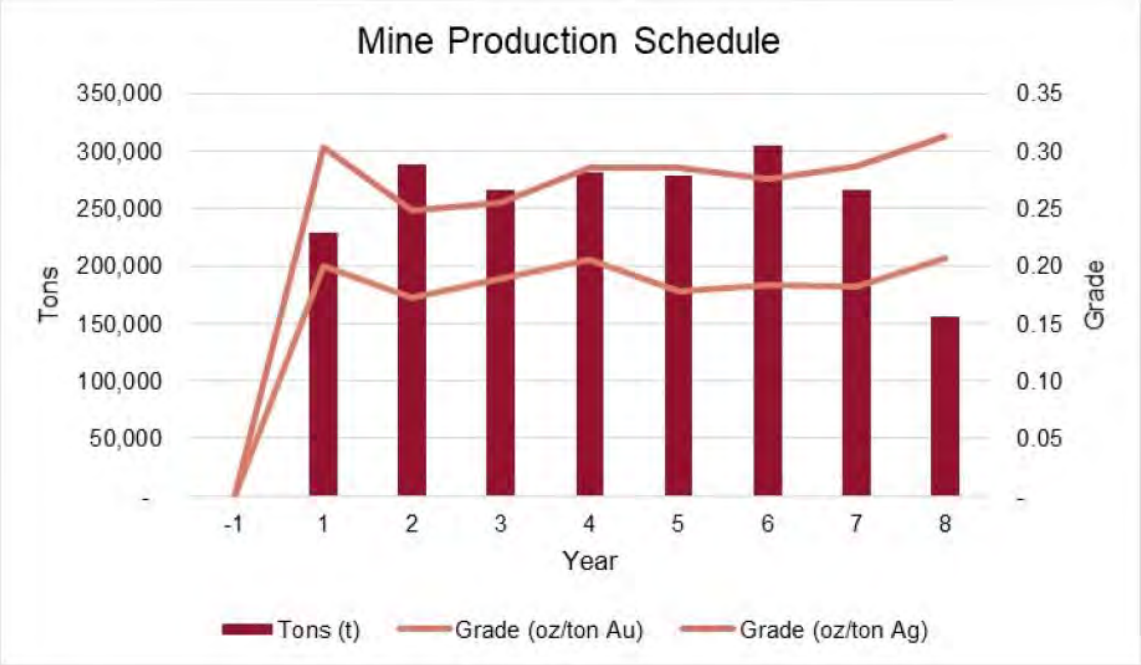
3.5 GENERAL SCHEDULE OF CONSTRUCTION AND OPERATION – OAR 340-093-0130(2)(a), OAR 632-037-0060(3)

The proposed Project, which currently is proposed to begin in 2025, will be active for approximately 10 years, which includes 2 years of pre-production (including construction activities) and 8 years of mining and processing. Four years of closure and reclamation are estimated, with 26 years beyond anticipated for groundwater monitoring. This schedule may be modified based on the rate of mining and future commodities prices. Table 34 and Figure 13, respectively, show detailed schedules.

Table 34. Project Schedule

Year	Year -1	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Total
Development Type										
Main Decline (ft)	3,000	1,890	250							5,140
Level Station (ft)	260	760	260							1,280
Level Development Waste (ft)	60	1,170	1,270	1,000	1,670	1,630	350	1,040	1,000	9,190
Level Development Ore (ft)		13,280	16,190	14,290	14,230	13,820	15,270	13,130	7,990	108,200
Vent Drift (ft)	490	330	100							920
Vent Raise (ft)	470	210	70							750
Total Development (ft)	***4,280***	***17,640***	***18,140***	***15,290***	***15,900***	***15,450***	***15,620***	***14,170***	***8,990***	***125,480***

Source: *Mine Plan of Operations* (Calico, 2022b).



Note: Figure prepared by MDA, 2020.

Figure 13. Detailed Operational Schedule

3.5.1 WORK FORCE

Personnel requirements for the LOM are shown in Figure 14, which includes the Mine; Process Plant; administration; security; parking lot; and Health, Safety, and Environmental Compliance (HSEC). The administrative personnel shift system is planned to be four days on and three days off, at 10 hours per day. Production-related mining personnel (operators, fitters, electricians, and assistants) will work a shift system of four days on and three days off in two teams. Each team will work 12 hours per day so the Mine can operate 24 hours per day, four days per week. Processing will work 24 hours per day, seven days a week. Some personnel may work additional overtime through weekends for care-and-maintenance requirements, as needed. The operating calendar is based on 360 operating days per year.

Employees will be transported to the Mine via bus shuttle service provided by Calico, intended to minimize traffic on the Malheur County roads and the Mine Access Road and thereby reducing impacts to the environment and the public using the county roads. Employees will be required to use the shuttle bus when regularly commuting to the Mine. The parking lot at the Mine can accommodate up to 24 light vehicles, consisting of operations vehicles and a minimal number of authorized vehicles from off site.

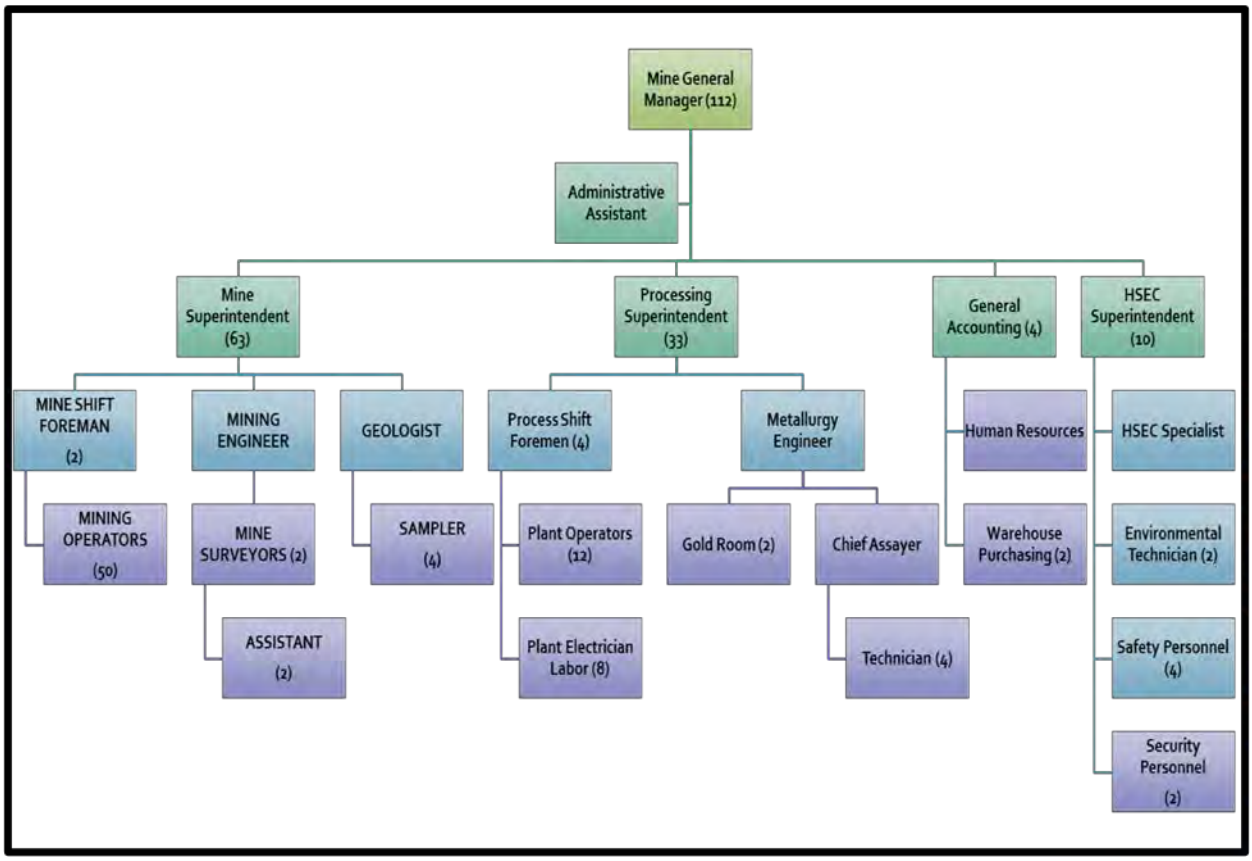


Figure 14. Life of Mine Work Force

3.5.2 LOCAL HIRE POLICY

Calico plans to implement a proactive community involvement and consultation process including: 1) local-hire preference; 2) local contracting and purchasing where practicable; and 3) Mine worker job training to provide an experienced work force.

Mining and milling jobs are expected to be sourced to local communities where possible, with limited relocation to supply the expertise reinforcing the local experience level. Calico also has plans to further partnerships with local community colleges and vocational schools, whereby "mining expertise" can be developed through "partnership curriculums." These partnerships are likely to include Treasure Valley Community College in Ontario, Eastern Oregon University in LaGrande, and the College of Western Idaho in Boise. The Project will employ approximately 100 to 120 people.

The Project will create many jobs within Malheur County. This would enable economic development during the 2-year construction period and the estimated 14-year Project life. Currently, Malheur County is the poorest county in Oregon, with an unemployment rate of 10.7 percent and a recent job growth rate of -2.10 percent. The economy of the County would increase with the new high-paying jobs provided by Calico. Workers will commute daily to the Project from surrounding towns.

3.6 TAILINGS STORAGE FACILITY – OAR 340-093-0130(2)(d), OAR 340-095-0020(3)(c), OAR 632-037-0060(4)(h), OAR 632-037-0060(9)(d), OAR 632-037-0077(4), OAR 340-043-0100, OAR 340-043-0130, OAR 340-043-0140, OAR 340-043-0020, ORS 517.971(8)(e)

The TSF receives the treated tails from the Process Plant and allows for material to settle while water is decanted and recovered and pumped to the process water tank for reuse in the Process Plant. Two centrifugal pumps (one duty/one standby) located on a barge at the TSF return water through a decant water pipeline, which runs in the same containment trench used for the tailings discharge pipeline, and therefore provides double containment. The TSF and associated infrastructure are located within the Perimeter Fence, which excludes the public, livestock, and most wildlife from accessing the Site and this facility.

The TSF also allows for the natural degradation of remaining trace cyanide. Degradation is achieved through exposure to UV light from the sun and metabolic processes of microorganisms native to the environment in the water of the supernatant pool.

The TSF design, described in the *Detailed Design Tailings Storage Facility and Temporary Waste Rock Storage Facility* report, hereinafter referenced as the TSF Design Report (Golder, 2021c), is provided in Appendix C4, and the Oregon Water Resources Department (OWRD) approval for the construction and operation of the TSF (OWRD, 2020) is provided in Appendix E6.

3.6.1 GEOTECHNICAL CONSIDERATIONS – OAR 340-043-0030(2)(g), OAR 632-037-0060(9)(d)

The following sections present the general subsurface soil and groundwater conditions at the site and a summary of the stability and settlement analyses performed for the TSF embankment. Slope stability analyses were conducted to evaluate performance of the north TSF embankment for long-term, post-closure conditions based on design criteria of the facility.

Settlement analyses were conducted to evaluate potential impacts of settlement within native and engineered materials on performance of the underdrain collection piping beneath the embankment. Brief summaries on stability and settlement analyses are presented in the following section, and presented in detail in the *TSF Design Report* (Golder, 2021c; Appendix C4).

Geotechnical Investigations: Subsurface geotechnical investigations were performed throughout the design of the TSF, which included:

- December 2017 – 15 geotechnical boreholes, 44 test pits, and 6 in-situ field falling head permeability tests on native subgrade materials;
- March 2019 – 6 geotechnical boreholes; and
- July 2019 – 11 cone penetration test (CPT) soundings.

Geotechnical laboratory testing was performed on selected soil samples deemed representative of the materials encountered during the investigation. The laboratory testing program focused on providing information for the more critical aspects of the design. These included the north TSF embankment and potential borrow areas, with a majority of the laboratory tests performed on the lacustrine clay deposits within the footprint of the north embankment. Laboratory testing completed on the lacustrine foundation clays included moisture content, grain size analyses, Atterberg Limits, consolidated-undrained triaxial, and one-dimensional consolidation tests.

To further support the selection of materials' strength parameters used in the stability analyses, a CPT program was completed within the foundation of the TSF embankments and basin. This program further refined the material properties of the lacustrine clay deposits below the embankments, including pre-consolidation, saturation level, stiffness, grain size distribution, and pore-pressure dissipation potential.

General Subsurface Soil and Groundwater Conditions: Subsurface soil and water conditions are described in detail in the *TSF Design Report* (Golder, 2021c; Appendix C4).

Topsoil was generally observed to be about 0.5 ft thick across the majority of the TSF site. The topsoil is underlain by near surficial alluvial and colluvial deposits across the site with depths ranging from about 0.5 ft to 25 ft bgs. These deposits were typically unconsolidated. Generally, the upper portion of the deposit was classified as fine-grained soils classified as lean and fat clay with varying amounts of sand and gravel and were underlain by coarse-grained soils classified as clayey- to silty-sand, clayey- to silty-gravel, and poorly- to well-graded sand and gravel.

Lacustrine deposits were encountered across a majority of the TSF site and primarily classified as lean- to high-plasticity clay with varying sand content. Abundant evaporites were often found in the upper 3 ft of the deposit and continued in limited amounts throughout. Based on similar units in the region, these units are estimated to be Miocene-age deposits. This horizon was encountered up to depths of 120 ft bgs (maximum depth of exploration) within the footprint of the TSF and may extend deeper.

Relatively shallow (less than 15 ft), weathered arkosic sandstone was observed within the north-central portion of the TSF and west portion of the Mine process facilities. The sandstone is similar to a silty- to poorly graded sand. In general, the west portion of the Mine process facilities consisted of Quaternary deposits underlain by weathered arkosic sandstone, and the east portion of the Mine process facilities area consisted of Quaternary deposits overlying lacustrine fat clay deposits.

As part of the field program performed by Golder Associates, Inc. (Golder), no subsurface water was encountered during the field exploration with boreholes within the TSF area extending to a maximum depth of approximately 120 ft bgs. In the *Grassy Mountain Gold Project Groundwater Reports, Vol. I, Groundwater Baseline Data Report* prepared by SPF Water Engineering, LLC (SPF, 2021a; Appendix B9) it was reported that the groundwater depth beneath the southern portion of the TSF basin ranged between 155 ft at the BLM Well located within the TSF footprint and 232 ft at the GW-3 well located just southwest of the TSF. Inferred groundwater contours presented in the same report indicate groundwater beneath the reclaim pond area may be as shallow as 55 ft; however, no groundwater was encountered in any of the boreholes.

Groundwater depths in this area will be refined after the installation of proposed groundwater monitoring wells, as presented in the *Well Field Design Report* (SPF 2019b; Appendix C5). In addition, no springs were observed in the TSF or Mine facility areas during the field investigation. However, fluctuations in precipitation may occur that could affect subsurface water conditions at the sites.

Seismic Hazard Analysis: Golder completed a seismic hazard analysis (SHA) for the Project site, presented in the *TSF Design Report* (Golder, 2021c; Appendix C4). The purpose of the SHA was to identify faults that have the potential for surface rupture and to estimate earthquake ground motions for the operational and closure design earthquakes at the site for input into stability modeling. The Grassy Mountain site is located in the Columbia Plateau, a region of relatively low historical earthquake activity.

A probabilistic seismic hazard analysis (PSHA) using the USGS 2014 National Seismic Hazard Model indicates that the earthquake for the 475-year return period has a mean peak ground accelerations (PGAs) of 0.08 gravity (g). The complete SHA is included in the *TSF Design Report* (Golder, 2021c; Appendix C4).

A deterministic seismic hazard analysis (DSHA) indicates that the Cottonwood Mountain fault is the controlling Maximum Credible Earthquake (MCE) for the Project TSF. The Cottonwood Mountain fault has a surface trace mapped about 18 miles (28 km) from the TSF at its closest approach and generates an MCE magnitude (M) 7.2 earthquake. Using the geometric mean of four equally weighted ground motion models, the median PGA value for the MCE is 0.15 g. The median deterministic PGA has the return period estimated from the 2014 USGS National Seismic Hazard Model (NSHM) at about 1,500 years.

By comparing the PSHA and DSHA, Golder selected the PGA resulting from the median MCE as determined by the DSHA as the design seismic event for the Project TSF for operation and closure. The event results in a PGA of 0.15 g.

A seismic coefficient (k) of 0.075 g (one half the peak acceleration) was used for the pseudo-static slope stability analysis to model the earthquake loading of the embankment. This reduction in PGA is in line with the commonly accepted state-of-practice by Hynes-Griffin and Franklin (1984).

Embankment Slope Stability: Slope stability of the north and west TSF embankments were analyzed along cross sections that were considered to be the critical embankment section based on anticipated geotechnical conditions in the embankment foundation and the current design configuration (e.g., embankment height, slope angles, and existing topography).

For the north embankment, downstream critical failure surfaces were analyzed at the ultimate Stage 3 height of the 3.64 Mst capacity TSF through the natural drainage. The analysis considered both drained effective stress and undrained strength considering both circular and block-type failures. Circular failures included both global failures through the embankment and foundation soils and shallow 'sloughing' failures of the downstream slope. Block-type failures were assumed to occur at the interface between the embankment fill and the underlying foundation material. Based on the stability analyses, the controlling scenario for geotechnical stability is a deep foundation circular failure using drained effective stress parameters for the clay foundation. Therefore, block-type failures are not presented.

All calculated factors of safety (FOS) values were found to be above the minimum criterion (FOS greater than or equal to [≥] 1.5 for static, FOS ≥1.1 for pseudo-static) as summarized in Table 35. Based on the stability analyses, the controlling scenario for geotechnical stability is a deep foundation circular failure using drained effective stress parameters for the clay foundation.

Table 35. Summary of Critical TSF Stability Analysis Results

Analysis Method	TSF Stage	Static FOS (Target design minimum = 1.5)		Pseudo-static FOS (k = 0.075 g) (Target design minimum = 1.1)	
		North Embankment Section A	West Embankment Section D	North Embankment Section A	West Embankment Section D
Effective Stress	1	1.5	1.9	1.2	1.4
	2	1.5	1.7	1.2	1.3
	3	1.5	1.5	1.2	1.2
Total Stress	1	2.1	-	1.7	-
	2	1.8	-	1.3	-
	3	1.5	-	1.1	-

Settlement: Settlement analysis was performed to evaluate impacts to the integrity and performance of the underdrain collection piping due to settlement of engineered fills and native foundation materials below the facility. Material properties for settlement calculations were estimated from Golder's geotechnical field and laboratory testing programs presented in the *TSF Design Report* (Golder, 2021c; Appendix C4). Subsurface soils generally consist of alluvium and colluvium Quaternary deposits of varying thickness (approximately 2 ft to 25 ft) overlying over-consolidated, lean-to-fat clays with varying sand content. Clays below the embankment were generally stiff to hard, and settlement in both the engineered fills and native materials was evaluated using elastic theory.

Post-settlement grades along the underdrain collection piping must remain adequately steep for positive solution flow. To maintain this flow, underdrain collection pipes are designed to be installed at steeper grades and are expected to flatten as the dam is constructed and tailings deposition progresses.

In order to achieve a minimum post-settlement gradient of 1 percent, the underdrain outlet pipes will be installed at grades between 1 and 2.5 percent. Results of the settlement analysis indicate that beneath the upstream and main portions of the north embankment, the underdrain outlet pipes will have a post-settlement grade of 1 percent and beneath the downstream portion of the main embankment, the underdrain outlet pipes will have a post-settlement grade between 1.4 and 2.5 percent. the *TSF Design Report* (Golder, 2021c; Appendix C4) presents detailed foundation settlement calculations of the TSF embankment and minimum underdrain collection pipe design grades below the north embankment.

3.6.2 TAILINGS DISPOSAL – OAR 340-093-0130(2)(c), OAR 340-093-0130(3), OAR 340-095-0020(2)(b), OAR 340-095-0020(5), OAR 340-095-0030(3)

The TSF will be located in the broad valley immediately west of the Mine Portal and Process Plant. The TSF will fill the native valley and requires staged embankment construction on the north and west sides. The embankments will be constructed in stages using downstream construction techniques. At an average deposition rate of 680 stpd and total available tailings capacity of 3.64 Mst constructed in three overall stages, the facility will have an ultimate approximate design operating life of 15 years, although the

current plan anticipates 8 years of active operation. The overall disturbance area is approximately 108 acres at completion of operation. Total disturbance will include the following:

- Embankments constructed of benign basalt generated from the Quarry,
- Geomembrane-lined tailings impoundment area,
- Process water and tailings delivery pipelines,
- Leakage Collection System,
- Leakage Detection System,
- Light vehicle access roads,
- Stormwater Diversion Channels, and
- Reclaim Pond.

The fundamental objectives of the TSF design are as follows:

- Tailings disposal will be consistent with OAR 340-043-0130;
- Zero-discharge facility;
- Designed for closure;
- Permanent and secure storage of all tailings;
- Protection of the Project area's groundwater and surface water;
- Diversion of surface water flows around the facility to the maximum extent practicable during operation and closure;
- Achievement of a stable, drained inert tailings mass that will be suitable for reclamation soon after operations cease, and will not pose a long-term threat to downstream water quality; and
- Routing of surface water over the TSF closure cover with no contact with the tailings.

The TSF will be a 100-percent geomembrane-lined facility with continuous primary and secondary leakage collection and leak detection systems where process solutions are expected to be localized. Process solution will be managed with two independent return water systems that return collected water from the TSF back to the Process Plant for reuse in the process circuit.

Freeboard water at the TSF surface will be collected and managed at the supernatant pool via a floating barge. A tailings Leakage Collection System above the primary geomembrane liner will convey underdrain flows via gravity to the Reclaim Pond at the northern downstream toe of the facility where the water is pumped back to the Process Plant for use in the process circuit. A secondary Leakage Detection System located below the primary geomembrane layer and above a secondary geomembrane layer will also convey underdrain flows via gravity to the Reclaim Pond for reuse. The anticipated maximum flow rates for each system are estimated using a monthly time-step deterministic water balance. The supernatant pool will be maintained away from the embankments on the eastern side of the facility, as shown on the Design Drawings in the *TSF Design Report* (Golder, 2021c; Appendix C4).

The TSF has been designed as a zero-discharge facility capable of storing the 500-year, 24-hour storm event and an allowance for wave action above the anticipated normal operation pool. Permanent Stormwater Diversion Channels will collect and divert stormwater runoff around the facility to a natural drainage north of the TSF or released to the environment. Stormwater that contacts tailings will be contained within the supernatant pool and pumped to the Process Area for use in the process circuit.

The TWRSF, a geomembrane-lined storage area adjacent to the TSF, has been designed to provide temporary containment of waste rock produced during ongoing mining operations. The design of the TWRSF is discussed in Section 3.7. Design concepts for containment leak detection and underdrain collection systems for the TWRSF are the same as those for the TSF. The underdrain collection piping system will be hydraulically separate from the TSF, and collected underdrain flows will be routed to the TSF Reclaim Pond through a solid wall pipe for independent monitoring and sampling.

3.6.3 DESIGN CRITERIA – OAR 340-043-0090

The design criteria presented below are based on OAR regulations, requirements of the Project as defined by Calico, and Golder's experience designing and constructing TSFs in similar environments. The following OAR Divisions have been used to develop acceptable design levels:

- OWRD, Dam Safety Regulations, OAR 690, Division 20;
- DOGAMI, Chemical Process Mine Regulations, OAR 632, Division 37;
- ODFW, Chemical Process Mining Consolidated Application and Permit Review Standards, OAR 635, Division 420; and
- ODEQ, Chemical Mining, OAR Chapter 340, Division 43.

The following TSF design criteria tables (Table 36 through Table 38) present the design criteria proposed for the Project TSF and the corresponding OAR regulation or guideline.

