United States Department of Agriculture
Forest Service

Stibnite Gold Project

Final

Environmental Impact Statement

Forest Service, Region 4, Payette and Boise National Forests, Valley County, Idaho

Lead Agency: USDA Forest Service

Cooperating Agencies: U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, Idaho Governor's Office of Energy and Mineral Resources, Idaho Department of Lands, Idaho Department of Water Resources, Idaho Department of Environmental Quality, Valley County

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Abstract: This Final Environmental Impact Statement (EIS) is a public document that discloses the direct, indirect, and cumulative effects of the proposed action and alternative actions for the Stibnite Gold Project. This document follows the format established in the Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] Parts 1500–1508). It includes a discussion of the purpose and need for the proposal; alternatives to the proposal; the physical, biological, social, and economic impacts of the proposed action and alternatives; and a listing of agencies and persons consulted. The document tiers to and incorporates by reference material in the Final EIS and record of decision (ROD) for the 2003 Land and Resource Management Plan (Forest Plan), as amended for the Payette National Forest, and the Final EIS and ROD for the 2010 Boise Forest Plan.

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Please state "Stibnite Gold Project" in the subject line when providing any electronic correspondence, or on the envelope when providing correspondence by mail. Electronic correspondence must be submitted in a common digital format such as plain text (.txt), rich text format (.rtf), Word (.doc, .docx) or PDF (.pdf).

Project Website: https://www.fs.usda.gov/project/?project=50516

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Executive Summary

Introduction

The Stibnite Gold Project (SGP) proposes mine operations on federal, state, and private lands located in Valley County, Idaho. This Final Environmental Impact Statement (Final EIS) was prepared in response to a revised Plan of Restoration and Operations (Plan) for the SGP. The Forest Service received the original SGP Plan in 2016, (Midas Gold Idaho, Inc. [Midas Gold] 2016a) for review and approval in accordance with regulations at 36 Code of Federal Regulations (CFR) 228 Subpart A. A revised Plan was submitted to the Forest Service in 2019 (Brown and Caldwell 2019a). A draft EIS (DEIS) evaluating five alternatives based on the revised Plan was released by the Forest Service in August 2020. A further modified Plan was initially submitted by Midas Gold in December 2020 with a revised submittal in October of 2021 (Perpetua 2021a). Midas Gold changed their name to Perpetua Resources Ltd (Perpetua) in February 2021. In consideration of the modified Plan, the Forest Service determined that a supplemental draft EIS (SDEIS) was warranted and released in October 2022. In the SDEIS, two of the previous action alternatives (August 2020 DEIS Alternatives 1 and 3) were eliminated from further consideration. Therefore, the SDEIS evaluated the Proposed Action, the Johnson Creek Route Alternative, and the No Action Alternative. After review and consideration of the public comments on the SDEIS, revisions were made to the Final EIS including addition of mitigation measures to offset Project effects. Environmental effects of the alternatives are described in this executive summary and a compilation and comparison of these effects is found in **Table 2.8-1** of this Final EIS.

The Forest Service is the lead agency in the preparation of this Final EIS (40 CFR 1501.5). The Project occurs on both the Boise and Payette National Forests; the Payette National Forest (PNF) is the agency lead. Cooperating agencies include the U.S. Army Corps of Engineers (USACE), U.S. Environmental Protection Agency (EPA), Idaho Governor's Office of Energy and Mineral Resources (OEMR), Idaho Department of Lands (IDL), Idaho Department of Environmental Quality (IDEQ), Idaho Department of Water Resources (IDWR), and Valley County, Idaho.

Purpose and Need

The Forest Service purpose is to consider approval of Perpetua's proposed use of the surface of NFS lands in connection with operations authorized by the U.S. mining laws as first described in the Plan submitted September 2016, then refined in 2019 (Brown and Caldwell 2019a), and further modified in 2021 as the 2021 Modified Mine Plan (2021 MMP; Perpetua 2021a). The Forest Service's need for action is to ensure that the proposed occupancy and use of NFS lands is consistent with statutory and regulatory requirements. For purposes of this environmental analysis, the agency is assuming the proposed uses would be able to be authorized under existing regulatory authorities.

The need for action is to:

- Consider approval of Perpetua's 2021 MMP for development of the SGP to mine and mill gold, silver, and antimony deposits that, where feasible, would minimize adverse environmental impacts on NFS surface resources; and ensure that measures are included that provide for mitigation of environmental impacts and reclamation of the NFS surface disturbance.

Perpetua's 2021 MMP includes the discharge of dredge and fill material into waters of the U.S. (WOTUS), including wetlands. Accordingly, the USACE, pursuant to Section 404 of the Clean Water Act (CWA), will review the SGP Plan and render a decision to either issue, issue with special condition, or deny a permit for the Project. As a cooperating agency the USACE intends to use this EIS process and document for evaluating compliance with its responsibilities under NEPA and the CWA Section 404(b)(1) Guidelines. As part of its review, the USACE is required by the CWA to independently consider and express the activity's underlying purpose and need from Perpetua's (the applicant) and the public's perspectives (33 CFR 325).

From the USACE's perspective, the basic purpose for the SGP is to extract gold, silver, and antimony from ore. Under the CWA Section 404(b)(1) guidelines (40 CFR 230), the USACE uses the basic project purpose to determine if a project is "water dependent" (40 CFR 230.10(a)(3)). A project is water dependent if it must be located in, or be close to, a special aquatic site, including wetlands, to fulfill its basic purpose. The USACE has determined that mining gold, silver, and antimony ore is not a water-dependent activity. The overall project purpose is to mine gold, silver, and antimony from ore deposits associated with the SGP. This overall project purpose is being used for evaluating practicable alternatives under the 404(b)(1) guidelines. The 404(b)(1) analysis is being completed by the USACE following the public comments on both the SDEIS and Perpetua's application for a Department of the Army (DA) permit for the SGP.

Federal Decision Framework

The U.S. mining laws (30 U.S.C. 21-54) govern exploration and development of mineral resources on federal lands. Locatable minerals operations on NFS lands are subject to regulations found at 36 CFR 228 Subpart A. Locatable mineral operations are to be conducted so as, where feasible, to minimize adverse environmental impacts on National Forest surface resources (36 CFR 228.8). In prospecting, locating, and developing the mineral resources, all persons must comply with the rules and regulations covering the National Forests (16 U.S.C. 478). All functions, work, and activities on NFS lands in connection with prospecting, exploration, development, mining, or processing of mineral resources and all uses reasonably incident thereto, including roads that are constructed and maintained in connection with development and mining of mineral resources, are operations authorized by the U.S. mining laws (36 CFR 228.3(a)).

The Forest Service is the lead agency in the preparation of this document (40 CFR Part 1501.5). The USACE is a federal cooperating agency with decisions to be made based on this environmental analysis consistent with the NEPA. Other federal, state, and local agencies are also participating in this review as cooperating agencies.

The Payette Forest Supervisor, as the responsible official acting on behalf of the lead agency, has determined that preparation of an EIS is required because approving the 2021 MMP may have significant impacts on the human environment (40 CFR Part 1501). The Payette Forest Supervisor will make the following decisions:

- Whether to approve the 2021 MMP as submitted, or any alternative considered in detail in the Final EIS.

- Whether to amend[1] the Payette Land and Resource Management Plan (Final EIS and Record of Decision for the Revised Payette Land and Resource Management Plan [Forest Service 2003a] is incorporated by reference). One or more project-specific amendments to the forest plan would be required.
- Whether to authorize the power transmission line under the regulations governing special use authorizations at 36 CFR 251.53(l)(4).

The Boise Forest Supervisor will make the following decisions:

- Whether to amend the Boise Land and Resource Management Plan (Final EIS and Record of Decision for Revised Boise Land and Resource Management Plan [Forest Service 2010a] is incorporated by reference). One or more project-specific amendments to the forest plan would be required.

The Payette and Boise Forest Plans provide direction relevant to the 2021 MMP and its alternatives through forest-wide plan components and management areas. Management Areas (MAs) in the SGP area include the following:

Payette National Forest

- Management Area 13 Big Creek/Stibnite

Boise National Forest

- Management Area 17 North Fork Payette River
- Management Area 19 Warm Lake
- Management Area 20 Upper Johnson Creek
- Management Area 21 Lower Johnson Creek

Project-specific Plan Amendments

Project-specific plan amendments to the Payette and Boise Land and Resource Management Plans would be required to approve the 2021 MMP or the Johnson Creek Route Alternative. A forest plan may be amended at any time. A plan amendment is required to add, modify, or remove one or more plan components. The proposed removal of the below identified forest plan Standards would be one-time amendments to the current forest plans and would be project-specific and apply only to the SGP. These amendments would be made according to the 2012 Planning Rule (36 CFR Part 219.13, as amended) and will comply with the direction in both forest plans relating to Standards.

The Notice of Intent and Federal Register notices included notification of amendments and opportunity to comment. Substantive analysis requirements as per the 2012 Planning Rule (36 CFR 219.8 and 219.9) are addressed within **Appendix A** for sustainability (Section 219.8), plant and animal community diversity and persistence of native species (Section 219.9), multiple use (Section 219.10), timber (Section 219.11), and others.

[1] Forest plan amendments are evaluated under the 2012 Planning Rule per 36 CFR Part 219.17(b)(2), which requires all forest plan amendments initiated after May 9, 2012, to use the 2012 Planning Rule.

Project-specific amendments to the Payette and Boise Forest Plans are evaluated for the 2021 MMP or the Johnson Creek Route alternatives. The amendments would remove the forest plan Standards as outlined in **Table ES-1**. The proposed forest plan amendments are in accordance with 36 CFR 219, the Forest Service 2012 Planning Rule (USDA 2012c). The amendments are a project-specific, one-time variance (36 CFR 219.13(B)(1)) from the current Boise and Payette Forest Plans direction for the SGP. The responsible officials (Boise and Payette Forest Supervisors) have the discretion to determine whether and how to amend the plan(s) and to determine the scope and scale of any amendment.

Table ES-1 Forest Plan Amendments

Resource	Plan Component	Current Forest Plan Component Text
General Management Actions	PNF Standard 1301 PNF Standard 1306 BNF Standard 2010 BNF Standard 2113 BNF Standard 1919 BNF Standard 2005	Management actions, including salvage harvest, may only degrade aquatic, terrestrial, and watershed resource conditions in the temporary time period (up to 3 years), and must be designed to avoid resource degradation in the short term (3-15 years) and long term (greater than 15 years).
Total Soil Resource Commitment	PNF Standard SWST03	Management activities that may affect Total Soil Resource Commitment (TSRC) shall meet the following requirements: • In an activity area where existing conditions of TSRC are below 5 percent of the area, management activities shall leave the area in a condition of 5 percent or less TSRC following completion of the activities. • In an activity area where existing conditions of TSRC exceed 5 percent of the area, management activities shall include mitigation and restoration so that TSRC levels are moved back toward 5 percent or less following completion of activities. • To estimate TSRC it is essential that the glossary definitions for "activity area, detrimental soil disturbance and total soil resource commitment" are clearly understood.
Visual Quality Objectives	PNF and BNF Standard SCST01	All projects shall be designed to meet the adopted Visual Quality Objectives (VQOs) as identified in Management Area direction and represented on the Forest VQO map.
	BNF Standard 1767 (MA 17)	Meet the visual quality objectives as represented on the Forest VQO Map, and where indicated in **Appendix A** (Table 3) as viewed from the following areas/corridors: FSH 22.
	BNF Standard 1983 (MA 19)	Meet the visual quality objectives as represented on the Forest VQO Map, and where indicated in **Appendix A** (Table 3) as viewed from the following areas/corridors: FSH 22 and Forest Road (FR) 467.
	BNF Standard 2052 (MA 20)	Meet the visual quality objectives as represented on the Forest VQO Map, and where indicated in **Appendix A** (Table 3) as viewed from the following areas/corridors: FR 413.
Visual Quality Objectives	BNF Standard 2155 (MA 21)	Meet the visual quality objectives as represented on the Forest VQO Map, and where indicated in **Appendix A** (Table 3) as viewed from the following areas/corridors: FR 413, FR 416 W to Hennessey Meadow, and FR 440.
Fish	PNF Standard SWST09	In fish-bearing waters, do not authorize new surface diversions unless they provide upstream and downstream fish passage and, if needed, include either fish screens or other means to prevent fish entrapment/entrainment.

Resource	Plan Component	Current Forest Plan Component Text
Threatened, Endangered, Proposed, and Candidate Species – Mineral Resources, Land Use	PNF and BNF Standard TEST28 PNF and BNF Standard TEST31	Avoid adverse effects from locatable mineral operations to TEPC plant species and occupied habitat. Adverse effects from new facilities to occupied TEPC plant habitat shall be avoided.
Threatened, Endangered, Proposed, and Candidate Species - Recreation	BNF Standard TEST34	Allow no net increase in groomed or designated over-the-snow routes or play areas, outside of baseline areas of consistent snow compaction, by LAU or in combination with immediately adjacent LAUs unless the Biological Assessment demonstrates the grooming or designation serves to consolidate use and improve lynx habitat. This does not apply within permitted ski area boundaries, to winter logging, and access to private holdings. Permits, authorizations, or agreements could expand baseline routes of existing snow compaction, and grooming could expand to routs of existing snow compaction and route that have been designated but not groomed in the past and still comply with the standard.

USACE Decisions

The USACE, under Section 404 of the CWA, will review the SGP and either issue, issue with special conditions, or deny a permit for the Project. The USACE regulates the discharge of dredged and/or fill material into WOTUS, including wetlands (Section 404 of the CWA). The 2021 MMP would place dredged and/or fill material in WOTUS as regulated under Section 404 of the CWA. A CWA Section 404 permit is required for the discharge of dredged and/or fill material into jurisdictional WOTUS (33 CFR Part 323).

In accordance with the CWA Section 404(b)(1) guidelines (40 CFR Part 230), the USACE may permit only the least environmentally damaging practicable alternative while considering cost, logistics, and technology. The USACE has determined that potentially jurisdictional WOTUS, including wetlands, are present that may be impacted by the SGP. These waters are described in the "Wetlands and Riparian Resources" section of Chapter 3.

Proposed Action (2021 MMP)

The revised Plan submitted by Perpetua in October 2021 is considered to be the Proposed Action, also known as the 2021 MMP, and would consist of mine operations, including an open pit hard rock mine and associated ore processing facilities, located within Valley County in central Idaho on federal, state, and private lands (**Figure ES-1**). The SGP would produce gold and silver doré, and antimony concentrates, for commercial sale by Perpetua. Construction, operation, closure, and reclamation of the SGP, not including post-reclamation monitoring, would have a duration of approximately 20 years, with active mining and ore processing occurring over approximately 15 years.

The following mine components would be common to the two action alternatives:

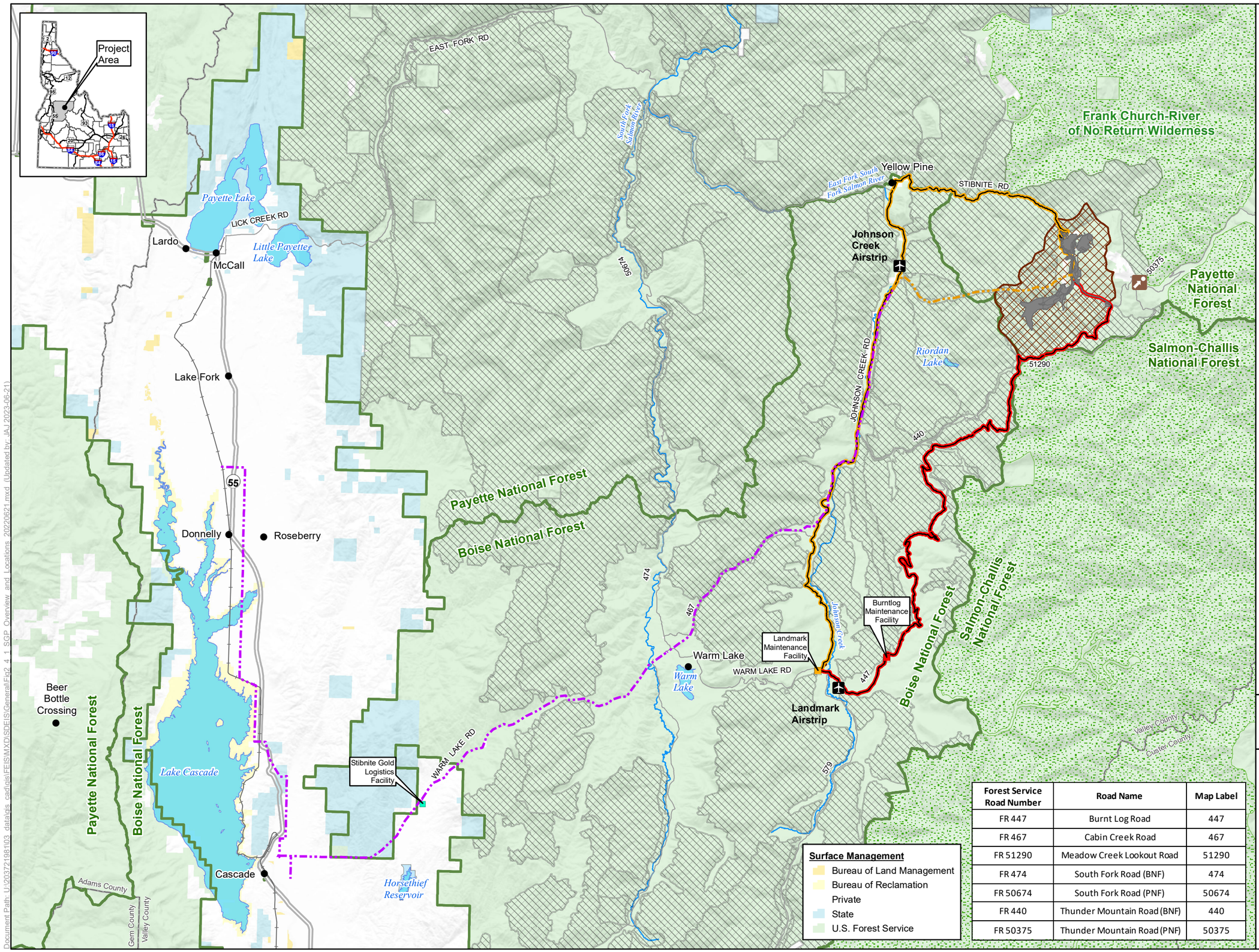
- Mine pit locations, areal extents, and mining and backfilling methods
- Transportation management on existing and proposed roads
- Pit dewatering, surface water management, and water treatment
- Ore processing
- Lime generation
- Tailings storage facility (TSF) construction and operation methods
- TSF Buttress construction methods
- Water supply needs and uses
- Management of mine impacted water and stormwater runoff
- Stibnite Gold Logistics Facility (SGLF)
- A road maintenance facility (location different depending on alternative),
- Surface and underground exploration
- Worker housing facility

For access, the 2021 MMP would utilize Warm Lake Road, Johnson Creek Road, and Stibnite Road during construction of the proposed Burntlog Route; then once constructed, the Burntlog Route would be the primary access route during operations and reclamation. The road maintenance facility would be located along the Burntlog Route.

In the 2021 MMP, public access on the newly constructed portions of the Burntlog Route was not restricted. Therefore, this EIS analyzed the effects of unrestricted public access along the existing and new portions of the Burntlog Route, describing the full Burntlog Route as available for access along with the potential effects of that access. Based on the analysis of these effects, restrictions on public access to the new portions of the Burntlog Route were developed by the Forest Service and have been included in the draft Record of Decision.

Johnson Creek Route Alternative

The Johnson Creek Route Alternative was developed to avoid or reduce certain impacts to Idaho Roadless Areas (IRAs), sensitive plant species, and wetlands. The mining portion of this alternative would be the same as under the 2021 MMP. Therefore, the primary focus of the Johnson Creek Route Alternative would be using an existing route, with improvements, for mine access during operations and reclamation instead of the Burntlog Route that requires new road construction in IRAs. The Johnson Creek Route would be used during the construction, operations, and closure and reclamation phases of the SGP. The road maintenance facility would be located near the intersection of Warm Lake Road and Johnson Creek Road and called the Landmark Maintenance Facility. The Johnson Creek Route Alternative would require extensive upgrades to both Johnson Creek Road and Stibnite Road. The construction schedule for upgrading the roads and construction of the SGP would increase from 3 years to 5 years under this action alternative.



LEGEND

Project Components
- SGP Features
- Operations Area Boundary

Access Roads and Trail System
- Burntlog Route *
- Johnson Creek Route

Utilities
- Upgraded Transmission Line
- New Transmission Line

Offsite Facilities
- Burntlog Maintenance Facility *
- Landmark Maintenance Facility **
- Stibnite Gold Logistics Facility

Other Features
- U.S. Forest Service
- Wilderness
- IRA and/or Forest Plan Special Area
- County
- City/Town
- Monumental Summit
- Airport/Landing Strip
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir

* Associated with 2021 MMP only
** Associated with Johnson Creek Route Alternative only

0 2 4 Miles

1 inch = 4 miles when printed at 11x17

Forest Service Road Number	Road Name	Map Label
FR 447	Burnt Log Road	447
FR 467	Cabin Creek Road	467
FR 51290	Meadow Creek Lookout Road	51290
FR 474	South Fork Road (BNF)	474
FR 50674	South Fork Road (PNF)	50674
FR 440	Thunder Mountain Road (BNF)	440
FR 50375	Thunder Mountain Road (PNF)	50375

Surface Management
- Bureau of Land Management
- Bureau of Reclamation
- Private
- State
- U.S. Forest Service

Figure ES-1 SGP Overview and Location Stibnite Gold Project Stibnite, ID

Base Layer: USGS The National Map: 3D Elevation Program. USGS Earth Resources Observation & Science (EROS) Center: GMTED2010. Data refreshed March, 2021. Other Data Sources: Perpetua; State of Idaho Geospatial Gateway (INSIDE Idaho); Boise National Forest; Payette National Forest

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No Action Alternative

Under the No Action Alternative, the 2021 MMP would not be approved and mining, ore processing, or related activities proposed in that plan would not occur, including removal of legacy materials (such as SODA and Hecla heap leach), restoration of stream channels, and enhanced riparian plantings included in the 2021 MMP. Previously approved activities (including approved exploration activities and associated reclamation obligations) would continue. Certain legacy and existing mining impacts are being addressed as directed in the 2021 Administrative Settlement Agreement and Order on Consent (ASAOC), including installation of stream diversion ditches designed to avoid contact of water with existing sources of contamination and removal of development rock and tailings currently impacting water quality. However, existing and approved activities (i.e., approved exploration activities and associated reclamation obligations) would continue and Perpetua would not be precluded from subsequently submitting another plan of operations pursuant to the General Mining Law of 1872.

Agency Preferred Alternative

Following their review of the environmental impacts as discussed in the Final EIS, the Forest Service has identified the 2021 MMP as their Preferred Alternative for the SGP. Use of the Burntlog Route for mine access is superior to alternative routes because it:

- Reduces the risks of geotechnical instability, hazardous materials transport, and public health and safety transportation during operations (2021 MMP: 26 landslides/rockfalls and 38 avalanche paths versus the Johnson Creek Route Alternative: 45 landslides/rockfalls and 94 avalanche paths). This reduction in exposure to landslide and avalanche paths was given preference over effects of new road ground disturbance because of the intensity of those impacts on hazardous materials, access and transportation, and public health and safety, compared to the effects of ground disturbance on other resources.
- Reduces potential for spill contamination, sedimentation, and turbidity to streams during operations (2021 MMP: 37 stream crossings, 6.6 miles of travelway within 100 feet of streams versus Johnson Creek Route Alternative: 43 stream crossings, and 11.5 miles of travelway within 100 feet of streams). This reduction in exposure of streams to spills resulting from traffic incidents and the reduction in potential sedimentation and turbidity impacts was given preference over effects of new road ground disturbance because of the intensity of those impacts on hazardous materials, water resources, fish and aquatic resources, and socioeconomics compared to the effects of ground disturbance on other resources.
- Reduces acres of riparian area lost within the off-site focus area (2021 MMP: 299.5 acres versus Johnson Creek Route Alternative: 352.6 acres).
- Reduces the volume of timber resources removed (2021 MMP: 595 acres versus Johnson Creek Route Alternative: 733 acres), and acres of timberland permanently converted to non-productive land use (2021 MMP: 66 acres versus Johnson Creek Route Alternative: 282 acres).
- Reduces public safety risks and potential accidents during operations (Johnson Creek Route Alternative has steeper topography and terrain requiring wider roads, more cut and fill sections and more switchbacks; traffic including heavy equipment would be routed through the village of

Yellow Pine for the duration of the SGP; the general public would utilize the same roads as large mining equipment). This reduction in exposure to public road use was given preference over effects of new road ground disturbance because of the intensity of those impacts on access and transportation, recreation, public health and safety, and socioeconomics compared to the effects of ground disturbance on other resources.

- Reduces potential impacts such as access to tribal fisheries restoration activities along Johnson Creek Road during operations.
- Improves fish access to habitat beyond existing open pit barrier.

The Agency Preferred Alternative would reasonably accomplish the purpose and need for the federal action, while considering environmental, economic, and technical factors.

Environmental Impacts

Geologic Resources and Geotechnical Hazards

Extraction of Mineral Resources

Geologic studies by Perpetua have reported approximately 132.3 million metric tons of measured and indicated ore resource (including historical tailings) for the SGP property with another 36.2 million metric tons of inferred ore. Under the 2021 MMP, approximately 280 million tons of development rock and 112 million tons of ore would be mined. About 3.2 million tons of historical Bradley tailings "ore" would also be removed and reprocessed. Total ore processed would be 115.2 million tons. The extraction of mineral resources would be the same for the 2021 MMP and the Johnson Creek Route Alternative.

The contained metal content in the 2021 proven and probable mineral reserve of the property is approximately 4.819 million ounces of gold, 6.431 million ounces of silver, and 148.686 million pounds of antimony. From the total ore currently planned to be mined the SGP is estimated to recover, over 15 years of mill production, 4.238 million ounces of gold, 1.710 million ounces of silver, and 115.342 million pounds of antimony.

Topography

Mining under the action alternatives would result in expanded open pits at the Yellow Pine and West End deposits and a new open pit at the Hangar Flats deposit. Each of these pits would result in highwalls developed in rock that would permanently remain after mining. These highwalls are geotechnically designed to be stable and would be permanent features imposed on the topography of the site. Each of these pits would also be backfilled with development rock to a certain degree which would bury certain portions of the open pits and their highwalls.

Other major changes to local topography would include the proposed TSF and the TSF Buttress. Smaller changes to topography would occur due to engineered cuts and fills at constructed haul roads, ore processing facilities, and ancillary facilities. Under the 2021 MMP Alternative, the Burntlog Route access road would also be constructed with engineered cuts and fills that would change the topography along its route. The effects of the mine operations on topography would be the same for the 2021 MMP and the Johnson Creek Route Alternative. Topographic impacts from construction of the Johnson Creek Route Alternative would be different than the 2021 MMP Alternative, but when considered in total along with

the other mining related topographic impacts, the differences in total project impacts to topography between the two road alignments in the alternatives would not be significant.

Geotechnical Stability

Some SGP facilities would have exposure to potential geotechnical impacts from existing landslides, rockfalls, and avalanche paths. SGP facilities to be located in the vicinity of these hazards would include designs and operational procedures to reduce risk to workers and operations.

Geotechnical stability of the SGP facilities would be ensured by practices for design, construction, and operation of the facilities. Studies have been conducted to characterize the geologic conditions of the foundation areas of these facilities and these characteristics have been incorporated into the designs of the facilities.

The designs of major earth fills such as the TSF and TSF Buttress have incorporated slope stability analyses including the potential effects of earthquakes. Impacts from earthquakes on these and other SGP facilities would be minimized by incorporation of existing geotechnical design standards and building code standards, as well as construction quality control, operations and maintenance, and surveillance.

The hazards from mass wasting events along the Johnson Creek Route Alternative would be increased compared to the 2021 MMP Alternative. There are more areas of landslides and rockfalls along the Johnson Creek Route Alternative (45) than there are along the Burntlog Route (26) of the 2021 MMP Alternative. Potential avalanche paths crossed by the Johnson Creek Route Alternative (94) are more numerous than the Burntlog Route (38) and are more significant in size than along the Burntlog Route of the 2021 MMP Alternative. The increased numbers of mass wasting hazards along the Johnson Creek Route Alternative would be expected to result in an increased number of temporary road closures and possible accidents involving vehicles than the Burntlog Route of the 2021 MMP Alternative.

Both access routes are in the “Moderate” Avalanche Hazard Index (AHI) category but the Burntlog Route AHI is lower than the Johnson Creek Route. In addition to a lower AHI, the Burntlog Route is exposed to fewer total avalanche paths and fewer of the larger avalanche paths. However, the higher-elevation Burntlog Route would be subject to more wind-drift snow potential. The Moderate hazard category for either of the access route alternatives should indicate a hazard management level of avalanche forecasting and control at selected sites.

Air Quality

The air quality analysis conducted for the SGP examined impacts on defined geographic regions that relate to different types of modeling processes. First, a “near field” region surrounding the SGP was examined using air dispersion models to quantify pollutant concentrations and related impacts.

Second, a much larger “far-field” region was defined that encompassed more-distant Class I areas, wilderness areas, and tribal lands. This is important given the potential impacts of poor ambient air quality to wilderness areas that are of Tribal cultural significance. In these areas, specialized air quality modeling tools were applied to evaluate the combined effects of dispersion, deposition, and chemical transformations in the atmosphere. The models assessed SGP source contributions to regional haze, nitrogen deposition, and sulfur deposition.

Extent of Pollutant Concentrations and Deposition

The SGP emission sources for the Johnson Creek Route Alternative are essentially the same as the 2021 MMP. Under the No Action Alternative, the SGP would not be constructed, so the air quality in the area would be unaffected by the 2021 MMP.

Dispersion modeling based on a representative mine operating scenario and the year with highest estimated aggregated air emissions, demonstrated that pollutant concentrations at the Operations Area Boundary would not exceed the National Ambient Air Quality Standards (NAAQS). This conclusion applies to both action alternatives. Deposition of mercury (Hg), nitrogen, and sulfur species were predicted to be less than Significant Impact Levels (SILs). A supplemental Hazardous Air Pollutants (HAPs) modeling analysis was also completed for all sources and compliance with the state acceptable ambient concentrations was demonstrated.

Type and Volume of Air Pollutants Emitted

To characterize the highest anticipated annual emission levels for purposes of conservative air quality impact analysis, a complete emission inventory was compiled for each year from construction through Life of Mine (LOM) Year 18. The year of peak mine throughput, LOM Year 6, was found to have the highest aggregate pollutant emissions, including haze precursors, airborne dust, and HAPs.

Criteria Air Pollutant Ambient Concentrations Outside the Operations Area Boundary

Dispersion modeling based on the 2021 MMP inventory demonstrated that impacts would not exceed NAAQS outside the operations area boundary. A supplemental HAPs analysis for all potential emission sources and each mine year was analyzed and demonstrated compliance with both the carcinogenic and non-carcinogenic acceptable concentrations. The Johnson Creek Route Alternative does not entail emission source differences of a permanent nature (e.g., roadway construction emissions) that result in long-term criteria pollutant impacts that differ from the 2021 MMP findings, respectively.

Comparison of Modeled Concentrations to Class I and Class II Increments

Both near-field and far-field modeling demonstrated that the Class I and Class II air quality increments would not be exceeded outside the Operations Area Boundary. Although evaluation of incremental air quality impacts does not apply to minor sources such as the SGP, this provided an indicator of relative SGP impacts under the 2021 MMP and Johnson Creek Route Alternatives.

HAP Emissions and Hg Deposition

Emissions of HAPs, including mercury, were quantified for the worst-case LOM Year. Additionally, hydrogen cyanide (HCN), sulfuric acid, Hg, and organic HAPs from fuel combustion, were found to be well below federal major source thresholds. Near-field deposition analysis for Hg indicated that even the maximum predicted deposition rates would be less than significance thresholds.

Deposition Impacts for Nitrogen and Sulfur compounds at Class I areas and Specified Class II Wilderness Areas

Predicted deposition impacts, in grams of pollutant per hectare per year, were obtained from far-field modeling for the peak year emissions. The modeled results were compared to the federal Deposition Analysis Thresholds (DAT) for the three modeled years of 2015 through 2017, the maximum predicted annual deposition rates were below the DAT in each Class I and Class II area evaluated.

Near-field Plume Blight and Far-Field Regional Haze Impacts

The Level 2 screening analysis addressed an observer in the nearby Frank Church River of No Return Wilderness (FCRNRW) and demonstrated that the aggregated emissions from the Project would have the potential to cause short-term, visible plumes at that wilderness area.

For analysis of regional haze impacts, maximum 24-hour SGP source emissions of SO_2, NO_X, SO_4, and fine and coarse PM were modeled. The level of regional haze impact in the Class I and Class II areas evaluated was predicted to be less than significant

Climate Change

Direct and indirect GHG emissions and their associated impacts would be the same under the Johnson Creek Route Alternative as those discussed under the 2021 MMP.

The alternatives would create a maximum of 221,202 metric tons of CO_2e annual direct Green House Gas (GHG) emissions (LOM Year 3). Indirect GHG emission sources associated with this proposal include access road vehicle travel (836 MT), electrical power generated off-site (but used on-site [164,973 MTT]), and emissions from off-site antimony concentrate transport and processing (64,152 MT). Therefore, the total direct and indirect GHG emissions are 451,163 MT. This equates to approximately 1.30 percent of the most recent annual Idaho statewide total GHG emissions (2018). Changes in hydrologic patterns, temperature, and extreme weather events would contribute to a varying level and degree of impacts to resources.

Changes in hydrologic patterns and overall increasing temperatures are expected to result in decreased or degraded soil moisture and quality, air quality, annual streamflow, groundwater recharge, and water quality. Increased surface water temperatures; increased spread of insects and diseases; changes in the timing, duration, and severity of fire seasons; as well as habitat loss and fragmentation also are expected to occur. Closure and reclamation activities under the alternatives could reduce climate change impacts by improving soil quality and implementing best management practices during all phases of the SGP.

Although geotechnical design standards have been developed to help minimize and lessen the extent of potential stability impacts, extreme precipitation events and flash flooding, could lead to more frequent and severe landslides and avalanches. Road maintenance during all SGP phases would improve resilience of the access roads and transportation infrastructure against climate change impacts.

Baseline conditions would continue and direct and indirect GHG emissions in the vicinity of the SGP area would not change under the No Action Alternative. No additional impacts beyond current trends are expected to occur to the physical, social, and biological resources in the area.

Soils and Reclamation Cover Materials

Total Soil Resource Commitment (TSRC)

TSRC is the conversion of a productive site to an essentially non-productive site for a period of more than 50 years. Productivity on these areas range from 0 to 40 percent of natural background. Forest Plan Standard SWST03 requires, in an activity area where existing conditions of TSRC are below five percent of the area, management activities to leave the area in a condition of five percent or less TSRC following completion of the activities. The PNF activity area has existing conditions of TSRC at three percent. The BNF activity area has existing conditions of TSRC at one percent. For the PNF activity area the

magnitude of impacts to soil resources as a result of the SGP would have a net increase in TSRC that would raise the post-SGP percent TSRC to above five percent under either action alternative (i.e., 17 percent under 2021 MMP, and up to 17 percent under the Johnson Creek Route Alternative).

Detrimental Disturbance (DD)

For this analysis (which is comparable among both action alternatives), existing DD within the transmission line ROW is estimated at eight percent. The DD activity area is the area within the transmission line ROW that would be subject to vegetation clearing only and is estimated at up to 500 acres. The additional ROW impacts are consistent with Idaho Power Company's requests to mitigate fire potential along the ROW due to recent fires in California. It is estimated that SGP-related vegetation clearing could initially result in DD as high as 16 percent of the ROW but would more likely be somewhere between 8 and 15 percent. Additionally, the Forest Service would require features designed to minimize DD impacts.

The magnitude of impacts from vegetation clearing potentially include detrimental soil displacement, compaction, and puddling on a conservative estimate of up to 75 acres (15 percent) within the ROW, which would be further reduced by the Forest Service-required mitigation measures that target DD. Of the total DD analyzed, 88 percent occurs in the BNF while 12 percent occurs in the PNF based on the relative length of the ROW within the two Forests.

Quantity, Quality, and Suitability of Growth Media

The overall relatively poor quality of the soils at the SGP mine site (outside of valley bottom soils), the long-term stockpiling of growth media (GM) or soil bank material, and the high background concentrations of metals in soils would affect the quality and suitability of available reclamation cover materials. GM used for upland reclamation sites would mostly come from relatively poor upland soils. Overall, the majority of GM used would rate as poor or fair (per suitability criteria), due primarily to texture and coarse fragment content (Tetra Tech 2019a). These challenges, coupled with the harsh winter climate (short growing season) and generally steep slopes of the area, would compound the present difficulties in growing and/or maintaining persistent vegetation cover over reclaimed areas. This is consistent with the mixed vegetative cover success of nearby reclaimed mining areas and the previous efforts by Perpetua and others at the mine site to establish self-sustaining cover on previously mined lands that have had some limited success. Additionally, there would be a 796,873 bank cubic yards GM deficit at the mine site according to the balance calculations in the Reclamation Closure Plan. This deficit would be addressed with the surplus of material obtained from the Yellow Pine pit and Burntlog Route or could be met through additional composting and soil amendments. Thus, there is presently some uncertainty regarding the specific source of material to meet the GM criteria under either action alternative. Under the 2021 MMP there would be approximately 278 acres of unreclaimed associated with Hangar Flats high walls, the West End pit lake and high walls, Yellow Pine pit high walls, and the Stibnite Lake. The Johnson Creek Route Alternative would be the same as the 2021 MMP for mine-site related components but would differ due to use of the Johnson Creek Route instead of the Burntlog Route.

Perpetua has committed to salvage the appropriate volume of GM and to create the volume of compost necessary as an amendment to provide suitable quality and quantity of the GM to cover the areas to be reclaimed. Perpetua has also committed to performance criteria tied to slope and soil stability, sediment, and vegetation cover, which would need to be met prior to release of a reclamation performance bond.

The naturally high background levels of trace metals at the mine site represents a challenge with regards to the suitability of GM and reclamation-related revegetation efforts. The Forest Service would require limits on the GM for arsenic, mercury, and antimony based on baseline soil concentrations, and would require a Sampling and Analysis Plan that would include screening of soils as well as laboratory testing.

Noise

The noise analysis conducted for the SGP examined impacts on 12 defined noise sensitive receivers (NSRs) that were selected based on their approximate location to sensitive areas. Nine of these NSRs had baseline ambient noise levels available, while three did not. Of these 12 NSRs, ten were evaluated for the noise impacts from the SGP, two sites were omitted (Sites 1 and 4). Site 1 represents ambient sound levels near the SGP, and Site 4 is not considered an NSR, but the sound levels measured at Site 4 represent ambient sound levels in adjacent wilderness areas. The ten sites were compared against their baseline ambient noise level, as well as the SGP-set noise threshold of 55 dBA to evaluate the environmental impact to humans, following the Noise Control Act of 1972 and EPAs guidance on ambient noise levels.

Both action alternatives would create some short-term periodic noise exceedance impacts at up to four or five NSRs during SGP, access road, and transmission line construction, depending on the alternative. Construction and/or upgrades of access roads (Burntlog Route and Johnson Creek Route) for either action alternative would impact areas of the FCRNRW– noise would gradually attenuate to not noticeable up to 1.5 miles into the wilderness. Differing impacts to the FCRNRW are due to the distance of the access road to the wilderness boundary – the 2021 MMP utilizing the Burntlog Route is the closest to the FCRNRW for the longest length compared to the Johnson Creek Route Alternative.

Most of the operational activities (i.e., road maintenance and off-site facilities) would produce long-term and periodic noise impacts. Access road traffic and maintenance for both action alternatives would impact some areas of the FCRNRW, with impacts diminishing with distance from the wilderness boundary. Impacts from operations would not extend as far into the wilderness area as they would during construction.

Due to the avalanche hazard and the need to maintain reliable winter access, avalanche hazard control measures would include the use of explosives. The impact of explosive control measures on noise levels would depend on the mechanism of delivery, type of explosives used, and the frequency of use.

During closure activities, there would be short-term noise impacts from transmission line and access road decommissioning under both alternatives exceeding the baseline ambient noise level, but not the 55 dBA threshold. There would be no irreversible impacts; all noise would cease upon final closure and reclamation.

Hazardous Materials

Both action alternatives would include the use, storage, and transport of hazardous materials which, if released, could potentially affect human health and the environment. Hazardous materials to be used would include diesel fuel, gasoline, lubricants, antifreeze, other petroleum products, chemical reagents and reactants (including sodium cyanide and sulfuric acid), antimony concentrate, mercury containing residuals, lime, explosives, and other substances.

Duration of spill risk for both action alternatives would be long term as it would last throughout the life of the SGP. However, the duration of any single hazardous materials spill or release would be temporary (hours or days). A fuel or chemical spill at the SGP facilities would likely be readily contained and cleaned up without any release to the environment.

A spill outside of containment at the SGP site or in transportation would most likely involve liquid fuels or reagents. A small spill of a few gallons, or even tens of gallons, outside of secondary containment would be promptly contained and cleaned up according to the Spill Prevention Control and Countermeasures Plan.

A larger spill of fuel or oil outside of secondary containment would more likely occur in transportation of bulk shipments along public roads or one of the SGP access routes. The proposed controls of transportation of hazardous materials along the SGP access routes, and the availability of SGP spill response resources and trained responders suggest that a spill along the access routes would be promptly contained and cleaned up. However, depending on the amount of material released, the location of the release, weather conditions, and proximity to flowing streams, the impact of the event could be negligible to major.

State and federal regulations, project controls, and emergency response procedures would be in place to reduce spill risk and the extent of potential spill impacts.

In general, the potential for a release of hazardous material from a truck accident would be controlled for both the Burntlog and Johnson Creek routes with the use of management practices such as pilot vehicles, speed restrictions, and requiring appropriate spill kits in trucks hauling hazardous materials and in pilot vehicles.

Both the Burntlog and Johnson Creek routes have segments that are exposed to landslides, rockfalls, and avalanches. These geohazards present along the road corridors could increase the potential for truck accidents resulting in spills of hazardous materials. The Burntlog Route has exposure to 26 landslides or rockfalls and 38 avalanche paths. The Johnson Creek Route has exposure to 45 landslides or rockfalls and 94 avalanche paths. The Johnson Creek Route thus may have higher potential for increased trucking accidents and greater spill risk from these geohazards.

Close proximity to surface water resources increases the potential consequences of a significant spill along the access routes. The Burntlog Route crosses 37 streams and includes 9 total miles that are within 0.5 mile of surface water resources. The Johnson Creek Route crosses 43 different streams and includes 27 miles that are within 0.5 mile of surface water resources, including several miles which parallel the fish-bearing East Fork SFSR and Johnson Creek waterways. Though the Burntlog Route includes a greater number of stream crossings, the Johnson Creek Route includes greater proximity to water resources. The potential consequences from significant trucking spills would thus be greater along the Johnson Creek Route.

Surface Water and Groundwater Quantity

The SGP would result in stream flow impacts under both action alternatives. Low flow would be reduced at some locations during some periods of the SGP operations in the mine site area up to 14 percent in the East Fork SFSR and up to 40 percent in Meadow Creek.

Dewatering of the pits would lower groundwater levels in the alluvial and bedrock formations during the mining period and would reduce flows in local surface water streams that receive groundwater discharge. Additional seep and spring locations fed primarily by groundwater discharge from the dewatered aquifer may also observe flow reductions as an effect of dewatering.

The TSF and TSF Buttress proposed to be located in the Meadow Creek valley would lower groundwater levels and permanently remove six delineated wetland areas within the footprint of the TSF and TSF Buttress. The permanent reduction in local groundwater levels would be due to the installation of liner and cover systems over these facilities to inhibit meteoric recharge leaching through the mined materials. The cover systems placed over the Yellow Pine pit backfill and the Hangar Flats pit backfill would have a similar effect on groundwater levels at those locations.

Surface Water and Groundwater Quality

All action alternatives would include handling and storage of mineralized materials which could potentially leach major ions, total dissolved solids (TDS), and/or metals. Mineralized materials that would be managed include ore, development rock, and newly generated tailings. Similarly, mineralized materials would be exposed in pit walls, also resulting in exposure to oxygen and water, and the potential for leaching. Several proposed activities, including storage of mineralized materials above engineered liners and/or below engineered covers, diversion of stormwater and surface water around the disposal locations, and movement of legacy mineralized materials (tailings) from their current locations to engineered disposal facilities, would reduce, but not eliminate, the potential for the release of leached chemicals to surface water and groundwater. Because of Project design features and removal of historical source materials, the expected surface water metal concentrations would be improved or consistent with existing conditions.

The analysis shows that remaining rock in pit walls and the development rock, deposited in the TSF Buttress and pit backfills, would be largely non-acid generating, but would be capable of leaching aluminum, antimony, arsenic, cadmium, copper, manganese, mercury, zinc, sulfate and TDS into surface water and groundwater in concentrations that exceed water quality criteria. Therefore, active contact water collection and water treatment would be required for a period of time during the operations and post-closure period until geochemical stability of mined materials could be achieved. In the case of the TSF where stabilization would depend on consolidation of tailings plus liner and cover installations over the tailings, this collection period would be approximately 40 years. The water treatment would prevent mine-impacted waters with elevated analyte concentrations from contacting surface water in the environment. Upon closure, inundation of development rock placed in pit backfills would result in analyte leaching from the backfilled material to alluvial and bedrock groundwater. However, this leaching would not materially affect the utilization of groundwater compared to its existing condition where it frequently does not meet water quality criteria except for an area where antimony and arsenic concentrations are below groundwater standards.

Surface waters also would be impacted by modification of temperature due to removal of shading vegetation, development of a pit lake, and modification of stream depth during construction, operations, or the post closure/reclamation period. Compared to existing conditions, project operations are predicted to increase temperatures in West End Creek and the East Fork SFSR below the Yellow Pine pit area while decreasing water temperatures in Meadow Creek and the East Fork SFSR above the Yellow Pine pit area.

Upon closure activities, Meadow Creek temperatures are predicted to increase as the stream channel is restored atop the TSF while surface water diversion to mine the West End pit would raise temperatures in West End Creek. With the exception of the West End Creek segment below the pit area, predicted temperatures return to existing conditions within Meadow Creek segments atop the reclaimed TSF having the longest return period of approximately 100 years.

Surface water quality also could be impacted by increased sedimentation associated with mining activities, access road construction and use, and the construction and maintenance of required utilities, with the greatest potential for in-stream impacts occurring during times of higher overland flow. The effect to surface water quality as a result of sedimentation and erosion would be limited by environmental protection measures and control techniques, by the limited duration of active surface disturbing activities, and by the adaptability of the receiving environment. Furthermore, stabilization of the slopes in lower Blowout Creek would abate sediment generation from the current largest sediment source in the local watershed.

However, under existing conditions, streams in the SGP area (except for West End Creek) are listed as impaired for specific uses in accordance with Clean Water Act Section 303(d). The causes for listing of these waters are associated with arsenic (plus antimony and mercury at some locations) for exceedances of Idaho's human health criterion for consumption of water and organisms. Operational and post-closure concentrations of these elements in the East Fork SFSR are predicted to be comparable to or less than the existing conditions.

Groundwater analyte concentrations beneath the mine site, particularly in the vicinity of the TSF, TSF Buttress, Hangar Flats pit backfill, and Yellow Pine pit backfill, are expected to increase in response to constituent leaching from development rock. However, existing groundwater in those areas typically does not meet regulatory criteria for use as drinking water due primarily to arsenic and antimony concentrations.

There are no active domestic groundwater wells used for residential drinking water within 15 miles of the SGP. Because groundwater is not currently used as a public drinking water source at the SGP and is assumed to be unlikely to be used as a drinking water source in the future, the Agency for Toxic Substances and Disease Registry Public Health Assessment conducted for the existing mine site eliminated the groundwater as drinking water pathway from consideration as a public health concern (ATSDR 2003). With regard to wetland and riparian areas, changes to water quality parameters would occur under the 2021 MMP during the construction and operation phases. The 2021 MMP would improve the existing water quality conditions observed in Meadow Creek and the East Fork SFSR by removing and repurposing legacy mine wastes. However, the 2021 MMP would also have direct permanent impacts on water quality, as it would contribute new sources of mine waste material to the East Fork SFSR drainage.

Despite analysis area improvements to water quality as a result of the removal and reclamation of legacy mine wastes, exceedances of the most stringent water quality standards (including both human health and aquatic life) for water column antimony, arsenic, and mercury are anticipated, but predicted concentrations would be less than or comparable to existing conditions. In considering only the aquatic life criteria, which are more relevant for the protection of fish species, impacts due to antimony and

arsenic are not anticipated. For mercury, impacts are predicted to be minimal but uncertainties in predicting future conditions exist.

Vegetation

Overall, the 2021 MMP-related vegetation clearing would impact 3,564 acres, including primarily undisturbed areas for the Burntlog Route where an increase in the potential for non-native plant establishment and spread would be more deleterious. The Johnson Creek Route Alternative would impact 3,399 acres through vegetation clearing; however, much of the disturbance area would be along or near previously disturbed areas (i.e., existing roads) where non-native plants are already established or could become established as a result of previously authorized activities.

The 2021 MMP would remove an estimated 259.5 acres of occupied whitebark pine habitat and 78 acres of assumed occupied habitat (16.3% of occupied habitat in the analysis area) and 287.4 acres of modeled suitable habitat (6.7% of modeled suitable habitat in the analysis area), totaling 1,278 trees (27 would be individuals observed with cones during 2019 field surveys). Impacts to the whitebark pine would be less under the Johnson Creek Route Alternative as an estimated 108.5 acres of occupied whitebark pine habitat and 78 acres of assumed occupied habitat (9.0% of occupied habitat in the analysis area) but no additional acres of modeled suitable habitat, totaling an estimated 777 trees (27 would be individuals observed with cones during 2019 field surveys) would be removed. The mine site and access roads would remove the majority of whitebark pine individuals and habitat, while impacts as a result of the utilities and off-site facilities would be minimal. Indirect impacts to occupied whitebark pine habitat may occur during implementation of the 2021 MMP and Johnson Creek Route Alternative, primarily as a result of dust, impacts to seed dispersers (e.g., Clark's nutcracker), and increased erosion and sedimentation where disturbance occurs. These indirect impacts would occur near all Project components but especially along the access roads and utilities as this species has been documented over a large area in the vegetation analysis area and surveyed occupied habitat totals approximately 2,069 acres. The Project would result primarily in localized, long-term and permanent, moderate impacts to the whitebark pine.

The 2021 MMP would impact known occurrences of bent-flowered milkvetch, least moonwort, Sacajawea's bitterroot, Blandow's helodium, sweetgrass, and Rannoch-rush, while the Johnson Creek Route Alternative would impact known occurrences of bent-flowered milkvetch, least moonwort, and Sacajawea's bitterroot. Additionally, the 2021 MMP would impact a greater amount of modeled potential habitat for sensitive and forest watch plant species than the Johnson Creek Route Alternative.

Impacts as a result of increased potential for non-native plant establishment and spread may be regional in nature due to the relatively large amount of habitat disturbance associated with the 2021 MMP and Johnson Creek Route Alternative.

Wetland and Riparian Areas

Direct Impacts to Wetland and Riparian Areas

Mine Site Focus Area

The 2021 MMP and the Johnson Creek Route Alternative would result in the same loss of 119.8 wetland acres within the mine site focus area and 618.2 acres of Riparian Conservation Areas (RCAs).

Off-Site Focus Area

Wetlands and RCAs in the off-site focus area would be impacted by the action alternatives. The off-site area includes features such as Big Creek - North Fork Payette River, Cascade Reservoir, Gold Fork River, Johnson Creek, Lake Fork - North Fork Payette River, Headwaters East Fork SFSR, and Upper South Fork Salmon River.

Losses of wetlands due to the 2021 MMP in this area would be 30.7 acres, with an additional 46.3 acres of temporary impacts. The Johnson Creek Alternative would result in the loss of 25.9 acres, with an additional 36.5 acres of temporary impacts. Perennial stream lengths affected would be 24,359.5 feet for the 2021 MMP and 21,857.2 feet for the Johnson Creek Alternative and lengths of non-perennial streams impacts would be 14,993.7 feet and 10,262.8 feet, respectively. Riparian area losses would be 299.5 acres for the 2021 MMP and 353 acres for the Johnson Creek Route Alternative. Differences of impacts to wetland and riparian acreages outside the mine site focus area are predominantly due to the absence of the Burntlog Route disturbance under the Johnson Creek Route Alternative.

Impacts on Wetland and Riparian Functions

The losses of wetland functional units by action alternative would be 822.4 for the 2021 MMP and 702.8 for the Johnson Creek Route Alternative with 373 of these functional units attributed to Category II wetlands (high value) for each alternative and the rest Category III and IV. In addition to the permanent loss of wetland functional units, approximately 235.3 functional units would be temporarily impacted due to transmission line construction under each alternative. Functional loss due to other indirect effects, including changes in hydrology, water quality, and increase dust and/or mercury deposition has been examined through inspection of dewatering drawdown, air quality modeling, and road location relative to wetlands and riparian areas, but is difficult to quantify precisely. As a result, functional units that would be lost if these indirect effects occur may be overestimated in some cases (e.g., groundwater drawdown) or underestimated in other cases (e.g., dust deposition).

Alteration of Wetland and Riparian Areas due to changes in Water Balance

Impacts due to groundwater drawdown would be the same for both alternatives since construction, operation, and reclamation activities would be the same within the mine site focus area. The action alternatives may vary in indirect effects due to roads, but those indirect effects have not been quantified. However, given the small amount of wetlands affected in the off-site focus area relative to the mine site focus area, the differences between the two action alternatives would be minimal.

Alteration of Wetland and Riparian Areas due to Changes in Water Quality

Both action alternatives would have direct permanent impacts on water quality due to contributions of new sources of mine waste material to the East Fork SFSR drainage. Indirect effects to wetlands and riparian areas could occur if the quantity and or quality of surface and groundwater flows, including the chemical characteristics of the waters, change downstream of disturbance areas. Removal and repurposing of legacy mine wastes would occur under both action alternatives, thereby improving some existing water quality conditions observed in Meadow Creek and the East Fork SFSR.

Under the Johnson Creek Route Alternative, water quality effects on wetlands and riparian areas would be similar as described under the 2021 MMP, although the absence of construction or use of the Burntlog Route would eliminate water quality impacts in this area as compared to the 2021 MMP. As the Johnson Creek Route is parallel and near Johnson Creek and the East Fork SFSR along much of its route, these

effects would be concentrated in these streams, whereas the Burntlog Route would cross several drainages resulting in less impact on any one drainage.

Compensatory Mitigation for Losses of Aquatic Resources

In order for the USACE to issue a permit under Section 404 of the CWA and authorize dredge or fill placement in WOTUS, all unavoidable impacts to jurisdictional WOTUS must be mitigated. The final rule for Compensatory Mitigation for Losses of Aquatic Resources (U.S. Environmental Protection Agency and USACE 2008) states a preference for achieving mitigation by first trying to find available wetland mitigation credits from an agency-approved wetland mitigation bank. When mitigation bank credits are not available, the final rule directs 404 permit applicants to seek out opportunities to use in-lieu fee programs to satisfy mitigation needs. In-lieu fee programs are generally operated by public resource agencies that accept money for wetland impacts within a specific geography and periodically use that money to fund wetland restoration, creation, or enhancement projects within that same geography. Perpetua proposes to accomplish compensatory mitigation for impacts to wetlands through a combination of mitigation bank credits in the North Fork Payette subbasin and permittee-responsible on-site mitigation within the SFSR subbasin, plus some additional off-site mitigation outside the SFSR subbasin to account for temporal impacts (Tetra Tech 2023).

Fish Resources and Fish Habitat

For fish and aquatic habitat, the important factors involve the removal and placement of barriers such as the Yellow Pine pit and TSF/TSF Buttress (which affect species differently), the modifications in surface water management and flows at the mine site, fish access through the East Fork SFSR tunnel, and stream channel restoration effects on stream temperature. The principal difference between alternatives is associated with the risk of transportation-related spills along access routes. Under the 2021 MMP, during construction, 11.5 miles of the transportation route would be within 100 feet of streams but would be reduced to 6.69 miles of route within 100 feet of streams once the Burntlog Route was constructed (including 5 miles of Warm Lake Road within 100 feet of Warm Lake Creek). The Johnson Creek Route Alternative would have 11.5 miles of transportation route within 100 feet of streams for the duration of the SGP.

Reclamation and stream restoration activities post-closure generally improve habitat conditions compared to the operational period as flows and channels are re-established. However, stream temperatures are increased in restored stream channels until revegetation establishes to provide riparian shading for the streams.

Individual fish would be affected by dewatering, salvage, and relocation due to modification of stream channels and dewatering of the existing Yellow Pine pit lake. Fish salvage would be required for dewatering and all in-water work at stream crossings in all fish-bearing water bodies. Management of individuals affected would be conducted under the Fisheries and Aquatic Resources Mitigation Plan and Fishway Operations Management Plan.

Alterations to mine area surface streams including the elimination of the Yellow Pine pit lake, construction of the East Fork SFSR fish tunnel, and removal of existing barriers would alter fish occupancy and available habitat during construction and operations primarily by allowing fish access to portions of the East Fork SFSR and relocating the barrier on Meadow Creek upstream.

During operations summer maximum stream water temperatures in Meadow Creek and the East Fork South Fork would decrease due to diversion of Meadow Creek around the TSF and TSF Buttress. Upon closure and routing of Meadow Creek to the restored stream channel on top of the reclaimed TSF, summer maximum stream temperatures would increase due to the time needed for revegetation to result in riparian shading of the stream. Over time, summer maximum stream temperatures would decline to near or below baseline conditions.

Changes in water chemistry due to mining activities would not negatively affect fish because predicted concentrations for key constituents are comparable or lower than existing conditions. Effects of spills, sedimentation, and turbidity on water quality would be managed through Forest Service requirements and project design features to minimize these effects.

Stream flow reductions would affect fish productivity during operations, but productivity would return toward existing conditions as stream flows recover over time. Post-closure stream flows and productivity would decrease in Meadow Creek and the East Fork SFSR upstream from Meadow Creek by approximately 1 percent and 2 percent, respectively due to hydrological and physical changes associated with the project. Flows and productivity in the East Fork SFSR downstream from Meadow Creek would return to existing conditions post-closure.

The combination of physical stream channel changes, direct effects to individuals, and changes to many of the WCIs (e.g., temperature, stream flow) would affect Chinook salmon and habitat in the analysis area. SGP activities that would potentially cause these impacts include, but are not limited to, new road construction, transportation including hazardous materials, stream diversions, and construction and operation activities at the mine site. These effects may cause injury or mortality to individuals and temporarily or permanently displace Chinook salmon from several mine site streams during certain periods when habitat conditions become unsuitable. This would cause a temporal loss of habitat. Following closure and reclamation, the overall net effect from the SGP would be a net increase in available habitat; however, flows and temperatures would make the additional habitat less optimal.

There would be similar operational period effects on steelhead trout, bull trout, and westslope cutthroat trout. Effects for trout species differ from Chinook salmon following closure and reclamation, as there would be a net increase in both the quantity and quality of habitat for steelhead trout and net decreases in both quantity and quality of habitat for bullhead trout and westslope cutthroat trout.

Wildlife

The 2021 MMP and Johnson Creek Route Alternative would remove an estimated 3,266 acres and 3,096 acres, respectively, of wildlife habitat, including habitat for Canada lynx (194 and 175 acres, respectively), wolverine (2,342 and 2,005 acres, respectively), northern Idaho ground squirrel (63 acres), monarch butterfly (121.4 acres), Region 4 sensitive species and management indicator species, Idaho species of greatest conservation concern, general wildlife species, big game species, and migratory bird species and golden eagles.

Direct impacts to wildlife species may include direct mortality (i.e., vehicle collisions, removal of nest or roost trees, etc.) or loss of habitat due to land clearing activities and land use changes. Indirect impacts could include reduced use of foraging or breeding habitat or reduced prey resources in the analysis area.

Within the Operations Area Boundary, direct effects on wildlife species would primarily be due to loss and fragmentation of habitat; direct mortality through vehicle-wildlife collisions; and disturbance from light, noise, fugitive dust, and increased human activity under the 2021 MMP and Johnson Creek Route Alternative. Wildlife would likely be displaced around the perimeter of the mine site. Additional roadways in the Operations Area Boundary would expose individuals to direct vehicle collisions or increased hunting pressure from humans in the wildlife analysis area. Light, noise, and fugitive dust impacts associated with mine site activities are likely to disturb or displace wildlife species. However, because the existing (ambient) sound levels vary between 20 and 40 dBA, it is likely that SGP area wildlife would have a higher tolerance for noise. Equipment would have limited external lighting and would employ noise-minimizing practices. As part of the SGP, buildings, equipment, and drill rigs would have limited external lighting when feasible. The result would generally be a reduction in the area of habitat disturbed at most sites.

As a result of new access roads, limited to the 2021 MMP and not the Johnson Creek Route Alternative, direct effects on wildlife species would primarily be due to loss and fragmentation of habitat; direct mortality through vehicle-wildlife collisions; and disturbance from light, noise, fugitive dust, and increased human activity. Construction of 15 miles of new road for the Burntlog Route would likely fragment habitat for general wildlife species and may act as a barrier to movement for some species. The intensity of this impact could range from minor displacement to mortality. The duration ranges from temporary road construction to short-term. It is not expected that the increased risk of injury or mortality would become permanent, because the new segment of the Burntlog Route would be reclaimed, and traffic levels on the existing roads would return to current levels.

Regarding utilities, direct impacts on wildlife species may include loss or fragmentation of habitat along utility corridors, substations, and communication towers due to land clearing activities and land use changes under the 2021 MMP and Johnson Creek Route Alternative. The addition of new utility access roads, as well as new transmission lines, and upgraded transmission lines, could impact individual wildlife species. Construction impacts would likely displace wildlife but would be temporary. Vegetation would be cleared only in those areas necessary for 2021 MMP and Johnson Creek Route Alternative activities to preserve natural habitat to the greatest extent practicable. However, impacts to forested wetlands would likely be permanent as ROW management practices generally do not allow the establishment of woody vegetation.

Construction and operation of the off-site facilities under the 2021 MMP and Johnson Creek Route Alternative are unlikely to disturb most wildlife species, because construction activities are not planned to occur in suitable habitat used by them. Although construction and operation of the off-site facilities themselves would likely not cause direct mortality to wildlife species, vehicle traffic associated with the facilities could result in mortality.

The important differences among the alternatives lie in the acres of habitat loss, the amount and location of the disturbance from noise and human activity, new access roads, and the location of the facilities. The Johnson Creek Route Alternative would have 170 fewer acres than the 2021 MMP due to the elimination of the Burntlog Route which also would reduce the magnitude and extent of impacts on most wildlife, especially wolverine, big game, and migratory birds. However, under both alternatives, greater impacts would occur for several groups of wildlife (e.g., big game [moderate impacts] and wolverine [moderate

impacts]) due the species known occurrences and location and amount of habitat disturbance associated with the SGP.

Timber Resources

The 2021 MMP would result in incidental vegetation clearing on 595 acres containing 438,243 cubic feet of sawtimber and sub-merchantable product, while the Johnson Creek Route Alternative would result in vegetation clearing on 733 acres containing 547,984 cubic feet of sawtimber and sub-merchantable product. Permanent impacts under the 2021 MMP would occur on 66 acres containing 12 acres of land suited for timber production in Management Prescription Categories (MPCs) 5.1 and 4.2, with approximately 206 million board feet (MBF) of sawtimber. The Johnson Creek Route Alternative would result in permanent impacts to 282 acres in the analysis area that contain 28 acres of land suited for timber production in MPCs 5.1 and 4.2, with approximately 808 MBF.

To address the loss of timber resources within the timber resources analysis area, 111 acres would be replanted during reclamation with conifer and other tree species under the 2021 MMP and Johnson Creek Route Alternative. Areas identified for timber species replanting are entirely within the mine site, where lands would either be treated to regenerate forest conditions (planted at 81 trees per acre) or park-like conditions (planted at 170 trees per acre) under two conditions: cool aspect and general aspect. Planted timber species would include primarily Douglas-fir and lodgepole pine, with the inclusion of Engelman spruce on the cool-aspect sites.

Land Use and Land Management

The SGP would primarily occupy National Forest System (NFS)-managed lands, with the majority of impacts on PNF lands. Land use would be impacted by expansion of the mine site and associated mining activities and facilities (access roads, utilities, and off-site facilities). Other land uses (agriculture, fisheries, timber harvests, tribal, and recreational and special uses) would be impacted by the conversion of land to mine uses. These impacts are described in other resource sections within this Final EIS. **Table ES-2** shows the total acreage impacts from each mine component that would result from each action alternative.

Table ES-2 Total Mine Component Acreage Impacts

Mine Component	2021 MMP (acres)	Johnson Creek Route Alternative (acres)
Mine Site	1,740	1,728
Access Roads	485	328
Utilities	1,012	1,011
Off-site Facilities	29	29
Total[1]	3,266	3,095

[1] Subtotals may not add to totals due to rounding.

Either action alternative would require new mine or related infrastructure to be built on previously undisturbed private, state, NFS, and Bureau of Reclamation lands. **Table ES-3** shows the acreage of impacts from the mine components by action alternative. Approximately 27 percent of disturbance on previously undisturbed land would be within riparian areas or adjacent to streams.

Table ES-3 Mine Component Acreage Impacts on Previously Undisturbed Land

Mine Component	2021 MMP (acres)	Johnson Creek Route Alternative (acres)
Mine Site	881	876
Access Roads	341	217
Utilities	422	421
Off-site Facilities	29	29
Total[1]	1,673	1,543

[1] Subtotals may not add to totals due to rounding.

The action alternatives would require new ROWs or easements to accommodate the construction of new and upgraded access roads and transmission lines. These impacts would be located on private, state, and NFS lands; new transmission line ROW would not cross any Bureau of Reclamation lands for either action alternative. New ROWs on NFS lands are considered a direct effect to land use and may be authorized under Forest Service special uses regulations at 36 CFR 251 or under 36 CFR 228A depending on the type of use, location, and other factors. For purposes of this environmental analysis, the agency is assuming the proposed uses would be able to be authorized under existing regulatory authorities. ROW authorizations on private lands in Valley County would require a conditional use permit, and ROW authorizations on lands owned by the State of Idaho would require coordination with IDL. **Table ES-4** provides the acreage of new disturbance required within the ROW for each alternative.

Table ES-4 New Acres of Disturbance Required by Alternative

New ROW	2021 MMP (acres)	Johnson Creek Route Alternative (acres)
Roads	341	217
Transmission Lines	422	421
Total	763	638

Access and Transportation

Traffic Volumes

During construction, mine traffic under the 2021 MMP and Johnson Creek Route Alternative would generate an estimated annual average daily traffic (AADT) of 65 vehicles (45 heavy vehicles and 20 light vehicles) between the SGLF and the Operations Area Boundary. Construction traffic volumes on Johnson Creek Road and Stibnite Road would almost double and triple, respectively. Over a third of the vehicles traveling on these one-lane, native surfaced roads would be comprised of heavy vehicles and could result

in slower travel times for non-mine-related traffic and may deter other travelers from using these roadways. Travelers may use alternative roadways including McCall-Stibnite Road to South Fork Salmon River Road.

During operations, mine-related traffic would include transport of employees to and from the SGP, delivery of supplies, and activities associated with road maintenance such as snowplowing and sanding. Under the 2021 MMP and the Johnson Creek Route Alternative, operational AADT would be 50 vehicles (33 heavy vehicles and 17 light vehicles), resulting in approximately four mine-related vehicles per hour traveling outside the SGP.

The upgraded Burnt Log Road and the newly constructed Burntlog Route would experience an increase in traffic of over 71 percent under the 2021 MMP, with 27.5 percent of the traffic comprised of heavy vehicles. Under the Johnson Creek Route Alternative, traffic on Johnson Creek Road and Stibnite Road would increase approximately 71 percent as well, also with 27.5 percent of the traffic comprised of heavy vehicles. Although heavy vehicles currently use Johnson Creek Route to access the SGP, the Johnson Creek Route Alternative traffic would result in a noticeable change in baseline driver experience and slower drive times due to the substantial increase in mine-related heavy vehicles along the Johnson Creek Route during the life of the SGP. Even though upgrades to Johnson Creek Road and Stibnite Road would be made, these roads would still have many curves and slopes.

During closure and reclamation, activities including slope recontouring, facility removal, seeding and planting, and post-closure environmental monitoring would require approximately 7 years. Closure and reclamation would generate a total estimated AADT of 27 vehicles (15 heavy vehicles and 12 light vehicles). Post-closure monitoring activities would generate a total estimated AADT of six light vehicles.

Local roads experience a seasonal effect which results in noticeable differences in traffic. Valley County has many summer recreational areas that attract visitors from May through October with peak AADT levels in June, July, and August. Mine access via the Johnson Creek Route would be more impactful on summer recreational traffic because it would utilize established roads rather than new road development. Winter driving conditions influence the amount of traffic and result in lower AADT levels during the winter months. Therefore, the effect of SGP traffic on these roads would show a noticeably greater increase in mine-related winter traffic during winter. Post-closure winter traffic would not be as noticeable as heavy vehicle deliveries would not occur and approximately six mine-related light vehicles per day would utilize the accessible roadways in the analysis area for monitoring and maintenance purposes.

Public Access

Under the 2021 MMP, public access to the SGP area would be enhanced by the development of a new access road (Burntlog Route) compliant with current road standards. Under both action alternatives, there would also be a controlled public access route through the SGP during the operations, and closure and reclamation phases; however, public access would be intermittently interrupted during the construction phase. Under the Johnson Creek Route Alternative, the Burntlog Route would not be constructed, and the Johnson Creek Route would be used for both public and SGP-related access. To continue providing OSV access to Landmark, a groomed OSV route between Warm Lake and Trout Creek Campground on Cabin Creek Road would be established as part of the 2021 MMP to connect to Landmark from Trout Creek

Campground via an OSV route on the west side of Johnson Creek Road, along with a parking area, resulting in a new winter access facility that would be maintained by Valley County.

Safety and Emergency Access

For the duration of the SGP, the increase in total volume of mine-related vehicles, specifically heavy vehicles or trucks, on the Johnson Creek and Burntlog routes would result in an increased risk for accidents occurring between public and SGP-related traffic due to the one-lane constraints during construction that restrict the passing of slower moving vehicles and due to increasing traffic on the road with more frequent heavy vehicle travel. Proposed controls for deliveries of hazardous materials would address the risk of accidents for those convoys. The steep terrain would be a greater risk to safety along the Johnson Creek Route under the Johnson Creek Route Alternative as it would be the only route used for the life of the SGP and would require safety considerations for geotechnical hazards, landslides, and avalanche zones, including intermittent and extended road closures during the four years of construction. Additionally, access into the SGP mine site under the Johnson Creek Route Alternative would be through a single point of ingress and egress and would require additional safety considerations for mine deliveries and public access. The steep climb to provide access around the Yellow Pine pit would require a wider road with more switchbacks to accommodate the heavy trucks transporting mine supplies and may increase hazardous driving conditions for crew rotation, emergency responses, and wildfire evacuation.

Other Modes of Transportation

Under both action alternatives, a helipad would be located at the SGP for exploration during daylight hours, Medevac purposes, and avalanche control activities. Approximately one round trip (two truck trips) of antimony concentrate would be hauled off-site daily. The daily shipment of antimony and the potential transport of supplies and materials to and from the SGP would generate minimal to negligible changes in regional water transportation. Although there is no commercial rail transportation system in the analysis area, there is potential for the trucks to transport mine products to rail lines located in Boise or for supplies and materials to be indirectly transported to and from the SGP by trucks originating from rail shipments. Nevertheless, these impacts would generate negligible changes to rail transport during operation of the SGP and would not substantially alter the regional level of service.

Heritage Resources

Of the 250 heritage resources in the area of potential effects (APE), 100 have been determined not eligible for listing on the National Register of Historic Places (NRHP) and would require no further management. The remaining 150 sites, however, would require additional consideration and/or management if impacted by the SGP and its components and include 64 resources documented as eligible for listing on the NRHP, three NRHP-listed resources, and 83 resources identified as unevaluated for listing on the NRHP. Unevaluated heritage resources are addressed the same way as NRHP-eligible heritage resources for the assessment of impacts, until their eligibility is determined.

Under the 2021 MMP, 53 historic properties would be within the physical and visual/auditory/vibratory (VAV) APE and an additional 97 historic properties within the VAV APE only.

Under the Johnson Creek Route Alternative, a total of 51 historic properties are located within the physical and VAV APEs and an additional 84 historic properties are located only within the VAV APE.

Potential impacts to historic properties caused by ground disturbance, the introduction of new visual elements, and/or noise and vibration disturbances do not vary substantially between the action alternatives. Impacts to historic properties would be short term to permanent, localized, and minor to moderate depending on avoidance and mitigation.

Consultation with the tribes indicates there is potential for Traditional Cultural Properties (TCPs) and Cultural Landscapes (CLs) to be identified in the SGP area. The Forest Service is in ongoing consultation with the Nez Perce Tribe, Shoshone-Bannock Tribes, and the Shoshone-Paiute Tribes. Noise levels higher than ambient could affect use of TCPs or CLs by creating a distraction and altering the sense of solitude and feeling of the natural environment. Under either action alternative, effects from increased visual intrusions also are of concern for TCPs or CLs that could be present in the APE. All of these types of impacts, as well as access restrictions caused by the SGP for a period of 20 years, could affect the integrity of TCPs and CLs and the ability of tribes to access these resources under both action alternatives.

The potential indirect effects from increased access in the SGP area due to new and upgraded roads is generally the same under either action alternative. Traffic may increase over current use, and this could possibly create an indirect effect to historic properties by making them more visible and more vulnerable to damage or vandalism.

Any areas within the physical APE proposed for disturbance that have not been surveyed would be inventoried prior to SGP-related ground disturbing activities in accordance with stipulations in the programmatic agreement. The programmatic agreement includes provisions for identification of historic properties, mitigation for adverse effects to historic properties, the preparation of a Historic Properties Management Plan, and subsequent Historic Properties Treatment Plans to address effects to historic properties over the life of the SGP.

Public Health and Safety

Potential public health and safety impacts (both positive and negative) were evaluated. These effects would be primarily related to alterations of environmental conditions, economic conditions, local public services, and infrastructure. Removal of legacy mine materials along with regulatory requirements and project design features minimizes effects associated with air quality, soil quality, and water quality resulting from changing environmental conditions.

Associated with changes in economic conditions, there would be greater exposure to natural hazards such as avalanches due to the increase in the number of people traveling and working in the area. Further, economic dislocation and disruption to the local area economy after cessation of mine operations (“boom and bust” impacts) may occur but may be somewhat offset by the residual positive impacts of SGP operations on socioeconomic conditions.

Public services and infrastructure would be affected by increased use during construction and operations but would benefit from improvements to roads and access plus upgrades to electrical power utilities. Emergency medical technicians and emergency equipment and supplies would be on-site, including an ambulance, first aid, and medical supplies. These facilities would minimize the demand on the local services and provide medical services for workers and site-visitors in an otherwise remote area. However, with 500 or more employees living and dining in relatively close quarters, the potential for transmission

of infectious diseases exists. Employees from the local community who lodge at the on-site facility could potentially transmit infectious diseases to the local communities upon return from the on-site housing facility. Therefore, worker safety protocols include basic measures for good hygiene and protection of infectious disease transmission; and on-site health care services would provide basic treatments for worker illnesses.

Recreation

Both action alternatives would result in impacts to recreation access, settings, opportunities, use, facilities, and recreation-related special use permits. The SGP would restrict the mine area from recreation use and alter the recreation setting in the surrounding area due to visual changes and noise. Use of Warm Lake Road (CR 10-579) and the Johnson Creek Route during construction would affect access and the recreation setting for facilities and use areas along Johnson Creek and Warm Lake Roads. Construction of many SGP facilities may have temporary impacts to recreation (access, opportunities, use) and may alter the recreation setting of the areas within and adjacent to these facilities. The SGP also would affect access to operating areas of three outfitters and guides, affect their ability to provide activities, and may degrade customer's recreation experiences.

Under both action alternatives, temporary closure of the connection between the Stibnite and Thunder Mountain roads through the Operations Area Boundary would affect access and use of sites off these roads until the new connecting route through the Operations Area Boundary was constructed. Road access through the Operations Area Boundary would provide access to the Thunder Mountain Road area for the public and permitted outfitters.

The Burntlog Route under the 2021 MMP would offer new motorized access where such access does not currently exist and could increase recreation use in areas surrounding these facilities. These facilities also may displace wildlife-based and non-motorized recreation opportunities and would alter the recreation setting for the FCRNRW and two dispersed camping areas. Due to its closeness to the FCRNRW border, a portion of the Burntlog Route would result in additional change to the recreation setting for wilderness activities, potentially induce increased use of the Black Lake area and FCRNRW, and potentially result in unauthorized motorized use of the FCRNRW. The Burntlog Route may have an increased impact on the ability of the two permitted outfitters to provide permitted activities due to the impacts on wilderness activities. The maintenance facility under the 2021 MMP would be located along the Burntlog Route, and noise during its construction may affect the Mud Lake dispersed camping area, which also would be affected by construction of the Burntlog Route.

The Burntlog Route would not be developed under the Johnson Creek Route Alternative. Therefore, there would be no impacts to recreation from this route compared to the 2021 MMP. Instead, the Johnson Creek Route would be used during all phases of the SGP. Construction impacts of using the Johnson Creek Route under the Johnson Creek Route Alternative would be similar to the 2021 MMP, except periodic temporary closures on Johnson Creek Road and daily closures on Stibnite Road during construction would result in reduced access and recreation opportunities and impacts to visitor experiences along Johnson Creek, Stibnite, and Thunder Mountain Roads and locations accessed from these roads, potentially including the Big Creek area depending on where the closure would be located along Stibnite Road. Construction would also take two years longer for the Johnson Creek Route Alternative.

Unlike the 2021 MMP, impacts from use of the Johnson Creek Route under the Johnson Creek Route Alternative would continue through operations and closure/reclamation instead of ending once the Burntlog Route was completed (except for impacts from road closures as these would not occur during operations or closure/reclamation). The maintenance facility would be located at Landmark, increasing recreation impacts in that area.

In winter, under the 2021 MMP, backcountry skiers and OSV riders using Warm Lake Road and Johnson Creek Road to access different areas would experience increased traffic and may be displaced due to route closures. OSV routes along Warm Lake Road (from Warm Lake to Landmark) and Johnson Creek Road (from Trout Creek Campground north to Wapiti Meadows) would be closed. An OSV route from Warm Lake to Landmark would be provided utilizing the Cabin Creek Road and a groomed OSV trail on the west side of Johnson Creek Road for the duration of the project. The OSV route from Trout Creek Campground to Wapiti Meadows would reopen after construction of the Burntlog Route. Impacts to recreation in the winter from the Johnson Creek Route Alternative would be similar to the 2021 MMP, except plowing of Johnson Creek Road and closure of the OSV route from Trout Creek Campground to Wapiti Meadows would continue through operations, closure, and reclamation.

After reclamation under the Johnson Creek Route Alternative, Stibnite Road improvements would remain and could increase access for more vehicles and affect the recreation setting.

Travel Management Rule minimization criteria for the reroute of Stibnite Road through the mine site and the temporary relocation of the Warm Lake OSV route to Cabin Creek Road and west of Johnson Creek Road were considered to determine if the routes intersect with impaired watersheds, wetlands, riparian areas, high-risk flood hazard areas, soils having erosion potential, and riparian vegetation communities.

Scenic Resources

Change in Landscape Character and Scenic Quality of the Analysis Area

The action alternatives would cause similar changes to local landscape scenic qualities over the construction, operation, and closure and reclamation timeframes. The No Action Alternative would result in no change to landscape character and scenic quality. The 2021 MMP would result in the greatest change in landscape character and scenic quality, primarily due to construction and operation of the Burntlog Route in addition to the SGP mine site and infrastructure. The Johnson Creek Route Alternative would entail less change to landscape character and scenic quality of the analysis, as the mine access route would not require construction of the Burntlog Route. After operations, new portions of the Burntlog Route would be decommissioned, and visual impacts would lessen over time.

Change in Distance Zone

The 2021 MMP would result in the greatest change to distance zones, because it would require construction of a new roadway in the forest. Individuals traveling through the forest on the new roadway would be able to see areas of the forest either not seen from viewing platforms under existing conditions or see them from a closer distance. The 2021 MMP would add the largest amount of new access roads. Under the 2021 MMP, the SGP would be in the middleground distance zone of the new roadway for approximately 2 miles. Both alternatives would involve construction of the new access road that would traverse through the SGP providing immediate foreground views of the mine.

Change in Nighttime Lighting

Nighttime lighting at the SGP mine site would be the same for both action alternatives. Similarly, there would be nighttime lighting effects from vehicles traveling on roads (new or improved) under both action alternatives. The 2021 MMP would include the greatest mileage of new roadway, some of which would occur at higher elevations, potentially increasing distant visibility. The Johnson Creek Route Alternative would not include construction of Burntlog Route, but nighttime lighting effects would increase along the Johnson Creek Route, which potentially has more viewers to experience increased light as there are residences in the village of Yellow Pine and ranches along Johnson Creek Road (CR 10-413).

Context of Impacts per Forest Guideline Visual Quality Objectives

Under both action alternatives, the SGP mine site, access routes, new and upgraded transmission lines, and off-site facilities would introduce moderate to major levels of visual contrast to areas with local and regional scenic importance as indicated by Preservation, Retention, and Partial Retention Visual Quality Objectives (VQOs) and in certain areas would be in conflict with established Forest Service VQOs.

Changes to Scenic Integrity

The analysis area generally has moderate scenic integrity because the landscape is altered by existing roads and transmission lines. Scenic integrity is low where existing disturbances are present from historical mining activities. Under both action alternatives, additional alterations would occur to the already impacted SGP mine site area during construction and operations. After closure and reclamation, the scenic integrity at the SGP mine site would slowly improve. Access roads under the 2021 MMP would cause similar degradations to scenic integrity caused by the construction of and activities on the Burntlog Route. Under the Johnson Creek Route Alternative, the change to scenic integrity would be less evident, because existing roadways would be improved rather than new roadway segments built. However, as there are residences along the existing Johnson Creek Route, there may be more viewers to experience these changes.

Social and Economic

Construction and operation of the SGP would provide jobs and income for both individuals directly employed for the SGP, as well as for other individuals whose employment and incomes would be indirectly or induced by SGP's activities. Most of these employment and income impacts would support Idaho residents, of which a portion would be Valley and Adams counties residents. Given the local area's population and current low unemployment conditions, the SGP would result in an in-migration of up to 198 individuals and another 240 dependents for SGP-related employment opportunities. Project-related employment opportunities would have the potential to affect the labor supply for other local employers needing to backfill open positions.

The potential for socioeconomic impacts to the local area's economy and social conditions would primarily result from the new in-migrant population. The potential influx of new residents (especially those that would be non-SGP employees) may increase the demand and supply of housing and housing affordability within the local area. Other in-migration effects would include potential impacts on school enrollment, telecommunications, infrastructure, government services, and transportation. It also is expected that there could be potential for "boom and bust" impacts on the local area economy if there are insufficient alternative employment opportunities when SGP operations end.

Compared to the 2021 MMP, the Johnson Creek Route Alternative would have substantial increased construction and O&M costs. However, due to its longer construction period (five years instead of three years) and the operating phase's extended duration, the Johnson Creek Route Alternative's resulting socioeconomic impacts (i.e., employment, income, population, housing, public services, and government revenue impacts) would be expected to be marginally higher than those identified under the 2021 MMP.

The potential for other adverse impacts to the local area's economy would be relatively limited. This is due to both the limited extent and remote location of SGP's expected resource impacts. In addition, recreational opportunities would be available elsewhere in the analysis area for recreationists displaced by SGP's activities. As a result, these other SGP-related impacts generally would not result in future visitation changes or other impacts to the local area's overall economy but could affect specific outfitters' access to the SGP area.

Once in operation, annual government tax revenue benefits from SGP operations are estimated to total $61.7 million. Perpetua is projected to pay $29.4 million in taxes annually. The other $32.3 million would be paid by SGP support businesses and employees. The federal government is expected to receive most of the total tax revenues resulting from operations. Federal tax receipts during the SGP operations phase are projected to be $51.6 million annually. The state and local tax revenues generated are projected to be $10.1 million per year. Most of these taxes would be received by the State of Idaho. Local tax revenues paid by Perpetua are projected to average $0.3 million per year. Local property taxes may be used to fund local schools, local governments, local law enforcement, fire protection, local roads, and other public services. The extent that the SGP-related increase in state and local tax revenues would result in a net benefit to Valley County's public services would depend on the extent that they offset increases in costs to provide public services.

The SGP would result in other benefits and costs besides those identified above. The primary purpose and benefit of the SGP action alternatives for the owner/operator would be mineral extraction. Although there are some construction and operational differences between the two action alternatives, their total future revenues would be approximately the same.

Environmental Justice

The SGP area is within the traditional subsistence range of tribal communities with environmental justice concerns including the Nez Perce Tribe, Shoshone-Bannock Tribes, and Shoshone-Paiute Tribes. Tribal members are more susceptible to be impacted by local area resource changes due to both their use of the SGP area and their long-established cultural connections and attitudes to the local area resources. As a result, many of the SGP-related resource impacts would likely be perceived by tribal members to have a greater and more long-term adverse impact than that by non-tribal users. For these reasons, tribal members have a greater potential to be affected than the general population under both action alternatives.

Special Designations

Wilderness

No structures or human facilities would be developed inside the FCRNRW for the SGP. SGP operations would affect soundscapes, natural dark skies, and natural wildlife distribution within the FCRNRW, impacting the untrammeled quality of wilderness. The SGP would result in emissions that could affect air quality in the FCRNRW. However, emissions would be below NAAQS thresholds. Under the 2021

MMP, construction and use of the Burntlog Route near the FCRNRW boundary could increase noise and lights in adjacent wilderness areas. Use of the Johnson Creek Route under the Johnson Creek Route Alternative would eliminate these impacts. However, the volume of traffic and potential delays along Johnson Creek Route could result in forest visitors avoiding FCRNRW trailheads accessed from Stibnite Road (CR 50-412). Indirectly, recreation use in recommended wilderness areas and other areas of the FCRNRW could increase.

Wild and Scenic Rivers

Impacts to WSR Free-Flowing Conditions

No impacts to WSR free-flowing conditions are anticipated under either action alternative.

Impacts to WSR Water Quality

The 2021 MMP may impact water quality in Burntlog Creek as a result of increased sedimentation from the Burntlog Route construction, winter maintenance, and increased traffic from heavy vehicles. Under the Johnson Creek Route Alternative, Burntlog Creek would not be impacted as the Burntlog Route would not be built. However, increased heavy vehicle traffic could increase sedimentation rates and therefore decrease water quality in Johnson Creek due to use of Johnson Creek Road for all SGP-related traffic under the Johnson Creek Route Alternative.

Impacts to Outstandingly Remarkable Values (ORVs)

Under either action alternative, the heritage ORV of Johnson Creek would not be adversely affected by the upgrade of the existing transmission line or the upgrade of Johnson Creek Road, as historic properties located in the vicinity would be avoided or impacts minimized as directed by the programmatic agreement. Impact to the scenery ORV at the existing crossing of SFSR by the transmission line from the upgrade would be negligible and impact to the recreation ORV would be temporary during construction. Under the 2021 MMP, the fish ORV of Burntlog Creek would not be adversely affected.

Impacts to Wild, Scenic, or Recreational Classification

Under the 2021 MMP, the wild segment of Burntlog Creek would be adversely impacted by noise and visual effects from the extension, widening, and mine traffic usage of Burnt Log Road (FR 447). The recreational segment of Burntlog Creek could be adversely impacted if a proposed borrow source (i.e., gravel quarry) is sited at the only road access to the recreational segment of this creek.

Idaho Roadless Areas

The analysis of effects on roadless character focuses on the wilderness attributes of naturalness; undeveloped character; outstanding opportunities for solitude and primitive types of recreation; special features and values; and manageability which inform impacts to roadless area characteristics.

Construction of SGP facilities, access roads, and utilities would remove vegetation, alter topography, and modify fish and wildlife habitat within IRAs. Construction and operation of the SGP under the 2021 MMP would directly impact the Meadow Creek, Horse Heaven, Black Lake, Burnt Log, Caton Lake, and Reeves Creek IRAs. The Johnson Creek Route Alternative would have a reduced impact on IRAs. Under the Johnson Creek Route Alternative, improvements and use of only the Johnson Creek Route for mine access would eliminate impacts within the Black Lake and Burnt Log IRAs and within portions of the Meadow Creek IRA associated with the Burntlog Route.

Research Natural Area

SGP activities would be located downgradient of streams that flow through RNAs or would be in watersheds that do not contain streams that flow through RNAs. There would be no changes to water chemistry, temperature, or quality in the stream segments that flow through the RNAs.

Under the 2021 MMP, reconstructing approximately 3 miles of Burnt Log Road (FR 447) for the Burntlog Route would remove vegetation within 100 to 3,100 feet of the Chilcoot Peak RNA. Interim reclamation and vehicles could provide opportunities for non-native plant species to become established and spread into the RNA. There would be loss of the Chilcoot Peak RNA research and ecological process values if and where non-native plant species become established. Increased human activities could increase the risk of human ignited fires. Changes in the fire regime could result in a loss of research and ecological process values within the Chilcoot Peak RNA.

Under the 2021 MMP, installation of culverts on the Burntlog Route could change the movement of sediment, woody debris, and other organic material. Culverts could change water quantity or hydrologic connection and indirectly ecological processes in areas adjacent to the Chilcoot Peak RNA. The extent and duration of where there could be changes to ecological processes within Chilcoot Peak RNA is unknown.

The Burntlog Route would not be constructed under the Johnson Creek Route Alternative and would retain the existing ecological process values of the Chilcoot Peak RNA. The Belvidere Creek RNA would be over 3 miles from SGP activities; potential impacts on research values, ecological site conditions, and ecological processes within this RNA would be negligible.

Tribal Rights and Interest

Either action alternative would cause disturbances that may impact tribal resources and would adversely affect tribal rights and interests. Locations of places or resources important to the Tribes identified through consultation and in the tribal ethnographic studies are not publicly disclosed due to confidentiality but are known to be present in the analysis area. Tribal fishing, hunting, and plant gathering activities occurred for millennia in this area, as supported by the archaeological record, known usual and accustomed fishing places, and descendant Tribes that continue to use the analysis area and exercise their rights to fish, harvest, and gather resources from their traditional places.

Construction and operation of the SGP would directly and indirectly effect tribal resources through physical impacts during construction, through visual impacts due to alteration of the landscape, as well as through audible elements that would impact solitude and tribal use of the analysis area, for example during spiritual practices and resource harvesting. Consultation with the Tribes would be ongoing; therefore, if there are additional discoveries of culturally significant sites or resources during or post construction, formal government-to-government consultation would occur.

Tribal access to the Operations Area Boundary would be restricted during the SGP's construction, operations, and closure and reclamation phases, preventing tribal members from exercising their off-reservation rights to hunt, gather, and pasture on unoccupied federal lands, access streams and springs, and to fish in usual and accustomed places, for a period of 20 years. Under the 2021 MMP, the Burntlog Route would change the setting and access to traditional tribal use areas. Under the Johnson Creek Route Alternative, Johnson Creek and Stibnite road widening and improvements, as well as increased traffic,

would also change the setting and access to traditional tribal use areas although to a lesser degree as the roads already exist.

The SGP would impact endangered salmon, other fish species, and essential fish habitat. Harm to fish, wildlife, and habitat would in turn impact availability and harvestability of these resources by tribes at their usual and accustomed fishing places and traditional hunting and gathering places. Although the action alternatives differ in the acres of habitat affected for fish, wildlife, and plant species, there would be an impact to the availability and harvestability of tribal resources caused by the SGP. There are also concerns that the SGP would impact the Tribes' fisheries restoration efforts. The Forest Service has therefore concluded that the SGP would have adverse impacts to tribal rights and interests under either the 2021 MMP or the Johnson Creek Route Alternative.

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1.0 PURPOSE OF AND NEED FOR ACTION

1.1 Introduction

The United States (U.S.) Department of Agriculture Forest Service (Forest Service) has prepared this Final environmental impact statement (EIS) in compliance with the National Environmental Policy Act (NEPA) and other relevant federal laws and regulations. This Final EIS discloses the potential environmental effects of the alternatives considered for the Stibnite Gold Project (SGP or the Project) proposed by Perpetua Resources Idaho Inc. (Perpetua). The SGP proposes mine operations on federal, state, and private lands located in Valley County, Idaho. This document discloses the direct, indirect, and cumulative environmental effects of the Proposed Action and the Action Alternative. More than one federal agency is involved with the EIS for the SGP. The Forest Service is the lead agency in the preparation of this Final EIS (40 CFR 1501.5). The Project occurs on both the Boise and Payette National Forests; the Payette National Forest (PNF) is the agency lead. Cooperating agencies include the U.S. Army Corps of Engineers (USACE), U.S. Environmental Protection Agency (EPA), Idaho Governor's Office of Energy and Mineral Resources (OEMR), Idaho Department of Lands (IDL), Idaho Department of Water Resources (IDWR), Idaho Department of Environmental Quality (IDEQ), and Valley County, Idaho.

The Forest Service received the original SGP Plan in 2016 (Midas Gold Idaho, Inc. [Midas Gold] 2016a) for review and approval in accordance with regulations at 36 Code of Federal Regulations (CFR) 228 Subpart A. A revised Plan, also known as ModPRO[1], was submitted to the Forest Service in 2019 (Brown and Caldwell 2019a). A draft EIS (DEIS) evaluating five alternatives based on the 2019 Plan was published in August 2020. The DEIS considered five action alternatives including: Alternative 1 - the 2016 proposed mining plan by Perpetua as Alternative 1; Alternative 2 - a modification of the mining plan (ModPRO) by Perpetua as Alternative 2 (considered to be a derivative of Alternative 1); Alternative 3 - relocation of the Hangar Flats Disposal Rock Storage Facility and the Tailings Storage Facility into the East Fork South Forth Salmon River drainage; Alternative 4 - Use existing access road along Johnson Creek instead of the proposed Burntlog Route; and Alternative 5 - No Action.

Following the DEIS public comment period, a further modified Plan, also known as ModPRO2[2], was submitted in December 2020 with a revised submittal in October of 2021 (Perpetua 2021a). Midas Gold changed their name to Perpetua Resources Idaho, Inc. in February 2021[3].

The 2021 modified mine plan (2021 MMP) reduced new surface disturbance and anticipated environmental impacts while providing revised descriptions and predicted environmental effects to be evaluated in the EIS. In consideration of the 2021 MMP, as well as comments received on the DEIS, the Forest Service determined that a supplemental DEIS (SDEIS) was warranted and two of the previous action alternatives (August 2020 DEIS Alternatives 1 and 3) were eliminated from further consideration

[1] Associated project documents may reference the Revised Plan as the ModPRO.

[2] Associated project documents may reference the Modified Plan as the ModPRO2.

[3] Documents provided by Perpetua prior to the February 2021 name change will still be cited and referenced as Midas Gold.

(see **Section 2.6** for discussion about alternatives dismissed from detailed analysis). The DEIS Alternatives 1 and 2 were replaced by the 2021 MMP so were dismissed from further analysis. Alternative 3 was found to be more impactful to local fish habitat and would not result in the cleanup of the legacy SODA and Bradley Tailings (see Table 2.9-1 of the 2020 DEIS), so was eliminated from further consideration. Alternative 4 was retained as the Johnson Creek Road Alternative. To summarize, the SDEIS analyzed the 2021 MMP, the Johnson Creek Route Alternative, and the No Action Alternative. The SDEIS was published in October 2022.

This Final EIS takes into consideration comments received on the SDEIS as well as additional relevant information that became available since publication of the SDEIS.

Additional documentation describing the EIS process, the analyses of the effects of the alternatives considered, public involvement, and other relevant documents may be found within the project record located at the Forest Service's Payette National Forest Supervisor's Office, 500 North Mission Street, McCall, Idaho.

1.2 Stibnite Mining District History

Prospecting in this region of Idaho began in the 1890s. Gold and antimony mineralization was discovered in the Stibnite area with the first mining claims staked in 1914 (Midas Gold 2016a). The claimants organized the Meadow Creek Silver Mines Company and began minor underground mining in 1919 developing what would become the Meadow Creek Mine, now referred to as the Hangar Flats area. Multiple mining companies considered the Meadow Creek Mine but found the gold/silver/antimony mineralization too difficult to process in milling circuits of the time. Underground development work continued until 1927 when the property was optioned by the Yellow Pine Company.

The Yellow Pine Company invested in a major expansion of the Meadow Creek Mine which, by 1929, included an enlarged camp and a road to connect the mine with the town of Yellow Pine. Expansion of the underground mine from its original portal continued, with other adits driven to gain underground access into other parts of the property including the North Tunnel, Monday Tunnel, and Cinnabar Tunnel. A new camp was built at the location of these two later tunnels south of the current Yellow Pine pit. Additional surface facilities were constructed at Monday Camp including housing, shops, assay facilities, an air strip, and a post office.

In order to provide power for the Meadow Creek and Monday mine camp and facilities, the Yellow Pine Company constructed a reservoir on the East Fork of Meadow Creek in 1930 and installed a wooden pipe and steel penstock between the reservoir and a hydroelectric plant built on Sugar Creek.

Ongoing metallurgical testing of the Meadow Creek Mine ore lead to the construction of a 150-ton per day pilot mill in 1931 at Meadow Creek Camp.

The Meadow Creek Mine was the largest antimony producer in the U.S. and a major gold/silver producer in Idaho. Milling and mining continued at the Meadow Creek Mine until 1938 (Midas Gold 2016a), when the Yellow Pine Company property was taken over by the Bradley Mining Company (BMC).

After 1938 BMC focused on development of an open pit mine at the Yellow Pine deposit which contained higher gold values and lower antimony grades than at the Meadow Creek Mine. Ore was extracted from pits on the east and west sides of the East Fork South Fork Salmon River (East Fork SFSR) and hauled south in trucks from the Yellow Pine open pit to the mill at the Meadow Creek Mine. The mill was expanded from 200 to 400-tons per day capacity and renamed the Stibnite Mill. Mill tailings were initially released into Meadow Creek and later into a tailings impoundment adjacent to the mill.

Beginning in 1939, the federal government began purchasing mineral commodities, including antimony and tungsten, considered to be of strategic importance. The U.S. Geological Survey (USGS) and Bureau of Mines supported detailed exploration of the Yellow Pine deposit with the discovery of economic values of tungsten in 1941. With the federal government's wartime interest in both antimony and tungsten produced from the Yellow Pine deposit, BMC expanded mine operations and upgraded the Stibnite Mill to produce a tungsten concentrate in addition to antimony and gold/silver concentrates. Expansion of the mining at the Yellow Pine deposit included enlarging the open pit along with underground mining and diversion of the East Fork SFSR in a tunnel, called the Bailey Tunnel, which discharged the river water into Sugar Creek (Mitchell 2000). By this time, fish passage to the upward reaches of the East Fork SFSR became impassable due to the development of the Yellow Pine deposit and open pit.

During World War II, BMC continued to expand mining and milling operations at the Meadow Creek Mine. As employment at the mine increased, the Meadow Creek camp grew into the town of Stibnite and included homes, recreational facilities, school, hospital, general store, and other commercial facilities. Two other neighborhoods were also established along lower Fiddle Creek and Midnight Creek. Idaho Power Company built a power line to Stibnite in 1943 which allowed expansion of the Stibnite Mill and provided additional power to support mining and community demands. By the end of the war, the tungsten ore in the Yellow Pine pit was exhausted and lesser tungsten mineral production continued for a time from a placer operation downstream of the Yellow Pine pit.

The tailings storage area west of the mill reached capacity in 1946. A large tailings dike was built south of the mill in the Meadow Creek valley. Meadow Creek was diverted in order to contain more tailings. Between 1946 and 1952, BMC deposited an estimated four million tons of tailings in this storage facility. In 1947 BMC constructed an antimony smelter at the Stibnite Mill to process the antimony concentrate.

Subsequently, the antimony price dropped, and operations of the Yellow Pine Mine and Stibnite Mill and Smelter were shut down in the 1950s. The Bailey Tunnel diversion of the East Fork SFSR was abandoned, and the East Fork SFSR was allowed to flow over the south edge of the Yellow Pine pit forming a pit lake. Meadow Creek was rerouted over the BMC tailings impoundment, resulting in erosion of the tailings. Residents living in the valley moved out and over time the mine and town buildings in the valley were abandoned or moved to other locations (Petersen 1999). Although exploration work continued into 1955 after active mining ceased in 1952, it did not trigger the resumption of mining.

Photo 1: Conveyors and Mill Buildings at Stibnite Mine in 1949
(Source: Idaho State Historical Society, Boise Idaho)

In the 1970s, the technology of cyanide heap leaching of low-grade gold/silver ores was developed by the U.S. Bureau of Mines and this raised renewed interest in many former gold production districts including Stibnite. Superior Oil Company (Superior) conducted geological, geophysical, and geochemical investigations from 1974 to 1977 to evaluate the potential for heap-leach oxide gold and silver in the West End and adjacent Stibnite deposit, which led to permitting of the open pit West End Mine with the Forest Service and mine operations by Superior commenced in 1982. An on-off, cyanide heap leach facility that included five lined leach pads, solution ponds, and a gold/silver recovery plant was built north of the former Stibnite Mill in the Meadow Creek Valley west of East Fork SFSR. Between 1982 and 1996 more than six million tons of ore were leached in this facility. After gold/silver was extracted from the ore it was rinsed of its cyanide content and removed from the leach pads. This "spent" ore was hauled to the former Stibnite Mill tailings storage facility and spread over the top of the fine-grained tailings. This area was called the Spent Ore Disposal Area (SODA) and included a diversion of Meadow Creek out of the old tailings area.

Mobile Oil Corporation purchased Superior in 1984 and suspended operations of the West End Mine in 1985 but continued to leach previously mined ore. The West End Mine and leach facilities were purchased by Pioneer Metals Corporation (Pioneer) in 1986 and were operated by Pioneer until 1991.

Between 1988 and 1992 Hecla Mining leased some of the BMC claims and developed an open pit gold mine just north of the Yellow Pine pit called the Homestake pit. Initially ore from the pit was leached at the Pioneer on-off leach facility under a tolling agreement between the companies. In 1990 Hecla constructed its own leach pad and plant near Stibnite which operated until 1992. The Hecla mine and leach areas were reclaimed between 1991 and 1993.

Beginning in 1991 the former Pioneer operations were operated by a number of other mining companies who developed other deposits including the Stibnite and Garnet Creek pits. All mining and leaching operations in the Stibnite area ceased in 1996.

1.3 Comprehensive Environmental Response, Compensation, and Liability Act Background

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as Superfund, was enacted by Congress in 1980 and amended in 1986, to respond to pollution and the threats posed to human health and the environment from the release, or imminent threat of a release, of hazardous substances. The law authorizes short-term removal actions requiring prompt response and long-term remedial responses at sites, including those listed on EPA's National Priorities List (NPL). CERCLA provides that the potentially responsible parties for releases of hazardous substances pay the costs to investigate and remediate contaminated sites.

The Stibnite Mine Site (CERCLIS [Comprehensive Environmental Response, Compensation and Liability Information System] #9122307607, the Site) was assessed and proposed to be added to the NPL in 2001. Key state and congressional leaders supported funding the cleanup of the Site but opposed the stigma of adding the site to the NPL, thus the Site was not listed. Before 2001, some mining operators at the site conducted activities to reduce the release of hazardous substances. Since 2001, the Forest Service has conducted multiple projects under its CERCLA authority to reduce releases at the Site. The current owner of the site, Perpetua, has proposed to renew mining activities with the proposed SGP intended to address certain impacts associated with the legacy mining as described in Chapter 2 of this EIS. The SGP activities would be conducted under applicable mining law and regulations without connection to CERCLA.

In January 2021, Perpetua and affiliates entered into an Administrative Settlement Agreement and Order on Consent (ASAOC) with the EPA and the Forest Service under CERCLA to conduct cleanup of certain conditions at the Site, these areas are mostly outside of and not included in the proposed mining project.

As described in **Section 1.2**, the mining, milling, smelting, and leaching activities in the district left behind impacts including underground mine workings, multiple open pits, development rock dumps, mill tailings deposits, cyanidation heap leach pads, neutralized (spent) heap leach ore piles, a mill and smelter site, three town sites, camp sites, a washed-out earthen dam (with its associated erosion and downstream sedimentation), haul roads, an abandoned water diversion tunnel, an airstrip, and other disturbances.

Releases of hazardous substances at the Site are documented in multiple studies. Currently, there are ongoing releases of hazardous substances, pollutants, and contaminants to surface water and groundwater at the site including elevated concentrations of antimony, arsenic, copper, lead, mercury, and cyanide. Most notable are elevated concentrations of arsenic and antimony. Past mining activities have also caused alterations to stream configurations and habitat including formation of the Yellow Pine pit lake, sediment and tailings deposits, development rock dumps, and channel diversions.

In the early 1980s spent ore from on/off leach pads was purposely placed over fine-grained tailings deposited in the valley from earlier operations, known as the Bradley Tailings. This feature referred to as the Spent Ore Disposal Area (SODA), was intended to cover the Bradley tailings and prevent their erosion. In the 1990s the mine operator Stibnite Mine Inc. entered into an Administrative Order on Consent (AOC) with EPA to divert stream flow and stabilize the Bradley Tailings/SODA disposal area to improve water quality in Meadow Creek, but the company did not complete the AOC scope of work. In 1998, a new AOC was signed between Mobil Oil Corporation, EPA, and the Forest Service to stabilize and reclaim the Bradley Tailings/SODA area. This work included construction of two diversion channels, lining an old diversion channel to reduce seepage, closing a pond, covering exposed tailings, restoring more natural stream channel features, and reclaiming the area with vegetation. This work was completed in 1999.

Pursuant to its CERCLA authorities, the Forest Service engaged in multiple remediation projects in the district to further reduce impacts from the legacy mining activities. In 2002, the Forest Service removed tailings from a pond and soils located at the former smelter stack area. The material was placed in a repository located at the Bradley NW development rock dump. The Meadow Creek floodplain was reconstructed in the former pond area. In 2004 and 2005, the Forest Service reconstructed Meadow Creek directly downstream of Smelter Flats. This included the removal of tailings from the channel and depositing this material in a new containment cell located on the SODA. The new channel banks were revegetated with willow plants and the old channel was backfilled and reclaimed. In 2009, the Forest Service regraded and covered a portion of the remaining tailings at Smelter Flats to prevent further erosion and exposure risk.

With the signing of the 2021 ASAOC, the parties to the Agreement plan to address certain legacy mining impacts under CERCLA that would not otherwise be addressed by the proposed SGP activities by Perpetua outside the project footprint. The ASAOC includes three primary phases. Phase 1 includes several “time critical removal actions” (TCRAs) consisting of stream diversion ditches designed to avoid contact of water with sources of contamination, and removal of approximately 325,000 tons of development rock and tailings from locations in Meadow Creek or East Fork SFSR that are currently impacting water quality. Phase 1 also includes baseline studies of conditions at five historic mine adits where mine water is discharging. Implementation of removal actions to address the adits is optional under the ASAOC. The purpose of these studies is to collect information to inform potential future CERCLA removal actions at these locations. In addition, Perpetua conducted a biological assessment, Clean Water Act evaluation, and a cultural resource survey to support Phase 1 activities. Phase 1 activities would be accomplished regardless of the status and potential approval of the SGP and is scheduled to be completed between 2021 and 2025. Perpetua is providing $7.5 million in financial assurance for the Phase 1 scope of work.

When all work in Phase 1 is completed, and if approvals and permits have not been obtained by Perpetua for the SGP, the company, upon approval by the agencies, may elect to perform activities in the optional Bridge Phase described in the ASAOC. These activities would potentially include additional water diversions, capping or covering of mine waste in place, and targeted removal of additional mine waste materials to improve water quality. The Bridge Phase would be completed within a year of the agencies' acceptance of the work plan for this phase if Perpetua and the agencies elected to implement the activities.

Optional Phases 2 and 3 would be conducted if elected by Perpetua and approved by the agencies. The work would consist of "Non-time Critical Removal Actions" (NTCRAs) and would only be performed by Perpetua if it has obtained approval for the proposed SGP. Phase 2 would consist of further planning and implementing potential removal actions at the five adits studied in Phase 1. Phase 3 would consist of a synoptic study of two reaches of the East Fork SFSR to identify areas for implementation of additional removal actions in locations identified in the ASAOC Statement of Work and agreed to by the parties that would not be subject to mining and reclamation activities under the SGP in effect at that time. Because these phases are optional, phases 2 and 3 are not considered reasonably foreseeable by the EPA and therefore are not included as cumulative or connected actions within this EIS.

1.4 Stibnite Gold Project Overview

The 2021 MMP proposes use of the surface of National Forest System (NFS) lands in connection with operations authorized by the U.S. mining laws within the Operations Area Boundary. The 2021 MMP provides details for the construction, operation, reclamation, and closure of a gold, silver, and antimony mine. The following elements are integral to the 2021 MMP:

- Mine pit locations, areal extents, and mining and backfilling methods
- Transportation on existing and proposed roads
- Pit dewatering, surface water management, and water treatment
- Ore processing
- Lime generation plant
- Tailings Storage Facility (TSF) construction and operation
- TSF Buttress construction methods
- Water supply needs and uses
- Management of mine impacted water and stormwater runoff
- Electrical transmission lines
- Stibnite Gold Logistics Facility (SGLF)
- Road maintenance facility
- Surface and underground exploration
- Worker housing facility

1.5 Operations Area Boundary

The SGP Operations Area Boundary, associated access roads, and off-site facilities are located in Valley County, Idaho. The Operations Area Boundary is situated approximately 98 miles by air and 146 miles by road northeast of Boise; approximately 44 air miles and 68 miles by road northeast of Cascade; and approximately 10 air miles and 14 miles by road east of the village of Yellow Pine, Idaho (**Figure 1.5-1**). Activities described in the 2021 MMP would occur within approximately 820 acres of private lands (including approximately 535 acres of patented mining claims owned or controlled by Perpetua), approximately 2,372 acres of NFS lands, 13 acres of federal land administered by the Bureau of Reclamation, and 62 acres of lands administered by the State of Idaho.

1.6 Purpose And Need

1.6.1 Purpose and Need for Federal Action

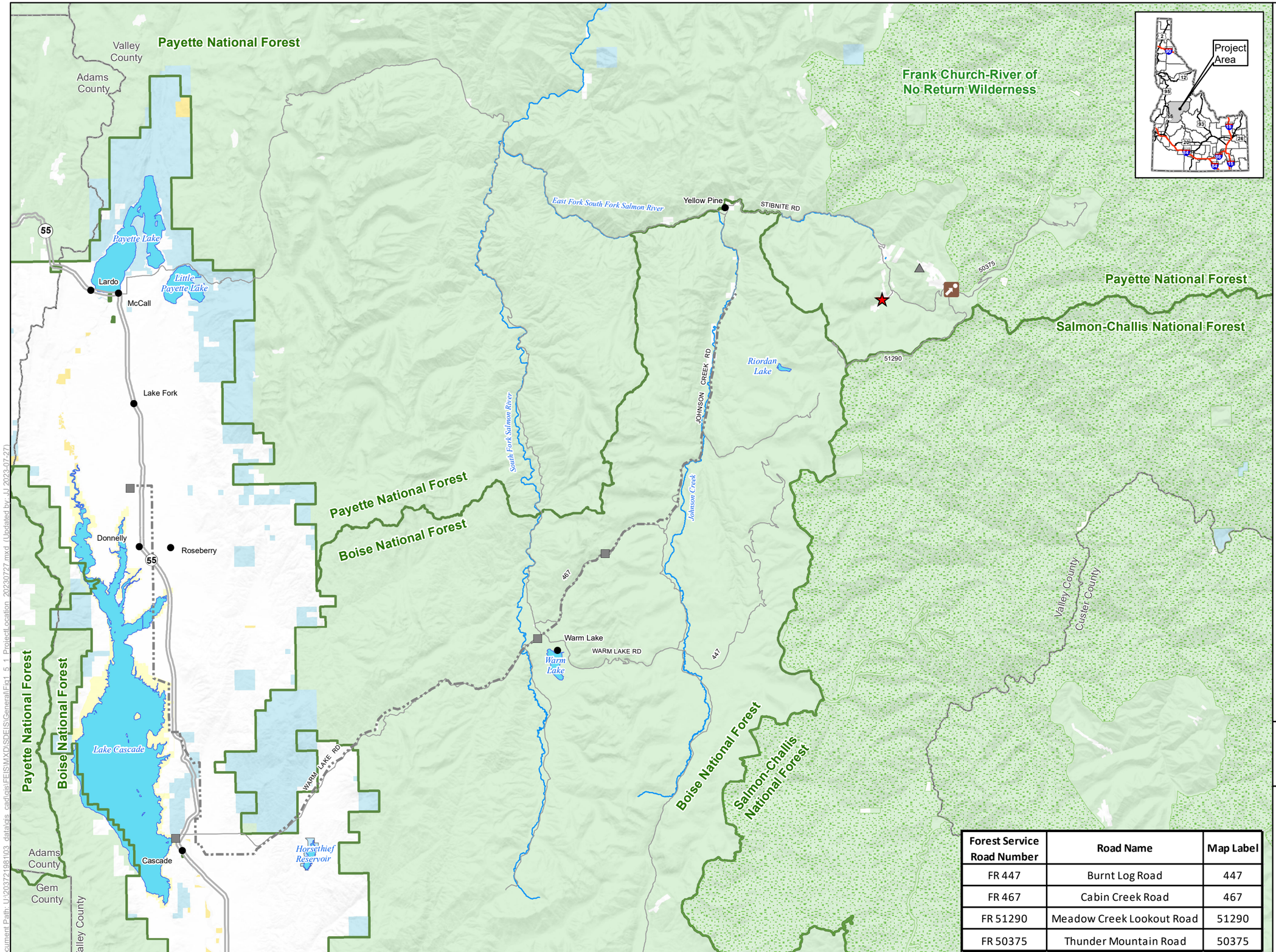
The Forest Service purpose is to consider approval of Perpetua's proposed use of the surface of NFS lands in connection with operations authorized by the U.S. mining laws as first described in the Plan submitted September 2016, then refined in 2019 (Brown and Caldwell 2019a), and further modified in 2021 as the 2021 MMP (Perpetua 2021a). The Forest Service's need for action is to ensure that the proposed occupancy and use of NFS lands is consistent with statutory and regulatory requirements. For purposes of this environmental analysis, the agency is assuming the proposed uses would be able to be authorized under existing regulatory authorities.

The need for action is to:

- Consider approval of Perpetua's 2021 MMP for development of the SGP to mine and mill gold, silver, and antimony deposits that, where feasible, would minimize adverse environmental impacts on NFS surface resources; and ensure that measures are included that provide for mitigation of environmental impacts and reclamation of the NFS surface disturbance.

1.6.2 USACE'S Purpose and Need

Perpetua's 2021 MMP includes the discharge of dredge and fill material into waters of the U.S. (WOTUS), including wetlands. Accordingly, the USACE, pursuant to Section 404 of the Clean Water Act (CWA), will review the SGP and render a decision to either issue, issue with special condition, or deny a permit for the Project. As a cooperating agency the USACE intends to use this EIS process and document for evaluating compliance with its responsibilities under NEPA and the CWA Section 404(b)(1) Guidelines. As part of its review, the USACE is required by the CWA to independently consider and express the activity's underlying purpose and need from Perpetua's (the applicant) and the public's perspectives (33 CFR 325).



Forest Service Road Number	Road Name	Map Label
FR 447	Burnt Log Road	447
FR 467	Cabin Creek Road	467
FR 51290	Meadow Creek Lookout Road	51290
FR 50375	Thunder Mountain Road	50375

LEGEND

- Proposed Mine Site Location

Project Components *

Utilities

- Existing Powerline
- Existing Communication Tower
- Existing Substation**

Other Features

- U.S. Forest Service
- Wilderness
- County
- Monumental Summit
- City/Town
- Highway
- Road
- Stream/River
- Lake/Reservoir

Surface Land Management

- Bureau of Land Management
- Bureau of Reclamation
- Private
- State
- U.S. Forest Service

* Project Components are associated with existing conditions

** Substation locations are approximate

0 2.5 5 Miles

1 inch = 4.5 miles when printed at 11x17

Figure 1.5-1
Project Location
Stibnite Gold Project
Stibnite, ID

Base Layer: USGS Shaded Relief
Other Data Sources: Perpetua; State of Idaho Geospatial Gateway (INSIDE Idaho); USGS; Boise National Forest; Payette National Forest; Stantec

Map Date: 2023-07-27

From the USACE's perspective, the basic purpose for the SGP is to extract gold, silver, and antimony from ore. Under the CWA Section 404(b)(1) Guidelines (40 CFR 230), the USACE uses the basic project purpose to determine if a project is "water dependent" (40 CFR 230.10(a)(3)). A project is water dependent if it must be located in, or be close to, a special aquatic site, including wetlands, to fulfill its basic purpose. The USACE has determined that mining gold, silver, and antimony ore is not a water-dependent activity. The overall project purpose is to mine gold, silver, and antimony from ore deposits associated with the SGP. This overall project purpose will be used for evaluating practicable alternatives under the 404(b)(1) guidelines. The 404(b)(1) analysis is being completed by the USACE following the public comments on both the SDEIS and Perpetua's application for a Department of the Army (DA) permit for the SGP.

1.7 Federal Decision Framework

The U.S. mining laws (30 U.S.C. 21-54), govern the exploration and development of minerals on federal lands. Locatable minerals operations on NFS lands are subject to regulations found at 36 CFR 228 subpart A. Locatable mineral operations are to be conducted so as, where feasible, to minimize adverse environmental impacts on National Forest surface resources (36 CFR 228.8). In prospecting, locating, and developing the mineral resources, all persons must comply with the rules and regulations covering the National Forests (16 U.S.C. 478). All functions, work, and activities on NFS lands in connection with prospecting, exploration, development, mining, or processing of mineral resources and all uses reasonably incident thereto, including roads that are constructed and maintained in connection with development and mining of mineral resources, are operations authorized by the U.S. mining laws (36 CFR 228.3(a)).

The Forest Service is the lead agency in the preparation of this document (40 CFR Part 1501.5). The USACE is a federal cooperating agency with decisions to be made based on this environmental analysis consistent with the NEPA. Other federal, state, and local agencies are also participating in this review as cooperating agencies as noted in **Section 1.1**.

1.7.1 Forest Service Decisions

The Payette Forest Supervisor, as the responsible official acting on behalf of the lead agency, has determined that preparation of an EIS is required because approving the 2021 MMP may have significant impacts on the human environment (40 CFR Part 1501). The Payette Forest Supervisor will make the following decisions:

- Whether to approve the 2021 MMP as submitted, or any alternative considered in detail in the Final EIS.
- Whether to amend[4] the Payette Forest Plan (Final EIS and Record of Decision for the Revised Payette Land and Resource Management Plan, [Forest Service 2003a] is incorporated by reference). One or more project-specific amendments to the forest plan would be required.

[4] Forest plan amendments are evaluated under the 2012 Planning Rule per 36 CFR Part 219.17(b)(2), as amended in 2016, which requires all forest plan amendments initiated after May 9, 2012, to use the 2012 Planning Rule.

- Whether to authorize the power transmission line under the regulations governing special use authorizations at 36 CFR 251.53(l)(4).

The Boise Forest Supervisor will make the following decisions:

- Whether to amend the Boise Forest Plan (Final EIS and Record of Decision for Revised Boise Land and Resource Management Plan, [Forest Service 2010a] is incorporated by reference). One or more project-specific amendments to the forest plan would be required.

The Payette and Boise Forest Plans provide direction relevant to the 2021 MMP and its alternatives through forest-wide plan components and management areas. Management Areas (MAs) in the SGP area include the following:

Payette National Forest

- Management Area 13 Big Creek/Stibnite

Boise National Forest

- Management Area 17 North Fork Payette River
- Management Area 19 Warm Lake
- Management Area 20 Upper Johnson Creek
- Management Area 21 Lower Johnson Creek

1.7.2 Project-specific Plan Amendments

Project-specific plan amendments to the Payette and Boise Forest Plans would be required to approve the 2021 MMP or the Johnson Creek Route Alternative. A forest plan may be amended at any time. The responsible officials (Boise and Payette Forest Supervisors) have the discretion to determine whether and how to amend the plan(s) and to determine the scope and scale of any amendment. A plan amendment is required to add, modify, or remove one or more plan components. The proposed removal of the below identified forest plan Standards would be one-time amendments to the current forest plans and would be project-specific and apply only to the SGP. These amendments would be made according to the 2012 Planning Rule (36 CFR Part 219.13, as amended) and will comply with the direction in both forest plans relating to Standards.

The Notice of Intent and Federal Register notices included notification of amendments and opportunity to comment. Substantive analysis requirements as per the 2012 Planning Rule (36 CFR 219.8 and 219.9) are addressed within **Appendix A** for sustainability (Section 219.8), plant and animal community diversity and persistence of native species (Section 219.9), multiple use (Section 219.10), timber (Section 219.11), and others.

Project-specific amendments to the Payette and Boise Forest Plans are evaluated for the 2021 MMP or the Johnson Creek Route Alternative. The amendments would remove the forest plan Standards as outlined in **Table 1.7-1**. The proposed forest plan amendments are in accordance with 36 CFR 219, the Forest Service 2012 Planning Rule (USDA 2012c). The amendments are a project-specific, one-time variance

(36 CFR 219.13(B)(1)) from the current Boise and Payette Forest Plans direction for the SGP. The responsible officials (Boise and Payette Forest Supervisors) have the discretion to determine whether and how to amend the plan(s) and to determine the scope and scale of any amendment.

Table 1.7-1 Forest Plan Amendments

Resource	Plan Component	Current Forest Plan Component Text
General Management Actions	PNF Standard 1301 PNF Standard 1306 BNF Standard 2010 BNF Standard 2113 BNF Standard 1919 BNF Standard 2005	Management actions, including salvage harvest, may only degrade aquatic, terrestrial, and watershed resource conditions in the temporary time period (up to 3 years), and must be designed to avoid resource degradation in the short term (3-15 years) and long term (greater than 15 years).
Total Soil Resource Commitment	PNF Standard SWST03	Management activities that may affect Total Soil Resource Commitment (TSRC) shall meet the following requirements: • In an activity area where existing conditions of TSRC are below 5 percent of the area, management activities shall leave the area in a condition of 5 percent or less TSRC following completion of the activities. • In an activity area where existing conditions of TSRC exceed 5 percent of the area, management activities shall include mitigation and restoration so that TSRC levels are moved back toward 5 percent or less following completion of activities. • To estimate TSRC it is essential that the glossary definitions for "activity area, detrimental soil disturbance and total soil resource commitment" are clearly understood.
Visual Quality Objectives	PNF and BNF Standard SCST01	All projects shall be designed to meet the adopted Visual Quality Objectives (VQOs) as identified in Management Area direction and represented on the Forest VQO map.
	BNF Standard 1767 (MA 17)	Meet the visual quality objectives as represented on the Forest VQO Map, and where indicated in **Appendix A** (Table 3) as viewed from the following areas/corridors: FSH 22.
	BNF Standard 1983 (MA 19)	Meet the visual quality objectives as represented on the Forest VQO Map, and where indicated in **Appendix A** (Table 3) as viewed from the following areas/corridors: FSH 22 and Forest Road (FR) 467.
	BNF Standard 2052 (MA 20)	Meet the visual quality objectives as represented on the Forest VQO Map, and where indicated in **Appendix A** (Table 3) as viewed from the following areas/corridors: FR 413.
	BNF Standard 2155 (MA 21)	Meet the visual quality objectives as represented on the Forest VQO Map, and where indicated in **Appendix A** (Table 3) as viewed from the following areas/corridors: FR 413, FR 416 W to Hennessey Meadow, and FR 440.
Fish	PNF Standard SWST09	In fish-bearing waters, do not authorize new surface diversions unless they provide upstream and downstream fish passage and, if needed, include either fish screens or other means to prevent fish entrapment/entrainment.

Resource	Plan Component	Current Forest Plan Component Text
Threatened, Endangered, Proposed, and Candidate Species – Mineral Resources, Land Use	PNF Standard TEST28 BNF Standard TEST28 PNF Standard TEST31 BNF Standard TEST31	Avoid adverse effects from locatable mineral operations to TEPC plant species and occupied habitat. Adverse effects from new facilities to occupied TEPC plant habitat shall be avoided.
Threatened, Endangered, Proposed, and Candidate Species - Recreation	BNF Standard TEST34	Allow no net increase in groomed or designated over-the-snow routes or play areas, outside of baseline areas of consistent snow compaction, by LAU or in combination with immediately adjacent LAUs unless the Biological Assessment demonstrates the grooming or designation serves to consolidate use and improve lynx habitat. This does not apply within permitted ski area boundaries, to winter logging, and access to private holdings. Permits, authorizations, or agreements could expand baseline routes of existing snow compaction, and grooming could expand to routs of existing snow compaction and route that have been designated but not groomed in the past and still comply with the standard.

For further information pertaining to meeting forest plan consistency requirements, please see the Forest Plan Consistency Analysis by resource in Chapter 4.

1.7.3 USACE Decisions

The USACE, under Section 404 of the CWA, will review the Project and either issue, issue with special conditions or deny a permit for the Project. The USACE regulates the discharge of dredged and/or fill material into WOTUS, including wetlands (Section 404 of the CWA). The 2021 MMP would place dredged and/or fill material in WOTUS as regulated under Section 404 of the CWA. A CWA Section 404 permit is required for the discharge of dredged and/or fill material into jurisdictional WOTUS (33 CFR Part 323).

In accordance with the CWA Section 404(b)(1) guidelines (40 CFR Part 230), the USACE may permit only the least environmentally damaging practicable alternative while considering cost, logistics, and technology. The USACE has determined that potentially jurisdictional WOTUS, including wetlands, are present that may be impacted by the Project. These waters are described in the "Wetlands and Riparian Resources" section of Chapter 3.

1.7.4 Key Permits Necessary to Implement the Plan of Operations

To implement the 2021 MMP and activities described in this EIS, Perpetua would need to obtain (or renew) permits and licenses. **Table 1.7-2** is a list of the key permits likely required to implement the 2021 MMP or the action alternative.

Table 1.7-2 Key Permits, Approvals, and Regulation Compliance Likely Required

Agency	Permit or Authorization
U.S. Forest Service	• Approved Plan of Operations (meeting the requirements of the Payette and Boise Forest Plans) • New Special Use Permit (SUP) for extension of the transmission line (PNF) • Revised SUP for the upgrade of transmission line 328 (BNF) • Timber Sale Permit(s) and Contract(s)
USACE Regulatory Division	• DA authorization pursuant to CWA Section 404
U.S. Environmental Protection Agency	• CWA Section 404 Permit Review • Spill Prevention Control and Countermeasures Plan (SPCC)
U.S. Fish and Wildlife Service	• Incidental Take Permit pursuant to Section 7 of the Endangered Species Act (ESA) • Protection of migratory birds under the Migratory Bird Treaty Act • Protection of bald and golden eagles under the Bald and Golden Eagle Protection Act
U.S. Department of Transportation	• Hazardous Materials Transportation Permit
U.S. Bureau of Reclamation	• Updated Land Use Authorization for upgrade of existing transmission line 328
National Oceanic and Atmospheric Administration National Marine Fisheries Service	• Incidental Take Permit pursuant to Section 7 of the ESA
Mine Safety and Health Administration	• Issue a mine identification number • Legal Identity Report • Approval of Ground Control Plan • Approval of Mine Health and Safety Training Plan
Federal Communications Commission	• Radio Authorizations
Treasury Department (Bureau of Alcohol, Tobacco, Firearms and Explosives)	• High Explosives Permit • Explosives Manufacturing Permit (ammonium nitrate and fuel oil [ANFO])
State Historic Preservation Officer	• Section 106 Consultation under the National Historic Preservation Act (NHPA)
Idaho Department of Lands	• Mine and Reclamation Plan Permit and Permanent Closure Plan under the Mined Land Reclamation Act • Permit for Permanent Closure of Cyanidation Facilities • Compliance with Best Management Practices for Mining in Idaho
Idaho Department of Water Resources	• Stream Channel Alteration Permits • Water Well Drilling Permits • Mine Tailings Impoundment Approval for Construction • Water Storage Embankment Approval for Construction • Water Right Permits

Agency	Permit or Authorization
Idaho Department of Environmental Quality	• Air Quality Permit to Construct under Rules for the Control of Air Pollution in Idaho • Air Quality Title V or Tier 1 Operation Permit per NESHAP 40 Part 63, Subpart 7E applicability and under Rules for the Control of Air Pollution in Idaho • Section 401 Certification under the CWA • Point of Compliance Determination under the Ground Water Quality Rule • Permit for Ore Processing by Cyanidation • Compliance with the Idaho Rules for Public Drinking Water Systems • Compliance with the Water Quality Standards • Compliance with the Solid Waste Management Rules • Compliance with the Rules and Standards for Hazardous Waste • Compliance with the Individual/Subsurface Sewage Disposal Rules • Compliance with the Wastewater Rules • Compliance with the Recycled Water Rules • Stormwater General Idaho Pollutant Discharge Elimination System Permit(s) (construction or multi-sector) • Wastewater Discharge Permits under Idaho Pollutant Discharge Elimination System Rules (Industrial Discharge Permit and Sanitary Discharge Permit)
Idaho Department of Health	• Food Establishment Permit
State Fire Marshal	• Compliance with the International Fire Code
Office of Emergency Management	• Tier II Reporting under the Emergency Planning and Community Right to Know Act (EPCRA) • TRI Reporting under the EPCRA and Pollution Prevention Act
Valley County	• Conditional Use Permit • Building Permits • Compliance with Valley County Liquefied Petroleum Gas Systems Ordinance • Compliance with Valley County Public Road Easement Stipulations • Road maintenance agreement

Table Source: Perpetua 2021a

1.8 Tribal Participation

The government-to-government relationship between federal agencies and federally-recognized tribes is a special relationship based on tribal sovereignty. The Forest Service is conducting government-to-government consultation with these federally recognized tribes: the Nez Perce Tribe, the Shoshone-Paiute Tribes, and the Shoshone-Bannock Tribes. The Forest Service requested scoping input from the tribes through letters dated May 31, 2017 (Shoshone-Paiute Tribes), June 1, 2017 (Shoshone-Bannock Tribes), and June 6, 2017 (Nez Perce Tribe). The Forest Service presented the SGP and initiated consultation during government-to-government meetings (Nez Perce Tribe May 23, 2017; Shoshone-Bannock Tribes July 26, 2017; and Shoshone-Paiute Tribes April 13, 2017). Since then, numerous meetings, calls, and communications have occurred. Government-to-government consultation will continue throughout the process. Details of this consultation are included in Chapter 6 of this EIS.

1.9 Scoping and Public Engagement

The Stibnite Gold Project has been published in both the Boise and Payette National Forests' Schedule of Proposed Actions (SOPA) since January 1, 2017. The Forest Service published a notice of intent (NOI) to prepare an EIS for the SGP in the Federal Register June 5, 2017. The NOI initiated a 45-day scoping period which ended July 20, 2017. During this time period, the Forest Service conducted five public meetings, including in-person meetings in Cascade, McCall, Yellow Pine, and two in Boise, Idaho. A legal notice was published in *The Idaho Statesman*, Boise, Idaho (the newspaper of record), and *The McCall Star News*, McCall, Idaho June 1, 2017.

The Forest Service received a total of 536 submissions during public scoping. The Scoping and Issues Summary Report can be viewed here: https://www.fs.usda.gov/project/?project=50516.

A notice of availability (NOA) for the DEIS was published in the Federal Register August 20, 2020. The NOA initiated a 60-day public comment period; in response to requests for extension, a 15-day extension was granted for public comments on the DEIS. In total, approximately 10,000 submissions were received during the 75-day public comment period in response to the DEIS. During that time, a virtual, on-line project information room provided SGP data for review such as posters, documents, and figures; due to the COVID-19 pandemic, in-person public meetings were not held. In addition, DEIS reference documents were available via a linked document on the Project webpage, except for information held as confidential per Forest Service procedures. The issues evaluated in this EIS are derived from public comments originally made during the public scoping period and summarized in the SGP Scoping and Issues Summary Report issued in January 2018 (AECOM 2018). In that document, the comments received during scoping from agencies and the public were summarized into categories, which became the basis for defining issues and indicators. After the public comment period for the SGP DEIS, Midas Gold (now Perpetua) revised the Plan to address potential impacts and public concerns. The comments received on the SGP DEIS were reviewed as additional scoping input during development of the SDEIS.

A NOA for the SDEIS was published in the Federal Register October 28, 2022. The NOA initiated a 60-day public comment period. Individuals and several organizations requested an extension of the comment period. The request was accommodated by extending the public comment period through January 10, 2023, resulting in a total overall comment period of 75 days. Approximately 19,400 submissions were received during the public comment period. During that time, four in-person public meetings were held in McCall (December 6, 2022), Cascade (December 7, 2022), and Boise (two meetings on December 9, 2022). An interactive StoryMap for the Project was available online at: Stibnite Gold Project (arcgis.com). Supporting documents and specialist reports were also made available with the SDEIS on the Project webpage.

Additional details regarding public involvement and public scoping are provided in Chapter 6, **Section 6.1**, Public Participation Summary.

1.10 Issues

Using the comments from public and agency scoping, the Forest Service, in coordination with cooperating agencies, developed a list of resource concerns and topics to address in the EIS. For each issue, indicators were created to describe, compare, and contrast the effects of the Proposed Action and alternatives carried forward for detailed analysis.

1.10.1 Significant Issues

The regulations implementing NEPA require federal agencies to develop and evaluate alternatives to Proposed Actions that involve unresolved conflicts concerning alternative uses of available resources (40 CFR 1501.2). Significant issues are those which are used to formulate alternatives to the Proposed Action and to develop mitigation measures. The following significant issues were identified for the SGP and are listed below with indicators which measure and compare potential effects. Significant issues are analyzed in depth in the EIS (40 CFR 1501.7(a)(2)) and may be a cause/effect relationship between the Proposed Action and a significant impact (Forest Service Handbook [FSH] 1909.15 chap. 12.41 [Forest Service 2015a]).

1.10.1.1 Fish Resources and Fish Habitat

Issue:

Construction and operation of mine infrastructure may impact the quality and quantity of water, habitat for Chinook salmon, steelhead, and bull trout. SGP activities may also affect fish behavior and reproductive success and may result in injury or mortality of Chinook salmon, steelhead, and bull trout in the analysis area.

Indicators:

- Changes in stream and lake habitat directly impacted by channel removal (kilometers [km]).
- Change in amount of total useable Chinook salmon Intrinsic Potential (IP) habitat (km).
- Direct loss of Chinook salmon Critical Habitat (km).
- Changes in total useable steelhead IP habitat (km).
- Changes in the length of available bull trout habitat (km).
- Bull trout occupancy probability.
- Changes in access to bull trout lake habitat.
- Direct loss of bull trout critical habitat (km).
- Length of westslope cutthroat trout habitat (km).
- Westslope cutthroat trout occupancy probability.
- Changes in stream peak and baseflow (cubic feet per second [cfs]).
- Changes in water temperature (degrees Celsius [˚C]).
- Changes in water chemistry (analysis criteria).

1.10.1.2 Surface Water and Ground Water Quantity and Quality

Issue:

Construction and operation of mine infrastructure may impact water quality and quantity within the analysis area.

Indicators:

- Mineralized waste generated (tons, closure stabilization, and water chemistry).
- Exposures of ore bodies/potentially acid-generating material (rock and water chemistry).
- Legacy mine tailings and waste rock (rock and water chemistry).
- Methylation rates for mercury (water chemistry).
- Surface water quality (water chemistry and temperature).
- Groundwater quality (water chemistry).
- Stream flow characteristics (daily, seasonal, annual).
- The extent, magnitude, and duration of changes in groundwater levels (feet of drawdown).

1.10.1.3 Tribal Rights and Interests

Issue:

Construction and operation of mine infrastructure may impact access to reserved Tribal rights and resources. Construction and operation of mine infrastructure may impact tribal resources.

Indicators:

- Existence of the Nez Perce Tribe Treaties (1855 and 1863).
- Existence of Shoshone-Bannock Treaty (1868).
- Existence of the Shoshone-Paiute Tribes Executive Order.
- Known prehistoric cultural resources and/or traditional use sites impacted by the SGP.
- Presence of traditional cultural properties[5] (TCPs), cultural landscapes[6] (CLs), sacred sites, and tribal resource collection areas that may be physically impacted by ground disturbance.
- Presence of TCPs, CLs, sacred sites, and tribal resource collection areas that may be impacted by visual intrusions caused by SGP components or an increase in audible elements (noise and vibrations).

[5] A TCP, as defined in the NHPA, is a property that is eligible for inclusion on the National Register of Historic Places (NRHP) "because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history and are important in maintaining the continuing cultural identity of the community" (Parker and King 1998).

[6] A CL is defined as a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person, or exhibiting other cultural or aesthetic values. CLs are generally one of four types: vernacular, designed, historic site, or ethnographic (NPS 2021).

- Changes in access to TCPs, CLs, sacred sites, and tribal resource collection areas due to the restricted access within the Operations Area Boundary.
- Changes to species viability and/or availability for tribal harvest of culturally important fish, wildlife, and plants.

1.10.1.4 Wetlands and Riparian Resources

Issue:

Construction and operation of mine infrastructure may impact the quantity of wetland acres, impact ecological function, and fragment wetland habitat.

Indicators:

- Amount (acres) of wetland and riparian habitat permanently lost through construction of SGP components.
- Amount (acres) of wetland and riparian habitat temporarily lost through construction of SGP components.
- Functional units of high-value wetlands lost due to project construction, as demonstrated using functional assessment method.
- Acres of wetlands that would be affected by new or improved roads.
- Qualitative analysis of effects of wetland and riparian habitat fragmentation in affected areas.
- Amount (acres) of wetlands that would be within the footprint of groundwater drawdown.
- Qualitative analysis of estimated changes in water quality parameters based on predictive water modelling in wetland areas.

1.10.1.5 Access and Transportation

Issue:

Construction and operation of mine infrastructure may impact public access to NFS lands and affect travel routes within the SGP area.

Indicators:

- Number, location, and description of changes in access due to new and improved roadways.
- Amount of new road (miles).
- Change in amount of use (number of trips).
- Changes to current status on motorized mixed use of routes.

Issue:

Construction, operation, and reclamation may affect traffic volumes, types of vehicles, and patterns of use. Further, it may affect access to federal lands as well as public safety during mine construction, operations, and closure and reclamation.

Indicators:

- Miles of roads used by mine vehicles.
- Change in traffic volume.
- Potential number of accidents, both current and projected.
- Change in emergency access.
- Assessment of effectiveness of design features designed to prevent accidents.

1.10.2 Important Resource Related Issues

Other important issues were developed from scoping comments along with Forest Service and cooperating agency review. Though these issues were not identified as 'significant issues', they were identified by the public, the Forest Service, and cooperating agencies as relevant considerations. These other important issues help to focus the analysis of environmental effects to the physical, biological, and social resources under consideration. Like significant issues, other important issues use indicators to measure and compare potential effects. **Table 1.10-1** presents other important issues discussed in greater detail in Chapter 4.

Table 1.10-1 Important Resource Related Issues

Resource	Issues	Indicators	EIS Sections Where Resources are Described and Impacts are Addressed
Geologic Resources and Geotechnical Hazards	• The minerals present at the site are economically valuable and may contribute to the national goal of being economically independent in strategic metals, such as antimony. • Mining activities could change the existing topography and leave physical hazards if not properly designed and managed. • Geological and geotechnical stability of the SGP facilities, including the TSF and other mine components.	• Amount and value of ore extracted (million tonnes/$). • Depletion of mineral resources (million tonnes). • Alteration of natural topography. • Unstable slopes. • Geological/Geotechnical suitability of the selected locations for the mining and facilities to be constructed. • Long-term geologic/geotechnical stability of the proposed structures.	Geologic Resources and Geotechnical Hazards
Air Quality	• The SGP may affect air quality characteristics and resources that are affected by air pollutants.	• Geographical extent of pollutant concentrations and deposition. • Type and volume of air pollutants emitted, including haze precursors, airborne dust, and hazardous air pollutants (HAP). (tons per year) • Criteria air pollutant ambient air concentrations outside the Operations Area Boundary anywhere the public is allowed unrestricted access. • Comparison of predicted ambient concentrations to Class I and Class II increments and Significant Impact Levels. • HAPs (including mercury [Hg]) emissions and Hg deposition. • Deposition of nitrogen and sulfur compounds in Class I and specified Class II areas. • Near-field plume blight and far-field regional haze in protected areas.	Air Quality

Resource	Issues	Indicators	EIS Sections Where Resources are Described and Impacts are Addressed
Climate Change	• The SGP activities could contribute to factors that influence climate change. • Changing climatic conditions, in synergy with the SGP (including construction, operations, and closure and reclamation), could impact the physical, biological, and social resources.	• Greenhouse Gas (GHG) emissions from SGP activities (construction, operations, and closure and reclamation), expressed as metric tons (MT) of carbon dioxide (CO_2) equivalent (CO_2eq) of GHGs. • Changes in hydrologic patterns (drought, precipitation variability, and seasonality). • Changes in temperature (extreme heat/cold, or overall change in annual or seasonal temperatures). • Changes in extreme weather events (flash flooding, wildfires, severe storms).	Climate Change
Soils and Reclamation Cover Materials	• The SGP may result in long-term adverse impacts to soil resources. • Available reclamation cover material (RCM) may not be of sufficient quantity or quality to achieve reclamation objectives of returning disturbed areas to productive conditions that sustain long-term wildlife, fisheries, land, and water resources.	• Amount of (acres) and proportion of the TSRC activity area that are converted from a productive site to a non-productive site (as defined in the both the Payette Forest Plan and Boise Forest Plan). • Amount of (acres) and proportion of detrimental soil disturbance (DD) activity area that have altered soil characteristics resulting in a loss of productivity and altered soil-hydrologic conditions (as defined in both the Payette and Boise Forest Plans). • Volume of RCM available (bank cubic yards [BCY]) for reclamation compared to expected demand to achieve reclamation objectives. • Quality and suitability of RCM available for reclamation.	Soils and Reclamation Cover Materials

Resource	Issues	Indicators	EIS Sections Where Resources are Described and Impacts are Addressed
Noise	• The SGP may cause disturbance to Noise Sensitive Receivers (NSRs) such as occupied residences and campgrounds.	• Noise exceeds 55 decibels (dB) on the A-weighted scale (dBA) day-night noise level (L_{DN}) at the exterior use area of an NSR, or 55 dBA average hourly noise level (L_{EQ1h}) at any time at an exterior use area. • Noise exceeds 45 dBA L_{DN} at the interior portion of a residential NSR. • Noise causes the baseline outdoor ambient (i.e., existing) noise level to increase by more than 5 dBA in the vicinity of an NSR. • Noise causes the resulting indoor or outdoor ambient noise level to exceed 60 dBA equivalent sound level (L_{EQ}).	Noise
Hazardous Materials	• The SGP may cause accidental releases of hazardous materials or wastes, including diesel fuel, gasoline, lubricants, antifreeze, chemical reagents and reactants (including sodium cyanide and sulfuric acid), antimony concentrate, mercury containing residuals, lime, explosives and other substances during their transport, use, storage, or disposal.	• Volumes (gallons, truckloads, tons) and types of hazardous materials and hazardous wastes transported, used, and stored during site operation. • Practices for storage and use on site including primary/secondary/tertiary containment types and volumes and material handling practices. • Amount of vehicular transport (trips) of hazardous materials during construction, operations and closure and reclamation. • Travel routes and road conditions (such as terrain, proximity to water bodies, geohazard risk, etc.).	Hazardous Materials

Resource	Issues	Indicators	EIS Sections Where Resources are Described and Impacts are Addressed
Vegetation (General Vegetation Communities, Botanical Resources, and Non-native Plants)	• The SGP may impact forested Potential Vegetation Groups (PVGs) within Forest Service-administered land and could impact the ability of these areas to reach desired conditions. • The SGP may impact non-forested areas (i.e., those that are identified through PVG mapping as not being successional to forests) within Forest Service-administered land and could impact the ability of these areas to reach desired conditions. • The SGP may impact vegetation outside the boundaries of the Forests. • The SGP may impact known occurrences of Regional and Forest-specific designated sensitive and forest watch plant species. • The SGP may result in a direct loss of modeled potential habitat for Regional and Forest-specific designated sensitive and forest watch plant species. • SGP actions may result in increased potential for non-native plant establishment and spread. • Candidate Plant Species - Construction and operation of mine infrastructure may impact habitat for whitebark pine and may result in individual mortality.	• Amount of disturbance (acres) to previously undisturbed forest PVGs within Forest Service-administered land. • Amount of disturbance (acres) to previously undisturbed non-forested areas within Forest Service-administered land. • Amount of disturbance (acres) in previously undisturbed Landscape Fire and Resource Management Planning Tools Project (LANDFIRE) existing vegetation types outside Forest Service boundaries. • Presence of known occurrences of sensitive or forest watch plant species or occupied habitat within 300 feet of the disturbance area. • Amount of modeled potential habitat (acres) for Regional and Forest-specific designated sensitive and forest watch plant species disturbed by the SGP. • Amount (acres) of land disturbed by the SGP. • Amount (acres) of vegetation removal in modeled potential habitat for whitebark pine. • Amount (acres) of whitebark pine occupied habitat impacted by the SGP. • Estimated number of mature whitebark pine trees to be cut during SGP construction. • Acres of habitat for whitebark pine known occurrences that would be directly impacted.	Vegetation (General Vegetation Communities, Botanical Resources, and Non-native Plants)

Resource	Issues	Indicators	EIS Sections Where Resources are Described and Impacts are Addressed
Wildlife and Wildlife Habitat (Including Threatened, Endangered, Candidate, and Sensitive Species)	• The SGP may cause changes in wildlife habitat in the analysis area that may affect wildlife species including special-status species (threatened, endangered, Management Indicator Species, and sensitive species). • The SGP may affect wildlife by introducing barriers to movement, including the mine site, infrastructure, new/existing maintained roads, new transmission line. • The SGP may affect wildlife by potentially increasing the risk of direct injury or mortality.	• Amount (acres) of general wildlife habitat disturbed. • Amount (acres) of special-status wildlife habitat disturbed. • Amount (acres) of disturbance to other high-value habitats such as crucial and or high-value big game ranges, wetlands, and seep and spring areas. • Change in noise levels (dB) in, or in proximity to, wildlife habitat. • Amount (acres) of new road disturbance for the SGP. • Amount (acres) of disturbance for new and upgraded transmission lines. • Length (miles) of potential movement barriers. • Amount of increased traffic along the access routes, or acres of ground disturbance for less-mobile species. • Miles of new roads and transmission lines. • Miles of existing roads that are not currently plowed that would be plowed.	Wildlife and Wildlife Habitat (Including Threatened, Endangered, Candidate, and Sensitive Species)
Timber Resources	• The SGP may change the availability of timber resources, including sawtimber and special forest products.	• Volumes and acres of timber resources removed. • Acres of timberland (including land suited for timber production) converted to other, non-productive land uses. • Miles or acres of new or changed rights-of-way (ROWs) or easements, regardless of jurisdiction.	Timber Resources
Land Use and Land Management	• The SGP would cause changes in or create new ROWs or easements. • The SGP would cause changes in land use or land management.	• Miles or acres of new or changed ROWs or easements, regardless of jurisdiction. • Acres of land used for SGP components by land management agency. • Acres of total and new land disturbance within SGP area.	Land Use and Land Management

Resource	Issues	Indicators	EIS Sections Where Resources are Described and Impacts are Addressed
Heritage Resources	• The SGP would impact historic properties through temporary or permanent ground disturbing activities during construction, operation, and closure and reclamation phases. • The SGP may impact aboveground historic properties, TCPs, and CLs by introducing visual elements that could diminish the integrity of the resources. • The SGP would create noise and vibration that could impact fragile standing or partially standing historic properties, TCPs, and CLs. • The SGP may create increased visibility of historic properties through increased public access via new roadways and improvements to existing roads, which could potentially lead to loss or destruction.	• Location of ground disturbance. • Number and location of historic properties, including TCPs and CLs. • Significance of historic properties that could be displaced, damaged, or destroyed. • Locations of tall or massive SGP components in relation to aboveground historic properties, TCPs, and CLs. • Number and location of aboveground historic properties, TCPs, and CLs that may have altered viewsheds. • Vibration causing activities, including very high noise levels, and the locations of activities. • Number and location of standing or partly standing historic properties, TCPs, and CLs in relation to noise and vibration causing activities. • Location of public access roads that would be improved, constructed, and remain in use following mine closure and reclamation. • Number and location of historic properties, including TCPs and CLs, that may be impacted.	Heritage Resources

Resource	Issues	Indicators	EIS Sections Where Resources are Described and Impacts are Addressed
Public Health and Safety	• The SGP may affect public safety on the roads used by mine vehicles during construction, operation, and closure activities. • The SGP may affect human health or exposure to hazards. • The SGP may affect infrastructure and services as related to emergency services, medical services, utilities, sanitation, and wastewater treatment. • The SGP may cause public health effects related to changing environmental conditions.	• Number of SGP-related vehicles trips on public roads. • Changes in health metrics such as soil, air, and water quality. • Quantity of hazardous materials transported on access roads. • Risk of natural hazards (wildfire, avalanche, landslide). • Capacity of existing infrastructure and services to meet anticipated increased use. • Changes in soil, air, fish consumption, and water quality that may affect public health. • Disruption at recreational areas during construction, operation, and closure and reclamation.	Public Health and Safety
Recreation	• The SGP may cause changes to recreation setting, access, facilities, and/or opportunities.	• Changes in motorized access (including restrictions and/or changes in maintenance) to recreation opportunities. (miles) • Changes in recreation physical setting characteristics and related Recreation Opportunity Spectrum (ROS) class (by season) measured in acres. • Changes in recreation facilities (trails, campgrounds, trailheads), including the level of development and setting. • Changes in recreation use. (qualitative) • Changes in recreation special use permits. • Changes in recreation opportunities available. • Changes in the ability to participate in recreation opportunities.	Recreation

Resource	Issues	Indicators	EIS Sections Where Resources are Described and Impacts are Addressed
Social and Economic Conditions	• The SGP may impact the socioeconomics of Valley and Adams counties and the State of Idaho.	• Contributions to employment levels (total, State of Idaho, and Valley and Adams counties). • Estimated value (dollars) of local income contributions. • Estimated value (dollars) of goods and services procured in Valley and Adams counties. • Change in populations of Valley and Adams counties. • Impacts to housing demand in Valley and Adams counties. • Estimated tax revenue contributions (dollars). • Changes in tourism and recreational based businesses. • Changes in transportation and infrastructure.	Social and Economic Conditions
Environmental Justice	• The SGP may disproportionately impact minority or low-income populations.	• Number and size of minority populations affected. • Number and size of low-income populations affected. • Location of SGP facilities, including roads and transmission lines in relation to minority or low-income residents. • Differences in access to public lands.	Environmental Justice
Idaho Roadless Areas (IRAs)	• The SGP may impact roadless characteristics and wilderness attributes in IRAs and lands contiguous to unroaded areas.	• Miles and acres of roads in IRAs or contiguous unroaded lands. • Acres/miles of proposed SGP facilities in IRAs or contiguous unroaded lands.	Special Designations
Wilderness	• The SGP could change the quality of wilderness character in designated or recommended wilderness areas.	• Distance (miles) of SGP facilities from designated or recommended wilderness. • Distance (miles) of designated or recommended wilderness from sights and sounds of human activity. • Change in opportunities for self-reliant recreation within designated or recommended wilderness.	Special Designations

Resource	Issues	Indicators	EIS Sections Where Resources are Described and Impacts are Addressed
Wild and Scenic Rivers (WSRs)	• The SGP may affect WSRs.	• Changes to free-flowing conditions for eligible and suitable WSR segments. • Changes in water quality for eligible and suitable WSR segments. • Changes to Outstandingly Remarkable Values (ORVs) for which eligible and suitable WSR segments are designated or nominated. • Changes to classification of eligible and suitable WSR segments as Wild, Scenic, or Recreational.	Special Designations
Research Natural Areas (RNAs)	• The SGP could impact research values or ecosystem conditions within RNAs.	• Change in vegetation community composition and structure within an RNA. • Change in number of vehicles using roads and human activity. • Changes to water quality (chemistry, temperature) or quantity within an RNA.	Special Designations
Scenic Resources	• The SGP may cause changes to scenic resources.	• Visual contrast. • SGP component visibility. • Change in landscape character and scenic quality of the analysis area. • Change in distance zone. • Change in nighttime lighting. • Context of impacts, including that directed by forest plan standards and guidelines. • Change in scenic integrity.	Scenic Resources

1.10.3 Issues Eliminated and Dismissed from Additional Analysis

NEPA regulations require the agency to identify and eliminate from detailed study those issues that are not significant or that have been covered by prior environmental review, to narrow the scope of the analysis (CEQ Guidance Regarding Scoping, 4-30-81). Reasons for eliminating issues from detailed study include when the issues are related to the following:

- General opinions or position statements not specific to the Proposed Action;
- Items addressed by other laws, regulations, or policies;
- Items not relevant to the potential effects of the Proposed Action, or otherwise outside the scope of this analysis; and/or,
- Items that have no or negligible effects.