Table 36. General TSF Design Criteria Table

Parameter	Value	Reference or Regulation
Capacity - Cumulative	3.64 million dry st	Calico
Storage for Stage 1A	0.40 million dry st	Golder, 2021
Storage for Stage 1B	0.58 million dry st	Golder, 2021
Storage for Stage 2	1.06 million dry st	Golder, 2021
Storage for Stage 3	1.60 million dry st	Golder, 2021
Life of Mine	~14 years	Calico
Average Tailings Deposition Rate	680 tons/day	Ausenco, 2020
Tailings Slurry Concentration	42.4% solids (by weight)	Ausenco, 2020
Settled Tailings Density	-80 lb/ft³	Golder, 2021
Slope of Tailings Surface	1.0%	Golder, 2021
Dam Construction Method	Staged Downstream Construction	Golder, 2021
Dam Construction Material	Heterogeneous RF and/or soil fill	Golder, 2021
Tailings Deposition System	Subaerial discharge spigots	Golder, 2021
Reclaim Water System	Decant pumping and gravity underflow Reclaim Pond	Golder, 2021
Supernatant Pool Location	East side hill, not in contact with dam	Golder, 2021

Table 37. Division 20 – Dam Safety Minimum Design Criteria Table

Parameter	Value	Reference or Regulation
Embankment Geometry		
Upstream Slope Angle	Overall 3H:1V, or flatter local slopes 2.5H:1V	OAR 690-020-0038
Downstream Slope Angle	2.5H:1V	OAR 690-020-0038
Geotechnical Criteria		
Hazard Classification	Low	OAR 690-020-0100, Golder recommended
Design Earthquake, Operational	Median Maximum Credible Earthquake (MCE)	Exceeds OAR 690-020-0038 for Low Hazard Dams
Peak Ground Acceleration, PGA	0.15 g	Golder, 2021
Horizontal PGA Factor, k, for pseudo-static stability analyses	½ of the PGA	Hynes-Griffin and Franklin (1984), and Seed (1982)
Static Stability, Factor of Safety	1.5 (minimum)	Golder, 2021
Closure Seismic Stability (pseudo-static), Factor of Safety Hazard Classification	1.1 (minimum) Low	Golder, 2021 OAR 690-020-0100
Impoundment Storage Requirement		
Watershed and Hydrologic Inflows	Precipitation on TSF, small area of run-on into impoundment	Golder, 2021
Minimum Freeboard Above Supernatant Pool	3 ft above maximum operating water surface elevation for peak design storm event and wave action	Golder, 2021 Partial OAR 690-020-0042
Minimum Freeboard Above Tailings Beach	2 ft against dam embankment	Golder, 2021
Peak Design Storm Event	500-year, 24-hour storm event, plus wave run-up above supernatant pool operating depth	Exceeds OAR 690-020-0037 and OAR 340-043-0090
Water Conveyance		
Tailings Underflow Collection System	Perforated and solid CPE and HDPE gravity draining piping network	OAR 690-020-0038

H:V = horizontal to vertical

Table 38. Chemical Mining Minimum Containment Design Criteria Table

Parameter	Value	Reference or Regulation
Containment and Leak Detection		
Facility Discharge	Zero discharge facility	Calico, Golder, 2021 OAR 340-043-0000
TSF Basin Containment System (top to bottom)	Continuous 80-mil HDPE geomembrane, geosynthetic clay liner (GCL), prepared subgrade	Golder, 2021 OAR 340-043-0130
TSF Reclaim Pond Containment System (top to bottom)	Continuous 80-mil HDPE geomembrane, geonet leak collection and recovery system (LCRS), 60-mil HDPE geomembrane	Golder, 2021
Overall TSF and TWRSF Leak Detection System	Perforated 2-in-diameter Schedule 80 polyvinyl chloride (PVC) pipe network and monitoring/evacuation ports	OAR 340-043-0000
Underdrain Channel Leak Detection System	Geomembrane lined channel will provide secondary containment, leak detection will be visual	Golder, 2021
Reclaim Pond Leak Detection System	LCRS between two geomembranes and evacuation port	Golder, 2021
Process Water Management		
Tailings Underflow Collection System	Perforated and solid CPE and HDPE gravity piping network in 18-in-thick drainage layer 6-in-thick filter layer Gravity flow to Reclaim Pond	Golder, 2021 OAR 340-043-0050
Tailings Delivery and Distribution System	4-in-diameter HDPE DR17 carrier pipe inside 8-in-diameter HDPE DR17 containment pipe Pumping system, if any (designed by others)	Ausenco, 2020 (others)/Golder, 2021
Supernatant Water	Decant pumping system (designed by others) 4-in-diameter HDPE DR17 carrier pipe inside 8-in-diameter HDPE DR17 containment pipe	Ausenco, 2020 (others)/Golder, 2021
Reclaim Water System	Pumping system (designed by others) 4-in-diameter HDPE DR17 carrier pipe inside 8-in-diameter HDPE DR17 containment pipe	Ausenco, 2020 (others)/Golder, 2021
Surface Water Management		
Perimeter Diversion Channels	100-year, 24-hour storm event plus 9-in. freeboard or 500-year, 24-hour storm event to channel crest	OAR 340-043-0090
Temporary Diversions Channels	25-year, 24-hour storm event plus 9-in. freeboard, or 100-year, 24-hour storm event to channel crest	Golder, 2021

3.6.4 TSF DESIGN SUMMARY – OAR 632-037-0060(4)(b)

3.6.4.1 Site Layout – OAR 340-093-0130(4)(c)

The proposed TSF is located in the broad valley immediately west of the Mine Portal and Process Plant facilities. Native slopes within the valley range between approximately 1 and 20 percent. Embankments will be constructed on the north and west sides to impound the tailings. The north embankment will span the width of the valley (generally east to west), while the smaller west embankments will be used to bridge saddles along the western ridge. The TSF will cover an approximate area of 108 acres and has been designed to accommodate 3.64 Mst of tailings. An overall layout of the site is presented on the Design Drawings in the *TSF Design Report* (Golder, 2021c; Appendix C4).

One groundwater well, BLM Well, is currently located within the footprint of the TSF and is currently used as a water supply for livestock. Prior to construction of the TSF, the BLM Well will be abandoned in compliance with OAR 690-220 to prevent potential contamination of water resources.

3.6.4.2 Hazard Classification

The Project TSF is designed to meet or exceed the minimum OAR design requirements for a hazard rating of "Low" in accordance with OAR 690-020-0022(22). This classification is based on OWRD's definition of a low hazard classification as, "if the dam were to fail, loss of life would be unlikely and damage to property would not be extensive."

Although a dam breach analysis is not required for a low hazard dam, one was performed and is presented in the *TSF Design Report* (Golder, 2021c; Appendix C4). OWRD approval for the construction and operation of the TSF (OWRD, 2020) is provided in Appendix E6.

3.6.4.3 Embankments

As shown on the Design Drawings in the *TSF Design Report* (Golder, 2021c; Appendix C4), embankments will be constructed to impound the tailings along the north and west sides. The main embankment will cross the natural drainage to the north, and small secondary embankments will be constructed across saddles along the western ridge. The embankments will have a maximum overall upstream slope of 3H:1V with a downstream slope of 2.5H:1V. The north and west embankments will have a maximum height of 84 ft and 30 ft, respectively. The crest width of the north embankment will be 50 ft, with 30-ft-wide crests for the smaller west embankments. The upstream slope of the embankments will be geomembrane-lined to maintain the continuous lining within the facility. A discussion on the embankment lining system is presented in the *TSF Design Report* (Golder, 2021c; Appendix C4).

The TSF will be constructed in a maximum of three stages using downstream construction techniques. Embankment construction materials will be soil and benign basalt sourced from the Quarry and during impoundment grading operations. Viable growth media will be salvaged during construction for use at reclamation. A detailed discussion on construction materials and construction quality assurance and quality control (QA/QC) is presented in the *TSF Design Report* (Golder, 2021c; Appendix C4), and in the *Project Quality Assurance Plan – Processing* (Ausenco, 2019; Appendix D5).

Staged construction will provide incremental increases to the facility's storage capacity. The staged storage capacity was calculated based on a measured settled dry density of 80 lb/ft^3. Table 39 presents a summary of the storage capacity relationship of the TSF.

Table 39. Stage Capacity Relationship Summary

Stage	Main Embankment Crest Elevation (ft)	Maximum Tailings Surface Elevation (ft)	Maximum Tailings Surface Area (acres)	Stage Storage Capacity (Mst)	Cumulative Storage Capacity (Mst)
1A	Varies (Max. 3583)	3581	42	0.40	0.40
1B	Varies (Max. 3595)	3593	44.7	0.58	0.98
2	Varies (Max. 3609)	3607	59.5	1.06	2.04
3	Varies (Max. 3622)	3620	83.0	1.60	3.64

3.6.4.4 Lining System

The TSF impoundment area and upstream slopes of each embankment will be continuously lined with both primary and secondary lining systems to provide continuous containment of process solution. The overall lining system will vary depending on the location within the facility. The proposed lined areas are presented on the Design Drawings in the *TSF Design Report* (Golder, 2021c; Appendix C4).

Golder performed an evaluation to compare an alternative lining system to the one prescribed in OAR 340-043-0130(3). The OAR guidelines for secondary containment are "*an engineered, stable, soil/clay bottom liner (maximum coefficient of permeability of 10^{-7} cm/sec) having a minimum thickness of 36 inches.*"

The evaluation compared the OAR guideline with both a standard geosynthetic clay liner (GCL) and an enhanced GCL. Both GCLs consist of a sodium bentonite layer between two geotextiles needle-punched together. The enhanced GCL contains an additional laminated, thin, flexible membrane barrier to offer an increased level of hydraulic performance (decreased hydraulic conductivity). To perform the comparison, the potential fluid travel time through each of the lining systems was evaluated for the following scenarios:

- Comparison of secondary containment alternatives alone (soil/clay liner versus GCL),
- Comparison of a 60-mil primary containment geomembrane liner with the secondary containment, and
- Comparison of an 80-mil primary containment geomembrane liner with the secondary containment.

Using the comparison of fluid travel times, the standard GCL did not meet the same performance standard as the soil/clay secondary layer (OAR requirement); however, the enhanced GCL exceeded the performance based on fluid travel time for all three scenarios. The enhanced GCL is proposed in place of the soil/clay secondary liner. The detailed evaluation is presented in the *TSF Design Report* (Golder, 2021c; Appendix C4).

Within the impoundment, the lining system will consist of (from bottom to top) a 6- to 12-in-thick native prepared subgrade, a 300-mil-thick enhanced GCL, an 80-mil HDPE geomembrane liner, an 18-in-thick drainage layer, and a 6-in-thick filter layer. Perforated piping will be located within the drainage layer to promote drainage of the tailings and to reduce hydraulic head on the lining system.

On the upstream embankment slopes, the lining system will be the same but without the overlying piping, drainage layer, and filter layer. Placement of a drainage layer above the geomembrane on the upstream embankment slopes is impractical due to the relatively steep side slopes and erosion potential of a cover from tailings deposition. Additionally, the TSF underdrain channel, TWRSF underdrain channel, and tailings delivery channel from the Process Plant will use the same lining system as the TSF embankment slopes providing secondary containment.

3.6.4.5 Water Management – OAR 340-095-0020(2)(a), OAR 340-095-0020(3)(g), OAR 340-095-0020(3)(h), OAR 340-095-0020(7), OAR 340-095-0030(5)

Process Fluid Circuit

Water is used in the process circuit for both the metallurgical process and transportation of the tailings to the TSF. Tailings are thickened in the Mill after metals extraction. Prior to transport, water is added back into the tailings slurry to decrease the solids concentration and allow for pumping. Based on rheological requirements for transport, the tailings will be deposited into the TSF at an average solids concentration of 46 percent solids by weight.

Tailings are discharged into the lined TSF impoundment through evenly spaced spigots. As tailings are deposited into the impoundment, the solids separate from the slurry. A portion of the separated water flows to a low point within the impoundment to form the supernatant pool. The remaining water within the tailings mass will drain down to the underdrain collection and lining system. Both the drain and supernatant water are pumped to the Process Plant for reuse.

All piping and pumping systems are comprised of HDPE pipes that are either dual containment pipelines or are located within geomembrane-lined channels. Leak detection is performed by visually monitoring flows within the secondary containment systems.

Tailings Distribution System

Tailings will be delivered to the TSF from the Process Plant via a dual containment HDPE tailings delivery pipe. The tailings delivery pipe consists of a 4-in-diameter DR17 HDPE carrier pipe and an outer 8-in-diameter DR17 HDPE containment pipe. The tailings delivery pipe will be parallel to the proposed reclaim water pipe located along the access road from the Process Plant to the TSF, as shown on the Design Drawings in the *TSF Design Report* (Golder, 2021c; Appendix C4).

The tailings delivery pipe will tie into a 4-in-diameter DR17 HDPE tailings distribution pipe routed along the TSF perimeter access road where tailings will be deposited via evenly spaced spigots. Spigots are 1-in-diameter HDPE drop pipes with manual control valves to allow for tailings deposition, as needed, to maintain the appropriate supernatant pool configuration and location.

The tailings distribution pipe and spigots are located above the TSF basin containment system, providing dual containment at all times.

Supernatant Pool

Water collecting in the supernatant pool is comprised of free water produced during tailings deposition and precipitation falling on the impoundment surface. The supernatant pool will be maintained on the eastern side of the facility away from the facility embankments, as shown on the Design Drawings in the *TSF Design Report* (Golder, 2021c; Appendix C4). As outlined in Section 3.3.9, the tailings discharged to the TSF will be detoxified to minimize cyanide concentration of the water in the supernatant pool. An ERA of the constituents in the supernatant pool was completed and is incorporated in the application (SLR, 2023a; Appendix H). The ERA establishes a cyanide concentration in the supernatant pool that will be protective of wildlife (1 mg/L WAD cyanide, six-month average). This level will be used as a target value for cyanide detoxification, as described in Section 3.3.9.

Water from the supernatant pool will be extracted via barge pumping and delivered back to the Process Plant for reuse through a return water pipe. The supernatant pool is designed to fluctuate seasonally depending on climatological conditions. The supernatant pool will have an average operating depth of 5 ft that is controlled by the pumping system and is deep enough to prevent drawing tailings solids from the pool bottom.

The return water pipe will combine the flows from the supernatant pool and the Reclaim Pond. The combined flows will be pumped in a single, dual containment, return water pipe consisting of a 4-in-diameter DR17 HDPE carrier pipe and an outer 8-in-diameter DR17 HDPE containment pipe that will parallel the tailings delivery pipe located along the access road from the Process Plant to the TSF, as shown on the Design Drawings in the *TSF Design Report* (Golder, 2021c; Appendix C4).

Underdrain Collection System

As deposition continues, the tailings will consolidate due to increased vertical pressure as the tailings surface elevation increases. In addition to water bleeding upward into the tailings surface and the supernatant pool, water will also be released from the tailings downward into the underdrain. The intent of the underdrain collection system is to reduce the hydraulic head on the liner system and to promote drainage of the tailings for long-term closure.

This network of perforated pipes in the underdrain will capture and convey underflow via gravity to the Reclaim Pond located downstream of the main embankment, as shown on the Design Drawings in the *TSF Design Report* (Golder, 2021c; Appendix C4). The underdrain collection system will consist of pipes of variable diameter and type depending on their location and vertical pressure. In general, primary and secondary collection pipes will be perforated, 6-in-diameter, double-wall corrugated polyethylene (CPE); and tertiary collection pipes will be 4-in-diameter, double-wall CPE. Tertiary collection pipes will be installed with greater density adjacent to the north embankment and beneath the supernatant pool.

The primary collection pipes will transition to solid-wall HDPE outlet pipes and then penetrate through the geomembrane liner at the upstream toe of the north embankment and pass under the dam via solid-wall HDPE gravity conveyance pipelines to the Reclaim Pond. For redundancy, the primary collection pipes will interconnect within the TSF basin and flow to the Reclaim Pond.

Where the underdrain outlet pipes pass beneath the embankment, the pipes will be encased in reinforced concrete to protect against deformation and maintain the integrity of the pipes. The pipes and reinforced concrete will be located above a geomembrane-lined channel below the embankment to provide further protection and containment of the system. Beyond the Stage 3 downstream toe, the reinforced concrete encasement will terminate, and the outlet pipes and geomembrane-lined channel will continue to the Reclaim Pond.

Prior to discharging into the Reclaim Pond, each underdrain pipe will enter a monitoring flume. Valves will be located upstream of the monitoring flumes to restrict flows or be closed in the event that flows to the pond need to be limited for short periods of time for maintenance or emergencies.

Leakage Detection System

Independent leak detection and LCRS will be installed to monitor and manage potential leakage between primary and secondary containment layers within the TSF.

Below the primary geomembrane liner of the TSF, perforated 2-in-diameter Schedule 80 PVC piping will be installed immediately below the primary collection pipes and primary geomembrane (above the secondary GCL), as shown on the Design Drawings provided in the *TSF Design Report* (Golder, 2021c; Appendix C4), to monitor potential leaks where concentrated flows are expected. Along the alignment of the leak detection pipes, an additional layer of 80-mil HDPE geomembrane liner will be installed immediately below the GCL.

As perforated leak detection piping continues downgradient toward the downstream toe of the north embankment of the TSF, the pipes transition to solid-wall and additional perforated piping will start at each transition to provide leakage isolation to different areas within the TWRSF and TSF.

Each leak detection pipe will report to an independent leak detection riser near the Reclaim Pond, as shown on the Design Drawings provided in the *TSF Design Report* (Golder, 2021c; Appendix C4). The leak detection risers will provide access for both monitoring of leakage flows and allow for the installation of small submersible pumps to evacuate any observed flows if necessary.

Reclaim Pond – OAR 632-037-0060(4)(c)

The Reclaim Pond will be a double-lined pond north of the main embankment and will contain the TSF and TWRSF underdrain flows, as shown on the Design Drawings in the *TSF Design Report* (Golder, 2021c; Appendix C4). The lining system for the Reclaim Pond will consist of (from bottom to top): a native prepared subgrade, 60-mil HDPE secondary geomembrane liner; 2-ft-deep by 15-ft-square leak detection sump; HDPE geonet; and 80-mil HDPE geomembrane primary liner.

The Reclaim Pond was sized to contain, at a minimum, the total volume of water generated during the following:

- 500-year, 24-hour storm event falling on the surface of the pond;
- Gravity underdrain flow from the TSF and TWRSF for the duration of a 48-hour power outage; and

- Volume of water within the entire length of the reclaim water pipe between the Reclaim Pond and the Process Plant.

The Reclaim Pond has a storage capacity of 146,000 gallons to the underdrain channel invert elevation, which is 3.6 ft below the pond crest. The total storage capacity of the Reclaim Pond is 215,000 gallons while maintaining 2 ft of freeboard beneath the pond crest. In this scenario, water in the Reclaim Pond would also back up into the portion of the lined underdrain channel for additional emergency storage above the minimum required. Pond sizing calculations are presented in the *TSF Design Report* (Golder, 2021c; Appendix C4).

Water from the Reclaim Pond will be pumped back to the Process Plant for reuse in the process circuit. The reclaim water pipe provides dual containment and consists of a 4-in-diameter DR17 HDPE carrier pipe and an outer 8-in-diameter DR17 HDPE containment pipe. The reclaim water pipe will be installed along the access road downstream of the TSF and along the eastern TSF perimeter access road, as shown on the Design Drawings in the *TSF Design Report* (Golder, 2021c; Appendix C4). The reclaim water pipe will connect with the supernatant return water pipe where the combined flows will be pumped in a single dual containment pipe installed parallel with the tailings delivery pipe located along the access road from the Process Plant to the TSF.

At all times, process fluid pipelines will be located above secondary containment that consists of either geomembrane liners or concrete containment structures.

Development of Climate Data

Climate data for the Project site was developed using nearby meteorological monitoring station data and regression analysis based on elevation of the TSF dam. For this project, climate data and station metadata of the closest Remote Automated Weather Stations and Cooperative Observer Network Stations to the Project site were identified and compared, along with the PRISM Climate Group spatial data, using statistical and regression analyses.

A technical memorandum describing the climate data reviewed for the TSF design is presented in the *TSF Design Report* (Golder, 2021c; Appendix C4).

Water Balance

A deterministic spreadsheet-based monthly time-step water balance was developed for each stage of the TSF based on a tailings deposition rate of 680 stpd.

Inflows to the system include precipitation and snowmelt above lined areas, stormwater run-on from the catchment areas downgradient of the Stormwater Diversion Channel, and water being deposited within the tailings slurry at a rate of 164 gpm. Stormwater run-on from upgradient catchment areas, upgradient of the Stormwater Diversion Channel, is diverted around the TSF.

To effectively manage water in the supernatant pool, outflows/losses include evaporation from the tailings beach area, evaporation from the supernatant pool area, interstitial water permanently stored within the tailings mass, and estimated reclaim flow rates to the Process Plant.

The average reclaim rate from the supernatant pool is 71 gpm for Stages 1A through 3 and varies between zero during summer months (July and August) to 134 gpm during winter months (December and January). Makeup water required was defined as the rate of evaporation from the tailings beach and supernatant pool (outflow), plus interstitial water loss (outflow) minus precipitation (inflow). The makeup water rate is less than or equal to the rate that water is reporting to the TSF in the tailings slurry. The average makeup water rate is 72 gpm for Stages 1A through 3 and varies between 160 gpm during summer months (July and August) to 3 gpm during winter months (December and January).

The detailed water balance and supporting discussions are presented in the *TSF Design Report* (Golder, 2021c; Appendix C4).

TSF Freeboard

For TSFs (non-water impounding structures), freeboard is generally defined separately for the area with free water in the supernatant pool and the dry tailings beach areas. The OAR guidelines do not define these separately. The minimum freeboard definition presented in OAR 690-020-0042 is generally intended for water storage reservoirs where water is in contact with the embankments. However, for TSFs in arid climates, tailings deposition and reclaim water can be managed to prevent free water from contacting the embankment, which is the approach for the Grassy Mountain TSF, as shown on the Design Drawings in the *TSF Design Report* (Golder, 2021c; Appendix C4).

The TSF is designed to provide a minimum freeboard depth of 5 ft above the maximum supernatant pool water surface where it is impounded against the geomembrane-lined southern hillside. This freeboard will provide suitable dam storage height above the maximum water surface elevation to contain wave action above the 500-year, 24-hour storm event falling on the TSF impoundment and the upgradient catchment areas below the permanent and temporary diversion channels. Wave run-up calculations were developed assuming the TSF had experiences of a 500-year, 24-hour storm event with waves generated from sustained wind loading using the average wind speed in the prevailing wind direction. Wave run-up calculations have been included in the *TSF Design Report* (Golder, 2021c; Appendix C4).

Tailings beach areas are defined as areas where the impoundment surface is free of pooled water and only comprised of drying or dry tailings. The TSF is designed so that only tailings will impound against the embankments. In the tailings beach areas, a minimum freeboard of 2 ft will be provided from the highest beach elevation to the lowest dam crest elevation.

In addition to the above freeboard dimensions, the TSF is designed such that the lowest tailings surface and pool elevation is away from the perimeter embankments. This results in the overall tailings surface sloping away from the perimeter embankments southeast toward the supernatant pool and not directly contacting the embankment. Overtopping or freeboard encroachment is not expected with the fluid management for the TSF, as presented in the *TSF Design Report* (Golder, 2021c; Appendix C4).

At closure, a spillway has been sized to accommodate surface water flows from the surface of the reclaimed TSF while the permanent Stormwater Diversion Channels (discussed below) remain in place. This spillway can be constructed and implemented at any point during operation or closure.

Stormwater Control

Permanent and temporary Stormwater Diversion Channels have been included in the design to convey surface water runoff from upgradient catchment areas around the TSF to decrease the amount of run-on water that needs to be managed within the TSF. The stormwater channels are sized to contain the following:

- Permanent channels: 100-year, 24-hour storm event with 9 in. of freeboard or the 500-year, 24-hour storm event without overtopping; and
- Temporary channels: 25-year, 24-hour storm event with 9 in. of freeboard or 100-year, 24-hour storm event without overtopping.

A detailed summary of the hydrologic and channel hydraulic calculations is presented in the *TSF Design Report* (Golder, 2021c; Appendix C4).

3.7 WASTE ROCK MANAGEMENT – OAR 340-093-0130(2)(c), OAR 340-093-0130(2)(d), OAR 340-095-0020(2), OAR 340-095-0020(3)(a), OAR 340-095-0020(3)(c), OAR 340-095-0030(2)(d), OAR 632-037-0060(4)(b), OAR 340-043-0040, OAR 340-043-0050

A single TWRSF will be constructed to temporarily store approximately 0.27 Mst of waste rock generated during operations. A haul road will connect the Mine Portal with the TWRSF, and equipment listed in Table 33 will be used to load, haul, and place the waste rock in the TWRSF. The TWRSF will reach its maximum storage of approximately 0.27 Mst at Year 4 of operations; however, the waste rock will be used as the aggregate in CRF used to backfill the underground mine. Table 40 shows the expected schedule of waste rock production and usage as backfill. The design of the TWRSF is included in the *TSF Design Report* (Golder, 2021c; Appendix C4).