1.10.3.1 Changes to the General Mining Law of 1872

Comments received suggested that reforming or changing the Mining Law, as amended, would address potential future environmental impacts. While the Mining Law is fundamentally a law for acquiring property rights, rather than an environmental law, presumably the comments were directed at eliminating the ability to establish property rights and increasing agency discretion to prevent mining. This is dismissed from consideration because making or amending law is an explicit function of Congress and not within the authority of the Secretary of Agriculture.

1.10.3.2 36 CFR Part 251 Land Uses

Comments received questioned why the proposal was not being evaluated for issuance of a special use permit under the 36 CFR 251 Subpart B regulations. The U.S. mining laws (30 USC 21-54) govern exploration and development of minerals on federal lands and the Forest Service is responsible for approving plans for such use and occupancy of NFS lands for locatable mineral operations pursuant to 36 CFR 228 Subpart A. As proposed, SGP is a locatable minerals operation authorized by the U.S. mining laws and subject to regulations at 36 CFR 228 subpart A. Pursuant to 36 CFR 251.50(a), such operations are not subject to 36 CFR 251 Subpart B.

1.10.3.3 Executive Orders

Comments received stated opinions that Forest Service should either comply or ignore certain executive orders, such as Executive Order (EO) 13766 (*Expediting Environmental Reviews and Approvals for High Priority Infrastructure Projects*), 13807 (*Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure Projects*), and EO 13927 (*Accelerating the Nation's Economic Recovery from the COVID-19 Emergency by Expediting Infrastructure Investments and Other Activities*). These EOs were revoked by EO 13990 (*Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis*). Forest Service complies with the requirements of valid EOs when completing NEPA and implementing processes.

1.10.3.4 Wild and Scenic Rivers

Comments received stated that if the SGP might jeopardize the eligibility for WSRs designation for a certain river, and the WSR evaluation was not already completed as part of land use planning, a site-specific analysis is required. The Forest Plan standard WSST-01 states "When management actions are proposed that may compromise the outstandingly remarkable value, classification, or free-flowing character of an eligible Wild and Scenic River segment, a suitability study must be completed for that eligible river segment prior to initiating the actions." Eligibility studies have already been conducted. In 1997, the need for a WSR eligibility study on forest lands based on new information and changed conditions was identified and then conducted. The WSR Act states that, in order to be eligible, a river segment must be free-flowing (free of impoundments or diversions) and contain at least one ORV. During this process it was determined that Burntlog Creek was eligible as a recreational segment from the headwaters to the crossing with FR447 and wild from FR447 to the confluence with Johnson Creek with fish as the ORV. Johnson Creek was determined as eligible as a recreational segment with heritage as the ORV.

The South Fork Salmon River (SFSR) was determined as suitable and recommended for designation as a WSR by the Forest Service (Forest Service 2003a: Appendix J WSR Suitability Study Report). The ORVs for the recreational segment within the analysis area are botanical, scenic, geology, heritage, and recreation. There could be temporary impacts to the recreation ORV if access is restricted during construction activities. Although the Warm Lake Road and transmission line are existing scenic impacts, the new taller transmission line poles and additional cleared vegetation may be more noticeable; however, this would be limited to where this crosses the river. There would be no impacts to the botanical, geology, or heritage ORVs.

Existing or new mining activity on a Forest Service-identified WSR eligible or suitable river segment are subject to regulations in 36 CFR Part 228 Subpart A and must be conducted in a manner that minimizes surface disturbance, sedimentation, pollution, and visual impairment (FSH 1909.12, Chapter 84.3). Historic properties along the eligible segment of Johnson Creek would be avoided during the transmission line upgrade. There would be no impact to the heritage ORV along this segment. The fish ORV would not be adversely affected associated with the segments of Burntlog Creek identified as eligible as wild or recreational. There is no impairment to the free-flowing characteristics of either the Johnson Creek or Burntlog Creek segment.

Further, comments stated that a Section 7 analysis under the WSR Act is required to determine whether the SGP would impair the free-flowing character of any impacted WSR. A Section 7 analysis is only completed for a designated WSR; none of the streams or rivers in the analysis area are designated WSRs. Further, a Section 7 analysis is conducted for federal water resources projects (i.e., located below the ordinary high-water mark); therefore, it is not applicable to the SGP.

1.11 Changes from the SDEIS to the Final EIS

The Forest Service considered all substantive comments and used them to assist in updating, revising, or adding clarifications to the Final EIS. The Final EIS changes include consideration given to public comments, corrections, and minor grammatical changes including rewording for clarification of purpose and intent.

The Forest Service focused on addressing public comments, while continuing to meet its legal, regulatory, and policy mandates. No additional alternatives have been evaluated in the Final EIS. There are mitigation measures added to address resource impacts. Key changes to the Final EIS include:

- Geotechnical sampling and data collection in support of the Burntlog Route development (**Section 2.4.4.3**).
- A new figure depicting growth media profiles (**Figure 2.4-19**).
- Reclamation cover materials baseline data updated and revised (**Section 3.5**).
- Additional wolverine baseline data provided (**Section 3.13**). Wolverine status changed from Proposed Threatened to Federally Threatened.
- Expansion of the Access and Transportation analysis area to include SH 55 south to I-84 in Boise and north to US 95 in New Meadows (**Section 3.16**).
- Revised heritage resources baseline data to include additional inventories and updated evaluations (**Section 3.17**).
- Inventoried Roadless Areas revised to Idaho Roadless Areas and roadless characteristics baseline data was expanded (**Section 3.23**).
- Additional avalanche and seismic analysis (**Section 4.2**).
- Addition of individual GHG emissions estimates by Project activity (**Section 4.4**).
- Detail added regarding growth media suitability criteria (**Section 4.5**).
- Expanded avalanche analysis (**Section 4.6**).
- Additional water treatment description (**Section 4.9**).
- Revised wetlands analysis associated with submittal of the Compensatory Mitigation Plan to the USACE (**Section 4.11**).
- Analysis of offsite transportation of hazardous materials added (**Section 4.16**).
- Additional mitigation measure to restrict public access to newly constructed portions of the Burntlog Route (**Section 4.16.3**).
- Travel Management Rule subsection added (**Section 4.19**).
- Expanded Idaho Roadless Areas roadless characteristics analysis (**Section 4.23**).
- Additional mitigation measures identified (**Chapter 4**).

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2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 Introduction

Chapter 2 describes the action proposed by Perpetua in its 2021 MMP submitted in October 2021 (Perpetua 2021a), an additional alternative utilizing another access route, and the No Action Alternative. Each alternative (including the No Action Alternative) would result in different environmental effects, which are analyzed in detail in Chapter 4. In addition, **Section 2.6** includes a discussion of other alternatives considered but eliminated from further analysis. **Section 2.7** summarizes the Agency Preferred Alternative. **Section 2.8** concludes with a comparative summary of the environmental effects.

2.2 Development of Alternatives

2.2.1 Regulatory Setting for Alternatives Development

Alternatives to the Proposed Action were developed by the Forest Service, with input from other cooperating agencies, guided by the NEPA, CWA, and U.S. Department of Agriculture Forest Service regulations (40 CFR 1502.14, 40 CFR 230, and 36 CFR 220.5, respectively), Forest Service Region 4 guidance, and the FSH. The Organic Administration Act, and Forest Service regulations at 36 CFR 228 Subpart A, governing mineral development on NFS lands also provided guidance regarding alternatives development.

2.2.2 Alternatives Screening Criteria

As used in this EIS, an action "alternative" is a complete package of operations, activities, and facilities that comprise a functioning mine project. A complete mining plan has several "component" parts, each necessary to allow production. In many instances, operational components may be further comprised of "subcomponents." To develop a range of reasonable alternatives, Perpetua's plan of operations, as supplemented by additional information and clarifications, was separated into components and subcomponents.

Public comments received during scoping provided early input into potential alternatives to the proposed SGP. An iterative review by the Forest Service and cooperating agencies, evaluated these comments to determine whether they were reasonable alternatives to the proposed SGP using four basic screening criteria described below. In addition to alternatives suggested during scoping, the Forest Service, cooperating agencies, and Perpetua also completed an alternatives development and review process. This process incorporated a review of the Plan and included consideration of alternatives Perpetua had already evaluated prior to the submission of their Plan (Midas Gold 2016a, Appendix G). Potential alternatives and component options were screened based upon four criteria:

1. Does the alternative, including a combination of component options, meet the purpose and need of the SGP?

2. Would the alternative or component option potentially reduce environmental effects to at least one resource?
3. Is the alternative or component option technically feasible?
4. Is the alternative or component option economically feasible?

Alternatives or component options not meeting the purpose and need (described in **Section 1.6**) were documented and eliminated first. Each remaining alternative was then evaluated for technical and economic feasibility and potential environmental impacts using the significant impact issues identified through the scoping process (**Section 1.10**). Infeasible alternatives or alternatives lacking any environmental benefit over the Proposed Action were then eliminated. In addition, options similar in design to an alternative that was carried forward into detailed analysis were screened out to avoid duplication. **Section 2.6** provides additional discussion of specific component alternatives and options that were considered but eliminated.

Further review of alternatives after consideration of comments on the DEIS and submittal of a 2021 MMP by Perpetua eliminated certain action alternatives considered in the DEIS (**Section 2.6**).

Project refinements included in the 2021 MMP: (1) are supported by updated data and analysis that identify opportunities to reduce potential environmental impacts; (2) further ameliorate potential environmental impacts; (3) are informed by public and agency comments on the DEIS, and; (4) align with the NEPA, and all applicable federal, State, and local regulations and permit requirements.

2.2.3 Alternatives Overview

As described below, there are two action alternatives and the No Action Alternative. In general terms, these alternatives are:

No Action Alternative – The No Action Alternative provides an environmental baseline for comparison of the action alternatives. Under the No Action Alternative, the mining, ore processing, and related activities under the action alternatives, including removal of legacy materials, would not take place. However, existing, and approved activities (i.e., approved exploration activities and associated reclamation obligations) would continue and Perpetua would not be precluded from subsequently submitting another plan of operations for consideration and evaluation pursuant to the General Mining Law of 1872.

2021 MMP – The 2021 MMP is based upon Perpetua's Modified Plan of Operations submitted in October 2021 for the SGP. The SGP operations footprint would be within the identified Operations Area Boundary (**Figure 2.4-1**). The Operations Area Boundary is defined as the ambient air boundary (Air Sciences 2018a) and encompasses 14,221 acres, of which 13,441 acres are NFS lands and 780 acres of private lands. Within the Operations Area Boundary, the SGP operations footprint is where mining activities would occur, such as explosives handling, blasting, drilling, and heavy equipment operation which require strict safety protocols and controlled access. For access, the 2021 MMP would utilize Warm Lake Road, Johnson Creek Road, and Stibnite Road (comprising the Johnson Creek Route) during construction of the Burntlog Route, then utilize the Burntlog Route for the last year of construction of the mine site through operations and reclamation. The 2021 MMP primarily refines the open pit mining, pit

backfill, water management, and closure aspects of the project compared to earlier Plan of Operations submittals.

In the 2021 MMP, public access on the newly constructed portions of the Burntlog Route was not restricted. Therefore, this EIS analyzed the effects of unrestricted public access along the existing and new portions of the Burntlog Route, describing the full Burntlog Route as available for access along with the potential effects of that access. Based on the analysis of these effects, restrictions on public access to the new portions of the Burntlog Route were developed by the Forest Service (see **Section 4.16.3**) and have been included in the draft Record of Decision.

Johnson Creek Route Alternative – The Johnson Creek Route Alternative was developed by the Forest Service and the cooperating agencies to evaluate potential reductions from access related effects. The mining portion of this alternative would be the same as the 2021 MMP. Therefore, the primary focus of the Johnson Creek Route Alternative is consideration of using an existing route, which would require improvements, for mine access during operations and reclamation instead of a route that under the 2021 MMP requires new road construction in and through IRAs.

2.2.4 Components Common to and Primary Differences Between the Action Alternatives

The following mine components would be common to the two action alternatives:

- Mine pit locations, areal extents, and mining and backfilling methods
- Transportation management on existing and proposed roads
- Pit dewatering, surface water management, and water treatment
- Ore processing
- Lime generation
- Tailings Storage Facility (TSF) construction and operation
- TSF Buttress construction methods
- Water supply needs and uses
- Management of mine impacted water and stormwater runoff
- Electrical transmission lines
- Stibnite Gold Logistics Facility (SGLF)
- A road maintenance facility (location different depending on alternative, see **Table 2.2-1**)
- Surface and underground exploration
- Stibnite Gold Project worker housing facility

These mine components are described under the 2021 MMP and would remain the same under the Johnson Creek Route Alternative. **Table 2.2-1** provides a summary of the differences between the action

alternatives. Because **Table 2.2-1** describes primary differences, not all the components listed above are included in the table.

Table 2.2-1 Action Alternatives Summary

SGP Phase	Component/ Subcomponent	2021 MMP	Johnson Creek Route Alternative
All Phases	SGP timeline	• Construction: Approximately 3 years. • Operations: Approximately 15 years. • Exploration: Approximately 17 years (during construction and operations). • Reclamation: Approximately 5 years (except for the TSF which would require an additional 9 years for tailings dewatering and consolidation). • Closure/Post-Closure Water Treatment: Approximately through Mine Year 40. • Environmental Monitoring: As long as needed.	Same as 2021 MMP except: • Construction: Approximately 5 years (upgrading the existing Johnson Creek and Stibnite Roads to provide permanent mine access).
All Phases	Access Roads	Construction/Operations: • Warm lake road from State Highway (SH) 55 to Johnson Creek Route intersection (34 miles). • Johnson Creek Route for SGP access during early construction with minor improvements within the road prism. • Burntlog Route (38 miles) for SGP access during last year of construction, mining and ore processing operations, and closure and reclamation. Includes improvements of existing segments (23 miles) and road construction for new segments (15 miles). • Up to eight borrow areas developed along Burntlog Route for materials needed for road improvements and maintenance. • Access route around the Yellow Pine pit for public access. Closure and Reclamation: • New sections of Burntlog Route to be reclaimed after the closure and reclamation period.	• Warm lake road from SH 55 to Johnson Creek Route intersection (34 miles). • Johnson Creek Route (39 miles: Johnson Creek Road 25 miles, Stibnite Road 14 miles) upgraded and used for access throughout life of mine (LOM) instead of the Burntlog Route. • Access route around the Yellow Pine pit for public access, employee access, and deliveries of supplies and equipment to the processing, warehouse, worker housing facility, and administration areas. • No improvements or construction of new segments for Burntlog Route. • Up to seven borrow sources developed along the Johnson Creek Route for materials needed for road improvements and maintenance. Closure and Reclamation: • Improved Johnson Creek and Stibnite roads would not be reclaimed to pre-existing conditions.

SGP Phase	Component/ Subcomponent	2021 MMP	Johnson Creek Route Alternative
All Phases	Public Access	Construction: • Temporary groomed over-snow vehicle (OSV) route on the west side of Johnson Creek from Trout Creek to Landmark while Burntlog Route is constructed (8 miles). • OSV route on Johnson Creek Road from Wapiti Meadows to Trout Creek Campground closed during construction (9 miles). • OSV route from Warm Lake to Landmark closed during construction through reclamation and closure (8.5 miles). • Cabin Creek Road groomed OSV route (11 miles). • Public roads remain open through the Operations Area Boundary with temporary closures as needed to accommodate construction. Operations: • Groomed OSV route moves from west side of Johnson Creek Road to Johnson Creek Road from Landmark to Wapiti Meadows (16.7 miles). • Stibnite Road (County Road [CR] 50-412) / Thunder Mountain Road (FR 50375) closed through the Operations Area Boundary. • Seasonal public access through the Operations Area Boundary provided by constructing new road through Yellow Pine pit and below mine haul road to link Stibnite Road (FR 50412) to Thunder Mountain Road (FR 50375). • Public access allowed on Burntlog Route to Thunder Mountain Road (FR 50375). Closure and Reclamation: • New road constructed over the Yellow Pine Backfill (backfilled Yellow Pine pit) connecting Stibnite Road (FR 50412) to Thunder Mountain Road (FR 50375).	Construction and Operations: Same as 2021 MMP except: • OSV route on the west side of Johnson Creek from Wapiti Meadows to Trout Creek Campground would be closed from construction through mine closure (9 miles). • Groomed OSV route on the west side of Johnson Creek from Trout Creek to Landmark lasting from construction through mine closure. Closure and Reclamation: Same as 2021 MMP.

SGP Phase	Component/ Subcomponent	2021 MMP	Johnson Creek Route Alternative
Operations	Utilities – Transmission Lines	• Upgrade approximately 63 miles of the existing 12.5 kilovolt (kV) and 69 kV transmission lines. • New approximate 9-mile, 138 kV line would be constructed from the Johnson Creek substation to a new substation at the mine site. • Upgrade the substations located at Oxbow Dam, Horse Flat, McCall, Lake Fork, and Warm Lake. • Reroute approximately 5.4 miles of transmission line to avoid the Thunder Mountain Estates subdivision. • Reroute approximately 0.9 miles of transmission line between Cascade and Donnelly to use an old railroad grade on private property. • Installation of approximately 3 miles of new underground distribution line along Johnson Creek Road from the Johnson Creek substation south to Wapiti Meadows.	Same as 2021 MMP.
Operations	Utilities – Communication Towers and Repeater Sites	• One cell tower located north of the Hangar Flats pit. • Locations along Burntlog Route for very high frequency (VHF) repeater sites. • Use existing access roads to repeater site locations along Burntlog Route. • Communication site at the SGLF. • Upgrades to existing communication site.	Same as 2021 MMP except: • Cell tower sites constructed and maintained using helicopter (instead of constructing access roads) for sites within IRAs managed for Backcountry/Restoration. • Locations along Johnson Creek route for repeater sites.
Operations	Off-site Maintenance Facility	• SGLF located along Warm Lake Road. • Burntlog Maintenance Facility located at one of the borrow source locations 4.4 miles east of the junction of Johnson Creek Road and Warm Lake Road along the proposed Burntlog Route.	• SGLF same as 2021 MMP • Landmark Maintenance Facility located at junction of Warm Lake Road at Johnson Creek Road.
Closure and Reclamation	Access road segments	• Removal and reclamation of new road segments constructed for Burntlog Route. • Return of previously existing road segments to pre-construction width and condition.	• No removal or reclamation of pre-existing access routes.

Source: Perpetua 2021a

2.3 No Action Alternative

Under the No Action Alternative, the 2021 MMP would not be approved and the mining, ore processing, or related activities proposed in that plan would not occur, including removal of legacy materials (such as the SODA and Hecla heap leach), restoration of stream channels, and enhanced riparian plantings included in the 2021 MMP.

Previously approved activities (including approved exploration activities and associated reclamation obligations) would continue. Certain legacy and existing mining impacts are being addressed as directed in the 2021 ASAOC described in **Section 1.3**, including installation of stream diversion ditches designed to avoid contact of water with existing sources of contamination and removal of approximately 325,000 tons of development rock and tailings that are currently impacting water quality. These CERCLA response actions would occur under all alternatives considered in this analysis. However, other existing legacy disturbances such as the SODA and Hecla heap leach would continue to impact the environment. Under the No Action Alternative, Perpetua would not be precluded from subsequently submitting another plan of operations pursuant to the Mining Law to the Forest Service for subsequent evaluation.

2.4 2021 MMP

2.4.1 Overview

The 2021 MMP, the revised Proposed Action, is based on the ModPRO2 (Perpetua 2021a). Mine operations would occur on patented mining claims owned or controlled by Perpetua and on unpatented mining claims and other areas of federal lands comprised of NFS lands that are administered by the PNF. Supporting infrastructure corridors (access and transmission line) are located on the BNF, IDL, Bureau of Reclamation (BOR), and non-federal lands.

Perpetua proposes to develop a mine operation that produces gold and silver doré, and antimony concentrates from ore deposits associated with their mining claims in the SGP area. The estimated recoverable mineral resource consists of:

- 4.2 million ounces of gold
- 1.7 million ounces of silver
- 115 million pounds of antimony

Development of the mineral resource would include construction of access and haul roads; construction of supporting infrastructure; open pit mining; ore processing; placement of tailings in a TSF; and placement of development rock (also known as waste rock). New access to the SGP would be provided by the proposed Burntlog Route, which would be a combination of widening the existing Burnt Log Road (FR 447), Thunder Mountain Road (FR 50375), and Meadow Creek Lookout Road (FR 51290) and constructing new connecting road segments of approximately 15 miles (**Figure 2.4-1**). Development of the Burntlog Route would entail 340.9 acres of new cut and fill activity (including borrow sources) along existing and newly constructed roadways.

To provide electric power for the SGP, an existing powerline would be upgraded and a new transmission line from a new Johnson Creek substation to the mine would be constructed. Additional off-site support facilities to be constructed along access corridors include the SGLF and the Burntlog Access Route Maintenance Facility. The SGLF would house administrative offices, the assay laboratory, and a warehouse while the maintenance facility would be the headquarters for road maintenance and snow removal (**Section 2.4.4.9**). The proposed facilities and access roads are shown on **Figure 2.4-1** and **Figure 2.4-2**. The Operations Area Boundary shown on **Figures 2.4-1** and **2.4-2** is the boundary within which Perpetua would control public access.

The components of the 2021 MMP are described in the following sections in terms of overall land management and affected areas, and project phases: construction; operations; exploration; and closure and reclamation, including post-closure monitoring.

The 2021 MMP would require project-specific amendments to the Payette and Boise Forest Plans (**Appendix A**).

2.4.2 Land Management and Affected Areas

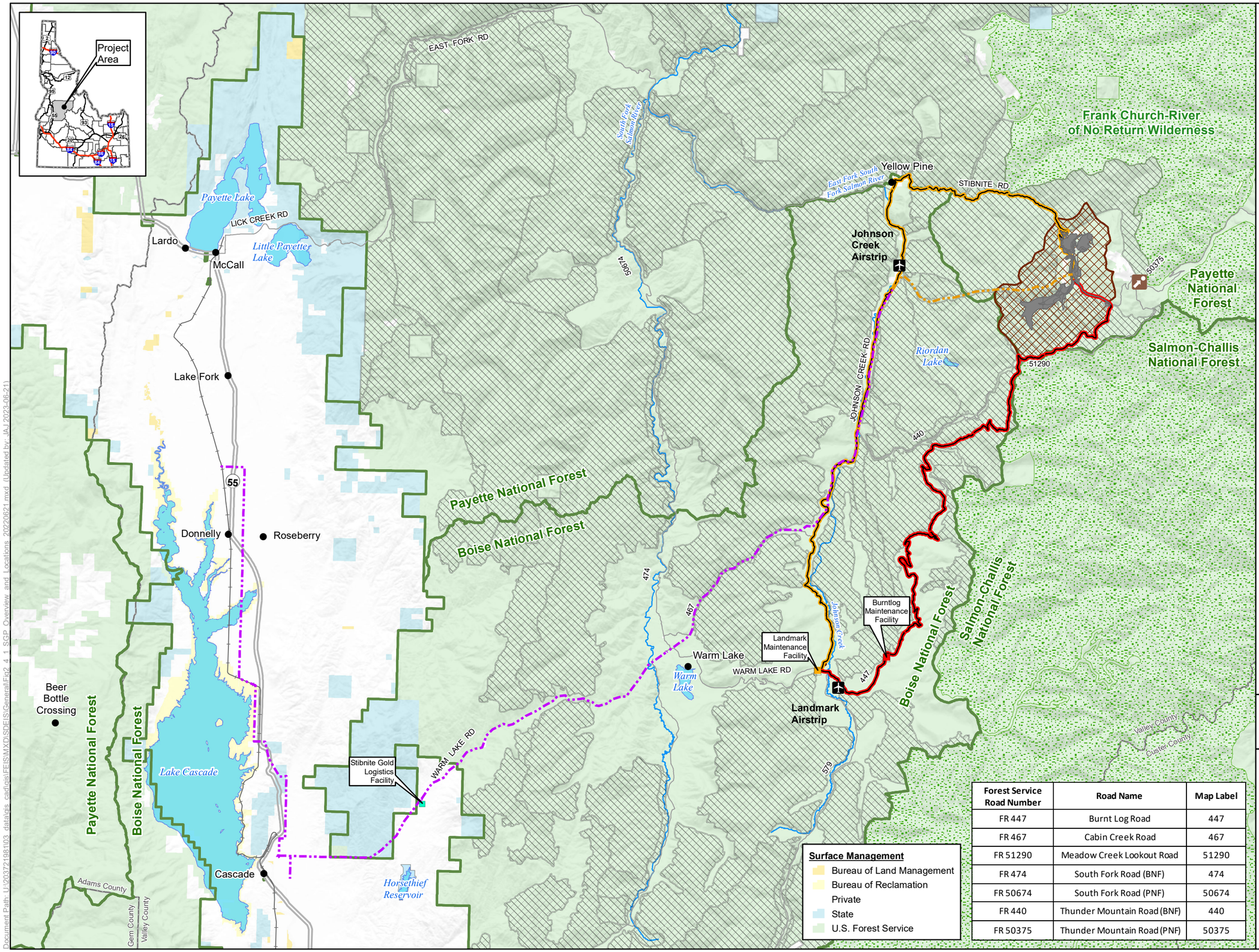
Table 2.4-1 provides a summary of land management or ownership by estimated SGP component for the maximum affected area proposed and also includes acreages of new disturbance and re-disturbance by SGP component and ownership.

2.4.3 Phases and Timeline

The actions proposed under the 2021 MMP would take place over a period of approximately 20 to 25 years, not including the long-term, post-closure environmental monitoring or potential long-term water treatment. The phases of the SGP are described in subsequent sections and include:

- Construction (approximately 3 years; Mine Years -3 through -1);
- Mining and Ore Processing Operations (approximately 15 years; Mine Years 1 through 15);
- Surface and Underground Exploration (approximately 17 years, beginning during construction and continuing concurrent with operations; Mine Years -2 through 15); and
- Closure and Reclamation (Mine Year 16+).

Most activities in the Closure and Reclamation period would be completed within five years. However, closure water management and water treatment are expected to continue for as long as 25 years (Mine Years 16 through 40). The environmental monitoring phase would continue for as long as needed to demonstrate that the site has been fully reclaimed. **Figure 2.4-3** provides an illustration of the timing of construction and operations activities and the initiation of the closure phase.



LEGEND

Project Components
- SGP Features
- Operations Area Boundary

Access Roads and Trail System
- Burntlog Route *
- Johnson Creek Route

Utilities
- Upgraded Transmission Line
- New Transmission Line

Offsite Facilities
- Burntlog Maintenance Facility *
- Landmark Maintenance Facility **
- Stibnite Gold Logistics Facility

Other Features
- U.S. Forest Service
- Wilderness
- IRA and/or Forest Plan Special Area
- County
- City/Town
- Monumental Summit
- Airport/Landing Strip
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir

* Associated with 2021 MMP only
** Associated with Johnson Creek Route Alternative only

0 2 4 Miles

1 inch = 4 miles when printed at 11x17

Forest Service Road Number	Road Name	Map Label
FR 447	Burnt Log Road	447
FR 467	Cabin Creek Road	467
FR 51290	Meadow Creek Lookout Road	51290
FR 474	South Fork Road (BNF)	474
FR 50674	South Fork Road (PNF)	50674
FR 440	Thunder Mountain Road (BNF)	440
FR 50375	Thunder Mountain Road (PNF)	50375

Surface Management
- Bureau of Land Management
- Bureau of Reclamation
- Private
- State
- U.S. Forest Service

Figure 2.4-1 SGP Overview and Location Stibnite Gold Project Stibnite, ID

Base Layer: USGS The National Map: 3D Elevation Program. USGS Earth Resources Observation & Science (EROS) Center: GMTED2010. Data refreshed March, 2021. Other Data Sources: Perpetua; State of Idaho Geospatial Gateway (INSIDE Idaho); Boise National Forest; Payette National Forest

Map Date: 2023-06-21

Document Path: U:\2023\21981\03_data\gis_ea\gis\FEIS\MXD\SDEIS\General\Fig2_4_1_SGP_Overview_and_Locations_20220621.mxd (Updated by: JAJ 2023-06-21)

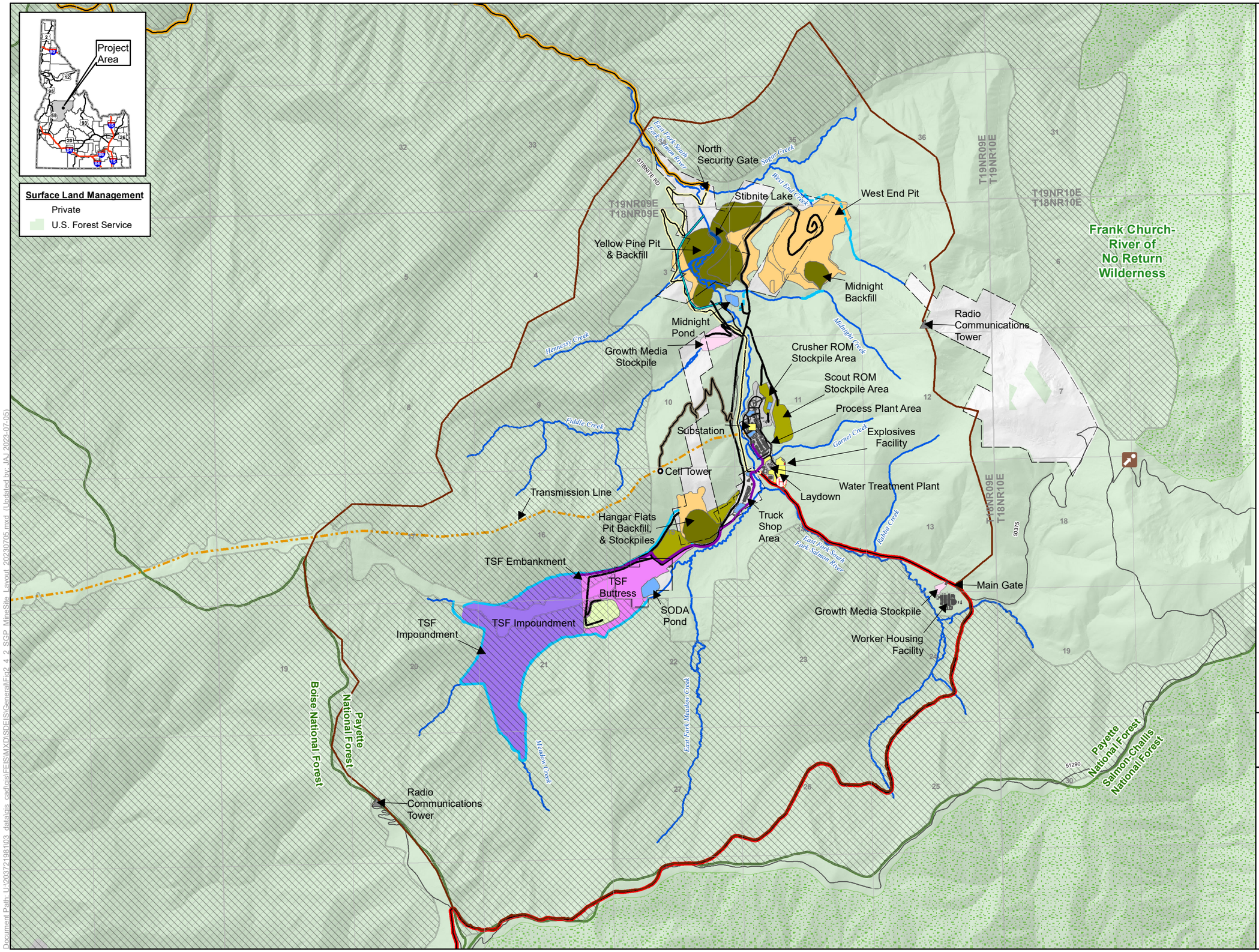
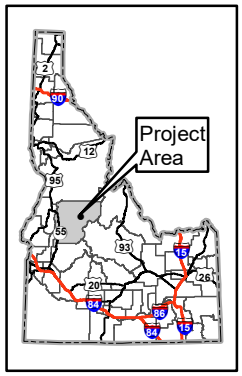


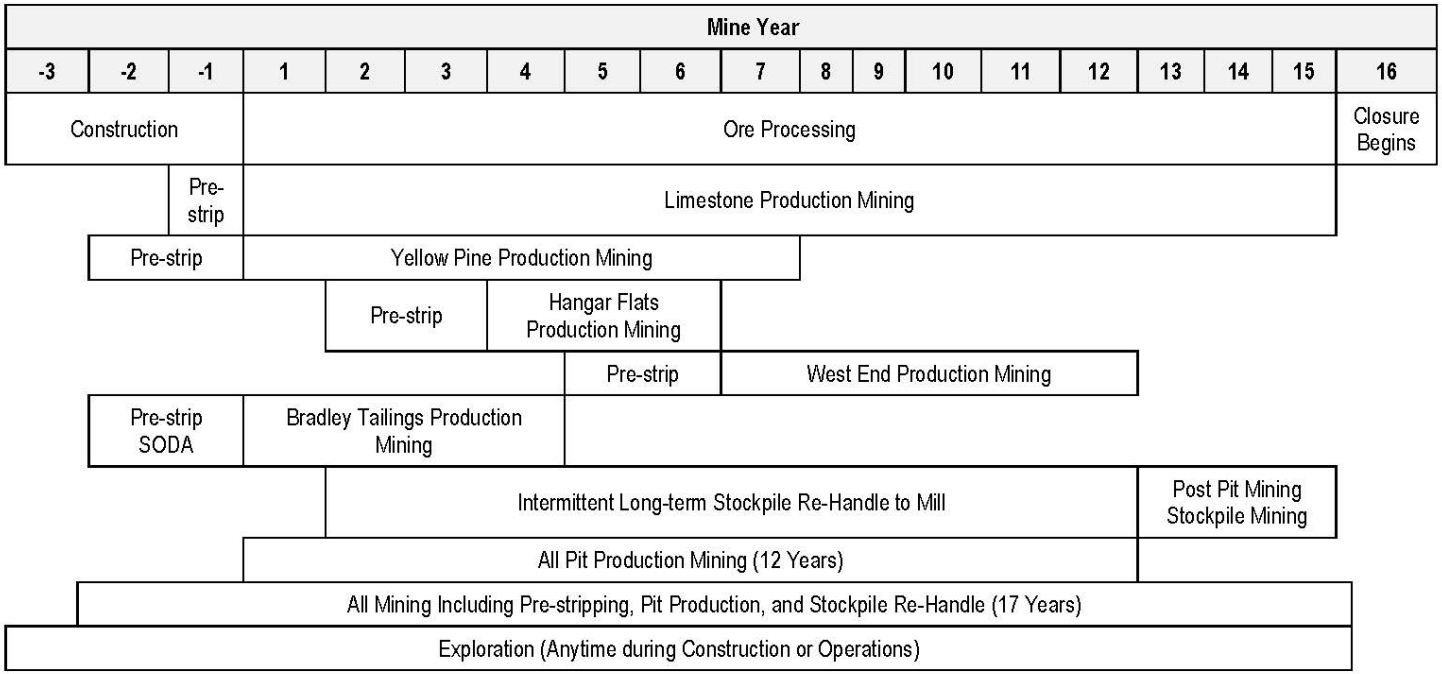
Figure 2.4-2
Mine Site Layout
Stibnite Gold Project
Stibnite, ID

Base Layer: Hillshade derived from LiDAR supplied by Midas Gold
Other Data Sources: Perpetua; State of Idaho Geospatial Gateway (INSIDE Idaho); Boise National Forest; Payette National Forest

Map Date: 2023-07-05

Document Path: U:\20037\198\03_data\gis_cad\gis\FEIS\MXD\SDFES\General\Fig2_4_2_SGP_MineSite_Layout_20230705.mxd (Updated by JAJ 2023-07-05)





Construction Phase (Mine Year -3 through -1):
Facility construction
Road construction
Pre-stripping
Exploration

Operation Phase (Mine Years 1 through 15):
Ore processing
Limestone production mining
Yellow Pine production mining
Pre-stripping for Hangar Flats
Hangar Flats production
Pre-stripping for West End
West End production
Bradley tailing production
Stockpile re-handling
Exploration

Reclamation and Closure Phase (Mine Years 16 through 20):
Reclamation of facilities

Post Closure Water Treatment and Monitoring Phase (Mine Years 16 through 40):
Site monitoring with collection and treatment of tailings consolidation water

Figure 2.4-3
Phases and Timeline

Stibnite Gold Project
Stibnite, ID

Data Sources: Perpetua 2021a

Table 2.4-1 Land Management and Acreage by Component for the 2021 MMP

Component		Perpetua Private	Other Private	PNF	BNF	Salmon-Challis National Forest[4]	BOR	IDL	Totals
Mine Site	New Disturbance	48.2	0	767.9 + 65[2]	0	0	0	0	881.1
	Re-disturbance	456.7	0	402.3	0	0	0	0	859.0
Off-site Facilities	New Disturbance	24.3	0	0	4.5	0	0	0	28.8
	Re-disturbance	0	0	0	0	0	0	0	0
Access Roads	New Disturbance	0	0	81.6	253.8	5.5	0	0	340.9
	Re-disturbance	1.9	4.5	26.9	102.5	8.7	0	0	144.5
Utilities[1]	New Disturbance	2.9	105.9	61.4	221.8	0	3.5	26.0	421.5
	Re-disturbance	1	174	19.4	350.6	0	9	36.1	590.1
Disturbance Totals	Total New Disturbance	75.4	105.9	910.9 + 65[2]	480.1	5.5	3.5	26.0	1,672.3
	Total Re-disturbance	459.6	178.5	448.6	453.1	8.7	9	36.1	1,593.6
Total New and Re-Disturbance		535.0	284.4	1,424.5	933.2	14.2	12.5	62.1	3,265.9[3]

Source: Perpetua 2021a

[1] Utilities affected areas include both existing utility corridors and access routes, and new utility corridors and access routes. Acres do not reflect entire area within the rights-of-way. Some existing utility access routes would be upgraded.

[2] Approximately 65 affected acres associated with temporary surface exploration pads and roads (SGP component) have an unknown land ownership because the exact locations of these exploration areas are not yet known; however, these are included in the PNF SGP subtotal.

[3] Items, subtotals, and totals may not add up to grand total due to rounding.

[4] Approximately 14 acres of land is administered by the PNF but is within the boundary of the Salmon Challis National Forest.

BOR – Bureau of Reclamation; IDL – Idaho Department of Lands

2.4.4 Site Preparation, Access, and Infrastructure

2.4.4.1 Overview

Implementing the 2021 MMP would require construction of surface facilities, haul roads, and water management features. Supporting infrastructure would include transmission lines, substations, communication sites, and access roads. Additionally, removal of some features from past mining activities (legacy mining features) would be initiated during the construction phase. Perpetua would install 15 to 20 temporary trailers on private lands adjacent to the existing exploration camp (located in the proposed ore processing area) to accommodate construction crews; these temporary trailers would be used during site preparation and early construction until the worker housing facility is constructed.

Prior to site preparation and construction of surface facilities, vegetation would be removed from operating areas. Trees, deadwood, shrubs, and slash not needed to construct windrows at the edge of the Burntlog Route disturbance (to function as sediment barriers), would be chipped, and suitable soil would be separately salvaged and stockpiled (except for a small portion that would be 'live handled') for use as part of site reclamation and restoration. Portions of the salvaged soil would be blended with the chipped wood to create growth media. All growth media placed in stockpiles would be stabilized, seeded, and mulched to protect the stockpiles from wind and water erosion.

The existing potable water supply system at the exploration camp would be used and expanded for the construction camp. The existing system would be supplemented with deliveries of potable water, if needed. Supplemental water sources (i.e., water deliveries) would be used by personnel in remote construction areas. Sanitation during construction would be provided through the existing sewage treatment system adjacent to the exploration camp. In addition, portable sanitary facilities would be located throughout the SGP and at remote construction areas.

Construction of the Burntlog Route would occur from both ends of the route at the same time on a seasonal basis (May to November), but construction could occur outside of this time period if conditions allow. The southern portion workforce would be housed in three temporary trailer camps located within construction borrow sources or staging areas. The northern portion workforce would be housed at the temporary trailer construction camp at the SGP. Some construction workers could be housed in Cascade, Idaho.

Pre-construction water management activities would include best management practices to reduce erosion and sediment delivery to streams. These water management features could include sedimentation ponds; run-on water diversion ditches, trenches, and/or berms; runoff water collection ditches; silt fence; water bars; culverts; energy dissipation structures; terraces; and other features specified in construction permits. In the second and third years of construction, mine contact water would be generated by stormwater runoff at the West End pit, Yellow Pine pit, TSF embankment, legacy Hecla heap leach, and the SODA, but would be contained as described in **Section 2.4.5.10**.

2.4.4.2 Growth Media Stockpiles

Suitable growth media within the area proposed for operations (per specifications from the Reclamation Closure Plan [Tetra Tech 2021a]) would be salvaged following vegetation clearing and moved to growth media stockpiles (GMSs) either within the Fiddle Valley or at the Worker Housing Facility. Other short-term GMSs would be located within the footprint of the TSF. Growth media from the new construction of the Burntlog Route would be stockpiled in the borrow source areas used for construction and widening of the route and in windrows along the edges of fill slopes. GMSs would be stabilized, seeded, and mulched to protect the stockpile from wind and water erosion.

To achieve the reclamation success criteria and offset the growth media deficits, 1.5 million BCY of unconsolidated overburden (chiefly alluvial and glacial materials from Yellow Pine pit) would be stored in the Fiddle GMS to allow use as growth media, seed bank material, or reclamation cover material for reclamation of the TSF, TSF Buttress, and Hangar Flats pit backfill.

2.4.4.3 Access Roads

Warm Lake Road

Warm Lake Road (CR 10-579) is a two-lane (one lane each direction), asphalt-paved roadway with lane markings open year-round to all vehicles from Idaho State Highway (SH) 55 to Warm Lake. The road starts in Cascade at an intersection with SH 55, which is a major north-south transportation corridor. This intersection would be used by all mine-related traffic through all phases of the SGP. The Warm Lake Road continues eastward for approximately 35 miles, ending at Johnson Creek Road (CR 10-413) at Landmark. Warm Lake Road includes steep grades and crosses two high mountain passes, Big Creek Summit between Cascade and Warm Lake and Warm Lake Summit between Warm Lake and Landmark. Warm Lake Road is under the jurisdiction of Valley County and has a functional classification of major collector (IDT 2024). Currently, Valley County does not maintain Warm Lake Road in winter beyond Warm Lake Lodge. With adequate snowpack, an 8-mile segment of the Warm Lake Road route east of Warm Lake Lodge is used as an OSV route, allowing access into Landmark and points beyond.

SGP would need year-round passenger and delivery truck access from the onset of construction through the life of the mine. The Warm Lake Road is suitable for this use in its current condition. Perpetua would conduct wintertime maintenance east of Warm Lake Lodge to ensure safe, year-round access to the sole route of ingress/egress to the SGP for all mine support traffic. This would include snow removal and road sanding, as appropriate, to maintain a safe driving surface. Commitments for wintertime maintenance of Warm Lake Road would be documented in a Road Maintenance Agreement with Valley County.

Perpetua wintertime maintenance and use of Warm Lake Road would result in two changes to current traffic conditions:

- Warm Lake Road east of Warm Lake Lodge would not be available as a recreational OSV route from the start of construction through reclamation of the SGP. To replace this recreational use, a dedicated alternative OSV route would be established from the Warm Lake area to Landmark via the Cabin Creek Road and adjacent to the Johnson Creek Road. Establishing this replacement

OSV route would minimize the interactions between SGP traffic and recreational traffic in the winter. The proposed OSV route is illustrated in **Figure 2.4-4**.

- Expanded wintertime public vehicle access on Warm Lake Road east of Warm Lake Lodge would commingle SGP and public travel.

Changes to the SH 55 and Warm Lake Road intersection would improve access for large trucks carrying equipment and supplies to the SGP and would facilitate turns from SH 55 onto Warm Lake Road and from Warm Lake Road back onto SH 55. Any changes proposed to the intersection would need to be approved and implemented by the Idaho Transportation Department (ITD). Recommended changes to the intersection include: the addition of left and right turning lanes (Parametrix 2018a); an intersection modification to accommodate larger trucks; potential relocation of two power poles (HDR Engineering, Inc. [HDR] 2017a); and a modification to the westbound approach at Warm Lake Road to improve the view of traffic coming from the north.

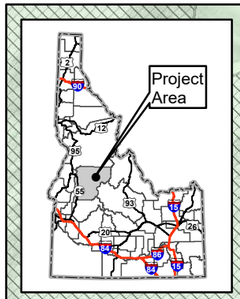
Johnson Creek Route

During the initial construction period of the Burntlog Route (approximately 2 to 3 years), mine-related traffic would access the SGP from SH 55, north of the city of Cascade, via Warm Lake Road for approximately 34 miles, then north on Johnson Creek Road (CR 10-413) for approximately 25 miles to the village of Yellow Pine, and from Yellow Pine east approximately 14 miles to the SGP via the Stibnite Road (CR 50-412). The portion of the route that includes Johnson Creek Road and Stibnite Road is known as the Johnson Creek Route. This route is primarily situated topographically adjacent to the valley bottom, paralleling Johnson Creek and then the East Fork SFSR.

Johnson Creek Road is a county-maintained, native-surface road that is open to vehicles with seasonal restrictions due to snow. During the winter, Valley County plows approximately 10 miles of Johnson Creek Road from Yellow Pine south to Wapiti Meadow Ranch and grooms the remaining 17 miles of Johnson Creek Road from Wapiti Meadow Ranch to Warm Lake Road at Landmark for OSV use. Valley County does not plow Warm Lake Road from Warm Lake to Landmark; this section is a designated groomed OSV route.

The Stibnite Road portion of the route is also a county-maintained native surface road, open to all vehicles with seasonal restrictions due to snow. This road is plowed in the winter by Perpetua through an agreement with Valley County. Stibnite Road connects to Thunder Mountain Road on the southeastern portion of the Stibnite site and currently provides seasonal (non-winter) public access through the site.

Minor surface improvements (such as ditch and culvert repair, adding gravel, winter snow removal, resurfacing if required, and summer dust suppression) would occur on the Johnson Creek Route under the 2021 MMP to reduce sediment runoff and dust generation. However, there would be no road alignment modification or widening of these existing roads along the Johnson Creek Route. The road varies in elevation from approximately 4,750 to 6,700 feet amsl with an average grade of 1.5 to 2 percent with occasional local segments with grade up to approximately 8 percent.



Wapiti Meadows

Riordan Lake

Payette National Forest

Boise National Forest

JOHNSON CREEK RD

440

Trout Creek Campground

467

South Fork Salmon River

474

467

Knox Ranch Parking Area

488

CR 579

Groomer Storage

Warm Lake

WARM LAKE ROAD

474

Warm Lake

WARM LAKE RD

Johnson Creek

413

Landmark

579

447

Boise National Forest

Salmon-Challis National Forest

LEGEND

Over Snow Vehicle Routes

- Cabin Creek Road OSV trail
- Cabin Creek to Johnson Creek OSV trail connector
- Johnson Creek Road OSV trail
- Parking area to USFS Warm Lake Project Camp OSV trail
- Trout Creek Campground north to Wapiti Meadows OSV trail*
- Warm Lake area OSV connector
- Warm Lake to Landmark OSV trail
- OSV Parking Area

Other Features

- U.S. Forest Service
- Wilderness
- IRA and/or Forest Plan Special Area
- County
- City/Town
- Campground
- Airport/Landing Strip
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir

OSV Route	Length (mi)
Trout Creek Campground north to Wapiti Meadow s OSV trail	8.85
Johnson Creek Road OSV trail (*OSV Access during Construction*)	8.14
Johnson Creek Road OSV trail (*OSV Access during Operations*)	7.80
Parking area to USFS Warm Lake Project Camp OSV trail	1.88
Cabin Creek Road OSV trail	10.82
Cabin Creek to Johnson Creek OSV trail connector	0.82
Warm Lake area OSV connector	0.39
Warm Lake area to Landmark OSV trail (Existing)	8.49

* Trout Creek Campground north to Wapiti Meadows would be closed for the duration of construction through closure and reclamation under the Johnson Creek Route Alternative.

Surface Management

- Private
- U.S. Forest Service

0 0.75 1.5 Miles

1 inch = 1.5 miles when printed at 11x17

N

Figure 2.4-4
OSV Routes
Stibnite Gold Project
Stibnite, ID

Base Layer:
Other Data Sources: Perpetua; State of Idaho Geospatial Gateway (INSIDE Idaho); Boise National Forest; Payette National Forest

Map Date: 4/10/2022

Portions of Johnson Creek Road (i.e., Landmark to Wapiti Meadows) are currently used as a groomed OSV route during winter and use of the Johnson Creek Route by mine-related construction traffic would conflict with this existing groomed OSV route. Thus, while the Burntlog Route (described below) is under construction, a temporary 16-foot-wide groomed OSV route adjacent to Johnson Creek Road between the proposed groomed Cabin Creek OSV Route and Landmark would be constructed (**Section 2.4.4.4** and **Figure 2.4-4**). However, the OSV route from Trout Creek Campground to Wapiti Meadows would be closed until construction of the Burntlog Route is complete; once mine traffic moves to that route, then the OSV route would return to Johnson Creek Road and would reconnect Landmark with Wapiti Meadows.

Perpetua has an existing agreement with Valley County for maintenance of Johnson Creek and Stibnite roads, including performing maintenance measures to repair segments that have deteriorated. Appropriate revisions to the road maintenance agreement would be established for use of the Johnson Creek Route as a construction route and to ensure year-round access in accordance with Valley County's public road easement stipulations. Once construction of the Burntlog Route has been completed (2-3 years), the Johnson Creek Route would no longer be used by mine-related traffic.

Burntlog Route

The Burntlog Route would connect the eastern end of Warm Lake Road (at Landmark) to the SGP (to the northeast) by widening and improving approximately 23 miles of existing roads, including the full length of the existing Burnt Log Road (FR 447) and segments of Meadow Creek Lookout Road (FR 51290) and Thunder Mountain Road (FR 50375). The three road segments would be connected with two new road segments totaling approximately 15 miles. Burnt Log Road is currently a native surface road that is open year-round to all vehicles with seasonal restrictions due to snow. The last 0.25 to 0.5 mile of the existing road is closed and motorized traffic prohibited. Meadow Creek Lookout Road is a native surface road, open year-round to all vehicles. The Burntlog Route is primarily situated topographically on mid-slopes and ridgeline.

Improvements on the existing roads that comprise the Burntlog Route include:

- Straightening tight corners to allow for improved safety and traffic visibility;
- Maintaining grades of less than 10 percent in all practicable locations;
- Placing sub-base material and surfacing with gravel;
- Application of a road binding agent in localized segments to suppress dust, increase stability, and reduce sediment runoff;
- Widening the existing road surface (currently approximately 12 feet wide) to a 21-foot-wide travel way (approximately 26 feet including shoulders); and
- Installing side-ditching, culverts, guardrails, and bridges, where necessary, with design features to provide fish passage and limit potential sediment delivery to streams.

Figure 2.4-5 shows the proposed Burntlog Route. Activities within the route corridor would include geotechnical data collection including borehole sampling, cone penetrometer testing, and test pit excavations to assist in the route development for the proposed new road construction. A segment of new road construction for the Burntlog Route would be located on the south side of the Riordan Creek drainage and cross Riordan Creek north of Black Lake. The approximately 5.3-mile road segment would have 12 stream crossings, three of which cross perennial streams. The elevation of this road segment is approximately 8,000 to 8,600 feet and the average grade of this road segment would be 5 to 6 percent. After construction is completed, public use would be allowed on the Burntlog Route only when other public access roads are blocked by mine operations.

The connection segment between the end of Burnt Log Road and Meadow Creek Lookout Road is approximately 11 miles and would cross Trapper Creek 0.5 miles east of the intersection of Trapper Creek Road (FR 440) and FR 440A and continue northeast towards Black Lake and on to the Meadow Creek Lookout Road. The second connector between the Meadow Creek Lookout Road and Thunder Mountain Road would be approximately 4 miles and links up with Thunder Mountain Road approximately 2 miles south of the SGP. Minor surface improvements (e.g., blading) would occur on the portions of the existing Thunder Mountain Road and Meadow Creek Lookout Road that would not become part of the Burntlog Route to provide a safe road surface for transportation of construction equipment required to build the Burntlog Route. There would be no road alignment modification or widening of the portions of the existing roads that are not part of the Burntlog Route.

Primary SGP access would shift from the Johnson Creek Route to the Burntlog Route near the end of the construction phase. The Burntlog Route would be compliant with all related usage and approval requirements included in 36 CFR Section 228, Part A. The Burntlog Route would avoid environmental and human health and safety risks associated with the Johnson Creek Route which passes through identified areas for avalanches, landslides, and floods. This route would provide another route for SGP ingress/egress, would decrease SGP and public traffic interaction with Yellow Pine and Johnson Creek area residents; and would decrease the potential for spill risk adjacent to fish-bearing streams.

Burntlog Route Borrow Sources, Staging Areas, and Construction Camps

Up to eight borrow sites would be established along the Burntlog Route (**Figure 2.4-5**) to meet construction and ongoing maintenance needs throughout the life of the mine and to support decommissioning following mine closure. Additionally, those same eight borrow areas would be utilized for staging of equipment and supplies. Three construction camps would be located within the disturbance created by borrow sources or staging areas. The construction camps would be for trailer parking. Each trailer would need to be equipped with fresh water and sanitary waste storage.

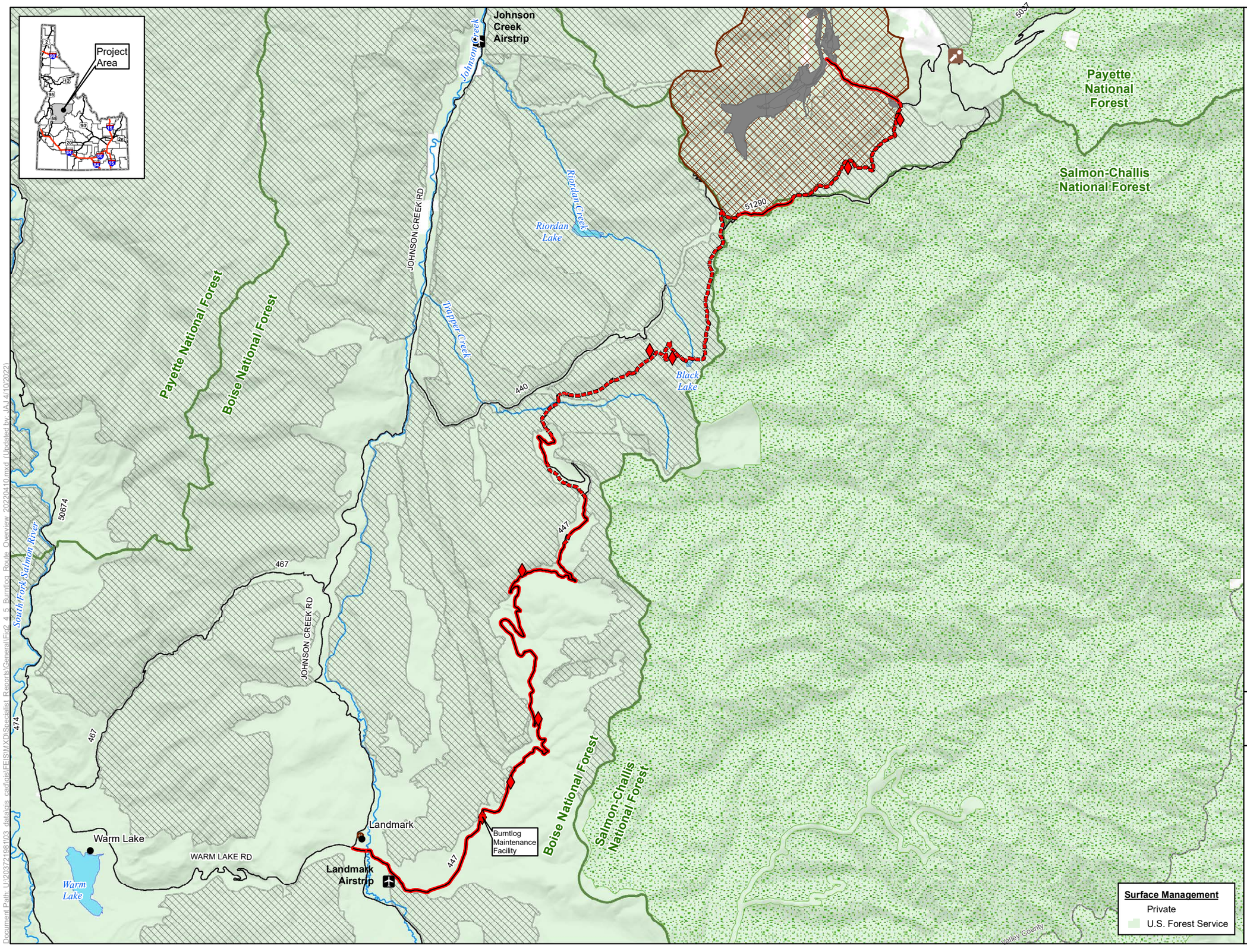


Figure 2.4-5
Burntlog Route
Stibnite Gold Project
Stibnite, ID

Base Layer:
Other Data Sources: Perpetua; State of Idaho Geospatial Gateway (INSIDE Idaho); Boise National Forest; Payette National Forest

Map Date: 4/10/2022

Document Path: U:\2037\298\03_data\gis_cad\gis\EIS\MXD\Specialist Reports\General\Fig2_4_5_Burntlog_Route_Overview_20220410.mxd (Updated by JAJ 4/10/2022)

2.4.4.4 Public Access

During construction of the SGP and completion of the Burntlog Route, to the degree practicable, the public would continue to have access on forest roads currently available to the public (**Figure 2.4-1**). However, public access through the Operations Area Boundary on Stibnite Road would be restricted for a period of approximately one year while a new through-site public access road is constructed. A new 4-mile long, 12-foot-wide gravel road would be constructed to provide public access from Stibnite Road (FR 50412) to Thunder Mountain Road through the SGP (**Figure 2.4-2**). The road would be constructed on a widened bench on the west side within the Yellow Pine pit, then head south of the Yellow Pine pit, where this road would utilize an underpass to cross under a SGP haul road and continue southward, parallel to and on the east side of the mine haul road on a partially revegetated portion of a former haul road (**Figure 2.4-2**). Southwest of the ore processing area, the public access road would connect with Thunder Mountain Road and continue toward the worker housing facility, exiting the SGP to the southeast.

During operations, the public access road through the Operations Area Boundary would provide seasonal use, open to all vehicles; access would not be provided in winter when impassable (current county maintenance standards) and signs would inform the public of seasonal and temporary closures. Public vehicles passing through would be required to check-in with mine personnel at the North or South SGP entry points and would receive a safety briefing and would also be required to check-out with SGP personnel upon exiting the SGP. For safety purposes, public access would be separated from other SGP roads by berms, security fencing, and the underpass to allow the public road to pass beneath the mine haul road. No stopping or deviating from the public access road would be allowed. Perpetua could restrict access to any vehicles due to concerns related to public or employee health and safety, such as during road construction and maintenance, blasting, highwall scaling, mining in the immediate area of the road, and similar operations.

Public access along Johnson Creek Road during the life of the SGP would be unchanged; however, closures spanning from a half-day to multiple days could occur due to construction activities. Total closures of half-day to multiple days could occur during construction work on Stibnite Road between the village of Yellow Pine and the SGP, part of Thunder Mountain Road, and Burnt Log Road.

Public access on existing segments of the Burnt Log Road would be restricted for limited periods of time to upgrade road segments during construction of the Burntlog Route. Other routes available for public use are shown on **Figure 2.4-1**.

Public access by foot via existing trails or on roads would be restricted within the Operations Area Boundary shown on **Figure 2.4-2**. Security personnel, fencing (including wildlife exclusion fencing), and signs would restrict public access to vehicular traffic on the designated public access roadway inside the Operations Area Boundary.

Warm Lake to Landmark Groomed OSV Route Closure

Due to year-round mine access to the SGP Operations Area along the Warm Lake Road, an existing, approximately 8.5-mile-long groomed OSV route from Warm Lake to Landmark would be closed for the life of the SGP. To replace this recreational use, a dedicated alternative OSV route would be established from the Warm Lake area to Landmark via the Cabin Creek Road and Johnson Creek Road (**Figure 2.4-4**).

Cabin Creek Road Groomed OSV Route

Near Warm Lake, an approximately 2-acre parking area would be established west of South Fork Road on FR 474B. A new 3.2-mile groomer access trail would be established from the parking area to the Forest Service Warm Lake Project Camp south of Paradise Valley Road (FR 488) where the groomer would be stored. An approximate 0.1-mile segment would be groomed from the intersection of Paradise Valley Road and FR 488A to Warm Lake Road. The Cabin Creek Road (FR 467) groomed OSV route would extend approximately 11 miles to the Trout Creek Campground on Johnson Creek Road. Portions of Cabin Creek Road would require stream crossing improvements, road widening, and surface grading to support the OSV route grooming equipment.

Johnson Creek Groomed OSV Route

An approximately 8-mile temporary groomed OSV route would be created and maintained on NFS lands adjacent to the west side of Johnson Creek Road (CR 10-413) from Trout Creek Campground to Landmark. Portions of the temporary groomed OSV route would be established using a snowplow wing attachment requiring some vegetation and tree removal to allow for safe snowplowing. In areas where topography and vegetation prevent using the wing attachment to establish the groomed OSV route, sections would merge with Johnson Creek Road. During construction, operations, and closure, the OSV route would include an additional 0.34-mile segment south of and paralleling the Warm Lake Road heading east connecting Johnson Creek Road to Deadwood-Stanley Road (FR 579) (**Figure 2.4-4**).

Warm Lake Area OSV Connection

A 0.3-mile, 16-foot-wide groomed OSV route would be created and maintained north of Warm Lake Road to connect the southern end of the Cabin Creek Road OSV route to the Warm Lake Road (FR 579). It would also provide access to North Shoreline Drive (FR 489) from the Cabin Creek Road OSV route. This 0.3-mile route would be used throughout construction, operations, and closure, and would require the removal of some vegetation and trees.

Temporary OSV Closure Trout Creek Campground to Wapiti Meadows

OSV access would be temporarily halted between Trout Creek Campground and Wapiti Meadows (about 9 miles north of Trout Creek Campground on Johnson Creek Road; **Figure 2.4-4**) for approximately 2 to 3 years during construction of the Burntlog Route. Once construction of the Burntlog Route has been completed, the Johnson Creek Route would no longer be used by mine-related traffic and the OSV route would be returned to the unplowed Johnson Creek Road and extended northward to provide approximately 17 miles of groomed OSV access between Landmark and Wapiti Meadows. Resumption of OSV access between Trout Creek Campground and Wapiti Meadows would occur following construction of the Burntlog Route.

Travel Management Rule

The reroute of Stibnite Road and the designation of a temporary OSV route to replace an existing OSV route are actions that fall under the Travel Management Rule (36 CFR 212), Subparts B and C, respectively (FSM7715.03(5)). These actions require consideration under the Travel Management Rule Minimization Criteria (36 CFR 212.55(b)). This is presented in **Section 4.19**, Recreation Resources.

2.4.4.5 Traffic

Traffic associated with SGP construction would occur year-round, depending upon road and weather conditions. Construction-related traffic and material hauling would be most concentrated from May through November, and personnel would be transported primarily using buses and vans. The total estimated annual average daily traffic (AADT) for construction and operations activities driving from SH 55 to the SGLF and between the SGLF and the SGP are listed in **Table 2.4-2**. Supplies and deliveries for the SGP during construction would access the SGLF using SH 55 to Warm Lake Road and would use SH 55 through Cascade and other communities along SH 55 south of Cascade including Banks and Horseshoe Bend.

Table 2.4-2 Project Construction and Operations SGP Traffic

Phase	Route	Transport Type	AADT
Construction	SH 55 to SGLF	HV	30
Construction	SH 55 to SGLF	LV	169
Total			**199**
Construction	SGLF to SGP	HV	45
Construction	SGLF to SGP	LV	20
Total			**65**
Operations	SH 55 to SGLF	HV	25
Operations	SH 55 to SGLF	LV	131
Total			**156**
Operations	SGLF to SGP	HV	33
Operations	SGLF to SGP	LV	17
Total			**50**
Reclamation and Closure	SH 55 to SGP	HV	15
Reclamation and Closure	SH 55 to SGP	LV	12
Total			**27**

SH 55 to SGLF – State Highway 55 to Stibnite Gold Logistics Facility
SGLF to SGP - Stibnite Gold Logistics Facility to Stibnite Gold Project
HV – heavy vehicle
LV – light vehicle
AADT – annual average daily traffic

Supplies and deliveries for the SGP during operations would access the SGLF using SH 55 to Warm Lake Road. Approximately two-thirds of all mine-related traffic would originate south of Warm Lake Road and would use SH 55 through Cascade and other communities along SH 55 south of Cascade including Banks

and Horseshoe Bend. Approximately one-third of all mine-related traffic originating north of Warm Lake Road would use SH 55 through the communities of Donnelly, Lake Fork, and McCall. Through McCall, mine-related traffic would generally use Deinhard Lane and Boydstun Street. Employees would be encouraged to use company provided shuttle buses as transport to the SGLF from towns along SH 55 but would be mandated to use shuttle buses from the SGLF to the SGP.

2.4.4.6 Water Use and Water Treatment During Construction

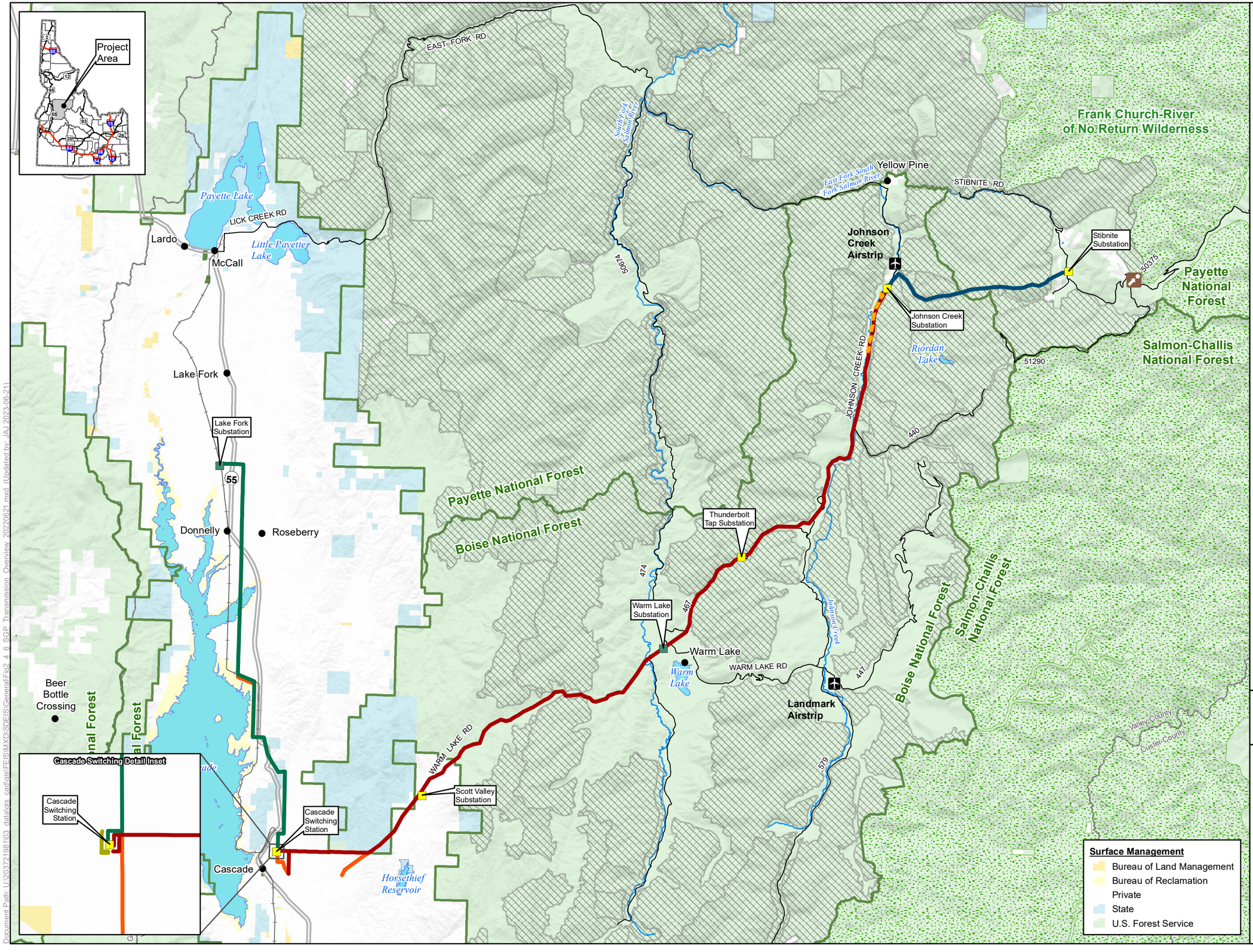
During construction, mine-impacted water would be generated and would require treatment before being discharged to receiving streams. Water treatment plants would be modular, vendor-supplied equipment package skids placed on improved pads with covers and freeze protection for sensitive piping and equipment. Peak capacity on-site for construction water treatment requirements is expected to be 300 gpm with average flows of 18 gpm and 128 gpm during the first and second years of mine site construction, respectively. Water treatment plant residuals would be sent to the TSF for disposal.

2.4.4.7 Transmission Line Upgrades

In order to serve Perpetua's 60-megawatt (MW) load requirement for the SGP, Idaho Power Company (IPCo) would rebuild or construct 72.8-miles of transmission line and associated facilities (**Figure 2.4-6**). The existing Cascade to Warm Lake 69-kV transmission line, and much of the Lake Fork to Cascade and the Warm Lake to Yellow Pine 69-kV transmission lines, would be rebuilt to 138-kV clearances and capacity (Perpetua 2021b). A new Johnson Creek Substation would be constructed and a new 9.1-mile, 138-kV transmission line would be built between the new Johnson Creek Substation and the new Stibnite Substation at the SGP. The existing single-phase distribution line between the proposed Johnson Creek Substation and the village of Yellow Pine would remain intact. A new single-phase underground distribution line, within the existing road ROW, would be built along Johnson Creek Road between the Johnson Creek Substation and Wapiti Meadows to the south. The existing 69-kV transmission line between the Cascade Dam and the Cascade Substation would remain unchanged except for tying the two lines into the new Cascade Switching Station. A new 69-kV line would be constructed to connect the Cascade Switching Station to the existing grid to the south.

Changes to the existing IPCo system for SGP operations would include:

- Upgrade approximately 59.1 miles of the existing 12.5-kV and 69-kV transmission lines between the Lake Fork and Johnson Creek substations to 138-kV service. The ROW would be 50 to 100 feet (depending on slope aspect) and existing transmission line support structures would be replaced with taller structures.
- A new approximate 9.1-mile, 138-kV line would be constructed from the Johnson Creek substation to a new substation at the SGP, partially within a former transmission line ROW. The ROW for the new transmission line would be approximately 100 feet wide. At the SGP, transformers would reduce the voltage from 138-kV to 34.9-kV for distribution to facilities through overhead distribution lines or underground conduits.
- Upgrade the substations located at Oxbow Dam, Horse Flat, McCall, Lake Fork, and Warm Lake (**Figure 2.4-6**).



LEGEND

Project Components *

- New Substation **
- Existing Substation **

Transmission Sections

- Cascade Switching to Johnson Creek (Rebuild)
- Cascade to Cascade Switching (New)
- Johnson Creek to Stibnite (New)
- Lake Fork to Cascade Switching (Rebuild)
- Johnson Creek to Wapiti Meadows (Underground, New)
- Transmission Sections to be Removed

Other Features

- U.S. Forest Service
- Wilderness
- IRA and/or Forest Plan Special Area
- County
- City/Town
- Monumental Summit
- Airport/Landing Strip
- Railroad
- Highway
- Road
- Stream/River
- Lake/Reservoir

* Project Components associated with all Alternatives
** Substation locations are approximate

0 2 4 Miles

1 inch = 4 miles when printed at 11x17

Surface Management

- Bureau of Land Management
- Bureau of Reclamation
- Private
- State
- U.S. Forest Service

Figure 2.4-6
SGP Transmission Line Overview
Stibnite Gold Project
Stibnite, ID

Base Layer: USGS The National Map: 3D Elevation Program. USGS Earth Resources Observation & Science (EROS) Center: GMTED2010. Data refreshed March, 2021. Other Data Sources: Perpetua; State of Idaho Geospatial Gateway (INSIDE Idaho); Boise National Forest; Payette National Forest

Map Date: 2023-06-21

Document Path: U:\2023\21981\03_data\gis_cad\gis\FEIS\MXD\SDFEIS\General\Fig2_4_6_SGP_Transmission_Overview_20220621.mxd (Updated by: JAJ 2023-06-21)

- A new substation (Johnson Creek substation) approximately 0.7 mile south of the Johnson Creek airstrip on NFS lands would be built to provide low voltage distribution to Yellow Pine and electricity to the SGP (**Figure 2.4-6**).
- New construction of the Scott Valley and Thunderbolt Tap substations, a new switching substation near Cascade (Cascade switching station), and the removal of the existing Scott Valley substation.
- Reroute approximately 5.4 miles of transmission line to avoid the Thunder Mountain Estates subdivision. The reroute would parallel Warm Lake Road for approximately 2.4 miles before crossing onto NFS and IDL land for approximately 1.7 miles. The portion crossing IDL property would require a ROW easement. An additional 1 mile of 69-kV transmission line would be required along Thunder City Road linking the existing transmission line out of Emmett to the reroute. Approximately 2.7 miles of transmission line would no longer be required and would be removed.
- Reroute approximately 0.9 miles of transmission line to approximately 600 feet north of its current location between Cascade and Donnelly to use an old railroad grade on private property and the existing transmission line would be removed.
- Install approximately 3 miles of new underground distribution power along Johnson Creek Road from the Johnson Creek substation south to Wapiti Meadows.

The transmission line extends across lands managed by the Forest Service, BOR, IDL, and private lands (**Figure 2.4-6**). **Table 2.4-3** summarizes the transmission line segments by land ownership crossed.