Table 40. Schedule of Waste Rock Production and Use as Backfill

Year of Operation	-1	1	2	3	4	5	6	7	8	Totals
Non-Portal Waste Rock	65	62	31	17	28	28	6	17	17	271
Portal Excavation	92									92
Total Waste	157	62	31	17	28	28	6	17	17	363
Cumulative Waste	157	219	250	267	295	323	329	346	363	363
Backfill Demand		136	174	210	199	204	200	194	144	1,461
Waste Used as Backfill	0	81	50	36	48	48	26	37	37	363
Net Waste in Stored in TWRSF	157	138	118	98	78	58	38	18	0	0
Quarry Basalt Used as Backfill	0	55	124	174	151	156	174	157	107	1,098

Notes:
- Tonnages of waste rock, portal excavation, and backfill demand are as reported in the Feasibility Study (Ausenco, 2020).
- Waste Rock is material excavated to access the ore and includes excavation spoils for construction of the Portal, the decline, and drifts/crosscuts for level access and stope access.
- Cumulative waste is the total that would be stored in the TWRSF if no waste is used as cement rock backfill.
- Waste Used as backfill assumes that one-eighth of the waste generated in Year -1 is added to the waste generated in each year of operation and the total is used as backfill for that year.
- Units are kilotons.

The design criteria presented below are based on OAR regulations, requirements of the Project as defined by Calico, and Golder's experience designing and constructing lined mine waste facilities in similar environments. The following OAR Divisions have been used to develop minimum acceptable design levels:

- DOGAMI, Chemical Process Mine Regulations, OAR 632, Division 37;
- ODFW, Chemical Process Mining Consolidated Application and Permit Review Standards, OAR 635, Division 420; and
- ODEQ, Chemical Mining, OAR Chapter 340, Division 43.

The TWRSF design criteria in Table 41 presents the minimum design criteria proposed for the Project waste rock and the corresponding OAR regulation or guideline.

Table 41. TWRSF Design Criteria Table

Parameter	Value	Reference or Regulation
Capacity	0.27 Mst	Ausenco, 2020
TWRSF Containment System (top to bottom)	Continuous 80-mil high-density polyethylene liner (HDPE) geomembrane, geosynthetic clay liner (GCL), prepared subgrade	Golder, 2021
TWRSF Leak Detection System	Perforated 2-in-diameter Schedule 80 polyvinyl chloride (PVC) pipe network and monitoring ports	OAR 340-043-0000
TWRSF Underflow Collection System	Perforated and solid CPE and HDPE gravity piping network in 18-in-thick drainage layer 6-in-thick filter layer Gravity flow to Reclaim Pond	Golder, 2021 and OAR 340-043-0050
TWRSF Design Earthquake, Operational	475-year return period	Golder, 2021
Peak Ground Acceleration, PGA	0.08 g	Golder, 2021
Horizontal PGA Factor, k, for pseudo-static stability analyses	½ of the PGA	Hynes-Griffin and Franklin (1984), and Seed (1982)
Static Stability, Factor of Safety	1.5 (minimum)	Golder, 2021
Seismic Stability (pseudo-static), Factor of Safety	1.1 (minimum)	Golder, 2021

3.7.1 LINING SYSTEM – OAR 632-037-0060(4)(f), OAR 340-043-0000(2)(a)

The TWRSF will be continuously lined with both primary and secondary lining systems to provide dual containment of process solution. The containment system is consistent throughout the facility, but the drainage system above the primary geomembrane liner will vary depending on the location as described in the *TSF Design Report* (Golder, 2021c; Appendix C4).

To meet the minimum guidelines of OAR 340-043-0130(3), the secondary containment layer of the TWRSF dual containment system will be an enhanced GCL with a maximum hydraulic conductivity of 1×10^{-10} cm/sec. The enhanced GCL provides a slower conductivity than a compacted soil with a thickness of 36 in. and permeability of 1×10^{-7} cm/sec. Hydraulic conductivity comparison calculations for the enhanced GCL are presented in the *TSF Design Report* (Golder, 2021c; Appendix C4). Estimates for leakage

through the primary geomembrane liner were prepared for variable quality of installation and construction QA/QC in accordance with U.S. Environmental Protection Agency (EPA) report number EPA/530-SW-87-015, "Background Document on Proposed Liner and Leak Detection Rule" (EPA, 1987). These estimates are based on both the average and maximum anticipated piezometric head on the primary geomembrane liner between collection pipes. Estimates for piezometric head above the geomembrane and leakage through the primary liner are presented in *TSF Design Report* (Golder, 2021c; Appendix C4).

The lining system will consist of (from bottom to top) a 6- to 12-in-thick native prepared subgrade, a 300-mil-thick enhanced GCL, an 80-mil HDPE geomembrane liner, an 18-in-thick drainage layer, and a 6-in-thick filter layer. Perforated piping will be located within the drainage layer to promote drainage of the tailings. This lining system is the same as described above for the TSF.

The TWRSF pad is designed to capture and convey precipitation infiltrating the waste rock to the TSF Reclaim Pond for independent monitoring and management. Generally, the TWRSF pad slopes from south to north at an approximate 1-percent grade.

3.7.2 UNDERDRAIN COLLECTION SYSTEM – OAR 632-037-0060(4)(f)

An underdrain collection system will be installed above the geomembrane liner. The collection system will consist of a series of perforate pipes installed within the drainage layer above the geomembrane liner. A single perforated 6-in-diameter, double-wall CPE primary collection pipe will capture flows from 4-in-diameter, double-wall CPE pipes within the drainage layer.

Prior to exiting the TWRSF, the perforated 6-in-diameter CPE primary collection pipe will transition to a solid-wall, dual containment, 6-in-diameter HDPE DR17 by 10-in-diameter DR17 pipe. The dual containment underdrain outlet pipe will penetrate through the lined perimeter berm of the TWRSF and travel above ground between the TWRSF and the edge of the TSF Stage 1A geomembrane liner limits.

At the Stage 1 TSF basin liner limits, the 10-in-diameter containment pipe will terminate, and the 6-in-diameter carrier pipe will continue to the TSF Reclaim Pond above the TSF basin geomembrane liner. The TWRSF underdrain collection system is presented in detail in the *TSF Design Report* (Golder, 2021c; Appendix C4).

The TWRSF drain pipe is one of four primary collection pipes across the TSF basin that report to the Reclaim Pond. The primary collection and underdrain outlet pipes have a full flow capacity of 249 gpm at the minimum 1-percent, post-settlement grade below the north embankment of the TSF. A maximum design flow rate of 99 gpm to account for potential pipe deformation and long-term scale build-up was used in the design. The flow rate anticipated from the TWRSF will be comprised solely of precipitation falling directly on the TWRSF and, as a result, is significantly lower than the design flow rate for each pipe.

Because the primary collection pipes are perforated to the upstream toe of the north embankment of the TSF, each pipe provides redundant capacity to the others in the event that one or more become blocked. Hydraulic sizing of the primary collection and underdrain outlets pipes is presented in the *TSF Design Report* (Golder, 2021c; Appendix C4). As embankment construction and tailings deposition progresses, the primary underdrain outlet pipes will experience grade flattening due to foundation settlement of the

embankments. Foundation settlement is discussed in detail in the *TSF Design Report* (Golder, 2021c; Appendix C4).

Where the underdrain outlet pipes pass beneath the embankment, they are located above a geomembrane-lined channel that provides secondary containment. Within this underdrain outlet channel, the outlet pipes are encased in reinforced concrete to protect against deformation and maintain the integrity of the pipes. Design of the reinforced concrete encasement is presented in the *TSF Design Report* (Golder, 2021c; Appendix C4).

The underdrain outlet pipes will continue to the Reclaim Pond within the geomembrane-lined underdrain channel. Prior to discharging into the Reclaim Pond, each underdrain pipe will enter a flume where flows can be measured and monitored. Additionally, upstream of the monitoring flumes, 6-in-diameter knife gate valves will be installed that can be used to restrict flow or closed in case of emergency. The water conveyed from the TWRSF to the Reclaim Pond will be used as makeup water for the mining operation.

3.7.3 LEAKAGE DETECTION SYSTEM – OAR 632-037-0060(4)(f), OAR-340-043-0000(2)(a)

Independent leak detection and LCRS will be installed to monitor and manage potential leakage between primary and secondary containment layers within the TWRSF containment pad.

Below the primary geomembrane liner of the TWRSF (and the TSF), perforated 2-in-diameter Schedule 80 PVC piping will be installed immediately below the primary collection pipes and primary geomembrane (above the secondary GCL), as shown on the Design Drawings provided in the *TSF Design Report* (Golder, 2021c; Appendix C4), to monitor potential leaks where concentrated flows are expected. Along the alignment of the leak detection pipes, an additional layer of 80-mil HDPE geomembrane liner will be installed immediately below the GCL.

As perforated leak detection piping continues downgradient toward the downstream toe of the north embankment of the TSF, the pipes transition to solid-wall, and additional perforated piping will start at each transition to provide leakage isolation to different areas within the TWRSF and TSF.

Each leak detection pipe will report to an independent leak detection riser near the Reclaim Pond and the TWRSF containment berm, as shown on the Design Drawings provided in the *TSF Design Report* (Golder, 2021c; Appendix C4). The leak detection risers will provide access for both monitoring of leakage flows and allow for the installation of small submersible pumps to evacuate any observed flows if necessary.

3.7.4 WASTE ROCK STORAGE STABILITY – OAR 340-043-0030(2)(g), OAR 632-037-0060(9)(b)

The TWRSF is designed to remain in place during operation only. Due to the temporary nature of the TWRSF, geotechnical stability of the TWRSF was performed for static and pseudo-static conditions using an operational basis earthquake with a return period of 475 years. The site-specific hazard assessment for the Project is presented in the *TSF Design Report* (Golder, 2021c; Appendix C4). Table 42 presents the geotechnical stability analysis results for the TWRSF.

Table 42. Summary of Critical TWRSF Stability Analysis Results

Analysis Method	Static FOS (Target design minimum is 1.5)		Pseudo-static FOS (k = 0.04 g) (Target design minimum is 1.1)	
Effective Stress	Failure through Foundation	Waste Rock Slide over the Liner	Failure through Foundation	Waste Rock Slide over the Liner
	1.8	1.6	1.6	1.4

FOS = factors of safety

Detailed discussions on analyses and construction-level design of the TWRSF containment system are presented in the *TSF Design Report* (Golder, 2021c; Appendix C4).

3.8 CHEMICAL STORAGE AND USE – OAR 632-037-0060(4)(i), OAR 632-037-0060(11), OAR 632-037-0060(13), ORS 517.971(7)(j)

The volume and shipment frequency of fuels and reagents used in the process is shown in Table 43. Acid solutions, caustic soda, and concentrated cyanide solutions will be delivered to the Site in liquid form. Containment of process solutions is based on 110 percent of the largest containment volume for each reagent. Anti-scalant is included in Table 43 and in the *Emergency Response Plan* (Calico, 2023d; Appendix D6).

Acid will be stored in the absorption, desorption, and refining (ADR) building and limited to individual totes or barrels that are used in the acid area and will not exceed 1,300 gallons. The volume of acid stored in the building will be less than the largest acid tank, which will be the acid wash vessel having a volume of 2,320 gallons.

Caustic soda solution will be received in a 10,000-gallon tank, diluted, and then distributed to the Process Plant. Liquid caustic soda will be delivered to the Mine at 50-percent concentration and diluted to 20-percent concentration for use on site. Transfer of caustic soda solution will occur on the same concrete slab used for cyanide solution.

Hydrocarbon products, including lubricants, oils, antifreeze, and used oil will be stored at the truckshop, located south of the Process Plant Area (Map 4). Reagents will be transported, stored, and used in accordance with federal, state, and local regulations as outlined in the *Toxic and Hazardous Substances Transportation and Storage Plan* (Calico, 2021d; Appendix D7). The transportation, storage, and use of cyanide is outlined in the *Cyanide Management Plan* (Ausenco, 2023; Appendix D8). Spill contingency and emergency preparedness measures are outlined in the *Emergency Response Plan* (Calico, 2023d; Appendix D6).

Diesel fuel and hydrocarbon products will be stored in primary (tanks, tote bins, barrels) and secondary containment to prevent release to the environment. Used oil and used containers will be disposed of or recycled according to federal, state, and local regulations.

Table 43. Fuels and Reagents Volumes and Shipments

Chemical	Onsite Storage	Anticipated Stored Amount	Estimated Consumption Rate	Shipment Frequency
Mill Ore Processing				
Sodium Cyanide, liquid - Mixed to 30% Sodium Cyanide (NaCN)	13,000 gallons	13,000 gallons	191 gal/day	1/month
Lime - Dry pebble at 90% calcium oxide (CaO)	25-ton truckload to bulk storage silo	100-ton silo	12.9 tons/day	3-4/month
Anti-Scalant (liquid surfactant)	240 lb carboy	2 carboys	30 lb/day	2/month
Carbon Acid Wash & Neutralization				
Hydrochloric Acid (HCl) - Liquid 33%	330-gallon HDPE totes	14 totes 3,000 gallons in tank/vessel	107 gal/day	8-9/year
Acid Wash Vessel	2,320 working gallons			
Acid Mix Tank	282 working gallons			
Caustic Soda - Sodium Hydroxide (NaOH) - Liquid, 50%	330-gallon totes	11 totes	136 gal/day	1/month
Cyanide Detoxification				
Copper Sulfate Pentahydrate – 98% by weight, Used at 15% strength	2,750-lb bulk bags 2,955 working gallons	2,955 gallons	35 lb/day	4-5/year
Sodium Metabisulfite (SMBS)	2750-lb bulk bags	16 bags	2,552 lb/day	2/month
Fluxes				
Borax (pentahydrate) - Dry	50-lb sacks	20 sacks	10.4 lb/week	1-5/year
Silica (SiO_2) - Dry	50-lb sacks	10 sacks	51.8 lb/week	
Niter ($NaNO_3$) - Dry	50-lb sacks	5 sacks	8.6 lb/week	
Feldspar - Dry	50-lb sacks	5 sacks		
Mercury Control				
Sulfide-impregnated Carbon - Dry	50-lb sacks	40 sacks	42.5 lb/day	8/year
Mercury Recovered				
Mercury	80-lb flask		5 lb/day	As needed
Electrolytes				
Sodium Hydroxide (NaOH) - Dry	20-lb sacks	10 sacks	15 lb/day	3/month
Assay and Met Lab				
Sulfuric Acid (H_2SO_4) Reagent Grade	1 gallon	6 gallons		
Nitric Acid (HNO_3) Reagent Grade	1 gallon	10 gallons	1lb/day	
Hydrofluoric Acid (HFI) Reagent Grade	1 gallon	2 gallons		
Hydrochloric Acid (HCl) Reagent Grade	1 gallon	4 gallons		
Sodium Cyanide (NaCN) Reagent Grade – Dry	5-lb box	10 boxes	1 lb/day	6/year
Buffer Solution Reagent Grade - Dry	5-lb box	10 boxes		
Lead Nitrate ($PbNO_3$)- Dry	20-lb bag	1 bag		
Acetylene	Size 45 industrial Acetylene Cylinder	3 in lab/15 in shop	2 cylinders per week	6/year

Chemical	Onsite Storage	Anticipated Stored Amount	Estimated Consumption Rate	Shipment Frequency
Fluxes				
Borax Penta - Use Plant Source	50-lb sacks	20 sacks	10 lbs/week	5/year
Silica - Use Plant Source				
Lead Oxide - Reagent Grade	80-lb pail	1 pail	2 lbs/day	Assay Laboratory Use – shipment frequency will vary
Methyl Ethyl Ketone (MEK)	5-gallon pail	1 pail		
Silver Inquart	10-lb package	1 pkg		
Fuel/Lube/Oil				
Diesel - Truck Shop	8,250 gallons	Up to 8,250 gal	140 gal/day	1/month
Ammonium Nitrate/Fuel Oil (ANFO)	2,800-lb totes	7 totes	20,000 lb/month	
30WT Motor Oil	4,000 gallons	Up to 4,000 gal	15-20 gal/day	
Used Motor Oil	4,000 gallons	Up to 4,000 gal	15-20 gal/day	
Antifreeze	2,000 gallons	Up to 2,000 gal	10-15 gal/day	
Hydraulic Fluid	2,000 gallons	Up to 2,000 gal	10-15 gal/day	
90WT Gear Lube	2,000 gallons	Up to 2,000 gal	10-15 gal/day	
Used Antifreeze	2,000 gallons	Up to 2,000 gal	10-15 gal/day	
Grease bins	4 x 120-gallon totes, 4 x 30-gallon drums	Up to 4 totes, Up to 4 drums	5-10 gal/day	

3.8.1 REAGENTS

Given the properties of the reagents and their interactions with each other, design of the reagent preparation area will largely focus on the isolation of the cyanide. The cyanide preparation area is located away from incompatible reagents and in a low-traffic area of the Process Plant. The cyanide preparation area will also be separated from the acidic reagents preparation area by the alkaline reagents. In this configuration the basic chemicals act as a buffer to prevent mixing of acidic reagents and sodium cyanide, which would lead to the generation of cyanide gas. Process flow diagrams are provided in the *Mill Design Report* (Ausenco, 2022; Appendix C3).

3.8.1.1 Hydrated Lime

Preparation of the hydrated lime will require:

- A bulk storage silo,
- A mixing tank,
- Dosing pumps feeding a ring main, and
- Automatically controlled dosing points from the ring main.

Hydrated lime is used in leaching and detoxification for pH control. The hydrated lime is delivered to the Site by bulk tanker and blown into a bulk storage silo.

When the mixing tank level is low, hydrated lime is added to the tank via a rotary valve and screw feeder. Process water is added at the same time to maintain the mixture strength of 20 percent, forming a milk-of-lime suspension.

Milk-of-lime is distributed to the various dosing points using a ring main that provides constant flow to various destinations. Dosing is accomplished with drop lines off the ring main with automated on-off valves that open when pH is low and close when the operator-specified target is reached.

3.8.1.2 Sodium Hydroxide

Preparation of sodium hydroxide will require dosing pumps.

Sodium hydroxide, also known as caustic soda, is used in the elution circuit to prepare the stripping solution used to recover the gold from the loaded carbon. The reagent will be delivered in 330-gallon totes received by truck and unloaded near the sodium hydroxide area. The solution is supplied at a concentration of 50 percent by weight basis. A dosing pump is connected directly to the tote and provides the required dosage of sodium hydroxide to the point of use in the elution circuit. Additional totes are stored in secured containers in a bunded Reagent Storage area adjacent to the leach-CIL circuit.

3.8.1.3 Sodium Cyanide

Storage and distribution of sodium cyanide will require:

- A tanker unloading pad,
- A bulk storage tank,
- A ring main, and
- Dosing pumps.

Sodium cyanide is used in leaching as a lixiviant and in elution as a carbon-stripping aid. Sodium cyanide is delivered to the Site in liquid form by bulk tanker in 6,400-gallon loads at 30 percent purity and transferred into the sodium cyanide storage tank.

Sodium cyanide is dosed from the storage tank to dosing points via a ring main that provides constant flow to various destinations. Additional information on the equipment and procedures for handling cyanide is provided in the *Cyanide Management Plan* (Ausenco, 2023; Appendix D8).

3.8.1.4 Sodium Metabisulphite

Preparation of SMBS will require:

- A bulk handling system,
- A combined mixing/storage tank, and
- Dosing pumps.

SMBS is the source for SO_2 in the Air/SO_2 process and will be supplied in 2,750-lb bulk bags with a minimum quality of 67 percent SO_2. It will be delivered to the Site by truck, offloaded by forklift, and stored in the

Reagent Storage area adjacent to the reagents mixing facility. SMBS is mixed and stored in a combined mixing/storage tank laid out such that the mixing tank is directly above the storage tank, and mixed solution drops by gravity into the storage tank.

When the storage tank level is low, an SMBS mix is started by dropping a bulk bag of SMBS onto a bag breaker, which discharges SMBS into the mix tank. The mix tank has been previously filled with sufficient process water to produce a mixture strength of 20 percent. Once mixing is complete, and there is sufficient room in the storage tank, the mixed SMBS solution is transferred by gravity to the storage tank.

SMBS is dosed from the storage tank to the detoxification circuit via a dosing pump. A second pump is provided as an installed spare.

3.8.1.5 Copper Sulfate (Pentahydrate)

Preparation of copper sulfate will require:

- A bulk handling system,
- A combined mixing/storage tank, and
- Dosing pumps.

Copper sulfate (pentahydrate) ($CuSO_2.5H_2O$) is supplied in 2,750-lb bulk bags at a purity of 98 percent on a weight basis. It will be delivered to the Site by truck, offloaded by forklift, and stored in the Reagent Storage area adjacent to the reagent mixing facility. Copper sulfate is mixed and stored in a combined mixing/storage tank laid out such that the mixing tank is directly above the storage tank, and mixed solution drops by gravity into the storage tank.

When the storage tank level is low, copper sulfate is added to the mixing tank by dropping a bulk bag onto a bag breaker, which discharges copper sulfate into the mix tank. The mix tank has been previously filled with sufficient process water to produce a mixture strength of 15 percent. Once mixing is complete, and there is sufficient room in the storage tank, the mixed copper sulphate solution is transferred by gravity to the storage tank.

Copper sulfate is dosed from the storage tank to the detoxification circuit via duty/standby dosing pumps.

3.8.1.6 Hydrochloric Acid

Hydrochloric acid is used in the elution circuit and is supplied in 330-gallon totes in liquid form at 33-percent concentration on a weight basis. It will be delivered to the Site by truck. The hydrochloric acid will be dosed directly to the acid wash column through a dosing pump. Raw water is added to the hydrochloric acid to a strength of 3 percent via inline mixing ahead of the acid wash column.

3.8.1.7 Low-Pressure Air

The blowers will supply low-pressure process air to the pre-aeration, leach, CIL, and the cyanide detoxification circuits. The blowers are multiple-stage, centrifugal-type blowers and are used with a “blow-off” arrangement to adapt to fluctuations in air demand.

3.8.1.8 Plant and Instrument Air

Two plant air compressors in a duty/standby configuration will provide high-pressure compressed air to meet the demand for plant and instrument air requirements.

Wet plant air will be stored in the plant air receivers to account for variations in demand prior to being distributed throughout the plant. Instrument air will be filtered and then dried in an instrument air dryer prior to reporting to the gold room or general plant distribution.

3.8.2 PETROLEUM-CONTAMINATED SOILS MANAGEMENT – OAR 340-093-0170, OAR 340-093-0190

In the event site soils become contaminated with petroleum products due to accidental spills or other activity, the soils will be handled as described in the *Petroleum-Contaminated Soils Management Plan* (Calico, 2022c; Appendix D9).

3.8.3 WASTE DISPOSAL MANAGEMENT – OAR 340-093-0130(3), OAR 340-093-0170, OAR 340-093-0190, OAR 340-093-0210

Management of wastes begins before materials are purchased by evaluating the potential environmental impacts of materials considered for use. The Project will minimize the overall generation of waste to the extent practical and minimize the use of materials that are regulated as hazardous waste when they no longer serve their intended purposes. Materials are reused and recycled whenever possible. Materials that cannot be managed on site, such as liquid waste, hazardous waste, certain items to be recycled or reused, and waste prohibited from disposal in landfills, will be shipped off site for reuse, recycle, treatment, or disposal at appropriate facilities.

Materials will be characterized according to the Resource Conservation and Recovery Act (RCRA) requirements and will be stored appropriately. Calico will obtain a Hazardous Waste Identification Number from the ODEQ to address hazardous waste generated at the Project. The Mine is expected to be in the "small quantity generator" category as defined by the EPA. Waste handling and disposal methods for the specific wastes anticipated at the Project are provided In Calico's *Waste Management Plan* (Calico, 2023b; Appendix D3).

A training program will be implemented to inform employees of their responsibilities in proper waste disposal procedures. RCRA requires this training occur within six months of employment and annually thereafter.

As outlined in the *Emergency Response Plan* (Calico, 2023d; Appendix D6), Calico will have a trained response team at the Site 24 hours per day to manage potential spills of regulated materials at the Site. Response for transportation-related releases of regulated materials bound for the Site will be the responsibility of the local and regional agencies, as outlined in the *Toxic and Hazardous Substances Transportation and Storage Plan* (Calico 2021d; Appendix D7). However, where appropriate, Calico may assist with response to offsite incidents, including providing resources, based on agency requests.

3.8.4 EXPLOSIVE STORAGE AND USE

Explosive agents will be purchased, transported, stored, and used in accordance with the Bureau of Alcohol, Tobacco, Firearms and Explosives, Department of Homeland Security provisions, and MSHA regulations. The primary explosive used will be ANFO. Explosive agents, boosters, primers, detonators, detonation cord, and other ancillary blasting supplies will be stored within a secure powder magazine. Boosters and detonators will be stored in separate storage magazines.

Explosives storage facilities will be constructed at the southwest side of the Project (Map 4). This location uses the hill as a natural barrier between the explosives storage facility and other infrastructure. The storage facilities will consist of leased powder magazines as per vendor quotation. Earthen berms will be placed around the magazines for additional security.

Explosives will be delivered by truck to the Site by vendors and will be delivered to the working face using stainless-steel totes on flatbed trucks.

3.8.5 CYANIDE MANAGEMENT

Cyanide transporters are expected to comply with the International Cyanide Management Code for the implementation of appropriate emergency response plans and capabilities in the event of a release or spill, and with the Federal Motor Carrier Safety Administration's regulations for transportation of hazardous materials on public highways (49 CFR Part 397). Aqueous sodium cyanide will be delivered to the Project by bulk tanker from Winnemucca, Nevada, with each tanker holding 6,400 gallons. The fluid will be transferred to a 13,000-gallon storage tank in the cyanide storage area, which will be completely fenced and secured, and placed on an impervious concrete slab with walls providing 110-percent containment. The cyanide solution will be metered to various points throughout the plant. Additional information on cyanide management is in the *Cyanide Management Plan* (Ausenco, 2023; Appendix D8).

3.9 MINE SITE INFRASTRUCTURE

3.9.1 HAUL AND ACCESS ROADS – OAR 340-095-0020(13)

The roads used to access the Mine and Process Plant Area are described in detail in the *Road Design Report* (HDR, 2019; Appendix C1). The *Road Design Report* describes the design specifications and where the existing road will be upgraded, widened, and realigned. The roads within the Permit Area are shown on Map 1 and Map 2. These roads will be upgraded in accordance with MSHA regulations, and best management practices (BMPs) will be used where necessary to control erosion and impacts to surface water.

3.9.2 POWER SUPPLY – OAR 340-093-0130(3)

Electrical power will be supplied for the Project via a powerline owned and maintained by Idaho Power. The existing powerline will be upgraded, and a new powerline will be constructed along and on either side of the BLM and county roads and the Mine Access Road to provide power to the Mine for approximately 25.2 miles. The powerline will be constructed to avoid any wetlands or sensitive plant species and will be

constructed, maintained, and reclaimed using the right-of-way (ROW) allowance from the roads. The powerline is shown on Maps 1, 2, and 4. The power demand will be approximately 5 megawatts (MWs) throughout the LOM, and a reduced power demand will remain during reclamation activities. The Idaho Power powerline will connect to the Project substation located at the Process Plant.

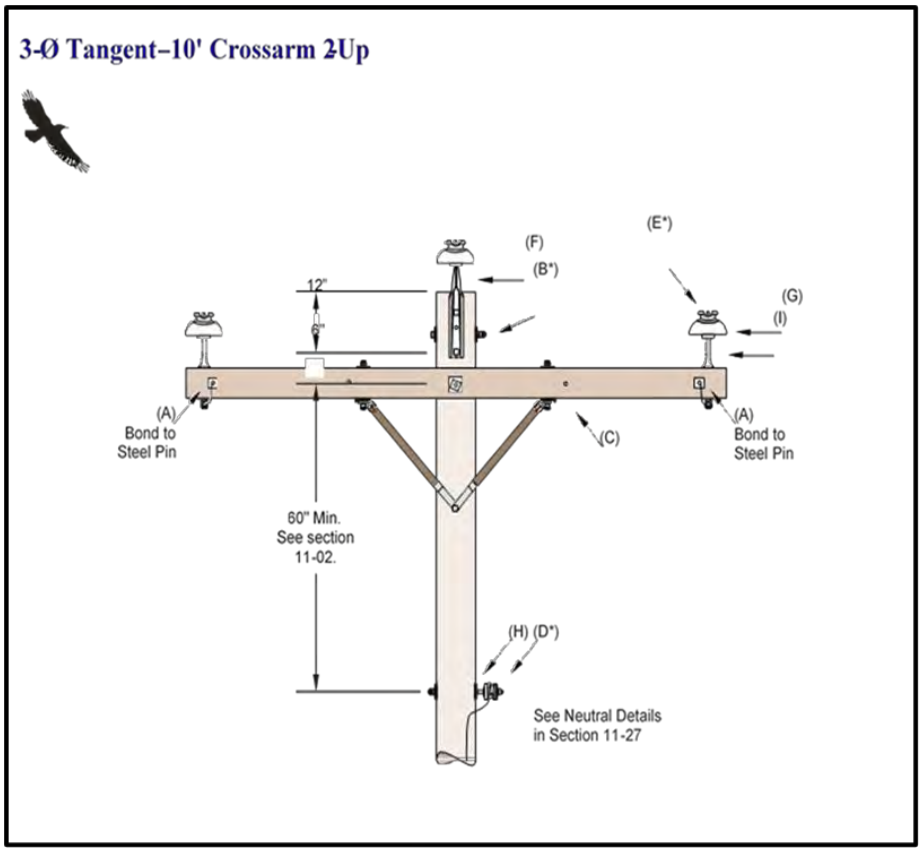
The power supply design report, *Calico – Grassy Mountain 34.5kV Line* (HDR, 2021), is provided in Appendix C6.

3.9.2.1 Onsite Power Generation

During construction of the powerline, one emergency diesel generator capable of producing 2,000 kilowatts (kW) will be located at the Process Plant. It will be used for slightly more than one year during construction and initial mining of the decline. After the powerline is complete, this generator will provide sufficient emergency power to operate critical components at the facility in the event of a power outage. Power generation is estimated based on monthly rates and fuel, as the rate per kilowatt hour (kWh) will vary depending on power consumption.

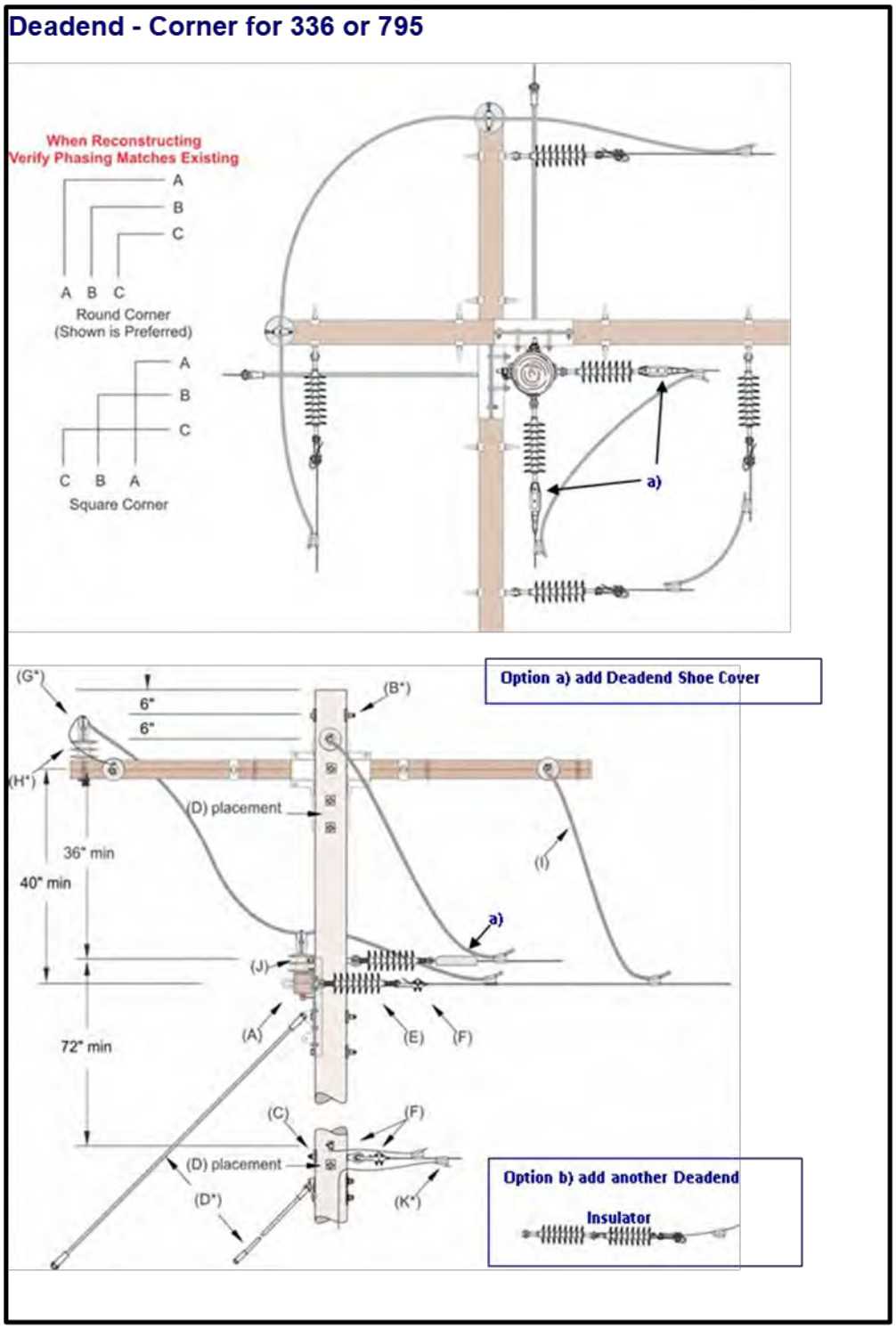
3.9.2.2 Line Power

The design for line power was coordinated with Idaho Power to deliver approximately 5.3 MW of power to the Site, including an approximately 25.2-mile distribution circuit, a new 69/34.5 kV to 14 megavolts transformer, and a new 34.5-kV 167-amp regulator. The powerline would be constructed from the Hope Substation near Vale, Oregon, to the Mine site along the main access road, within the Access Road portion of the Permit Area. Figure 15 through Figure 18 present the planned line pole configurations using structures designed for Zone 3 avian protection, as noted for each figure.



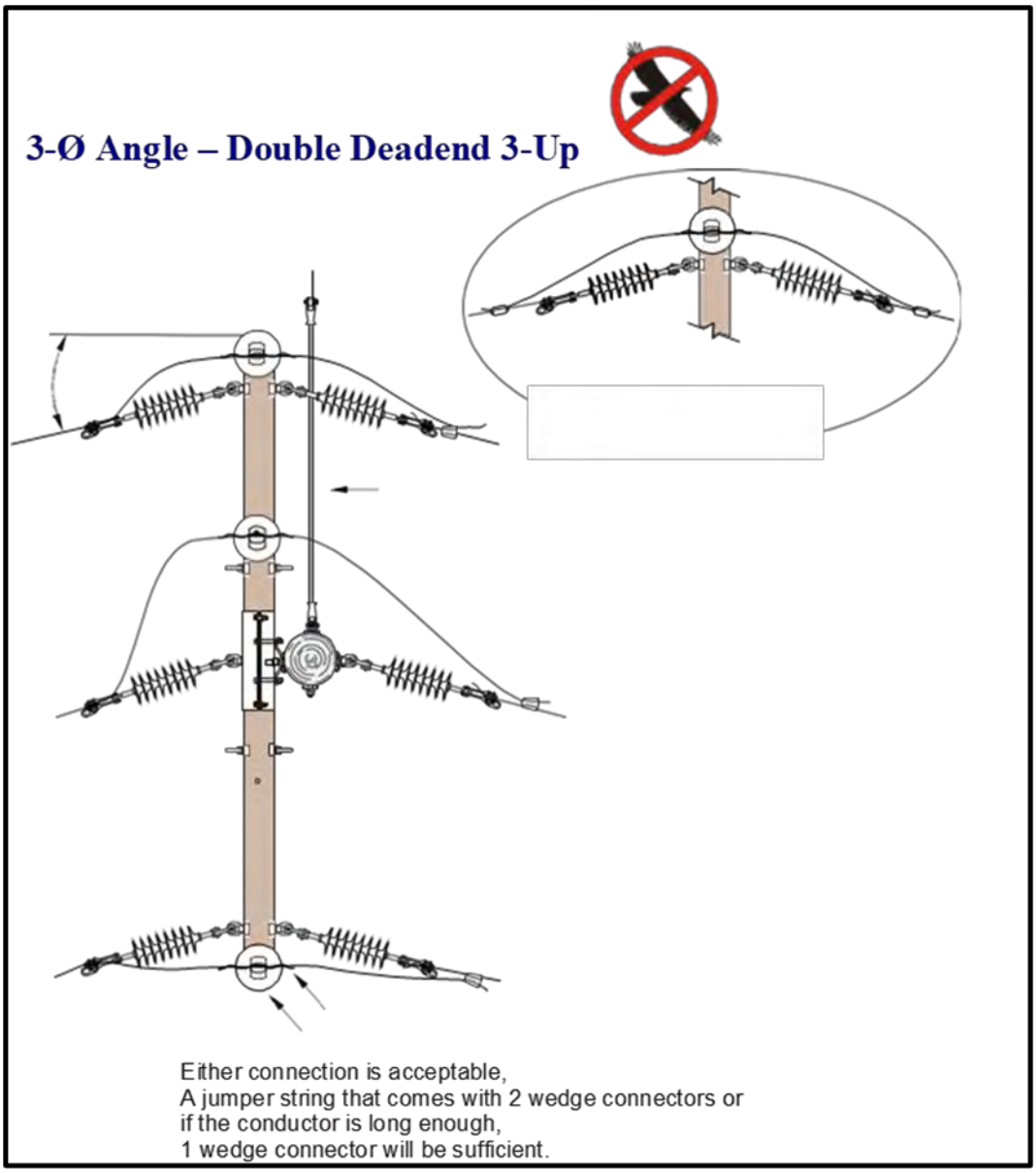
Note: Structures falling under this category will be modified per Idaho Power's Overhead Distribution Manual 11-33-01 to obtain Zone 3 avian protection.

Figure 15. Planned Line Pole Configurations, 3-0 Tangent – 10' Crossarm 2-Up



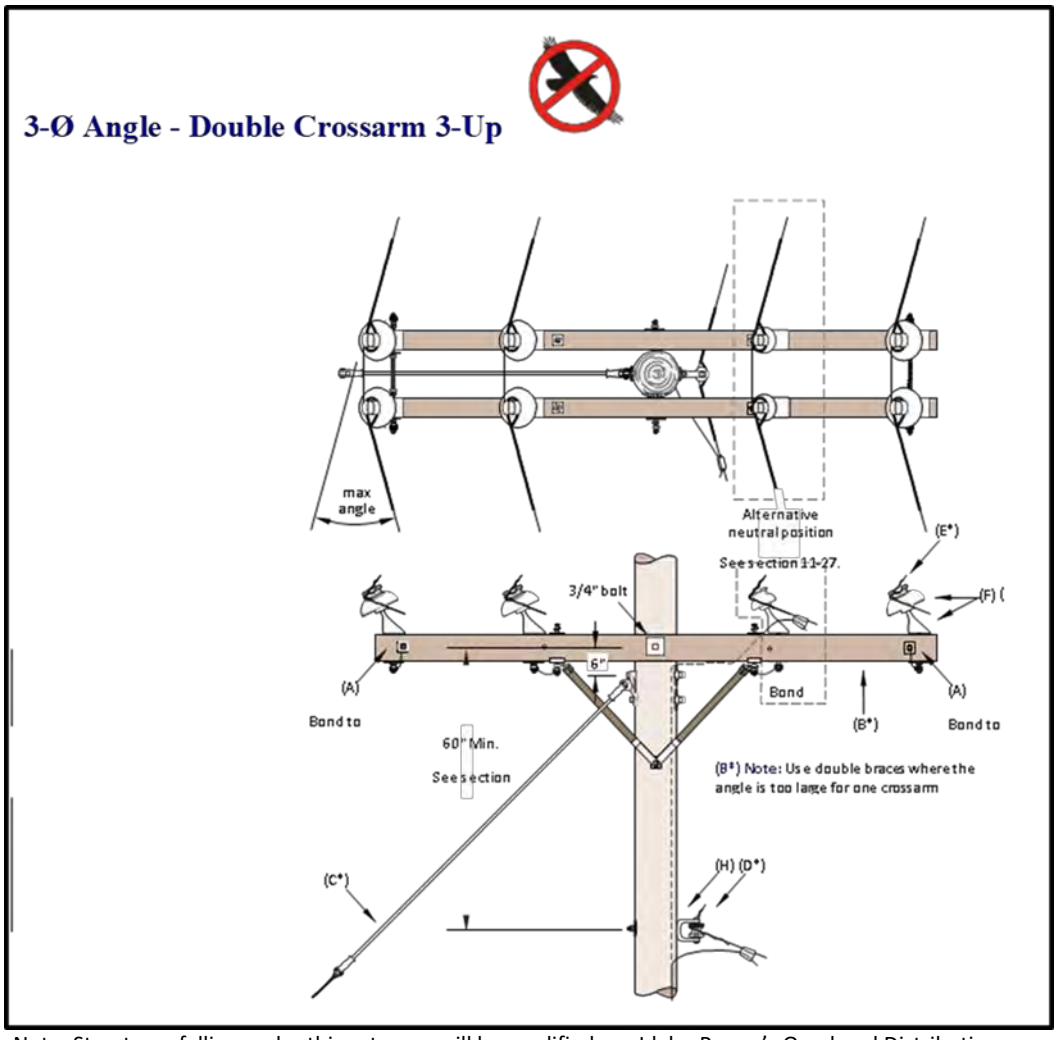
Note: Structures falling under this category will be modified per Idaho Power's Overhead Distribution Manual 11-33-03 to obtain Zone 3 avian protection.

Figure 16. Planned Line Pole Configurations, Deadend – Corner for 336 or 795



Note: Structures falling under this category will be modified per Idaho Power's Overhead Distribution Manual 11-34-05 to obtain Zone 3 avian protection.

Figure 17. Planned Line Pole Configurations, 3-0 Angle – Double Deadend 3-Up



Note: Structures falling under this category will be modified per Idaho Power's Overhead Distribution Manual 11-34-01 and 11-31-03 to obtain Zone 3 avian protection.

Figure 18. Planned Line Pole Configurations, 3-0 Angle – Double Crossarm 3-Up

New power poles will be constructed for approximately 25.2 miles from the connection to the existing powerline to the Mine and distribution powerlines within the Permit Area. The new construction will consist of approximately 525 poles, approximately 40 ft in height, and constructed approximately 0.05 poles per mile. Line power will be used following the cessation of mining to support reclamation and post-closure monitoring activities. Both the retrofitted infrastructure along the existing lines and the newly constructed transmission lines will meet Idaho Power's Zone 3 standard for avian protection from electrocution. The Zone 3 standard meets the suggested practices of the Avian Power Line Interaction Committee and the design protects all species of birds, including eagles, from the risk of electrocution. In addition, to reduce the risk of corvid predation on sage-grouse, new power poles located within 3.3 km of sage-grouse habitat will be fitted with deterrent structures (e.g., Triangular Avian Perch and Nest Diverters).

All new power poles and lines will be demolished and salvaged or disposed of off site as part of reclamation, as described in Section 4 and in the *Reclamation Plan* (Calico, 2023g; Appendix D1). All areas in which soil is disturbed by construction will be seeded to prevent the establishment of weeds, in accordance with the *Noxious Weed Monitoring and Control Plan* (Calico, 2023c; Appendix D17), Section 4, Weed Management Strategies.

3.9.2.3 Site Power Distribution

The plant power distribution from the powerhouse will be via overhead powerlines. The distribution voltage to the local electrical rooms will be 14.4 kV. There will be a combination control-room and motor-control-center room, which will be prefabricated and loaded with electrical equipment prior to delivery to the Site. The power distribution from the electrical rooms will be 480 V. The total connected load for the Process Plant is expected to be 4.8 MW, with an average power draw of 3.6 MW.

3.9.2.4 Underground Mine Power Distribution

At the start of mining, an underground 480 V transformer will be placed near the entrance to the Mine Portal. This will supply power to electrical equipment used to develop the main decline and operate portable fans. Once development has advanced far enough that carrying power at 480 V becomes too inefficient, a main powerline will be installed along the rib of the decline to carry 1.4 kV and will be connected to the transformer, which will be moved underground.

Upon completion of the decline to the 3420 elevation level and the initiation of production-mining activities, a second underground transformer will be installed for use in the lower areas of the Mine.

Line power will also be carried to the location of the ventilation shaft to supply power to the ventilation fans.

3.9.3 WATER SUPPLY AND MANAGEMENT – OAR 632-037-0060(5)(c)

Process water will be provided from the well field, reclaim water from the TSF and TWRSF underdrain systems captured within the Reclaim Pond, and recycled process water. The current and proposed water supply areas are described in the *Well Field Design Report* (SPF, 2019a; Appendix C5). Water from the well field will be piped through a combination of underground and aboveground steel and HDPE piping to a freshwater tank located at the Process Plant, after which it will be treated, then distributed accordingly. The *Wastewater Facilities Preliminary Engineering Report* (SPF, 2019b) is provided in Appendix C7, and the Application for New Water Pollution Control Facilities Individual Onsite Permit (Calico, 2021e) is provided in Appendix E7. The nominal capacity of the freshwater delivery system will be approximately 750 gpm.

Potable water will be supplied from the freshwater tank. Water will be delivered from the freshwater tank through adsorptive media for arsenic removal, followed by chlorination, prior to storage in the potable water tank. Calico secured conditional approval of the proposed potable water treatment system, Public Water System ID #4195624, by Oregon Health Authority in correspondence dated March 2, 2020 (OHA, 2020; Appendix E8). The approved treatment method uses granular ferric hydroxide for arsenic removal from groundwater. Arsenic will be treated for removal below the MCL of 0.010 mg/L.

Calico has water rights from the OWRD (2019; Appendix E9) in the amount of 2 cfs. This equates to approximately 900 gpm, which is more than the planned water demand for the Project (see Section 3.10).

The overall water balance/budget, as well as the water management plans are discussed in Section 3.10.

3.9.3.1 Raw Water

Raw water will be pumped from the Site Production Well Field to the raw water tank for distribution throughout the operation. Raw water in the tank is used to supply the following services:

- Reagent preparation water;
- Slurry pumps gland seal water;
- Fire Water;
- Vehicle Wash Station; and
- Potable water treatment plant – potable water is then sent to the potable water tank located at the Process Plant for safety showers and eyewash stations.

Livestock watering will not be supplemented by the Production Well Field or the mining operations.

3.9.3.2 Potable Water

Potable water is sourced from the raw water tank and treated in the potable water treatment plant, after which it is stored in the potable water storage tank. Potable water will be distributed throughout the Process Plant Area via two potable water pumps in a duty/standby configuration for use during operation and during Stage 1 through Stage 4 of reclamation. The potable water plant and distribution is shown on Process Flow Diagram 101768-0000-F-015 included in Appendix B of the *Mill Design Report* (Ausenco, 2022; Appendix C3), while the location of these buildings is shown on layout drawing 101768-0000-G-102 included in Appendix C of the *Mill Design Report* (Ausenco, 2022; Appendix C3). Detailed distribution within each building has not been developed yet.

3.9.3.3 Gland Water

Water for the gland water system is supplied from the raw water tank and distributed to each slurry pump by the gland seal water pumps in a duty/standby configuration.

3.9.3.4 Process Water

Process water is comprised of decant water from the TSF, contact water from the plant water collection pond, and raw water additions. Process water is stored in the process water storage tank and distributed by the process water pumps in a duty/standby configuration.

3.9.4 STORMWATER AND SEDIMENT CONTROL STRUCTURES – OAR 632-037-0060(4)(d), OAR 340-043-0040(2)(b), OAR 340-093-0130(3), OAR 340-095-0020(3)(i), ORS 517.971(8)(d)

Stormwater Diversion Channels and ditches will be constructed as necessary around Mine facilities to control stormwater run-on and reduce the volume of non-contact water captured in the process (Map 2). Stormwater control ditches and sediment retention basins will be constructed in accordance with BMPs as outlined in the *Best Management Practices for Reclaiming Surface Mines in Washington and Oregon* (DOGAMI, 1997) and in the *TSF Design Report* (Golder, 2021c; Appendix C4). Permanent diversion ditches are sized to contain a 100-year, 24-hour precipitation event with 9 in. of freeboard, or the 500-year, 24-hour storm event without overtopping. Temporary channels were designed to convey the 25-year, 24-hour storm event with 9 in. of freeboard or the 100-year, 24-hour storm event without overtopping. Primary Stormwater Diversion Channels will remain as permanent features after final reclamation and Mine closure, including the Stormwater Diversion Channel upgradient of the TSF and the Quarry.

Runoff control structures include silt traps and fences constructed of certified weed-free straw bales, or geotextile fabric, and sediment retention basins. Sediment control measures are implemented as necessary to reduce soil movement within the Site and to minimize offsite effects. These structures will be maintained throughout the LOM. Soil collected in these structures will be periodically removed and placed in growth medium stockpiles for future use during reclamation.