Table 2.4-3 Transmission Line Segment Summary by Land Ownership (miles)

Line Segment	Total Miles[1]	BOR		Forest Service		Private		State or Local	
		Miles	%	Miles	%	Miles	%	Miles	%
Lake Fork to Cascade Switching Station	20.0	1.2	6.0%	--	--	16.6	83.0%	2.2	11.0%
Cascade to Cascade Switching Station Tie	0.1	--	--	--	--	0.1	100.0%	--	--
Cascade Switching Station to Johnson Creek	43.6	--	--	31.5	72.2%	6.6	15.1%	5.5	12.6%
Johnson Creek to Stibnite	9.1	--	--	8.7	95.6%	0.4	4.4%	--	--
Transmission Line Total[1]	72.8	1.2	1.6%	40.2	55.2%	23.7	32.6%	7.7	10.4%
Johnson Creek to Wapiti Meadows Distribution (underground)	3.1	--	--	2.6	83.9%	0.5	16.1%	--	--

Source: Land ownership derived from parcel data (Valley County 2019a).
[1] Totals may not sum correctly due to rounding.
BOR = Bureau of Reclamation

Both temporary and permanent disturbances would be required for the construction of the transmission line and substations. While existing structure locations would be used when possible, the removal and installation of new structures would require temporary disturbance. Where possible, single-pole structures would be installed rather than H-frame structures to minimize the structure disturbance footprint. **Table 2.4-4** lists areas permanently disturbed for each transmission line structure type.

Table 2.4-4 Land Permanently Disturbed for Transmission Line Structures

Structure Type	Area Required Permanently
Single Pole Tangent Structure	16 square feet, 4-foot by 4-foot base
Single Pole Guyed Structure	28 square feet, 4-foot by 4-foot base, 3 x multi-helix screw anchors
H-Frame Tangent Structure	64 square feet, 16-foot by 4-foot base
H-Frame Guyed Structure	156 square feet, 37-foot by 4-foot base Up to 500 square feet, for up to 10, 5-foot by 10-foot down guy wire plate anchors

Each transmission line structure site needs a construction space large enough to remove the existing structure, excavate structure foundation holes, and install new structure poles and any guys and anchors. Temporary disturbance is based on a 100-foot by 60-foot pad for each structure location. Some temporary disturbance areas would be 100-foot by 100-foot pads. Lands affected during construction by line segment and substations and the land status are listed in **Table 2.4-5**.

Lands required permanently for Project operations by route segment and land status are listed in **Table 2.4-6**.

Table 2.4-5 Land Affected during Construction by Line Segment/Project Component and Land Status (acres)

Line Segment/Project Component	BOR	Forest Service	Private	State or Local	Total[1]
Lake Fork to Cascade Switching Station					
Access, Existing (Minor Improvements, 0-50%)	--	--	12.2	1.6	13.8
Access, Existing (Major Improvements, 50-100%)	--	--	0.9	6.5	7.4
Access, New (Bladed)	--	--	0.1	0.8	0.9
Access, New (Overland Travel)	1.1	--	24.4	1.1	26.7
Access, Temporary (Overland Travel)	1.6	--	<0.1	--	1.6
Pulling-Tensioning Sites	1.2	--	9.1	1.0	11.3
Staging Areas	--	--	--	--	--
Structures	1.7	--	36.2	3.7	41.6
Structures (Remove Existing)	1.5	--	<0.1	--	1.6
Lake Forest to Cascade Switching Station – Total[1]	7.1	--	82.9	14.7	104.9

Line Segment/Project Component	BOR	Forest Service	Private	State or Local	Total[1]
Cascade Switching Station to Cascade Substations					
Access, Existing (Minor Improvements, 0-50%)	--	--	--	--	--
Access, Existing (Major Improvements, 50-100%)	--	--	--	--	--
Access, New (Bladed)	--	--	--	--	--
Access, New (Overland Travel)	--	--	0.1	--	0.1
Pulling-Tensioning Sites	--	--	0.2	--	0.2
Staging Areas	--	--	--	--	--
Structures	--	--	0.5	--	0.5
Cascade Switching Station to Cascade Substations – Total[1]	--	--	0.8	--	0.8
Cascade Switching Station to Johnson Creek					
Access, Existing (Minor Improvements, 0-50%)	--	55.0	2.0	0.3	57.3
Access, Existing (Major Improvements, 50-100%)	--	65.7	4.4	7.5	77.5
Access, New (Bladed)	--	2.8	0.7	1.2	4.7
Access, New (Overland Travel)	--	0.9	7.7	1.4	10.0
Access, Temporary (Minor Improvements, 0-50%)	--	--	1.6	0.2	1.7
Access, Temporary (Overland Travel)	--	--	2.0	--	2.0
Pulling-Tensioning Sites	--	17.3	4.4	3.1	24.7
Staging Areas	--	17.3	9.9	--	27.1
Structures	--	31.7	12.3	6.4	50.4
Structures, (Remove Existing)	--	--	4.7	<0.1	4.8
Substation, Cascade Switching Station	--	--	2.6	--	2.6
Substation, Johnson Creek	--	1.1	--	--	1.1
Substation (Scott Valley), SGLF	--	---	0.9	--	0.9
Substation, Thunderbolt Drop Substation	--	0.1	--	--	0.1
Substation, Warm Lake	--	0.3	--	--	0.3
Cascade Switching Station to Johnson Creek – Total[1]	--	192.2	53.2	20.1	265.2

Line Segment/Project Component	BOR	Forest Service	Private	State or Local	Total[1]
Johnson Creek to Stibnite					
Access, Existing (Minor Improvements, 0-50%)	--	10.9	1.1	--	12.0
Access, Existing (Major Improvements, 50-100%)	--	36.5	1.2	--	37.6
Access, New (Bladed)	--	15.3	0.6	--	15.9
Access, New (Overland Travel)	--	--	--	--	--
Pulling-Tensioning Sites	--	6.5	0.5	--	7.0
Staging Areas	--	9.7	9.2	--	18.9
Structures	--	8.7	0.9	--	9.7
Johnson Creek to Stibnite – Total[1]	--	87.6	13.5	--	101.1
Total for all Line Segments/Project Components					
Access, Existing (Minor Improvements, 0-50%)	--	65.9	15.3	1.9	83.2
Access, Existing (Major Improvements, 50-100%)	--	102.1	6.4	14.0	122.6
Access, New (Bladed)	--	18.1	1.4	2.0	21.5
Access, New (Overland Travel)	1.1	0.9	32.3	2.6	36.8
Access, Temporary (Minor Improvements, 0-50%)	--	--	1.6	0.2	1.7
Access, Temporary (Overland Travel)	1.6	--	2.0	--	3.6
Pulling-Tensioning Sites	1.2	23.8	14.1	4.1	43.2
Staging Areas	--	27.0	19.0	--	46.0
Structures	1.7	40.4	52.0	10.1	99.9
Structures (Remove Existing)	1.5	--	4.7	<0.1	6.3
Substation, Cascade Switching Station	--	--	2.6	--	2.6
Substation, Johnson Creek	--	1.1	--	--	1.1
Substation (Scott Valley), SGLF	--	--	0.9	--	0.9
Substation, Thunderbolt Drop Substation	--	0.1	--	--	0.1
Substation, Warm Lake	--	0.3	--	--	0.3
Proposed Lines/Project Component - Total	7.1	279.7	152.3	34.9	469.8

Source: Land ownership derived from parcel data (Valley County 2019a).
[1] Totals may not sum correctly due to rounding.

Table 2.4-6 Land Permanently Disturbed during Operations by Line Segment/Project Component and Land Status (acres)

Line Segment/Project Component	BOR	Forest Service	Private	State or Local	Total[1]
Lake Forest to Cascade Switching Station					
Access, Existing (Minor Improvements, 0-50%)	--	--	7.1	1.0	8.0
Access, Existing (Major Improvements, 50-100%)	--	--	0.4	3.1	3.4
Access, New (Bladed)	--	--	0.1	0.3	0.4
Access, (Overland Travel)	1.0	--	21.4	1.0	23.3
Structures	<0.1	--	0.1	<0.1	0.1
Lake Forest to Cascade – Total[1]	1.0	--	29.1	5.4	35.2
Cascade Switching Station to Cascade Substations					
Access, Existing (Minor Improvements, 0-50%)	--	--	--	--	--
Access, Existing (Major Improvements, 50-100%)	--	--	--	--	--
Access, New (Bladed)	--	--	--	--	--
Access, New (Overland Travel)	--	--	0.1	--	0.1
Structures	--	--	<0.1	--	<0.1
Lake Forest to Cascade – Total[1]	--	--	0.1	--	0.1
Cascade Switching Station to Johnson Creek					
Access, Existing (Minor Improvements, 0-50%)	--	32.1	1.2	0.2	33.4
Access, Existing (Major Improvements, 50-100%)	--	30.4	2.0	3.4	35.8
Access, New (Bladed)	--	1.0	0.2	0.5	1.7
Access, New (Overland Travel)	--	0.8	6.8	1.2	8.8
Structures	--	0.4	0.1	0.1	0.5
Substation, Cascade Switching Station	--	--	2.6	--	2.6
Substation, Johnson Creek	--	0.4	--	--	0.4
Substation (Scott Valley), SGLF	--	--	0.9	--	0.9
Substations, Thunderbolt Drop Substation	--	0.1	--	--	0.1
Substation, Warm Lake	--	0.3	--	--	0.3
Cascade to Johnson Creek – Total[1]	--	65.5	13.8	5.4	84.5

Line Segment/Project Component	BOR	Forest Service	Private	State or Local	Total[1]
Johnson Creek to Stibnite					
Access, Existing (Minor Improvements, 0-50%)	--	6.4	0.6	--	7.0
Access, Existing (Major Improvements, 50-100%)	--	17.0	0.5	--	17.6
Access, New (Bladed)	--	6.0	0.2	--	6.3
Access, New (Overland Travel)	--	--	--	--	--
Structures	--	0.1	<0.1	--	<0.1
Johnson Creek to Stibnite – Total[1]	--	29.5	1.3	--	30.9
Proposed Route (Total)					
Access, Existing (Minor Improvements, 0-50%)	--	38.4	8.9	1.1	48.5
Access, Existing (Major Improvements, 50-100%)	--	47.5	2.9	6.5	56.8
Access, New (Bladed)	--	7.1	0.5	0.8	8.4
Access, New (Overland Travel)	1.0	0.8	28.2	2.2	32.2
Structures	<0.1	0.5	0.1	0.1	0.8
Substation, Cascade Switching Station	--	--	2.6	--	2.6
Substation, Johnson Creek	--	0.4	--	--	0.4
Substation (Scott Valley), SGLF	--	--	0.9	--	0.9
Substation, Thunderbolt Drop Substation	--	0.1	--	--	0.1
Substation, Warm Lake	--	0.3	--	--	0.3
Proposed Lines/Project Component – Total[1]	1.0	95.1	44.1	10.7	151.0

Source: Land ownership derived from parcel data (Valley County 2019a).
[1] Totals may not sum correctly due to rounding.

Transmission Line Structures

The transmission line structures would use standardized IPCo structure types, including single-pole and H-frame structures in a variety of configurations. Distribution underbuild is a construction method where the distribution voltage circuit is constructed underneath the transmission circuit to reduce the number of power poles. Single-pole structures would be used in areas where distribution underbuild is present, shorter structure spans are needed, smaller corridors are used, or a limited structural footprint is required. Typical spans for single-pole structures would be approximately 300 feet in length. H-frame structures typically comprise two poles and would be used for areas where longer spans, increased structural capacity, or mountainous terrain is encountered. Typical spans for H-frame structures would be approximately 600 feet in length. Structure heights would vary between 45 and 80 feet depending upon

structure type and terrain. However, structure heights greater than 80 feet could be required in isolated instances.

The estimated number of each type of structure by line segment is available in the Plan of Development (POD) for Electrical Transmission, Stibnite Gold Project (Perpetua 2021b).

Foundations

Structure foundations would include direct embedded wood poles. Angle structures and dead-end structures could require the excavation and placement of guy anchors to complete the structure installation, if needed. In locations where guy anchors would not be feasible and designed steel poles would be necessary, structures would be supported by drilled pier caisson foundations.

Conductors

Electrical transmission and distribution lines use metallic conductors to allow the flow of current which are designed in a manner that balances current flow, strength, and sagging characteristics. Alternating current (AC) transmission lines use three phases for each transmission circuit. IPCo standards require a minimum ground clearance of 24.5 feet for all new construction of 138-kV transmission lines. Additionally, the transmission lines would include fiber-optic cables and 3/8-inch steel overhead ground wire.

Overhead Ground Wire and Electrodes

Overhead ground wires are required to provide a transmission system with protection from the adverse effects of lightning. The shielding of the transmission system would be provided by an optical ground wire, which is a steel-coated, fiber-optic cable that provides the same levels of system protection as steel overhead ground wire, but also includes a core of fiber-optic cables used for communications.

Distribution Underbuild

Distribution underbuild (the lower voltage line) would be co-located on the transmission line structures under the primary 138-kV voltage (the higher voltage line).

Distribution underbuild is usually the last remaining conductor to be installed after the transmission conductors, overhead ground wire, and optical ground wire are finished.

Grounding

Grounding a transmission line is required to operate and maintain the facility safely. The grounding process is achieved by electrically connecting structure hardware to a ground rod buried within the earth. This electrical connection of hardware allows the safe flow of current and does not allow the build-up of voltage that could cause a mechanical failure or safety concern.

An electrical effects study is required to determine the methods and equipment needed to safely mitigate the site-specific current flows through these adjacent facilities. Typically, all metallic structures within the ROW would be grounded, including buildings, fences, and pipelines. If the electrical effects study determines that structures outside of the ROW require grounding, mitigation measures to safely ground those facilities would be required.

Other Nonelectrical Hardware

For utilities where avian protection and aircraft warnings are required, non-electrical hardware may be installed on the line. This hardware or marking could include bird flight diverters, marker balls, tower lighting, or tower painting. Structures would be marked or protected from avian intersect using the guidelines and methodologies detailed in the Avian Power Line Interaction Committee (APLIC) recommendations. Any Federal Aviation Administration (FAA) requirements would be in accordance with the FAA Circular 70/7460 document, which details the operational requirements for structures exceeding a safe operational elevation in relation to air space.

Access Roads

In addition to the transmission line work detailed above, the existing road network used to access these structures may require maintenance/improvements to allow construction equipment safe access into the power line corridor. While the existing road network proximate to the transmission line ROW would be used to the maximum extent possible, some new service roads (roads used solely by Perpetua or IPCo to access Project facilities) could be needed to reach structure locations without existing access.

Additionally, overland service routes would be required from the existing access road to reach structure locations without current access. These overland service routes would not require blade work (i.e., recontouring). A 14-foot-wide ROW is being requested for the existing/proposed roads outside of the power line corridor ROW to accommodate construction and maintenance equipment. For FR 467, a 16-foot-wide ROW is being requested to accommodate OSV.

During construction, the new section of transmission line between the Johnson Creek substation and the SGP would require major improvements to Horse Heaven Road (FR 416W), NFS Trail 233 (no name), and approximately 4 miles of new spur roads would be constructed. Minor upgrades to Cabin Creek Road (FR 50467) would also be required.

Road maintenance requirements prior to construction would vary depending on the type of road, level of use, and condition of the road. However, maintenance generally would consist of clearing vegetation and rocks, as well as repairing cut and fill slope failures, as necessary, to allow for a 14- foot-wide road surface. In most cases, the roads would be left as close to an undeveloped nature (i.e., two-track road) as possible without creating environmental degradation (e.g., erosion or rutting from poor water drainage). Equipment to perform the required road maintenance would include hand tools (e.g., chainsaws), track driven machines (bulldozers and graders) and crew- haul vehicles (such as 4-wheel-drive pickups and/or off-highway vehicles [OHV; includes all terrain vehicles (ATVs), utility task vehicles (UTVs) and side-by-sides]). Roads would be opened/cleared for use by trucks transporting materials, excavators, drill rigs, bucket trucks, pickup trucks, and crew-haul vehicles. Specific actions, such as installing water bars and dips to control erosion and stormwater, would be implemented to reduce construction impacts and would follow standard designs.

Access road construction and disturbance can typically be summarized into five types of access roads:

Existing (No Improvement) – These existing roads provide access to structures and would not require improvement. Minor maintenance activities such as pruning of vegetation for construction vehicle access and applying water to the road to reduce dust may be required.

Existing (Minor Improvement) – These existing roads provide access to structures and should not require significant improvement to utilize for construction. Existing road widths typically vary from 14-foot-wide access roads to 24-foot-wide gravel roads with 14 feet being the minimum needed to accommodate construction traffic. Minor maintenance activities such as applying water to the road to reduce dust and improve workability of the soil for blading and compaction, and blading may be required during and after construction to support construction traffic and return the road to a preconstruction condition.

Existing (Major Improvement) – These existing roads provide access to the structures and may require major reconstruction work. These roads appear to be in questionable condition and would likely require major reconstruction to support construction traffic. Existing road widths may be as narrow as 8 feet for primitive two-track roads that need reconstruction to widen the driving surface to 14 feet, with curve widening and turnouts added to accommodate construction traffic. Overall disturbance width is estimated to be an average of 20 feet, which includes cut/fill slopes and other impacts associated with reconstruction. Maintenance activities such as applying water to the road, to reduce dust and improve workability of the soil, and blading may be required during and after construction to support construction traffic. Aggregate/crushed rock placement may be required to maintain the existing road.

New (Overland Travel) –These roads traverse existing agricultural fields or open areas and are not expected to require grading work to support construction traffic. No permanent road construction is anticipated on these routes, and any earthwork or aggregate imported would be reclaimed after construction. Temporary driving surface is estimated to be 14 feet to accommodate construction traffic. Sections of road that cross wet fields or wetlands may have temporary matting installed to provide a stable surface to support construction equipment without disturbing the ground. Minor work such as grade smoothing at ditches or large rock removal may be required to provide a drivable surface.

New (Bladed) – New bladed roads are typically required where the existing ground has a significant cross slope or traverses terrain that needs to be bladed smooth. Construction of the road prism would require excavation and placement of fill material to provide a stable driving surface. The driving surface is constructed to a minimum width of 14 feet and includes curve widening and turnouts to accommodate construction traffic. Overall disturbance width is estimated to be an average of 35 feet, which includes cut/fill slopes and other impacts associated with construction. Earthwork quantities are typically balanced for each road by adjusting the grade to balance material being cut versus filled. Surfacing rock is not typically placed on these roads unless required by stakeholders or needed to support construction traffic.

Table 2.4-7 provides a summary of miles of access roads by route segment and land status.

Table 2.4-7 Miles of Access Roads by Line Segment and Land Ownership

Line Segment/ Access Type	BOR	Forest Service	Private	State or Local	Total[1]
Lake Fork to Cascade Switching Station					
Access, Existing (No Improvements)	--	--	0.2	<0.1	0.2
Access, Existing (Minor Improvements, 0-50%)	--	--	4.2	0.6	4.7
Access, Existing (Major Improvements, 50-100%)	--	--	0.2	1.8	2.0
Access, New (Bladed)	--	--	<0.1	0.2	0.2
Access, New (Overland Travel)	0.6	--	12.6	0.6	13.7
Access, Temporary (Overland Travel)	0.8	--	<0.1	--	0.8
Lake Fork to Cascade Switching Station – Total[1]	1.4	--	17.3	3.1	21.8
Cascade to Cascade Switching Station Tie					
Access, Existing (No Improvements)	--	--	--	--	--
Access, Existing (Minor Improvements, 0-50%)	--	--	--	--	--
Access, Existing (Major Improvements, 50-100%)	--	--	--	--	--
Access, New (Bladed)	--	--	--	--	--
Access, New (Overland Travel)	--	--	<0.1	--	<0.1
Cascade to Cascade Switching Station Tie – Total[1]	--	--	<0.1	--	<0.1
Cascade Switching Station to Johnson Creek					
Access, Existing (No Improvements)	--	5.1	4.2	4.6	13.9
Access, Existing (Minor Improvements, 0-50%)	--	18.9	0.7	0.1	19.7
Access, Existing (Major Improvements, 50-100%)	--	17.8	1.1	2.0	20.9
Access, New (Bladed)	--	0.6	0.1	0.3	1.0
Access, New (Overland Travel)	--	0.4	4.0	0.7	5.1
Access, Temporary (Minor Improvements, 0-50%)	--	--	0.5	0.1	0.6
Access, Temporary (Overland Travel)	--	--	1.0	--	1.0
Cascade Switching Station to Johnson Creek – Total[1]	--	42.8	11.6	7.7	62.1

Line Segment/ Access Type	BOR	Forest Service	Private	State or Local	Total[1]
Johnson Creek to Stibnite					
Access, Existing (No Improvements)	--	<0.1	0.7	--	0.7
Access, Existing (Minor Improvements, 0-50%)	--	3.7	0.4	--	4.1
Access, Existing (Major Improvements, 50-100%)	--	10.1	0.3	--	10.3
Access, New (Bladed)	--	3.5	0.1	--	3.7
Access, New (Overland Travel)	--	--	--	--	--
Johnson Creek to Stibnite – Total[1]	--	17.3	1.5	--	18.9
Total for all Line Segments					
Access, Existing (No Improvements)	--	5.1	5.2	4.6	14.9
Access, Existing (Minor Improvements, 0-50%)	--	22.6	5.2	0.6	28.5
Access, Existing (Major Improvements, 50-100%)	--	27.9	1.7	3.8	33.3
Access, New (Bladed)	--	4.1	0.3	0.4	4.8
Access, New (Overland Travel)	0.6	0.4	16.6	1.3	18.9
Access, Temporary (Minor Improvements, 0-50%)	--	--	0.5	0.1	0.6
Access, Temporary (Overland Travel)	0.8	--	1.0	--	1.8
Proposed Line Segment – Total[1]	1.4	60.2	30.5	10.7	102.8

Source: Land ownership derived from parcel data (Valley County 2019a).
[1] Totals may not sum correctly due to rounding.

Substations

IPCo determined there would be a need to increase the 230/138-kV transformer capacities at the Oxbow and Horse Flat substations to support the SGP load. A 20 megavolt amps reactive capacitor bank would also need to be installed at the McCall Substation for voltage support under abnormal (element out of service) conditions. A new 138/69-kV switching substation would be required to be located near Cascade. Several smaller substations along the transmission line from Cascade to Yellow Pine would also need to be upgraded from 69-kV to 138-kV. A 138-kV metering substation would be placed in the Johnson Creek area to feed the village of Yellow Pine and serve as a metering point for the Stibnite 138-kV line. The substations would be operated and maintained by IPCo. **Table 2.4-6** provides the area that is needed, by land status, for each of the substations.

Additional details regarding the upgrades needed to existing substations and the construction of new substations are available in the Electrical Transmission POD (Perpetua 2021b).

Periodic inspections of the transmission lines and supporting structures would be required and conducted as described below. Depending on the results of the inspection, maintenance work may be scheduled for immediate follow up (e.g., in the case of imminent failure or safety issues) or follow up in subsequent year(s) (e.g., issues that need to be repaired but do not cause an imminent problem). The activities presented below are considered routine Operation and Maintenance activities. Subject to specific terms, conditions, and stipulations of the ROW grant and reporting requirements contained herein, these activities may be conducted by IPCo as necessary and without prior notification to the Forest Service:

- Routine air patrols to inspect for structural and conductor defects, conductor clearance problems, and hazardous trees. These are typically conducted from a helicopter, and personnel include a pilot and line patrolmen.

- Routine ground patrols to inspect structural and conductor components. A vast majority of such inspections would require either a pickup truck or OHV. Patrols may rely on direct line of-sight and/or binoculars. Patrols are typically conducted in the spring and fall.

- Climbing surveys to inspect hardware or make repairs. Personnel access these structures by pickup, OHV, or on foot.

- Line and structure inspections may also be conducted using unmanned aerial vehicles.

- Structure or conductor maintenance from a bucket truck. Routine cyclical vegetation clearing to trim or remove tall shrubs and trees to prevent encroachment into the minimum vegetation clearance distance consistent with IPCo standards.

- During all vegetation clearing activities, IPCo would ensure there is no disturbance of the soil surface that would create an added risk of erosion, the promotion of the establishment or expansion of invasive species (including noxious weeds), damage to cultural resources, sensitive species, or ESA listed species.

- Removal of hazard trees within, or adjacent to, the ROW that pose a risk of falling into conductors or structures and causing outages or fires. Wood pole inspection and treatment to retard rotting and structural degradation.

- Routine inspection and maintenance of authorized service and access roads (length and width and alignment of road remains the same), such as blading the road to maintain the surface condition and drainage, removing minor physical barriers (i.e., rocks and debris), replacing culverts or rock crossing, and rehabilitating after major disturbances requiring heavy equipment (such as slumping). Heavy equipment would travel and maneuver on existing service and access roads.

- Vegetation removal on service roads to allow the necessary clearance for access and provide for worker safety. Removal is conducted by hand crews using chain saws or by mechanical means. Plants that would not interfere with the safe operation of vehicles and equipment would be left in place.

- Installation of bird protection devices, bird perch discouragers, and relocation or removal of bird nests. Under the authority of the Migratory Bird Treaty Act, the Bald and Golden Eagle Protection Act, or Idaho Code, the appropriate permits would be acquired from the U.S. Fish and Wildlife Service (USFWS) and/or Idaho Department of Fish and Game (IDFG), prior to relocation or removal of nests.

- Reduction of fuel loads around wood poles in fire-prone areas by (1) removal of vegetation within a 20-foot radius and/or treatment with herbicide from the approved Forest Service list by a certified applicator, and in accordance with the Pesticide Use Permit, or (2) application of fire-retardant coating to the base of wood poles. If herbicide is used, IPCo would report to the Forest Service the amount used for Forest Service's herbicide application yearly report.

- In-kind structure replacement (such as replacing a cross-arm, replacing an insulator, replacing a single wood pole with a single wood or steel pole). A bucket truck and/or other rubber- tired vehicles may be located on or off a road.

- Non-cyclical vegetation clearing to remove saplings or larger trees in the ROW consistent with IPCo standards.

- Structure or conductor maintenance in which earth must be moved, such as for the creation of a landing pad for construction or maintenance equipment.

- Follow-up restoration activities, such as seeding, noxious-weed control, and erosion control. To minimize the potential for wildland fires to damage structures, reseeding activities would not occur within a 20-foot radius around structures.

- Conductor replacement, which requires the use of several types of trucks and equipment and grading to create a safe work area to hang and pull the conductor into place.

Substation maintenance activities would include equipment testing, preventative repair, and procedures for providing continual service and maintaining electrical service. Typical substation maintenance does not require ground-disturbing activity, although ground disturbance could be required to replace damaged equipment, oil containment facilities, or other miscellaneous items.

2.4.4.8 Communication Towers and Repeater Sites

Perpetua installed a microwave relay communications tower in 2013, on private land to the east of the SGP, for communications. The existing communications tower would be upgraded by anchoring the existing tower pad; extending the tower 20 feet in height; upgrading the antenna by adding a dish or second antenna; and installing new high frequency radios capable of increasing bandwidth to 1,000 megabits per second. Alternatively, Perpetua in partnership with IPCo and local communication providers could add fiber optic cable to the transmission line between Cascade and Stibnite. The existing microwave relay tower is shown on **Figure 2.4-2**.

The existing two-way radio system would need to be expanded at the SGP and along the Burntlog Route to allow rapid communication between equipment operators and ground personnel, and to allow broadcast of emergency messages. The two-way radio system would be supported by a series of repeaters placed on public and private land.

A series of VHF radio repeaters would be placed along the Burntlog Route as needed. The VHF repeaters would be placed near the existing Meadow Creek Lookout and Thunderbolt Lookout communication sites, the new Burntlog Maintenance Facility, and on private parcels at the SGP, as needed. The 10-foot-tall towers on 3-foot by 3-foot concrete pads would be supported by solar panels, support hardware, and a backup battery case. Given their location at existing or proposed facilities, no additional disturbance for equipment installation or access would be required for their construction or maintenance. Each site would be accessed annually (at a minimum) or as required for maintenance. No additional disturbance for equipment installation or access would be required.

A cell tower also would be installed to facilitate area communications. The proposed cell tower would be approximately 60 feet tall and would include surface disturbance of approximately 30 feet by 60 feet (0.04 acre) and utilizing an existing access road. The cell tower location would be near the proposed transmission line alignment upslope of the Hangar Flats pit (**Figure 2.4-2**).

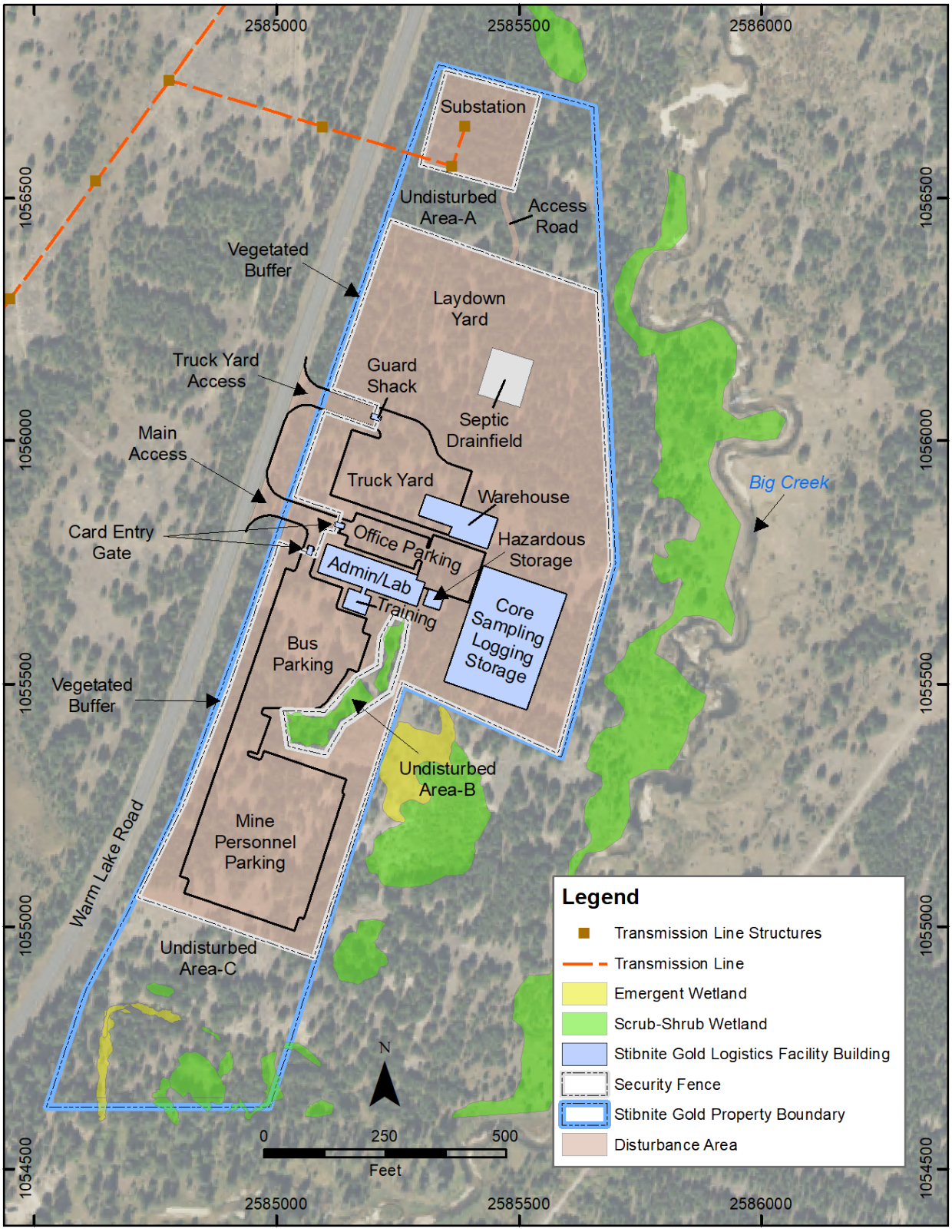
2.4.4.9 Off-site Facilities

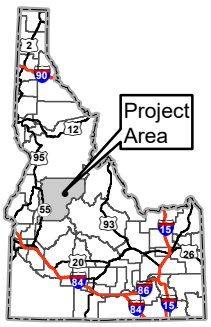
Perpetua would require off-site facilities (facilities not within the Operations Area Boundary) to support mine-related activities. Administrative offices, a transportation hub, and warehousing and assay laboratory would be located at the proposed SGLF, while road maintenance and snow removal activities would be supported by Perpetua from the proposed Burntlog Maintenance Facility.

The off-site facilities that would be constructed and operated are described below.

Stibnite Gold Logistics Facility

The SGLF would be located along Warm Lake Road on private land (approximately 7 miles northeast of Cascade), with access to SH 55 (**Figure 2.4-1**). The SGLF would require approximately 25 acres of disturbance to accommodate employee parking, an assay laboratory building, a core sampling logging storage facility, warehouses, laydown yards, equipment inspection areas, a truck scale, and an administration building for Perpetua personnel (**Figure 2.4-7**). The facility would be surrounded by a security fence. One point of ingress/egress would access office parking and the mine personnel card-entry gate, while another ingress/egress would access the truck yard via a guard shack. The parking and assembly area would accommodate approximately 250 light vehicles for employees using bus or van pooling to the SGP. Perpetua would mandate the use of busing and vans for employee and contractor transportation to the SGP.





(See Figure 2.4-1 for location of Stibnite Gold Logistics Facility.)

Figure 2.4-7
Stibnite Gold Logistics Facility

Stibnite Gold Project
Stibnite, ID

Data Sources: Perpetua 2021a

Perpetua would require supply truck drivers to check in at the SGLF and direct them to either proceed to the SGP or unload at the warehouse for temporary storage and consolidation of their load. A truck scale would be located at the SGLF to verify loads going into or out of the warehouse area. The check-in process would include general safety and road readiness inspection of incoming trucks and equipment being transported to SGP. Heavy equipment transport vehicles would be inspected for items such as presence of weeds, excessive soil on earth moving equipment, safety equipment, installed and maintained engine brake muffling systems, and general safety checks of equipment.

In addition, the Scott Valley substation would be located within the property boundary north of the SGLF, surrounded by a separate security fence.

The SGLF would require a domestic groundwater well to service the facility. This well and associated water right would require permitting through the Idaho Department of Water Resources (IDWR).

Burntlog Maintenance Facility

The Burntlog Maintenance Facility would be located on NFS land within a previously disturbed borrow source site 4.4 miles east of the junction of Johnson Creek Road and Warm Lake Road (**Figure 2.4-1**) and would be accessed via the Burntlog Route with two points of ingress/egress. The facility footprint would be approximately 3.5 acres and would not be fenced. The facility would include three main buildings: a 7,000-square-foot maintenance building; a 7,000-square-foot aggregates storage building; and a 4,050-square-foot equipment shelter (**Figure 2.4-8**). It would also contain a fuel station, electric generator, propane tank, outdoor storage area, and worker sleeping quarters. It would house sanding/snowplowing trucks, snow blowers, road graders, and support equipment in the equipment shelter or maintenance buildings. The Burntlog Maintenance Facility would require a domestic groundwater well to service the facility. This well and associated water right would require permitting through the IDWR.

This facility would include a double-contained fuel storage area housing three above-ground 2,500-gallon fuel tanks for on-road diesel, off-road diesel, and unleaded gasoline. Additionally, a 1,000-gallon used oil tank would be located inside the maintenance facility and a 1,000-gallon propane tank would be located at the facility for heating.

Additional features of this facility could include covered stockpiles of coarse sand and gravel for winter sanding activities; temporary or emergency on-site housing for road maintenance crews during periods of heavy snow removal needs and other winter maintenance activities; and communications equipment including a tower. This facility could also serve to support snowmobile route grooming and grooming equipment storage as needed.

2.4.5 Mine Operations

The SGP would consist of mining three primary mineral deposits and the re-mining of historical tailings using conventional open pit mining methods. Ore from three open pits (Yellow Pine, Hangar Flats, and West End pits) would be sent to either the crusher, located near the processing plant, or one of several ore stockpiles in various locations within the Operations Area Boundary (**Figure 2.4-2**; M3 2021). Pre-stripping, or removing the overlying soil and rock (i.e., development rock) to access the mineral deposit, would commence during the construction phase in Mine Year -2. Ore removal and processing would

begin in Mine Year 1 (operations phase) and continue year-round for approximately 15 years. Mine operations would occur in the area of two historical open pit mined areas (Yellow Pine and West End) and one new open pit (Hangar Flats) that includes the sites of former underground mining and mineral processing facilities.

In general, ore mined from the three open pits would be hauled directly to the primary crusher area; however, during extended periods when the ore tonnage or ore type from the pits exceed the availability of the ore processing plant, the ore would be stockpiled and processed at a future time. Development rock (also commonly referred to as waste rock) would be hauled to the TSF embankment or placed in one of four destinations: the TSF Buttress or the Yellow Pine, Hangar Flats, and West End open pits once they are mined out.

2.4.5.1 Open Pits

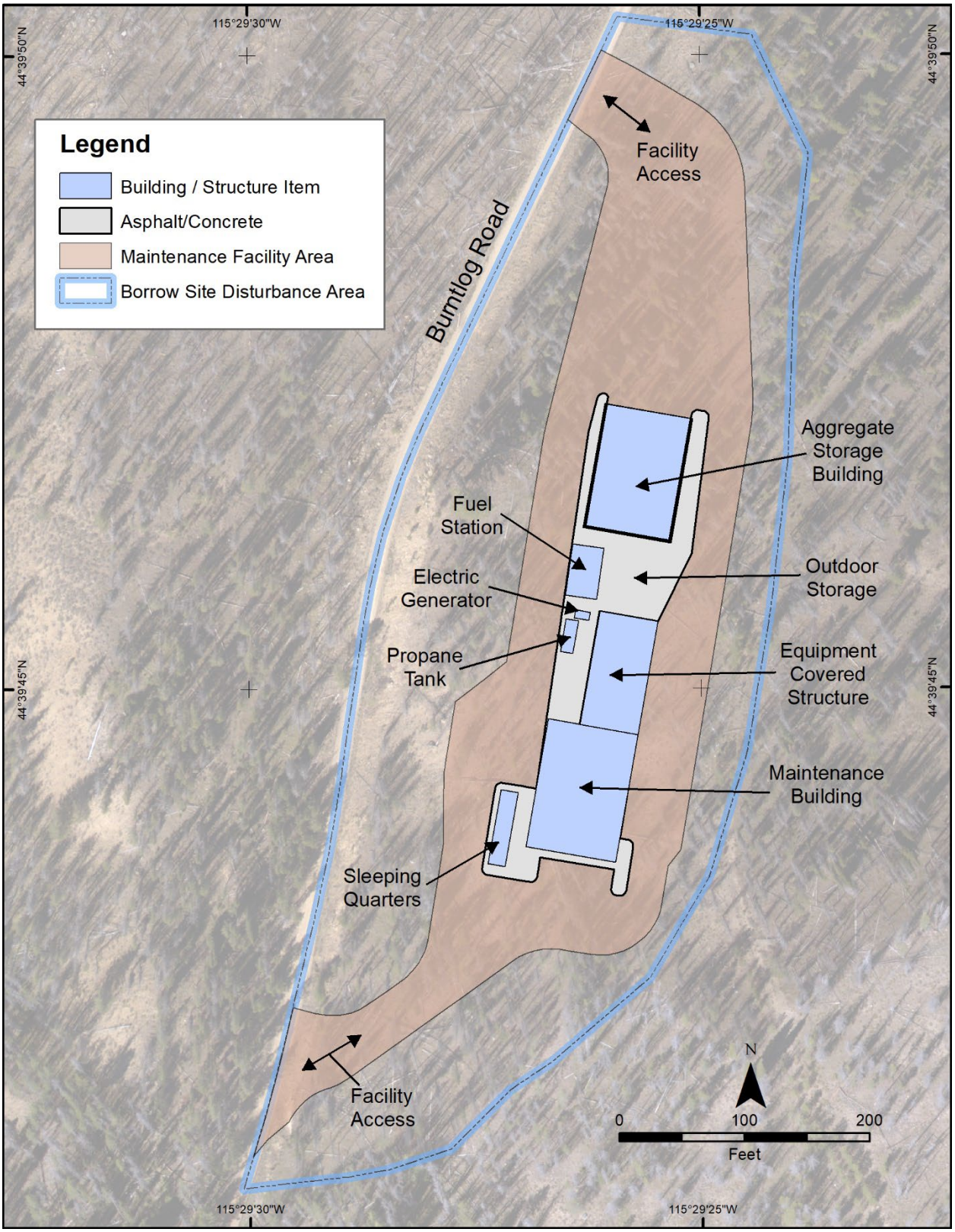
Figure 2.4-2 shows the location and extent of the three pits to be mined. A general sequence for mining, assuming 15 years of mine operations as shown on **Figure 2.4-3**, would be as follows:

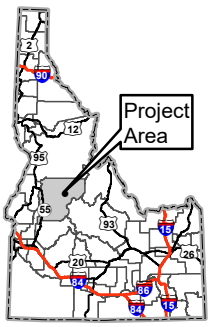
- Yellow Pine pit – Mine Years 1 through 7
- Hangar Flats pit – Mine Years 4 through 7
- West End pit – Mine Years 7 through 12
- Stockpile mining – Mine Years 12 through 15

The Yellow Pine pit would be in the northern portion of the SGP, in the same general location as a historical open pit mining area. The pit would be expanded to include a shallower mining area to the northeast previously mined as the Homestake pit. The East Fork SFSR currently flows through the legacy Yellow Pine pit, forming a pit lake (Yellow Pine pit lake.

The West End pit would be in the northeast portion of the SGP, east of and at a higher elevation than the Yellow Pine pit, generally situated between Sugar Creek to the north and Midnight Creek to the south. The West End pit would be in the same general location as historical open pit mining where multiple open pits, mine benches, waste rock dumps, and areas of deep backfill exist. The existing Stibnite pit is within the southern portion of the West End pit, and once expanded would be known as the Midnight pit.

The Hangar Flats pit would be in the central portion of the SGP, generally encompassing steep south and southeast facing slopes and the adjacent Meadow Creek valley floor at the toe of these slopes. Historical mining activity in this area was primarily underground but the proposed pit also would encompass the site of the former Bradley mill and smelter, the Hecla heap leach, and Stibnite Mine Inc. leach pads.





(See Figure 2.4-1 for the Burntlog Maintenance Facility location.)

Figure 2.4-8
Burntlog Maintenance Facility

Stibnite Gold Project
Stibnite, ID

Data Sources: Perpetua 2021a

Table 2.4-8 provides a summary of characteristics for each pit.

Table 2.4-8 Summary of Characteristics for Mine Pits

Characteristic	Yellow Pine Pit	West End Pit	Hangar Flats Pit
Acreage	222	185	66
Bottom Elevation (feet amsl)	5,360	6,180	6,080
Depth (feet) below existing ground surface	720	440	460
Highwall Height Above Valley Bottom (feet)	600 for western highwall 900 for eastern highwall	1,000 highwalls	800 for northwestern highwall
Approximate Total Tonnage Mined (in million tons)	163	198	31
Approximate Ore/Development Rock Tonnage Mined (in million tons)	53 / 110	50 / 148	9 / 22
Disposal of Development Rock	TSF embankment, TSF Buttress, Yellow Pine pit backfill	Yellow Pine pit backfill, TSF Buttress, Hangar Flats pit backfill, TSF embankment, Midnight pit backfill	TSF embankment, TSF Buttress, Yellow Pine pit backfill

Source: Perpetua 2021a
amsl = above mean sea level.

Partial dewatering of the open pits would occur prior to and concurrent to renewed SGP mining. Shallow alluvial and deeper bedrock wells would be drilled adjacent to the pits to intercept and pump groundwater before it flows into the pits. During mine operations, groundwater seepage and in-pit surface water runoff would be collected for reuse in the ore processing plant or treated and discharged, according to whether there was a water deficit or surplus at a given time. Additional details on pit water management can be found in **Section 2.4.5.10**.

2.4.5.2 Drilling and Blasting

Drilling and blasting would be used to break ore and development rock in the mine pits (see M3 2021 for additional details). Following drilling, explosives would be used to break rock into fragments that are suitable for loading into equipment. An Explosives and Blasting Management Plan would be prepared as part of the final mine plan. Explosives storage, transport, handling, and use would comply with applicable Department of Homeland Security, Bureau of Alcohol, Tobacco, Firearms and Explosives, Department of Transportation, and Mine Safety and Health Administration (MSHA) regulations.

2.4.5.3 Rock Loading and Haulage

Rock loading and haulage would use a development fleet and a production mining fleet. Mine development excavation required to establish haul truck access roads, access limestone, and pre-strip pits prior to production mining would use a fleet of medium sized excavators, wheel loaders, and 45-ton articulated trucks. This development fleet would also be used to salvage growth media and support reclamation activities. Production mining would use a conventional diesel truck and shovel fleet consisting of two 28-cubic yard hydraulic shovels, approximately sixteen 150-ton haul trucks, and one 28-cubic yard wheel loader. The wheel loader would be used primarily to load haul trucks during shovel maintenance and to load stockpiled ore as needed. The ore would be hauled directly to the primary crusher or the run-of-mine ore stockpile at the ore processing facilities.

2.4.5.4 Ore Management

Ore from the open pits would be hauled to and placed directly into the ore processing plant, except during periods when the amount or type exceeds the availability of the ore processing plant, the excess ore would be stockpiled in unlined facilities on top or within other mine disturbance areas. Seven long-term ore stockpiles and one short-term stockpile would be used to manage the excess ore (**Figure 2.4-2**). The long-term ore stockpiles would be located on and near the TSF Buttress and Hangar Flats pit and the short-term stockpiles would be located near the crusher.

Highest-grade ore would be sent directly to the crusher, or to the short-term stockpile area near the crusher where it would likely be processed within a few days. Lower-grade ore would be sent to the long-term ore stockpiles where it would remain for months or longer. Some of the ore sent to the low-grade ore stockpiles would be re-handled during active mine operations, and some would be re-handled and processed once open pit mining has ceased. If metal prices do not support processing of some of the long-term stockpiles, the stockpiled material would be covered as part of TSF Buttress closure activities (**Section 2.4.7**).

Three long-term ore stockpiles would be on the TSF Buttress on the north side of the valley. Two stockpiles would be adjacent to the Hangar Flats pit and extended onto the pit footprint after it is backfilled. A stockpile within the West End pit footprint would temporarily store ore mined during West End Road development and pre-stripping. Ore storage in long-term stockpiles peaks in Year 11 with approximately 19 million tons.

2.4.5.5 Development Rock Production and Storage

Development rock from the three open pits would be sent to five different permanent destinations over the mine life including the TSF embankment and rind fills; the TSF Buttress; the mined-out Yellow Pine open pit; the mined-out Hangar Flats open pit; and the Midnight area within the mined-out West End open pit. In addition to these five areas, other destinations would receive development rock from the three open pits including a temporary ore stockpile base within the West End open pit, a foundation for stockpiling growth medium and recovered seed bank material, a reclamation materials stockpile located on the TSF Buttress, and miscellaneous projects such as road fills and ore stockpile foundations. The development rock production rate would vary throughout the life of the mine because the cut-off grades demarcating ores from development rock would vary due to fluctuating economic conditions. At

individual open pits, the determination between ore and development rock is initially based on the mine plan and the delineation of the ore and development rock as determined through production mapping and analysis of blast hole cuttings in the grade control program. Approximately 280 million tons of development rock from active mining areas would be used to construct the TSF embankment and buttress, and placed in the mined-out pits, as described in **Table 2.4-9**.

After the main portion of the Yellow Pine pit has been mined and mining commences in the northern portion of the pit, development rock would be end-dumped into the Yellow Pine pit as backfill. The dumped development rock would not be mechanically compacted, except as it nears the final reclaimed surface elevation of the backfilled area.

The upper lifts of the backfill would be placed by direct dumping and compaction. The final backfill would be covered with a geosynthetic liner and soil/rock cover, and the East Fork SFSR and Stibnite Lake would be established across the backfill in a geosynthetic-lined stream/floodplain corridor. The inclusion of the lined Stibnite Lake on the Yellow Pine pit backfill would help buffer temperature extremes in the East Fork SFSR and replace the fish habitat of the existing Yellow Pine pit lake. The 16-million-gallon lake feature was designed based on results of lake temperature modeling to reduce diurnal temperature fluctuations while increasing average temperatures in effluent stream flow (see also **Sections 4.9.2.2** and **4.9.2.4**, Brown and Caldwell 2021a, Rio ASE 2021). Development rock to backfill the Yellow Pine pit would be sourced predominantly from the West End pit, with minor quantities originating from the Yellow Pine and Hangar Flats pits.

Once mining ceases at the Hangar Flats pit, development rock to backfill the Hangar Flats pit would be sourced predominantly from the West End pit. The Midnight pit, a portion of the West End pit in the southeast corner of the pit near Midnight Creek, would be backfilled concurrent to mining the West End pit, with development rock from the West End pit once mining in the area to be backfilled is completed.

In addition to the permanent development rock storage described above, a temporary DRSF would be constructed within the West End pit during road construction and pre-stripping activities. This temporary DRSF would contain approximately 2.5 million tons and serve as the base for the West End In-Pit stockpile. The purpose of this DRSF is to reduce the need for mixing the smaller development haul truck traffic with production haul truck traffic for safety purposes, and to provide a base for stockpiling ore encountered during road development and pre-stripping within the West End pit. Since this is a temporary DRSF entirely within the footprint of the West End pit, it would be rehandled during regular mine operations at the West End pit and relocated to other facilities for permanent development rock storage.

Perpetua has conducted geotechnical investigations supporting the design of the development rock backfills (Perpetua 2021c).

Surface water and groundwater management for facilities that permanently store development rock are discussed in **Section 2.4.5.10**, Surface Water and Groundwater Management. A Development Rock Management Plan, which describes procedures and methods for active management of development rock that is produced and stored across the SGP during operations, has been provided (Brown and Caldwell 2022a).

Table 2.4-9 Development Rock Management Summary

Characteristic	TSF Buttress[1]	Hangar Flats Backfill[1]	Midnight Backfill	Yellow Pine Backfill	TSF Embankment[3]
Location	Meadow Creek valley southwest of Hangar Flats pit	Backfill into Hangar Flats pit	Backfill into south portion of West End pit north of Midnight Creek	Backfill into the Yellow Pine pit	In the Meadow Creek drainage west of the Hangar Flats pit
Source	Hangar Flats pit, Yellow Pine pit, and West End pit	Yellow Pine pit and West End pit	West End pit	West End pit, Yellow Pine pit, and Hangar Flats pit	Hangar Flats pit, Yellow Pine pit, West End pit, historical SODA, and Hecla heap leach legacy materials
Million Tons[2]	81	18	7	113	61
Acres	120	41	18	180	88
Height (feet)	460	460	320	740	Initial embankment: 245 Final embankment: 460
Steepest Surface Grade (Horizontal: Vertical)	Overall 3:1	Varies from 5:1 to 2.5:1	3:1 north (pit) side 2:1 south side matching undisturbed slope	Varies from 5:1 to approximately 2.5:1	2:1 inter-bench (upstream) 2:1 overall (downstream) TSF slopes would meet IDWR and engineering standards, reviewed by IDWR in order to obtain Approval for Construction

Source: Perpetua 2021a

[1]The TSF Buttress was formerly referred to as the Hangar Flats Development Rock Storage Facility. To be consistent with the naming convention used for the other backfilled pits, the 2021 MMP uses the term Hangar Flats pit backfill for the backfilled Hangar Flats pit.

[2]Limited amounts of development rock would be used to construct haul roads and pad areas for site facilities. In addition, some development rock may be crushed and screened for use as road surfacing material and/or concrete aggregate. The Development Rock Management Plan (Perpetua 2021c) specifies testing to determine which development rock can be used for these applications.

[3]The source of development rock for TSF construction includes material from the SODA and the Hecla heap leach facility.

2.4.5.6 Spent Ore and Legacy Tailings Removal in Meadow Creek Valley

The Meadow Creek Valley contains legacy materials created from historical mining activities. Legacy materials include development rock, spent ore in the unlined SODA, the Bradley Mill Tailings, and run-of-mine and crushed ore in the historical lined heap leach pads. An Environmental Legacy Management Plan (Perpetua 2021d) describes procedures and methods for active management of legacy materials encountered during construction and mining operations. While the TSF is being built and expanded, Perpetua would remove and reuse as construction material the 7.5 million tons of spent ore within the unlined SODA and other areas (Hecla and Stibnite Mine Inc. leach pads). Physical and chemical testing of the legacy material would determine if the material was suitable for construction uses and determine the final placement of the material. During the first four years or so of ore processing operations, Perpetua would remove and reprocess the three million tons of Bradley tailings underlying the SODA. The legacy tailings would be mixed with water and then pumped to the ore processing facility. The temporary water addition and pumping facility would be an enclosed, heated structure located within the limits of the SODA.

If other legacy materials are encountered during construction they would be removed and hauled off site to an appropriate disposal facility, placed in the TSF, used as pit backfill or construction material, or left in place, depending on testing to determine physical and chemical suitability.

Legacy development rock not used for TSF construction purposes or reprocessed would be placed in pit backfills or used for the TSF Buttress.

2.4.5.7 Ore Processing

During operations, approximately 115 million tons of ore would be mined from the three proposed pits and processed at the mill facilities during the approximately 15-year process facility operation. At full operation, targeted ore production would range from 20,000 to 25,000 tons per day, which would be transported to the processing facility to separate the gold, silver, and antimony from the ore. Additional details on ore processing can be found in section 17 of SGP's updated feasibility study (M3 2021).

Ore feed for processing would be sourced from either the open pits, Bradley tailings, the SODA, the short-term stockpiles, or long-term stockpiles. Typically, ore would be hauled directly from the pits to the primary crusher whenever the mill is capable of receiving the ore based on grade and metallurgy. If the ore requires short-term stockpiling due to process constraints or haul truck congestion at the primary crusher, it would likely be placed in the short-term stockpile. Ore that is lower value than other ore available at the time of pit mining would be placed in long-term stockpiles.

Ore would be hauled to the crusher, either directly from one of the three open pits or from the ore stockpiles and would be crushed and ground to reduce the size of the rock to separate the gold, silver, and antimony-bearing minerals from the host rock. The ore processing flow sheet is shown on **Figure 2.4-9**. The ore processing facility and associated support infrastructure are shown on **Figure 2.4-2**.

The ore processing area would be designed to provide for containment of ore processing materials, chemicals, wastes, and surface runoff. Potentially hazardous chemicals and wastes would be stored within buildings or areas with both primary and secondary containment. Surface runoff within the ore processing

area would be directed to a contact water pond for collection. Any leaks or spills escaping both primary and secondary containment would flow to the contact water pond for collection and would not discharge off site.

The processing would result in production of an antimony mineral concentrate, gold- and silver-rich doré, tailings, and other waste products. Tailings disposal is discussed in **Section 2.4.5.1**, Tailings Storage Facility.

Crushing and Grinding

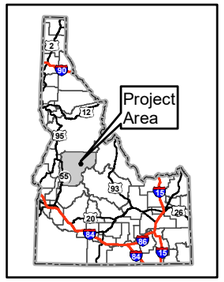
Mined ore would be hauled to the crusher and typically direct-dumped into the jaw crusher or stockpiled at the uncovered run-of-mine stockpile area near the crusher. Stockpiled ore would be loaded into the crusher dump pocket, based on crusher availability, using a loader. Surface water runoff from the run-of-mine ore stockpile area would be captured and directed to a pond and be used in the ore processing facility (**Section 2.4.5.10**).

Following crushing, the crushed ore would be transported via conveyor to a dome-shaped, covered stockpile. Dust emission controls, such as water sprays and/or bag house dust collectors, would reduce dust from crushing, conveying, and stockpiling. Apron feeders below the crushed ore stockpile would convey the ore to a semi-autogenous grinding mill followed by a ball mill for additional size reduction of the ore. Grinding would occur within an enclosed building to reduce noise levels and facilitate maintenance of the milling equipment. Grinding with process water would reduce the ore to the size of fine sand in a water slurry for further processing.

On-site Lime Generation

Ground limestone and lime are needed for pH adjustment in the SGP ore processing plant. Rather than trucking these materials to site from an off-site source, a limestone bed in the West End pit is of suitable quality and quantity to satisfy the life-of-mine SGP requirements for lime. Over the life of the mine, approximately 130,000 to 318,000 tons of limestone would be mined annually, averaging approximately 240,000 tons per year. Approximately 25 to 30 percent of the limestone mined annually would be crushed and run through an on-site lime kiln to produce metallurgical lime powder, with the remainder (70 to 75 percent) would be crushed and stockpiled for direct use as limestone. Both ore and limestone would be temporarily stored at the run-of-mine stockpile area.

The on-site lime generation would require additional equipment, which would be placed within the ore processing area. This equipment would include: limestone crusher and conveyor, propane-fired kiln (200 tons per day output capacity), kiln combustion air system including preheat heat exchanger, propane storage tank plus vaporizer, air compressor, receivers, and dryers for plant air and instrument air at kiln area, roll crusher for kiln product discharge, conveyors for moving feed and product materials, off-gas fume filter for kiln discharge, dust collector kiln feed bin, storage bin for kiln feed material; and storage bin for lime products. The limestone crusher, screens, conveyors, and feed bins would not be enclosed. Dust would be controlled in a similar manner to the ore crushing and conveying process through the use of water sprays and/or bag house dust collectors.



ROM STOCKPILE
GRIZZLY SCREEN
APRON FEEDER
DRIBBLE CONVEYOR
VIBRATING GRIZZLY
PEBBLE CRUSHER
PRIMARY CRUSHER
COARSE ORE STOCKPILE
RECLAIM FEEDER
SAG MILL FEED CONVEYOR
SAG MILL
TROMMEL OVERSIZE BARREL
BALL MILL
HISTORICAL TAILINGS
CYCLONE FEED PUMP BOX
CYCLONE CLUSTER
TRASH SCREEN
Sb ROUGHER FLOTATION CELL (4)
Sb CLEANER COLUMN
Sb CLEANER SCAVENGER FLOTATION CELL (4)
Sb ROUGHER CONDITIONING TANK
GOLD ROUGHER FLOTATION CELL (8)
GOLD 1ST CLEANER FLOTATION CELL (4)
GOLD CLEANER SCAVENGER FLOTATION CELL (4)
GOLD ROUGHER CONDITIONING TANK
Sb CONCENTRATE THICKENER
GOLD CONCENTRATE THICKENER
FILTER PRESS
Sb CONCENTRATE STORAGE TANK
Sb DRYING & BAGGING
FILTER OPTION
GOLD CONCENTRATE
PROCESS WATER TANK
AUTOCLAVE FEED TRASH SCREEN
ON-SITE LIMESTONE PRODUCTION
TO ATM
GAS CLEANING
AUTOCLAVE
AUTOCLAVE FEED TANK
COOLING WATER
OXYGEN
FLASH VESSEL (2)
GOLD CONCENTRATE SURGE TANK
LIMESTONE
SLURRY NEUTRALIZATION TANK
COOLING TOWERS
LIME
SLURRY NEUTRALIZATION TANKS (3)
TAILING THICKENER
NaCN
LIME
SULFIDE LEACH TANK (2)
SULFIDE CIP TANK (7)
SULFIDE CIP SAFETY SCREEN
SULFIDE DETOX TANK (2)
OXIDE LEACH TANK (4)
LOADED OXIDE CIP CARBON SCREEN
OXIDE CIP TANK (6)
OXIDE CIP SAFETY SCREEN
OXIDE DETOX TANK (2)
TAILING POND
ELECTROWINNING FEED TANK
ELECTROWINNING CELLS
ELECTROWINNING SLUDGE FILTER
LOADED CARBON DEWATERING SCREEN
DISTRIBUTION BOX
ACID WASH COLUMN
ELUTION VESSEL
FINE CARBON
CARBON SIZING SCREEN
CARBON REGENERATION
NaOH
NaCN
ACID
BARREN ELUATE TANK
HEAT EXCHANGER
RETORT
MERCURY VESSEL
DORÉ

SYMBOLS
MAIN PROCESS FLOW
AUXILIARY FLOW
INTERMITTENT FLOW
EQUIPMENT PACKAGE
FUTURE

Figure 2.4-9
Overall Process Flow Diagram
Stibnite Gold Project
Stibnite, ID

Data Sources: Perpetua 2021

Antimony Flotation

Two flotation circuits would be utilized; one circuit produces an antimony concentrate, and the other produces a gold-rich sulfide concentrate. Ore high in antimony would be processed by the antimony circuit to produce an antimony concentrate (M3 2021). Following grinding, the ground ore slurry would be mixed with lime and small amounts of sodium cyanide or equivalent to inhibit flotation of the gold-bearing minerals (pyrite and arsenopyrite). Lead nitrate or equivalent would be added and then a sulfur- and phosphate-bearing organic chemical. These chemicals make the stibnite mineral particles hydrophobic where the particles then attach to air bubbles and float to the surface in the stibnite flotation tanks. The gold-bearing mineral particles which do not adhere to the bubbles in the stibnite flotation tanks would drop to the bottom of the flotation tanks and be routed to the subsequent gold flotation circuit for further processing. The antimony flotation facility would have interior curbing high enough to contain 110 percent of the volume of the largest tank.

The stibnite-laden bubbles form a froth and would be collected from the top of the stibnite flotation tanks. The stibnite concentrate froth would be subjected to one or two additional flotation steps to further clean the concentrate. The resultant antimony-rich concentrate would be finally thickened and filtered. The final antimony concentrate would be placed in 2-ton supersack containers ready for shipment off site for further refining.

Antimony Concentrate Transport

The antimony concentrate would contain approximately 55 to 60 percent antimony by weight. The remaining balance, 40 to 45 percent by weight, of the concentrate includes sulfur and common minerals with trace amounts of gold, silver, and mercury. As described in the Transportation Management Plan (Perpetua 2021e) for transportation of antimony concentrate, Perpetua would load the sealed 2-ton super sacks containing the concentrate into a shipping container at the processing facility. Perpetua would load the concentrate by forklift and hooked lifting racks to safely move the super sacks, which are equipped with lifting straps, into fully enclosed shipping containers for the full course of their transport from the SGP site to their final destination. The supersacks and shipping container would provide primary and secondary containment for the antimony concentrate (Perpetua 2021e). The concentrate would be trucked via SH 55 to a commercial truck, train, barge, ship loading facility depending on the refinery location. An estimated one to two truckloads of antimony concentrate would be hauled off site each day. It is assumed that the concentrate, when sold, would be shipped to facilities outside of the U.S. for smelting and refining because there are currently no smelters in the U.S. with capacity for refining the antimony concentrate.

Gold and Silver Flotation

Low-antimony mill feed would be processed in the gold flotation circuit only, bypassing the antimony circuit (M3 2021). Gold and silver flotation is a process similar to that described for stibnite flotation, and would be housed in the same building, but using different chemicals to float pyrite and arsenopyrite, the minerals that contain the gold and silver. The flotation building would have interior curbing high enough to contain 110 percent of the volume of the largest tank. The flotation froth, with particles containing gold and silver, would be collected and pumped to the gold concentrate thickener to further separate the gold/silver mineral particles from the process water which would be recycled. The particles from gold

flotation that do not float would become the tailings slurry. The gold and silver concentrations of the tailings would be regularly monitored and, if the concentrations are high enough to warrant further processing, they would be sent to the leaching circuit; otherwise, the tailings would be thickened to recycle additional process water and then routed to the TSF as described below.

Oxidation and Neutralization

An autoclave pressure-oxidation system would be used to oxidize the gold- and silver-bearing sulfide minerals. Once oxidized, the gold and silver can then be liberated from the sulfide minerals by subsequent cyanide leaching. Before the gold concentrate is pumped into the autoclave, it would be mixed with appropriate amounts of ground limestone to maintain a constant free acid level of approximately 10 grams per liter in the autoclave. This value was established through bench and pilot-scale metallurgical testing to promote the formation of stable, crystalline arsenic compounds in the autoclave. Oxygen would be injected into the autoclave to promote the oxidation reaction, and the temperature in the autoclave would be maintained at approximately 220 degrees Celsius. Water would be injected into the autoclave as needed to control the temperature. After pressure oxidation, the acidic slurry containing gold and silver would be neutralized using slurried lime and other chemicals and cooled in two forced draft cooling towers. The neutralized slurry would then be sent to the leach circuit for recovery of gold and silver from the slurry.

When increasing arsenic levels are observed, the oxidized slurry would be treated with hot arsenic cure (HAC) prior to neutralization. Metallurgical tests showed that this process promotes formation of the stable crystalline form of the arsenic precipitate enhancing environmental stability of arsenic.

The autoclave system would be housed in a steel frame building set on concrete foundations, with interior curbing to provide secondary containment. Air emissions from the pressure oxidation facility would be captured in a series of air pollution controls, and the material collected would be disposed of as a solid waste or a hazardous waste depending on the waste characterization.

Gold and Silver Leaching and Carbon Adsorption

The gold and silver leaching component of the recovery process would be regulated by IDEQ under the Cyanidation Rule (Idaho Administrative Procedures Act [IDAPA] 58.01.13) and would be designed and operated consistent with the International Cyanide Management Code for the Manufacture, Transport, and Use of Cyanide in the Production of Gold which is described in **Section 3.7.3** (Perpetua 2021a). Gold and silver leaching and carbon adsorption would occur in a steel frame building set on concrete foundations, with secondary containment of 110 percent of the volume of the largest tank and could include audible alarms, interlock systems, and/or sumps, as spill control measures (Initiative for Responsible Mining Assurance 2018).

The leaching to recover gold and silver from the oxidized gold and silver concentrate slurry would occur in large carbon-in-pulp (CIP) tanks which would be fully contained to capture, retain, and recycle process solutions. Sodium cyanide would be added to the tanks containing the neutralized solution to form a gold-silver-cyanide complex and activated carbon would then be added to the tanks to promote the adsorption of the gold-silver-cyanide complex onto the carbon (**Figure 2.4-9**). The pH of the slurry in the leach circuit would be closely managed at an elevated level to maintain the cyanide in a stable soluble form.

The loaded carbon with gold-silver-cyanide complex attached would then be collected on screens and sent to the carbon stripping circuit. Inside sealed tanks, the carbon with the gold-silver-cyanide complex would be washed with an acid solution to remove impurities, rinsed with fresh water, and stripped of the gold using a hot alkaline elution solution. The resulting gold and silver-bearing elution solution would be piped to the electrowinning and refinery area.

The acid solution used during carbon stripping would be reused until it loses its effectiveness. The solution would be neutralized and sent to the tailings thickener for pumping to the TSF. Air emissions from the leaching facility would be captured in a series of air pollution controls, and the material collected would be disposed of as a solid waste or a hazardous waste depending on characterization of the waste.

Gold and Silver Electrowinning and Refining

The gold and silver electrowinning and refinery facility would be a closed-circuit system with 110 percent spill containment based on the largest vessel. The elution solution pumped into electrowinning cells which would electrolytically precipitate the precious metals into a solid sludge that would be removed from the elution solution with a filter. The solid precipitate would then be heated in a retort system to drive off and collect any contained mercury. The gold and silver precipitate from the retort would then be mixed with flux and then placed into an induction furnace and heated. The molten material from the induction furnace, consisting of gold and silver metal and slag, would be poured into molds to cool. The slag would be recycled within the mill circuit and the doré gold/silver bars would be shipped off site to refineries for further processing and refining.

Air emissions from the induction furnace and retort would be treated in a series of emission controls. Mercury metal would be securely stored prior to shipment to a certified hazardous waste disposal facility.

Tailings Neutralization Circuit

Cyanide-bearing process slurry from the carbon-in-leach (CIL) circuit would be neutralized within the ore processing plant to less than approximately 10 milligrams per liter weak acid dissociable cyanide before being pumped to the TSF. Residual cyanide in the slurry would be treated using a sodium metabisulfite and air system to oxidize cyanide to form cyanate. After neutralization, tailings would be routed to one or more tailings thickeners, to partially dewater the tailings before they are pumped to the TSF. The process water separated from the thickened tailings slurry would be recycled within the ore processing facility. The neutralized and thickened tailings slurry would be pumped to the TSF.

Tailings Pipeline Maintenance Pond

Lined tailings pipeline maintenance ponds would be located at the truck shop and at the ore processing facility, to which tailings slurry from the tailings pipeline between the mill and the TSF or and process water from the tailings reclaim pipeline could drain by gravity during maintenance shutdowns or if there were a leak in either pipeline. The ponds would typically be empty except during maintenance or unforeseen problems with the tailings or reclaim water pipelines, pumping system, or TSF. The ponds are designed to contain the contents of the pipelines and the runoff from the pond and open-trench portions of the lined pipeline corridor from a 100-year, 24-hour storm event plus snowmelt.

2.4.5.8 Tailings Storage Facility

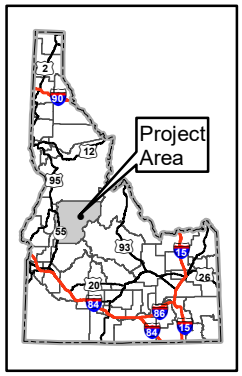
The TSF would be located on NFS lands within the Meadow Creek valley (**Figure 2.4-2**). The TSF, its embankment, and associated water diversions would occupy approximately 423 acres at final buildout with approximately 405 acres of new disturbance. Perpetua has conducted geotechnical and geophysical investigations to support the design of the TSF and associated buttresses. The TSF at the end of operations would be capable of holding approximately 120 million tons of tailings, the operational water pool, and precipitation falling within the TSF and contributing watershed up to the 24-hour Probable Maximum Precipitation event of 11.74 inches of rainfall. Additional details on ore processing can be found in section 18 of SGP's updated feasibility study (M3 2021).

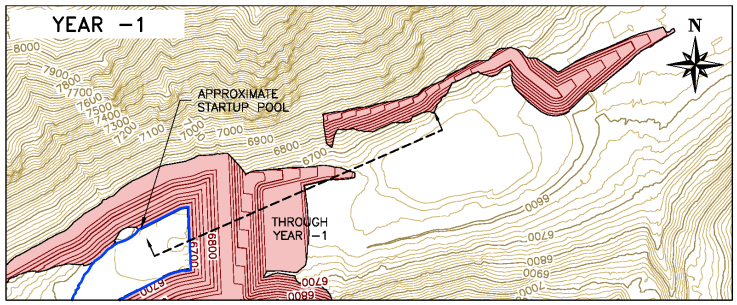
The TSF would consist of a rockfill embankment, a fully-lined impoundment, and appurtenant water management features. The TSF Buttress located immediately downstream of, and abutting against, the TSF embankment would substantially enhance embankment stability.

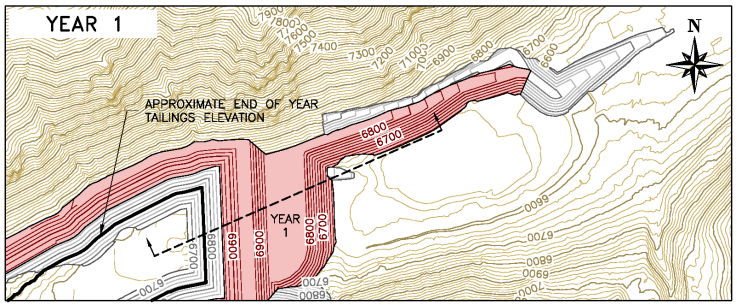
Design criteria were established based on the facility size and risk using applicable dam safety and water quality regulations and industry best practice for the TSF embankment on a stand-alone basis; the addition of the buttress substantially increases the safety factor for the design to about double the minimum requirements. The upstream face of the TSF embankment and the Meadow Creek valley where the TSF impoundment would be located would be fully lined to minimize leakage. The TSF would be surrounded by an 8-foot high, chain-link fence designed to keep wildlife, such as deer and elk, from entering the impoundment area. The TSF includes an engineered, rockfill starter embankment. Historical development rock (i.e., waste rock), spent ore from the historical SODA and heap leach areas, and development rock from mine pits would be used for the TSF embankment construction. The TSF Buttress would be built by first constructing a ramp along the north side of the valley to access the crest of the TSF embankment and upper portions of the buttress (**Figure 2.4-10**). Historical spent ores from the SODA and Hecla heap leach would be placed as bedding on the upstream face of the embankment or impoundment fill prior to placement of the geosynthetic liner to minimize interaction with infiltrating surface water. The starter embankment would be constructed to an elevation of 6,850 feet (or 245 feet above the existing ground surface). The TSF Buttress would then be constructed upwards to further access TSF embankment lifts while the base expands down the valley (eastward) as historical spent ore and legacy tailings are removed from the valley bottom. Engineered fill would be placed against steep slopes within the impoundment to flatten and smooth slopes to facilitate liner placement. This method of construction would allow for controlled material placement across the valley from the ramp north of the valley to the south side. The TSF Buttress would provide additional short- and long-term geotechnical stability. The final embankment height would be 475 feet at a crest elevation of 7,080 feet (**Figure 2.4-11**).

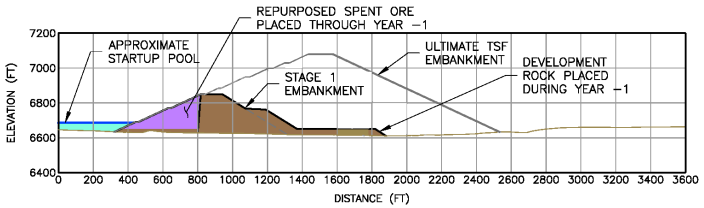
TSF Underdrain System

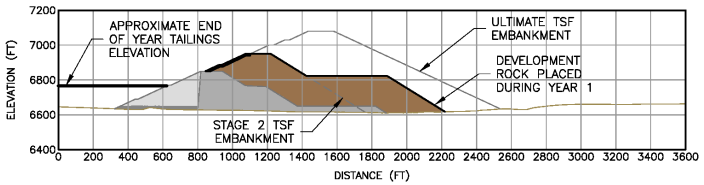
The TSF would have an underdrain groundwater collection and conveyance system located beneath the geosynthetic liner. Prior to construction, the area would be evaluated for springs and seeps. Evaluations would consist of visually identifying intermittent wet areas (seeps), areas with flowing water (springs), or areas supporting increased plant growth when compared to surrounding areas (see section 18 of M3 2021 for additional detail).