3.9.5 QUARRY – OAR 632-037-0060(4)(g), OAR 632-037-0077(1), OAR 632-037-0077(3), OAR 340-095-0020(3)(i)

One borrow area is located on the east edge of the Project Area and is the basalt Quarry. The DOGAMI *Abbreviated Operating Permit Application – Grassy Mountain Basalt Borrow Quarry Aggregate Application* (Golder, 2021a) is provided in Appendix E3, while the abbreviated operating permit application limited to the Project's *Closure Cover Borrow Areas Quarry* (Golder, 2021b) is provided in Appendix E4. Borrow material generated from the Quarry will be required for areas that need prepared subgrade materials, drainage materials, pipe bedding materials, road surfacing materials, retarding layer materials, closure cover materials, growth media, underground Mine backfill, and riprap.

The surface mining operation will cover approximately 48 acres, with a maximum depth of 125 ft, with the lowest elevation at 3,790 ft amsl. The estimated volume of material to be excavated is 3.16 million bcy. Quarry benches will be approximately 40 ft vertical faces separated by 60 ft horizontal benches, resulting in an interim sloping configuration of 1.5H:1V. The Permit Boundary setback is 50 ft from all operations. Activities associated with the Quarry surface mining will require drilling and blasting, shovel/loader/scraper for moving the material, crushing, stockpiling, and screening. Water will be used for dust control. Detailed drawings are included in Appendix E3.

Blasting plans will be developed and followed for the Quarry that will follow site-specific engineering controls (i.e., blast pattern design) and blasting protocols (i.e., sirens, restricting access, visual inspections, weather conditions, etc.) to reduce both onsite and offsite blasting-related risks, including offsite flyrock impacts.

Permanent Stormwater Diversion Channels and surface water run-on diversion berms are included in the design of the Quarry to divert stormwater from upgradient catchment areas upgradient of the Quarry.

The primary Stormwater Diversion Channel associated with the Quarry will remain at reclamation. Precipitation that falls directly onto the Quarry footprint will be managed within the Quarry using internal sloping, retention berms, and a stormwater management sump, which pumps water to the Process Plant for reuse. Additional BMPs will be implemented to minimize erosion and sedimentation. All stormwater will be managed under the *Stormwater Pollution Control Plan* (WSP, 2023; Appendix D4). The process material will be stockpiled at the borrow areas until it is needed.

3.9.6 FENCING – OAR 340-093-0130(3), OAR 340-095-0020(3)(i), OAR 340-095-0020(14), OAR 340-095-0020(15)

A Perimeter Fence, approximately 22,176 ft in length, will be constructed around the Mine and Process Plant Area to prevent access by livestock, wildlife, and the public (Map 2). The Perimeter Fence consists of an 8-ft-high chain link fence with a 0.5-in. galvanized hardware cloth mesh that extends a minimum of 18 in. below the ground surface and 30 in. above the ground surface (total height 48 in.) and will include signage related to Mine operations and public safety. The area within the Perimeter Fence is approximately 739 acres. Chain-link fences will also be constructed within the Perimeter Fence in areas where a higher level of security is needed, such as the Gold Room. Chain-link fences will also be constructed around the Production Well Field, including signage. Gates or cattle guards will be installed along roadways within the Project Area, as appropriate. The Perimeter Fence will be monitored on a regular basis and repairs made as needed.

3.9.7 INFRASTRUCTURE AND ANCILLARY FACILITIES

Planned ancillary facilities include laydown areas, maintenance facilities, a meteorological monitoring station, and other support facilities. Map 4 presents the planned Site layout.

3.9.7.1 Support Facilities – OAR 340-095-0020(18)

Support facilities will consist of the Mine maintenance shop, warehouse, and administration building. The administration building will be a modular wood-frame structure that will break down into component parts and can be hauled away and reused. The laboratory will be a number of single-level steel containers that can be hauled away and reused. The Process Plant and truckshop/warehouses are pre-engineered steel frame, metal-clad structures that can be similarly dismantled and reused elsewhere. The Mill building is a steel frame and metal-clad structure containing process equipment that will be removed before the frame is dismantled and removed. The electrical rooms are modular structures that can be hauled away and reused.

Heat will be provided by electric forced air furnaces in the office and personnel buildings and propane gas radiant heat in the maintenance bays. Gas will be provided from a propane tank located near the ADR plant building. Air conditioning will be provided by electrical cooling units.

Mobile equipment maintenance will be performed at the maintenance shop. The maintenance area will consist of an enclosure and concrete pad of appropriate size and an oil/water separator.

Lubricants, antifreeze, and used oil and coolant will be managed and stored in the area in a manner complying with MSHA requirements and other state and federal regulations.

A centralized oil/water separator will be installed adjacent to the truckshop to treat water from drains located at each maintenance bay and from the wash rack. The floor drains in the truckshop will be intended for collection of rainwater and snowmelt from vehicles and equipment. Wash water from the oil/water separator will be collected in a tank within containment. The wash water will be recycled back to the wash system. The separated oil will be stored either in a double-lined tank or a single-wall tank in a concrete containment and collected by a licensed waste collection contractor for offsite disposal. Solids will be periodically removed from the wash system and containerized pending profiling and disposal as described in the *Waste Management Plan* (Calico, 2023b; Appendix D3).

Security offices will be located at the Perimeter Fence northwest of the Process Plant as shown on Map 4.

The administrative building will be located at the Process Plant, north of the Mill. These offices will house the reception area, offices for administrative staff, a first aid clinic, and a meeting/training room. This building will also be used during reclamation and post-reclamation monitoring.

A septic field with the capacity to treat up to 3,920 gallons per day of domestic wastewater and backwash from the potable water treatment system will be installed to the west of the administration and warehouse buildings (Map 4).

3.9.7.2 Assay and Metallurgical Laboratory and Quality Control – OAR 340-095-0020(3)(i)

The plant is equipped with automatic samplers to collect shift and routine samples for aqua regia digestion, atomic absorption, and fire assays. Those samples include plant feed, intermediate products, tailings, and final products. The data obtained will be used for product quality control and routine process optimization.

The metallurgical laboratory will perform metallurgical tests for quality control and process flowsheet optimization. The laboratory will include equipment, such as laboratory crushers, ball mill, sieve screens, laboratory flotation cells, balances, and pH meters.

The laboratory will be situated adjacent to the process building. The laboratory facility will include areas for sample receiving and preparation, fire assay, weighing room, wet analytical laboratory, dry instrument room, and utilities and storage. The laboratory will house the equipment for assaying, metallurgical, and environmental requirements. Dust collection and gas-scrubbing equipment will be located external to the laboratory building. The building will be serviced with power, water, air conditioning and heating, communications, air, and fume hoods.

3.9.7.3 Fuel Supply, Storage, and Distribution

A fuel storage depot will be located at the Process Plant. It will include separate diesel aboveground tanks for fueling of light/intermediate and heavy vehicles. Fuel will be delivered via highway-legal trucks directly to the depot. Drivers offloading fuel will be certified and trained. Camlock fittings or other appropriate fittings will be located within local containment to collect spilled fuels. A sump will be located at one end of the containment so that spilled fuels can be pumped for appropriate disposal from the containment using a portable pump. Prior to arrival of oil-based products on site, a Spill Prevention, Control, and Countermeasure Plan will be authored and stamped by an Oregon professional engineer. Refer to the

Emergency Response Plan (Calico, 2023d; Appendix D6) and to the *Petroleum-Contaminated Soils Management Plan* (Calico, 2022c; Appendix D9).

Two double-walled, steel tanks will be used for diesel storage with a total capacity of 8,250 gallons. The fuel will be used by both underground and surface mobile equipment. The surface equipment will primarily be fueled at a fuel island near the storage tanks. The underground-mining equipment includes a fuel truck that will be used to fuel underground equipment as required. This fuel truck may be used to fuel surface equipment as needed.

3.9.7.4 Compressed Air Supply

High-pressure, compressed air will be provided by two duty screw compressors, one standby screw compressor, and a duty-plant air receiver. There will be two high-pressure air uses: instrument air and plant air. The instrument air will be filtered then dried prior to distributing to the gold room or the general plant. The plant air will be fed straight from the plant air receiver without a drying step.

Low-pressure air for pre-aeration, leach, CIL, and cyanide detoxification circuit requirements will be provided by multiple-stage, centrifugal-type blowers.

3.9.7.5 Communications

Onsite communications will comprise of inter-connected mobile and fixed systems, including a land-line telephone network, portable two-way radios, and internet. Access for internet and corporate network connection will be made via satellite connections. The landline cable will be installed on the powerlines to avoid additional disturbance areas associated with dedicated phone poles or cabling.

Underground communication with the surface will be via a leaky-feeder system as described in Section 3.2.3.1.

3.9.7.6 Transportation

Main transportation of personnel and supplies will be via the Mine Access Road. Employees will be required to use the shuttle bus when regularly commuting to the Mine. The parking lot at the Mine, located at the Process Plant, can accommodate up to 24 light vehicles consisting of operations vehicles and a minimal number of authorized vehicles from off site. A range of 8 to 31 vehicles will be traveling roundtrip to the Site on a daily basis, including employee personal vehicles, delivery vehicles, and other authorized vehicles from off site.

3.9.7.7 Buildings

A total of nine buildings are planned to be constructed at the Site to support mining, processing, and administrative activities. There will also be a guard house at the main gate to the facility and an explosives magazine south of the Mine Portal.

Administration, Offices, and Changehouse Building

The administration building will be a single level modular wood frame, 80 ft by 110 ft for a total footprint of approximately 8,800 square feet (ft^2) and will be positioned east of the Process Plant. It will contain the site management team, including general management, commercial and administration management, engineering, Mine operations, senior processing, and maintenance personnel.

Plant Workshop and Warehouse

The Process Plant workshop and warehouse building will be a pre-engineered, steel-frame and metal-clad building of approximately 40 ft by 60 ft, for a total footprint of 2,400 ft^2 and will be positioned south of administration, offices, and Changehouse. This building will be used to perform maintenance for process equipment, as well as for the storage of equipment spare parts.

Truckshop and Warehouse

The truckshop and warehouse building will be a pre-engineered, steel-frame and metal-clad building approximately 110 ft by 50 ft and 25 ft by 25 ft, for a total footprint of 6,125 ft^2 and will be positioned near the fuel storage area and ore stockpile. This area will be divided into two sections – one for warehousing spare parts and tool storage and the other for a maintenance workshop. A bridge crane will be included in this building above the maintenance workshop.

Laboratory

The laboratory will be constructed as a single-level, steel container of approximately 40 ft by 60 ft, for a total footprint of 2,400 ft^2 and situated between the gold room and plant workshop and warehouse. The laboratory building will house all laboratory equipment for assaying, metallurgical, and environmental requirements. Dust-collection equipment will be located external to the laboratory building.

Reagent Storage Area

The Reagent Storage area will include ten 40-ft intermodal containers for dry storage of reagents. The Reagent Storage area will be located west of the CIL tank containment area.

Process Plant

The Process Plant, approximately 9,800 ft^2, is located in a cast, in-situ concrete slab, with bund walls providing secondary containment and will include the reagent mixing area, grinding circuit, acid wash and elution, carbon regeneration, and cyanide detoxification processes. The pre-aeration tank, two CIL tanks, and seven adsorption tanks are located in a separate secondary containment area immediately south of the Process Plant.

Electrical Rooms: Crushing Area and Process Plant

Two electrical rooms are planned for the facility. One will be in the crushing area south of the Reagent Storage area, and the other on the north side of the Process Plant.

Gold Room

The gold room, approximately 40 ft by 24 ft, for a total footprint of 960 ft^2, will be located in a cast, in-situ concrete slab, with bund walls providing secondary containment. The gold room, located east of the Process Plant, houses the electrowinning cell, mercury retort, smelting furnace, and associated support equipment within a security envelope, which limits access to authorized gold room personnel.

Vehicle Wash-Bay Facility

The vehicle wash-bay facility will be an open-air, 30 ft by 40 ft concrete slab with a fluid-collection sump and will be located adjacent to the truckshop and warehouse. Wash water will be collected in the sump where settling will occur prior to the water being recirculated back to the wash system. An oil-water separation system will be included in the facility to recover hydrocarbons prior to reuse of the wash water. The recovered hydrocarbons will be collected and shipped off site for disposal in accordance with applicable environmental regulations. Solids and hydrocarbon management from the vehicle wash bay are described in the *Waste Management Plan* (Calico, 2023b; Appendix D3).

3.9.8 WASTE DISPOSAL SYSTEMS – OAR 632-037-0060(4)(e), OAR 632-037-0077(4), OAR 340-043-0030(2)(i), OAR 340-045-0015, OAR 340-093-0130(3), ORS 517.971(8)(j)

Used lubricants and solvents will be characterized according to the RCRA requirements and will be stored appropriately. Calico may obtain a Hazardous Waste Identification Number from the ODEQ. The Mine is expected to be in the "small quantity generator" category as defined by the EPA. Used solvents are the only identified potentially hazardous waste at this time. Calico developed a *Waste Management Plan* (Calico, 2023b; Appendix D3) that identifies the possible wastes generated at the site and their means of disposal.

Used oil and coolant will be stored in secondary containment. These will be either recycled or disposed of in accordance with state and federal regulations. Used containers will be disposed of or recycled according to federal, state, and local regulations.

Solid wastes and industrial solid wastes generated by the Mine and process departments will be collected in dumpsters near the point of generation. A training program will be implemented to inform employees of their responsibilities in proper waste disposal procedures. Solid waste will be disposed of off site at a licensed landfill.

Calico will have a trained response team at the site 24 hours per day to manage potential spills of regulated materials at the site, as described in the *Emergency Response Plan* (Calico, 2023d; Appendix D6). Response for transportation-related releases of regulated materials bound for the site will be the responsibility of the local and regional agencies. However, where appropriate, Calico may assist with response to offsite incidents, including providing resources, based on agency requests.

Wastewater will be discharged to a large-scale absorption system capable of handling up to 4,920 gallons per day. Discharges to this system will include domestic wastewater from bathrooms, showers, and sinks and backflush from the potable water treatment system. The wastewater design is provided in the *Wastewater Preliminary Engineering Design* report (SPF, 2019b; Appendix C7). An individual onsite permit (Calico, 2021d) for this system is included in Appendix E7.

3.9.9 STOCKPILES – TOPSOIL OR SUITABLE GROWTH MEDIA – OAR 632-037-0060(4)(f), OAR 632-037-0060(9)(c), OAR 632-037-0120(2)

Suitable growth media will be salvaged and stockpiled during the development of the facilities, during construction of the waste rock storage areas and the TSF, and construction of other Project facilities.

Following stripping, growth media will be stockpiled within the proposed disturbance areas. Growth media stockpiles will be located such that they will not be disturbed by mining operations. The surfaces of the stockpiles will be contoured with slopes no steeper than 2.5H:1V to reduce erosion. To further minimize wind and water erosion, Growth Media Stockpiles will be seeded after contouring with an interim seed mix developed in conjunction with the BLM. Diversion channels and/or berms will be constructed around the stockpiles as needed to prevent erosion from overland runoff. BMPs, such as silt fences or staked weed-free straw bales, will be used as necessary to contain sediment in runoff.

3.9.10 STOCKPILES – MINED ORE STOCKPILE – OAR 632-037-0060(9)(e)

As described in Section 3.1, there is an ore stockpile where the ROM ore is stockpiled temporarily before being fed into the crushing circuit. The typical residence time of material in this stockpile is less than one week. .

The ore stockpile will be small, and the slopes will be at angle of repose. This stockpile will have a lined base pad, with containment berms along each edge of the stockpile, and a sump to collect the contact runoff. The liner is specified as a GCL and an 80-mil HDPE geomembrane covered with 300 millimeter (mm) surfacing gravel. The pad will be nominally sloped towards the sump to promote drainage. The ore stockpile will have a nominal design capacity of approximately 3,000 tons. The GCL and liner base will cover an area of approximately 14,200 ft^2.

3.10 WATER MANAGEMENT – OAR 632-037-0060(5), OAR 632-037-0077(2), ORS 517.971(7)(c), ORS 517.971(8)(c)

3.10.1 PRECIPITATION AND EVAPORATION DATA – OAR 340-043-0030(2)(a), OAR 632-037-0060(5)(a)

Climate data for the Project site was developed using nearby weather station data and regression analysis based on elevation of the proposed Project TSF dam. For this Project, climate data and station metadata of the closest Remote Automated Weather Stations (RAWS) and Cooperative Observer Network (COOP) stations to the Project site were identified and compared, along with the PRISM Climate Group (PRISM) spatial data, using statistical and regression analyses.

Details of the climate model are presented in the *TSF Design Report* (Golder, 2021c; Appendix C4).

3.10.2 SITE WATER BALANCE – OAR 632-037-0060(5)(b), OAR 340-095-0020(2)(a), OAR 340-095-0020(3)(i)

An average annual water balance was developed for the Project to summarize the projected the inflows and outflows, to determine if the Project was net water negative (makeup water required) or positive (excess water to be treated and released to the environment). The water balance considers general inflows and outflows to the overall system. Inflows to the system include precipitation and snowmelt falling on lined facilities, runoff from an upstream basin reporting to the TSF, seepage into the underground Mine, and makeup water from the Production Well Field as needed. Outflows included evaporation from the tailings surface, supernatant pool, and Reclaim Pond, dust control, cement rockfill preparation, plus water lost in the void spaces of the stored tailings.

The TSF is one of the major water inflow/outflow sources for the site water balance. The following parameters related to the TSF were used in the calculations:

- Tailings are deposited in the TSF at an average rate of 709 tons per day over the entire Mine life.
- Tailings settled dry density of 80 lb/ft^3 at a saturation of 90 percent.
- Tailings have a specific gravity of 2.65.
- Tailings slurry contains 42.4 percent solids by weight.

The site water balance considered the water required/available for the following activities:

- Mining
  - Mining equipment requirements. This was estimated to be 76 gpm at steady state conditions. This is generally not a consumptive use (the water is recirculated); however, it was assumed once steady state mining conditions were reached, there would be a 10 percent loss (8 gpm) that would need to be made up from the underground Mine dewatering.
  - Dewatering associated with the underground Mine development. The seepage into the Mine was estimated to be 60 gpm average inflow (see Section 2.9.3.1 of this CPA).
  - As-delivered ore water content. The as-delivered water content of the ore was considered an inflow because it would reduce the amount of water needed to be added to the process and was estimated to be 7 gpm.
  - CRF. This was estimated to be 9 gpm outflow, based on an average CRF backfill rate of 183 tons per year that required the addition of 8.4 percent water for the cement.
- Mill/TSF
  - Tailings slurry. Approximately 160 gpm of water would be an outflow from the Mill to the TSF in the tailings slurry.
  - Tailings supernatant reclaim. An average of 71 gpm of supernatant tailings (process) water would be reclaimed and pumped back from the TSF and would be an inflow to the Mill for reuse in the process circuit.
  - Reclaim Pond. An average annual rate of 21 gpm of water collected in the Reclaim Pond would be pumped back to the Mill as an inflow for reuse in the process circuit.

- The difference between the tailings slurry and the tailings reclaim represents the net water loss in the TSF, with TSF losses due to water trapped in the tailings and evaporation from the impoundment beach and supernatant pond and TSF inflows from precipitation accumulating within the impoundment.
- Elution circuit. Approximately 36 gpm of freshwater was estimated as part of the gold recovery; however, once used, this would end up in the process water circuit.
- Collection Pond. Runoff water contacting industrial facilities is routed to the Collection Pond. The water collected and available as an inflow for reuse at the Collection Pond at the base of the process area was estimated to be 1 gpm.
- Potable water requirements. Potable water for the site was estimated to be 4 gpm inflow to the system and would need to be from a freshwater source.
- Dust suppression for roads and crushing. This was estimated to be 5 gpm outflow to the system and would be from a freshwater source.

Based on the inflows and outflows presented above, a site water balance summary was developed that identified an average annual makeup water requirement of approximately 54 gpm. The flow rates will vary during operations based on variable seepage flows in the underground Mine and meteoric contributions at the surface facilities. The inflows and outflows are shown schematically in Figure 19.

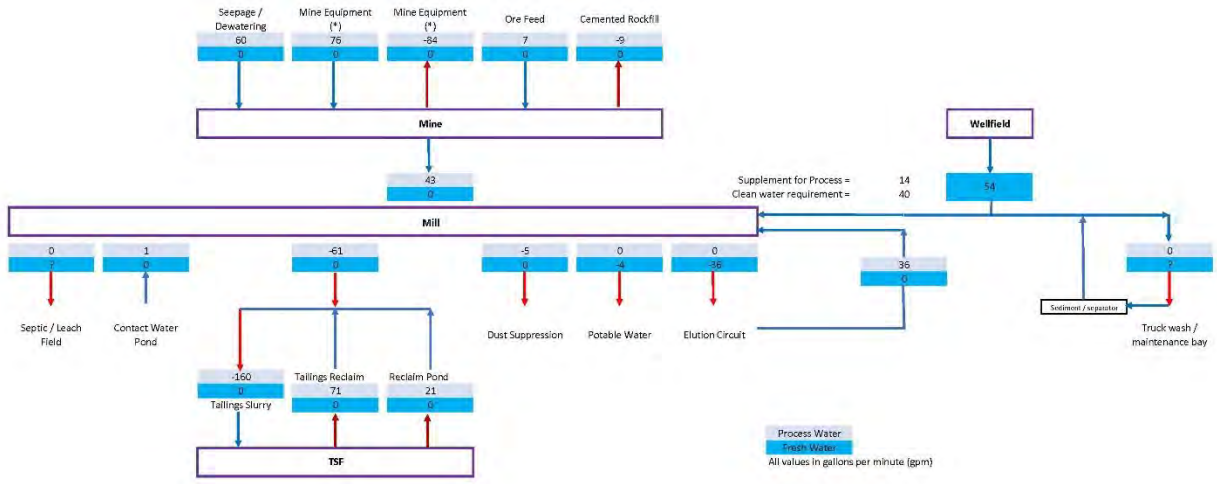


Figure 19. Site Water Balance Schematic

As noted in Figure 19, the overall process has a negative water balance and requires raw water makeup. The source of raw water makeup will be from the site production wells.

3.10.3 MINE DEWATERING ESTIMATE

The Mine dewatering rate was estimated using a three-dimensional groundwater flow model, as summarized in Section 2.9.3 and described in detail in Lorax (2022; Appendix G). The Mine dewatering rate is estimated to vary from 15 gpm during construction to 115 gpm during the first year of mining and decreasing thereafter, with the average dewatering rate over the period of mining being approximately 60 gpm.

3.10.4 MAKEUP WATER FROM PRODUCTION WELLS – OAR 632-037-0060(5)(c)

The water supply system for makeup water is discussed in Section 3.9.3. As shown in Figure 19, the average pumping rate from the Production Well Field over the Project life is 54 gpm based on the balance of sources and sinks. The Production Well Field pumping rate will vary both seasonally and year to year based on Mine dewatering rates and process operations. Early in the Project life, when dewatering rates are high, the production requirement for supplemental water will be lower and the Production Well Field requirement increases over time as the aquifer in the Mine area is dewatered.

As described in Section 2.9.3.2, the effects of groundwater production on local groundwater conditions were conservatively estimated using an average production rate approximately 45 percent higher than the supplemental water requirement determined from the overall water balance depicted in Figure 19.

3.10.5 SURFACE CONTACT WATER

Precipitation that falls directly within the Process Plant Area will be collected in a system of ditches and culverts and directed by gravity towards the Collection Pond. See Section 3.3.11 for further information regarding the Collection Pond.

3.10.6 WATER MANAGEMENT PLAN – OAR 340-093-0130(3)

Table 44 provides a cross reference identifying the title and number of the section and/or appendix of this CPA that satisfy the requirement for a Water Management Plan.