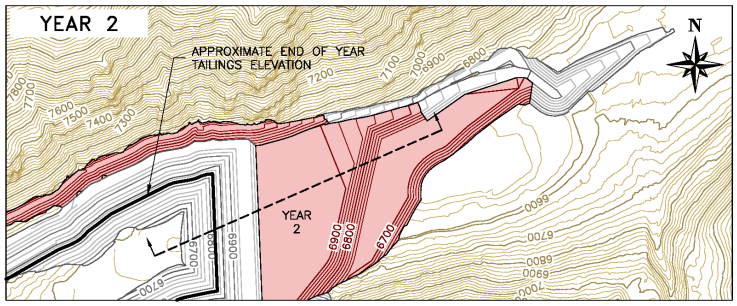


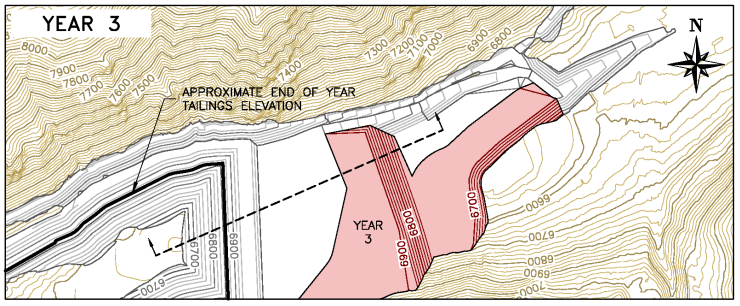


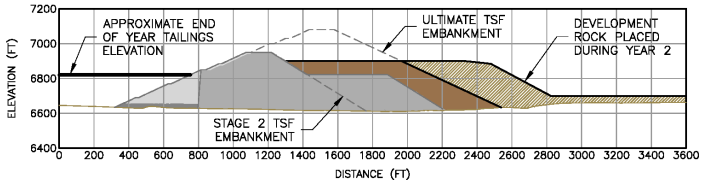












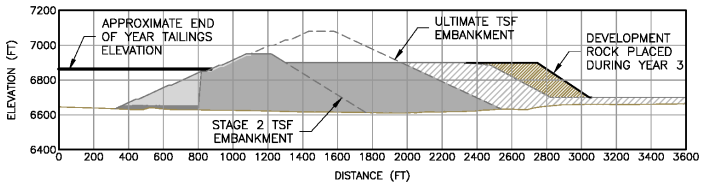
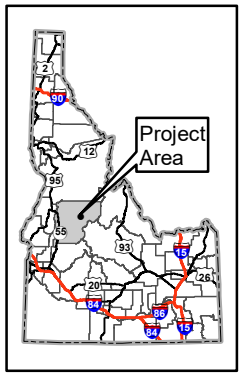
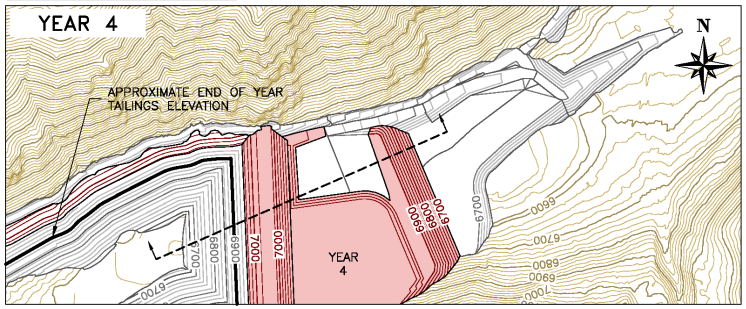
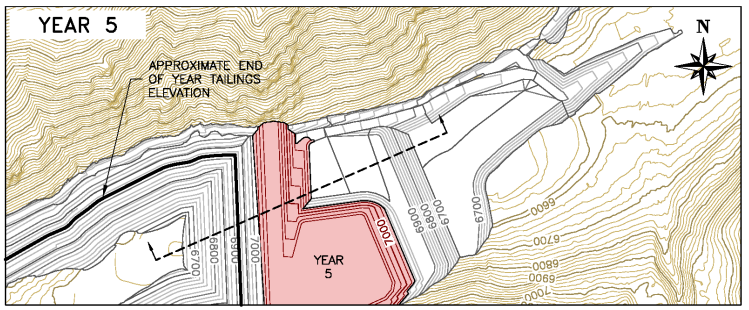


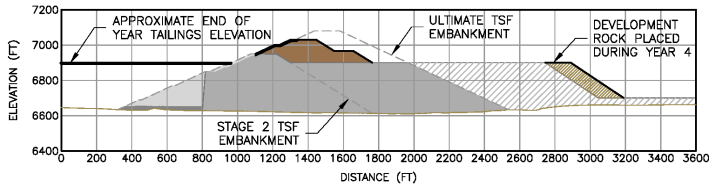
Figure 2.4-10
TSF and TSF Buttress Cross-Sections, Years -1 to 3
Stibnite Gold Project
Stibnite, ID

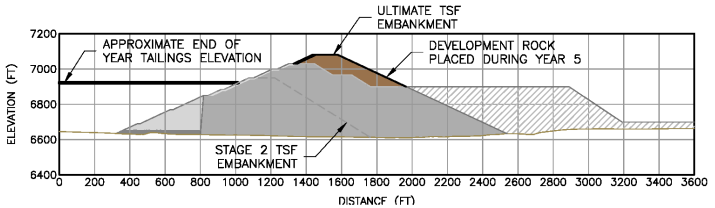
Data Sources: Perpetua 2021a

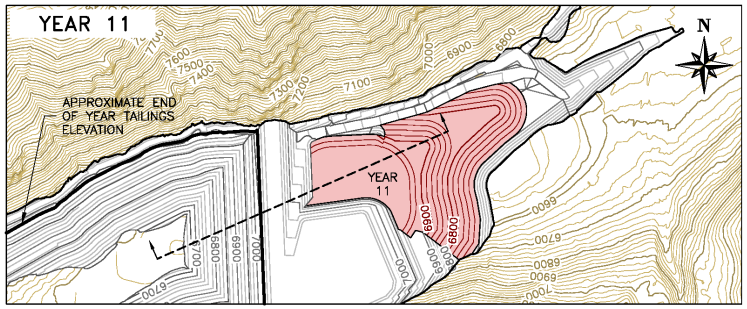


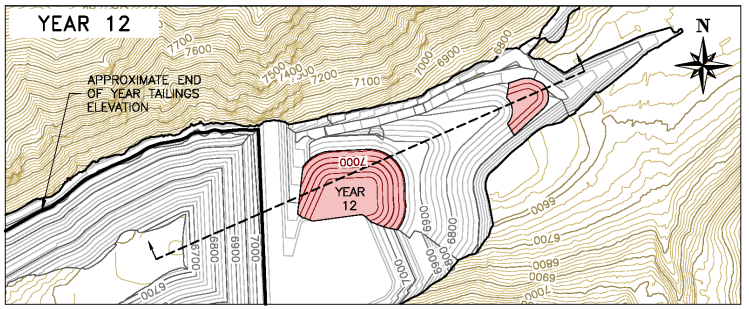


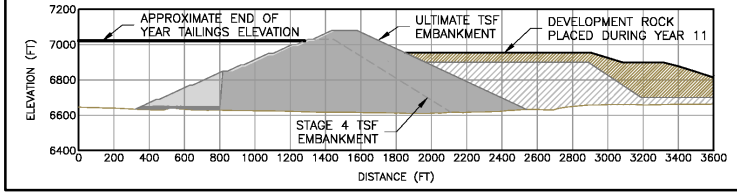












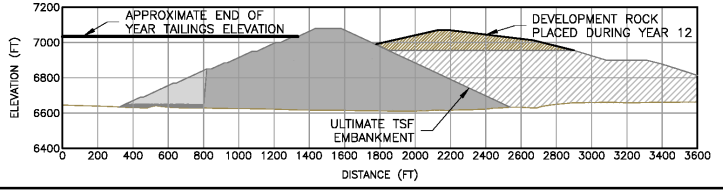


Figure 2.4-11
TSF and TSF Buttress Cross-Sections, Years 4 to 12
Stibnite Gold Project
Stibnite, ID

Data Sources: Perpetua 2021a

Groundwater underdrains would be a series of parallel drains with branching laterals, instead of a single valley bottom drain, due to the broad u-shaped nature of the Meadow Creek valley (**Figure 2.4-15**). Pipes would transition from perforated (able to collect groundwater) to solid-wall (for conveyance only) as they exit their respective collection areas (impoundment and embankment) and flow underneath the buttress to the outlet. Underdrain flows would be collected in a sump downstream of the toe of the buttress, monitored for water quality, then either discharged to surface water through a permitted Idaho Pollution Discharge Elimination System (IPDES) discharge, or pumped to the ore processing facility or a contact water pond for either treatment and discharge or use as makeup water for the mill process. The TSF liner system would then be installed in the TSF impoundment area over the underdrain system.

Underdrains would be installed beneath the TSF Buttress to ensure that groundwater does not saturate the base of that fill and potentially lead to water quality impacts or geotechnical instability; however, little if any flow is expected in the buttress underdrains owing to lower observed groundwater levels beneath the buttress. Underdrain collection sumps and downgradient monitoring wells would be used for TSF leak detection.

TSF Liner System

Due to water quality regulations and the presence of dissolved metals (chiefly arsenic and antimony, with trace mercury) and residual cyanide in the tailings pore water and supernatant pool, the TSF impoundment (including the upstream embankment face) would be composite-lined with geosynthetic materials to prevent seepage of process water or transport of tailings out of the facility. A network of geosynthetic drains (i.e., wicks) would be placed above portions of the geomembrane liner to reduce hydraulic head on the liner and excess pore pressure in the overlying tailings. The drains would report to a sump near the upstream embankment toe, and the water would be pumped out to the pool or reclaim system for reuse (M3 2021).

A composite liner consisting of a 60-mil, single-sided, textured, linear low-density polyethylene liner over a geosynthetic clay liner (GCL) would be employed to contain the tailings. Before placement of the liner within the TSF, the subgrade would be re-worked and compacted, or a minimum of 12 inches of buffer/liner bedding fill would be placed. Geosynthetic overliner drains would be placed above portions of the liner to reduce hydraulic head on the liner and pore pressure in the overlying tailings solids during operations. The drains would direct water that migrates through the tailings to a sump near the upstream toe of the embankment, and the water would then be pumped out to the tailings pool within the impoundment or the reclaim system for reuse in the mill.

Facilities that use cyanide in their mineral extraction process are required to obtain a permit from the Idaho Department of Environmental Quality (IDEQ) and follow the Rules for Ore Processing by Cyanidation (IDAPA 50.01.13). The IDEQ entered into rulemaking on the existing regulations to change the regulatory requirements from prescriptive requirements to performance-based requirements. A temporary Rule went into effect in October 2020, and the final rule was approved by the legislature in 2021. The liner system proposed for the SGP meets the requirements of the rule under which the Project's Cyanidation Permit is expected to be issued.

TSF Management Support Facilities

Light vehicle roads and haul roads would provide access between the ore processing facility and the TSF, and the tailings delivery and reclaim water return pipelines would parallel the haul road. Secondary containment in the event of a pipeline break would consist of a geosynthetic wrap or an open geosynthetic lined trench. Further, the pipeline corridor would drain to one of two pipeline maintenance ponds – one at the truck shop and one at the ore processing facility. Electrically-powered pumps would be located at the ore processing facility to pump tailings to the TSF and reclaim pumps would be located at the TSF to return water to the ore processing facility for reuse.

TSF Water Management

Thickened tailings slurry would be pumped to the TSF (see section 18 of M3 2021 for additional details). The TSF would be designed and operated as a closed-circuit, zero-discharge facility meaning no tailings water would be discharged during mining operations to the surface water or groundwater except in compliance with applicable permits and regulations. As the tailings consolidate, water collected in or falling on the surface of the TSF would form the supernatant pool on top of the tailings and be reclaimed for use in ore processing. Cyanide levels in the TSF reclaim water would be monitored throughout operations to ensure they remain in compliance with issued approvals and permits.

2.4.5.9 Mine Support Infrastructure

SGP infrastructure to support surface mining and ore processing operations (**Figure 2.4-2**) would include the following:

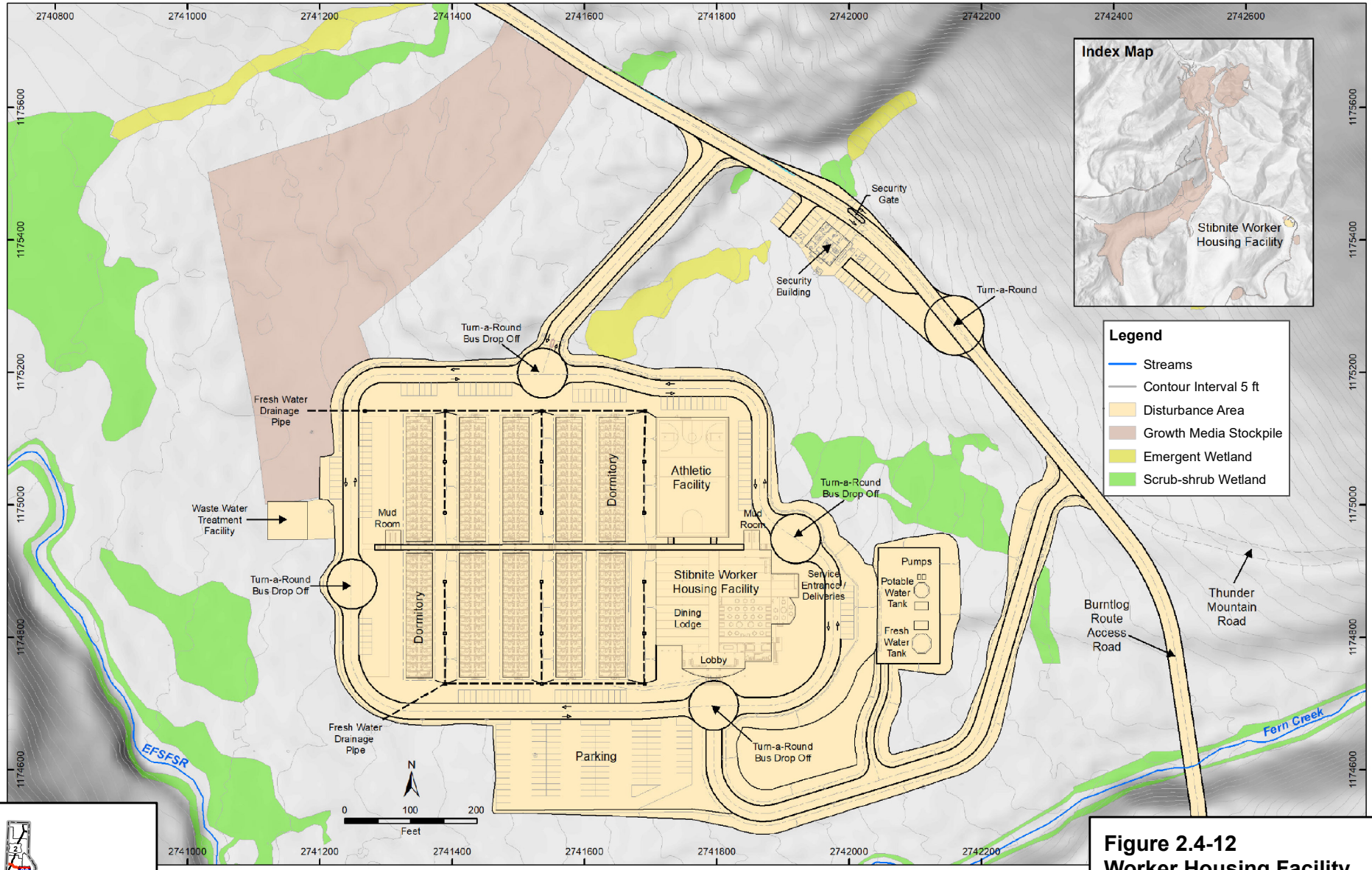
- A one-story mine administration building that would be sided or painted and roofed in neutral colors.

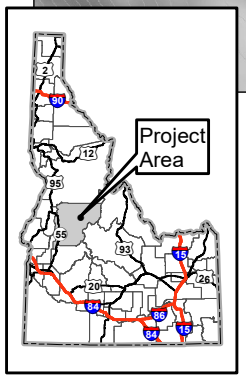
- A maintenance workshop which would store materials and supplies as discussed in **Section 2.4.5.14**, Materials, Supplies, Chemical Reagents, and Wastes.

- A truck wash facility which would include an oil/water separation system and water treatment facilities to enable recycling of the wash water.

- A worker housing facility (**Figure 2.4-12**), which would be constructed on 13.6 acres of NFS lands adjacent to Thunder Mountain Road (FR 50375) and would accommodate up to 500 people. This facility would include dormitories, food service, and recreation facilities, along with the supporting infrastructure of power, water supply, and wastewater treatment plant. The SGP main gate and security building would be co-located with the worker housing facility.

- Haul roads to transport ore, development rock, and reclamation materials from mining or storage areas, and to transport vehicles to the maintenance workshop. A typical haul road travelway would be approximately 87 feet wide (81.1 feet of running surface and 5 feet of safety berm width). The haul roads would be built and maintained for year-round access and would be surfaced with gravel materials. Road maintenance activities would be conducted to manage fugitive dust emissions and maintain stormwater management features.





(See Figure 2.4-2 for Worker Housing Facility location.)

Figure 2.4-12
Worker Housing Facility
Stibnite Gold Project
Stibnite, ID

Data Sources: Perpetua

Map Date:
04/10/2022

- Culverts would be installed where haul roads cross drainages or to direct stormwater to collection and retention structures. Culvert inlets and outlets would be lined with rock riprap, or equivalent, as needed to prevent erosion and protect water quality. Crossings of known fish-bearing streams would be constructed to support fish passage, with appropriately designed and constructed culverts or bridges.

- Service roads and paths that would provide an internal access system for employees and visitors to the site. The service roads would typically be 12 to 15 feet wide; some would be graveled or covered with rock aggregate, while others would be two-track roads. There would be no planned public use of the SGP service roads or trails. The path system would enable SGP pedestrian traffic to move safely throughout the SGP operating area. Service roads and paths would be located within the overall disturbance area defined for the SGP and existing roads would be used to the extent possible.

- Employee and visitor parking that would be maintained during construction and operations. During construction, the gravel parking areas would be located at the new worker housing facility, near the contractor/construction laydown areas, and at the Scout Portal. As operations are initiated, gravel parking areas would be maintained for buses, vans, and other miscellaneous vehicles for employees, contractors, vendors, and visitors at the new worker housing facility, at the shop area, and near the mine administration office.

2.4.5.10 Surface Water and Groundwater Management

Surface Water Management

To manage surface water at the SGP, existing streams that run through areas proposed for mining related disturbance would be diverted. Temporary diversions would be used within the SGP to keep non-contact water separated from contact water. Contact water is water that flows into or through disturbed areas and mining facilities and could have the potential to pick up increased levels of sediment, metals, and other possible contaminants which cannot be discharged into surface water and groundwater without proper treatment. Non-contact water is meteoric water that does not contact disturbed areas or mining facilities.

Stream Diversions around Mining Features

Existing streams would be temporarily diverted around SGP facilities, within constructed surface water channels. Diversion channel segments constructed in erodible materials would be lined with riprap to prevent erosion. Rock-cut channels would be constructed on steep slopes and in areas with shallow or at-surface bedrock, would have low erosion potential, and not require riprap lining. Certain channel segments constructed over fill or excavated in permeable materials would be lined with a geosynthetic liner to prevent seepage. A geotextile and/or transition layer of sand/gravel followed by riprap would be placed over the liner for erosion protection. Certain diversion sections would be piped as dictated by terrain or the need to limit warming of water.

During mine operations, summer low flows in perennial diversion channels around the TSF impoundment and buttress (Meadow Creek), Yellow Pine pit (Hennessy Creek), and West End pit (West End Creek) would be piped underground as an environmental design feature to maintain cold stream temperatures. Eight- to 12-inch-diameter pipes, sized to convey August baseflow, would be installed under the diversion channels in the riprap channel lining or under the adjacent access road to carry low flows. Stream flow would enter pipes through inlets at the same locations stream and tributary inflows would be diverted into the constructed channel. Some diversions, such as portions of Hennessy and West End Creeks, and the East Fork SFSR diversion tunnel, would be entirely underground, in which case conduits would be larger and sized for high flows.

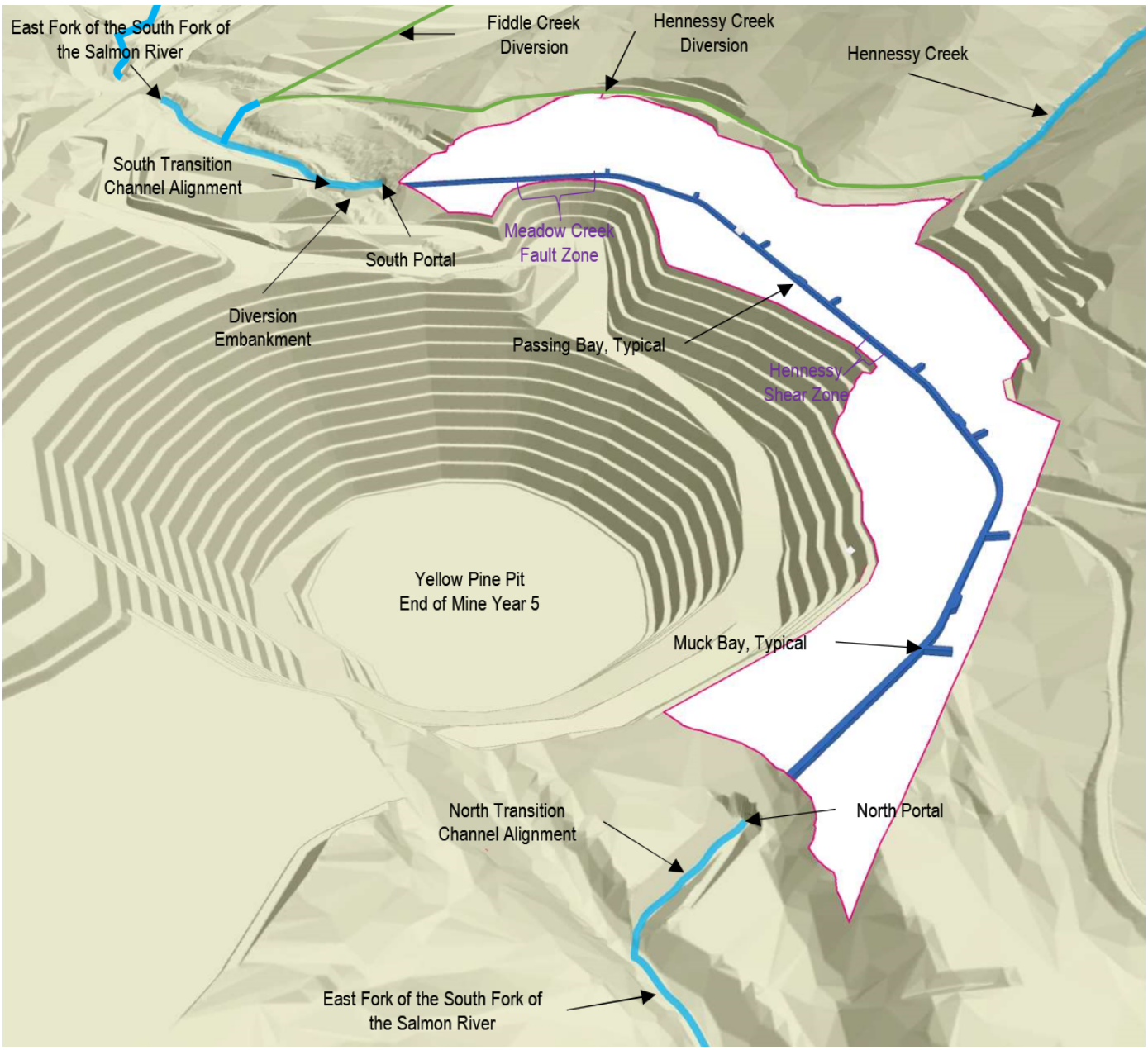
East Fork SFSR Temporary Diversion Tunnel

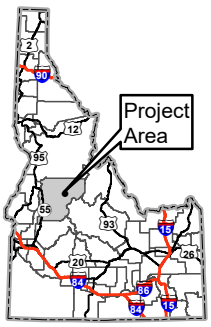
Currently, the East Fork SFSR flows into and through the Yellow Pine pit lake. The cascade at the inflow to the pit lake currently blocks upstream fish passage. A tunnel would be built to direct the East Fork SFSR around the west side of Yellow Pine pit to allow mining in the pit and fish passage during construction and operations (**Figure 2.4-13**). The tunnel would be approximately 0.9 mile long and 15 feet high by 15 feet wide. The tunnel would include a fishway stream channel designed to provide for upstream and downstream passage of migratory and anadromous salmonid fish.

The tunnel would be designed so that fish could swim through its entire length in both directions (Brown and Caldwell, McMillen Jacobs and BioAnalysts 2021a). To encourage fish passage, low-energy lighting would be installed in the tunnel and set on timers to simulate daylight. A trash rack would be constructed near the upstream entrance to the tunnel to prevent large wood, boulders, and other debris from entering the tunnel, and would be cleaned periodically. The spaces between the trash rack bars would be sized to allow passage of adult Chinook salmon. A surface water supply intake with fish screens would be installed upstream of the trash rack at a control weir to divert water from the East Fork SFSR for ore processing makeup when necessary.

A parallel roadway would be constructed in the tunnel to allow equipment and personnel access for monitoring, inspection, and maintenance. The accessway would function as a floodway for high flows, greater than the normal flow range within the fishway.

The tunnel fishway would incorporate concrete weirs, designed to produce hydraulic conditions that could be successfully navigated by fish (McMillen Jacobs 2018). The south portal (upstream end) of the tunnel would include a sediment collection and drop out area, a resting pool, trash rack, flow control weir, and picket panels. The north portal, located at the downstream end of the tunnel, would include an orientation pool for downstream migrating juvenile fish with an adult exclusion barrier to reduce potential predation, a separate adult fish holding/resting pool, rock weirs and a transition zone. Specific details on the north and south portals, plus the overall design, function, operation, and maintenance of the diversion tunnel are thoroughly described in the Fishway Operations and Management Plan (Brown and Caldwell, McMillen Jacobs, and BioAnalysts 2021a).





The white area on the figure depicts a cutaway portion of the ground surface to reveal the tunnel location in the subsurface.

Figure 2.4-13
Cutaway View of Fish Passage Tunnel

Stibnite Gold Project
Stibnite, ID

Data Sources: Perpetua 2021a

Midnight Creek

Midnight Creek is a first order, perennial, non-fish-bearing stream. The Midnight Creek stream diversion would reroute approximately 0.3 mile of the lower portion of Midnight Creek to the south, away from where it currently enters the Yellow Pine pit lake. The rerouted creek would be piped under haul roads so that it would enter the East Fork SFSR upstream of the proposed tunnel portal (**Figure 2.4-14**). The Midnight Creek diversion would manage flows in Midnight Creek during Yellow Pine pit operations and backfill activities until the newly developed East Fork SFSR alignment over the backfilled pit is complete and stabilized as described in **Section 2.4.7.4**.

Hennessy Creek

Hennessy Creek is a first order, perennial, non-fish-bearing stream. Hennessy Creek would be diverted south of Yellow Pine pit in a pipe along the public access road at the western edge of the pit (**Figure 2.4-13**). The diversion would include an impounding structure, overflow weir, and diversion cleanout basin. Diverted flows would be routed to Fiddle Creek downstream of the existing Stibnite Road culvert crossing, ultimately placing Hennessy Creek flows into the East Fork SFSR upstream of the south tunnel portal and disconnecting flow from the current unlined ditch passing alongside the Northwest Bradley dumps. Overflow, if any, would follow the existing stream channel into the Yellow Pine pit.

Fiddle Creek

Fiddle Creek is a second order, perennial, fish-bearing stream. Fiddle Creek would not be diverted. Rather, small stormwater diversions would route hillslope runoff around the Fiddle GMS and a culvert would route Fiddle Creek under the GMS, GMS access road, and public access road.

West End Creek

West End Creek is a first order, non-perennial, non-fish-bearing stream. The approximately 1.5-mile-long West End Creek stream diversion would reroute West End Creek around the north side of the legacy West End DRSF and cross the upper benches of the West End pit (**Figure 2.4-14**). The diversion would consist of a lined channel along the upper legacy DRSF, and a pipe in the segments along a steep hillside above the West End pit, within the pit, and along the steep hillside alongside the lower legacy DRSF down to the outlet at the existing stream channel. The lined channel portion would be designed to convey flows from a minimum 25-year storm event plus 2 feet of freeboard.

Garnet Creek

Garnet Creek is a perennial, first order, non-fish-bearing stream. During construction, Garnet Creek would be re-routed downstream of the ore processing facility to a relocated confluence with the East Fork SFSR (**Figure 2.4-14**). Above the early restoration reach, Garnet Creek would be routed along the upper processing plant site access road in a riprap channel, then cross under the ore processing facility roads in culverts, with environmental design features to reduce sediment loading to the stream, and to protect water quality. At closure, this segment of Garnet Creek would be restored, along with created wetlands at the plant site.

Meadow Creek

Meadow Creek is a perennial, third order, fish-bearing stream. Approximately 2 miles of Meadow Creek would be diverted around the south side of the TSF and TSF Buttress. The diversion would direct flows back into the existing SODA diversion upstream of the Hangar Flats pit (**Figure 2.4-15**). The new diversion would consist of a rock-cut channel in segments along the steep hillsides above the TSF and buttress, and an excavated channel in alluvium across tributary valley segments. Channel segments excavated in erodible or permeable materials would be lined with rock riprap and/or geosynthetic liner to prevent erosion and to minimize seepage where needed. The Meadow Creek diversion channel around the TSF and TSF Buttress would be designed to convey flows from a minimum 100-year storm event with 1 foot of freeboard.

The stream also would be diverted around the Hangar Flats pit. The Meadow Creek channel would be moved away from the pit to the south/southeast and reconstructed as a sinuous channel and floodplain to allow potential for spawning habitat and establishment of riparian habitat within the floodplain. A geosynthetic liner would be installed under the stream/floodplain corridor to minimize water seepage into the Hangar Flats pit or the pit dewatering well system, and to avoid potential pit wall instability or loss of stream habitat as a result of stream dewatering. The Meadow Creek diversion channel/floodplain corridor around the Hangar Flats pit would be designed to convey flows from a minimum 100-year storm event with 3 feet of freeboard; as a natural channel design, the stream channel itself would be designed for bankfull flows (1.5-year recurrence). This diversion would be permanent and incorporates design aspects to resemble natural channels not applied to temporary diversions of the other creeks. This permanent design accounts for channel migration, flooding, riparian development, and biological habitat.

Blowout Creek

Blowout Creek is a first order, perennial, fish-bearing stream outside the Project operational footprint. Blowout Creek (aka East Fork Meadow Creek [EFMC]) was impacted by the failure of a water storage dam in 1965 creating a steep actively eroding channel that conveys Blowout Creek. Perpetua proposes to stabilize and repair the failed area of Blowout Creek in the actively eroding chute and raise groundwater levels in the meadow upstream of the former dam site to restore wetland hydrology. A structure to control the grade of the creek would raise groundwater levels in the meadow and a coarse rock drain would address ongoing erosion of the channel side slopes that currently deliver sediment directly to the creek, while facilitating construction of a permanent surface channel. This would be an SGP environmental design feature and restoration effort, as the Blowout Creek chute and upper meadow are unrelated to and unaffected by the proposed mine features. The lower portion of the Blowout Creek alluvial fan would be an important borrow area for this and other restoration projects and is included in Project disturbance.

During construction and early mining, Perpetua would construct grade control and water retention features near the old reservoir water retention dam location to elevate the groundwater level and stream water surface sufficiently to restore wetland hydrology in the surrounding meadow. The retention structure would impound portions of the meadow channel, which would fill with sediment over time.

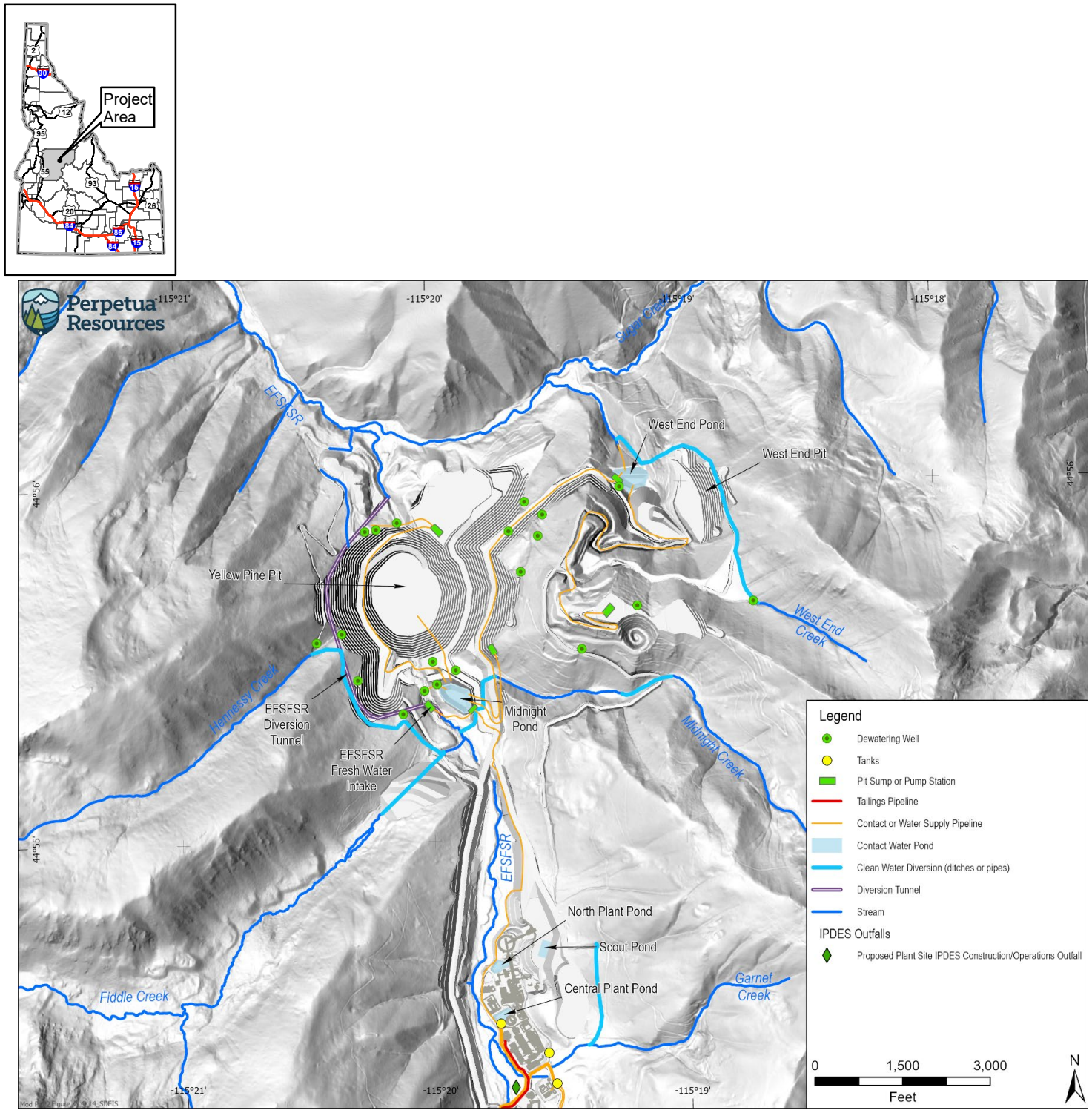


Figure 2.4-14
2021 MMP Water Management Plan - East Fork SFSR below Meadow Creek
Stibnite Gold Project
Stibnite, ID

Data Sources: Perpetua 2021a

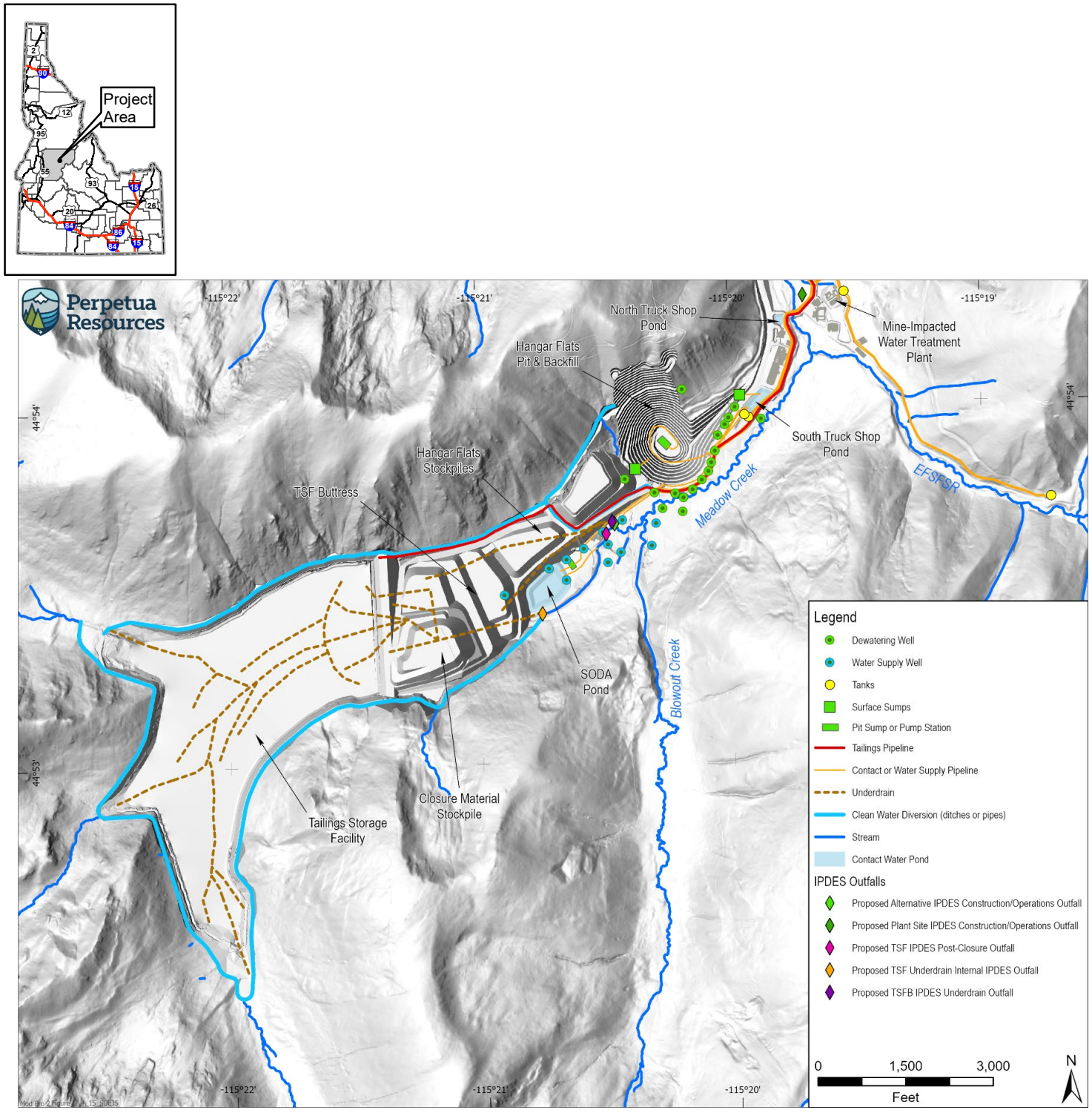


Figure 2.4-15
2021 MMP Water Management Plan - Meadow Creek
Stibnite Gold Project
Stibnite, ID

Data Sources: Perpetua 2021a

A coarse rock drain would be constructed within the chute downstream of the failed dam site to isolate the flow of Blowout Creek from the actively eroding chute side slopes and to prevent further erosion of the gully bottom, facilitating subsequent restoration of a surface channel on top of the drain. The rock drain would also provide area for the collection and retention of side-slope erosion material rather than allowing that material to potentially contribute sediment to Blowout Creek. As the rock drain fills with sediment, it would become closed off from the stream channel and flow would revert to the designed surface channel.

The existing alluvial fan in lower Blowout Creek, located adjacent to Meadow Creek, would be removed, mostly during mine operations for borrow materials, and the area reclaimed. A surface diversion would be constructed at the margin of the lower alluvial fan to facilitate borrow excavation, and this stream reach subsequently restored.

Non-Contact Stormwater Diversions

Non-contact stormwater is meteoric water (i.e., precipitation) that does not contact tailings, open pits, the TSF, TSF Buttress, spent heap leached ore, and tailings from past mine operations, or any other mining related surfaces. Stormwater runoff from undisturbed areas upslope of mine features in the major drainages would be captured in stream diversion channels described above or in other channels that would direct runoff away from mine disturbed areas. Smaller-scale diversion channels or earthen berms would be used, where necessary, to divert stormwater around other mine infrastructure. Non-contact water would be managed with features to reduce erosion and sediment delivery to streams. Where sedimentation is a concern, non-contact water stormwater diversions would be routed to sediment catch basins where the water can evaporate, infiltrate, or discharge into the stream system after settling. Energy dissipation structures would be installed at the non-contact surface outfalls as needed.

Contact Water

Water that contacts mining disturbances and has the potential to impact water quality is termed contact water. Contact water includes, but is not limited to, runoff from mine facilities such as the TSF, TSF Buttress, stockpiles, mine pits, haul roads constructed of development rock, toe seepage of precipitation infiltrating through the stockpiles, and underground exploration water. Collection of contact water would begin during the first year of on-site construction and would continue throughout operations and the closure and reclamation phases. Contact water would be captured in channels and sumps and routed to the ore processing facility, contact water storage ponds, water treatment plant, or enhanced evaporation systems. In unusually high runoff periods collected water may be allowed to remain in the pits or the TSF temporarily, excess contact water from outside of the pits may be routed to mine pits for temporary storage. Contact water storage ponds would be lined to minimize leakage. Water in the contact water storage ponds could be pumped to the mill for use, treated and discharged in accordance with applicable requirements, or evaporated. Contact water in the mine pits would be directed to in-pit sumps in the lowest part of the pit and piped to the mill for use, to other contact water storage ponds, to water treatment or evaporation, or into trucks for spraying for dust control within open pits and on stockpiles or TSF Buttress.

Contact water which exceeds regulatory discharge standards set by IDEQ and that cannot be used during operations would be disposed through a variety of methods including forced evaporation using sprayers located within the TSF or other managed areas or treated and discharged. Water would be treated to meet IPDES permit limits and treated water would then be discharged through IPDES permitted outfalls to the East Fork SFSR or Meadow Creek.

Runoff from haul roads and access roads outside of pits, ore stockpiles, or development rock storage areas may be of sufficiently good quality to be eligible for coverage under the Multi-Sector General Permit (MSGP) for Stormwater Associated with Industrial Activities. Eligibility would depend upon the materials used for road construction and would be determined through coordination with IDEQ with oversight by EPA. Runoff covered under the MSGP would be managed with a variety of environmental design features and conventional stormwater control measures to ensure the protection of surface water quality.

Surface Water Outfalls

The specific number and exact locations of outfalls would be determined via IPDES permitting through IDEQ. Approximate locations of the anticipated outfalls described below are shown on **Figure 2.4-14** and **Figure 2.4-15**. All outfalls would be required to meet water quality limits for specific constituents, and some outfalls may have discharge volume limits where the permit specifies a loading limit. Not all outfalls would necessarily be active or be permitted in the same permit cycle.

Two IPDES surface water outfalls would be used to discharge treated contact water from active mine pits, the TSF Buttress, pit dewatering, legacy mine materials disturbed by new mining activities, and the plant site and truck shop. One outfall located near the plant site would discharge to the East Fork SFSR. A second outfall would discharge to Meadow Creek upstream of Blowout Creek to augment streamflow during pit dewatering.

Water from the TSF and TSF Buttress underdrains may be discharged from two outfalls shown on **Figure 2.4-15**, depending on whether IPDES discharge limits are met without treatment of the underdrain water (otherwise, underdrain water would be routed to the plant site for use in processing, to the water treatment plant, or back to the TSF). Discharges from these two outfalls are expected to have a strong seasonal component, with some parts of the year seeing reduced flows, or even no discharge, as contact water is used for ore processing or other mine uses.

An outfall would be permitted on the upper East Fork SFSR for the sanitary wastewater treatment facility at the worker housing facility. That outfall would be active through the operations period and during mine closure until the facility is decommissioned.

An additional outfall is expected to be permitted in a future IPDES permit renewal for closure and post-closure discharge of treated TSF process water. That outfall would be on Meadow Creek upstream of Blowout Creek near the TSF Buttress.

Additional permitted outfalls may be necessary during a portion of the operations period for contact water storage pond spillways that could discharge to surface water – although discharge would be very rare or

non-existent, only occurring in the event of excessive precipitation or snowmelt. The need for additional outfalls associated with pond spillways and their location would be determined with IDEQ.

Each outfall would be permitted through IDEQ and would be required to be monitored, meet discharge limits, and regulate the rate of discharge.

Draining the Yellow Pine Pit Lake

Draining of the existing Yellow Pine pit lake would be initiated during construction. When the East Fork SFSR diversion tunnel is ready, stream flows would start being diverted into the tunnel during a period of low flow, most likely in the warmer months, and concurrent with salvaging fish from the pit lake and diverted sections of the East Fork SFSR. As the East Fork SFSR water is diverted into the tunnel, the decreased East Fork SFSR flow into the pit lake would be expected to cause some fish to out-migrate, thereby lessening the number of fish requiring salvage and creating better conditions for salvaging fish.

Once fish salvage has occurred in the East Fork SFSR from the tunnel diversion downstream to the pit lake and most of the East Fork SFSR flow is being diverted into the tunnel, fish salvage in the lake would commence and take approximately one week to complete. The pit lake would drain naturally down to the elevation of the outlet of the lake, where the existing rock sill would control the water level, though some leakage and slow lowering via groundwater outflows may occur beyond that level. No erosion or downcutting of the outlet rock sill would be expected because it has endured the full range of East Fork SFSR flows over decades and both inflow and outflow rates would be minimal during draining due to the river flow being diverted into the tunnel. The drain-down process would naturally convey lake water downstream to the East Fork SFSR.

After the natural drain down, water remaining in the pit lake or entering the pit from groundwater seepage or local stormwater runoff from pre-stripping operations on the highwalls above the pit lake would be managed as mine-impacted water. The water pumped from the pit lake would be used for construction purposes, transferred to the TSF (after it is lined and available) for future use in ore processing, or treated to meet permit limits before being discharged downstream in the East Fork SFSR via an IPDES permitted outfall.

Sediment remaining in the pit lake bottom would be removed beginning near the end of the final year of construction. Approximately 80 vertical feet of sediment lies on the pit bottom, and the pit walls are too steep to operate equipment without a ramp. Therefore, removal may be staged to coincide with successively lower benches as the pit is mined, and therefore may extend into the first year of operations. During this time, the pit would be used seasonally to capture and store contact water from the adjacent pit walls, and this water would be used or managed as stated above.

The sediment would be removed using an excavator or similar equipment and loaded into trucks and delivered to the TSF. Slurry/dredging methods are not anticipated but would be considered as part of adaptive management if the sediments are too wet to load and/or blend. The truck beds would have flashboards to minimize water leakage from the low-strength, saturated sediments. The loading area would drain back into the former pit lake, preventing off-site discharge of bleed water during loading. If necessary, wet material would be blended with loose dry material (e.g., development rock) from elsewhere on site to enable better loading, transport, and ultimate stability at the destination.

Groundwater Management

Groundwater would require management to allow mining in the pits and to direct seeps and springs from beneath mine facilities. Groundwater also would provide a portion of the water supply for the SGP. Water supply aspects of the mine operations are described in the Water Use and Water Balance subsection below. Any groundwater used within the SGP would require water right permitting through IDWR prior to use. Depending on final use or disposal of groundwater, wells drilled on the site could be permitted as domestic use, industrial use, or dewatering wells.

Pit Dewatering

Lowering the water table in and surrounding the Yellow Pine, Hangar Flats, and West End pits during operations would increase pit wall stability and provide dry working conditions in the pit bottoms. Development of the Yellow Pine and Hangar Flats pits would require partial dewatering of the alluvium of portions of the East Fork SFSR and Meadow Creek valleys, respectively, to limit groundwater inflow to the pits and maintain stability of the pit slopes. Once the West End pit is mined below the level of West End Creek, the West End pit also would require dewatering.

Dewatering would be accomplished by drilling a series of alluvial and deeper bedrock wells near the pit perimeters to intercept and pump groundwater before the water reaches each pit. Alluvial groundwater at the Yellow Pine and Hangar Flats pits would be managed using a series of vertical wells (**Figures 2.4-14** and **2.4-15**). The West End pit is primarily in bedrock with only a thin layer of alluvium in the vicinity of the pit and no alluvial dewatering is planned for that pit. Pumps would be installed in each well and would run as necessary to draw down the groundwater and facilitate mining and backfilling operations. Horizontal drain holes in pit walls may also be considered for depressurizing remnant high pore pressure areas.

Groundwater pumped from pit dewatering would be considered to be contact water and would be managed through forced evaporation or active water treatment when the volume of pumped water exceeds the ore processing facility demand. Treated water would be discharged to either of two IPDES-permitted outfalls, either Meadow Creek or the outfall on the East Fork SFSR near the water treatment plant, depending on the need for streamflow support in Meadow Creek.

The pit dewatering wells would be permitted as industrial wells in conjunction with a water right application through IDWR.

Groundwater not captured by the pit dewatering, and entering the pits as highwall seepage, would be directed to an in-pit sump in the lowest part of the pit where it would combine with stormwater and snowmelt runoff (i.e., contact water) from precipitation falling within the pit. The water would be used for dust control within the pits, and as needed, pumped to the ore processing facility for use as makeup water. In-pit water that cannot be used would be disposed of through forced evaporation or routed to the water treatment plant then discharged to the East Fork SFSR or Meadow Creek via IPDES permitted surface outfalls.

Water Use and Water Balance

The water balance is an accounting of inflows, outflows, and storage for various components of the mining and ore processing system. Actual volumes for water balance inputs and outputs could vary seasonally and annually from the volumes estimated. A water balance flow diagram for the mining and ore processing operations phase is provided in **Figure 2.4-16** with components of the water balance described below.

Water Use and Supply

Sources of water are required for ore processing, surface and underground exploration, dust control, and potable use. Water for industrial and mining uses would be supplied from water pumped from the dewatering wells located around the Hangar Flats, Yellow Pine, and West End pits; industrial water supply wells; contact water storage ponds; a surface water supply intake on the East Fork SFSR; and process water recycled within the ore processing and tailings circuit. Dedicated wells would provide potable water for worker consumption and sanitary use. Projected water use for the SGP is described in **Table 2.4-10**.

Table 2.4-10 Estimated Gross Fresh and Recycled Water Usage

Component	Construction and Start-Up (gpm)	Operations (gpm)[1]	Closure and Reclamation (gpm)
Underground and surface exploration	50	50	0
Surface dust control (seasonal basis)	33	66	16.5
Ore processing including tailings storage	0	3,900	0
Potable or domestic use	26	12	4
Sub-Total Use	109	4,028	20.5
Contingency (10%)	11	403	2
Total Estimated Use	120	4,431	22.5

Source: Perpetua 2021a
gpm – gallons per minute

As shown in **Table 2.4-10**, ore processing facility operations would represent approximately 97 percent of water use associated with the SGP. A separate wellfield of up to four wells would be developed in the East Fork SFSR drainage adjacent to the worker housing facility to provide potable water for the housing facility. The use of water from pit dewatering, contact water from precipitation runoff, surface water, and development of separate wellfields for supplemental industrial water and potable water at the worker housing facility would require permitting through the IDWR as new water rights or transfer of the place of use for one of Perpetua's existing water rights. Perpetua has submitted an application to IDWR for a total diversion of up to 9.6 cfs (4,308 gpm) for use by the SGP.

Water for Ore Processing

Ore processing is the primary driver for water use. Water sources for ore processing include water from pit dewatering and water supply wells, contact water, East Fork SFSR surface water intake, and water recycled from the TSF. Outflows from ore processing include tailings slurry conveyed to the TSF and evaporative losses from various process components.

The majority of the water needed for ore processing would be recycled (reclaimed) from the TSF. Reclaim water would be pumped from the supernatant water pool at the TSF to the reclaim water tank at the ore processing facility. Makeup water would be supplied from pit dewatering in wells located around the Hangar Flats, Yellow Pine, and West End pits; water supply wells; contact water; and surface water intake in the East Fork SFSR. Water would be pumped from the pit dewatering wells to freshwater tanks near the ore processing facility site. These tank facilities also could supply water for exploration drilling, development drilling, in-pit road dust control, and emergency fire suppression.

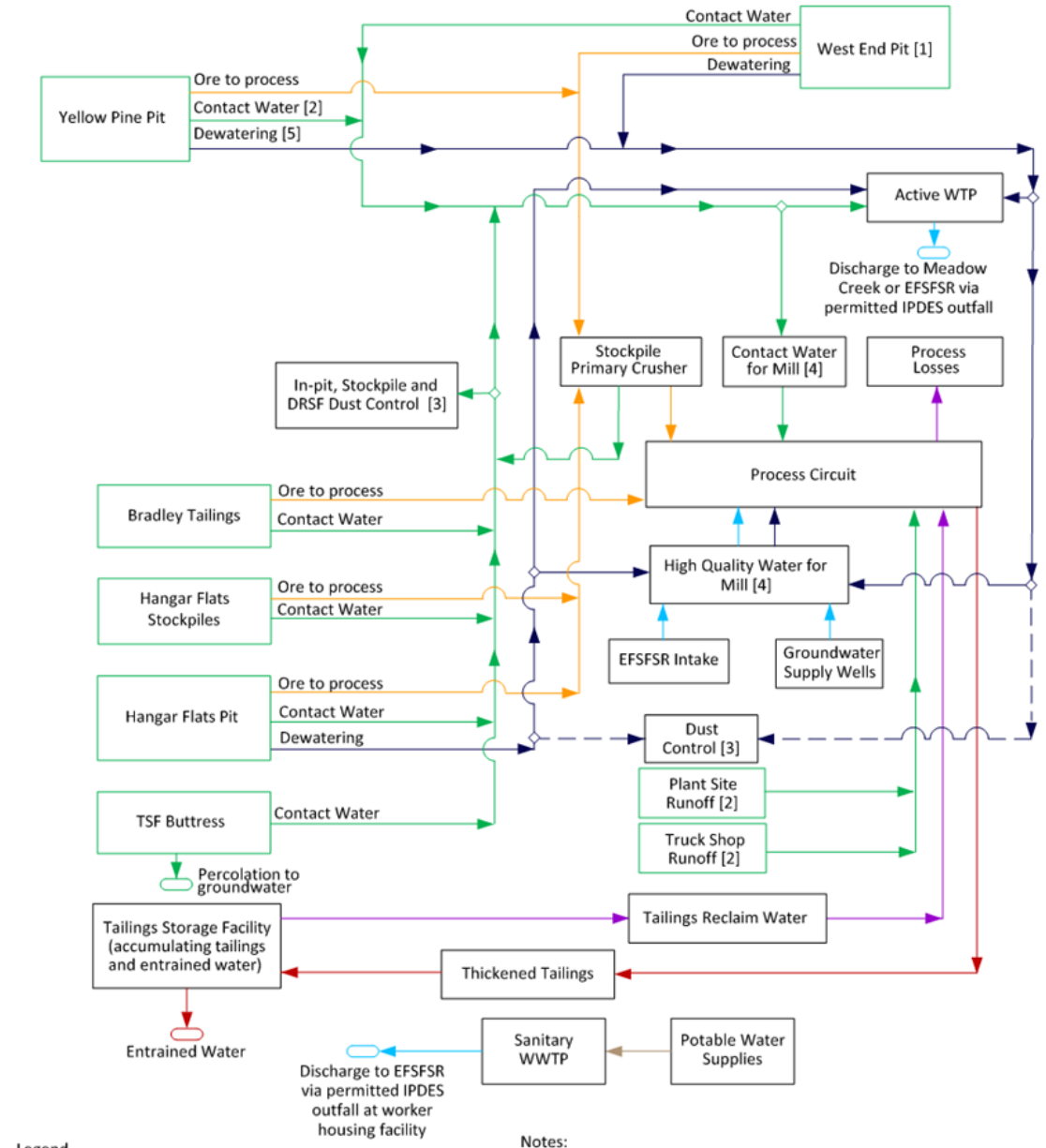
The freshwater tanks could store approximately 360,000 gallons of water; 240,000 would be available for process uses, and the remaining 120,000 gallons would be maintained for fire suppression only.

Water at the TSF

Inflows to the TSF include tailings slurry and precipitation. The TSF would store tailings solids, water entrained with the tailings, and free water atop the tailings (supernatant pool). Stormwater falling directly on the TSF and water from the supernatant pool, that forms as the tailings consolidate, would be stored in the TSF and reclaimed for ore processing. Water infiltrating to the base of the TSF would be captured by the geosynthetic liner overdrains, enter a sump, and be pumped back to the supernatant pond. The volume of available reclaim water would be influenced by the ore processing volumes, precipitation, and evaporation. The reclaim water would be pumped from the TSF to the reclaim water tank located at the ore processing facility. During periods of site-wide water excess, reclaim can be curtailed and contact water could be used directly in ore processing to facilitate emptying the contact water ponds, while retaining water in the TSF for use in an upcoming dry season. Local stormwater and snowmelt runoff and the existing Meadow Creek would be routed around the TSF.

Water for Potable Use

Potable water would be needed for worker consumption and sanitary use. Groundwater would be the primary source of water for potable use at the SGP. An existing well located near the exploration camp in the East Fork SFSR drainage would be used to supply an independent water circuit, along with a separate wellfield in the East Fork SFSR drainage adjacent to the worker housing facility. Wells also would be drilled for potable and industrial or commercial water uses at the Burntlog Maintenance Facility and the SGLF. Perpetua has applied to IDWR for water rights for these wells.



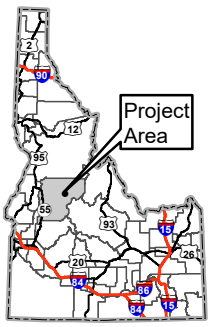


Figure 2.4-16
2021 MMP Water Balance Flow Diagram (Operations)

Stibnite Gold Project
Stibnite, ID

Data Sources: Perpetua 2021a

Water Treatment

The project's water treatment requirements, objectives and methods are described in detail in the Stibnite Gold Project Water Management Plan (Brown and Caldwell 2021b) and summarized in this section. Three water types would require treatment over the life of the SGP: contact water from mine facilities, which includes dewatering water (construction through closure); process water from the TSF (closure); and sanitary wastewater (construction through early closure). During operations, treating and releasing contact water would generally be limited to periods when a significant amount of dewatering water is being produced, or seasonally in wet years. Outside of that time, much of the collected contact water could be put to beneficial use in the mill. Any groundwater or contact water put to beneficial use within the SGP mine area would require permitting through IDWR prior to use. During construction and at closure, absent a water demand for ore processing, less contact water would be consumed and proportionally more would be disposed of through evaporation or treatment and discharge. From construction through early closure, the camp and offices would produce sanitary wastewater needing treatment. Additional water treatment that could be required during post-closure is discussed in **Section 2.4.7.13**, Post-Closure Water Treatment. Permit discharge limits would be developed according to IDEQ and CWA requirements and the limits would be established by the IPDES permit issued by the IDEQ.

The sources proposed for operational water treatment by Perpetua include:

- Contact water from dewatering of the Yellow Pine, Hangar Flats, and West End pits;
- Stormwater runoff (including snowmelt) from the pits, TSF Buttress, Bradley tailings, SODA, Hecla heap leach, run-of-mine ore stockpile area, truck shop, and ore processing facility;
- Toe seepage from the TSF Buttress and long-term ore stockpiles; and
- Sanitary wastewater from the worker housing facility, truck shop, ore processing facility, and administrative buildings.

The conceptual water treatment system during operations would need to adhere to stringent surface water quality standards for regulated constituents, most notably arsenic and antimony. Thus, coupled with the timing of water treatment needs with respect to the mining sequence and dewatering excess, treatment methods and capacity would be phased. During construction and early in operations, a modular, mobile, two-stage iron coprecipitation system would be utilized. Early in operations, this system would be replaced by a two-stage iron coprecipitation system located near the ore processing facility. Residuals (sludge) from the water treatment during construction would be stored in a small impoundment in the TSF footprint. During operations and closure, the residuals would be stored in the TSF. Due to contact water runoff seasonality, reuse, and equalization storage (i.e., ponds), average treatment rates are often significantly less than nominal treatment capacity, except during the Hangar Flats pit dewatering when a substantial proportion of treated water would be from relatively constant dewatering flows.

This is met with a staged water treatment strategy. The construction time period is paired with 300 gpm of peak capacity from package iron coprecipitation systems. The first three years of operations would require 1,000 gpm of total treatment capacity, using an iron coprecipitation system that would remain until closure. During peak simultaneous dewatering of the Yellow Pine pit and the Hangar Flats pit, an

additional 1,000 gpm of modular water treatment capacity would be brought online for approximately three years, then treatment capacity would be scaled back to 1,000 gpm for the remainder of operations and early closure.

Prior to closure, a new closure water treatment plant would be constructed to accommodate treatment of water from the TSF which would include iron coprecipitation and the application of reverse osmosis membrane treatment. After mine closure and final reclamation of the TSF Buttress and pit backfill surfaces, contact water treatment would no longer be required; but process water treatment for the TSF (**Section 2.4.7.13**) would continue longer, through approximately year 40. The closure treatment plant would be located on private land at the TSF Buttress as the TSF would ultimately be the only remaining water source requiring treatment.

Enhanced evaporation, using snowmaker style misters located over the lined TSF, collection ponds, and/or pits, would supplement the treatment system, in particular to prevent surplus process water accumulation in the TSF and eliminate contact water inventory, if necessary, when environmental conditions are conducive to evaporation.

2.4.5.11 Sanitary Waste Handling Facilities

Sanitary waste handling facilities would be present at SGP facilities and would be constructed and operated in accordance with Valley County, IDEQ, and Idaho Department of Health and Human Services standards. Sanitary wastewater would be treated using membrane bioreactor (MBR) or similar technology. Early in construction, the currently-permitted MBR plant at the existing exploration camp would be used, and treated effluent reused for flushing toilets and urinals (as allowed by Perpetua's existing Reuse Permit M-228-02) or discharged to the existing drain field, while the worker housing facility and its associated treatment plant is under construction. During operations and closure, sanitary wastewater from the worker housing facility, ore processing facility, and administration buildings would be treated at a new MBR or similar plant and discharged to the East Fork SFSR via a permitted IDPES outfall. Vaults or portable toilets would be used at off-site facilities and remote locations on site (TSF, pits, maintenance facility etc.), and serviced as needed using vacuum trucks. Treatment residuals would be hauled off site to a permitted sanitary landfill. Vault/portable toilet wastewater would be hauled to the on-site sanitary wastewater treatment plant for treatment.

2.4.5.12 On-site Composting Facilities and Solid Waste Collection and Disposal

On-site composting facilities would be permitted by IDEQ with oversight by the local Health District. Small scale composting associated with organic materials generated at the worker housing facility may be incorporated within the centralized GMS in the Fiddle Valley. These composting facilities would be fenced. Any larger composting facilities deemed necessary to support growth media quality or quantity improvements would be located off site.

All construction and demolition waste generated at the SGP would be hauled off site for disposal at a permitted landfill; a landfill would not be constructed or maintained at the SGP. Solid waste from the worker housing facility, shops, and other work areas that cannot be composted or recycled would be collected in wildlife-resistant receptacles and hauled off site for disposal in a municipal waste landfill.

Material that meets the classification of a "hazardous waste" would be collected and stored, per the SGP Waste Management Plan at specially designed and operated secured satellite collection sites and a main storage site prior to shipment off-site to a Resource Conservation and Recovery Act (RCRA) certified hazardous waste disposal facility.

2.4.5.13 Mine Site Borrow Sources

Various types of earth and rock material would be used from borrow sources for construction, maintenance, closure, and reclamation activities. Most of these materials can be sourced at the SGP from existing development rock dumps, legacy spent heap leach ore, and from development rock removed as part of proposed surface mining and underground exploration activities. These materials would be subject to physical and chemical testing to determine suitability for use.

Native earth materials would be required for some applications. Specific areas within the SGP that have large quantities of high quality native alluvial and glacial granular borrow materials for use include:

- The alluvial and glacial soils in the Meadow Creek valley floor within the footprint of the TSF, TSF Buttress, Hangar Flats pit, and Yellow Pine pit;
- Sand, gravel, and cobbles in the lower Blowout Creek alluvial fan; and
- Glacial soils in the Fiddle Creek valley walls within the footprint of the Fiddle GMS.

2.4.5.14 Materials, Supplies, Chemical Reagents, and Wastes

Numerous materials, supplies, and chemical reagents would be used, including fuel, explosives, and ore processing reagents for the SGP. A SPCC Plan would be developed to establish procedures for responding to accidental spills and releases of petroleum products. In addition, a Hazardous Materials Handling and Emergency Response Plan would be developed to address procedures for responding to accidental spills or releases of hazardous materials to minimize health risks and environmental effects.

Diesel Fuel, Gasoline, and Propane

Aboveground storage tanks at the SGP would be used for fuels and other fluids, including gasoline, diesel fuel, lubricants, coolants, hydraulic fluids, and propane. Approximately 200,000 gallons of diesel fuel, 10,000 gallons of gasoline, and 30,000 gallons of propane would be stored at the SGP in addition to a variety of materials, supplies, and reagents (**Table 2.4-11**). Storage management would be outlined in the SPCC Plan. The storage tank facility for gasoline, diesel fuel, and propane would be located near the maintenance workshop with additional propane storage at the ore processing facility area, the underground portal area, and the worker housing facility.

Explosives Storage

Ammonium nitrate prill would be received in bulk in tanker trucks and transferred into storage silos. Other blasting supplies used for mine blasting operations would include blasting emulsion products, detonating cord, cast primers, and blasting caps. These products would be delivered in boxes or other approved containers on trucks. The explosives storage facility would include two silos containing ammonium nitrate on a concrete pad and two buildings, one for explosives and one for detonators.

Components of bulk explosive material would be stored in separate and isolated containers, sized, and designed to meet Bureau of Alcohol, Tobacco, Firearms, and Explosives and MSHA requirements. The explosives storage facility would be fenced and securely gated. An explosives contractor would provide the products and manage the explosives storage facility.

Miscellaneous Oils, Solvents, and Lubricants

Various oils including motor oils, lubricants, antifreeze, and solvents would be shipped to the SGP on trucks. These would be stored in approved containers located within, or directly adjacent to, the maintenance shop and contained within secondary containments to prevent spills into the environment. All used petroleum products, waste antifreeze, and used solvents would be collected in approved containers, transported off site, and disposed or recycled.

Miscellaneous Consumables

Lime would be produced on site and stored in silos at the ore processing facility. Silos would be equipped with air emission controls. Sodium cyanide would be transported as dry cyanide briquettes to the SGP. Nitric and sulfuric acid would be transported in tanks designed to prevent spills even in the event of rollovers. Nitric and sulfuric acids would be stored in specialized non-corrosive, polyethylene-lined tanks located within the ore processing facility and would have secondary containment.

Miscellaneous consumables would consist of various reagents used in the ore processing facility, along with wear parts for the crushing and grinding circuits. Liquids would be shipped to the SGP in tank trucks designed for spill prevention and escorted to the SGP by pilot cars manned and equipped to handle spills. All reagents would be transported and stored in suitable containers in designated reagent storage areas.

Waste Handling

Wastes anticipated to be generated at the SGP include fluorescent bulbs, batteries, and empty aerosol containers which would be managed in accordance with the appropriate regulatory standards. Materials that are not consumed would be recycled, to the extent practical, or disposed of in accordance with applicable regulations.

Used petroleum products would be stored on site in approved containers that would be separate from other trash and garbage products. Used petroleum products would be transported off site for recycling or disposal in an approved facility.

Other legacy materials could be encountered during construction and operations. If encountered, these materials would be characterized to determine potential for re-processing, reuse, or on-site or off-site disposal.

Table 2.4-11 Proposed Materials, Supplies, and Reagents

Common Name	Units	Annual Use	Delivery Form	Typical Vehicle Payload	On-site Storage Capacity	Storage Method	On Site Mine Uses	Estimated Delivery Trips per Year
Diesel Fuel	Gallons	5,800,000	Bulk liquid	10,000	200,000	Tanks	Mine Site	580
Lubricants	Gallons	296,000	Bulk liquid	3,000	30,000	Tanks, Totes, Drums	Truck Shop	99
Gasoline	Gallons	500,000	Bulk liquid	5,000	10,000	Tanks	Mine Site	100
Antifreeze	Gallons	40,000	Bulk liquid	3,000	4,000	Tanks, Totes, Drums	Truck Shop	13
Propane - Buildings	Gallons	560,000	Bulk liquid	6,000	30,000	Tanks	Buildings	93
Propane – Lime Plant	Gallons	1,463,000	Bulk liquid	11,000	30,000	Tanks	Lime Plant	133
Solvents	Gallons	1,000	Bulk liquid	200	1,000	Totes or Drums	Truck Shop	5
Tires	Each	246	Bulk solid	Variable	59	Laydown	Mining	47
Batteries	Units	Variable	Pallets	Variable	500 units	Pallets	Mining	25
Light Ballasts	Pounds	25	Pallets	Variable	1,000	Pallets	General Operations	5
Pesticides/ Insecticides	Pounds	250	Pallets	Variable	1,000	Pallets, drums	General Operations	1
Herbicides	Pounds	1,000	Pallets	Variable	2,000	Pallets, drums	Environmental	1
Fertilizer	Pounds	2,500	Pallets	Variable	5,000	Pallets, drums	Reclamation	1
Ammonium Nitrate	Tons	7,300	Bulk solid	24	200	Secured Silos	Open Pits - blasting	304
Explosives	Tons	100	Boxes	5	20	Secured Magazines	Open Pits - blasting	20
Grinding media, SAG Mill	Tons	4,449	Bulk solid	24	200	Bunkers and Bins	Mine Process Area	186
Grinding media, Ball Mill	Tons	3,566	Bulk solid	24	200	Bunkers and Bins	Mine Process Area	149
Grinding media, LS Ball Mill	Tons	34	Bulk solid	24	200	Bunkers and Bins	Mine Process Area	2

Common Name	Units	Annual Use	Delivery Form	Typical Vehicle Payload	On-site Storage Capacity	Storage Method	On Site Mine Uses	Estimated Delivery Trips per Year
Primary crusher liners	Tons	62	Set	24	1 set	Laydown	Mine Process Area	3
Pebble crusher liners	Tons	84	Set	24	1 set	Laydown	Mine Process Area	4
SAG liners	Tons	801	Set	24	1 set	Laydown	Mine Process Area	34
BM liners	Tons	1,424	Set	24	1 set	Laydown	Mine Process Area	60
LS primary crusher liners	Tons	9.16	Set	24	1 set	Laydown	Mine Process Area	1
LS secondary crusher liners	Tons	9.32	Set	24	1 set	Laydown	Mine Process Area	1
LS Ball mill liners	Tons	27.8	Set	24	1 set	Laydown	Mine Process Area	2
Lime Slaker liners	Tons	3.5	Set	24	1 set	Laydown	Mine Process Area	0.25
Sodium Cyanide	Tons	4,000	Bulk containers	24	300	Tanks, bins	Mine Process Area	167
Activated carbon	Tons	500	Super sack solid	22	100	Supersacks	Mine Process Area	23
Copper sulfate	Tons	1,250	Supersacks, 1,000 kg	22	100	Supersacks	Mine Process Area	57
Lead nitrate	Tons	800	Supersacks, 1,000 kg	22	25	Supersacks	Mine Process Area	37
Aerophine 3418A	Gallons	10,500	Bulk liquid	200	400	Tanks	Mine Process Area	53
AP 3477	Gallons	60,000	Bulk Liquid	3,000	6,000	Tanks	Mine Process Area	20
Methyl isobutyl carbonyl	Gallons	120,000	Bulk liquid	3,000	6,000	Tanks	Mine Process Area	40
Flocculent (Unnamed)	Tons	300	Supersacks	22	50	Supersacks	Mine Process Area	14
Sodium metabisulfite	Tons	2,000	Supersacks	22	200	Supersacks	Mine Process Area	91
Potassium amyl xanthate	Tons	1,350	Bags in boxes	20	40	Stacked boxes	Mine Process Area	68
Sodium hydroxide	Tons	330	Supersacks	22	40	Supersacks	Mine Process Area	15

Common Name	Units	Annual Use	Delivery Form	Typical Vehicle Payload	On-site Storage Capacity	Storage Method	On Site Mine Uses	Estimated Delivery Trips per Year
Nitric acid	Gallons	65,000	Bulk liquid	3,000	6,000	Tanks	Mine Process Area	22
Scale control reagents	Pounds	5,000	Drums or totes	1,000	1,000	Drums or totes	Mine Process Area	5
Sulfuric acid	Gallons	12,000	Bulk liquid	3,000	8,000	Tanks	Water Treatment	5
Hydrogen peroxide	Gallons	7,100	ISO totes	3,660	10,000	ISO totes	Mine Process Area	2
Sodium hypochlorite	Gallons	2,000	Totes	1,000	1,000	Totes	Water treatment	2
Magnesium chloride, 33%	Gallons	250,000	Bulk liquid	4,500	20,000	Tanks	Road surfaces	56
Ferric Sulfate	Gallons	23,000	Bulk liquid	3,000	6,000	Tank	Water Treatment	17
Polymer	Gallons	1,000	Drums	200	3	Drums	Water treatment	5
Organic Sulfide	Gallons	4,000	Drums	200	3	Drums	Water treatment	5
Sodium Bisulfite	Tons	0.2	Drums	-	2	Drums	Water Treatment	1
Lime	Tons	150	Bulk Solids	24	30	Silo	Water Treatment	7
Sodium Carbonate	Tons	430	Bulk Solids	24	30	Silo	Water Treatment	18
Carbon Dioxide	Tons	14	Bulk Liquid	3	3	Tanks	Water Treatment	5
Microsand	Tons	6.58	Bags	-	7	Bags on pallets	Water treatment	1

Source: Perpetua 2021a
AP = AP 3477 is dialkyl dithiophosphate; a reagent used in the flotation circuit
BM = ball mill
ISO = International intermodal container that is manufactured according to the specifications outlined by the International Organization for Standardization (ISO)
kg = kilogram
LS = limestone
SAG = semi-autogenous grinding

2.4.5.15 Temporary Closure of Operations

No periods of temporary or seasonal closure of the mining activities are currently planned; however, a description of temporary closure is required for the SGP Cyanidation Permit if applicable. In the event of temporary suspension of mining activities, Perpetua would notify the Forest Service, USACE, IDEQ, IDWR, IDL, and Valley County in writing with as much advanced warning as possible of the temporary stop of mining activities. This notification would include reasons for the shutdown and the estimated timeframe for resuming production.

During any temporary shutdown, Perpetua would continue to implement operational and environmental maintenance and monitoring activities to meet permit stipulations and requirements for environmental protection. This would include the reclamation success monitoring.

Dewatering of the open pits may continue during temporary closure due to the negative effects that pit lake formation or highwall saturation would have on highwall stability and renewed mine operations. Since ore processing may not be occurring, excess water from the various facilities would need to be managed. The operational plans required by the Cyanidation Permit and other plans developed as part of IDEQ permits would also describe specific activities and provide details on how process water would be managed during a temporary closure.

A limited potential exists that unfinished facilities (such as haul roads, buttress, open pits, pit backfills, GMSs, etc.) would not have the same protective measures in place (e.g., stormwater collection systems or culverts) as would exist if the facility had been finished. Therefore, Perpetua would identify interim measures that would be taken to manage stormwater, sediment, dust, and other factors while the mining is temporarily stopped. Surface water diversion structures are all proposed to be installed prior to construction of the TSF, open pits, and the TSF Buttress; hence, surface water would be diverted around these facilities regardless of the stage of their completion.

Environmental reports would be submitted per previously agreed upon schedules. Regardless of the operating status of the mine, appropriate monitoring would continue until compliance with permanent regulatory closure requirements is attained, unless modified by the required regulatory authorities.

2.4.6 Surface and Underground Exploration

Surface and underground exploration including development drilling would occur to evaluate potential mineralized areas outside of the proposed mining areas. New surface and underground exploration activities would be conducted during construction and operations. Any additional future expansion of mining activities would require supplemental permitting and approvals, including additional evaluation under NEPA.

2.4.6.1 Surface Exploration

At any given time, disturbance associated with exploration activities conducted during construction and operations could include up to five acres of new temporary road disturbance and eight acres of temporary drill pad disturbance on NFS lands at the SGP. Exploration sites would be reclaimed after completion of drilling. During the life of the SGP, temporary disturbance resulting from surface exploration would total approximately 25 acres of roads and 40 acres of drill pads. Any jurisdictional stream crossings or impacts

to jurisdictional wetlands could require additional Section 404 CWA permits beyond those required for development and operation of the mine operations.

The exploration roads and drill sites would be located, as practical, on historical disturbance to avoid any identified cultural resources, other sensitive areas such as wetlands or Riparian Conservation Areas (RCAs), and potential impacts to habitat of ESA listed species. **Figure 2.4-17** shows the boundary of the area within which ongoing surface exploration during construction and operations would occur.

Drill pad sizes would vary depending on the type of drilling equipment, number of holes to be drilled from the pad, and depth of drill hole. Drill pad sizes may range from approximately 0.05 to 0.15 acre.

Sumps and/or portable tanks would be used at each drill pad to collect drill cuttings and to manage and circulate drilling fluids. Sumps would be fenced and constructed with at least one side having a shallow grade for wildlife egress. Sumps would be backfilled and reclaimed when no longer needed for drilling.

Depending on the location of the drill pad, a variety of drill rigs and equipment would be supported by helicopter or terrestrial vehicle. Some drill holes may exceed 1,500 feet, but the average drill-hole depth would be approximately 800 feet. Drill holes would be both vertical and angled. Drilling activities also may include water exploration, dewatering well installation, and monitoring well installation. Water and non-toxic drilling fluids would be used for all drilling.

Dewatering and monitoring wells would be abandoned with surface completions/seals and be capped consistent with IDAPA 37.03.09 – Well Construction Standards Rules. Pre-collared holes would only be associated with track or truck mounted drilling equipment.

Areas disturbed for exploration would be contoured to blend into surrounding terrain; water bars and surface water channels would be retained to handle flows through the area. Compacted areas would be de-compacted as necessary prior to fertilizing and seeding.

Previously approved activities (i.e., approved exploration activities and associated reclamation obligations) would continue as well.

2.4.6.2 Underground Exploration

Underground exploration activities could occur for the SGP throughout the life of the mine, such as the newly-discovered Scout Prospect, a 1-mile, downward-sloping tunnel (a decline). The decline would be used to reach the subsurface mineralized zone known as the Scout Prospect. The decline would be accessed from a portal facility known as the Scout Portal, located south of the planned ore processing facility (**Figure 2.4-17**). Approximately 100,000 tons of rock would be excavated from the decline. Exploration drill holes would be installed at various locations in the decline. Selected drill cuttings or core would be removed from underground for testing.

To construct the portal facility, the hillside would be cut into to develop a flat vertical slope using conventional underground drill and blast operations with mechanized equipment. Explosives would be used in the underground development process to construct the decline. The underground development rock could be used for surface pad construction, hauled to the ore stockpile area, or hauled for storage in the TSF Buttress as appropriate. Drilling is used in advance of the decline to ensure unexpected or unmanageable water pressures are not intersected. Water would be used in underground drilling or pumped from the collection point to the surface. Upon reaching the surface, this water would be piped to the ore processing facility to be used in the plant.

2.4.7 Closure and Reclamation

2.4.7.1 Overview

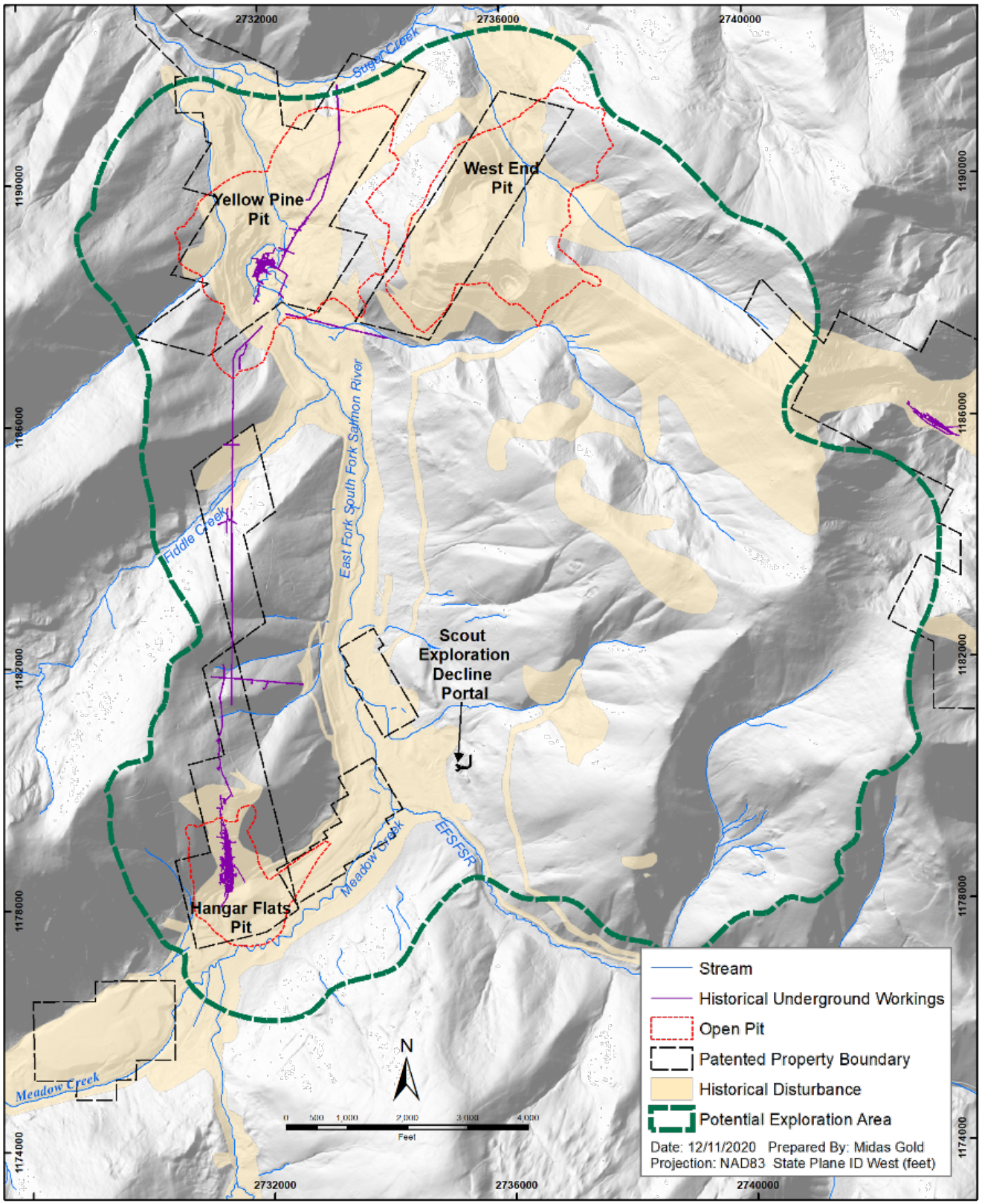
Closure and reclamation at the site would include interim, concurrent, and final closure and reclamation (**Figure 2.4-18**). Details on reclamation activities to be implemented for the SGP, including appropriate seed mixes to be used are described in the Reclamation and Closure Plan Stibnite Gold Project (Tetra Tech 2021a). Interim reclamation is intended to provide shorter-term stabilization to prevent erosion of disturbed areas and stockpiles that would be more fully and permanently reclaimed later.

Concurrent reclamation is designed to provide permanent, low-maintenance achievement of final reclamation goals on completed portions of the site prior to the overall completion of mining activities throughout the SGP. Approximately 37 percent of the reclamation is proposed to be completed concurrent to mining and ore processing; remaining reclamation activities would be completed during closure (TetraTech 2021a).

Final closure and reclamation would involve removing all structures and facilities; reclamation of those areas that have not been concurrently reclaimed such as the TSF and some backfill surfaces; recontouring and improving drainages; creation of wetlands; reconstructing various stream channels; decommissioning of the East Fork SFSR diversion tunnel; growth media placement; planting and revegetation on disturbance areas; and reopening Stibnite Road (FR 50-412) through the SGP Operations Area. The placement of growth media varies by facility and is summarized in **Figure 2.4-19** and in the subsections describing reclamation by facility below.

Final reclamation of certain facilities could continue beyond the five-year closure and reclamation period. The Burntlog Route would be needed until the TSF is fully reclaimed, after which the newly constructed portions of the road would be decommissioned and reclaimed, and the currently existing portions of the road would be returned to their prior use.

Surface water flow diversion of portions of the East Fork SFSR, Garnet Creek, Meadow Creek, Midnight Creek, and Hennessy Creek would be reclaimed and incorporated into constructed wetlands (i.e., Garnet Creek) or restored stream channels across the reclaimed TSF (i.e., Meadow Creek) or Yellow Pine pit backfill.



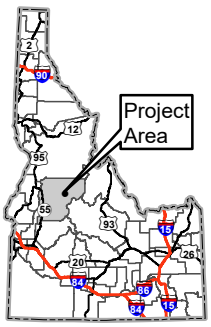
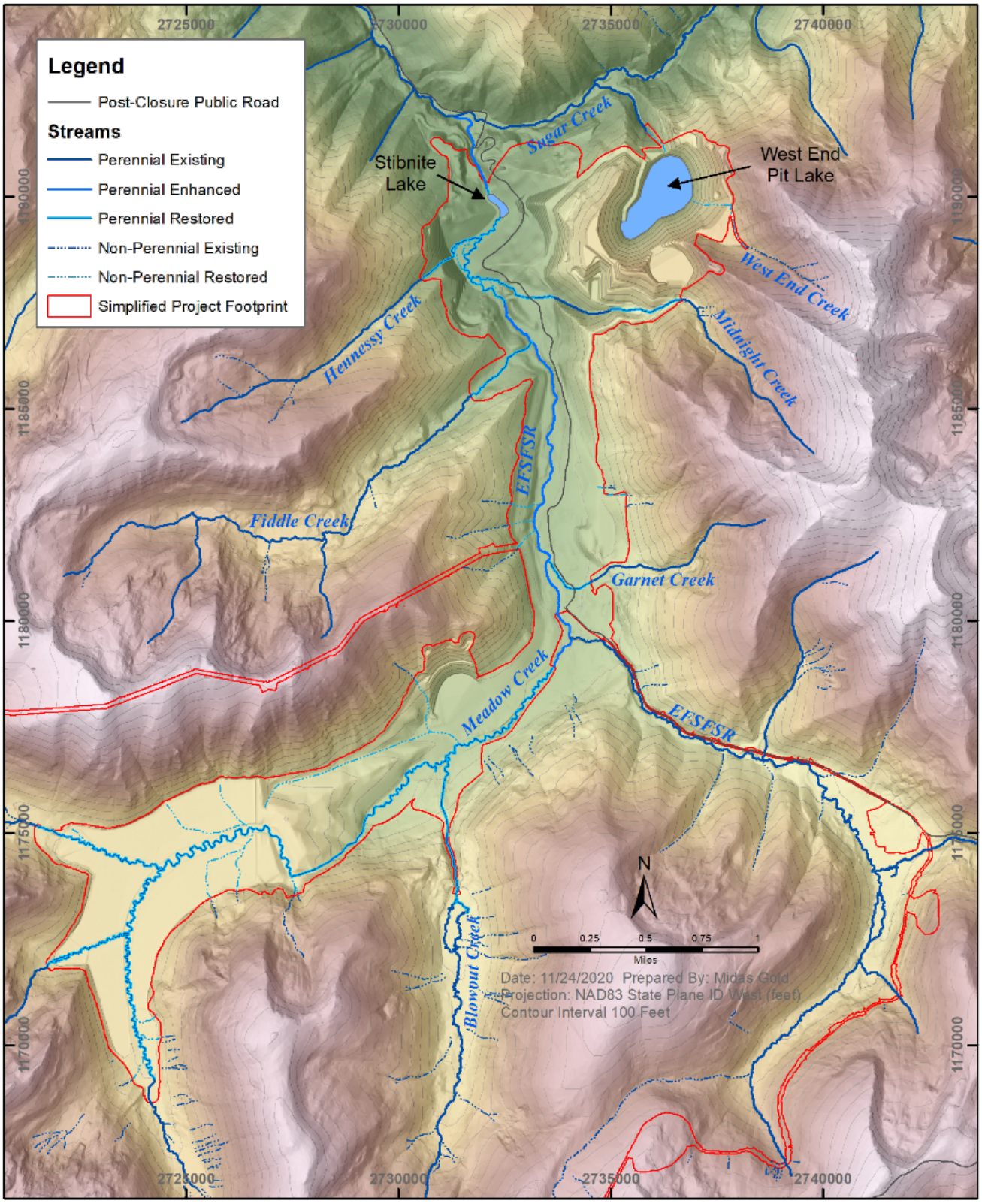


Figure 2.4-17
Surface Exploration Boundary

Stibnite Gold Project
Stibnite, ID

Data Sources: Perpetua 2021a



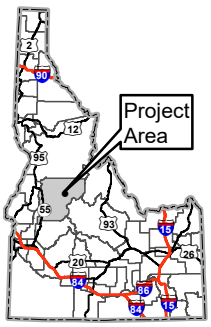
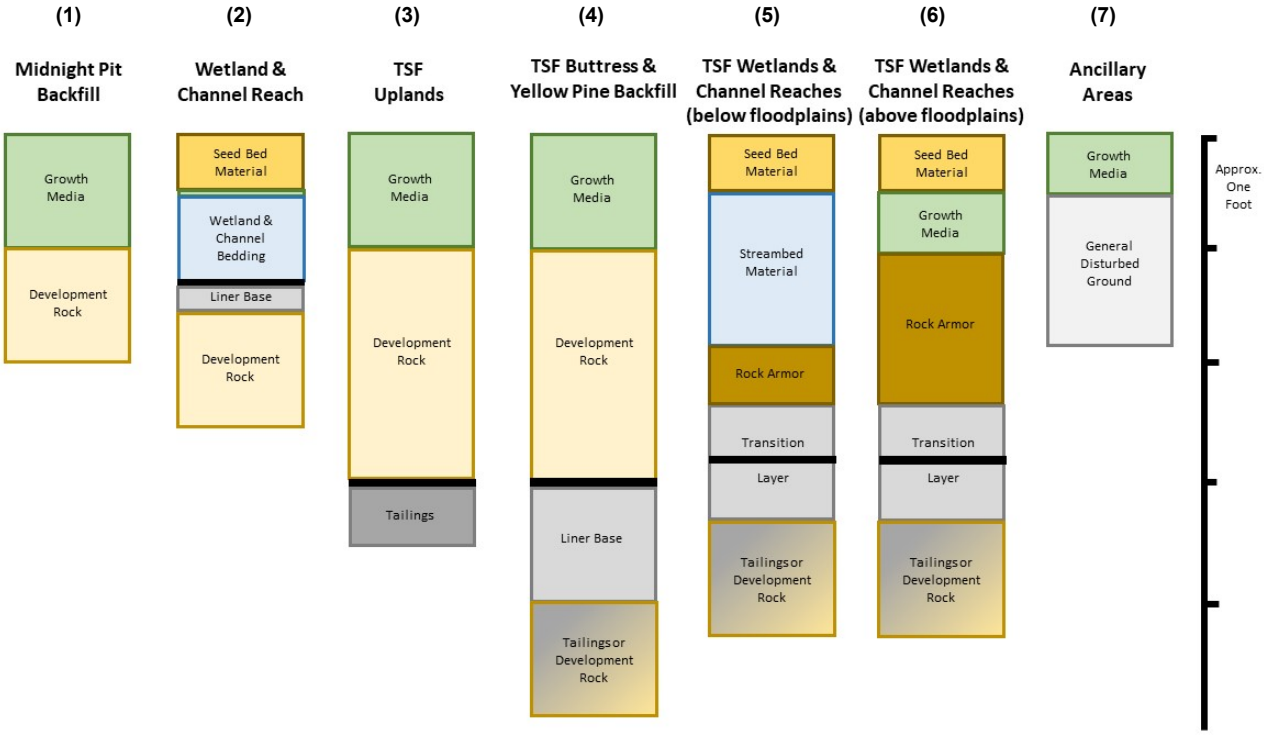


Figure 2.4-18
Post Closure and Reclamation Condition

Stibnite Gold Project
Stibnite, ID

Data Sources: Perpetua 2021a



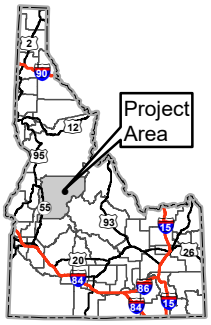


Figure 2.4-19
Reclaimed Growth Media and Root Zone Profiles
Stibnite Gold Project
Stibnite, ID

Data Sources: (TetraTech 2021a)

Closure and reclamation activities would be intended to achieve post-mining land uses of wildlife and fisheries habitat and dispersed recreation at the SGP. Dispersed recreation uses would be accessible by the reopening of Stibnite Road (FR 50412) through the backfilled Yellow Pine pit that would facilitate recreational traffic and access to Thunder Mountain Road. The proposed final reclaimed condition of the site is shown on **Figure 2.4-18**. Concurrent and final closure and reclamation for the SGP are described in greater detail in the following sections.

2.4.7.2 Decommissioning, Demolition, and Disposal of Facilities within the Operations Area Boundary

Perpetua would dismantle or demolish structures and facilities not necessary for post-closure water management (e.g., certain culverts and pipelines). The structures and facilities to be removed would include the ore processing facility, office and maintenance structures, the worker housing facility, water and fuel storage tanks, generators, switchgear, temporary trailers, and ancillary and storage facilities. The materials from the dismantling or demolition of structures and facilities would be salvaged or disposed of in permitted off-site landfills. All reagents, petroleum products, solvents, and other hazardous or toxic materials would be removed from the site for reuse or would be disposed of according to applicable state and federal regulations. Concrete foundations would be broken or fractured as required to prevent excessive water retention and covered in-place with a minimum of 2 feet of cover material (consisting of a minimum of 1.5 feet of backfill and a minimum of 0.5 feet growth media) or would be broken up and buried in the TSF Buttress or pit backfill prior to installation of a geosynthetic liner cover.

Soil/rock beneath fuel storage areas and chemical storage buildings would be tested for contamination and removed or disposed of appropriately if needed.

2.4.7.3 Underground Exploration and East Fork SFSR Diversion Tunnel

Perpetua would decommission and close underground facilities and underground support facilities, including the portals of the East Fork SFSR diversion tunnel and Scout decline. To prevent future access to underground workings, the underground portals (i.e., East Fork SFSR diversion tunnel and Scout decline) would be closed using concrete block bulkheads, rockfills, or a combination of rockfill and low-permeability foam. The downstream (north) East Fork SFSR portal and the Scout decline would be closed with bulkheads inside the portals (where overhead cover was at least 3 times the tunnel height) or backfilled with clean rockfill starting inside the portals and working outward, and up against the portal headwalls. Surface swales would be installed to direct surface water around the backfilled portal, and the exterior backfill, and surrounding disturbance would be graded to blend with adjacent topography, covered with growth media, and revegetated. At the East Fork SFSR upstream (south) portal, the control weir would be left in place, and the fishway weir notch raised with concrete, creating an approximately 4-foot-high sill to exclude river water or alluvial groundwater, and low-permeability geofoam or similar would be installed inside the portal after the initial backfill or bulkhead, to prevent water entry. Then, the portal area would be filled, regraded, and revegetated as described for the other openings.

2.4.7.4 Yellow Pine Pit

Concurrent reclamation of the Yellow Pine pit would occur during Mine Years 5 through 11. Concurrent reclamation would partially backfill the pit using the following material and their percentages of the total fill: West End pit development rock (90 percent); Hangars Flat pit development rock (5 percent); and Yellow Pine pit development rock (5 percent). Backfill would be placed in lifts not exceeding 100 feet in vertical height with the large equipment, to include selective placement of the top lifts by direct dumping to better control the type of rock that would be placed near the surface. This placement method also would limit subsidence of the backfill and the amount of regrading necessary prior to placement of growth media. This material would not be compacted beyond that which occurs during placement, subsequent routing of trucks, burial, and consolidation. Portions of the highwalls on the east and west sides of the pit would remain above the backfilled portion of the pit and would not be reclaimed. A sinuous channel would be constructed through the backfilled area for the reconstructed East Fork SFSR with an average valley gradient approximating the historical, pre-disturbance river gradient (Tetra Tech 2023). A low permeability geosynthetic liner would be incorporated into the cover over the entire surface of the backfilled Yellow Pine pit, including the re-constructed channel floodplain corridor to reduce the infiltration of meteoric water into backfill material, which could dewater the restored stream channel and result in additional metal leaching from the underlying backfill. Geosynthetic liners for mine waste rock are applied to act as barriers to infiltration of meteoric waters (Howse and Fleming 2022) such as the Sydney Coalfield in Nova Scotia, Canada (Ramasamy et al. 2018). Above the geosynthetic liner in the stream corridor, an operations layer of two-foot minimum thickness of relatively fine material would be placed to protect the stream liner from puncture, followed by coarse rock armor of variable thickness to protect from exposure via stream scour, followed by floodplain alluvium at a minimum thickness equal to the maximum estimated scour depth of the proposed stream channel. Growth media would then be placed and the area revegetated (**Figure 2.4-19**, profile 4). The lined corridor would be wide enough to accommodate future channel migration, evolution, and over-bank flooding. The cover system outside the stream/floodplain corridor would be similar to that described for the TSF Buttress (**Section 2.4.7.6**). Portions of Hennessy and Midnight Creeks would be restored over the backfilled area along with the reconstructed East Fork SFSR.

Hennessy Creek would cascade over the approximately 275 feet tall west highwall of the Yellow Pine pit to a restored section of low-gradient channel on the western edge of the reconstructed East Fork SFSR floodplain before joining the restored East Fork SFSR channel. Midnight Creek would be restored across the southeastern portion of the reconstructed East Fork SFSR floodplain. After closure of the East Fork SFSR diversion tunnel, backfilling of the Yellow Pine pit, and restoration of the East Fork SFSR and Hennessy Creek across the backfill, the Hennessy Creek diversion would be decommissioned and the area reclaimed, along with the adjacent operations-phase public access road.

To accommodate migrating fish, including Chinook salmon and bull trout, step pools would be established within the constructed East Fork SFSR channel. The vertical relief (drop) between successive pools would not exceed published fish passage criteria. Detailed hydrologic and hydraulic analyses would inform the overall channel and floodplain design and construction, with channel bankfull width approximately 25 to 30 feet, and average depth of approximately 2 feet. The lined Stibnite Lake, of similar size to the existing Yellow Pine pit lake, would be constructed within the lined corridor.

Access through the site to Thunder Mountain Road (FR 50375) would be reestablished with construction of an access road through the backfilled area, replacing the segments of the Stibnite Road (FR 50412) that were removed by mining.

2.4.7.5 West End Pit

The West End pit area includes the West End pit, the Midnight pit, the sidehill pit, and the development rock from legacy mining activity. Reclamation would occur at the conclusion of mining operations. The West End pit would not be reclaimed. Instead, a pit lake about 400 feet deep would be allowed to form in the northern portion of the pit below the highwall, which would be about 800 feet above the pit lake surface. The West End pit lake would fill gradually up to 400-feet-deep, and lake levels would fluctuate seasonally and with longer-term climate variations; however, the lake would not be expected to completely fill with water or spill due to its limited catchment area.

To account for model uncertainty, lake levels would be monitored after closure, as specified in the Environmental Monitoring and Management Plan (EMMP), and a threshold water level would be established, sufficient to contain the predicted runoff volume from a high-snowpack year without discharge. If water levels approach the threshold, either or both surface water diversion and water treatment could be implemented to prevent the lake from spilling. If needed, a temporary treatment unit would be mobilized to the site to treat and discharge the pit lake water until the lake level falls below the threshold discharge level, thus preventing untreated discharge in potential subsequent wet weather years and enabling gradual and predictable water treatment rather than treatment at higher but variable and uncertain peak spring runoff rates.

The Midnight pit, the approximately 6-acre, 100-foot-deep southeastern portion of the overall West End pit within the Midnight Creek catchment, would be backfilled during operations with approximately 6 million tons of development rock from the West End pit. The backfill would be placed to achieve a mounded final reclamation surface to promote drainage away from the West End pit and prevent formation of a pit lake within Midnight pit. Portions of the backfill would be covered with growth media and revegetated (**Figure 2.4-19**, profile 1), and the remainder covered with talus like development rock to mimic a natural talus slope.

The floor of the sidehill pit southwest of the main West End pit would be graded to drain, covered with growth media, and revegetated. No backfilling would occur for the main West End pit. At closure, the remaining road into the pit and access to highwalls would be blocked with large boulders and/or earthen berms to deter motorized vehicle passage into the pit.

2.4.7.6 Tailings Storage Facility and TSF Buttress

Concurrent reclamation on portions of the TSF would begin 3 to 5 years after the end of tailings deposition. Additional reclamation would begin on the TSF, its Buttress, and the water treatment plant approximately 9 years after ore processing operations cease. After tailings consolidate sufficiently to use heavy equipment on top of the tailings, predicted to be within 3 to 5 years after the end of deposition, Perpetua would begin with placement of reclamation cover material, then construct wetlands and restore Meadow Creek and its tributaries within appropriately sized lined floodplain corridors, place growth media, and revegetate the area.

Once ore processing operations have ceased, Perpetua would begin removing the remaining supernatant water pool and ongoing accumulation of meteoric water and consolidation water through a combination of spray evaporators (similar to snowmaking misters) operated within the TSF boundary and an active water treatment that meets IPDES discharge limits, followed by discharge to the East Fork SFSR or Meadow Creek. Removal of the remaining supernatant water from the TSF would allow the surficial layers of the tailings to dry and gain strength, which would allow equipment to operate on the tailings surface for grading and the placement of the geosynthetic liner, overlain by unconsolidated overburden and growth media. Concave areas in the consolidated tailings surface would be filled to create suitable drainage conditions prior to liner and cover installation in the area designed to become restored stream channel. Cover placement and minor grading of tailings would occur, beginning within 3 to 5 years from the end of deposition, as portions of the TSF surface dry enough to allow equipment traffic, working inward from the facility perimeter. The reclamation cover material overlying the geosynthetic liner would be sourced from unconsolidated overburden or other appropriate material stored in a GMS on top of the adjacent TSF Buttress.

Perpetua would restore appropriately designed meandering stream channels (Meadow Creek and tributaries) within a stream and floodplain corridor across the top of the lined TSF surface (Rio Applied Science and Engineering [Rio ASE] 2021). Pools and riffles would be constructed within the channel. Measures to create aquatic habitat would include side channels, oxbows, boulder clusters, root wads, and large woody debris. This would allow for the post-closure development of riparian habitat, convey water off the facility, and minimize potential interaction of surface water with the underlying tailings. Given the relatively flat topography and nature of the surface of the TSF, the constructed channel would have a shallow gradient.

Detailed hydrologic and hydraulic analyses would inform the overall channel and floodplain design, which would necessitate the construction of defined channels ranging from approximately 5 to 15 feet in bankfull width, with average bankfull depth reaching approximately 2 feet. A connected floodplain up to 200 feet wide would convey higher flows during flood events.

Consolidation of the tailings would continue after cover placement and surface reclamation, at gradually declining rates, until approximately Mine Year 40. To prevent tailings consolidation water from mixing with surface water on the cover, potentially leading to water quality impacts if discharged to streams, the consolidation water would be collected for treatment, using shallow wells and gravel or geosynthetic drains. Initially, collected flows would be routed to a water treatment plant (WTP) for treatment and discharge. When treatment of TSF drainage would no longer be required after approximately Mine Year 40, the treatment facility would be decommissioned and the WTP site reclaimed.

Final slopes of the TSF Buttress would be variable, to blend with the surrounding terrain to the extent practicable, produce a permanent and stable landform, provide access for future maintenance on the TSF and buttress, and provide for non-erosive drainage across the reclaimed face of the buttress. Upon completion of final grading of the TSF Buttress, a low permeability geosynthetic cover would be placed over the facility, which would be designed to limit infiltration through the underlying development rock. The geosynthetic liner would be overlain by an inert soil/rock layer (non-potentially acid generating [PAG]/metal leaching development rock, fill, or alluvium) and growth media and revegetated (**Figure 2.4-19**, profiles 3, 4, 5, and 6). Similar to that for the TSF, a channel and floodplain corridor would be

established for Meadow Creek across the top of the lined buttress. The channel would have a low gradient and wide floodplain across the top of the buttress, then drop more steeply to the valley floor near the south abutment. The steep channel segment would consist of a boulder chute that would flow through multiple energy-dissipating basins (one mid-slope and one at the toe of the TSF Buttress) before being discharged to a restored Meadow Creek on the valley bottom.

2.4.7.7 Hangar Flats Pit

In Mine Years 6 and 7, Hangar Flats pit would be backfilled up to the valley bottom elevation or slightly higher and no pit lake is anticipated. Following the closure, the western pit highwall would remain exposed above the backfilled area. The already-established Meadow Creek diversion channel and floodplain corridor would be retained around Hangar Flats pit as the final configuration, and the segment of Meadow Creek between the toe of the TSF Buttress and the entrance to the Hangar Flats pit diversion would be restored along with adjacent riparian wetlands. At closure, the entire surface of the backfilled Hangar Flats pit would be covered with a low permeability geosynthetic liner overlain with seed bank material to establish wetlands (**Figure 2.4-19**, profile 2). Non-perennial drainages in adjacent upland areas would be routed to facilitate development of the wetland hydrology. Meadow Creek downstream of the Hangar Flats pit diversion, to the confluence with the East Fork SFSR, would be enhanced during mine operations with large woody debris, boulder cluster habitat structures, and riparian plantings.

2.4.7.8 Transmission Line and Electrical Infrastructure

The Johnson Creek and Stibnite substations would not be decommissioned immediately during mine closure; the transmission line between these substations would remain to provide power for post-closure water treatment. Once there is no longer a need for active water treatment, Perpetua, in coordination with IPCo, would disassemble the approximately 9-mile transmission line between the Johnson Creek and Stibnite substations. The substations, switchgear, and power line would be removed. The transmission line ROW area and associated access roads would be recontoured to blend with surrounding topography and revegetated. As part of revegetation, the transmission line structure pads and access roads would be scarified and revegetated. Revegetation would not be required on affected lands, or portions thereof, where planting is not practicable or reasonable because the soil is composed of excessive amounts of sand, gravel, shale, stone, or other material to such an extent to prohibit plant growth (IDAPA 20.03.02 Section 140.11(h)).

2.4.7.9 Burntlog Route

Once all final mine closure/reclamation work has been completed, Perpetua would reduce the 21-foot-wide travel way of 19.8 miles of Burntlog Road (FR 447), 1.3 miles of Meadow Creek Lookout Road (FR 51290), and 2 miles along Thunder Mountain Road (FR 375) of the Burntlog Route to their approximate pre-mining width. Returning this 23 miles of existing road to pre-mining condition would entail grading and/or scarification along the outside edges of the road followed by seeding with the species listed in the Reclamation and Closure Plan (Tetra Tech 2021a) or as approved by the Forest Service. Perpetua would remove ditches, cross drains, culverts, safety berms, mile markers, guardrails, and signs on roads if these features are no longer needed. These roads would retain the flatter grades and gentler curves constructed for mine operations.

The approximately 15 miles of Burntlog Route that was newly constructed for the SGP, connecting Burnt Log Road (FR 447) to Meadow Creek Lookout Road (FR 51290) and Thunder Mountain Road (FR 50375) would be fully decommissioned. The road would be decommissioned by pulling back and re-contouring road cuts to slopes that are similar to, but not necessarily matching, pre-project conditions, and that would be consistent with the surrounding terrain as practicable. Surface water diversions, cross drains, culverts, safety berms, mile markers, guardrails, and signs would be removed. Soil nail walls, constructed of anchors bolted into the ground with a sprayed concrete surface, would remain to support slopes in areas with soft soils or weathered rock. Water bars or other erosion and sediment control structures, armored stream crossings, and stormwater crossings would be included where necessary. The reclaimed areas would be scarified, and 6 inches of growth media would be placed in upland areas, followed by seeding and for slopes over 30 percent certified weed-free mulching would be added. Revegetation would not be required where planting is not practicable or reasonable due to excessive amounts of sand, gravel, shale, stone, or other material to such an extent to prohibit plant growth (IDAPA 20.03.02).

2.4.7.10 Post Closure Public Access

As mentioned in **Section 2.4.7.4**, a service road would be established over the backfilled Yellow Pine pit to allow public access through the reclaimed site and connect Stibnite Road (FR 50412) to Thunder Mountain Road (FR 50375) (**Figure 2.4-18**).

2.4.7.11 Off-site Facilities

Following mine closure and reclamation, the Burntlog Maintenance Facility buildings would be removed. The sewer system and septic tanks for the Burntlog Maintenance Facility would be decommissioned. All petroleum products, solvents, and other hazardous or toxic materials would be removed from the site and disposed of according to applicable state and federal regulations. Soil/rock beneath fuel storage areas and chemical storage buildings would be tested for contamination and treated if necessary. After demolition of the buildings and facilities, the site would be graded, and drainage restored.

Because the SGLF would be zoned “light industry”, the facility could be maintained by a third party for future use; therefore, the facility, located on private land, would not be reclaimed. A new conditional use permit (CUP) from Valley County would be required prior to use by any other entity. If there is no interest or need for further use of the site after a two-year period, the structures would be removed and the site reclaimed (Valley County CUP No. 20-12 Stibnite Gold Project - Logistics Facility).

2.4.7.12 Contouring, Grading, Growth Medium Placement, and Seeding

Except for the Hangar Flats pit highwall above the valley bottom, the West End pit, a portion of the Yellow Pine pit highwall, the Stibnite Lake feature, and the Midnight, West End, and Plant site ponds, Perpetua would contour and grade disturbed areas to blend into the surrounding topography and terrain. Compacted areas such as roads, ore stockpile areas, parking lots, fuel storage areas, and building sites would be prepared prior to placement of growth media and revegetation. Haul routes and access roads would be re-contoured to establish natural drainage patterns.

Growth media suitability criteria include USDA texture, percentage of organic matter, course fragment percentage and acidity (pH). Root zone material suitability guidelines include USDA texture, course

fragment percentage, soil acidity (pH), electroconductivity, sodium adsorption ratio, Net Acid Generation (NAG) pH, bulk density and arsenic, antimony, and mercury levels. Perpetua would manufacture growth media material using fines from glacial till sources, available chipped vegetation, and off-site composted material from private lands. Off-site sources for composting feedstock materials would be in compliance with Forest Service requirements.

Planting, seeding, and mulching would be conducted in the fall and early winter to take advantage of snowpack and springtime moisture. Where cover crops are used in lieu of mulch, seeding would occur in the spring or fall followed by seeding of the permanent mixture. The forbs, grass species, seed amounts, and the trees and shrubs planned for planting on reclaimed areas are described in Tetra Tech (2021a) and would be approved by the Forest Service.

2.4.7.13 Post Closure Water Treatment

Evaluation of post-closure water treatment is ongoing. For the 2021 MMP, Perpetua has indicated that sources of water that could require treatment during closure and reclamation and through the post-closure period include TSF runoff and tailings consolidation water, plus any TSF Buttress toe seepage.

As previously described, consolidation water would be withdrawn from beneath the TSF geosynthetic cover using a combination of wells, wicks, and/or gravel drains, and routed to water treatment. Collected flows would be routed to the water treatment plant for treatment and discharge. Once it is determined that treatment is no longer required based upon agency approvals, the treatment facility would be decommissioned and the WTP site reclaimed. Water treatment would be provided during the reclamation and closure and post-closure phases until waters requiring treatment are no longer being generated. Life-of-mine water treatment of the TSF and other facilities is discussed in **Section 2.4.5.10**.

As described in **Section 2.4.7.5**, if spillage of surface water from the West End pit lake becomes imminent, a portable system would be brought to the site to treat and discharge pit lake water to maintain levels below the rim of the lake and prevent uncontrolled release of lake water.

2.4.7.14 Closure and Reclamation Financial Assurance

As part of the approval for the SGP, Perpetua would be required to post financial assurance to ensure that NFS lands and resources involved with the mine operations are reclaimed in accordance with the approved plan of operations and reclamation requirements (36 CFR 228.8 and 228.13). This financial assurance would provide adequate funding to allow the Forest Service to complete reclamation and post-closure operation, including continuation of any post-closure water treatment, maintenance activities, and necessary monitoring for as long as required to return the site to a stable and acceptable condition in the event Perpetua was unable to do so. The amount of financial assurance would be determined in collaboration with the Forest Service and would "address all Forest Service costs that would be incurred in taking over operations because of operator default" (Forest Service 2004). The financial assurance would be required in a readily available bond or other instrument payable to the Forest Service. To ensure the bond can be adjusted as needed to reflect actual costs and inflation, there would be provisions allowing for periodic adjustments in the final plan of operations prior to approval. Calculation of the initial bond amount would be completed following the Record of Decision (ROD) when enough

information is available to adequately and accurately perform the calculation. In addition to the Forest Service-required bond, mitigation under Section 404 of the CWA also requires financial assurance.

The IDL would require a bond as part of their cyanidation facility permitting authority and IDEQ would require a bond for the Cyanidation Permit which would then be held by IDL. The IDWR is the state agency responsible for design review and approval of the TSF. IDWR also would require a bond so that the TSF is placed in a safe maintenance-free condition upon decommissioning or if abandoned by the owner.

2.4.7.15 Closure and Reclamation Traffic

Most closure and reclamation traffic would occur May through November. Mine traffic during closure and reclamation is anticipated to result in a total AADT of 27, with 15 being from heavy vehicles and 12 being from light vehicles.

2.4.8 Monitoring

Monitoring would be conducted to ensure compliance with permits and regulations and to manage the impact of the SGP on the environment. Authorizations from federal and state agencies include monitoring requirements for resources (e.g., air emissions, surface water, and groundwater) during mine construction, operation, closure and reclamation, and post-closure. Air emissions, groundwater, surface water, aquatic, and other environmental parameters would be monitored during mine construction, operation, closure, and post-closure as described and specified in the EMMP (Brown and Caldwell 2021c). Monitoring actions would not be known fully until required permits have been issued.

Monitoring would be conducted following the completion of closure and reclamation of all facilities and disturbance areas to demonstrate compliance with permit requirements and to measure the success of reclamation and mitigation. Final monitoring requirements and timelines would be outlined in the final permit approval documents and the final EMMP.

The final EMMP would consist of multiple component plans, each of which would be finalized upon issuance of the related permit(s) and would contain monitoring and management requirements from each permit. In some cases, if environmental outcomes may be uncertain, the EMMP could include adaptive management planning which requires identification of performance measures, impact thresholds, and operational adjustment options, all intended to achieve and demonstrate compliance with applicable permitting and/or consistency with the environmental analysis.

2.4.8.1 Environmental Monitoring

In an effort to capture actual or anticipated monitoring and/or management requirements for each of the required regulatory permits, an EMMP (Brown and Caldwell 2021c) was drafted. The EMMP describes the component monitoring and management plans that would be developed and used by Perpetua to manage water resources, manage and monitor mine facilities, and monitor environmental and cultural resources. The EMMP includes environmental tasks and lists environmental permits, licenses, authorizations, and corresponding obligations. It also establishes Perpetua's commitments to environmental monitoring and management of mine facilities and environmental resources. The EMMP

would provide direction to Perpetua to monitor its operations and environmental commitments, document permit compliance, and reduce potential impacts to environmental resources.

2.4.8.2 Reclamation Monitoring

Following a Project ROD, Perpetua would prepare a Reclamation Monitoring and Maintenance Plan for regulatory agency approval.

Reclamation monitoring would begin during concurrent reclamation at SGP facilities. Quantitative and qualitative monitoring of reclamation success would begin the first growing season after concurrent or final reclamation is completed and would continue until success criteria are satisfied. The Reclamation and Closure Plan (Tetra Tech 2021a) presents the quantitative and qualitative reclamation monitoring that would be conducted and the performance standards that would be used (with Forest Service and IDL approval) to determine when maintenance activities are necessary, or reclamation is complete. These monitoring requirements are summarized below.

Erosion and Sediment Control Monitoring

Soil stability would be estimated for all reclaimed areas using qualitative descriptors. A reclamation specialist would observe each reclaimed area and assign qualitative descriptors. The observations would be completed twice annually for erosion control purposes, once in the spring and once in the fall; and after three years for performance monitoring purposes. For performance monitoring, the observations would be made at the same time the vegetation success observations are made. The monitoring results would be used to aid in determining the cause of any failures that are encountered and to locate problem areas before erosion becomes widespread enough to affect reclamation success.

Slope Stability Monitoring

Slope stability would be monitored during the erosion observations. Qualified staff would look for signs of slope movement, cut slope and rock face failures, and other indications of slope instability. The location and dimensions of significant surface cracks and fill slope bulges would be monitored. This information would be used to determine if surface cracks are the result of differential settling of fill material or slope instability. The appropriate regulatory agency would be notified, and corrective plans would be developed.

Reclamation Maintenance Procedures

If the performance of reclaimed areas is not satisfactory, appropriate maintenance activities would be implemented. Maintenance activities may include one or more of the following:

- Sediment removal from sediment basins, stormwater drainage channels, and diversions as necessary to maintain their design capacity;
- Diverting surface water away from reclaimed areas where erosion jeopardizes attainment of reclamation standards;
- Stabilizing rills, gullies, and other erosion features or slope failures that have exposed development rock;

- Noxious weed and invasive plant species control; and
- Re-seeding or re-applying reclamation treatments in areas where it is determined through monitoring and agency consultation that reclamation would not meet standards.

Annual Report

Perpetua would submit an annual report to the Forest Service and the other federal and state agencies that are responsible for issuing authorizations applicable to reclamation for the preceding calendar year. The annual report would contain descriptions of the reclamation activities completed during the previous year, a summary of areas reclaimed, a discussion of the results of the reclamation monitoring conducted, and corrective actions implemented.

2.4.9 Environmental Design Features

The SGP must comply with all laws and regulations that apply to the proposed activities with prominent requirements relative to the impact analysis described in Chapter 4 summarized in **Table 2.4-12**. Standards and guidelines in the Boise Forest Plan and Payette Forest Plan (Forest Service 2003a, 2010a) that are designed to reduce or prevent undesirable impacts resulting from proposed management activities are incorporated into the action alternatives by reference. In addition, best management practices outlined in the Best Management Practices for Mining in Idaho (IDL 1992) would be implemented where appropriate and applicable for operations to minimize site disturbance from mining and drilling activities.

In the design of the 2021 MMP, Perpetua has already considered many of the potential environmental impacts that might be caused by the SGP. This has led to an internal evaluation of project design features and operational characteristics that may have the effect of reducing and/or eliminating potential environmental impacts of the SGP. Such project-specific measures intended by a proponent to inherently reduce and/or avoid potential environmental impacts of a proposed action are referred to as environmental "design features".

Based on the application of permits and regulatory compliance requirements to the project, regulatory requirements, standards and guidelines, best management practices, and likely permit conditions are listed in **Table 2.4-12**. The environmental design features (EDFs) beyond regulatory requirements that have been proposed and committed to by Perpetua are listed in **Table 2.4-13**. The impact analysis and environmental consequences takes these EDFs as well as regulatory requirements into consideration, such that the identified potential impacts of the SGP would be those that remain after their application. These EDFs and regulatory requirements would be applied to reduce and minimize impacts to resources from the SGP.

Table 2.4-12 Prominent Regulatory and Forest Plan Requirements

Description	Type	Reference	Resources Affected
The proponent will prepare a dust mitigation plan with appropriate schedule or triggers for control deemed adequate by IDEQ to achieve the level of control of 93.3 percent of dust (as required in conditions 2.1-2.8 of the Permit to Construct from IDEQ).	IDEQ Permit	IDEQ Permit to Construct	Air Quality Visibility, Wildlife, Vegetation, Wilderness

Description	Type	Reference	Resources Affected
Additionally, the proponent would employ particulate matter or opacity monitors deemed adequate by the Forest Service and immediately apply water or chemical dust control when PM or opacity monitors reach levels within 10 percent of the threshold determined by IDEQ.			
During project planning, affected tribe(s) shall be consulted regarding opportunities for restoration, enhancement, and maintenance of native plant communities that are of interest to tribe(s) when proposed activities may affect those plant communities.	FP Component	BNF and PNF: TRST04	Cultural Resources, Vegetation
When taking water from fish-bearing waters for road and facility construction and maintenance activities, intake hoses shall be screened with the most appropriate mesh size (generally 3/32 of an inch), or as determined through coordination with National Oceanic and Atmospheric Administration Fisheries and/or USFWS.	FP Component	BNF and PNF: FRST01 TEST32	Fish
Fish passage shall be provided at all proposed and reconstructed stream crossings of existing and potential fish-bearing streams.	FP Component	BNF and PNF: SWST08	Fish
Surface water withdrawal intake hoses would be situated so as to prevent generation of turbidity in bottom sediments during pumping.	Design Feature		Fish, Water Resources
Where settlement ponds, tailing dams, or impoundments are planned, each would be located, designed, constructed, and inspected under the supervision of a professional engineer.	FP Component	BNF and PNF: MIGU03	Geology and Geotechnical
Prohibit solid and sanitary waste facilities in RCAs. If no alternative to locating mine waste (waste rock, spent ore, tailings) facilities in RCAs exists, then: • Analyze waste material using the best conventional methods and analytic techniques to determine its chemical and physical stability characteristics. • Locate and design waste facilities using the best conventional geochemical and geotechnical predictive tools to ensure mass stability and prevent the release of acid or toxic materials. If the best conventional technology is not sufficient to prevent such releases and ensure stability over the long term, and such releases or instability would result in exceedance of established water quality standards or would degrade surface resources, prohibit such facilities in RCAs. • Monitor waste and waste facilities to confirm predictions of chemical and physical stability and make adjustments to operations as needed to avoid degrading effects to beneficial uses and native and desired non-native fish and their habitats. • Reclaim and monitor waste facilities to ensure chemical and physical stability and revegetation to avoid degrading effects to beneficial uses and native and desired non-native fish and their habitats.	FP Component	BNF and PNF: MIST09	Geology and Geotechnical, Wetlands and Water Resources, Wildlife, Fish

Description	Type	Reference	Resources Affected
• Require reclamation bonds adequate to ensure long-term chemical and physical stability and successful revegetation of mine waste facilities.			
Transport hazardous materials on the Forest in accordance with 49 CFR 171 in order to reduce the risk of spills of toxic materials and fuels during transport through RCAs.	FP Component	BNF and PNF: SWGU11	Hazardous Materials, Fish, Health and Safety
A SPCC shall be prepared in accordance with 49 CFR parts 171 through 180, including packaging, transportation, incident reporting, and incident response. Include the following items within the SPCC Plan: • During off-loading of fuel from fuel vehicles or during refueling operations have a standard marine-type fuel containment boom (which would be of sufficient length for a worst-case discharge), spill prevention kit, and fire kit readily available on site. • Store two or more spill containment and response caches along each of the fuel delivery routes. • Spill response team will carry sufficient containment equipment for one full fuel tanker. • Include the Forest Service as a party to be notified in the event of a hazardous materials spill. • Intake pumps, engines, fuel storage, fuel containment site, and other equipment with fuel or lubricants would be inspected at each refueling and periodically between refueling for leakage or spillage. • Pilot and emergency spill response vehicles would carry appropriate containment and first aid equipment. • All fuel containers would be marked with contents, owner's name and contact information. • Material Safety and Data Sheets for all products would be posted and available on site with the SPCC plan. • Intake pumps would not be situated within the active stream and ditch channel and would be placed within containment vessels capable of holding 120 percent of the pump engine's fuel, engine oil and hydraulic fluid. The smallest practical pump and intake hose would be used. • Following large storm events, the intake pumps would be inspected to determine if stream flow has encroached into the pump area and if the pump needs to be moved so it remains above flowing water. • A spill prevention and clean-up kit would be placed at the intake pump site and would consist of absorbent pads and/or boom (which would be sufficient length for a worst-case discharge), drip pan, a shovel, and a fire extinguisher. • Spare fuel for the water intake pump would be stored in approved [29 CFR 1926.152(a)(1)] fuel storage containers placed into a secondary containment vessel capable of holding	Regulatory Requirement and Design Features	49 CFR 171	Hazardous Materials, Health and Safety, Water Resources, Wetlands, Fish, Wildlife, Soils,

Description	Type	Reference	Resources Affected
at least 120 percent of the volume of the fuel in the fuel container. • A copy of the SPCC plan would be kept at an appropriate on-site facility.			
Unless otherwise authorized, all garbage or refuse should be removed from NFS lands. This includes, but is not limited to, empty fuel and lubricant containers. Food and garbage would be stored either indoors, in vehicles, or if outside, in wildlife-proof containers. No garbage would be burned.	FP Component and Design Features	Design Feature developed for compliance with BNF and PNF: MIGU04	Hazardous Materials, Water Resources, Fish, Health and Safety, Wildlife
The operator shall comply with all applicable Federal and State fire laws and regulations and shall take all reasonable measures to prevent and suppress fires on the area of operations and shall require their employees, contractors and subcontractors to do likewise.	Regulatory Requirement	36 CFR 228.11	
The operator shall comply with State of Idaho fire protection procedures (as outlined in IDAPA 20.04.01) and any local Valley County Fire District regulations and shall require their employees, contractors and subcontractors to do likewise.	Regulatory Requirement	IDAPA 20.04.01	Health and Safety, Vegetation
Several fire-response kits would be spaced strategically around the project area and be inspected annually.	Design Feature		Health and Safety, Vegetation
On-site staff will maintain contact with Krassel District Ranger to ensure appropriate procedures are followed in the event of implementation of fire restrictions or woodland use restrictions (e.g., “Red Flag Warnings”).	Design Feature		Health and Safety, Vegetation
Damage to or loss of Forest System trails from mining activities should be repaired or mitigated by the appropriate party.	FP Component	BNF: REGU22, REGU24 PNF: REGU23, REGU26	Recreation
When new recreation facilities and trails must be located in RCAs, they shall be developed such that degrading effects to RCAs are mitigated. Where reasonable and practical location alternatives exist, new recreation facilities and trails should be located outside of RCAs.	FP Component	BNF: REST02 PNF: REST02	Recreation
Architectural designs would follow principles and concepts outlined in the Built Environment Image Guide. Facilities identified as necessary should blend with the surrounding landscape character and the ROS setting. ROS descriptions in the BNF and PNF Forest Plans Appendix F should be used to help guide facility development and recreation activity management within each ROS class. When a structure or facility is created for other than public use, the materials, color, and location should be chosen to reduce visual contrast of the structure. Natural or neutral colors should be used in to help structures blend with the landscape.	FP Component	BNF and PNF: FRGU13, SCGU13, SCGU14, SCGU15 BNF: REGU12, REGU15 PNF:	Scenic Resources, Tribal Resources

Description	Type	Reference	Resources Affected
The use of natural or neutral colors and non-reflective surfaces would be considered for structures. An exception to this would be when the function of the structure is to be seen.		REGU13, REGU16	
Reclamation cover material (e.g., growth media) used in places including but not limited to the TSF and TSF Buttress would be evaluated for contaminants prior to use during reclamation. Acceptable metal and contaminant concentrations and sampling and testing methodology would be documented in a sampling and analysis plan developed prior to reclamation.	Design Feature		Soil, Water, Public Safety
Topsoil and any brush removed would be stockpiled separate from fill material and used in reclamation.	Design Feature		Soils
Measures such as, but not limited to, segregating and stockpiling topsoil, implementing stormwater and sediment best management practices (BMPs), backfilling, revegetation, and concurrent reclamation would be conducted, where possible and practical, for areas where the soil has been exposed by ground-disturbing activities. These areas and sites include but are not limited to borrow sites, utility corridors, skid trails, firebreaks, temporary roads, cut and fill slopes, and areas where construction activities have occurred.	Design Feature	Design Feature developed to lessen impacts under BNF and PNF: SWST03, SWGU05	Soils, Vegetation, Timber, Transportation and Access, Water, Wetlands, Fish
Applicable road obliteration for all roads proposed for obliteration including temporary roads and applicable sections of the Burntlog route (if selected) would be fully recontoured, including full bench constructed road segments. Road obliteration through recontouring is the reclamation of a road template through the following: • Deep decompaction (36”) of the inside half of the road surface; • excavate road fill down to the natural ground level and then place on top of the decompacted inside half of the road surface on the cut slope side of road; • Reestablish the natural slope profile; and • Vegetation clump planting. Decompaction**:** All compacted road surfaces that would be covered with excavated material, for example the inside half of the road surface, shall be decompacted to a depth of 36 inches or to a restrictive layer (bedrock). This is to promote water infiltration, breakup any potential landslide slip surface between the road surface and excavated and placed fill material and allow deep root vegetation establishment. Excavation: After decompaction of the roadway, the outside road fill material shall be excavated and placed on roadbed between the top of cut and natural ground, forming a slope approximating natural contours. No ditches, water traps, or berms shall remain. Finished product should blend in with the surrounding terrain. Soil-Vegetation Plug Transplanting: Excavate soil-vegetation plugs from adjacent natural and undisturbed ground having a minimum surface area of 9 sq. ft. to a depth beyond the vegetation rooting zone (plug size is dictated by excavator bucket size). The plug transplant shall be of sufficient depth that	Design Feature		Soils, Vegetation, Transportation and Access

Description	Type	Reference	Resources Affected
would maintain the root system and contain adequate soil to enhance favorable growth. Soil-vegetation plug transplanting would be done at a minimum rate of 15 plantings per 100 lineal feet evenly distributed along the width and length of the recontoured surface. The plugs would be transplanted to a depth even with the surrounding recontoured ground level. This work would be accomplished with an excavator. Surface Ground Cover: Ground cover across the entire recontoured or disturbed surface (this would include all scarified ground, de-compacted roads and skid trials), by order of priority, shall be achieved using a combination of clump planting, native mulch, coarse woody debris and certified weed free agriculture straw to reach a minimum of 50 percent to the maximum 80 percent coverage of the recontoured surface or disturbed area. Apply native seed mix, hydromulch or organic fertilizer. This order or priority shall be given to vegetation plug planting, native mulch, coarse woody debris, and straw. When applying coarse woody debris, use various size classes at levels similar to surrounding undisturbed ground and placed at various orientations. The desired result of road obliteration through recontouring is to restore slope contours the natural slope profile, improve soil productivity, improve soil-water infiltration, and reestablish ground water flow paths and hydrologic function.			
Road rutting from operations, outside the mine site, would be minimized by construction and maintenance of surface drainage structures, application of surfacing material, and by restricting road use when conditions are unacceptable due to moisture that is leading to the onset of rutting and concentrated turbid flow. (Note typical guidance is 'no use' if ruts deeper than 4" are created.) This design feature does not apply to the mine site.	Design Feature	Design Feature developed to lessen impacts under BNF and PNF: SWST02 SWST03	Soils, Vegetation, Timber, Transportation and Access, Water, Wetlands, Fish
Handling of road waste material (e.g., slough, rocks) would avoid or minimize delivery of waste material to streams that would result in degradation of soil, water, riparian, and aquatic resources.	Design Feature	Design Feature developed for compliance with BNF and PNF: FRST05	Transportation and Access, Fish, Soils, Water Resources, Wildlife,
Commercial transport vehicles would be inspected at Knox or Landmark by the driver prior to accessing the Johnson Creek area.	Design Feature		Transportation and Access, Health and Safety
Road clearing and maintenance activities for roads under Forest Roads and Trail Act (FRTA) easement agreements would be coordinated with Valley County, as necessary.	Design Feature		Transportation and Access, Health and Safety

Description	Type	Reference	Resources Affected
Mitigate degrading effects from locatable mine operations situated within RCAs by identifying reasonable locations for access, processing, and disposal facilities outside of RCAs, wherever possible.	FP Component	BNF and PNF: MIST04, LSST07, MIST08, FRGU06	Transportation and Access, Water Resources, Fish, Wetlands.
To minimize the degradation of watershed resource conditions, prior to expected water runoff, water management features would be constructed, installed, and/or maintained. Activities and features include, but are not limited to, water bars, rolling dips, seeding, grading, slump removal, barriers and berms, distribution of slash, and culvert and ditch cleaning in all applicable areas.	Design Feature	Design Feature developed for compliance with BNF and PNF: SWST01 and SWST04	Transportation and Access, Water Resources, Soils, Wetlands
To accommodate floods, including associated bedload and debris, new culverts, replacement culverts, and other stream crossings would be designed to accommodate a 100-year flood recurrence interval unless site-specific analysis using calculated risk tools or another method, determines a more appropriate recurrence interval.	FP Component	BNF and PNF: FRST02	Transportation and Access, Water Resources, Soils, Wetlands, Fish
To minimize sediment runoff from the temporary roads and roadbeds, water management features would be constructed, installed, and/or maintained on authorized temporary roads and roadbeds, on completion of use, before expected water runoff, or before seasonal shutdown. Activities and features could include, but would not be limited to, water bars, silt fencing, certified weed-free wattles, and/or weed-free straw bales, rolling dips, seeding, grading, slump removal, barriers and berms, distribution of slash, and culvert and ditch cleaning. These features would be installed in strategic downslope areas and in RCAs, where and when appropriate.	Design Feature	Design Feature developed for compliance with BNF and PNF: SWGU06	Transportation and Access, Water Resources, Wetlands, Soils
Snow removal would be accomplished in accordance with the following standards of performance: • All debris, except snow and ice, that is removed from the road surface and ditches would be deposited away from stream channels at approved locations. • During snow removal operations, banks would not be undercut, and gravel or other surfacing material would not be bladed off the roadway surface. • Ditches and culverts would be kept functioning during and following plowing. Berms left on the shoulder of the road would be removed and/or drainage openings would be created and maintained. Drainage openings would be spaced to maintain satisfactory surface drainage without discharge on erodible fills. • Dozers would be used on an as-needed basis for plowing snow. The dozer operator would maintain an adequate snow floor over the gravel road surface.	Design Feature		Transportation and Access, Water Resources, Wetlands, Fish

Description	Type	Reference	Resources Affected
• Snow would not be totally removed to the gravel road surface. Appropriate snow floor depth would be maintained to protect the roadway. • Damage of roads from, or as a result of, snow removal would be repaired in a timely manner. • Culverts and stream crossings would be clearly marked before snow removal begins to avoid placing berm openings in locations that would allow runoff to enter drainages directly at the culverts or stream crossings. Excessive snow would not be plowed into locations that would impact operation of the culverts or prevent positive drainage from drainage areas. Some snow is necessary around culvert openings and in the bar ditches as this would insulate the ditch and culvert and would prevent the water in the ditch and culvert from freezing. • No ice and snow removal chemicals would be used on roads. • Traction material would be 3/8-inch diameter gravel or greater.			
If sensitive plants or their propagules are required to be collected, collection methods and other information will be under the direction of the Forest or Regional Botanist.	Design Feature	Design Feature developed for compliance with BNF and PNF: BTST02	Vegetation
For projects or activities that include application of insecticides, herbicides, fungicides, or rodenticides, degrading effects on sensitive plant species will be mitigated.	FP Component	BNF and PNF: BTST04	Vegetation
In revegetation and seeding projects in occupied TEPC plant habitat, a Forest botanist shall be consulted to ensure appropriate species are used.	FP Component	BNF and PNF: TEST09	Vegetation
When available and not cost-prohibitive, seeds and plants used for seedings and plantings in revegetation projects should originate from genetically local sources of native species. When project objectives justify the use of non-native plant materials, documentation explaining why non-natives are preferred should be part of the project planning process.	FP Component	BNF and PNF: BTGU03	Vegetation
Noxious weeds and undesirable non-native plants would be eradicated in the Operations Area boundary, within permitted use areas, and the cut and fill slopes of roads and trails used by mine and mine facility related traffic. Where it is not practical to eradicate existing infestations, infestations would be managed to prevent seed production and spread. In areas of existing extensive infestation, mitigation for noxious weed prevention would be incorporated into road layout, design, and project alternative evaluation.	Design Feature	Design Feature developed for compliance with BNF and PNF: FRGU02, TEST10	Vegetation
Clean borrow and gravel sources on Forest should be maintained as noxious weed free through an inspection and treatment program. Off-Forest inspections and treatments should be coordinated with county weed agents.	FP Component	BNF and PNF: NPGU02	Vegetation

Description	Type	Reference	Resources Affected
All seed used on National Forest System lands will be certified to be free of seeds from noxious weeds listed on the current All States Noxious Weeds List.	FP Component	BNF and PNF: NPST02	Vegetation
Materials such as hay, straw, or mulch that are used for rehabilitation and reclamation activities shall be free of noxious weed seed and shall comply with the 1995 weed-free forage special order against use of non-certified hay, straw, or mulch. Materials that are not covered under a weed seed free certification, and that have the potential to contain noxious weed seed, shall be inspected and determined to be free of weed seed before purchase and use.	FP Component	BNF and PNF: NPST01 NPST06	Vegetation
Source sites for gravel and borrow materials shall be inspected for noxious weeds before materials are processed, used, or transported from the source site into the project area or onto the National Forest.	FP Component	BNF and PNF: NPST07	Vegetation
Gravel or borrow material source sites with noxious weed species present shall not be used unless effective treatment or other mitigation measures are implemented.	FP Component	BNF and PNF: NPST08	Vegetation
To prevent invasion and expansion of noxious weeds, the following provisions will be included in the plan of operating where land-disturbing activities are associated with the authorized land use): a) Re-vegetate areas, as designated by the Forest Service, where the soil has been exposed by ground-disturbing activity. Implement other measures, as designated by the Forest Service, to supplement the influence of re-vegetation in preventing the invasion or expansion of noxious weeds. Potential areas would include: construction and development sites, underground utility corridors, skid trails, landings, firebreaks, slides, slumps, temporary roads, cut and fill slopes, and travel ways of specified roads. b) Earth-disturbing equipment used on National Forest System lands--such as cats, graders, and front-loaders--shall be cleaned to remove all visible plant parts, soil, and material that may carry noxious weed seeds. Cleaning shall occur prior to entry onto the project area and again upon leaving the project area if the project area has noxious weed infestations. This also applies to fire suppression earth-disturbing equipment contracted after a Wildland Fire Situation Analysis and Wildland Fire Implementation Plan has been completed.	FP Component	BNF and PNF: NPST03	Vegetation

Description	Type	Reference	Resources Affected
Integrated weed management shall be used to maintain or restore habitats for sensitive plants and other native species of concern where they are threatened by noxious weeds or non-native invasive plants. Specific measures to reduce the potential for spread and establishment of noxious weed infestations could include, but are not limited to, determining the presence, location, and amount of noxious weed infestations in the Operations Area, developing management strategies such as, methods and frequency for treating infestations, treatment procedures and restrictions, reporting requirements, and follow-up or monitoring requirements. Herbicide applications will be by or under the direct supervision of licensed Idaho professional herbicide applicators with Aquatic Pest Control certifications and will be consistent with the BNF Invasive Species Management Plan and PNF guidance.	FP Component and Design Features	Design Feature developed for compliance with BNF and PNF: NPST11	Vegetation
New facilities for storage of fuels and other toxicants would be located outside of occupied Regional Forest Sensitive, Forest Watch, and Threatened, Endangered, Proposed, or Candidate (TEPC) plant habitat.	FP Component	BNF and PNF: TEST11	Hazardous Materials, Water Resources, Fish, Health and Safety, Vegetation
Public firewood cutting and gathering along the Burntlog route would not be allowed.	Design Feature		Vegetation
Mitigate, through avoidance or minimization, management actions within known winter roosting sites of TEPC species if those actions would adversely affect the survival of wintering or roosting populations. During project planning, determine sites, periods, and appropriate mitigation measures to avoid or minimize effects.	FP Component	BNF and PNF: TEST13 WIST03	Wildlife
Section 6 of IDL's Best Management Practices for Mining in Idaho (IDL 1992) would be observed, including if water is encountered in exploration holes, water zones would be sealed off during abandonment to prevent crossflow.	Regulatory Requirement	Section 6 of IDL's Best Management Practices for Mining in Idaho (IDL 1992)	Water Resources
The proponent would implement surface water quality baseline turbidity monitoring, as defined in the IDEQ permit clauses.	Design Feature		Water Resources, Fish
Do not authorize storage of fuels and other toxicants or refueling within RCAs unless there are no other alternatives. Storage of fuels and other toxicants or refueling sites within RCAs shall be approved by the responsible official and have an approved spill containment plan commensurate with the amount of fuel.	FP Component	BNF and PNF: SWST11	Water Resources, Fish, Wetlands, Hazardous Materials, Health and Safety

Description	Type	Reference	Resources Affected
Dust abatement chemicals would be used in accordance with the applicable road maintenance Biological Assessment. Apply dust-abatement additives and stabilization chemicals (typically $MgCl_2$, $CaCl_2$, or lignin sulphonates) to avoid run-off of applied dust abatement solutions to streams. Spill containment equipment would be available during chemical dust abatement application. Where the road surface is within 25 feet (slope distance) of surface water, dust abatement would only be applied to a 10-foot swath down the centerline of the road. The rate and quantity of application would be regulated to insure all of the chemical is absorbed before leaving the road surface.	Design Feature		Water Resources, Fish, Wetlands, Air Quality, Transportation and Access
Drilling mud and hole plug products, if utilized, would conform to American Petroleum Institute guidelines for ensuring groundwater integrity.	Design Feature	American Petroleum Institute guidelines	Water Resources, Health and Safety, Hazardous Materials
Trees or snags that are felled in RCAs would be left unless determined not to be necessary for achieving soil, water, riparian, and aquatic desired conditions. Felled trees or snags left in RCAs would be left intact unless resource protection (e.g., the risk of insect infestation is unacceptable) or public safety requires bucking them into smaller pieces.	FP Component	BNF and PNF: SWST10	Water Resources, Soil, Fish, Vegetation
The proponent would monitor stormwater runoff and stormwater BMPs as per the Stormwater Pollution Prevention Plan (SWPPP). Stormwater monitoring, inspections, and reporting would be conducted in accordance with the IPDES MSGP and the SWPPP.	Permitting Requirement	IPDES MSGP and the SWPPP	Water Resources, Soils
All activities would be conducted in accordance with Idaho environmental anti-degradation policies, including IDEQ water quality regulations at IDAPA 58.01.02 and applicable federal regulations.	IDAPA 58.01.02		Water Resources, Wetlands, Fish
If additional water rights are applied for, the Forest Service would be informed to determine if additional analysis or consultation is necessary prior to use.	Design Feature		Water Rights
Road reconstruction and/or upgrades to NFR 51290 (Meadow Creek Lookout Road) on the ridgeline dividing Meadow Creek from the Indian Creek drainage would be restricted to 30 feet either side of the centerline of the existing alignment to prevent potential for direct impacts to the Frank Church River of No Return Wilderness (FCRNRW).	Design Feature	Design Feature developed for compliance with BNF and PNF: LSST03, LSST05	Wilderness
Mitigate management actions within known winter roosting sites or hibernacula (bats) of Sensitive species if those actions would measurably reduce the survival of wintering or roosting populations. Sites, periods, and mitigation measures will be determined during project planning.	FP Component	BNF and PNF: WIST04	Wildlife

Description	Type	Reference	Resources Affected
To mitigate impacts to known nesting or denning sites of Management Indicator Species (MIS) or Sensitive species, land clearing activities in areas where complete vegetation removal is necessary greater than 0.5 acres would not occur, to the extent possible, until after the bird breeding season (April 1 through July 30th) for migratory and resident birds. This design feature does not apply to the mine site, road construction or maintenance, hazard tree felling, or the power line upgrades and construction.	Design Feature	Design Feature developed for compliance with BNF and PNF: WIST03	Wildlife
Potential water sources would be surveyed by the proponent, in coordination with the Forest Service, for Columbia spotted frog egg masses and other amphibians after ice melt and avoid disturbing any water sources with identified egg masses or other species. Exceptions: If egg masses are found at a water source essential for proposed activities, the egg masses would be relocated in coordination with the Forest Service wildlife biologist.	Design Feature	Design Feature developed for compliance with BNF and PNF: WIST03, TEST12	Wildlife
The Forest Service wildlife biologist would be notified of any sightings of TEPC or Sensitive wildlife species, including, occupied sensitive species nests or dens encountered during implementation. If necessary to maintain key features of nesting and denning habitat or to avoid disruption of nesting and denning activities, prescribed activities would be modified in accordance with the Forest Service wildlife biologist.	Design Feature	Design Feature developed for compliance with BNF and PNF: WIST03, TEST12	Wildlife
Where practicable, monitoring of high elevation habitats characteristic of wolverine denning habitat would be done in cooperation with State fish and game agencies.	Design Feature	Design Feature developed for compliance with BNF: WIGU17	Wildlife
To minimize adverse effects of lighting to TEPC, MIS, or Sensitive species, where necessary and in accordance with MSHA and the Occupational Safety and Health Administration (OSHA), the proponent could utilize actions in line with, but not limited to, the below: • To the extent practicable, limit construction activities to the time between dawn and dusk. • Utilize, where possible, use down shielding or directional lighting such as 'Cobra' style lights rather than an omnidirectional light system. • While allowing for public and worker safety, utilize low intensity energy saving lighting (e.g., low pressure sodium lamps). • If possible, minimize illumination of lighting on associated construction or operation structures by using motion sensors or heat sensors. • If possible, place light shields over outside lights, confining light to the immediate area.	Design Feature	Design Feature developed for compliance with BNF and PNF: WIST03, WIST04 TEST29	Wildlife

Description	Type	Reference	Resources Affected
• Whisper Quiet light plants could be utilized used to mitigate visual impacts from night operations.			
Communication towers should not be sited in or near wetlands, or other known bird concentration or high use areas (e.g., riparian corridors), in known migratory or daily movement flyways. Towers should not be sited in areas with a high incidence of fog, mist, and low ceilings.	Design Feature		Wildlife
If fawning and calving activity is encountered during project activities, the activity would cease and/or be modified in coordination with the Forest Service.	FP Component	BNF: WIGU12 PNF: WIGU12	Wildlife
In goshawk territories with known active nest stands, identify alternate and replacement nest stands during project-level planning when it is determined that the proposed activity is likely to degrade nest stand habitat.	FP Component	BNF and PNF: WIST06	Wildlife
To minimize adverse effects of noise to TEPC, MIS, or Sensitive species, where necessary and in accordance with MSHA and OSHA, the proponent could utilize actions in line with, but not limited to, the below: • Construction equipment engines would be equipped with adequate mufflers, intake silencers, and engine enclosures when feasible. • When practicable, pumps, generators, and engines would be turned off when not in use. • Temporary wooden structure could be erected around portions of the drill, pumps, and heaters, with acoustic absorbent panels. These temporary structures would not be put in place if they created safety issues related to exhaust vapor build-up. • When feasible, activities such as helicopter use and blasting, could be scheduled at the same time.	Design Feature	Design Feature developed for compliance with BNF and PNF: WIST03, WIST04 TEST29	Wildlife, Scenic Resources, Noise, Wilderness
In revegetation and seeding projects in occupied sensitive plant habitat, a Forest botanist shall be consulted to ensure appropriate species are used.	FP Component	BNF and PNF: BTST05	Vegetation
Design and implement projects within occupied habitats of Sensitive species to help prevent them from becoming listed. Use Forest Service-approved portions of Conservation Strategies and Agreements, as appropriate, in the management of Sensitive species habitat to keep management actions from contributing to a trend toward listing for these species.	FP Component	BNF and PNF: WIST02	Wildlife, Vegetation

Table 2.4-13 Proponent Proposed Design Features

Description	Resources Affected
Following crushing, the crushed ore would report via conveyor to a dome-shaped, covered stockpile.	Air Quality
Dust emission controls, such as water sprays and/or bag house dust collectors, would reduce dust from crushing, conveying, and stockpiling.	Air Quality

Description	Resources Affected
Dust would be controlled in a similar manner to the ore crushing and conveying process using water sprays and/or bag house dust collectors.	Air Quality
Air emissions from the leaching facility would be captured in a series of air pollution controls, and the material collected would be disposed of as a solid waste or a hazardous waste depending on characterization of the waste.	Air Quality
Air emissions from the induction furnace would be captured in a series of emission controls. Mercury from the induction furnace would be converted to a liquid metallic state, and then securely stored prior to shipment to a certified hazardous waste disposal facility.	Air Quality
Silos would be equipped with air emission controls except for Prill Silo.	Air Quality
All off-highway diesel engines would be EPA Tier IV or better.	Air Quality, Climate Change
Perpetua would encourage employees to use company provided shuttle buses as transport to the SGLF from towns along SH 55.	Air Quality, Health and Safety, Transportation and Access
Busing and/or vanpooling would be provided for Perpetua and contractor employees. The associated parking area would accommodate approximately 300 vehicles. To the degree practicable, Perpetua would mandate the use of busing and vans for employee and contractor transportation to the SGP and the worker housing facility.	Air Quality, Health and Safety, Transportation and Access
Proper dust control would be employed along transportation corridors and active mining areas using aquatic safe dust suppression chemicals and methods.	Air Quality, Water Resources, Fish, Wildlife
Perpetua would utilize “smart grid” technology to reduce energy consumption, such as auto dimming lights in offices.	Climate Change
Perpetua employees and contractors would be informed about relevant governmental regulations intended to protect cultural and historic resources.	Heritage
To protect fish residing in, using, or potentially using the Yellow Pine Pit lake (Chinook salmon, steelhead trout, bull trout, Westslope cutthroat trout, mountain whitefish), Perpetua has developed a Fish Salvage and Release Plan to isolate the lake from upstream movement into the lake and salvage and release fish. The Fish Salvage and Release Plan would be refined in coordination with federal, state, and tribal agencies. Perpetua would, in consultation with the USFWS and the NMFS (the Services), design, install, and operate a fish trap and one or two weirs designed to allow fish to leave the Yellow Pine pit lake but not allow fish to migrate upstream past the trap to ensure that the fewest number of individual ESA-listed fish species are present in the pit lake when the draining process begins. The timing for providing the upstream barrier to fish movement would be designed to minimize the number of fish in the Yellow Pine pit lake, particularly larger bull trout. Fish captured in the Yellow Pine pit lake would be immediately released downstream of the upstream fish movement barrier or in another location determined by the appropriate regulatory agencies. The Yellow Pine pit lake would be partially drained to recover the remaining fish and relocate them prior to final draining of the pit lake.	Fish

Description	Resources Affected
A fishway has been designed and would be operated within the East Fork SFSR diversion tunnel to provide upstream and downstream volitional fish passage throughout mine operations. The East Fork SFSR diversion tunnel would be approximately 0.9 miles long and 15 feet high by 15 feet wide. The tunnel would include a parallel accessway to allow equipment and personnel access for monitoring, inspection, and maintenance. The accessway would function as a floodway for high flows, limiting the operating flow range within the fishway while river and thus total tunnel flows vary more widely.	Fish
As an alternative to the fishway in the East Fork SFSR diversion tunnel Perpetua would provide adult passage by trap and haul if needed. Criteria may be put in place so that if any unusual or unexpected events occur that result in adverse impacts to fish during operations, fish passage through the fishway would be switched to trap and haul operations.	Fish
Low-energy lighting would be provided in the fishway to determine if it aids in fish passage and to provide light for tunnel and fishway inspections. The system would be configured so that it mimics the photoperiod of the region, run manually on a dimming system, or be completely turned off at the option of the operator.	Fish
Fish salvage and relocation operations would be conducted any time the facility needs repair within the fishway, potentially during sediment removal, and potentially when streamflows recede from the accessway.	Fish
Post mining, the East Fork SFSR stream channel would be reestablished across the backfilled Yellow Pine pit with a channel design that would provide for upstream and downstream fish passage.	Fish
Perpetua would reestablish fish passage at the location of the existing box culvert on the East Fork SFSR just downstream of the confluence with Meadow Creek at the McCall-Stibnite Road (CR 50-412) crossing.	Fish
Perpetua would improve fish passage along the Burntlog Route within the SGP area by identifying and replacing existing collapsed, undersized, or otherwise degraded or poorly designed culverts at road crossings and committing appropriate resources to fix and improve these structures.	Fish
Perpetua would install side-ditching, culverts, guardrails, and bridges, where necessary along the Burntlog Route, with design features to provide fish passage and limit potential sediment delivery to streams.	Fish
Perpetua would employ blasting setback distances and other controlled blasting techniques following industry best management practices (modifying blasting variables including charge size, and vibration and overpressure monitoring) to minimize impacts to fish from blasting. Perpetua would follow up with monitoring in early stages of operation to evaluate effectiveness and refine blasting protocols in coordination with federal, state, and tribal agencies, if needed.	Fish
Dewatering of the Yellow Pine pit lake or stream segments would generally be conducted during low-flow periods to facilitate stream segment isolation and fish salvage. When practicable, dewatering also would be timed to avoid or minimize impacts during known spawning periods for Chinook salmon, steelhead, and bull trout.	Fish
To protect fish, Perpetua would develop a standard procedure for channel segment isolation, dewatering, fish salvage, and fish relocation to appropriate receiving streams during dewatering or maintenance of natural stream and diversion channels, based on the USFWS Recommended Fish Exclusion, Capture, Handling, and Electroshocking Protocols and Standards (USFWS 2012) and refined in coordination with federal, state, and tribal agencies.	Fish