Table 44. Cross-Reference for the Water Management Plan

Item	CPA Section or Appendix Title	Section or Appendix
Stormwater control	Erosion and Sediment Control	3.9.4
	Stormwater Pollution Control Plan	Appendix D4: *Stormwater Pollution Control Plan* (WSP, 2023)
	Facility Reclamation	4
Process solutions	TSF Design	Appendix C4: *TSF Design Report* (Golder, 2021c)
	Tailings Disposal	3.6.2
	Facility Reclamation	4
	Mill Site	3.2 and Appendix C3: *Mill Design Report* (Ausenco, 2022)
	Chemical Storage and Use	3.8
Mine drainage handling	Dewatering	3.10.3 and Appendix B9: *Baseline Groundwater Reports* (SPF, 2021a, b, c) and Appendix G: Grassy Mountain Gold and Silver Project; Numerical Hydrogeologic Assessment
	TSF Design	Appendix C4: TSF Design Report (Golder, 2021c)
Establishment of design storm event	Water Management	3.10
	TSF Design	Appendix C4: *TSF Design Report* (Golder, 2021c)
	Facility Reclamation	4
	Process Chemical Containment	3.8 Appendix C3: *Mill Design Report* (Ausenco, 2022)

Item	CPA Section or Appendix Title	Section or Appendix
Determination of runoff from design storm event	TSF Design	Appendix C4: *TSF Design Report* (Golder, 2021c)
	Process Chemical Containment	3.8 Appendix C3: *Mill Design Report* (Ausenco, 2022)
	Facility Reclamation	4
Location and sizing of runoff control structures	Stormwater and Sediment Control Structures	3.9.4
	Stormwater Pollution Control Plan	Appendix D4: *Stormwater Pollution Control Plan*
Ability to contain leaching solutions during wet periods or extreme precipitation events	Process Chemical Containment	3.8 Appendix C3: *Mill Design Report* (Ausenco, 2022)
	Facility Reclamation	4
Contingency plans for disposal or treatment of excess solutions	Interim Management Plan	Appendix D10: *Interim Management Plan* (Calico, 2021g)
State/Federal agency permits under National Pollutant Discharge Elimination System (NPDES)	WPCF and Division 43 permits	Appendix E10: Division 43 Permit Application and Application for New Water Pollution Control Facilities Individual Permit (WPCF-N) (Calico, 2023i)
	Stormwater General Discharge Permit	Appendix E5: ODEQ Application for New NPDES General Permit 1200-Z (Calico, 2021f)
	Septic permit (Onsite WPCF)	Appendix E7: WPCF-OS Application for New Water Pollution Control Facilities Individual Onsite Permit (Calico, 2021e)
	Permit to Appropriate Water	Appendix E9: OWRD Water Rights Amendment (Final Order T-13157 to Replace Permit G-10994 with Permit G-18306) (OWRD, 2019)
Dredge and fill permit under United States Army Corps of Engineers (USACE) 404 permit program	Not applicable	--
Coordination with Regional Water Control Board during development of Water Management Plan	Groundwater Baseline Report **Water Resources Commission, East Commissioner:** Bruce Corn **Water Resource District, East Region Manager:** Jason Spriet Baker County Courthouse 1995 3rd Street, Suite 180 Baker City, OR 97814 541-523-8224 Jason.D.Spriet@oregon.gov **Water Resource Watermaster, District -09:** Jered Hoshaw Malheur County Courthouse #4 251 B Street West Vale, OR 97918 541-473-5130 Jered.L.Hoshaw@oregon.gov	Appendix B9: *Baseline Groundwater Reports: Vol. I Groundwater Baseline Data Report* (SPF, 2021a) and *Vol. II Groundwater Characterization Report* (SPF, 2021b), and Appendix G: *Grassy Mountain Gold and Silver Project; Numerical Hydrogeologic Assessment* (Lorax, 2022)

Item	CPA Section or Appendix Title	Section or Appendix
Other State regulations and standards:	Not applicable	--
■ Detailed plans for water treatment	SPF Well Field Design Report, SPF Wastewater Design Report	Appendix C5: *Well Field Design Report* (SPF, 2019a) Appendix C7: *Wastewater Facilities Preliminary Engineering Report* (SPF, 2019b)
■ Treatment Methods	Water Supply and Management	3.10.4 Appendix C5: *Well Field Design Report* (SPF, 2019a) Appendix C7: *Wastewater Facilities Preliminary Engineering Report* (SPF, 2019b) Appendix E8: Oregon Health Authority Conditional Approval of Public Water System ID #4195624, dated March 2, 2020
■ System Design	Water Supply and Management	3.10.4 Appendix C7: *Wastewater Facilities Preliminary Engineering Report* (SPF, 2019b)
■ Outfalls	Not applicable	--
■ Rates	Water Supply and Management	3.10.4
■ Treatment threshold	Water Supply and Management	3.10.4
■ Duration of treatment	Not applicable	--
■ State/Federal permits needed for operation of treatment system	Oregon Health Authority (OHA) Non-transient, Non-Community	3.10.4 Appendix E8: Oregon Health Authority Conditional Approval of Public Water System ID#4195624, dated March 2, 2020 (OHA, 2020)

3.10.7 SUMMARY OF WATER STORAGE AND TREATMENT – OAR 340-095-0020(3)(i), OAR 340-095-0020(16)

Based on the average annual site water balance and the estimated fresh makeup water required for freshwater consumption and process water requirements, SPF developed a Production Well Field design that can support the Project needs. However, additional work may be needed to verify if there is sufficient makeup water available for seasonal variations (i.e., summer months when higher makeup water requirements are needed).

As part of the Feasibility Study design, Calico understands that a nominal 237,000-gallon storage tank (total volume) will be installed to address water demands for the Project. Approximately 78,000 gallons of water will be dedicated for fire suppression, with the remaining 159,000 gallons available for makeup water (note that this would provide approximately 49 hours capacity for a makeup water demand of 37 gpm).

Potable water will be supplied from treated water stored in the freshwater tank. Water quality is expected to meet drinking water standards after treatment. Water will gravity flow from the freshwater tank to the potable water tank. Calico has received Conditional Approval from Oregon Health Authority for New Public Water System, Plan Review #11-2020, Calico Grassy Mountain Mine, Public Water System ID #4195624 (OHA, 2020; Appendix E8), and will secure appropriate permits for the potable water system.

Calico has water rights from the OWRD in the amount of 2 cfs (OWRD, 2019; Appendix E9). This equates to approximately 900 gpm, which is more than the planned water demand for the Project.

3.11 TEMPORARY CLOSURE (SEASONAL OR OTHER) – OAR 632-037-0060(6), ORS 517.971(7)(l)

Procedures that will be implemented during temporary closure of the facility, whether due to seasonal activity, weather events, major system failure, or other interruptions, are described in the *Interim Management Plan* (Calico, 2021g; Appendix D10), with key points summarized in the section below.

3.11.1 TARGET SEASONAL OR TEMPORARY STORAGE VOLUMES AND TOTAL SYSTEM STORAGE CAPACITY – OAR 632-037-0060(6)(a), OAR 632-037-0060(6)(b)

The storage capacity at the facility is designed to accommodate stormwater runoff resulting from a 100-year, 24-hour storm event.

3.11.2 PROCEDURES TO HANDLE VOLUMES OF WATER IN EXCESS OF SEASONAL OR TEMPORARY STORAGE CAPACITIES – OAR 632-037-0060(6)(c)

Water generated from the TSF or TWRSF will be collected by the Reclaim Pond and pumped to the surface of the TSF, resulting in a closed-loop system.

3.11.3 ESTIMATED SCHEDULE FOR CLOSURE – OAR 632-037-0060(6)(d)

No temporary or seasonal closures of the facility are planned. However, if temporary closure is necessary, Calico will notify DOGAMI, ODEQ, and BLM within 30 days of the temporary closure, including a description of the procedures and controls that have been, or will be, initiated to maintain and control process components and process fluids. Calico will also provide DOGAMI, ODEQ, and BLM with a list of supervisory personnel with responsibility to oversee the Project and support staff required in each department to maintain the Project during the temporary closure. Standard security procedures will remain in place for the duration of a temporary closure. If the interim closure period exceeds 180 days, Calico will petition DOGAMI, ODEQ, and BLM for an extension to delay permanent closure or initiate procedures to permanently close process components.

3.11.4 MONITORING AND REPORTING PROGRAMS – OAR 632-037-0060(6)(e)

Calico will adhere to provisions in the WPCF permit, the *Interim Management Plan* (Calico, 2021g; Appendix D10), and other regulatory requirements during the temporary closure period. Management plans will continue to be followed, including the *Stormwater Pollution Control Plan* (WSP, 2023; Appendix D4), *Waste Management Plan* (Calico, 2023b; Appendix D3), *Monitoring Proposal for Groundwater and Facilities* (SPF, 2022; Appendix D12), *Cyanide Management Plan* (Ausenco, 2023; Appendix D8), *Tailings Chemical Monitoring Plan* (Calico, 2023h; Appendix D2), *Wildlife Mitigation Plan* (MB&G, 2023b; Appendix D15), *Wildlife Protection Plan* (MB&G, 2023a; Appendix D14), *Noxious Weed Monitoring and Control Plan* (Calico, 2023c; Appendix D17), and the *Noise Monitoring Plan* (Calico, 2023e; Appendix D19).

Monitoring will also continue at the Production Well Field, Perimeter Fence, and other facilities that remain during the temporary closure. Routine reporting and notification will also continue during this period.

3.12 OPERATIONAL MONITORING – OAR 632-037-0060(7), OAR 340-093-0130(3), ORS 517.971(7)(e)

3.12.1 FULLY DETAILED MONITORING AND REPORTING PROGRAMS

The *Inventory of Project Monitoring Plans* (Calico, 2023f; Appendix D11) provides an index of monitoring plans describing inspections and monitoring that will occur at the Project, including air, stormwater, groundwater, waste management, cyanide, spill prevention, noxious weeds, wildlife, noise, and drinking water. In addition, the *Monitoring Proposal for Groundwater and Facilities* (SPF, 2022; Appendix D12) provides details of well installation, development, and monitoring, as well as monitoring of the underdrain systems associated with the TSF and TWRSF.

3.13 CHEMICALS, WASTE, AND SAFETY

3.13.1 CHEMICALS – OAR 632-037-0060(11), ORS 517.971(7)(i)

A table of reagents, explosives, cyanide and other materials planned for the Project is provided in Section 3.8. Handling, storage, and disposal of materials required for mining or processing are described in the *Toxic and Hazardous Substances Transportation and Storage Plan* (Calico, 2021d; Appendix D7) and the *Waste Management Plan* (Calico, 2023b; Appendix D3). These plans also describe handling, storage, and disposal procedures for mercury and process water, and evaluation of materials for hazardous waste characteristics. Management of tailings and waste rock is described in the *TSF Design Report* (Golder, 2021c; Appendix C4). Other acid-forming materials, radioactive, or hazardous materials generated from mining or processing are not anticipated. If spills of petroleum products occur on site such that soil is contaminated, the petroleum-contaminated soil will be managed as described in Section 3.8.2 and in the *Petroleum-Contaminated Soil Management Plan* (Calico, 2022c; Appendix D9).

3.13.2 TRANSPORTATION OF CHEMICALS – OAR 632-037-0060(13), ORS 517.971(7)(j)

Hazardous and toxic chemicals will be transported to the facility in accordance with state and federal regulations. Details of material transport are discussed in the *Toxic and Hazardous Substances Transportation and Storage Plan* (Calico, 2021d; Appendix D7). The plan fulfills the requirements in ORS 517.971 and OAR 632-037-0060(13) for a plan for transporting and storing toxic chemicals. The *Toxic and Hazardous Substances Transportation and Storage Plan* provides a description of requirements for receipt of toxic or hazardous substances at the facility, requirements for storage, initial and annual reporting of toxic or hazardous substances, and specific reporting procedures in the event of an incident during transportation of hazardous or toxic substances.

3.13.3 EMERGENCY RESPONSE PLAN – OAR 632-037-0060(15), OAR 340-043-0040(2)(g), OAR 340-093-0130(3), ORS 517.971(7)(m)

The *Emergency Response Plan* (Calico, 2023d) is provided in Appendix D6. The *Emergency Response Plan* fulfills the requirements in ORS 517.971 for a spill prevention and credible accident contingency plan and the requirements for a spill contingency plan under the BLM Mine Plan of Operations, as well incorporates

by reference the Malheur County Local Emergency Planning Committee Emergency Response Plan. The *Emergency Response Plan* provides the operating facility with information needed to properly respond to an incident; defines personnel roles for emergencies involving hazardous conditions, including the Incident Command System; reduces the potential for accidental spills and environmental degradation by taking precautionary measures and being prepared for potential emergencies; and includes an exercise program to ensure the *Emergency Response Plan* and related response activities meet environmental protection objectives.

3.13.4 CHARACTERIZATION AND MANAGEMENT PLAN – OAR 632-037-0060(16), ORS 517.971(i)

Characterization and disposal of wastes is discussed in Section 3.8.3. A *Waste Management Plan* (Calico, 2023b) for the Project is provided in Appendix D3. The *Waste Management Plan* fulfills the requirements in ORS 517.971 for identifying and managing wastes and the means of disposal available. Calico will adhere to RCRA regulations in 40 CFR 260 to 279 and state regulations in OAR Chapter 340, Divisions 43 and 90 through 113, as applicable. The Oregon rules include provisions for chemical mining, recycling and waste reduction, solid waste, hazardous waste management, identification and listing of hazardous waste, standards applicable to generators of hazardous waste, used oil management, and universal waste management.

3.13.5 EMPLOYEE SAFETY TRAINING PLAN – OAR 632-037-0060(14), ORS 517.971(7)(k)

The *Safety Training Plan* (Calico, 2021c) developed for the Project to comply with state and federal law is provided in Appendix D13. The *Safety Training Plan* provides a description of health and safety training requirements for Mine employees that comply with the federal MSHA and OSHA requirements, as well as Oregon-specific health and safety training. In accordance with 30 CFR 48.3(a) and (e), a site-specific program for training new miners, training experienced miners, training miners for new tasks, annual refresher training, and hazard training for miners will be submitted to, and approved by, the MSHA District Manager prior to opening the Mine. Per 30 CFR 48.3(g), courses will be taught by MSHA-approved instructors. The facility will work with Eastern Oregon University (EOU) in LaGrande, Oregon, to develop and provide the MSHA safety training program. EOU has an approved MSHA training plan. EOU will provide four days of in-person training, and the fifth day of training will be provided by onsite health-and-safety personnel qualified to instruct employees on site-specific health and safety procedures and protocols. The annual refresher training program will also be established.

3.13.6 WILDLIFE PROTECTION PLAN – OAR 340-043-0110, OAR 340-093-0130(3), OAR 632-037-0125, OAR 635-420-0020, OAR 635-420-0030, OAR 635-420-0040, OAR 635-420-0050, OAR 635-420-0070, OAR-635-420-0080, ORS 517.956, ORS 517.971(7)(d)

Calico will implement a *Wildlife Protection Plan* for the Project (MB&G, 2023a; Appendix D14) that outlines the measures that Calico will take to comply with the wildlife protection standards described in OAR 635-420-0030. This Plan describes how the Project will meet the State requirement of an objective zero-wildlife mortality.

The *Wildlife Protection Plan* outlines the location of chemical processing solutions and associated wastewaters, describes how they will be contained (including fencing and covering), identifies any

wastewaters that are not contained, and describes the measures that will be implemented to stop wildlife from being exposed to or ingesting chemical processing solutions. The *Wildlife Protection Plan* also outlines the measures that Calico will implement to maintain and monitor these wildlife protection measures, as well as report wildlife injuries or mortality, should any occur at the Project.

The *Wildlife Protection Plan* also includes a plan for minimizing the impact of vehicular traffic or the public on wildlife as a result of the proposed Mine. It includes information about wildlife migration and movement and identifies measures that will be taken to minimize the impact of vehicle traffic (e.g., carpooling, limitations on the use of access roads, speed limits). If necessary, the *Wildlife Protection Plan* may be revised to address any failures of wildlife protection measures or to provide additional protection. Finally, the *Wildlife Protection Plan* includes the provision for notifying ODFW 30 days prior to completion of the chemical Process Plant to conduct a facility inspection and not commencing use of chemical processing solutions until notified that the inspection is complete.

3.13.7 WILDLIFE MITIGATION PLAN – OAR 632-037-0125, OAR 635-415-0025, OAR 635-420-0060, ORS 517.971(7)(d)

Calico will implement a *Wildlife Mitigation Plan* (MB&G, 2023b, Appendix D15) for the Project. The purpose of the *Wildlife Mitigation Plan* is to describe the impacts of the proposed Project on wildlife habitat and the proposed mitigation for those impacts. The habitat categorizations and mitigation strategies included in the *Wildlife Mitigation Plan* are preliminary and have not been reviewed by the Oregon Department of Fish and Wildlife (ODFW).

The *Wildlife Mitigation Plan* presents the direct and indirect impacts to wildlife habitats and details the measures taken to avoid or reduce impacts. It also quantifies the impacts resulting from the Project that remain after avoidance and reduction measures have been implemented and describes the mitigation credits created through the proposed compensatory mitigation projects. Mitigation measures for the Project will be implemented and completed either prior to, or concurrent with, the Project to maintain consistency with ODFW Habitat Mitigation Policy (OAR 635-415-0025).

3.13.8 INADVERTENT DISCOVERY PLAN FOR PALEONTOLOGICAL AND ARCHAEOLOGICAL RESOURCES – OAR 340-093-0130(3), ORS 358.905 THROUGH ORS 358.955

All inadvertent discoveries will follow the BLM and Oregon SHPO regulations. Calico will implement an *Inadvertent Discovery Plan* for the Project (Calico, 2022a; Appendix D16), which will be used throughout all aspects of the exploration, mining, and reclamation activities at the Mine.

In the event of an inadvertent discovery of cultural materials, including human remains, pursuant to 43 CFR 10.4(b), (c), and (d), and 43 CFR 3809.420(b)(8)(i-iii), Calico will immediately stop all activities in the vicinity of the inadvertent discovery and immediately notify the responsible federal official – BLM Manager – of the discovery via telephone and followed with written confirmation. A 100-ft protection buffer will be placed around discoveries. Work in the vicinity of the discovery will not commence again for 30 days after certification is received from the BLM-authorized officer, or a binding agreement is executed between the federal agency and the affiliated Indian tribes.

Pursuant to 43 CFR 10.4(b), any person who knows or has reason to know that he or she has inadvertently discovered human remains, funerary objects, sacred objects, or objects of cultural patrimony on federal or tribal lands after November 16, 1990, must provide immediate telephone notification of the inadvertent discovery, with written confirmation, to the responsible federal agency official with respect to federal lands, and with respect to tribal lands, to the responsible Indian tribe official. The requirements of these regulations regarding inadvertent discoveries apply whether or not an inadvertent discovery is duly reported. If written confirmation is provided by certified mail, the return receipt constitutes evidence of the receipt of the written notification by the federal agency official or Indian tribe official.

Pursuant to 43 CFR 10.4(c) and (d), Calico will immediately stop all activities in the vicinity of the inadvertent discovery and not commence again for 30 days after certification is received from the BLM-authorized officer, or a binding agreement is executed between the federal agency and the affiliated Indian tribes. According to 43 CFR 10.4(d)(2), "The activity that resulted in the inadvertent discovery may resume thirty (30) days after certification by the notified federal agency of receipt of the written confirmation of notification of inadvertent discovery if the resumption of the activity is otherwise lawful. The activity may also resume, if otherwise lawful, at any time that a written, binding agreement is executed between the federal agency and the affiliated Indian tribes or Native Hawaiian organizations that adopt a recovery plan for the excavation or removal of the human remains, funerary objects, sacred objects, or objects of cultural patrimony following 10.3(b)(1) of these regulations. The disposition of all human remains, funerary objects, sacred objects, or objects of cultural patrimony must be carried out following 10.6."

Pursuant to 43 CFR 10.4(d), within three days of receiving the written confirmation of notification, the responsible federal agency will certify receipt of the notification, take any additional necessary steps to secure and protect the inadvertent discoveries, notify any lineal descendants whose ancestors the discoveries are likely associated, initiate consultation on the inadvertent discovery, and follow procedures in 43 CFR 10.3, 10.5, and 10.6, as needed. Consultation following 43 CFR 10 does not replace other required consultation efforts. Federal agencies cannot allow human remains, burial goods, or potentially NRHP-eligible sites to be knowingly adversely affected without properly consulting (per 36 CFR 79, 36 CFR 800.5-800.7, and 25 U.S.C. 3001-3013) other parties and establishing agreements to mitigate those effects [43 CFR 3809.420(b)(8)].

If otherwise lawful, the activity stopped due to an inadvertent discovery may resume "thirty (30) days after certification by the notified Federal agency of receipt of the written confirmation of notification of inadvertent discovery" [43 CFR 10.4d(2)]. Calico may also resume an otherwise lawful activity once the federal agency and the affiliated Indian tribes or Native Hawaiian organizations execute a written, binding agreement that adopts a recovery plan for the excavation or removal of the human remains, funerary objects, sacred objects, or objects of cultural patrimony following 10.3(b)(1) of these regulations. The disposition of human remains, funerary objects, sacred objects, or objects of cultural patrimony must be carried out following 34 CFR 10.6.

Calico will follow the process outlined in the *Inadvertent Discovery Plan* (Calico, 2022a; Appendix D16). The *Inadvertent Discovery Plan* was developed in consultation with the Tribes and Oregon SHPO.

4. RECLAMATION AND CLOSURE PLAN

Reclamation of disturbed areas resulting from proposed mining activities outlined in the *Reclamation Plan* (Calico, 2023g; Appendix D1) will be completed in accordance with the BLM and the State of Oregon DOGAMI and ODEQ regulations. The purpose of 43 CFR 3809, *Surface Management*, is to prevent unnecessary or undue degradation of public lands by operations authorized by the mining laws. Anyone intending to develop mineral resources on public lands must prevent unnecessary or undue degradation of the land and reclaim disturbed areas. This subpart establishes procedures and standards to ensure that operators and mining claimants meet this responsibility and provide for the maximum possible coordination with appropriate state agencies to avoid duplication and to ensure that operators prevent unnecessary or undue degradation of public lands by operations authorized by the mining laws. The State of Oregon requires that a reclamation plan be developed for any new chemical mining project and for expansions of existing operations (OAR 632-037-0070) and for the quarry (OAR 632-030-0027).

The *Reclamation Plan* detailing the objectives, reclamation implementation, planned reclamation for each facility, post-closure care and maintenance, Reclamation Cost Estimate (RCE), and schedule are provided in Appendix D1.

The Reclamation Bond or alternative security, as required by ORS 517.987, OAR 632-037-0135, and OAR 340-43-0025, will be determined at the time permits are issued and assessed annually. The bonding or alternative security will be based on future discussions with the State. A credible accident failure modes review of the TSF has been incorporated as a part of the *Emergency Response Plan* (Calico, 2023d; Appendix D6).

The certificate of liability insurance (Acord, 2021) is provided in Appendix I.

4.1 SCHEDULE FOR RECLAMATION

The proposed post-mining land uses for the Project are livestock grazing or range land, wildlife habitat, and recreational land, with opportunities to consider mineral exploration and development when feasible. Where practical, areas impacted by the Project will be returned to conditions that existed prior to mining and mineral processing and provide for the post-mining land uses described above. Post-mining land uses are in conformance with the BLM Vale District Management Plan and Malheur County Land Use Plans. (The Malheur County LUCS is in Appendix E2.) Baseline studies performed to understand existing conditions and direct reclamation activities include *Grazing Management Baseline Report* (EM Strategies, 2018f; Appendix B8), *Land Use Baseline Report* (EM Strategies, 2018g; Appendix B10), and *Terrestrial Vegetation Baseline Report* (EM Strategies, 2018l; Appendix B17).

The *Reclamation Plan* (Calico, 2023g; Appendix D1) will be performed in five stages, with various activities and monitoring occurring at and in between each stage. A description of activities for each stage is presented below and detailed in Appendix D1.

- Stage 1 (Closure Year 1) begins immediately following the cessation of mining operations, with activities being performed in this general sequence:
  - Cessation of ore processing and placement of tailings;
  - Removal of underground mine equipment and chemicals and reagents;
  - Closure of the Ventilation Shaft;
  - Closure of the Mine Portal;
  - TSF underflow passive evaporation on the surface of the TSF (12-month period);
  - Placement of growth media and revegetation of the TSF Embankment;
  - If present, removal of waste rock from the TWRSF;
  - Closure of the TWRSF and overflow spillway;
  - Closure of the ore stockpiles;
  - Removal and disposal of hazardous waste, chemicals, and reagents;
  - Closure of the fuel storage and dispensing area;
  - Closure of the Process Plant buildings and ancillary facilities, including foundations and offsite disposal (except some of the support buildings and years that will be reclaimed in Stage 3 and the administration building that will be reclaimed in Stage 4);
  - Closure of the Collection Pond;
  - Closure of the parking areas (except the parking lot adjacent to the administration building, which will remain through Stage 4); and
  - Closure of the internal access and haul roads not required for Stage 2 and Stage 3 reclamation activities.

- Stage 2 (Closure Year 2) will commence approximately one year following Stage 1, at the time when the surface of the TSF is suitable for construction activities. The following activities will be performed in this general sequence:
  - Regrading the entire TSF surface;
  - Closure of approximately 75 percent of the surface of the TSF (the remaining 25 percent will be utilized for evaporation of seepage collected in the Reclaim Pond); and
  - TSF underflow passive evaporation on the surface of the TSF (12-month period).