Description	Resources Affected
The fishway operations and management plan (FOMP) defines the monitoring and evaluation plan elements and describes how the hydraulic conditions, fish use, and performance of the tunnel fishway would be measured and evaluated, and the design of the adaptive management component of the plan including the option of using trap and haul.	Fish
Access and SGP haul road crossings of fish bearing streams would be designed such that structures installed or constructed allow fish passage.	Fish and Wildlife
Perpetua would implement measures to limit stream baseflow effects during active operations, including a combination of lining key reaches of streams potentially impacted by pit dewatering, and treating and discharging pit dewatering water that is not used for ore processing or other industrial uses. Maintain instream flows for fish species and other aquatic resources: flows within natural stream channels affected by SGP operations would be maintained to meet seasonally appropriate and stream-specific low-flow needs to the maximum extent practicable. Perpetua would continue to evaluate options and measures to further avoid and minimize the magnitude and duration of effects of the SGP through other measures in consultation with federal, state, and tribal agencies.	Fish, Water Resources
Following permanent cessation of mining activities at the Yellow Pine pit, Perpetua would backfill the pit and route the East Fork SFSR over the backfilled pit with a longer, lower-gradient channel with higher intrinsic potential for Chinook salmon and steelhead spawning and rearing than the channel that exists presently. The floodplain area along the constructed channel would include side-channels and other off-channel features and would be revegetated to restore wetland and riparian habitat providing long-term shade and cover favorable to fish.	Fish, Wetlands
The Meadow Creek channel would be routed over the final TSF and TSF Embankment and Buttress, resulting in a long, relatively flat surface and a short, steep face. On top of the TSF surface, Meadow Creek would be contained within a broad floodplain corridor bound laterally by erosion-resistant terraces and vertically by a subsurface armor layer over a low-permeability stream liner.	Fish, Wetlands
Perpetua would stabilize and restore Blowout Creek. Blowout Creek wetland restoration would consist of restoring and enhancing palustrine aquatic bed (PAB), palustrine emergent (PEM), Palustrine scrub-scrub (PSS) wetlands that were impacted when a historical dam failed on Blowout Creek. Headcutting and shallow aquifer dewatering have impaired and reduced functions of the wetland vegetation classes. A grade control and groundwater cutoff structure is proposed to raise the water level in Blowout Creek as well as recharge the shallow groundwater system and reduce stream headcutting. A coarse rock drain would be constructed within the chute downstream of the failed dam to isolate the flow of Blowout Creek from the actively eroding chute side slopes and to prevent further erosion of the gully bottom, facilitating subsequent restoration of a surface channel on top of the drain. Perpetua would stabilize the steep, confined, erosive middle reach to address the significant fine sediment load currently produced from this reach and restore the downstream, relatively low-gradient reach.	Fish, Wetlands, Water Resources
Perpetua would lead annual site visits for USACE, EPA, IDFG, and other interested agency personnel as needed to facilitate agency review of mitigation areas if desired. Final reporting and data archival requirements would be subject to permit conditions; however, it is anticipated that until the USACE concurs that mitigation sites meet success criteria, monitoring reports would be prepared by Perpetua annually and submitted to USACE Walla Walla District, EPA, IDFG, IDL, National Oceanic and Atmospheric Administration (NOAA) Fisheries, USFWS, the Forest Service, and other interested agencies, SGP partners, and stakeholders. After success criteria are met, permit conditions will set the frequency for long-term monitoring and reporting.	Fish, Wetlands, Water Resources

Description	Resources Affected
Perpetua would repair and rehabilitate habitats adversely affected by historical mining impacts in the SGP area within the disturbance footprint of the modified mine plan.	Fish, Wetlands, Water Resources
Minor surface improvements (e.g., ditch and culvert repair, adding gravel, winter snow removal, and summer dust suppression) would occur on the Yellow Pine Route to reduce sediment runoff and dust generation.	Fish, Wildlife, Water Resources
Implementation of an avalanche hazard management program that "could" include avalanche control and/or road closure. Also proposed is daily region-scale assessments; daily weather observations including snowpack and avalanches; notifying SGP staff of highly unstable conditions; closing roads during periods of elevated hazard or blocked roads; and mitigating the avalanche hazard with explosives. Section 7.2 of DAC (2021) provides a description of an active avalanche monitoring and mitigation program that has more specific descriptions of the components that could be included in an SGP-specific plan. Section 8.0 of DAC 2021) includes a discussion of avalanche mitigation likely to be necessary for the avalanche paths identified and this should be included in the program discussed above. Perpetua would provide for Forest Service review of a written avalanche monitoring and mitigation program that could be implemented for the SGP.	Geotechnical Hazards
Construction and operation of snow catchment areas for smaller avalanche paths. Section 7.3 of DAC (2021) includes a more detailed discussion of specific locations and design characteristics for ditches and catchment areas to reduce avalanche impacts to roads. Perpetua would review this information and current road designs to provide for Forest Service review of specific designs and maintenance and operating plans for said ditches and catchment areas along the selected access route.	Geotechnical Hazards
Avalanche structural defense options that could be beneficial in the SGP mine site to protect high-value, stationary facilities from avalanche hazards. Perpetua would review this information and provide the Forest Service with any recommendations for implementing structural avalanche defenses in at the SGP mine site.	Geotechnical Hazards
Perpetua would increase the ground limestone dosage to the pre-oxidized concentrate as it is fed into the autoclave to address the potential for creation of soluble arsenic. By decreasing the free acid levels (increasing the pH) in the autoclave by increasing the ground limestone dosage in the autoclave feed increases the quantity of crystalline (stable) arsenic compounds in the resultant slurry with a proportional decrease in the quantity of amorphous (unstable) arsenic compounds.	Hazardous Materials
Perpetua would monitor levels of soluble arsenic in the tailings. If soluble arsenic levels are higher than anticipated, Perpetua would treat the oxidized concentrate with HAC prior to neutralization.	Hazardous Materials
The ore processing area would be designed to provide for containment of ore processing materials, chemicals, wastes, and surface runoff. Potentially hazardous chemicals and wastes would be stored within buildings or areas with both primary and secondary containment. Surface runoff within the ore processing area would be directed to a contact water pond for collection. Leaks or spills escaping primary and secondary containment would flow to the contact water pond for collection and would not discharge off site.	Hazardous Materials
The processing circuit would be housed in a steel frame building set on concrete foundations with interior curbing to provide secondary containment; the interior curbing would be high enough to contain 110 percent of the volume of the largest tank.	Hazardous Materials

Description	Resources Affected
The gold and silver leaching circuit would be designed and operated consistent with the International Cyanide Management Institute Code (ICMC) (https://www.cyanidecode.org) and the Initiative for Responsible Mining Assurance (IRMA) Standard for Responsible Mining (https://responsiblemining.net/resources/). Accordingly, impermeable secondary containment for cyanide unloading, storage, mixing and process tanks shall be sized to hold a volume at least 110 percent of the largest tank within the containment and any piping draining back to the tank, with additional capacity for the design storm event, if applicable. Pipelines containing process water or process solution shall also use secondary containment in combination with audible alarms, interlock systems, and/or sumps as spill control measures.	Hazardous Materials
Cyanide-bearing solutions used in ore processing would be neutralized to approximately 10 milligrams per liter weak acid dissociable (WAD) cyanide before the material is pumped to the TSF. Residual cyanide would be treated using a sodium metabisulfite and air system to detoxify the cyanide by oxidation to form cyanate.	Hazardous Materials
Cyanide would be neutralized to levels protective of wildlife, and the TSF would be surrounded by an 8-foot high, chain-link fence designed to keep wildlife, such as deer and elk, from entering the impoundment area, to prevent either liner damage or wildlife drowning.	Hazardous Materials
Oils, solvents, and lubricants would be stored in approved containers located within, or directly adjacent to, the maintenance shop and contained within secondary containments to prevent spills into the environment. All used petroleum products, waste antifreeze, and used solvents would be collected in approved containers, transported off site, and disposed or recycled.	Hazardous Materials
Nitric and sulfuric acid would be transported in tanks designed to prevent spills even in the event of rollovers.	Hazardous Materials
Nitric and sulfuric acids would be stored in specialized non-corrosive, polyethylene-lined tanks located within the ore processing facility and would have secondary containment.	Hazardous Materials
Liquids would be shipped to the SGP in tank trucks designed for spill prevention and escorted to the SGP by pilot cars manned and equipped to handle spills.	Hazardous Materials
Other legacy materials may be encountered during construction and operations. If encountered, these materials would be characterized to determine potential for reprocessing, reuse, or disposal.	Hazardous Materials
Small scale composting associated with organic materials generated at the worker housing facility may be incorporated within the centralized GMS in the Fiddle valley.	Hazardous Materials
An Explosives and Blasting Management Plan would be prepared for the SGP. Explosives storage, transport, handling, and use would comply with applicable Department of Homeland Security, Bureau of Alcohol, Tobacco, Firearms and Explosives, and MSHA regulations.	Health and Safety
For safety and security reasons, no alcohol, firearms, or illegal drugs would be permitted on site.	Health and Safety
For safety and security reasons, public access into the mine area would be prevented by using fencing, gate locking, security personnel, and/or notice postings that prohibit unauthorized entry; no unauthorized vehicles or personnel would be permitted on the SGP.	Health and Safety
Personnel transporting, handling, or using any hazardous chemicals (including sodium cyanide) would be trained to ensure the safe use of such materials. Perpetua would design, construct, and manage facilities to conform to ICMC.	Health and Safety, Fish, Wildlife, Hazardous Materials

Description	Resources Affected
Fuel and other petroleum products at the site would be stored in above ground containment structures, with appropriate secondary containment measures.	Health and Safety, Fish, Wildlife, Hazardous Materials
Air emissions, groundwater, surface water, and aquatic parameters would be monitored during mine construction, operation, closure, and post-closure as specified in the final authorizations from the regulating agencies.	Monitoring
Monitoring would be conducted following the completion of closure and reclamation of all facilities and disturbance areas to demonstrate compliance with permit requirements and to measure the success of reclamation and mitigation.	Monitoring
The draft EMMP includes the following plans for monitoring aquatic resources: Stream and Wetlands Monitoring and Management Plan and Fisheries and Aquatic Habitat Monitoring and Management Plan.	Monitoring
The ore processing facility building would be enclosed.	Noise, Wildlife, Health and Safety
Appropriate sound dampening and muffling equipment would be utilized to minimize noise excursion from equipment and facilities. When possible, schedule high noise activities at the same time. Monitor and maintain equipment to reduce noise related impacts.	Noise, Wildlife, Health and Safety
When practicable, pumps, generators, and engines would be turned off when not in use to avoid unnecessary noise generation and reduce energy consumption.	Noise, Wildlife, Health and Safety
Electric line power would be utilized during operations to eliminate diesel generator noise, except in emergency situations when grid power is down or temporary use in remote areas where it is not practical to run power lines.	Noise, Wildlife, Health and Safety
An 8-mile temporary 16-foot-wide groomed OSV route would be created adjacent to Johnson Creek Road between Landmark and Trout Creek Campground during construction of the Burntlog Route.	Recreation
A 16-foot-wide groomed OSV route would be created south of Warm Lake Road to connect the southern end of Johnson Creek Road to the Landmark-Stanley Road. This 0.3-mile route would be used throughout construction and operations.	Recreation
During construction, approximately 11 miles of groomed OSV route would be maintained along Cabin Creek Road (FR 467).	Recreation
Suitable surface coatings or exterior design features would be used on SGP buildings and other structures to reduce visual impacts.	Scenic Resources
Lighting would be managed within active mining areas to avoid unintended lighting of natural, wildlife usage areas. External lighting would be kept to the minimum required for safety and security purposes. Lights would be directed down toward the interior of the SGP and shielded, where appropriate.	Scenic Resources, Wildlife
Approximately 37 percent of the reclamation would be done concurrent to mining and ore processing; the remaining 63 percent would be accomplished during closure.	Soils, Reclamation
The Yellow Pine pit would be backfilled with West End pit development rock during operations.	Soils, Reclamation
A sinuous channel would be constructed through the backfilled area for the reconstructed East Fork SFSR with an average valley gradient approximating the historical, pre-disturbance river gradient.	Soils, Reclamation
The backfill would be placed to achieve a mounded final reclamation surface to promote drainage away from the West End pit and prevent formation of a pit lake within Midnight pit.	Soils, Reclamation

Description	Resources Affected
The floor of the sidehill pit southwest of the main West End pit would be graded to drain, covered with growth media, and revegetated.	Soils, Reclamation
Perpetua would begin with placement of soil and rock cover material, then construct wetlands and restore Meadow Creek and its tributaries within appropriately sized lined floodplain corridors, place growth media, and revegetate the area.	Soils, Reclamation
Hangar Flats pit would be fully backfilled with development rock to the valley bottom elevation or slightly higher during mine operations. There would be no Hangar Flats pit lake.	Soils, Reclamation
Once all final mine closure and reclamation work has been completed, Perpetua would reduce the 21-foot-wide travel way of 19.8 miles of Burntlog Road (FR 447), 1.3 mile of Meadow Creek Lookout Road (FR 51290), and 2.0 miles along Thunder Mountain Road (FR 375) of Burntlog Route to their approximate pre-mining width.	Soils, Reclamation
The approximately 15 miles of Burntlog Route connecting to Meadow Creek Lookout Road (FR 51290) and Thunder Mountain Road (FR 50375) would be decommissioned.	Soils, Reclamation
Following mining and ore processing operations, unless they are taken over by a third-party for ongoing use and maintenance, the Burntlog Maintenance Facility buildings would be removed. The sewer system and septic tanks for the facility would be decommissioned. Soil and rock beneath fuel storage areas and chemical storage buildings would be tested for contamination. All petroleum products, solvents, and other hazardous or toxic materials would be removed from the site and disposed of according to applicable state and federal regulations. After demolition of the buildings and facilities, the site would be graded, and drainage restored.	Soils, Reclamation
Perpetua would manufacture growth media material using fines from glacial till sources mined from the Yellow Pine pit, available mulched vegetation, and off-site composted material.	Soils, Reclamation
Planting, seeding, and mulching would be conducted in the fall and early winter to take advantage of snowpack and springtime moisture. Where cover crops are used in lieu of mulch, seeding would occur in the spring or fall followed by seeding of the permanent mixture.	Soils, Reclamation
Reclamation monitoring would begin during concurrent reclamation at SGP facilities. Quantitative and qualitative monitoring of reclamation success would begin the first growing season after final reclamation is completed and would continue until success criteria are satisfied.	Soils, Reclamation
Soil stability would be estimated for all reclaimed areas using qualitative descriptors.	Soils, Reclamation
Slope stability would be monitored during the erosion inspections.	Soils, Reclamation
If the performance of reclaimed areas is not satisfactory, appropriate maintenance activities would be implemented. Maintenance activities may include one or more of the following: • Sediment removal from sediment basins, stormwater drainage channels, and diversions as necessary to maintain their design capacity; • Diverting surface water away from reclaimed areas where erosion jeopardizes attainment of reclamation standards; • Stabilizing rills, gullies, and other erosion features or slope failures that have exposed development rock; • Noxious weed and invasive plant species control; and, • Re-seeding or re-applying reclamation treatments in areas where it is determined through monitoring and agency consultation that reclamation would not meet standards.	Soils, Reclamation

Description	Resources Affected
Perpetua would submit an annual report to the USFS and the other federal and state agencies that are responsible for issuing authorizations applicable to reclamation for the preceding calendar year. The annual report would contain descriptions of the reclamation activities completed during the previous year, a summary of areas reclaimed, a discussion of the results of the reclamation monitoring conducted, and corrective actions implemented.	Soils, Reclamation
A new 12-foot-wide gravel road would be constructed to provide public access from Stibnite Road (FR 50412) to Thunder Mountain Road (FR 50375) through the SGP. During operations, the public access road would be used to travel through the SGP and would provide seasonal use, open to all vehicles. Vehicles passing through the SGP would be required to check-in with mine personnel at the North or South SGP entry points.	Transportation and Access, Health and Safety
Post reclamation, a road would be established over the backfilled Yellow Pine pit to allow public access through the reclaimed site and connect Stibnite Road (FR 50412) to Thunder Mountain Road (FR 50375). This would replace the operational phase public access route.	Transportation and Access
Prior to site preparation and construction of surface facilities, vegetation would be removed from operating areas. Trees and deadwood, shrubs, and slash not needed to construct windrows at the edge of Burntlog Route disturbance (to function as sediment barriers), would be chipped, and suitable soil would be separately salvaged and stockpiled (except for a small portion that would be 'live handled') for use as part of site reclamation and restoration. Portions of the salvaged soil would be blended with the chipped wood to create growth media. All growth media placed in stockpiles would be stabilized, seeded, and mulched to protect the stockpiles from wind and water erosion.	Vegetation
Perpetua would inspect and remove vegetation material (including noxious weeds) from mechanical equipment and properly dispose to minimize the spread of unwanted vegetation.	Vegetation
Wood wastes and wood mulch are the two primary sources of compost. Food waste produced from on-site meal preparation and wastes may provide another source. Combined and properly managed during composting, these materials would provide a source of organic matter to be blended into substrate materials suitable for mitigation.	Vegetation
Perpetua would be responsible for noxious weed control within areas disturbed by SGP activities.	Vegetation, Wildlife
Develop and employ planting plans for wildlife benefits (cover, forage, etc.) using approved seed mixes.	Vegetation, Wildlife
Perpetua would use aquatic safe herbicides during vegetation management activities and noxious weed control. Adhere to chemical label restrictions, Federal and State rules on usage. Use proper equipment for chemical application by trained personnel.	Vegetation, Fish
Perpetua or its designated contractor(s) would perform long-term maintenance as necessary, including maintaining and monitoring the Mitigation Area (including stream and wetlands) in perpetuity once the final performance standards are met or until such responsibility is relinquished to an appropriate third party (Forest Service, etc.) as approved by the USACE.	Vegetation, Wetlands
Perpetua would plant stream reclamation reaches and wetland reclamation areas with native plant species that are present in PAB, PEM, PSS, and palustrine forested wetlands and riparian areas along streams throughout the Mitigation Area.	Vegetation, Wetlands
To address stream temperature, riparian planting widths along restored and enhanced stream reaches would be 18 feet wide on each stream bank where possible. Taller and denser vegetation such as spruce trees would be planted. Further, the creation of the lined Stibnite Lake, a feature similar in size to the present Yellow Pine pit lake, would replace the function of the existing Yellow Pine pit lake in buffering stream temperature extremes and reduce maximum stream temperatures in East Fork SFSR in and downstream of the SGP.	Vegetation, Wetlands, Surface Water, Reclamation

Description	Resources Affected
Pre-construction water management activities would include the installation of surface water management features and implementation of best management practices to reduce erosion and sediment delivery to streams. These water management features and best management practices could include sedimentation ponds; run-on water diversion ditches, trenches, and/or berms; runoff water collection ditches; silt fence; water bars; culverts; energy dissipation structures; terraces; and other features specified in construction permits.	Water Resources
Stormwater runoff from undisturbed areas upslope of mine features in the major drainages would be captured in the stream diversion channels described above or in other channels that would direct runoff away from disturbed areas. Smaller-scale diversion channels or earthen berms would be used, where necessary, to divert stormwater around other mine infrastructure.	Water Resources
Stormwater drains, ditches, and stream channels would be protected against erosion through a combination of adequate dimension, appropriate gradient, riprap, fabric- encapsulated soil lifts, or other stabilization materials. Diversions would be sized for a peak flow recurrence interval appropriate to the risk level of the facility, in recognition of other water management measures and fail-safes in place (excess flood storage and freeboard in the TSF, etc.), and in accordance with regulatory standards.	Water Resources
Existing streams that run through areas proposed for mining related disturbance would be diverted to prevent generation of contact water or commingling of contact and non-contact water, keeping clean water clean; and to prevent flooding of mine facilities by runoff generated off site.	Water Resources
Groundwater pumped from the dewatering wells would be considered to be contact water and would be managed through forced evaporation or active water treatment when the volume of pumped water exceeds the ore processing facility demand.	Water Resources
Channel segments constructed over fill or excavated in permeable materials would be constructed over a geosynthetic liner to reduce seepage. A transition layer of sand and gravel followed by riprap or similar would be placed over the liner for erosion protection.	Water Resources
Secondary containment for pipelines would consist of an open geosynthetic-lined trench, pipe-in-pipe, or backfilled geomembrane-wrapped trench, depending on location, and the pipeline corridor would drain to one of two pipeline maintenance ponds – one at the truck shop and one at the ore processing facility.	Water Resources
A lined tailings pipeline maintenance pond would be located at the ore processing facility, to which tailings and process water in the tailings distribution or water reclaim pipelines would drain by gravity during maintenance shutdowns or if there is a leak in either pipeline. The pond would typically be empty except during maintenance or unforeseen problems with the tailings pipeline, pumping system, or TSF. The pond is designed to contain the contents of the pipelines and the runoff from the pond and lined pipeline corridor from a 100-year, 24-hour storm event plus snowmelt.	Water Resources
Underdrain collection sumps and downgradient monitoring wells would be used for TSF leak detection.	Water Resources
Water treatment would continue until metal concentrations from each source have stabilized at levels that meet water quality standards for discharge.	Water Resources
A truck wash facility would include an oil and water separation system and water treatment facilities to enable reuse of the wash water.	Water Resources
During mine operations, summer low flows in perennial diversion channels around the TSF impoundment and buttress (Meadow Creek), Yellow Pine pit (Hennessy Creek and East Fork SFSR diversion tunnel), and West End pit (West End Creek) would be piped underground as a mitigation measure to maintain cold stream temperatures.	Water Resources

Description	Resources Affected
Hennessy Creek flow would be disconnected from the current unlined ditch passing alongside the Northwest Bradley dumps.	Water Resources
A liner would be installed under the Meadow Creek stream and floodplain corridor to minimize water seepage into the Hangar Flats pit or the pit dewatering well system, and to avoid potential pit wall instability or loss of stream habitat as a result of stream dewatering.	Water Resources
The underdrain system would convey spring and seep flows beneath both facilities to a collection sump at the buttress toe where the flows would be monitored for water quality prior to release into the stream system or capture for use in the processing circuit or treatment prior to discharge, depending on water quality.	Water Resources
Crushed rock would be placed on SGP access roads as needed to provide a durable surface and limit sediment transport.	Water Resources, Fish, Soils
Road surfaces throughout the SGP would be stabilized and managed to minimize transport of sediment, dust, and other materials, especially near watercourses through appropriate road engineering, surface drainage, watering, and application of dust control binding agents (magnesium chloride, lignin sulfonate, etc.), roadside ditching, road-cut stabilization, road surface maintenance, appropriate speed limits, and by limiting traffic.	Water Resources, Fish, Soils
During operations, runoff generated from direct precipitation on the TSF would be retained in the TSF water pool for reclaim to the ore processing circuit.	Water Resources, Fish, Wildlife, Wetlands
Riparian fringe and floodplain wetlands would be established on the broad, gently sloping floodplains on both sides of the reclaimed stream channels.	Wetlands
Valley margin wetlands would only be established where there is an upgradient water source sufficient to produce enough saturation and near surface water tables for wetland conditions.	Wetlands
Wetland reclamation would begin after the end of mine construction, with the first reclaimed wetlands occurring in the Blowout Creek drainage. Additional reclamation would occur in and after operational year 3 and continue through operations to closure year 25.	Wetlands
Salvaged O and A horizon soils from wetland or hydric soils (seed bank materials over or in combination with mineral soils uplands and wetland subsoils (growth media) would be used to create wetland soil conditions.	Wetlands
During Burntlog Route and SGP haul road construction and use, Perpetua would install and maintain sediment control measures and devices, such as culverts, culvert inlet protection devices, ditching, silt fencing, straw wattles, straw bales, and sediment catch basins.	Wetlands, Fish, Wildlife
Erodible cut and fill slopes along roads would be mulched, hydro-seeded or have durable rock inlay material to minimize the potential for sediment generation.	Wetlands, Fish, Wildlife
During winter road maintenance, Perpetua would remove snow from the Burntlog Route and haul roads at the SGP and the temporary construction access Yellow Pine Route. Perpetua would avoid disposal of snow in riparian areas, wetlands, or areas where snowmelt might cause road damage or erosion during spring melt. Care would also be taken to dispose of collected snow, which may contain sand or gravel, in a manner that avoids impacts to nearby streams and rivers.	Wetlands, Fish, Wildlife
Perpetua would use coarse sand (with less than 20 percent fines) for winter sanding of the main access road and SGP haul roads in combination with a fine to medium gravel as needed, (approximately 1/4 - 5/8-inch sizing).	Wetlands, Fish, Wildlife
Perpetua would salvage and preserve the growth media and seedbank materials of wetlands and riparian areas that would be impacted by the SGP. These salvaged soils, containing native seed banks, would be used to aid in establishment of wetland and riparian vegetation in the stream and wetland reclamation areas.	Wetlands, Vegetation

Description	Resources Affected
Soil would be amended with additional compost and other sources of organic matter necessary to successfully reclaim wetlands at the SGP.	Wetlands, Vegetation
Perpetua would maintain a recycling program at the SGP.	Wildlife
In order to reduce attractants, during construction and operations, trash and other miscellaneous inert (non-hazardous) garbage would be contained in on-site wildlife-resistant containers and hauled to the Valley County waste transfer station for disposal. Used oils, solvents, grease, and antifreeze would be handled separately from normal trash and garbage. Good housekeeping practices would include minimizing loose trash, odors, and access for wildlife to trash storage or disposal areas and prompt removal of trash.	Wildlife
Implement an Avian Protection Plan at the SGP for transmission lines, including designing power lines and poles to minimize potential bird mortalities due to electrocution. Develop procedures for managing nests of protected species on utility structures (if nests are built).	Wildlife
Construct and operate all overhead powerlines and transmission lines and related facilities in accordance with APLIC suggested practices (APLIC 2012) as described in Idaho Power's Avian Protection Plan.	Wildlife
Electric power structures to serve the SGP facilities would be designed and constructed to avoid raptor perching on structures for predation purposes and minimize the risk of their being electrocuted.	Wildlife
Perpetua would install a wildlife exclusion fence around the TSF, process facility areas, and related process ponds in order to reduce the potential for mortalities.	Wildlife
Perpetua would plan routine inspections of TSF facilities for wildlife use. If needed, Perpetua would implement measures to remove wildlife and install additional BMPs to reduce wildlife exposure to these areas.	Wildlife
If critical wildlife zones or corridors are identified, restricted or seasonal access would be established prior to construction or expansion activities to the extent practicable. Physical barriers and/or signage would be added identifying these areas and site-specific measures would be implemented to minimize impacts.	Wildlife
Perpetua would implement an animal trapping and relocation plan, as necessary, for nuisance species for safety of staff, visitors, and animals.	Wildlife
Perpetua would install fences along and around the ore processing facilities, TSF, explosive storage areas, and composting and landfill, excluding pit perimeters and high walls.	Wildlife
Perpetua would install signs of known wildlife crossing and usage areas along access and SGP haul road corridors and all active facility areas. Locations are yet to be determined but signs would be installed to state the road name and mile markers where these corridors are known to exist. These would also be referenced in the training materials.	Wildlife
Perpetua would provide tiered training for awareness, sighting, operations and maintenance, and restoration. Cross training to include noxious weeds, maintenance needs, unsafe conditions, etc., as well as reporting mechanisms. All mine personnel and visitors would receive some level of training tiered appropriately based on where they are working, type of work activities, and reason for mine visit. Forms would be developed to document training and identify how often training needs to be refreshed. Fact sheets would be developed on known wildlife in the area including pictures, warnings, and what to do if encountered.	Wildlife

Description	Resources Affected
Perpetua would design and manage the TSF and associated facilities to reduce wildlife attraction. These include the following: • Surface area of the supernatant pond would be minimized to the extent practical. • Install an 8-foot fence around the TSF facility to exclude wildlife from the facility. • Implement an avian mortality reporting system for the TSF and contact water ponds. • Use skirting to enclose open spaces as necessary beneath raised structures as practical. • Follow the ICMC to avoid features possibly attractive to wildlife, as feasible.	Wildlife
Erosion control techniques at the SGP would include mulching, wetland sodding; planting of vegetation to stabilize slopes; and use of silt fences, biofilters, brush mats, erosion control fabric, and/or fiber rolls along temporary swales, perimeter dikes, and stream banks. In addition, to minimize human disturbance, permanent signage would be posted around the perimeter of individual project sites to prohibit unauthorized foot traffic and the use of all-terrain vehicles and motorbikes, dumping, draining, and cutting and/or removal of plant materials.	Wildlife
Sumps would be constructed with at least one side having a shallow grade for wildlife egress. Sumps would be backfilled and reclaimed when no longer needed for drilling.	Wildlife
Mine site facilities would be monitored in accordance with the draft EMMP for the presence and potential mortality of birds, mammals, reptiles, and amphibians. Sightings of rare or sensitive wildlife, along with any wildlife mortalities, would be recorded and provided in periodic reports to the Forest Service, USFWS, and IDFG.	Wildlife
Perpetua would provide mine personnel with mobile deterrents to avoid conflicts with wildlife – sprays, air horns, etc.	Wildlife
Perpetua would establish and post speed limits for the Burntlog Route, SGP haul roads, and light vehicle access roads on the SGP site. Slower speed limits would be posted at known wildlife crossings and along defined migratory corridors during migration season.	Wildlife, Health and Safety
There would be no hunting or discharge of firearms during construction and operations within the SGP area. The SGP site would be posted to prohibit hunting, and employees would be prohibited from carrying firearms on the SGP.	Wildlife, Health and Safety
Perpetua would employ vegetation maintenance for safety along roads, removal of hazard trees, and riparian conservation areas, etc. – coordinate such that wildlife protection and restoration are incorporated during maintenance.	Wildlife, Health and Safety

2.4.9.1 Agency Identified Mitigation

The Burntlog Route provides operating and closure period access to the mine area allowing for the safe transportation of employees, consumables, products, and hazardous materials to and from the mine area. As such, transportation safety considerations have been incorporated into the Burntlog Route design and construction that include road grade (i.e., slope), width, turning radii, cut and fill slope angles, speed limits, construction materials, avalanche risk mitigation, maintenance practices, and other elements. The road design also takes into account potential effects on wilderness areas, streams, fish passage, wetlands, heritage resources, wildlife and wildlife habitat, and vegetation. As such, the road design is constrained by numerous factors that may conflict. Therefore, the road design prioritizes safe transportation conditions that minimize the risk associated with traffic incidents that have the potential to affect human health and safety plus the release of hazardous materials to the environment. Further, the road design avoids designated wilderness areas. While maintaining safe transportation conditions and avoiding

designated wilderness areas, it may not be feasible or reasonable to modify the road footprint to avoid effects on other environmental resources. In instances where avoidance is not feasible or reasonable, effects on environmental resources would be minimized or restored by EDFs, reclamation, or mitigation measures incorporated into the SGP to offset those effects. Regulatory requirements and EDFs are compiled in **Tables 2.4-12** and **2.4-13**, respectively, and mitigation measures are described in their associated resource section in **Chapter 4**, including measures associated with wildlife and wildlife habitat, vegetation, fish passage, water quantity, water quality, stream temperature, and sedimentation.

Once environmental impacts are identified and described, mitigation measures are considered. Mitigation measures required by the Forest Service would represent reasonable and effective means to reduce the impacts identified in the resource analysis or to reduce uncertainty regarding the forecasting of impacts into the future. If environmental impacts are inevitable, certain regulatory programs may require compensatory mitigation of the impacts. Any mitigation measures are in addition to the regulatory requirements (**Table 2.4-12**) and project design features (**Table 2.4-13**) accounted for in the impact analysis.

2.4.9.2 Stibnite Gold Mitigation Plans

The potential impacts of the SGP remaining after applying the avoidance and minimization measures were addressed by Perpetua on a resource-basis by further avoidance, minimization, and/or compensatory mitigation described in proponent-proposed specific resource mitigation plans. The following mitigation plans have been developed for the SGP:

- Stibnite Gold EMMP (Brown and Caldwell 2021c);
- Fisheries and Aquatic Resources Mitigation Plan (Brown and Caldwell, Rio Applied Science and Engineering, and BioAnalysts, Inc. 2021b);
- Fishway Operations and Management Plan (Brown and Caldwell, McMillen Jacobs Associates, and BioAnalysts 2021a); and
- Compensatory Stream and Wetland Mitigation Plan (Tetra Tech 2023).

Below is a brief discussion of each of these accompanying resource-specific plans.

Following the ROD, Perpetua would integrate all required Forest Service requirements and mitigation commitments into the current draft EMMP (Brown and Caldwell 2021c). This EMMP consists of a program framework and appendices containing component monitoring and management plans. Perpetua would use the EMMP to guide monitoring, document permit compliance, implement impact reduction procedures, and address adaptive management thresholds and responses where impacts and mitigation effectiveness carry substantial uncertainty.

Fisheries and Aquatic Resources Mitigation Plan

Perpetua's FMP (Brown and Caldwell, McMillen Jacobs, and BioAnalysts 2021a) describes the measures that Perpetua has proposed to minimize adverse impacts on fisheries and aquatic resources, with particular attention to fish species listed as threatened under the ESA: Columbia River bull trout (*Salvelinus confluentus*), Snake River spring/summer Chinook salmon (*Oncorhynchus tshawytscha*), and Snake River Basin steelhead (*Oncorhynchus mykiss*). The FMP also addresses westslope cutthroat trout

(Oncorhynchus clarkii lewisi), considered a sensitive species by the Forest Service and IDFG, and other resident fish species.

The FMP actions would begin during construction and continue throughout mine operations and into closure and reclamation. It is focused on Chinook salmon, steelhead, bull trout, and Westslope cutthroat trout, but would also have benefits for other fish and aquatic species. The FMP includes water quality protection; fish protection, salvage, and relocation during diversions and dewatering activities; a process of protection and salvage for draining of the Yellow Pine pit; measures to avoid impacts during blasting; monitoring streamflow; restoring passage in stream channels with fish passage impediments; and monitoring of fish and aquatic biota. The FMP and its components continue to be refined in consultation with natural resource and regulatory agencies.

Fishway Operations and Management Plan

Perpetua has proposed a fishway for safe upstream and downstream passage of anadromous and migratory fish in the East Fork SFSR during construction and mine operations, to be part of the tunnel that diverts the East Fork SFSR around the Yellow Pine pit.

Perpetua's FOMP (Brown and Caldwell, McMillen Jacobs Associates, and BioAnalysts, Inc. 2021a) outlines the operation of the fishway and monitoring for effective fish passage as well as an adaptive approach to provide for fish trap and haul operations as an alternative, using the same facilities. Fish protection measures for the East Fork SFSR diversion tunnel and Yellow Pine pit dewatering are outlined as well, such as a temporary fish barrier downstream of the Yellow Pine pit during tunnel construction, carefully sequenced dewatering of the Yellow Pine pit, and start of fishway operations (Brown and Caldwell, McMillen Jacobs, and BioAnalysts 2021b).

Measures to avoid and minimize impacts to fish habitat are detailed in the FMP and FOMP (Brown and Caldwell, Rio ASE, and BioAnalysts 2021b and Brown and Caldwell, McMillen Jacobs, and BioAnalysts 2021a). As listed above, these measures including the following:

- Water quality protection - measures designed on managing contact and non-contact water to maintain and improve water quality while supplying sufficient water for mining and ore processing. Diversions, ditches, and other mine facilities would be lined and/or water collected and treated to protect water quality. Riparian corridors would be restored and enhanced, and certain diversions piped, to reduce stream temperatures. Water treatment would continue during both operations and the post-closure phase.
- Fish protection, salvage, and relocation during dewatering and diversions - measures for screening or excluding of fish from diversion channels, water withdrawals, low-flow pipes, and the Yellow Pine pit dewatering to exclude and protect fish. Work windows have been developed based on fish periodicity to account for the different life stages of the targeted fish species. During diversions and dewatering activities in fish bearing streams, fish handling and salvage protection measures have been identified to safely isolate, collect, handle, and transport the fish.
- Trap and haul protocols at the fishway (if needed) - the primary goal is operating and maintaining the East Fork SFSR fishway during construction and operations and later in the mine life by restoring the East Fork SFSR stream channel over the backfilled Yellow Pine pit to provide permanent, volitional upstream and downstream fish passage and access to important stream habitats of the upper East Fork SFSR and portions of Meadow Creek. If fish are not able to use

the fishway during any period, trap and haul procedures have been developed to safely collect, handle, and move fish upstream of the fishway.

- Avoidance measures during blasting activities - measures to largely avoid or minimize the potential effects from blasting activities using appropriate setback distances from aquatic habitats to limit blast-related air overpressure and ground vibrations to harmless levels. Other additional blasting techniques can also be used to reduce these levels, and BMPs and site-specific modification of methods can further minimize or prevent damage to fish and the aquatic environment.
- Monitoring streamflow - activities for maintaining, to the extent practicable, appropriate streamflows and streamflow monitoring in natural or restored channels where fish are present.
- Stream restoration and enhancement - design elements for stream restoration and enhancement based on natural channel design principles intended to restore permanent fish passage at Yellow Pine pit, improve fish habitat site-wide for spawning and rearing salmonids, and provide a net ecological benefit relative to current conditions.
- Restoring passage in stream channels - removing existing passage barriers within the mine site to allow for fish movement between streams and areas of the mine site where access is currently blocked or impeded within the SGP footprint as well as along the Burntlog Route.
- Monitoring fish and aquatic biota - provide the data necessary to evaluate how the various mitigation and protection measures are implemented, and to assess the status and trends and ongoing effectiveness. To address the potential for variances in the outcome of these measures, an adaptive management approach is outlined that would provide the mechanism to modify or adjust these measures or approaches in response to monitoring and evaluation as well as new information or technologies that may become available over the more than 20 years of construction, mining, reclamation, and restoration.

Compensatory Stream and Wetland Mitigation Plan

Construction of the SGP would permanently impact wetlands and other WOTUS subject to regulation under Section 404 of the CWA and requires a Department of the Army (DA) permit pursuant to Section 404. Perpetua's Compensatory Stream and Wetland Mitigation Plan (CMP) (Tetra Tech 2023) provides detailed descriptions of proposed restoration, establishment, enhancement, and/or preservation of aquatic resources to compensate for unavoidable impacts to WOTUS associated with activities that would be authorized by a DA permit. The CMP can be updated and revised until the USACE has determined all mitigation requirements. The CMP demonstrates the feasibility of achieving the amount and types of mitigation to offset the impacts in a manner consistent with the 2008 Mitigation Rule. The CMP provides detailed descriptions of proposed restoration, establishment, enhancement, and/or preservation of aquatic resources to compensate for unavoidable impacts to WOTUS associated with activities that would be authorized by a DA permit (Tetra Tech 2023). In addition to proposed on-site mitigation activities to address the loss of wetlands function and off-site mitigation activities, off-site stream channel restoration and enhancement activities are proposed along the upper Lemhi River to address the temporal lag between the loss of on-site wetlands function and its on-site restoration.

The CMP describes mitigation to address the requirements of the USACE and EPA under the Compensatory Mitigation for Losses of Aquatic Resources under CWA Section 404 (Final Rule). The CMP includes the 12 required elements of compensatory mitigation plans (33 CFR 332.4(c)/40 CFR

230.94(c)): objectives, maintenance plan, site selection, performance standards, site protection, monitoring requirements, baseline information, long-term management plan, determination of credits, adaptive management plan, mitigation work plan, and financial assurances.

The completed CMP would be approved by the USACE Regulatory Division—Walla Walla District, Boise Field Office, in compliance with the CWA Section 404/DA permit, stream and wetland delineations and jurisdictional determinations, development of the stream functional assessment for USACE-approved stream functional analysis, wetland and stream credits and debits determinations, and compliance with USACE's 404(b)(1) Guidelines (40 CFR Part 230).

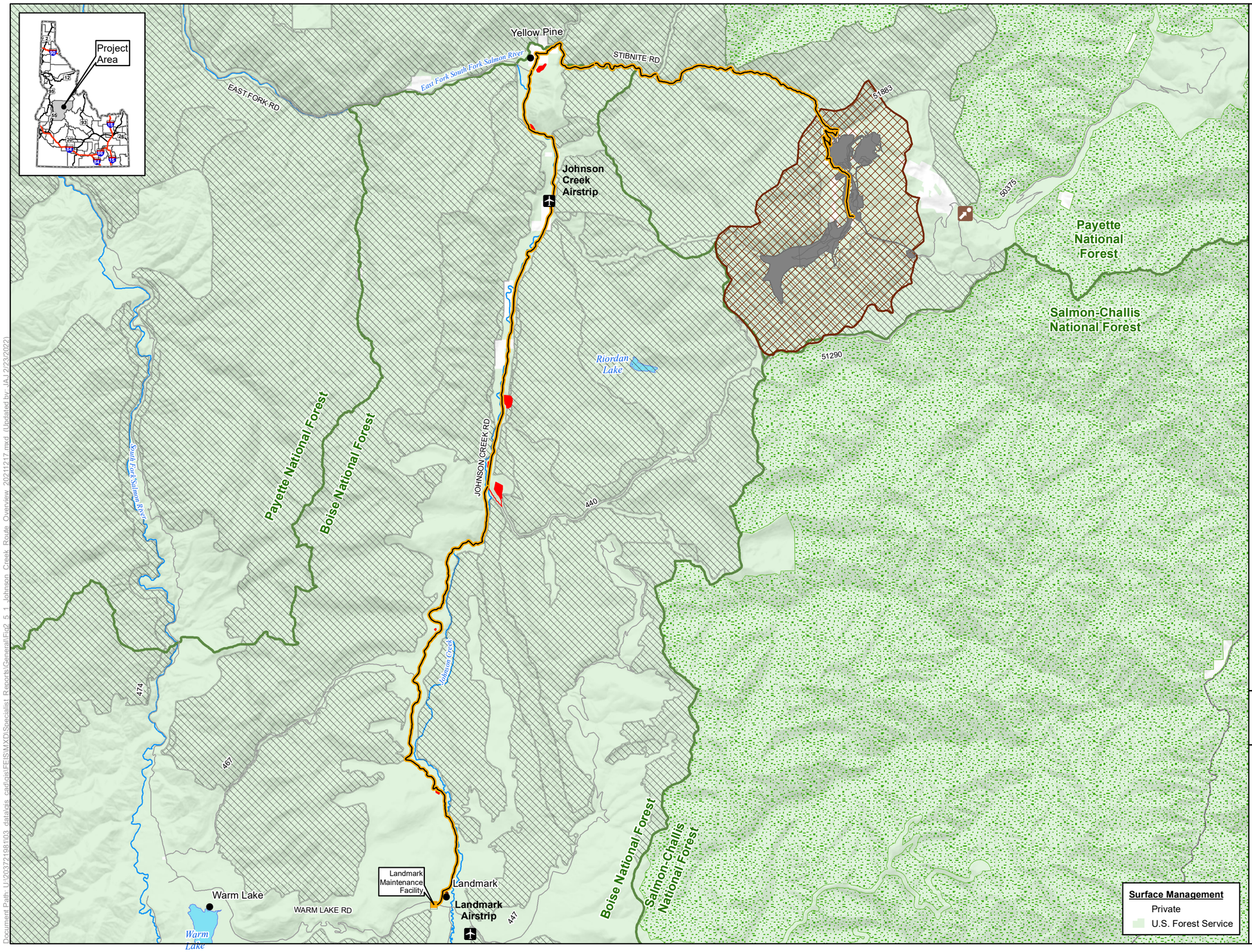
2.5 Johnson Creek Route Alternative

2.5.1 Overview

The Johnson Creek Route Alternative was developed to avoid or reduce certain impacts to IRAs, sensitive plant species, and wetlands. In this alternative the Burntlog Route would not be constructed and used for primary access to the SGP. The Johnson Creek Route would be used not only during SGP construction but would also be used during the operations and closure/reclamation phases of the SGP as well.

Development of the Johnson Creek Route would entail upgrading approximately 25 miles of Johnson Creek Road and 15 miles of the Stibnite Road. A total of 216.6 acres of new cut and fill activity (including borrow sources) along the existing roadways that follow segments of Johnson Creek and East Fork SFSR to make those roadways usable for mine access during its lifespan. Improvements to the Johnson Creek Route would include road widening and straightening, as well as drainage and bridge improvements to the Johnson Creek Road portion of the Johnson Creek Route. The new Landmark Maintenance Facility would be located at the junction of the Warm Lake Road and Johnson Creek Road instead of along the Burntlog Route as proposed in the 2021 MMP. The Stibnite Road portion of the Johnson Creek Route would be improved by straightening curves, adding retaining walls, and installing culverts. It would approach the village of Yellow Pine at the junction of Johnson Creek and Stibnite roads.

This section describes only the differences from the 2021 MMP that have been incorporated into the Johnson Creek Route Alternative. Under this alternative, all of the mining, ore processing, and development rock storage activities would be the same as described in the 2021 MMP. Previously approved activities (i.e., approved exploration activities and associated reclamation obligations) would continue as well as the ASAOC activities. The components of the Johnson Creek Route Alternative that are different from the 2021 MMP are listed in **Table 2.5-1** and include the rationale for inclusion of each component. The proposed facilities and access roads related to this alternative are shown on **Figure 2.4-1** and **Figure 2.5-1**. Forest Service requirements and EDFs as described in **Section 2.4.9** would apply to the Johnson Creek Route Alternative.



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LEGEND

Project Components
- SGP Features
- Operations Area Boundary

Access Roads and Trail Systems
- Johnson Creek Route

Offsite Facilities
- Landmark Maintenance Facility
- Johnson Creek Route Borrow Source

Other Features
- U.S. Forest Service
- Wilderness
- IRA and/or Forest Plan Special Area
- County
- City/Town
- Monumental Summit
- Airport/Landing Strip
- Road
- Stream/River
- Lake/Reservoir

0 1.15 2.3 Miles

1 inch = 2.3 miles when printed at 11x17

N

Figure 2.5-1
Johnson Creek Route
Stibnite Gold Project
Stibnite, ID

Base Layer:
Other Data Sources: Perpetua; State of Idaho Geospatial Gateway (INSIDE Idaho); Boise National Forest; Payette National Forest

Map Date: 2/23/2022

Table 2.5-1 Johnson Creek Route Alternative Components and Rationale for Inclusion

Phase – Component/ Subcomponent	Facility or Process Change	Rationale for Inclusion
Construction/Operations/ Closure and Reclamation – Access Roads	The Johnson Creek Route would be the mine access route as well as the public access route.	Using the Johnson Creek Route for mine access could avoid impacts from construction of approximately 15 miles of new road for the Burntlog Route, including impacts to IRAs, whitebark pine (a federally threatened plant species), and wetlands and riparian areas.
Construction/Operations/ Closure and Reclamation – Public Access	The Johnson Creek temporary groomed OSV Trail from Landmark to Trout Creek Campground would be maintained through operations. The segment from Trout Creek to Wapiti Meadows would be closed from construction through Closure and Reclamation.	Keeping the temporary groomed OSV route open during construction and operations would provide for public access each winter and connect to other OSV routes during construction and mine operation.
Operations – Utilities/Communication Towers and Repeater Sites	Cell tower/repeater sites construction within IRAs would be by helicopter.	Helicopter construction could reduce impacts to IRAs and whitebark pine (a federally threatened plant species).

The Johnson Creek Route Alternative would require project-specific amendments to the Payette and Boise Forest Plans (**Appendix A**).

2.5.2 Land Management and Affected Areas

For the Johnson Creek Route Alternative, the estimated maximum land affected by component and land ownership is shown in **Table 2.5-2**.

Table 2.5-2 Land Management and Acreage by Component for the Johnson Creek Route Alternative

Component		Perpetua Private	Other Private	PNF	BNF	Salmon-Challis National Forest[4]	BOR	IDL	Totals
Mine Site	New Disturbance	46.0	0	764.8+ 65[2]	0	0	0	0	875.8
	Re-disturbance	454.6	0	397.6	0	0	0	0	852.2
Off-site Facilities	New Disturbance	24.3	0	0	4.8	0	0	0	29.1
	Re-disturbance	0	0	0	0	0	0	0	0
Access Roads (including borrow sources)	New Disturbance	5.5	4.6	27.0	179.5	0	0	0	216.6
	Re-disturbance	4.8	4.5	28.3	65.4	8.7	0	0	111.7
Utilities[1]	New Disturbance	2.9	105.9	61.4	220.8	0	3.5	26.0	420.5
	Re-disturbance	1.0	174.0	19.4	349.8	0	9	36.1	589.3
Disturbance Totals	Total New Disturbance	78.7	110.5	853.2 + 65[2]	405.1	0	3.5	26.0	1,542.0
	Total Re-disturbance	460.4	178.5	445.3	415.2	8.7	9	36.1	1,553.2
Total New and Re- Disturbance		539.1	289.0	1,363.5	820.3	8.7	12.5	62.1	3,095.2[3]

[1] Affected acres for utilities include both existing utility corridors and access routes, some of which would be upgraded, and new utility corridors and access routes. Acres do not reflect entire area within the rights-of-way.

[2] Approximately 65 acres associated with surface exploration pads and temporary roads (SGP component) have unknown land ownership breakdown because the exact locations of these exploration areas are not yet known; however, these are included in the PNF SGP subtotal.

[3] Subtotals may not add to totals due to rounding.

[4] Approximately 9 acres of land listed under the PNF is administered by the PNF but is within the boundary of the Salmon Challis National Forest.

2.5.3 Phasing and Timeline

The upgrades to the Johnson Creek Route, particularly along portions of the Johnson Creek Road and Stibnite Road, would take longer due to space constraints and allowance of through-traffic. Construction at the SGP could not be completed until the Johnson Creek Route is sufficiently upgraded. Accordingly, if the Johnson Creek Route Alternative were selected, the overall construction timeframe to upgrade the Johnson Creek Route and complete construction at the SGP would need to be extended by a minimum of 2 years relative to the 2021 MMP. The time period for SGP operations and closure and reclamation phases would be unchanged, but the start of operations would be delayed in comparison to the 2021 MMP.

2.5.4 Site Preparation, Access, Infrastructure, and Mine Operations

Site preparation, access, and infrastructure, and mining activities under the Johnson Creek Route Alternative would be the same as under the 2021 MMP except for construction/operations of the Johnson Creek Route as described below.

2.5.4.1 Access Roads

Under this Alternative, the Johnson Creek Route would be improved and used to access the SGP through construction, operations, and closure and reclamation and would be the only route of ingress and egress for the SGP. Road widening and straightening, along with drainage and bridge improvements, would be required for the Johnson Creek Road (CR 10-413) portion of the Johnson Creek Route. The Stibnite Road (FR 50412) portion would be improved by straightening curves, constructing retaining walls, and installing 182 18-inch culverts and two 60-inch culverts. Rock blasting would be required in areas to accommodate increasing the road width. Mesh and anchors, retaining walls, and concrete barriers are anticipated to be necessary due to steep rock canyon topography to mitigate safety hazards. The Johnson Creek Route would take approximately twice as long to construct as the Burntlog Route as the level and pace of construction would be limited by space constraints and the need to maintain some level of access through the construction zone to allow for passage of equipment, materials, and laborers to the mine site. It would also require drilling and blasting of rock overhands. Approximately 1 mile of road through the village of Yellow Pine would be paved.

Construction of facilities at the SGP would be completed following upgrades to the Johnson Creek Route. Construction of improvements to the Johnson Creek Route would require approximately 4 years due to the nature of the topography (e.g., constraints of the river canyon) and terrain and the inability to do construction from both ends simultaneously.

During construction, Johnson Creek Road would require periodic temporary road closures. To complete upgrades to the Stibnite Road, daily road closures would be required from 10 a.m. to 4 p.m. during a 3-year construction period to conduct the cut and fill activities required to straighten curves and install retaining walls.

2.5.4.2 Public Access

During construction and mine operations, the public would share the Johnson Creek Route with mine related traffic transporting personnel, materials, and supplies to the SGP. The access route around the Yellow Pine pit would provide public access, employee access, and delivery access of supplies and equipment to the processing, warehouse, worker housing facility, and administration areas. Therefore, this road would need to accommodate heavy vehicles in addition to light vehicles.

This alternative would include constructing a road through the SGP to accommodate public access and delivery of mining materials and supplies. The road would be constructed around the Yellow Pine pit and into the SGP as shown on **Figure 2.4-2**. South of the Yellow Pine pit, the through-site public access road would follow an alignment similar to the 2021 MMP through-site access road. As such, it would pass under the mine haul road and continue southward, and southwest of the ore processing area, connecting with the Thunder Mountain Road and continuing toward the Worker Housing Facility before exiting the site area to the southeast. This portion of the access road would not be plowed in the winter per current county maintenance standards and would not be winter-season accessible to the public.

Under the Johnson Creek Route Alternative, the Johnson Creek groomed OSV route would be on the west side of Johnson Creek Road from Landmark to Trout Creek Campground during operations as described for 2021 MMP but the segment along Johnson Creek Road from Trout Creek Campground to Wapiti Meadows would be closed from construction through closure and reclamation. Other OSV routes as described in **Section 2.4.4.4** would be the same as the 2021 MMP.

2.5.4.3 Utilities

The transmission line upgrade and new construction would be the same as under the 2021 MMP. However, the two VHF repeater sites would be located along Johnson Creek Road; one VHF repeater site would be located off FR 410 at Deadhorse point and the other on the north end at Golden Gate Hill. Helicopters would be used to construct and maintain high frequency radio repeater and cell tower sites located within IRAs managed for Backcountry/Restoration. Other utilities would be the same as 2021 MMP.

2.5.4.4 Off-site Facilities

Under the Johnson Creek Route Alternative, the access road maintenance facility would be shifted to the west and located on approximately 3.5 acres of NFS land near the intersection of Warm Lake and Johnson Creek roads, it would be accessed via Warm Lake Road. It would be called the Landmark Maintenance Facility and would include the same components as displayed in **Figure 2.4-8** for the Burntlog Maintenance Facility described in the 2021 MMP.

2.5.5 Closure and Reclamation

The improvements to the Johnson Creek Route would remain after mine operations end. Johnson Creek Road and Stibnite Road would not be returned to the pre-mine width. Rock cuts, 9-foot-high retaining walls, 182 18-inch culverts, and the two 60-inch culverts would remain.

Post-closure public access through the SGP would be the same as 2021 MMP (**Figure 2.4-18**).

2.6 Alternatives Considered but Eliminated from Further Detailed Study

Federal agencies are required under NEPA to rigorously explore and objectively evaluate a reasonable range of alternatives that could both meet the project purpose and need and potentially reduce environmental impacts from the project. The alternatives development and evaluation process also should briefly discuss the reasons for any alternatives eliminated from further analysis and thus, not developed in detail (40 CFR 1502.14). FSH 1909.15, Chapter 10, Section 14.4 provides further guidance on the evaluation and elimination of alternatives: "Alternatives not considered in detail may include, but are not limited to, those that fail to meet the purpose and need, are technologically infeasible or illegal, or would result in unreasonable environmental harm."

The alternatives development process for the SGP was conducted in accordance with the Council on Environmental Quality (CEQ) and Forest Service regulations (40 CFR 1502.14 and 36 CFR 220.5, respectively) and Forest Service alternatives development guidance.

The component options that comprise the alternatives evaluated by the Forest Service and the cooperating agencies were focused on addressing one or more of the significant issues listed in **Section 1.10**, Issues.

Potential alternatives and component/subcomponent options were screened based upon four criteria:

- Does the alternative, including a combination of component options, meet the purpose and need of the project?
- Would the alternative or component option potentially reduce environmental effects to at least one resource?
- Is the alternative or component option technically feasible?
- Is the alternative or component option economically feasible?

If an alternative or component option would not have the potential to provide at least one environmental advantage as compared to the actions described in the 2021 MMP, it was eliminated from further study.

The emphasis for alternatives development is whether the alternative is reasonable, rather than whether the proponent or applicant likes or is itself capable of carrying out a particular alternative. Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant (46 FR 18026). Additional detail of the alternative development process and elimination of various options for detailed analysis is available in the Alternatives Development Report (AECOM 2020a).

2.6.1 Mining Method Alternatives Considered

Three potential types of mining method alternatives were examined and are detailed below.

2.6.1.1 Underground Mining Alternative

Some public comments suggested an underground mining alternative that would reduce impacts to resources such as fish and soils. Under this underground mining alternative, ore from the Hangar Flats, Yellow Pine, and West End deposits would be subject to underground mining methods instead of open pits. Development rock generated would be utilized to backfill completed underground workings for geotechnical stability or placed in surface facilities. The potential environmental benefit would be less surface disturbance for the mine operation.

Typical economic cutoff grades for underground mine operations are approximately 5 grams per ton (g/t) gold (Birch 2017). In aggregate, grades for these three deposits above a 0.48 g/t gold cut-off grade averaged 1.43 g/t gold, 1.91 g/t silver, and 0.064 percent antimony (M3 2021). With gold grades well below typical economic cutoff grade, underground mining would not meet the purpose and need for the SGP to produce saleable minerals because doing so would not be a feasible economic endeavor. Associated silver and antimony grades are not sufficient to offset the lower gold grade or to merit underground mining for production of those minerals.

In addition, the development rock produced would be insufficient to meet the construction needs for the SGP such as the TSF Embankment and Buttress. Therefore, this alternative would not completely remove the need for surface disturbance, as disturbance would be required to obtain the necessary construction materials. In addition, less development rock production could eliminate the currently proposed backfill and re-establishment of the East Fork SFSR across the Yellow Pine pit.

2.6.1.2 West End Pit Backfill Alternative

This alternative would involve placement of development rock in the West End pit during reclamation in consideration of significant issues regarding water resources. This would reduce or eliminate the post-reclamation West End pit lake and the amount of development rock placed in the TSF Buttress, Hangar Flats pit backfill, and Yellow Pine pit backfill.

Currently proposed project phasing enables backfilling of the Hangar Flats and Yellow Pine pits with development rock from the West End pit during operations. However, as the final pit is mined, backfill of the West End Pit could not be conducted safely until mining in that pit ceased. This would require re-handling and haulage of tens of millions of tons of development rock that would need to be placed temporarily in other locations back to the West End pit. The rehandling of development rock would increase the duration of mine operations to rehandle the development rock into the West End pit after mining in the pit ceased. This would increase mining equipment traffic and emissions over the life of the SGP.

Development rock from the West End pit is currently scheduled to be incorporated into the TSF Embankment and Buttress, and the backfills of the Hangar Flats, Midnight, and Yellow Pine pits. Rehandling the development rock required to backfill the West End pit would necessarily change the currently proposed final configuration of one or more of these other sites, potentially including reductions to the currently proposed pit backfills. Therefore, this alternative does not represent a net reduction of environmental effects. In addition, the operation costs associated with rehandling a large amount of development rock would negatively affect the economic feasibility of the SGP. Therefore, because the

alternative does not represent a net reduction of environmental effects and the operation costs associated with rehandling a large amount of development rock would negatively affect the economic feasibility of the SGP, the alternative was dismissed.

2.6.1.3 Electric Mining Equipment Alternative

Some public comments suggested that certain mining equipment, such as large shovels, drills, and haul trucks, should be required to be electric to reduce emissions. There is a trend toward powering a wider variety of mining equipment with electricity. This reduces the need for diesel fuel handling and combustion at mine sites, reducing local air emissions. However, mining equipment of the type and moderate size proposed for use at the SGP is still typically powered by diesel engines, and this is what Perpetua has proposed for the SGP.

To constrain or dictate the selection of mine equipment is outside the purview of the Forest Service regulatory approval; therefore, this alternative was dismissed. Air impact analysis for the SGP has shown that regulatory limits related to the air emissions from the mining equipment fleet would be complied with so major reductions in equipment emissions is not required. Electrifying the proposed mining equipment would not reduce environmental impacts associated with ground disturbance, water management, geological hazards, hazardous materials, and associated resources.

2.6.2 Processing Method Alternatives Considered

Two potential types of processing method alternatives were examined and are discussed further below.

2.6.2.1 Off-Site Ore Processing Alternative

Some public comments suggested that ore should be processed off-site to reduce the amount of reagents transported and used at the SGP and reduce the number of employees traveling to the site to reduce impacts on water resources, a significant issue. The off-site ore processing alternative was considered for its potential to reduce water resources issues but was eliminated. Under this alternative, raw ore would be processed off-site and would reduce the amount of reagents transported and used at the SGP, and the number of employees traveling to the site. It would also eliminate the need to store mill tailings at the SGP site. Transporting approximately 22,000 tons per day by trucks to an offsite mill would require approximately 550 round trips daily during the 15 years of mine operations. This would greatly increase the air emissions and transportation impacts of the SGP and dramatically increase operational costs. The main problem with this alternative is that there currently is no commercial milling operation in the Western U.S. that could economically process the SGP ore. So, a new mill, with all the same associated environmental impacts as the proposed SGP on-site mill would need to be constructed.

In the absence of on-site ore processing, the environmental benefits of legacy material removal (e.g., SODA) to allow for construction of the on-site TSF would also not be realized.

Shipping a gold concentrate for offsite processing was also considered in the Feasibility Report (M3 2021) and was found to result in a supplemental loss of gold of about 3.3 percent compared to the production of a concentrate that could be further processed on site as proposed. The value of this large supplemental loss of gold would not be consistent with the purpose and need of the SGP. The environmental effects of operating the flotation mill and TSF onsite would also essentially be the same as

the Proposed Action. Therefore, because the alternative would increase mine traffic and air emissions, would not reduce environmental effects, and would be economically infeasible, this alternative was dismissed.

2.6.2.2 Filtered Tailings Alternative

Initial project development included consideration of filtered tailings management, which would involve deposition of a tailings slurry in the proposed TSF where the contained solids would settle out and the accumulated water would be recycled to the mill process. This type of tailings management requires careful attention to the handling of the water balance in the tailings system and the geotechnical stability of the embankment forming the TSF. There is also the potential for subsurface seepage of tailings water out of the bottom of the TSF. Per public comments received, alternative methods for handling tailings include: 1) dewatering the tailings by mechanical filtration and transporting the "dry" tailings solids to the TSF, and 2) partially dewatering the tailings to produce a paste which is then pumped to the TSF. Mechanical filtration of tailings is also referred to as “dry stacking” of tailings and those terms are utilized synonymously. These approaches eliminate or greatly reduce the amount of tailings water stored in the TSF reducing the concerns for water balance, subsurface leakage, and geotechnical stability of the tailings embankment.

The use of the dry stack method of tailings disposal was evaluated and determined to be technically and economically infeasible. The ore processing rate and tailings grind size are not conducive to the generation of dry tailings. In addition, although the "dry" tailings could be handled as a solid waste, they would still contain appreciable moisture and seasonal high precipitation and freezing temperatures could create day to day handling problems. An additional consideration in the determination to not fully evaluate a dry stack option is that stability of the proposed TSF is enhanced by the waste rock buttress so the stability advantage of a dry stack or paste tailings disposal approach over a conventional tailings impoundment is not as prominent for the SGP as it might be for other projects.

Paste tailings disposal was also evaluated and determined to be technically feasible but not economically feasible and did not offer environmental advantages over other action alternatives. Additional information on the evaluation of tailings disposal methodologies is included in the Technical Memorandum titled “Review of Midas Gold Tailing Technology for the Stibnite Gold Project and Alternatives, Valley County, Idaho” (AECOM 2020b).

2.6.3 Facility Locations Alternatives Considered

Alternative locations for four project facilities were examined and discussed further below.

2.6.3.1 Tailings Storage Facility Alternatives

In consideration of significant issues including water resources, fish resources and habitat, and wetlands, several options were considered for the TSF component. These included:

- Construction of the TSF in a series of smaller facilities separated by TSF embankments in a phased manner;

- The construction and use of multiple, phased TSF locations would increase the disturbance footprint, triple the number of TSF embankments, and increase the quantity of embankment construction material required for tailings storage. Therefore, there would be an increase of impacts to soils, water resources, and aquatic resources under this scenario, resulting in no reduction to environmental effects. Therefore, because there would be an increase of impacts to soils, water resources, and aquatic resources under this scenario, resulting in no reduction to environmental effects, this alternative was dismissed.

- Construction of the TSF within the East Fork SFSR valley upstream of Fern Creek; and

  - The TSF location within the East Fork SFSR upstream of Fern Creek would not realize the benefit of legacy material removal from Meadow Creek and would increase effects on water resources plus fish and wildlife habitats by increasing ground disturbance (approximately 510 acres). Therefore, this alternative was dismissed.

- Construction of the TSF in the East Fork SFSR east of Meadow Creek in areas previously undisturbed by mining.

  - The TSF location in the East Fork SFSR east of Meadow Creek was fully analyzed as Alternative 3 in the DEIS (Forest Service 2020a). There were no environmental benefits noted for this location and this location would have substantially similar effects to the 2021 MMP. Therefore, this alternative was dismissed.

2.6.3.2 Power Transmission Line Route Alternatives

Per public comments received, two potential transmission line route alternatives were considered:

- Locating the transmission line segment from the Johnson Creek substation to the mine on the north side of the TSF, following a former jeep trail alignment between the Horse Heaven and Meadow Creek IRAs; and

- Extending the existing 138-kV transmission line from the Yellow Pine substation to FR 458 east of Golden Hill road and then along Stibnite Road (FR50412) to the SGP.

These route options did not reduce environmental effects of the SGP as they would require additional disturbance for access and maintenance to install longer routes; further, topographical constraints could require use of self-supported steel structures rather than conventional wood poles. In particular, the Horse Heaven to Meadow Creek route was analyzed as part of Alternative 3 in the DEIS (Forest Service 2020a). Based on that analysis indicating it would have greater impacts on IRAs, riparian and wetlands habitat, and associated wildlife, it was not retained for detailed analysis in the EIS.

In addition to environmental affects, the Stibnite Road route has relatively more exposure to avalanche hazards.

2.6.3.3 Worker Housing Facility Alternative

Under this alternative, in consideration of potential effects on water resources, the worker housing facility would be located in proximity to the active mine area within the Operations Area Boundary. Architectural and engineering controls would be utilized to reduce interior noise along with sound control building materials.

This location was evaluated under Alternative 3 of the DEIS (Forest Service 2020a). There was no reduction in environmental effects associated with this location plus it moved the housing facility into an area of greater geological hazard risk. Therefore, it was not retained for detailed analysis in the EIS.

2.6.4 Transportation and Access Road Alternatives Considered

In consideration of significant issues, six potential transportation and access road component options were examined and are discussed below.

2.6.4.1 South Fork Route Alternative

Under this alternative, the South Fork Route would serve as the main access road, utilizing Warm Lake Road, South Fork Road, East Fork SFSR Road, and then Stibnite Road, for SGP access. This route was determined to have greater environmental impacts and greater safety issues than other alternatives; therefore, it was not technically feasible, did not reduce environmental effects, and was not carried forward for further evaluation. The South Fork Road is not proposed for use by the SGP under any of the analyzed alternatives.

2.6.4.2 Lick Creek Route Alternative

Under this alternative, the Lick Creek Route would serve as the main access road, utilizing Lick Creek Road from SH 55 to East Fork SFSR Road, and then Stibnite Road, for SGP access. This route met the purpose and need; however, it would not lessen potential environmental impacts and posed greater safety issues than other alternatives. This route was determined to not be technically feasible, did not reduce environmental effects, and was not carried forward for further evaluation. The Lick Creek Road is not proposed for use by the SGP under any of the analyzed alternatives.

2.6.4.3 Other Routes

Other alternative road segments were also considered that could be combined with others to provide access to the SGP including Cabin/Trout Creek Road, Old Thunder Mountain Road, and Riordan Creek Road. These segments were eliminated because they did not lessen potential environmental impacts, posed greater safety issues (Old Thunder Mountain Road), and were economically not feasible.

2.6.4.4 Convoy Mine Traffic

Under this alternative, all mine workforce, supply and haulage, and miscellaneous traffic would be transported in convoys (grouping deliveries together) of approximately six vehicles during construction and operations. Convoys would be used to minimize disruption to the public and would be used Monday through Friday from approximately 6:00 a.m. to 8:00 p.m. Convoys could improve public safety and reduce the risk of traffic accidents.

This alternative would not reduce the overall volume of traffic to and from the SGP. Recreational or public vehicles using the same route as the convoys would still encounter mine related traffic. Oncoming vehicles would have to wait for the convoy to pass before entering the roadway, while vehicles behind the convoy would be required to follow along until a safe (longer) place to pass was available. Designated pullouts or turnouts for the convoy to allow safe passage of following vehicles would help mitigate traffic related concerns. However, because convoys would not reduce the volume of traffic, there would be no discernable environmental advantages. Additionally, coordinating arrival and delivery times of all vendors traveling to the SGP could prove technically infeasible. Therefore, this alternative was not carried forward for further evaluation.

2.6.4.5 Public Parking Lots at Project Components

This alternative would involve development of public parking lots for recreational use at the worker housing facility and/or Knox Ranch near Cascade, Idaho. It would also include accommodations for snowmobile route grooming by either constructing a storage shed for grooming equipment at the parking lot or hauling grooming equipment from Cascade to the lot.

Parking lots in mine areas increase the potential impacts associated with public safety and geological hazards. They also lead to potential inconsistencies between the regulatory agencies' independent responsibilities to regulate mining and public access. Therefore, they were not evaluated further.

2.6.4.6 No Temporary OSV Trail

In this alternative, the proposed temporary OSV route would not be developed. Instead, wintertime traffic would be diverted to the South Fork Route. The rationale for eliminating the South Fork Route from further evaluation is described in **Section 2.6.4.1**. Without diversion of wintertime traffic, electing to not develop a temporary trail would increase SGP impacts to recreational use.

2.6.5 Water Management Alternatives

In consideration of significant issues, four potential component options for water management were examined and are discussed below.

2.6.5.1 Dry Mining and Processing

The ability to mine and process ore under dry conditions was examined and determined to be technically infeasible. However, pit dewatering is necessary to meet the purpose and need for the SGP because the targeted minerals reside primarily below the water table. There are no technically feasible dry processing methods for the beneficiation of gold and silver from ores exhibiting the mineralization type present at the SGP.

2.6.5.2 West End Pit Drainage

For this alternative, an engineered drain utilizing a head gate to a pipe would be installed at the base of the West End pit to convey water from the pit bottom to West End Creek. This would prevent the formation of a pit lake in West End pit but would not reduce effects on water chemistry in the pit because groundwater and meteoric water entering the pit would still interact with the exposed pit walls. In addition, long-term operation and maintenance of the gate and pipe would be susceptible to technical

feasibility issues similar to the historical mine diversion and drainage features at the SGP; therefore, it was dismissed from further consideration.

2.6.5.3 Modified Blowout Creek Restoration

Under this modification, a French drain design would not be used to control water and sediment conveyance at the Blowout Creek drainage. Instead, the drainage slopes would be graded to improve their hydrologic functioning condition. This alternative was not evaluated further because it had substantially similar effects to the 2021 MMP.

2.6.5.4 Yellow Pine Pit Stream Diversion without Fish Passage

For this alternative, the diversion of the East Fork SFSR around the Yellow Pine pit area would not accommodate fish passage. This alternative was examined as part of Alternative 3 in the DEIS (Forest Service 2020a). It is not evaluated further because it did not result in a reduction of environmental impacts.

2.7 Agency Preferred Alternative

Following their review of the environmental impacts as discussed in the EIS and presented in **Table 2.8-1**, the Forest Service has identified the 2021 MMP as their Preferred Alternative for the SGP. Use of the Burntlog Route for mine access is superior to alternative routes because it:

- Reduces the risks of geotechnical instability, hazardous materials transport, and public health and safety transportation during operations (2021 MMP: 26 landslides/rockfalls and 38 avalanche paths versus Johnson Creek Route Alternative: 45 landslides/rockfalls and 94 avalanche paths). This reduction in exposure to landslide and avalanche paths was given preference over effects of new road ground disturbance because of the intensity of those impacts on hazardous materials, access and transportation, and public health and safety, compared to the effects of ground disturbance on other resources.
- Reduces potential for spill contamination, sedimentation, and turbidity to streams during operations (2021 MMP: 37 stream crossings, 6.6 miles of travelway within 100 feet of streams versus Johnson Creek Route Alternative: 43 stream crossings, and 11.5 miles of travelway within 100 feet of streams). This reduction in exposure of streams to spills resulting from traffic incidents and the reduction in potential sedimentation and turbidity impacts was given preference over effects of new road ground disturbance because of the intensity of those impacts on hazardous materials, water resources, fish and aquatic resources, and socioeconomics compared to the effects of ground disturbance on other resources.
- Reduces acres of riparian area lost within the off-site focus area (2021 MMP: 299.5 acres versus Johnson Creek Route Alternative: 352.6 acres).
- Reduces the volume of timber resources removed (2021 MMP: 595 acres versus Johnson Creek Route Alternative: 733 acres), and acres of timberland permanently converted to non-productive land use (2021 MMP: 66 acres versus Johnson Creek Route Alternative: 282 acres).

- Reduces public safety risks and potential accidents during operations (Johnson Creek Route Alternative has steeper topography and terrain requiring wider roads, more cut and fill sections and more switchbacks; traffic including heavy equipment would be routed through the village of Yellow Pine for the duration of the SGP; general public would utilize same roads as large mining equipment). This reduction in exposure to public road use was given preference over effects of new road ground disturbance because of the intensity of those impacts on access and transportation, recreation, public health and safety, and socioeconomics compared to the effects of ground disturbance on other resources.
- Reduces potential impacts such as access to tribal fisheries restoration activities along Johnson Creek Road during operations.
- Improves fish access to habitat beyond existing open pit barrier.

The Agency Preferred Alternative would reasonably accomplish the purpose and need for the federal action, while considering environmental, economic, and technical factors.

2.8 Summary Comparison of Alternatives

Table 2.8-1 provides a tabular summary and comparison of impacts from the components of the No Action Alternative, the 2021 MMP, and the Johnson Creek Route Alternative. A comparison of the 2021 MMP to earlier proposed plans can be found in Perpetua 2021a (Table A-1).