- Stage 3 (Closure Year 3) will commence approximately 2 years following Stage 1, at the time when the flow rate from the tailings underflow can be passively managed within the E-Cell (evaporation pond), resulting in the final closure of the TSF. The following activities will be performed in this general sequence:
  - Closure of the remaining 25 percent of the surface of the TSF, and construction of the overflow spillway;
  - Conversion of the Reclaim Pond to an E-Cell;
  - Closure of the Quarry;
  - Closure of the remaining internal Mine roads;
  - Closure of the structures and yards for visitor parking, security, contractor laydown, contractor office and weather station areas; and
  - Closure of the Growth Media Stockpiles and Reclamation Borrow Areas.

- Stage 4 (Closure Year 4) will commence approximately 3 years following Stage 1, and upon the completion of Stage 3. The following activities will be performed in this general sequence:

  - Closure of the Perimeter Fence;
  - Closure of the administration building and adjacent parking lot;
  - Closure of the Water Supply, including the well field and associated pipelines, and well houses, fences and pads, raw water storage tank, septic tank, and potable water treatment unit;
  - Closure of the Power Supply, including generator, overhead lines and poles;
  - Reduction of Mine Access Road from two lanes to one lane with the exception of the county road that will remain.

  Upon completion of Stage 4, there will be approximately 27 years of post-closure monitoring and inspections.

- Stage 5 (Closure Year 30) will commence approximately 29 years following the completion of Stage 1, at the conclusion of post-closure monitoring for all mining facilities. The following activities will be performed in this general sequence:

  - Closure of the groundwater monitoring wells,
  - Closure of the final Growth Media Stockpile; and
  - Closure of the Mine Access Road.

4.2 TOPOGRAPHY AND VEGETATION – OAR 632-037-0070(1), OAR 632-037-0070(2), OAR 632-037-0070(3), OAR 632-037-0070(8), OAR 632-037-0120(2), OAR 635-420-0110, OAR 635-420-0060(5)

Post-closure landforms will be designed to be stable and respond to erosive forces in a similar manner to equivalent naturally-occurring landforms. This is applicable to the TSF, TWRSF, roads, former building locations, yards, and quarry areas.

To the extent practicable, the areas of the Project used for mining and mineral processing will be revegetated to a condition similar to the surrounding area using local native species. Calico will coordinate with agencies to implement and monitor the reclamation using quantitative measures for evaluating habitat diversity, wildlife species diversity, and plant community composition structure, and use by wildlife. Once established, the vegetative cover will be self-sustaining and show progression toward the surrounding undisturbed vegetation in terms of species diversity and plant density.

Salvageable growth media from the Project surface disturbance will be stockpiled at three centralized Growth Medium Stockpiles, as described in the *Reclamation Plan* (Calico, 2023g; Appendix D1). Growth media will be salvaged for reclamation activities at the commencement of construction of each Project component. Soil on slopes of 15 percent or less will be salvaged up to a depth of 2 ft, while soil on slopes greater than 15 percent will be salvaged up to a depth of 1 ft. Growth media will include soils and alluvium stripped prior to surface disturbance activities.

Growth media remaining in the stockpiles for one or more planting seasons will be seeded with an interim seed mix to stabilize the material and reduce erosion, as well as minimize the establishment of undesirable weeds. Erosion berms or straw waddles will be placed around Growth Media Stockpiles to prevent erosion. The stockpiles will be periodically inspected to monitor stabilization, and if necessary, additional stabilization measures will be employed.

Growth media will be placed on disturbed areas such as the final TSF cover, and the Quarry floor. Revegetation will include scarifying the ground surface or growth media surface, then applying a site-specific, native seed mix to promote establishment of a self-sustaining native ecosystem. Additional details are provided in Appendix D1.

Calico recognizes the economic and environmental impact that can result from the establishment of noxious weeds and has committed to a proactive approach to weed control. A noxious weed monitoring and control plan will be implemented during construction and continue through operations. The plan, provided in Appendix D17, contains a risk assessment, management strategies, provisions for annual monitoring and treatment evaluation, and provisions for treatment. The results from annual monitoring will be the basis for updating the plan and developing annual treatment programs.

4.3 FACILITIES

4.3.1 PROCEDURES FOR DECOMMISSIONING MINE FACILITIES – OAR 632-037-0070(12)

The *Reclamation Plan* will provide for the long-term physical stability of the post-closure landforms that will remain, specifically the TSF and Quarry. This includes demonstrating that the TSF will be physically stable for the maximum credible earthquake event and the Quarry high walls are reclaimed to comply with OAR 532-030-0027.

Pending confirmation of competent foundation soils, the design slopes of 2.5H:1V will be adequate for reclamation stability for the TSF embankments and 1.5H:1V for the Quarry walls, both of which will be constructed at the final stable slope as part of construction/operations.

4.3.2 PROCEDURES FOR REMOVAL OF ALL PROCESS CHEMICALS – OAR 632-037-0070(12)(c)

Chemicals, reagents, and petroleum products will be sold, used at another site, recycled where possible, or disposed of off site according to local, state, and federal regulatory requirements. Tanks and pipelines will be removed and salvaged, or disposed of off site according to local, state, and federal regulatory requirements. Hazardous or toxic materials at the Mill that are not salvaged will be removed from the Project and disposed of off site according to state and federal regulations. Concrete that may be contaminated through exposure to chemicals and reagents will be characterized, excavated, and disposed of off site according to federal and state regulations. Refer to the Waste Disposal sheet in the Reclamation Security cost estimate (see Section 4.6 of this CPA) for an itemized cost breakdown for disposal.

4.3.3 PROCEDURES FOR THE REMOVAL OR DISPOSAL OF ALL EQUIPMENT, REFUSE, STRUCTURES AND FOUNDATIONS FROM THE PERMIT AREA – OAR 632-037-0070(10)

Generally, buildings will be torn down, reduced to rubble, and the debris disposed of off site according to local, state, and federal regulatory requirements. Because most buildings on site will be constructed on concrete slab foundations, the slabs will be broken and buried, covered with growth media and revegetated. If economically feasible, salvage companies will be encouraged to recycle reusable construction materials, such as steel I-beams, galvanized siding, pipes, electrical gear and some lumber.

After buildings and ancillary facilities are removed, the concrete foundations and slabs will be broken using a trackhoe-mounted hydraulic hammer or similar method, and buried in place under approximately 36 in. of cover material in a manner that prevents ponding, promotes natural drainage, generally matches native ground, and promotes vegetative growth. After demolition and salvage operations are complete, disturbed areas will be covered with 12 in. of growth media, then revegetated. Additional details are provided in the *Reclamation Plan* (Calico, 2023g; Appendix D1).

4.3.4 CHARACTERIZATION AND MANAGEMENT PLAN – OAR 632-037-0070(4)

The *Waste Management Plan* (Calico, 2023b; Appendix D3) provides further information regarding characterization and disposal of waste materials.

4.3.5 PROCEDURES FOR APPROPRIATE ISOLATION OR REMOVAL OF WASTE MATERIAL – OAR 632-037-0070(12)(d), OAR 340-043-0000(2)(c)

The tailings distribution pipeline and tailings reclaim water pipeline will be removed and disposed of off site. After approximately one year, tailings are expected to consolidate sufficiently to allow for regrading and cover placement of the tailings impoundment surface. The tailings underflow reporting from the TSF to the Reclaim Pond is expected to be reduced to a level that can be managed within the footprint of the Reclaim Pond/E-Cell.

The tailings impoundment surface will be regraded to locate the low point of the surface to the northeast corner where a spillway will be constructed. The tailings impoundment surface will provide positive drainage, with a slope of 1.5 to 2 percent. After the surface is complete, the low permeability tailings impoundment cover will be installed, followed by vegetated growth media. Additional details are provided in the *Reclamation Plan* (Calico, 2023g; Appendix D1).

The waste rock generated from the underground mining operation will be used as rock fill amended with cement and returned underground as cemented rock fill. Therefore, no waste rock is anticipated to be present in the TWRSF at closure. If a minor amount of rock remains, the waste rock will be amended with lime, if necessary, then placed on the tailings impoundment surface prior to closure of the TSF. The TWRSF lining system will be cut, removed, and disposed of off site. The underdrain and leakage collection and recovery system will be drained, removed, and disposed of off site. The embankment will be used to regrade the ground surface below the TWRSF to prevent ponding, promote natural drainage, generally match native ground, and promote vegetative growth. After regrading, approximately 12 in. of growth media will be placed, and the area revegetated.

4.4 MONITORING – OAR 632-037-0070(12)(e), ORS 517.971(7)(n), OAR 340-095-0020(14), OAR 340-095-0020(15)

A detailed post-closure monitoring plan, including monitoring methodology, parameters, and frequencies, will be submitted to the BLM and DOGAMI prior to execution. The post-reclamation monitoring and maintenance plan is detailed in the *Reclamation Plan* (Calico, 2023g; Appendix D1).

Post-closure monitoring and maintenance performed by Calico will include the following:

- The fence surrounding the E-Cell will be inspected routinely during the post-closure monitoring period. Maintenance may consist of repairs to the fence and fence posts. This activity will be conducted until closure has been approved and the bond released. Post-closure E-Cell fence monitoring will be conducted in three phases:
  - Phase 1 includes quarterly monitoring for a period of 5 years.
  - Phase 2 includes semi-annual monitoring for a period of 10 years.
  - Phase 3 includes annual monitoring for a period of 15 years.
- Vegetation monitoring of the reclaimed facilities will be conducted at the various mining facilities at the Project 5 years after revegetation activities have been completed. The monitoring will involve photo-documentation and be conducted during the "peak green" spring season. This program will be coordinated with the BLM and DOGAMI to facilitate coordination between the agencies. Reclaimed areas not meeting regulatory standards would be evaluated and corrective actions implemented. These measures could include, if necessary, additional soil amendments, reseeding, and installation of erosion control measures, followed by monitoring consistent with what was conducted previously. This obligation will cease when the reclamation goals and requirements have been achieved and upon release of all related reclamation bonds.
- The flow rate of the tailings underflow from the TSF to the Reclaim Pond/E-Cell will be routinely monitored.
- Groundwater quality will be monitored by routinely collecting, testing, and reporting groundwater monitoring results to respective regulatory agencies to demonstrate reclamation compliance in the 15 monitoring wells according to the requirements established by the ODEQ upon approval of the Chemical Mining Permit. This activity will be conducted until closure has been approved and the bond released, estimated to be a period of 30 years. Groundwater monitoring will be conducted in three phases:
  - Phase 1 includes quarterly monitoring for a period of 5 years.
  - Phase 2 includes semi-annual monitoring for a period of 10 years.
  - Phase 3 includes annual monitoring for a period of 15 years.
- Noxious weed monitoring and control will be implemented during operations and for a period of 5 years following the cessation of operation.
- Stormwater diversion channels will be inspected during the reclamation monitoring period to ensure that sediment and debris has not accumulated and that the lining in the channels (riprap, concrete, etc.) has not been compromised, thereby reducing the design capacity of the structure.
- Surface water samples will be collected, tested, and reported to respective regulatory agencies to demonstrate reclamation compliance where necessary.

4.5 WATERCOURSES AND DRAINAGE – OAR 632-037-0070(3)

The goals of water management during and following reclamation are to minimize environmental impacts to groundwater and achieve passive surface water and stormwater drainage across the Project. The water management ponds for operations will be decommissioned with the exception of the Reclaim Pond, which will be converted to an E-Cell for the management of tailings underflow from the reclaimed TSF.

Permanent stormwater diversion channels will remain in place following reclamation and have been designed to safely convey runoff from the reclaimed facilities to the natural drainages while controlling erosion.

The *Reclamation Plan* (Calico, 2023g; Appendix D1) will ensure the mining facilities do not contribute to groundwater degradation or contamination during and following reclamation. A low permeability cover will be installed over the tailings in the TSF to impede infiltration and reduce tailings underflow reporting to the Reclaim Pond. Additional details are provided in Appendix D1.

4.6 RECLAMATION SECURITY – OAR 632-037-0070(13), OAR 632-037-0135(6)(p), ORS 517.987

An RCE was developed in accordance with regulations at 43 CFR 3809.522, 3809.553, and Oregon Revised Statute (ORS) 517.810. The Nevada Standardized Reclamation Cost Estimator (SRCE) was used to estimate the RCE. The SRCE model contains standardized cost data to calculate reclamation bonding requirements for the reclamation of Mine sites based on reclamation areas and volumes using geometry parameters defined by the user. The model uses a first-principals approach to reclamation cost estimating, using built-in worksheets with either fixed or user-defined labor and equipment rates for the calculation of reclamation activities that are specific to a mining project.

Calico will use a phased-bonding approach and will work out suitable milestone events with respect to Project development with the BLM and DOGAMI. Calico will provide a reclamation surety in accordance with regulations at 43 CFR 3809.522, 43 CFR 3809.553, and ORS 517.810 based on the reclamation tasks at the cessation of mining. Calico will update the surety to reflect the actual disturbance and whatever additional disturbance is planned for the subsequent period. Any changes to equipment, consumable, and labor costs will also be incorporated during the updates.

A total reclamation cost of $12,416,573 has been calculated, including indirect costs, such as contingency and contractor profit using SRCE Beta Version 2.0 and are presented in Table 45.

The development of this RCE, including the SRCE cost output file, is detailed in the *Reclamation Plan* (Calico, 2023g; Appendix D1).

Table 45. Reclamation Cost Estimate

Closure Items	Total
Underground Mine	$84,600
Tailings Storage Facility	$5,023,500
Temporary Waste Rock Storage Facility	$195,215
Process Plant	$605,480
Infrastructure & Ancillary Facilities	$86,097
Roads	$136,108
Yards & Laydown Areas	$53,381
Growth Media Stockpiles	$42,088
Water Supply	$111,026
Power Supply	$1,179,503
Stormwater Diversion Channels	$0
Exploration	$7,914
Quarry	$180,161
Reclamation Borrow Areas	$34,024
Post-closure Monitoring	$1,960,409
Mobilization / Demobilization	$154,918
Subtotal	**$9,854,424**
Indirect Costs	$2,562,149
Total	**$12,416,573**

5. ALTERNATIVE ANALYSIS

An alternatives assessment was completed to identify and analyze environmental impacts of the proposed mining operation. To support the alternatives assessment, conceptual plans were developed to estimate footprints and areal extents, and the alternatives were developed assuming that they would meet local, state, and federal regulatory requirements and guidance, such as the lining of chemical mining processing facilities. The evaluation of alternatives focused on environmental and social impacts, including air quality; archaeological resources; cultural and historical resources; existing land use and land use designations; fish, fish habitat, and aquatic biology; geologic hazards, including geology; noise; socioeconomic conditions; threatened, sensitive, or endangered species; surface water and groundwater; vegetation; wildlife, including wildlife habitat; and other resources. A detailed discussion is provided in the *Alternatives Assessment Report* (Calico, 2021b; Appendix J), and a summary is presented below.

In selecting and developing a gold extraction process, metallurgists consider the range of alternative technologies that are available and choose the technology based on a number of factors, including how gold occurs in the ore, ore type/chemistry, worker safety, environmental protection, and cost (i.e., CIL with sodium cyanide). For the Grassy Mountain Mine Project, the selected extraction process (CIL with sodium cyanide) proved to have the best balance performance against these criteria. CIL with sodium cyanide has been used safely and effectively at hundreds of gold mines throughout the world. Therefore, the alternatives analyses performed to prepare this CPA did not revisit evaluation of extraction technologies. The use of unproven processes and/or chemicals that have not been successfully implemented in full-scale mining operations did not survive technology screening.

5.1 ALTERNATIVE LOCATIONS FOR MINE FACILITIES – OAR 632-037-0075(2)(a)

Golder developed a technical memorandum to evaluate tailings siting and tailings deposition options (Golder, 2019). Five TSF sites were considered for the facility, and a ranking matrix developed that consolidated the advantages and disadvantages of each option.

Technical criteria considered in the evaluation of locations included:

- Volume of earthworks material,
- Ease of construction,
- Complexity and reliability of stormwater management,
- Efficiency of pumping and piping of the tailings to the TSF and return water back to the Mill, and
- Tailings rate of rise.

The current site (Golder's Option 2) was selected as the preferred TSF location because it received the best overall ranking as well as having the best total ranking for technical criteria and human safety and environmental protection.

5.2 ALTERNATIVE DESIGNS, PROCESSES (INCLUDING CHEMICAL PROCESSES), OPERATIONS AND SCHEDULING FOR MINE FACILITIES AND OPERATIONS – OAR 632-037-0075(2)(b)

The alternatives reviewed for mining and processing include an underground mine with TSF (proposed action), an open pit mine with TSF (Alternative 1A), and an open pit mine with heap leach pad (HLP) (Alternative 1B). A summary of each option is presented below in Table 46, with a more detailed discussion provided in Appendix J. The proposed action has the least impacts on air quality; archaeological resources; noise; threatened, sensitive, or endangered species; surface water and groundwater; vegetation; and wildlife. Both the proposed action and the two alternatives have similar long-term impacts to existing cultural/historical resources, land use, fish, and geologic hazards. Alternatives 1A and 1B have a more positive impact on socioeconomic conditions than the proposed action.

Table 46. Proposed Action and Alternative Designs

Detail	Proposed Action	Alternative 1A	Alternative 1B
Description	Underground Mine with TSF	Open Pit Mine with TSF	Open Pit Mine with Heap Leach Pad
Mine Development	Drill and Blast Technique with CRF to backfill production drifts; Ore is hauled via underground trucks to surface stockpile. 750 stpd	Conventional open pit 79.9 Mst and,74 acre footprint Drilling and blasting, excavators/loaders, and haul trucks. 5,000 tons/day	Conventional open pit 109 Mst and 97 acre footprint Drilling and blasting, excavators/loaders, and haul trucks. 15,000 tons/day
Ore Handling	Ore is stockpiled, crushed, then conveyed to the Mill where it is crushed by a ball mill with a hydro-cyclone cluster	Ore is hauled to a three-stage crushing system.	Ore is hauled to a three-stage crushing system.
Processing	• Leach/CIL circuit with pre-aeration; cyanide added to first leach tank; lime added to pre-aeration tank. • Gold and silver are adsorbed onto activated carbon, which is reverse circulated through the CIL tanks. • Loaded carbon is fed to the elution process where gold and silver are stripped from the carbon. • Final processing occurring in the gold room includes electrowinning, mercury retort, flux mixer, and melting furnace. • CIL tailings undergo cyanide detoxification prior to transfer to the TSF.	Gold will be recovered using a CIL recovery circuit, similar to the Proposed Action, but sized to handle 5,000 tons/day.	Crushed ore is placed in a heap leach pad, solution applied then recovered, and gold recovered from the leach solution in the carbon adsorption desorption recovery (ADR) plant.

Detail	Proposed Action	Alternative 1A	Alternative 1B
Tailings Storage	**TSF with TWRSF** • Fill native valley, with staged embankments on north and west sides • TSF is sized to handle 3.7 Mst • TSF covers 99 acres • TSF and TWRSF are geomembrane-lined, with continuous primary and secondary containment. • Leakage collection and detection systems • Supernatant from Supernatant Pool is pumped to Process Plant for reuse. • Tailing underdrain collection system gravity flows to Reclaim Pond then is pumped to Process Plant for reuse. • TWRSF underdrain routes to the Reclaim Pond. • TWRSF contains 0.27 Mst waste rock. Covers 8 acres.	**TSF with WRSF** • Fill native valley, with staged embankments on north and west sides • TSF is sized to handle 22.5 Mst of tailings • TSF covers 216 acres with embankment height of 180 ft. • TSF and WRSF are geomembrane lined • WRSF contains 57.4 Mst waste rock. Covers 215 acres and will be located near the open pit.	**HLP with Internal Process Pond and WRSF** • Fill native valley and require embankment to serve as a buttress to improve HLP stability and provide containment for process solution. • Sized to handle 53.3 Mst of crushed ore. • Covers 147 acres with maximum ore height of 340 ft. • Primary geosynthetic liner, leak detection system, and secondary composite liner • Internal pond with geomembrane liner and continuous primary and secondary containment with leak detection systems. • WRSF contains 53.3 Mst waste rock. Covers 219 acres and will be located near the open pit.
Mine Life and Staffing	8 years 100 people	12.7 years 100 people	10 years 130 people

5.3 ALTERNATIVE WATER SUPPLY – OAR 632-037-0075(2)(c)

Two water supply alternatives were evaluated, including onsite water wells (proposed action) and a municipal water supply (Alternative 2).

In the proposed action, raw water is pumped from up to four production wells to a raw water storage tank via a 2.8-mile buried pipeline to a raw water storage tank.

Alternative 2 proposes municipal water obtained from the City of Vale, conveyed via a 25.3-mile buried pipeline.

A detailed discussion of the options is provided in Appendix J. Both options result in equivalent long-term impacts for most of the environmental and social factors, except for short-term impacts to local groundwater anticipated to be greater with the proposed action and short-term noise impacts may be greater for Alternative 2.

5.4 ALTERNATIVE POWER SUPPLY – OAR 632-037-0075(2)(d)

Three power supply alternatives were evaluated including an overhead transmission line (proposed action), a combination upgraded overhead and buried transmission line (Alternative 3A), and onsite generators (Alternative 3B).

In the proposed action, power will be supplied to the Project via an upgraded overhead transmission line, along approximately 25 miles from the Hope Substation to the Mine, and addition of approximately 20 miles of new, overhead transmission line, with two backup 60 hertz (Hz) diesel-powered generators supplying power in the event of a short-term power loss.

In Alternative 3A, power will be supplied to the Project via a combination of an upgraded transmission line and a buried transmission line, owned and maintained by Idaho Power. The overhead transmission line upgrade is approximately 5 miles, at which point the line would be buried for approximately 20 miles, with two backup 60 Hz diesel-powered generators supplying power in the event of a short-term power loss.

In Alternative 3B, power to the aboveground mining operations would be supplied by three 60 Hz diesel-powered generators and one 60 Hz backup diesel-powered generator located adjacent to the Process Plant. Power to the underground mining operations would be supplied by one 60 Hz diesel-powered generator and one 60 Hz diesel-powered backup generator. The generators would operate 24 hours per day, 365 days per year, with the backup generators running approximately 500 hours per year.

A detailed discussion of options is provided in Appendix J. The proposed action and Alternative 3A have similar impacts to archaeological resources, cultural/historical resources, fish, land use, geologic hazards, socioeconomic conditions, surface water and groundwater, and vegetation. The proposed action and Alternative 3A have no or similar impacts to air quality and a potential short-term impact to endangered or threatened species. Alternative 3B has the largest impact to noise and may result in a non-compliance with Cleaner Air Oregon rules. The proposed action would have a greater visual impact than the alternatives.

5.5 ALTERNATIVE RECLAMATION PROCEDURES – OAR 632-037-0075(2)(e)

Two reclamation alternatives were evaluated, including infrastructure removal and limited access (proposed action) and post-closure industrial land use (Alternative 4).

In the proposed action, buildings and facilities will be decommissioned and dismantled, and materials will be salvaged, sold, used elsewhere, or removed and disposed of off site in an authorized landfill. Non-movable physical aspects, such as the Process Plant footprint and building foundations, will be recontoured to match the original site topography and will be revegetated. Project roads, yards, and parking areas will be reclaimed. Infrastructure, including water and power supply, will be decommissioned and dismantled, and materials will be salvaged, sold, used elsewhere, or removed and disposed of off site in an authorized landfill.

In Alternative 4, the post-closure land use will be changed to an industrial post-closure use that promotes access, with the infrastructure and buildings remaining. Reclamation of the major mining facilities

(underground Mine, TSF, TWRSF, Quarry, Reclamation Borrow Areas, etc.) will be the same as the proposed action; however, the Project area and infrastructure will be transferred to the BLM or Malheur County, including the buildings, Mine access road, power supply, and water supply.

A detailed discussion of options is provided in Appendix J. The proposed action has fewest impacts on air quality, noise, threatened or endangered species, vegetation, and wildlife. Both the proposed action and Alternative 4 have similar impacts to archaeological resources, cultural/historical resources, land use, fish, geologic hazards, and surface water. Alternative 4 has a more positive impact on socioeconomic conditions.

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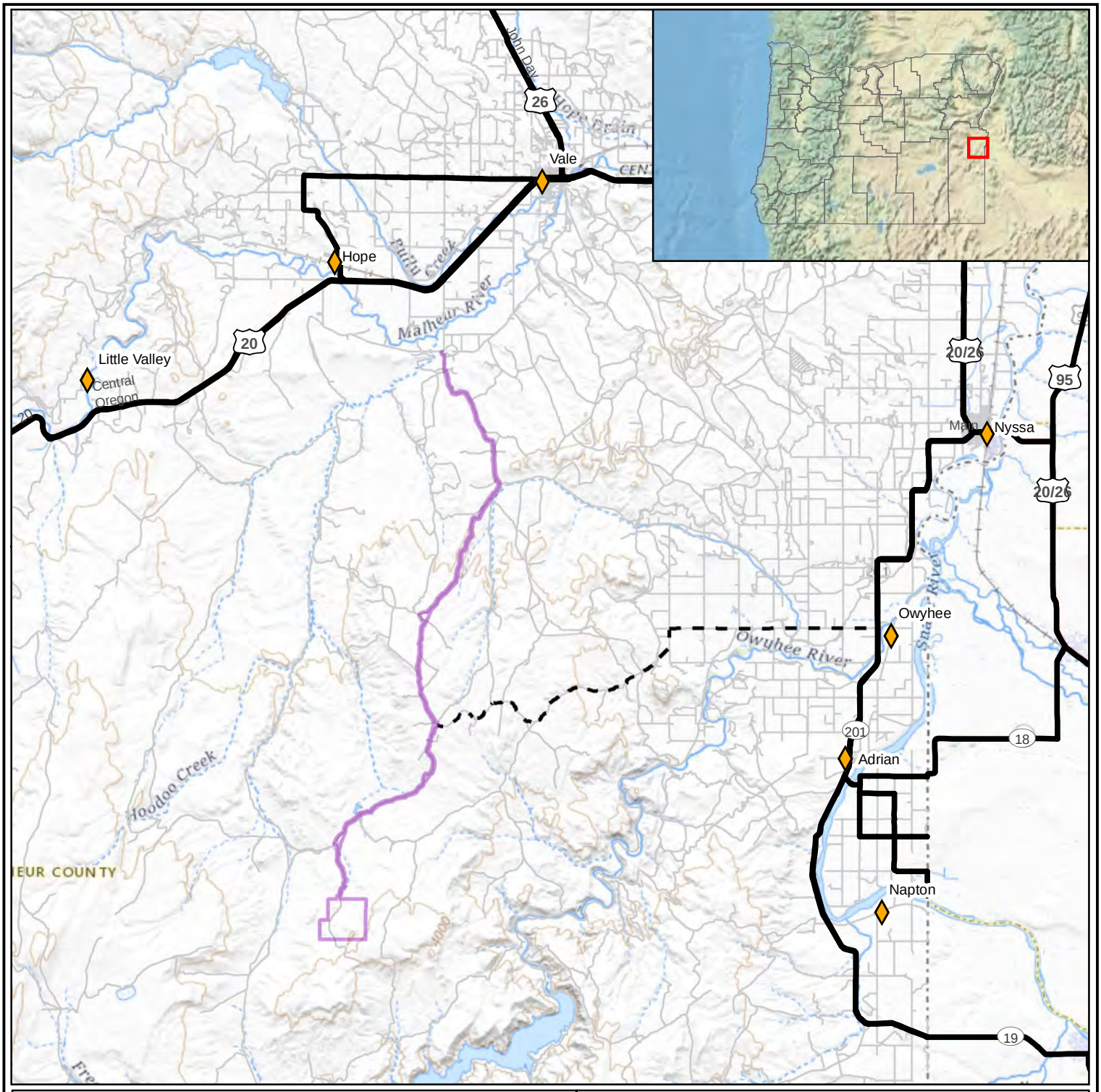
MAPS



Legend

- PoO Boundary
- Emergency Access Road
- Roads

1 ":4 Miles

0 1 2 4Miles

Scale as shown when plotted at 8.5"x11".

N W E S

Notes:

1. Figure references 1983 UTM zone 11N datum.
2. Road and highway system were referenced from the Bureau of land Management.

Site/Report:

Calico Resources USA Corp.
Grassy Mountain Mine

Consolidated Permit Application

Map:

Location Map

SLR / CALICO RESOURCES	Date: December, 2021		Map: 1
	Project No: 108.02203.00001		
	By: MS	Chk'd: TM	

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Hope
Russell Rd.
Cow Hollow Rd.
Twin Springs Rd.
Mitchell Butte Rd.
Owyhee Ave.
Grassy Mountain Deposit
Nyssa
Kingman
Owyhee
Adrian
Napton
Jamieson Gulch Reservoir
East Cow Hollow Reservoir
Mitchell Butte Lateral
Owyhee River
Sand Hollow Creek
Boise River
Snake River
Arena Canal
Riverside Canal
Snake River

Legend

- PoO Boundary
- Cities of Oregon_ USA
- BLM Land Vehicle Access Point
- Highway
- Major Road
- Local Road
- County Road
- Federal Road

Land Status

- Bureau of Land Management
- Bureau of Reclamation
- Private Individual or Company
- State Agency
- U.S. Fish and Wildlife Service
- Undetermined
- Water

1 ":2 Miles

0 0.5 1 2 Miles

N W E S

Scale as shown when plotted at 11"x17".

Notes:

1. Figure references 1983 UTM zone 11N datum.
2. Road and highway system were referenced from the Bureau of land Management.
3. Land status was referenced from the Bureau of Land Management database, BLM Idaho Surface Management Agency 2020 and OR BLM Status Line 2021.

Site/Report:

Calico Resources USA Corp.
Grassy Mountain Mine

Consolidated Permit Application

Map:

Vicinity and Access Map

SLR / CALICO RESOURCES	Date: April, 2023		Map: 2
	Project No: 108.02203.00001		
	By: MS	Chk'd: TB	

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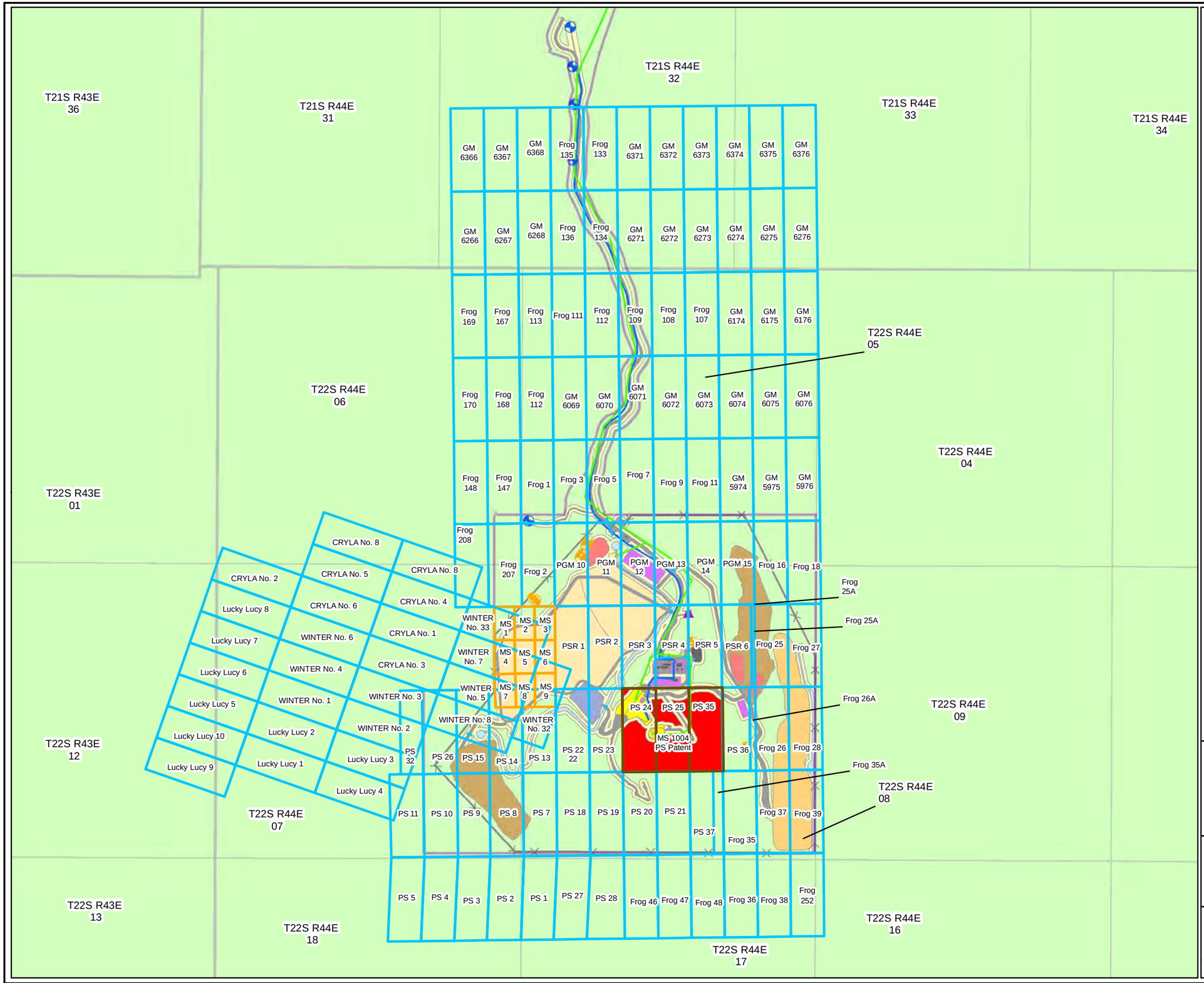

Legend

- Lode Mining Claims
- Mill Site Claims
- Patented Claims
- Public Land
- Private Land
- PoO Boundary
- Fence Line
- Quarry (Public: 48.2 Acres, Private: 0.0 Acres)
- Reclamation Borrow Areas (Public: 55.9 Acres, Private: 0.0 Acres)
- Growth Media Stockpiles (Public: 7.7 Acres, Private: 0.0 Acres)
- Yards, Laydown Areas, and Stockpiles (Public: 9.9 Acres, Private: 0.1 Acres)
- Underground Mine (Public: 0.5 Acres, Private: 6.2 Acres)
- Process Plant (Public: 2.5 Acres, Private: 0.0 Acres)
- Infrastructure & Ancillary Facilities (Public: 17.8 Acres, Private: 0.0 Acres)
- Power Supply (Public: 61.1 Acres, Private: 0.0 Acres)
- Temporary Waste Rock Storage Facility (Public: 5.7 Acres, Private: 0.0 Acres)
- Tailings Storage Facility (Public: 99.8 Acres, Private: 0.0 Acres)
- Water Supply (Public: 7.9 Acres, Private: 0.0 Acres)
- Roads (Public: 31.6 Acres, Private: 3.3 Acres)
- Stormwater Diversion Channel (Public: 11.6 Acres, Private: 0.2 Acres)
- Disturbed Area (Public: 98.6 Acres, Private: 9.1 Acres)
- Culvert
- Power Line
- Water Supply Line
- Production Well
- Monitoring Well
- MET Station

1 ":1,700 '

0 425 850 1,700 Feet

N W E S

Scale as shown when plotted at 11"x17".

Notes:

1. Figure references 1983 UTM zone 11N datum.
2. Topography, facility layout, and site claims provided by others.

Site/Report:

Calico Resources USA Corp.
Grassy Mountain Mine

Consolidated Permit Application

Map:

Land Ownership, Patented Lode Mining Claims, and Unpatented Load Mining Claims

SLR / CALICO RESOURCES	Date: March, 2023		Map: 3
	Project No: 108.02203.00001		
	By: MS	Chk'd: TB	

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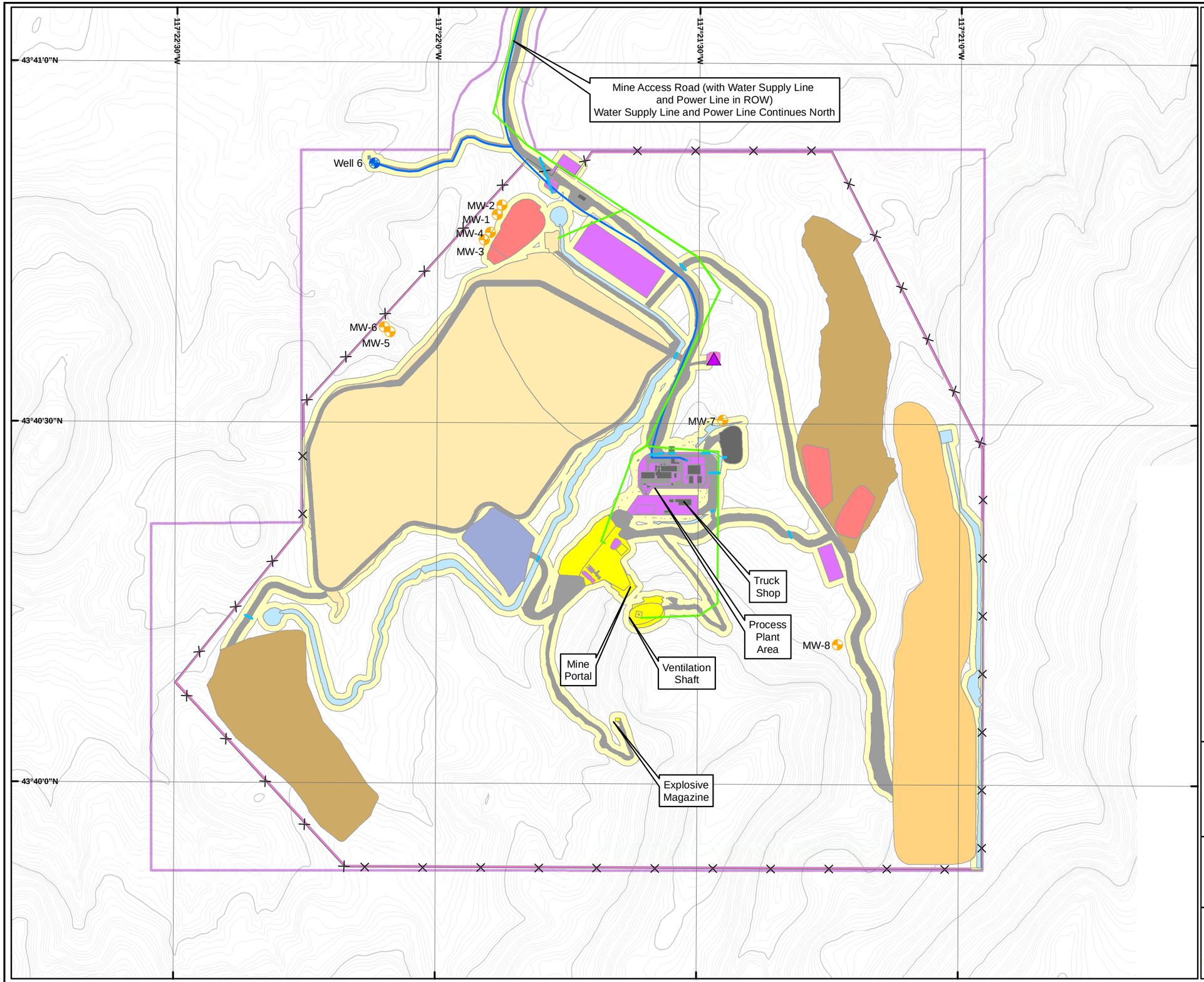

Legend

- PoO Boundary
- Fence Line
- Culvert
- Power Line
- Water Supply Line
- Production Well
- Monitoring Well
- MET Station
- Quarry
- Reclamation Borrow Areas
- Growth Media Stockpiles
- Yards, Laydown Areas, and Stockpiles
- Underground Mine
- Process Plant
- Infrastructure & Ancillary Facilities
- Power Supply
- Temporary Waste Rock Storage Facility
- Tailings Storage Facility
- Water Supply
- Roads
- Stormwater Diversion Channel
- Disturbed Area
- Existing 25ft Elevation Contour
- Existing 5ft Elevation Contour

1 ":800 '
0 200 400 800 Feet

N
W E
S

Scale as shown when plotted at 11"x17".

Notes:

1. Figure references 1983 UTM zone 11N datum.
2. Topography and facility layout provided by others.

Site/Report:

Calico Resources USA Corp.
Grassy Mountain Mine

Consolidated Permit Application

Map:

General Arrangement

Date: November, 2022		Map: 4
Project No: 108.02203.00001		
By: MS	Chk'd: TM	

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1 ":0.6 Miles

0 0.15 0.3 0.6 Miles

N
W E
S

Scale as shown when plotted at 11"x17".

1 ":0.8 Miles

0 0.2 0.4 0.8 Miles

N
W E
S

Scale as shown when plotted at 11"x17".

Map Extent

Map Extent

Legend

- PoO Boundary
- Drewsey Very Fine Sandy Loam, 2 to 6 Percent Slopes
- Drewsey-Quincy-Solarview Complex, 8 to 30 Percent Slopes
- Farmell-Chardoton Extremely Stony Soil, 4 to 15 Percent Slopes
- Farmell-Chardoton oil, 8 to 15 Percent Slopes
- Farmell-Chardoton Very Cobbly Soil, 15 to 30 Percent Slopes
- Farmell-Chardoton Very Cobbly Soil, 4 to 15 Percent Slopes
- Farmell-Rock Outcrop Complex, 8 to 30 Percent Slopes
- Nyssa Silt Loam, 2 to 8 Percent Slopes
- Owsel Silt Loam, 1 to 6 Percent Slopes
- Powder Silt Loam, 0 to 3 Percent Slopes
- Ruckles Very Stony Loam, 8 to 30 Percent Slopes
- Ruclick Cobbly Loam, 4 to 15 Percent Slopes
- Shano Silt Loam, 2 to 6 Percent Slopes
- Soil A Extremely Gravelly Sandy Loam, 15 to 30 Percent Slopes
- Soil B Very Gravelly Sand Loam, 8 to 30 Percent Slopes
- Virtue Loam, 2 to 8 Percent Slopes
- Xeric Torriorthents, 8 to 30 Percent Slopes

Notes:
1. Figure references 1983 UTM zone 11N datum.
2. Topography and facility layout, soil survey provided by others.

Site/Report:

Calico Resources USA Corp.
Grassy Mountain Mine

Consolidated Permit Application

Map:

Soil Map Units

SLR
CALICO RESOURCES

Date: December, 2021		Map: 5
Project No: 108.02203.00001		
By: MS	Chk'd: TM	

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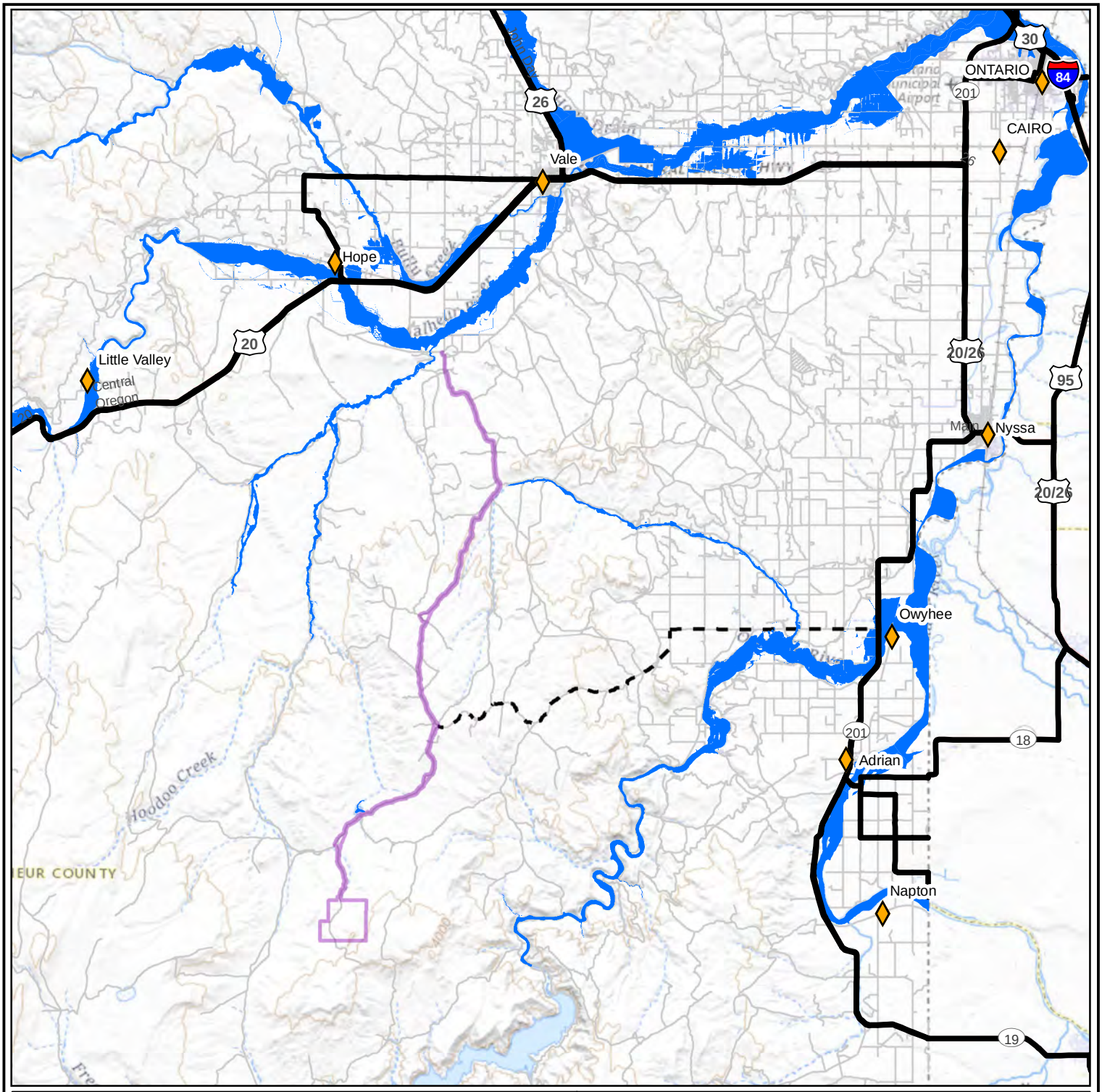

Legend

- PoO Boundary
- Estimated Flood Hazard Area
- Emergency Access Road
- Roads

1 ":4 Miles

0 1 2 4Miles

Scale as shown when plotted at 8.5"x11".

N W E S

Notes:

1. Figure references 1983 UTM zone 11N datum.
2. Road and highway system were referenced from the Bureau of land Management.
3. Flood hazard areas were referenced from FEMA's 2017 and 1984 flood mitigation assessment; last updated April 27th 2021.

Site/Report:

Calico Resources USA Corp.
Grassy Mountain Mine

Consolidated Permit Application

Map:

Flood Plains Hazard Area
Malheur County, OR

SLR

CALICO RESOURCES

Date:	December, 2022	Map:
Project No:	108.02203.00001	6
By: MS	Chk'd: TM	

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APPENDICES

APPENDIX A: PATENTED / UNPATENTED MINING CLAIMS

Click here.

APPENDIX B: BASELINE DATA REPORTS

B1. Air Quality Resources Baseline Report

B2. Aquatic Resources Baseline Report

B3. Areas of Critical Environmental Concern Research Natural Areas Baseline Report

B4. A Cultural Resource Inventory of 830 Acres for the Grassy Mountain Mine Project – withheld from public review

B5. Environmental Justice Baseline Report

B6. Baseline Geochemical Characterization Report

B7. Geology and Soils Baseline Report

B8. Grazing Management Baseline Report

B9. Grassy Mountain Gold Project Baseline Groundwater Reports

B10. Land Use Baseline Report

B11. Noise Baseline Report

B12. Oregon Natural Heritage Resources Baseline Report

B13. Outstanding Natural Areas Baseline Report

B14. Recreation Baseline Report

B15. Socioeconomics Baseline Report

B16. Surface Water Baseline Report

B17. Terrestrial Vegetation Baseline Report

B18a. Transportation Baseline Report

B18b. Transportation Baseline Traffic

B18c. Transportation Baseline Trip Generation

B19. Visual Resources Baseline Report

B20. Wetland Delineation Report

B21. Wild, Scenic, or Recreational Rivers Baseline Report

B22. Wildlife Resources Baseline Report

B23. Work Plans, Environmental Baseline Study

APPENDIX C: DESIGN REPORTS

APPENDIX D: MANAGEMENT PLANS

APPENDIX E: PERMIT APPLICATIONS

APPENDIX F: GRASSY MOUNTAIN CEMENTED ROCK FILL CHARACTERIZATION REPORT

Click here.

APPENDIX G: GRASSY MOUNTAIN GOLD AND SILVER PROJECT, NUMERICAL HYDROGEOLOGIC ASSESSMENT

Click here.

APPENDIX H: ECOLOGICAL RISK ASSESSMENT: NUMERICAL PREDICTION OF TAILINGS, SUPERNATANT POND AND RECLAIM POND CHEMISTRY FOR THE GRASSY MOUNTAIN PROJECT

Click here.

APPENDIX I: CERTIFICATE OF LIABILITY INSURANCE

Click here.

APPENDIX J: ALTERNATIVES ASSESSMENT REPORT

Click here.