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Table 2.8-1 Alternative Comparison and Impact Summary

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
Geology and Geotechnical Hazards					
Minerals present at the site are economically valuable	Amount of ore extracted	132.3 M tons of measured and indicated ore (including tailings)	Same as Baseline Condition.	112 M tons of ore would be mined. About 3.2 M tons of historical Bradley tailings would also be removed and reprocessed. Total ore processed would be 115.2 M tons.	Same as 2021 MMP.
Minerals contribution to national economy	Depletion of mineral resources	Mineral reserve is approximately 4.819 M oz ounces of gold, 6.431 M oz of silver, and 148.686 M lbs. of antimony	Same as Baseline Condition.	Recover, over 15 years of mill production, 4.238 M oz of gold, 1.710 M oz of silver, and 115.342 M lbs. of antimony.	Same as 2021 MMP.
Change in topography	Alteration of topography	Legacy pit highwalls undisturbed valley bottom	Same as Baseline Condition.	Three new open pits, backfilled but highwalls remaining, TSF and TSF buttress in valley bottom, road cuts/fills along access roads.	Same as 2021 MMP.
Geotechnical stability	Stability of selected locations	Rockfalls, landslides and avalanche paths	Same as Baseline Condition.	26 landslides and rockfalls along access road route 38 avalanche paths along access road route. Operations AHI value of 18.1.	45 landslides and rockfalls along access road route. 94 avalanche paths along access road route. Operations AHI value of 22.7.
Geotechnical stability	Long-term geologic/geotechnical stability of TSF	No TSF present.	Same as Baseline Condition.	Underlying bedrock is more than sufficiently competent to support the TSF (rock types consist of quartz monzonite, diorite, granite and rhyolite). Designed to meet regulatory stability criteria even in the absence of the downstream buttressing provided by the TSF Buttress.	Same as 2021 MMP.
Air Quality					
The SGP may affect air quality characteristics and resources	Geographical extent of pollutant concentrations and deposition.	No SGP air emissions to affect existing conditions.	Same as Baseline Condition.	SGP air quality impacts would be less than NAAQS, HAPs emissions are less than the acceptable ambient carcinogenic concentration and other pollutants are less than deposition significance levels.	Same as 2021 MMP.
The SGP may affect air quality characteristics and resources	Type and volume of air pollutants emitted, including haze precursors, airborne dust, and HAPs.	No SGP air emissions to affect existing conditions.	Same as Baseline Condition.	Emission inventories for construction through LOM Year 18 indicated that the peak year for aggregated pollutant emissions would be LOM Year 6, also the peak year for mine throughput.	Same as 2021 MMP, except for those changes in emissions location due to use of Johnson Creek Route (i.e., different haul routes).
The SGP may affect air quality characteristics and resources	Criteria air pollutant ambient concentrations outside the Operations Area Boundary anywhere the public is allowed unrestricted access.	Current air quality in the SGP area is good, and in attainment with air quality standards.	Same as Baseline Condition.	SGP air quality impacts would be less than NAAQS, HAPs emissions are less than the acceptable ambient carcinogenic concentration and other pollutants are less than deposition significance levels.	Same as 2021 MMP, except that locations of off- site concentrations may differ due use of Johnson Creek Route rather than Burntlog Route.
The SGP may affect air quality characteristics and resources	Comparison of modeled concentrations to Class I and Class II increments.	Current air quality in the SGP area is good, and in attainment with air quality standards.	Same as Baseline Condition.	SGP air quality impacts would be less than the Class I and Class II increments.	Same as 2021 MMP, except that magnitude and locations of off-site concentrations may differ due use of Johnson Creek Route rather than Burntlog route.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
The SGP may affect air quality characteristics and resources	HAPs (including Hg emissions and Hg deposition.	Background concentrations and deposition occurs due to transport from distant industrial and urban sources.	Same as Baseline Condition.	Emissions HAPs, HCN, and Hg estimated for peak mine production year. Deposition of Hg limited in extent and well below health-based thresholds. HAP emission impacts are less than state acceptable ambient non-carcinogenic concentrations/acceptable ambient carcinogenic concentrations.	Same as 2021 MMP.
The SGP may affect air quality characteristics and resources	Deposition impacts from nitrogen and sulfur compounds at Class I areas and specified Class II wilderness areas.	Existing deposition rates occur due to transport from distant industrial and urban sources.	Same as Baseline Condition.	Modeling of N and S deposition in areas of concern show that deposition rates are below acceptable levels for Class I areas.	Same as 2021 MMP.
The SGP may affect air quality characteristics and resources	Near-field plume blight and far- field regional haze impacts in protected areas.	No SGP sources to create visible near-field plumes. Existing regional haze occurs due to transport from distant industrial and urban sources.	Same as Baseline Condition.	SGP sources may cause visible plumes at the closest Class II wilderness area (FCRNRW) for a small fraction of daylight hours (~0.02 hours). Far-field modeling of regional haze shows contribution from SGP sources would be below federal significance level.	Same as 2021 MMP.
Climate Change					
The SGP activities could contribute to factors that influence climate change.	GHG emissions from SGP activities (construction, operations, and closure and reclamation), expressed as MT of CO_2e of GHGs.	No emissions.	Same as Baseline Condition.	Maximum LOM 3 221, 202 short tons/yr. of CO_2e of total annual GHG emissions.	Small incremental differences from the 2021 MMP. GHG emissions would be reduced because the Burntlog Route would not be constructed; however, the construction activities required on the Johnson Creek Route would likely offset the decrease and would likely end up very similar.
Changing climatic conditions, in synergy with the SGP (including construction, operations, and closure and reclamation), could impact the physical, biological, and social resources.	Changes in hydrologic patterns (drought, precipitation variability and seasonality). Changes in temperature (extreme heat/cold, or overall change in annual or seasonal temperatures). Changes in extreme weather events (flash flooding, wildfires, severe storms).	Current trends show variable annual average precipitation and drought patterns, decreases in snowpack, and decreases in streamflow. Current trends show increases in annual average temperature and more frequent temperature extremes. Current trends show increased frequency and intensity of extreme weather events.	Changing climatic conditions would be expected to result in decreased soil moisture and quality; air quality; annual streamflow; groundwater recharge; water quality; increased surface water temperatures; increased spread of insects and diseases; changes in the timing, duration, and severity of fire seasons; and habitat loss and fragmentation.	Changing climatic conditions would be expected to result in decreased soil moisture and quality; air quality; annual streamflow; groundwater recharge; water quality; increased surface water temperatures; increased spread of insects and diseases; changes in the timing, duration, and severity of fire seasons; and habitat loss and fragmentation.	Same as 2021 MMP.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
Soils and Reclamation Cover Material					
The SGP may result in long-term adverse impacts to soil resources.	Acres and proportion of TSRC activity area that are converted from a productive site to a non-productive site (TSRC, as defined in the Payette Forest Plan). Acres and proportion of DD activity area that have altered soil characteristics resulting in loss of productivity and altered soil-hydrologic conditions.	**TSRC** Existing conditions of TSRC in the PNF activity area is approximately 259 acres within the combined subwatershed activity areas (7,468 acres), or roughly 3 percent. Existing conditions of TSRC in the BNF activity area is approximately 904 acres of the combined subwatershed activity areas (76,196 acres), or roughly 1 percent. **DD** Existing conditions of DD within the transmission line ROW is estimated at 8 percent.	Same as Baseline Condition.	**TSRC** **PNF Activity Area** The magnitude of impacts to soil resources within the PNF activity area includes excavation, grading, or filling of 1,457 acres (approximately 120 acres of which are already disturbed to some degree from historical mining activities or other TSRC). This results in a net increase of TSRC in the PNF activity area of approximately 1,198 acres (from an existing 259 acres to 1,457 acres). Overall TSRC under 2021 MMP would increase from approximately 3 percent to 17 percent of the PNF activity area. **BNF Activity Area** The magnitude of impacts to soil resources within the BNF activity area includes excavation, grading, or filling of up to 902 acres (approximately 66 acres of which are already disturbed due to overlap with and use of existing dedicated roadways, etc.) This results in a net increase of TSRC in the BNF activity area of approximately 836 acres (from 904 acres to 1,740 acres). Overall TSRC under 2021 MMP would increase to 2 percent of the BNF activity area. **DD** The DD activity area is the area within the transmission line ROW that would be subject to vegetation clearing only and is estimated at up to 500 acres. The magnitude of impacts from vegetation clearing potentially include detrimental soil displacement, compaction and puddling on up to a conservatively estimated 75 acres (15 percent) within the ROW. Of the total DD analyzed, 88 percent occurs in the BNF while 12 percent occurs in the PNF based on the relative length of the ROW within the two Forests.	**TSRC** **PNF Activity Area** The magnitude of impacts to soil resources within the PNF activity area includes excavation, grading, or filling of 1,366 acres (approximately 153 acres of which are already disturbed to some degree from historical mining activities or other TSRC). This results in a net increase of TSRC in the PNF activity area of approximately 1,107 acres (from an existing 259 acres to 1,366 acres). Overall TSRC under Johnson Creek Route Alternative would increase from approximately 3 percent to 17 percent of the PNF activity area. **BNF Activity Area** The magnitude of impacts to soil resources within the BNF activity area includes excavation, grading, or filling of 321 acres (approximately 133 acres of which are already disturbed due to overlap with and use of existing dedicated roadways, etc.) This results in a net increase of TSRC in the BNF activity area of approximately 188 acres (from 904 acres to 1,092 acres). Overall TSRC under the Johnson Creek Route Alternative would increase to 2 percent of the BNF activity area. **DD** Essentially the same as the 2021 MMP (15 percent of ROW).

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
Available RCM may not be of sufficient quantity or quality to achieve reclamation objectives of returning disturbed areas to productive conditions that sustain long-term wildlife, fisheries, land, and water resources.	Volume of RCM available for reclamation compared to expected demand to achieve reclamation objectives. Quality and suitability of RCM available for reclamation.	RCM availability is based on soil type, subsurface and bedrock character and topography in previously undisturbed areas within the SGP area.	Same as Baseline Condition.	A total of 1,657,246 BCY of GM and seed bank material (SBM) would be required to meet the specified reclamation areas and GM/SBM thicknesses. Soil salvage would generate approximately 860,000 BCY of GM/SBM. The 796,873 BCY deficit of RCM would be generated from unsuitable unconsolidated till mined from the Yellow Pine Pit plus other cover material at the project site and amended for suitability. The quality of RCM would vary based on its source, the best material coming largely from the organic and alluvial soils of the Meadow Creek valley. Most of this material would be used for GM and SBM for wetland restoration. GM used for upland reclamation sites would mostly come from relatively poor upland soils. Overall, the majority of GM used would rate as poor or fair (per suitability criteria), due primarily to texture and coarse fragment content (Tetra Tech 2019a, 2023). Additionally, the naturally high background levels of trace metals at the SGP represents a challenge for reclamation-related revegetation efforts. Perpetua's proposed 3,000-ppm arsenic limit for suitable root zone material is high; however, the Forest Service also would require limits on the GM (that would overlay the root zone material) for arsenic, mercury, and antimony, and would require a screening of soils as well as laboratory testing.	Essentially the same as the 2021 MMP for the mining area, with disturbance footprint-related adjustments for required GM/SBM and GM deficit. No potential Burntlog Route surplus salvage to compensate for the GM deficit at the mine site.
Noise					
The SGP may cause disturbance to NSRs (such as occupied residences and campgrounds).	Area affected by noise that exceeds Outdoor Ambient Sound Level and 55 dBA.	Baseline ambient sound levels vary by location and range between 34 and 64 dBA, L_{DN} over the 12 identified NSRs as summarized **Table 3.6-2**.	Same as Baseline Condition.	**Construction:** Site 2 would have temporary impacts while transmission line work is within approximately 800-850 feet. There are no other source impacts at Site 2 due to distance. Site 3 would have short-term, negligible, localized impact during construction, mainly caused by the Burntlog Route construction. Site 5 would have a temporary increase in noise levels due to the Burntlog Route access road construction, Burntlog Maintenance facilities construction, and SGP-related traffic on Johnson Creek Route would cause the majority of noise impacts. The transmission line work would cause temporary impacts within approximately 800-850 feet. Sites 6, 7, and 8 would have short-term, negligible, localized impacts caused by the transmission line upgrades. Site 9 would have temporary impacts during transmission line is occurring, include the utility access roads and facility construction at SGLF. Site 10 would have short-term, negligible, localized impact caused mainly by SGP-related traffic on Johnson Creek Route access road. Site 11 would have temporary impacts during the construction of the transmission line upgrades, including the utility access roads in the immediate vicinity, and SGP-related traffic on Johnson Creek Road.	**Construction:** Temporary impacts at Site 2, Site 5, Site 9, Site 10, and Site 11 while transmission line work is within approximately 800-850 feet. Site 10 and some parts of the FCRNRW would have some noise increase due to Johnson Creek Route construction. **Operations:** Long-term, periodic impacts at Site 2, Site 5, Site 10, and Site 11 during road maintenance activity due to use of Johnson Creek Route. There would be increased noise at Site 5 due to location of maintenance facility at Landmark. **Closure:** No impacts above recommended noise level. Johnson Creek Route would not be decommissioned and would remain as built.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
				Site 12 would have the highest impacts during the first year of Burntlog Route construction. The impacts at Site 12 would be short-term, negligible to minor, and localized. **Operations:** SGP-related traffic during operations would cause minor, long-term, and localized impacts from SH 55 to SGLF, and from SGLF to SGP or Burntlog Route. The borrow area impacts would be negligible to minor, long-term, but intermittent, and localized. Utilities and off-site facilities would cause minor, long-term, and localized impacts. Site 2 would have no impact. Site 3 would have negligible impacts during Burntlog Route access road maintenance. Site 5 would have negligible to minor, long-term impacts during road maintenance activities. Sites 6, 7, 8, 9, 10, 11, and 12 would have negligible impacts during operations, with and without blasting. Site 7 would have an increased impact during winter maintenance on Burntlog Route, remaining below 55 dBA. Substation noise is the only SGP-related noise impact at Sites 8, 9, 10, and 11. **Closure:** Temporary impacts at Site 5 while access road decommissioning work is within approximately 0.5 miles. No decommissioning-related noise of the transmission line into the SGP.	
Hazardous Materials					
The SGP may cause accidental release of hazardous materials or wastes, including milling reagents and reaction products, during the transport, use, storage, and disposal of materials.	Volumes and types of hazardous materials and hazardous wastes transported, used, and stored during site operation.	Petroleum products are currently stored at existing facilities for the exploration activities. Fuel storage areas are present in 16 locations with capacities from 55 to 10,000 gallons.	Same as Baseline Condition.	Hazardous materials and petroleum products storage would be stored at the following locations: SGLF, Burntlog Maintenance Facility, Worker Housing Facility, and Fuel and Explosive Storage. Approximate hazardous materials annual use and transport volumes would include: explosives (7,400 tons), fuels and lubricants (6.6 million gallons); antifreeze (40,000 gallons); propane (2 million gallons); antimony concentrate (variable, 0 to 730 truckloads); sodium cyanide (4,000 tons); copper sulfate (1,250 tons); nitric acid (65,000 gallons); sulfuric acid (12,000 gallons) and solvents (1,000 gallons) along with other chemicals as listed in **Table 4.7-1**.	Same as 2021 MMP.
	Practices for storage and use on site including primary and secondary containment types and volumes and material handling practices.	Hazardous materials are used and stored on site in accordance with applicable regulations including secondary containment for fuels and other hazardous materials. Perpetua has developed documents for use and storage including a SPCC Plan and a Solid Waste Management Plan, which addresses management of hazardous materials.	Same as Baseline Condition.	Hazardous materials would be used and stored on site in accordance with applicable regulations including secondary containment for fuels and other hazardous materials. Perpetua would develop documents for use and storage including a SPCC Plan and a Solid and Hazardous Materials Handling and Emergency Response Plan, which addresses management of hazardous materials. Following regulatory requirements and plans for spill containment, control, and response would reduce the potential for spills and for impacts associated with those spills.	Same as 2021 MMP.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
	Hazardous materials transport traffic volumes during construction, operations, and closure and reclamation.	Petroleum products are transported to the site on an as-needed basis.	Same as Baseline Condition.	Overall heavy vehicle traffic between the SGLF to SGP, of which hazardous materials transport would be a part, would be approximately 45 trips per day as an AADT count for construction; for operations, the heavy vehicle AADT would be 33 daily trips; and for closure and reclamation the AADT would be 15 daily trips. These trips represent the risk of a traffic accident.	Same as 2021 MMP.
	Travel route road hazards.	The existing routes are a combination of paved routes (Warm Lake Road) and existing native surface roads. There are potential road hazards along the routes used for delivery of supplies for the exploration project including landslide and rockslide areas, avalanche paths and routes close to streams. These would represent a potential for hazard for accidents and spills.	Same as Baseline Condition.	Burntlog Route has 26 landslide/ rockslide areas and 38 avalanche paths. Nine miles of the travel way have streams within 0.5 mile. The route crosses 37 streams.	Johnson Creek Route has potential road hazards, including 45 landslide or rockfall areas and 94 avalanche paths. Twenty-seven miles of the route have streams within 0.5 mile of the travel way. The route crosses 43 streams.
Surface Water and Groundwater Quantity					
The SGP may cause changes in quantity of surface water and groundwater in all drainages within the analysis area.	Stream flow characteristics (daily, seasonal, annual).	Surface waters include the East Fork SFSR, Rabbit Creek, Meadow Creek, EFMC (also known as Blowout Creek), Garnet Creek, Fiddle Creek, Midnight Creek, Hennessy Creek, West End Creek, and Sugar Creek. Monthly average seasonal low flows: • Meadow Creek between TSF and Hangar Flats pit = 2.7 cfs • Meadow Creek below the diversion and above East Fork SFSR (Mine Years 7-10) = 3.8 cfs	Same as Baseline Condition.	Low flow would be reduced at some locations during some periods of the SGP operations up to 18 percent in East Fork SFSR (at USGS Gaging Station 13311250) and up to 40 percent in Meadow Creek (downstream of the Hangar Flats diversion but upstream of the confluence with East Fork SFSR). Changes in flow are not expected to be measurable below the East Fork SFSR confluence with Johnson Creek (located approximately seven miles from the Operations Area Boundary). Surface flows are generally predicted to recover to pre-mine conditions within approximately 3 years after operations cease.	Same as the 2021 MMP.
	The extent, magnitude, and duration of groundwater level changes.	Groundwater flow in the analysis area occurs primarily in the Quaternary unconsolidated deposits filling the valleys and through the unconsolidated deposits covering the mountainsides.	Same as Baseline Condition.	Dewatering of open pits lowers groundwater levels in alluvial and bedrock formations during operations and post-closure periods. These lower levels reduce flows in streams that receive groundwater discharge. There are 93 seep and spring locations within the area of groundwater drawdown that could be affected by lower water levels to the extent that any of these specific seeps or springs are receiving discharge from the aquifer affected by groundwater pumping. In most areas, groundwater levels recover within 10 years. However, groundwater levels below and directly downgradient from facilities lined as part of mine closure (the TSF, TSF Buttress, Yellow Pine Pit backfill, and Hangar Flats Pit backfill) would be permanently lower due to reduced local recharge.	Same as the 2021 MMP.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
The SGP may affect water rights.	Change in water rights availability in the SGP area.	Four existing water rights at the SGP owned by Perpetua.	Same as Baseline Condition; No changes in water rights availability.	No changes in water rights availability in the SGP area. May affect downstream water rights.	Same as the 2021 MMP.
	New water rights needed.	Existing water rights held by Perpetua: • 77-7285 - Groundwater right for storage and mining with diversion of 0.5 cfs for a maximum total usage of 39.2 acre-feet • 77-7141 – Groundwater right for domestic with diversion of 0.2 cfs for a maximum total usage of 11.4 acre-feet • 77-7293 – Surface water right for storage and mining for diversion of 0.25 cfs and a maximum total usage of 20 acre-feet. • 77-7122 – Surface water right for storage and mining for diversion of 0.33 cfs for a maximum total usage of 7.1 acre-feet.	Same as Baseline Condition; No new water rights required.	Up to an additional 9.6 cfs of water rights needed to support ore processing. An additional total of 0.34 cfs of groundwater rights needed for potable water supply at the Stibnite Worker Housing Facility, Burntlog Maintenance Facility, and SGLF.	Same as the 2021 MMP.
Surface and Ground Water Quality					
The SGP may affect soil and water resources through acid rock drainage and/or metals leaching from mineralized rock in the mine pits, development rock, and TSF.	Volume and disposition of mineralized waste generated.	No new mining waste generated.	No new mining waste generated.	**Development Rock:** • TSF buttress and embankment (142 MT) • Yellow Pine Pit backfill (113 MT) • Midnight Pit backfill (7 MT) • Hangar Flats Pit partial backfill (18 MT) • On-site lime generation (1 MT) **Tailings:** • TSF (115 MT)	Same as 2021 MMP.
	Lithologic composition of final pit walls and exposure of potentially acid-generating material.	No known mapped extent of exposed lithologies in existing Yellow Pine and West End pits.	No known mapped extent of exposed lithologies in existing Yellow Pine and West End pits.	**Area of PAG rock exposed in pit walls:** • Hangar Flats Pit (7.9% of total surface area; 6% of surface area above backfill elevation). • West End Pit (0.4%) • Midnight Area (0.1%) • Yellow Pine Pit (20.1% of total surface area; 3% of surface area above backfill elevation)	Same as 2021 MMP.
	Removal of legacy mine tailings and waste rock.	Legacy waste in Meadow Creek valley from historical mine operations, including SODA and Bradley tailings.	No removal of legacy mine tailings and waste rock.	SODA and Bradley tailings removed and repurposed.	Same as 2021 MMP.
	Predicted leachate chemistry of development rock and tailings.	Not Applicable.	Same as Baseline Condition.	Development Rock and Tailings are generally non-acid generating but capable of leaching arsenic, antimony, aluminum, manganese, sulfate, TDS, copper, cadmium, and zinc above water quality criteria.	Same as 2021 MMP.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
The SGP may cause changes in surface water and groundwater quality.	Surface water quality parameters (e.g., pH, temperature, major ions, total dissolved solids, metals, sediment content, and organic carbon).	**East Fork SFSR:** • Antimony (0.005 to 0.037 mg/L) • Arsenic (0.014 to 0.076 mg/L) • Mercury (5 to 10 ng/L) • Summer Max Temperature (13.7 to 17.4°C) **Meadow Creek:** • Antimony (0.001 to 0.025 mg/L) • Arsenic (0.004 to 0.075 mg/L) • Mercury (1 to 2 ng/L) • Summer Max Temperature (17.9 to 19.8 °C) West End Creek: • Antimony (0.008 to 0.012 mg/L) • Arsenic (0.064 to 0.088 mg/L) • Mercury (4 to 6 ng/L) • Summer Max Temperature (12.9°C)	Same as Baseline Condition.	**East Fork SFSR:** • Antimony (0.004 to 0.041 mg/L) • Arsenic (0.010 to 0.066 mg/L) • Mercury (4 to 10 ng/L) • Summer Max Temperature (13.8 to 18.3°C) **Meadow Creek:** • Antimony (0.006 to 0.014 mg/L) • Arsenic (0.001 to 0.018 mg/L) • Mercury (1 to 5 ng/L) • Summer Max Temperature (14.6 to 24.5 °C) **West End Creek:** • Antimony (0.002 to 0.014 mg/L) • Arsenic (0.008 to 0.095 mg/L) • Mercury (4 to 63 ng/L) • Summer Max Temperature (16.8 to 21.7°C)	Same as 2021 MMP.
	Potential for spills in proximity to streams and sedimentation from access road traffic	No mine- related traffic on existing Forest Service roads	Same as Baseline Condition.	Between Warm Lake and Landmark, there are 5 miles of road within 100 feet of streams. During mine construction, access via the Johnson Creek Route would include 43 stream crossings and an additional 6.5 miles of the route would be within 100 feet of streams. The Cabin Creek OSV Route would include 7 stream crossings but only in winter over snow for the life of the SGP. During operations and closure, the Burntlog Route would include 37 stream crossings. During operations, 1.56 miles (4% of routes) would be within 100 feet of streams. Sedimentation and fugitive dust predicted to be within normal range of properly maintained Forest Service roads.	Between Warm Lake and Landmark, there are 5 miles of road within 100 feet of streams. During construction, operations, and closure, mine access roads would include 43 stream crossings. The Cabin Creek OSV Route would include 7 stream crossings but only in winter over snow for the life of the SGP. 11.5 miles along the Johnson Creek Route (11% of routes) would be within 100 feet of streams. Sedimentation and fugitive dust predicted to be within normal range of properly maintained Forest Service roads.
	Sedimentation from utility stream crossings	No transmission line upgrades or new lines constructed	Same as Baseline Condition.	Mine utility work would cross 36 different streams. Potential for transmission line-related erosion and sedimentation would be minimized by BMPs.	Same as 2021 MMP.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
	Groundwater quality parameters (e.g., pH, major ions, total dissolved solids, metals).	**TSF area groundwater:** • pH (7.57) • Arsenic (0.006 mg/L) • Antimony (0.0020 mg/L) • Mercury (0.6 ng/L) **Hangar Flats:** • pH (6.4 to 7.2) • Arsenic (0.0005 to 1.8 mg/L) • Antimony (0.002 to 0.61 mg/L) • Mercury (10 to 43 ng/L) **Yellow Pine:** • pH (6.8 to 8.2) • Arsenic (0.13 to 0.32 mg/L) • Antimony (0.010 to 0.014 mg/L) • Mercury (0.8 to 3 ng/L) **West End:** • pH (7.4 to 7.9) • Arsenic (0.009 mg/L) • Antimony (0.002 mg/L) • Mercury (47 to 55 ng/L)	Same as Baseline Condition.	**TSF area groundwater:** • pH (7.6) • Arsenic (0.009 to 0.48 mg/L) • Antimony (0.003 to 0.22 mg/L) • Mercury (1 to 50 ng/L) **Hangar Flats:** • pH (8.3) • Arsenic (0.041 to 0.095 mg/L) • Antimony (0.010 to 0.030 mg/L) • Mercury (1 to 7 ng/L) **Yellow Pine:** • pH (8.1) • Arsenic (0.34 to 0.58 mg/L) • Antimony (0.021 to 0.050 mg/L) • Mercury (10 to 30 ng/L) **West End:** • pH (8.3) • Arsenic (0.09 to 0.13 mg/L) • Antimony (0.016 to 0.021 mg/L) • Mercury (13 to 33 ng/L)	Same as 2021 MMP.
The SGP may cause increased mercury methylation in adjacent waterbodies through SGP- related emissions and activities.	Predicted impact on methylmercury (MeHg) production.	MeHg *not detected* in 90 percent of baseline stream samples (<0.1 ng/L)	Same as Baseline Condition.	Water treatment for mercury concentrations to target levels would result in methylmercury concentrations up to 0.24 ng/L in discharge to surface waters (at a 2% methylation rate). However, predicted MeHg concentrations in streams would remain below 0.1 ng/L.	Same as 2021 MMP.
Vegetation					
The SGP would impact forested PVGs within Forest Service-administered land and could impact the ability of these areas to reach desired conditions.	Acres of disturbance to previously undisturbed forest PVGs within Forest Service boundaries.	PVG data are available for the analysis area on NFS lands in the PNF and BNF.	Same as Baseline Condition.	The 2021 MMP would remove an estimated 2,083.2 acres of previously undisturbed forest PVGs within the boundaries of the Forests.	The Johnson Creek Route Alternative would remove an estimated 1,959.4 acres of previously undisturbed forest PVGs within the boundaries of the Forests.
The SGP would impact non-forested areas (i.e., those that are identified through PVG mapping as not being successional to forests) within Forest Service-administered land and could impact the ability of these areas to reach desired conditions.	Acres of disturbance to previously undisturbed non-forested areas within Forest Service boundaries.	PVG and existing vegetation data are available for the analysis area on NFS lands in the PNF and BNF.	Same as Baseline Condition.	The 2021 MMP would remove an estimated 161.5 acres of previously undisturbed non-forest areas within the boundaries of the Forests.	The Johnson Creek Route Alternative would remove an estimated 151.9 acres of previously undisturbed non-forest vegetation within the boundaries of the Forests.
The SGP would impact vegetation outside the boundaries of the Forests.	Acres of disturbance in previously undisturbed LANDFIRE existing vegetation types outside Forest Service boundaries.	LANDFIRE data are available for the analysis area outside NFS lands.	Same as Baseline Condition.	The 2021 MMP would remove an estimated 450.2 acres of previously undisturbed vegetation communities outside Forest Service-administered lands.	The Johnson Creek Route Alternative would remove an estimated 450.2 acres of previously undisturbed vegetation communities outside Forest Service-administered lands.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
The SGP would remove whitebark pine individuals, and habitat conversion associated with the SGP would impact seed production, seed banks, seed dispersal, and establishment of this species.	Number of acres of whitebark pine occupied and suitable habitat impacted by the SGP.	Results of modeled suitable habitat for whitebark pine (AECOM 2019a) and whitebark pine surveys (Tetra Tech 2020b) are available within suitable habitat in the analysis area. Approximately 2,069 acres of occupied whitebark pine habitat and 4,259 acres of modeled suitable habitat for whitebark pine were identified within the analysis area.	Same as Baseline Condition.	The 2021 MMP would remove an estimated 259.5 acres of occupied whitebark pine habitat, 78 acres of assumed occupied habitat (16.3% of occupied habitat in the analysis area), and 287.4 acres of modeled suitable habitat (6.7% of modeled suitable habitat in the analysis area).	The Johnson Creek Route Alternative would remove an estimated 108.5 acres of occupied whitebark pine habitat, 78 acres of assumed occupied habitat (9.0% of occupied habitat in the analysis area) but no additional acres of modeled suitable habitat.
	Estimated number of mature whitebark pine trees to be cut during SGP construction.	Results of whitebark pine surveys (Tetra Tech 2020b) are available within the analysis area.	Same as Baseline Condition.	An estimated 1,278 individual trees, 27 of which were observed as having cones during field surveys in 2019, would be removed under the 2021 MMP.	An estimated 777 individual trees, 27 of which were observed as having cones, would be removed under the Johnson Creek Route Alternative.
The SGP would impact known occurrences of sensitive and forest watch plant species.	Presence of known occurrences of special status plants or occupied habitat within 300 feet of the SGP disturbance area.	Rare Plant Geographic Information System Data are available for the SGP area (IFWIS 2017).	Same as Baseline Condition.	The 2021 MMP would impact known occurrences of bent-flowered milkvetch, least moonwort, Sacajawea's bitterroot, Blandow's helodium, sweetgrass, and Rannoch-rush.	The Johnson Creek Route Alternative would impact known occurrences of bent-flowered milkvetch, least moonwort, and Sacajawea's bitterroot.
The SGP would result in a direct loss of modeled potential habitat for sensitive and forest watch plant species.	Acres of modeled potential habitat for sensitive and forest watch plant species disturbed by the SGP.	Modeled potential habitat for special status plant species is available for the SGP area.	Same as Baseline Condition.	The 2021 MMP would impact between 10.4 and 887.2 acres, (depending on the species) of modeled potential habitat for sensitive and forest watch plant species.	The Johnson Creek Route Alternative would impact between 6.6 and 704.7 acres, (depending on the species) of modeled potential habitat for sensitive and forest watch plant species.
SGP actions would result in increased potential for non-native plant establishment and spread.	Total acres of land disturbed by the SGP.	PVG data are available for the analysis area on NFS lands in the PNF and BNF and LANDFIRE data are available for the analysis area outside Forest Service lands.	Same as Baseline Condition.	The 2021 MMP-related vegetation clearing would impact 3,563.7 acres, including primarily undisturbed areas for the Burntlog Route where an increase in the potential for non-native plant establishment and spread would be more deleterious.	The Johnson Creek Route Alternative would impact 3,399.3 acres through vegetation clearing; however, much of the disturbance area would be along or near previously disturbed areas (i.e., existing roads) where non-native plants are already established or could become established as a result of previously authorized activities.
Wetland and Riparian					
Loss of wetland and riparian areas.	*Within the mine site focus area* - Acres of wetland and riparian habitat permanently impacted (i.e., lost) due to SGP construction.	There are 429 acres of wetlands delineated in the mine site focus area. There are 2,655 acres of RCAs mapped in the mine site focus area.	Same as Baseline Condition.	119.8 acres of wetlands would be permanently impacted at the mine site (28% of wetlands at the mine site). 618.2 acres of RCAs would be permanently impacted at the mine site.	Same as 2021 MMP.
	Within the off-site focus area - Acres of wetland and riparian habitat permanently impacted (i.e., lost) through SGP construction.	There are 2,138.6 acres of wetland delineated in the off-site focus area. There are 127,389 acres of RCAs mapped in the off-site focus area.	Same as Baseline Condition.	30.7 acres of wetlands would be permanently impacted within the off-site focus area. An additional 46.3 acres would be temporarily impacted. 299.5 acres of RCAs would be permanently impacted within the off-site focus area.	25.9 acres of wetlands would be permanently impacted within the off-site focus area. 353.0 acres of riparian areas would be permanently impacted within the off-site focus area.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
Impacts on wetland and riparian functions[1].	Functional units of wetlands, including high-value wetlands (i.e., Category I and II per Montana Wetland Assessment Method [MWAM]), lost due to SGP construction.	Existing Wetland Functions and Values of AAs assessed for the SGP are available for the analysis area.	Same as Baseline Condition.	822.4 functional units would be permanently impacted, including 373.3 high-value functional units. In addition, approximately 235.3 functional units would be temporarily impacted due to transmission line construction.	702.8 functional units would be lost, including 373.1 high-value functional units. In addition, approximately 261.4 functional units would be temporarily impacted due to transmission line construction
Wetland and riparian area fragmentation.	Number of wetlands crossed by new roads.	See baseline reports and associated figures.	Same as Baseline Condition.	39 wetlands would be crossed by new roads.	Six wetlands would be crossed by new roads.
	Total area (in acres) of wetlands that would be permanently impacted (i.e., lost).	See first row in this table for acreages on wetlands and RCAs.	Same as Baseline Condition.	150.5 wetland acres permanently impacted.	145.7 wetland acres permanently impacted.
Alteration of wetland and riparian areas due to changes in water balance.	Wetland acres within indirect impact area that would be affected by groundwater drawdown (maximum extent of drawdown under all years).	Wetlands within the groundwater analysis area are discussed in the Water Quantity Specialist Report (Forest Service 2023f).	Same as Baseline Condition.	15.8 acres of wetlands would potentially be affected by drawdown.	Same as 2021 MMP.
Alteration of wetland and riparian areas due to changes in water quality.	Quantitative analysis of estimated changes in water quality parameters based on predictive water modelling in areas coincident with wetlands within the indirect impact area.	Surface water and groundwater quality are discussed in the Water Quality Specialist Report (Forest Service 2023f).	Same as Baseline Condition.	The SGP would have the potential to impact wetland and riparian area water quality, primarily associated with sedimentation and traffic-related incidents. These impacts are discussed further in the Water Quality Specialist Report (Forest Service 2023f). These effects would be minimized through best management practices, spill prevention, and spill response measures. Effects if sedimentation and fugitive dust would be within normal range of properly maintained Forest Service roads.	Water quality effects on wetlands and riparian areas would be the same as the 2021 MMP, though no construction or use of Burntlog Route would eliminate water quality impacts in that area but would increase the impacts along the Johnson Creek Route that is parallel and near East Fork SFSR and Johnson Creek.
Fish Resources and Fish Habitat					
The SGP may cause changes in fish habitat in the analysis area that may affect aquatic species, including federally listed fish species and aquatic habitat (i.e., Critical Habitat) within and downstream of the SGP area.	Direct Impacts to Individuals	No mining related activities.	Same as Baseline Condition.	Individuals would be affected by dewatering, salvage, and relocation due to modification of stream channels and the dewatering of the Yellow Pine Pit lake.	Same as 2021 MMP.
	Altered Physical Stream Structure	No mining related activities.	Same as Baseline Condition.	Diversion of stream channels, elimination of the Yellow Pine Pit lake, the diversion tunnel, and new barriers would affect fish occupancy and habitat during construction and operations.	Same as 2021 MMP.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
	Changes to Water Temperature WCI	No mining related activities.	Same as Baseline Condition.	During operations, summer maximum stream water temperatures in Meadow Creek and the East Fork South Fork would decrease by up to 3.7°C due to diversion of Meadow Creek around the TSF and TSF Buttress. Upon closure and routing of Meadow Creek to the restored stream channel on top of the reclaimed TSF, summer maximum stream temperatures would increase by up to 6.8°C due to the time needed for revegetation to result in riparian shading of the stream. Over time, summer maximum stream temperatures would decline to near or below baseline conditions except for the Meadow Creek upstream of East Fork Meadow Creek which would remain 1.1°C above existing conditions.	Same as 2021 MMP.
	Sediment and turbidity from construction of temporary roads and transmission lines	No mine-related traffic on existing Forest Service Roads.	Same as Baseline Condition.	Construction: Johnson Creek Route access road would include 43 stream crossings and transmission lines would cross 37 streams. 11.5 miles (18% of routes) would be within 100 feet of streams. Operations: Burntlog Route access road would include 37 stream crossings. 1.56 miles (4% of routes) would be within 100 feet of streams. Sedimentation and fugitive dust predicted to be within normal range of properly maintained Forest Service roads.	Same as 2021 MMP except 11.5 miles of stream would be within 100 feet of streams during operations and there would be 43 stream crossings.
	Change in Access to fish habitat through culverts from road construction	Use of existing roads and culverts.	Same as Baseline Condition.	Culvert replacements on the Burntlog Route may increase or re-establish habitat access for native and non-native species.	Same as Baseline Condition.
	Change in amount of stream habitat by barrier removal and new barriers	Existing barriers in place.	Same as Baseline Condition.	Removal of the box culvert in the EFSFSR would provide additional access to around 6 km of intrinsic potential habitat for Chinook salmon and steelhead, with the removal of the barrier at the YPP lake cascade adding more than an additional 2.5 km for Chinook salmon. Removal of these barriers will improve access to nearly 33 km of habitat for bull trout and westslope cutthroat trout, thus improving genetic integration. Removal of barriers in the downstream end of Fiddle Creek would provide an additional 2 km of habitat for bull trout and westslope cutthroat trout. Creation of a partial gradient barrier in East Fork Meadow Creek would provide additional access to habitat for bull trout and westslope cutthroat trout. The removal and addition of barriers in Meadow Creek would ultimately result in a reduction in access to the Meadow Creek headwaters.	Same as 2021 MMP.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
	Changes to Chemical Contaminants Associated with Spills	No mining related activities.	Same as Baseline Condition.	Effects of spills would be managed via application of Forest Service requirements and project design features to minimize effects.	Same as 2021 MMP. Effects from spills would be potentially more significant because 6.5 miles of the permanent access road would be within 100 feet of streams during operations.
	Changes to Chemical Contaminants Associated with Mining Activity	<u>TSF Area</u> Aluminum: No exceedance Copper: No exceedance Antimony: 0.001 mg/L to 0.025 mg/L Arsenic: 0.004 mg/L to 0.075 mg/L Mercury: 1 ng/L to 2 ng/L <u>EFSFSR Downstream from SGP</u> Aluminum: No exceedance Copper: No exceedance Antimony: 0.0052 mg/L to 0.025 mg/L Arsenic: 0.014 mg/L to 0.076 mg/L Mercury: 3.2 ng/L to 9.6 ng/L	Same as Baseline Condition.	<u>TSF Area</u> Aluminum: No exceedance Copper: No exceedance Antimony: 0.001 mg/L to 0.014 mg/L Arsenic: 0.001 mg/L to 0.018 mg/L Mercury: 1 ng/L to 2 ng/L <u>EFSFSR Downstream from SGP</u> Aluminum: No exceedance Copper: No exceedance Antimony: 0.003 mg/L to 0.016 mg/L Arsenic: 0.010 mg/L to 0.066 mg/L Mercury: 3.0 ng/L to 10.0 ng/L Increased seasonal peaks in mercury concentrations would be 1 to 3 ng/L above existing conditions in the mine area but below applicable water quality standards (12 ng/L). The effects of incremental change in water column mercury concentrations on fish tissue concentrations is uncertain. The effects of mercury concentrations on methylated mercury concentrations in the mine site area are comparable to existing conditions based on site-specific ratios of methylmercury to mercury concentrations (up to 2%). Effects of differences in peak mercury concentrations on downstream mercury methylation have not been quantified.	Same as 2021 MMP.
	Changes in Stream Flow	No mining related activities.	Same as Baseline Condition.	<u>EFSFSR Upstream from Sugar Creek:</u> Up to 24.8% reduction in flow during operations. No reduction in flow post-closure. <u>EFSFSR at Stibnite:</u> Up to 20.4% reduction in flow during operations. No reduction in flow post-closure. <u>EFSFSR Upstream from Meadow Creek:</u> Up to 3.8% reduction in flow during operations. Up to 2% reduction in flow post-closure. <u>Meadow Creek:</u> Up to 36.4% reduction in flow during operations. Less than 1% reduction in flow post-closure.	Same as 2021 MMP.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
	Suitable Habitat Based on Optimal Thermal Requirements for Chinook Salmon	<u>Below Yellow Pine Pit:</u> Adult Migration (15-19˚C: 0 km Adult Migration (12-17˚C): 2.01 km Spawning (13˚C): 0 km Spawning (4-14˚C): 2.01 km Incubation: 0 km Juvenile Rearing: 2.01 km Total Available: 2.01 km <u>Above Yellow Pine Pit:</u> Adult Migration: 2.43 km Adult Migration (12-17˚C): 7.48 km Spawning (13˚C): 1.51 km Spawning (4-14˚C): 10.92 km Incubation: 3.44 km Juvenile Rearing: 10.92 km Total Available: 10.92 km	Same as Baseline Condition.	**Middle of Operations (Mine Year 6):** <u>Below Yellow Pine Pit:</u> Adult Migration: 0 km Adult Migration (12-17˚C): 1.48 km Spawning (13˚C): 0 km Spawning (4-14˚C): 1.48 km Incubation: 0 km Juvenile Rearing: 1.48 km Total Available: 1.48 km <u>Above Yellow Pine Pit:</u> Adult Migration: 0.25 km Adult Migration (12-17˚C): 3.35 km Spawning (13˚C): 0.28 km Spawning (4-14˚C): 6.85 km Incubation: 3.50 km Juvenile Rearing: 10.92 km Total Available: 10.92 km **Post-Closure:** <u>Below Yellow Pine Pit:</u> Adult Migration: 0 km Adult Migration (12-17˚C): 1.66 km Spawning (13˚C): 0 km Spawning (4-14˚C): 1.66 km Incubation: 0.73 km Juvenile Rearing: 1.66 km Total Available: 1.66 km <u>Above Yellow Pine Pit:</u> Adult Migration: 0 km Adult Migration (12-17˚C): 6.57 km Spawning (13ºC): 0 km Spawning (4-14ºC): 10.07 km Incubation: 7.39 km Juvenile Rearing: 18.97 km Total Available: 18.97 km	Same as 2021 MMP.
	Chinook Salmon Flow Productivity	<u>EFSFSR Upstream of Sugar Creek:</u> 1.06 <u>EFSFSR at Stibnite:</u> 1.06 <u>EFSFSR Upstream of Meadow Creek:</u> 1.06 <u>Meadow Creek:</u> 1.06	Same as Baseline Condition.	<u>EFSFSR Upstream from Sugar Creek:</u> Up to 21.4% reduction during operations. No reduction post-closure. <u>EFSFSR at Stibnite:</u> Up to 17.7% reduction during operations. No reduction post-closure. <u>EFSFSR Upstream from Meadow Creek:</u> Up to 3.9% reduction during operations. Up to 1.8% reduction post-closure. <u>Meadow Creek:</u> Up to 28.6% reduction during operations. Less than 1% reduction post-closure.	Same as 2021 MMP.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
	Chinook Salmon Intrinsic Potential	11.15 km	Same as Baseline Condition.	Operations: Loss of 3.34 km (30 percent) Closure: Gain of 0.28 km (2 percent).	Same as 2021 MMP.
	Chinook Salmon Critical Habitat	EFSFSR above Yellow Pine Pit: 25.88 km Meadow Creek: 6.81 km	Same as Baseline Condition.	Operations: Above Yellow Pine Pit: 25.9 km Closure: Above Yellow Pine Pit: 25.9 km	Same as 2021 MMP.
	Suitable Habitat Based on Optimal Thermal Requirements for Steelhead	Below Yellow Pine Pit: Incubation: 2.01 km Juvenile Rearing: 2.01 km Total Available: 2.01 km Above Yellow Pine Pit: Incubation: 0 km Juvenile Rearing: 0 km Total Available: 0 km	Same as Baseline Condition.	**Middle of Operations (Mine Year 6):** Below Yellow Pine Pit: Incubation: 0 km Juvenile Rearing: 1.48 km Total Available: 1.48 km Above Yellow Pine Pit: Incubation: 0 km Juvenile Rearing: 8.52 km Total Available: 8.52 km **Post-Closure:** Below Yellow Pine Pit: Incubation: 0 km Juvenile Rearing: 1.66 km Total Available: 1.66 km Above Yellow Pine Pit: Incubation: 0 km Juvenile Rearing: 10.07 km Total Available: 10.07 km	Same as 2021 MMP.
	Steelhead Flow Productivity	EFSFSR Upstream from Sugar Creek: 1.24 EFSFSR at Stibnite: 1.24 EFSFSR Upstream from Meadow Creek: 1.24 Meadow Creek: 1.24	Same as Baseline Condition.	EFSFSR Upstream from Sugar Creek: Up to 21.1% reduction during operations. No reduction post-closure. EFSFSR at Stibnite: Up to 17.6% reduction during operations. No reduction post-closure. EFSFSR Upstream from Meadow Creek: Up to 1.8% reduction during operations. No reduction post-closure. Meadow Creek: Up to 29.5% reduction during operations. Less than 1% reduction post-closure.	Same as 2021 MMP.
	Steelhead Intrinsic Potential	10.67 km	Same as Baseline Condition.	Operations: Loss of 2.33 km (22 percent) Closure: Gain of 1.77 km (17 percent).	Same as 2021 MMP.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
	Steelhead Critical Habitat	No critical habitat at mine site. Critical habitat in proximity to access routes could be affected by spills.	Same as Baseline Condition.	No change from Baseline for mine site area. See above for spills summary.	Same as 2021 MMP. See above for spills summary.
	Suitable Habitat Based on Optimal Thermal Requirements for Bull Trout	<u>Below Yellow Pine Pit:</u> Spawning - FA: 0 km Spawning - FR: 0 km Spawning - FUR: 2.01 km Incubation - FA: 0 km Incubation - FUR: 0 km Juvenile Rearing - FA: 2.01 km Juvenile Rearing - FR: 0 km Juvenile Rearing - FUR: 2.01 km Total Available: 2.01 km <u>Above Yellow Pine Pit:</u> Spawning - FA: 1.62 km Spawning - FR: 7.76 km Spawning - FUR: 14.82 km Incubation - FA: 0 km Incubation - FUR: 24.20 km Juvenile Rearing - FA: 12.16 km Juvenile Rearing - FR: 9.60 km Juvenile Rearing - FUR: 2.43 km Total Available: 24.20 km	Same as Baseline Condition.	**Middle of Operations:** <u>Below Yellow Pine Pit:</u> Spawning - FA: 0 km Spawning - FR: 0 km Spawning - FUR: 1.48 km Incubation - FA: 0 km Incubation - FUR: 1.48 km Juvenile Rearing - FA: 0 km Juvenile Rearing - FR: 1.48 km Juvenile Rearing - FUR: 0 km Total Available: 1.48 km <u>Above Yellow Pine Pit:</u> Spawning - FA: 1.42 km Spawning - FR: 6.28 km Spawning - FUR: 8.64 km Incubation - FA: 0 km Incubation - FUR: 16.34 km Juvenile Rearing - FA: 10.35 km Juvenile Rearing - FR: 5.99 km Juvenile Rearing - FUR: 0 km Total Available: 16.34 km **Post-Closure:** <u>Below Yellow Pine Pit:</u> Spawning - FA: 0 km Spawning - FR: 0.05 km Spawning - FUR: 1.61 km Incubation - FA: 0 km Incubation - FUR: 1.66 km Juvenile Rearing - FA: 0 km Juvenile Rearing - FR: 1.66 km Juvenile Rearing - FUR: 0 km Total Available: 1.66 km <u>Above Yellow Pine Pit:</u> Spawning - FA: 1.42 km Spawning - FR: 6.34 km Spawning - FUR: 8.29 km Incubation - FA: 0 km Incubation - FUR: 16.05 km Juvenile Rearing - FA: 7.76 km Juvenile Rearing - FR: 8.29 km Juvenile Rearing - FUR: 0 km Total Available: 16.05 km	Same as 2021 MMP.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
	Bull Trout Distance Weighted Average Occupancy Probabilities	Weighted usable area was estimated based on index streams, and the conditions are not identical to the index stream.	Same as Baseline Condition.	EFSFSR below Sugar Creek: A decrease in flows would result in a decrease in weighted usable area during operations. Slight increase in flows would result in a slight increase in weighted usable area post-closure. EFSFSR at between Sugar Creek and Meadow Creek: A decrease in flows would result in a decrease in weighted usable area during operations. Slight increase in flows would result in a slight increase in weighted usable area post-closure. EFSFSR Upstream of Meadow Creek and Meadow Creek: A decrease in flows would result in a decrease in weighted usable area during operations. Slight decrease in flows would result in a slight decrease in weighted usable area post-closure.	Same as 2021 MMP.
	Bull Trout Length of Available Habitat for Potential Occupancy	EFSFSR between YPP and Sugar Creek: 1.2 km EFSFSR at between Meadow Creek and YPP: 6.5 km EFSFSR Upstream of Meadow Creek: 13.1 km Meadow Creek: 13.1 km	Same as Baseline Condition.	EFSFSR between YPP and Sugar Creek: 0.5 – 0.7 km during operations. 0.7 km post-closure EFSFSR at between Meadow Creek and YPP: 5.6 – 7.8 km during operations. 8.1 km post-closure. EFSFSR Upstream of Meadow Creek: 13.1 – 13.9 km during operations. 13.1 km post-closure. Meadow Creek: 6.8 - 7.4 km during operations. 14.0 km post-closure.	Same as 2021 MMP.
	Suitable Habitat Based on Optimal Thermal Requirements for Westslope Cutthroat Trout	Below Yellow Pine Pit: Incubation: 0 km Juvenile Rearing: 2.01 km Total Available: 2.01 km Above Yellow Pine Pit: Incubation: 0.85 km Juvenile Rearing: 20.91 km Total Available: 24.20 km	Same as Baseline Condition.	**Middle of Operations:** Below Yellow Pine Pit: Incubation: 0 km Juvenile Rearing: 1.48 km Total Available: 1.48 km Above Yellow Pine Pit: Incubation: 0.78 km Juvenile Rearing: 17.33 km Total Available: 18.11 km **Post-Closure:** Below Yellow Pine Pit: Incubation: 0 km Juvenile Rearing: 1.66 km Total Available: 1.66 km Above Yellow Pine Pit: Incubation: 2.11km Juvenile Rearing: 21.65 km Total Available: 23.77 km	Same as 2021 MMP.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
	Westslope Cutthroat Trout Distance Weighted Average Occupancy Probabilities	Weighted usable area was estimated based on index streams, and the conditions are not identical to the index stream.	Same as Baseline Condition.	EFSFSR below Sugar Creek: A decrease in flows would result in a decrease in weighted usable area during operations. Slight increase in flows would result in a slight increase in weighted usable area post-closure. EFSFSR at between Sugar Creek and Meadow Creek: A decrease in flows would result in a decrease in weighted usable area during operations. Slight increase in flows would result in a slight increase in weighted usable area post-closure. EFSFSR Upstream of Meadow Creek and Meadow Creek: A decrease in flows would result in a decrease in weighted usable area during operations. Slight decrease in flows would result in a slight decrease in weighted usable area post-closure.	Same as 2021 MMP.
	Westslope Cutthroat Trout Length of Available Habitat for Potential Occupancy	EFSFSR between YPP and Sugar Creek: 1.2 km EFSFSR at between Meadow Creek and YPP: 6.7 km EFSFSR Upstream of Meadow Creek: 13.1 km Meadow Creek: 13.1 km	Same as Baseline Condition.	EFSFSR between YPP and Sugar Creek: 0.5 – 0.7 km during operations. 0.8 km post-closure EFSFSR at between Meadow Creek and YPP: 5.6 – 7.8 km during operations. 8.1 km post-closure. EFSFSR Upstream of Meadow Creek: 13.1 – 13.9 km during operations. 13.1 km post-closure. Meadow Creek: 6.8 - 7.4 km during operations. 14.0 km post-closure.	Same as 2021 MMP.
Wildlife					
The SGP may cause changes in wildlife habitat in the analysis area that may affect wildlife species including special-status species (endangered, threatened, MIS, and sensitive species)	Acres of general wildlife habitat disturbed.	Hydrologic Unit Code (HUC) 12 Wildlife Analysis Area: 400,417 acres	Same as Baseline Condition	Habitat Impacts: 3,266 acres	Habitat Impacts: 3,095 acres

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
	Acres of special-status wildlife habitat disturbed.	Canada Lynx Analysis Area: 656,493 acres Northern Idaho ground squirrel (NIDGS) Analysis Area: 17,917 acres Wolverine Analysis Area: 316,035 acres Wildlife Analysis Area: 400,417 acres	Same as Baseline Condition	Canada Lynx: 194 acres NIDGS: 63 acres Wolverine: 2,406 acres Monarch Butterfly: 121.4 acres White-headed Woodpecker: 16 acres Lewis's Woodpecker: 11 acres American Three-toed Woodpecker: 57 acres Black-backed Woodpecker: 89 acres Dusky Grouse: 160 acres Boreal Owl: 37 acres Fisher: 54 acres Flammulated Owl: 44 acres Great Gray Owl: 270 acres Northern Goshawk: 89 acres Pileated Woodpecker: 1 acre Silver-haired bat: 219 acres Mountain Quail: 405 acres Bighorn Sheep (Summer): 636 acres Bighorn Sheep (Winter): 137 acres Columbia Spotted Frog: 1,049 acres	Canada Lynx: 175 acres NIDGS: 63 acres Wolverine: 2,005 acres Monarch Butterfly: 121.4 acres White-headed Woodpecker: 29 acres Lewis's Woodpecker: 25 acres American Three-toed Woodpecker: 48 acres Black-backed Woodpecker: 80 acres Dusky Grouse: 208 acres Boreal Owl: 36 acres Fisher: 45 acres Flammulated Owl: 64 acres Great Gray Owl: 225 acres Northern Goshawk: 81 acres Pileated Woodpecker: 1 acre Silver-haired bat: 275 acres Mountain Quail: 449 acres Bighorn Sheep (Summer): 629 acres Bighorn Sheep (Winter): 149 acres Columbia Spotted Frog: 1,053 acres
	Acres of disturbance and the proximity of the proposed mine operations to high-value habitats such as crucial and or high-value big game ranges, wetlands, and seep and spring areas.	N/A	Same as Baseline Condition.	Habitat Impacts: 3,266 acres Canada Lynx: 194 acres NIDGS: 63 acres Wolverine: 2,406 acres Monarch Butterfly: 121.4 acres Bighorn Sheep (Summer): 636 acres Bighorn Sheep (Winter): 137 acres Columbia Spotted Frog: 1,049 acres	Habitat Impacts: 3,096 acres Canada Lynx: 175 acres NIDGS: 63 acres Wolverine: 2,005 acres Monarch Butterfly: 121.4 acres Bighorn Sheep (Summer): 629 acres Bighorn Sheep (Winter): 149 acres Columbia Spotted Frog: 1,053 acres
	Change in noise levels (in decibels) in—or in proximity to—wildlife habitat	Existing ambient sound levels were measured at various noise-sensitive receptor sites and varied between 34 and 64 dBA.	Same as Baseline Condition.	Ongoing noise levels would attenuate to 55 dBA within 0.8 miles of the disturbances based on distance alone. Temporary disturbances (e.g., blasting, winter road maintenance) would be audible further away. Construction: Mine site noise would attenuate to 55 dBA at 0.8 mile from source; access road construction would attenuate to 55 dBA at 0.57 mile on distance alone. Operations: Based on distance alone, mine site noise would attenuate to 55 dBA at 1.5 miles; blasting would attenuate to 55 dBA at 2.2 miles; road maintenance would attenuate at 0.4 to 0.55 miles; and mine traffic would be below the threshold at 49 dBA. Closure: Noise impacts would be similar to the construction phase.	Same as the 2021 MMP, with the exception of the Burntlog Route – noise from traffic on Johnson Creek Route would be similar. Helicopter installation of utility structures would reduce habitat impacts but would introduce noise that could affect sensitive species. Construction: Helicopter use would attenuate to 55 dBA approximately 1.7 miles from the source of the activity on distance alone.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
The SGP may affect wildlife by introducing barriers to movement, including the mine site, infrastructure, new/existing maintained roads, new transmission line.	Miles of new roads proposed for the SGP.	Access Roads – existing roads – 89 miles Utilities – existing roads – 25 miles	Same as Baseline Condition.	Access Roads – 15 miles new road on Burntlog Route; 4 miles public access road through Operations Area Boundary Cabin Creek OSV Route – 10.4 miles groomed OSV route through closure Johnson Creek OSV Route – 8 miles groomed OSV route west of roadway through construction Utilities – new utility access roads – 25 miles	Access Roads – 4 miles public access road through Operations Area Boundary Cabin Creek OSV Route – 10.4 miles groomed OSV route through closure Johnson Creek OSV route – 8 miles groomed OSV route west of roadway through closure Utilities – new utility access roads – 25 miles
	Acres of disturbance for new and upgraded transmission lines.	Existing transmission lines –459 acres	Same as Baseline Condition.	New transmission lines – 115 acres Upgraded transmission lines – 158 acres	Same as the 2021 MMP.
	Length of potential movement barriers.	There are no known or designated wildlife corridors for big game species or listed species. Linkage areas for Canada lynx have been estimated to occur north to south across Warm Lake Road, and east to west across the SFSR.	Same as Baseline Condition.	**Potential barriers:** • Mine Site – 6 miles long x 1 mile wide • Access Roads – new roads – 38 miles • Utilities – new utility access roads: 25 miles and new transmission corridors: 115 acres • Off-site Facilities – no barrier effects	Same as the 2021 MMP, with the exception of the Burntlog Route, which would reduce new access road mileage as a barrier.
The SGP may affect wildlife by potentially increasing the risk of direct injury or mortality.	Amount of increased traffic along the access routes, or acres of ground disturbance for less-mobile species.	Baseline AADT: • Warm Lake Road – 1,670 • Johnson Creek Road – 70 • Stibnite Road – 30 • Burnt Log Road – 70	Same as Baseline Condition.	**AADT – Construction through Post Closure:** • Warm Lake Road – 1,826 - 1,868 • Johnson Creek Road – 70 - 135 • Stibnite Road – 30 - 95 • Burnt Log Road – 120	**AADT – Construction through Post Closure:** • Warm Lake Road – 1,826 – 1,868 • Johnson Creek Road – 70 - 135 • Stibnite Road – 30 - 95
	Miles of new roads and new transmission lines.	Access Roads – existing roads – 135 miles Utilities – existing roads – 30 miles	Same as Baseline Condition.	Access Roads – new roads – 19 miles Utilities – new utility access roads – 25 miles	Access Roads – new roads – 4 miles Utilities – same as the 2021 MMP
	Miles of existing roads that are not currently plowed that would be plowed.	Currently plowed: Warm Lake Road – 26 miles Stibnite Road – 14 miles Johnson Creek Road – 10 miles	Same as Baseline Condition.	Proposed (new) to be plowed: Burnt Log Road – 2.3 miles (currently groomed) Burnt Log Road Extension – 15 miles (proposed new) Johnson Creek Road – 17 miles (construction) Warm Lake Road – 8 miles (Warm Lake to Landmark)	Proposed (new) to be plowed: Johnson Creek Road – 17 miles (conversion of existing OSV portion of Johnson Creek Road) Warm Lake Road – same as the 2021 MMP
Timber Resources					
The SGP may change the availability of timber resources, including sawtimber and special forest products.	Volumes of timber resources removed.	Timber resources data are available for the analysis area on NFS lands in the PNF and BNF.	0 CF (total)	438,243 CF (*total*) 342,442 CF (Forest Service) 95,801 CF (Other Federal, State and Private Land)	547,984 CF *(total)* 447,058 CF (Forest Service) 100,926 CF (Other Federal, State and Private Land)
	Acres from which timber resources removed.	Timber resources data are available for the analysis area on NFS lands in the PNF and BNF.	0 acres *(total)*	595 acres (total) 468 acres (Forest Service) 127 acres (Other Federal, State and Private Timber)	733 acres (total) 601 acres (Forest Service) 132 acres (Other Federal, State and Private Timber)
	Acres suited for timber production permanently converted to other, non-productive land uses.	Maps of the Timberland Vegetation Communities in the analysis area are included in **Section 3.14**.	0 acres *(total)*	66 acres (*BNF*) 0 acres (*PNF*)	282 acres *(BNF)* 0 acres (*PNF*)

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
Land Use and Land Management					
The SGP would cause changes in land use or land management.	Acres of land used for SGP components by land management agency.	(Analysis area) Private: 925 acres State: 77 acres BNF: 1,027 acres PNF: 2,373 acres BOR: 25 acres	Same as Baseline Condition.	Private: 819 acres State: 62 acres BNF: 933 acres PNF: 1,439 acres BOR: 12.5 acres	Private: 828 acres State: 62 acres BNF: 820 acres PNF: 1,372 acres BOR: 12.5 acres
	Acres of total and new land disturbance within SGP area.	Existing disturbance acreage within analysis area: 1,554 acres (includes historic mine disturbance, existing roads and utilities)	Same as Baseline Condition.	Disturbance acreage impacts: 3,266 total acres 51% (1,674 acres) of total is new disturbance	Disturbance acreage impacts: 3,095 total acres 50% (1,544 acres) of total is new disturbance
The SGP could cause changes in or create new ROWs or easements.	Miles or acres of new or changed ROWs or easements, regardless of jurisdiction.	Total existing ROW (transmission lines and roads): 666 acres	Same as Baseline Condition.	Total new ROW (transmission lines and roads): 763 acres	Total new ROW (transmission lines and roads): 639 acres
Access and Transportation					
The SGP may affect access to public lands during mine construction, operations, and closure and reclamation.	Number, location, and description of changes in access due to new and improved roadways.	See **Table 3.16-1** and **Figure 3.16-1**.	Same as Baseline Condition.	Burntlog Route (plowed). Mine site public access during operations (not plowed). Loss of winter groomed OSV route on Warm Lake Road to Landmark. Loss of winter groomed OSV route on Johnson Creek Road from Wapiti Meadows to Trout Creek Campground during construction of Burntlog Route.	No Burntlog Route, only Johnson Creek Route (plowed). Mine site public access during operations (not plowed). Loss of winter groomed OSV route on Warm Lake Road to Landmark. Loss of winter groomed OSV route on Johnson Creek Road from Wapiti Meadows to Trout Creek Campground for life of SGP.
The SGP may change the miles of roads and trails, the amount of use, and types of vehicles on each road or trail.	Miles of new road for public use.	Forest Service = 1,557 miles Valley County = 278 miles State = 131 miles	Same as Baseline Condition.	Forest Service = no change Valley County = 2.2 miles State = no change Private = 15 miles (with an additional 4 miles through the SGP)	Forest Service = no change Valley County = 2.2 miles State = no change Private = 4 miles through the SGP
	Change in amount of use.	See **Table 3.16-2** for existing roads.	Same as Baseline Condition.	Johnson Creek Route = 5 mine-related vehicles/hr. during construction Burntlog Route = 4 mine- related vehicles/hr. during operations; 2 mine-related vehicles/hr. closure and operations	Johnson Creek Route = 5 mine-related vehicles/hr. during construction; 4 mine- related vehicles/hr. during operations; 2 mine-related vehicles/hr. closure and reclamation
	Changes in frequency of rail, air, and water transportation.	Rail – no active lines Air – 7 public use airports Water – Port of Lewiston	Same as Baseline Condition.	Rail - No impact. Air – Helicopter usage for when roads are inaccessible. Water – potentially 1 roundtrip (2 truck trips) daily of antimony concentrate that could be shipped out via the Port of Lewiston.	Rail - No impact. Air – Helicopter usage for when roads are inaccessible. Helicopter usage during construction to install repeaters. Water – potentially 1 roundtrip (2 truck trips) daily of antimony concentrate that could be shipped out via the Port of Lewiston.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
The SGP may affect public safety on the roads used by mine vehicles during construction, operations, and closure and reclamation activities.	Approximate miles of roads used by mine vehicles.	Johnson Creek Route = 70 miles Burntlog Route = 0 mile (does not exist)	Same as Baseline Condition.	Johnson Creek Route = 70 miles Burntlog Route = 71 miles	Johnson Creek Route = 70 miles Burntlog Route = 0 mile
	Change in traffic volume. (AADT)	Refer to **Table 3.16-2**.	Same as Baseline Condition.	Construction = 65 (45 HV) Operations = 50 (33 HV) Closure and Reclamation = 25 (13 HV) Post Closure = 6 (0 HV)	Construction = 65 (45 HV) Operations = 50 (33 HV) Closure and Reclamation = 25 (13 HV) Post Closure = 6 (0 HV)
	Number of accidents, both current and projected.	Warm Lake Road = 8/year Johnson Creek Road = 2/year Stibnite Road = 1/year	Same as Baseline Condition.	Perpetua would implement safety measures to reduce accidents including radio communications, pilot cars, and hour restrictions.	Perpetua would implement safety measures to reduce accidents including radio communications, pilot cars, and hour restrictions. Johnson Creek Route has a steeper topography and terrain that would require wider roads, more cut/fill sections, and more switchbacks.
	Change in emergency access.	N/A	N/A	Additional access routes through the SGP.	Additional access routes via public access during the winter.
	Change in OSV access.	Groomed OSV route along Warm Lake Road from Warm Lake Parking Area to Landmark Groomed OSV route along Johnson Creek Road from Landmark north to Wapiti Meadows	Same as Baseline Condition.	Groomed OSV from Warm Lake to Landmark closed for use for life of SGP. An alternative OSV route would be established from Trout Creek Campground to Landmark. Warm Lake area OSV would be created north of Warm Lake Road to southern end of Cabin Creek Road OSV Route to Warm Lake Road. Paradise Valley, North Shore Lodge, and Johnson Creek Road to FR 579 OSV connectors. OSV from Trout Creek Campground to Wapiti Meadows closed through construction of Burntlog Route. Groomed OSV route would be re-established on Johnson Creek Road between Landmark and Wapiti Meadows following construction.	Same as under the 2021 MMP; except the OSV from Trout Creek Campground to Wapiti Meadows closed for life of SGP.
Heritage Resources					
The SGP may affect historic properties through ground disturbance.	Locations of ground disturbance.	N/A	N/A	3,266 acres Ground disturbing activities could affect historic properties at these locations: Access Roads (including OSV routes) Construction of Burntlog Route and associated facilities (access roads, borrow areas) VHF repeater sites and telecommunications tower location and associated access roads Transmission line corridor upgrades and access roads	3,095 acres Same as 2021 MMP except: Reduces ground disturbance. Limits disturbance for new road construction as Burntlog Route would not be constructed. Extensive upgrades to Johnson Creek and Stibnite Roads would be required including cut and fill areas.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
	Number of historic properties that could be affected by ground disturbance.	A total of 53 historic properties are within the Physical are of potential effect (APE). Additional 97 historic properties are within the visual, auditory, and vibratory (VAV) APE. Numbers and locations of potential TCPs and CLs have not been disclosed.	Existing historic properties located in the analysis area would remain in their current states and would be expected to experience natural deterioration over time.	53 historic properties in Physical APE and 97 in VAV APE. Potential physical and/or visual impacts to an unknown number of TCPs or CLs may occur if identified. Impacts would be short term to permanent, localized, and minor to moderate depending on avoidance and mitigation. The PA would outline the process and procedures for mitigation for adverse effects to historic properties.	51 historic properties in Physical APE and 84 in VAV APE. Potential physical and/or visual impacts to an unknown number of TCPs or CLs may occur if identified. Impacts would be short term to permanent, localized, and minor to moderate depending on avoidance and mitigation. The PA would outline the process and procedures for mitigation for adverse effects to historic properties.
The SGP may affect above ground historic properties, TCPs, and CLs by introducing visual elements.	Locations of tall or massive SGP components where screening landscape features are lacking.	The existing Yellow Pine Pit is considered to be massive.	Same as Baseline Condition.	Three open pits during operations, a TSF and TSF Buttress, and several other mining facilities would be present at the SGP. Burntlog Route and Burntlog Maintenance Facility. SGP off-site facilities.	Same as 2021 MMP, except no Burntlog Route. Also, maintenance station located at Landmark rather than along the Burntlog Route.
	Number and types of historic properties including TCPs and CLs that would have viewshed altered.	A total of 150 historic properties are located within the VAV APE for both alternatives. Meadow Creek Lookout, Landmark Ranger Station, and Thunderbolt Mountain Lookout are standing. The integrity of the Stibnite Lithic site is sensitive to visual intrusions. Numbers and locations of potential TCPs and CLs have not been disclosed.	No new impacts to the viewshed of historic properties.	Visual impacts could occur to: Meadow Creek Lookout, Stibnite Lithic site, and Thunderbolt Mountain Lookout. Integrity of the Stibnite Lithic site could be compromised by visual intrusions. Potential visual impacts to TCPs and CLs, if identified.	Same as 2021 MMP, except visual impacts could also occur to the Landmark Ranger Station.
The SGP may affect aboveground historic properties, TCPs, and CLs through noise and vibration disturbance.	Noise levels and locations of activities that would produce high noise levels and ground vibrations.	Current noise levels are intermittently louder than ambient due to approved activities.	Same as Baseline Condition.	Vibrations would be caused by blasting, drilling, and ore crushing. Haul trucks would cause high noise levels, but these would be much shorter term and more intermittent.	Same as 2021 MMP.
	Number and location of standing or fragile partially standing structures, TCPs, and CLs that could be impacted by increase in noise and vibrations.	There are no standing historic properties that would be subject to noise and vibration within the mine site. Numbers and locations of potential TCPs and CLs have not been disclosed.	Same as Baseline Condition.	No architectural historic properties located within the SGP. An unknown number of TCPs and CLs could be impacted, if identified.	Same as 2021 MMP.
The SGP may cause increased visibility of historic properties through increased public access via new roadways and improvements to existing roads.	Number and location of public access roads improved or constructed.	There are existing roads that currently access the SGP.	Same as Baseline Condition.	Johnson Creek Route improved within existing road prism, Burntlog Route.	Same as 2021 MMP except the Burntlog Route would not be constructed. Johnson Creek Route road improvements include road widening and straightening.
	Number of historic properties that may be affected.	Historic properties are present along proposed new roadways and improvements to existing roads.	Same as Baseline Condition.	Increased public access beyond baseline conditions along the Burntlog Route once constructed and along Johnson Creek Route during construction.	Same as 2021 MMP except there would be increased public access beyond baseline conditions along Johnson Creek Route.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
Public Health and Safety					
The SGP may affect public safety on the roads used by mine vehicles during construction, operation, closure, and reclamation activities.	Number of SGP-related vehicles and trips on public roads.	SGP area is dominated by unpaved roads, one state highway, and county roads. The road segment of highest safety and traffic concern is Warm Lake Road.	Same as Baseline Condition.	Major The increased mine-related traffic on Warm Lake Road and other access roads increases the potential for accidents. There would be heavy truck traffic through the Village of Yellow Pine during construction.	Major The use of Johnson Creek Route during operations, closure, and reclamation would increase safety issues by routing heavy truck traffic through the Village of Yellow Pine and the general public traveling on the same road as large mining equipment.
The SGP may affect human health or exposure to hazards.	Current public health statistics and descriptors.	Valley County ranks sixth best in state for health outcomes and fourth best in the state for overall health factors	Same as Baseline Condition.	The economic benefits could lead to continued or improved access to health services, better nutrition, and better overall well-being for the local community. Potential negative economic impacts associated with “boom and bust” could result in negative health impacts during closure and beyond.	Same as the 2021 MMP.
	Changes in health metrics such as soil, air, and water quality along with resulting metal concentrations in site biota	Baseline air quality measurements indicate current concentrations of the criteria air pollutants are well below the NAAQS. Soil - legacy mine tailings are known to contain elevated levels of arsenic and antimony. Surface Water – The chemicals of concern for public health were arsenic, antimony, and mercury. Each of the inventoried waterbodies (except for West End Creek) are CWA Section 303(d) listed. The causes for listing of these waters are associated with arsenic, with the East Fork SFSR also being listed for antimony (downstream of Meadow Creek) and Sugar Creek also being listed for mercury.	Same as Baseline Condition.	Air - Negligible: predicted ambient air concentrations at boundary where public is allowed shown to be below NAAQS. Soil - Minor: exposures by recreationists to impacted soil materials would be of relatively low frequency, short duration, and low magnitude during construction and operations of the SGP; closure and reclamation activities assumed to lead to overall reduction in chemical impacts to surface soil. Potential negative impacts would be off-set by positive impacts from reclamation of legacy contamination. There would be a concomitant reduction in these pollutants in biota harvested from the site area. Surface Water - Negligible. Exposures are expected to be of limited magnitude and short duration. Water treatment systems and design features lead to comparable or lower arsenic, antimony, and mercury concentrations in surface water. There would be a concomitant reduction in these pollutants in biota harvested from local waterbodies.	Same as the 2021 MMP.
	Increased risk of natural hazards (wildfire, avalanche, landslide).	The entire SGP area presents potential flash-flood and debris-flow hazards that also can cause severe injury or death, or block access. Some portions of the mine site also are conducive to landslides and avalanches. Fires can cause severe injury or death for travelers, recreationists, and Forest Service and Perpetua employees, as well as damage to property.	Same as Baseline Condition.	Moderate. The SGP would increase the risk of damage, injury, or loss of life by allowing the increase in people traveling through the area to the mine site and construction and/or use of roads would increase the risk of damage, injury, or loss of life from such hazards by allowing additional people and facilities into avalanche susceptible areas.	Moderate. None of the positive impacts associated with improvement and development of the Burntlog Route. Johnson Creek Route has steeper topography and terrain and there are more areas of landslides and rockfalls along the Johnson Creek Route than there are along the Burntlog Route. Safety issues also are increased by heavy truck traffic through the Village of Yellow Pine and the general public traveling on the same road as large mining equipment.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
The SGP may affect infrastructure and services as related to emergency services, medical services, law enforcement, social services, sanitation, and wastewater treatment.	Capacity of existing infrastructure and services to meet anticipated increased use.	Due to the remote nature, most of the SGP area is located more than 30 miles from the nearest local emergency services.	Same as Baseline Condition.	Moderate and positive. Emergency medical technicians and emergency equipment and supplies would be on-site, including an ambulance, first aid, and medical supplies.	Same as the 2021 MMP.
The SGP may cause public health effects related to changing environmental conditions.	Disruption of recreational areas during construction, operation, and closure and reclamation.	Recreation is a major use throughout much of the SGP area; activities commonly include hunting, fishing, sightseeing, hiking, camping, all-terrain vehicle use, snowmobiling, and horseback riding.	Same as Baseline Condition.	Negligible. Displacement of project-area recreational activities would be offset by improved access to alternative recreational areas.	Same as the 2021 MMP.
	Psychological effects due to noise.	Sound levels at the 12 baseline noise measurement locations in the SGP area ranged from 34 dBA to 64 dBA.	Same as Baseline Condition.	Negligible. Predicted noise levels would be under, at, or slightly over the outdoor threshold level of 55 dBA.	Same as the 2021 MMP.
Recreation					
The SGP may cause changes to recreation setting, access, facilities, and/or opportunities.	Changes in motorized access (including restrictions and/or changes in maintenance) to recreation opportunities.	State and County roads provide access to connecting unpaved Forest Service roads, which provide access to NFS lands and facilities.	Current access to the area via Johnson Creek Road and Stibnite Road would remain unimpeded. In general, areas that are inaccessible to motorized vehicles would continue to be inaccessible to vehicles or certain vehicle types in summer.	Access to the areas/facilities accessed from Thunder Mountain Road (FR 50375) east of the Operations Area Boundary would be modified due to closure of Stibnite Road (CR 50-412) and construction of the Burntlog Route, which would provide motorized access (year-round) to areas that currently do not have motorized access. Winter access would be increased along Cabin Creek Road due to new OSV route. There would be direct access to Thunder Mountain Road through the Operations Area Boundary during operations, in addition to access via the Burntlog Route. The re-routed segment of the Burntlog Route would provide increased motorized access to areas without such access currently. Access to several OSV routes would be affected by plowing of Johnson Creek Road, Warm Lake Road, and the Burntlog Route. Construction activities for transmission lines and the maintenance facility may result in delays or detoured access. After mine reclamation, the Stibnite Road public access through the mine to Thunder Mountain Road would be restored.	Similar to the 2021 MMP, except there would be no Burntlog Route and resulting new motorized access to areas from these facilities. Access to several OSV routes would be affected by plowing of Johnson Creek Road and Warm Lake Road.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
	Changes in recreation physical setting characteristics and related ROS class (by season) measured in acres.	Designated ROS classes in the analysis area vary by season, and include Rural, Roaded Natural, Roaded Modified, Semi-Primitive Motorized, Semi-Primitive Non-Motorized, and Primitive. Estimated existing ROS physical settings are similar.	Generally, existing designated ROS classes and physical recreation setting characteristics would remain as is. Modifications to the recreation setting in the SGP area continued low level of unauthorized motorized use, and increased winter motorized access and use could lead to changes in the designated ROS class and/or ROS physical setting of some areas due to additional motorized use both in the summer and winter. Acreage of Estimated ROS Physical Setting Classes – Summer/Winter: • Primitive: 17,278/21,370 acres • Semi Primitive Non-Motorized: 218,512/245,210 acres • Semi-Primitive Motorized: 83,497/240,387 acres • Semi-Primitive Motorized Groomed (winter only): 50,436 acres (this acreage overlaps other features) • Roaded Natural: 140,594/7,511 acres • Rural: 81,450/26,853 acres	Several components would result in inconsistencies with existing designated ROS classes including: Burntlog Route, plowing of the Burntlog Route, temporary plowing of the Johnson Creek Road and Stibnite Road, plowing of Warm Lake Road (CR 10-579), new transmission line. Acreage of Disturbance to ROS Physical Setting Classes During Operations – Summer/Winter: Primitive: 0/0 acres Semi Primitive Non-Motorized: 0/0 acres Semi-Primitive Motorized: 42/364 acres Semi-Primitive Motorized Groomed (winter only): 163 acres Roaded Natural: 685/387 acres Rural: 345/322 acres	Similar to the 2021 MMP, except there would be no inconsistencies with existing designated ROS classes related to the Burntlog Route or plowing of the Burntlog Route. Inconsistency with the existing designated ROS class for Johnson Creek and Stibnite Roads in the winter would not be temporary during construction (as in the 2021 MMP) but would continue through operations and reclamation because the roads would be plowed as part of the Johnson Creek Route. Acreage of Estimated ROS Physical Setting Classes During Operations – Summer/Winter: Primitive: 0/0 acres Semi Primitive Non-Motorized: 0/0 acres Semi-Primitive Motorized: 43/212 acres Semi-Primitive Motorized Groomed (winter only): 113 acres Roaded Natural: 387/34acres Rural: 353/536 acres
	Changes in recreation facilities (trails, campgrounds, trailheads), including the level of development and setting.	The Warm Lake area contains most of the developed recreation facilities (apart from trailheads). Scattered campgrounds and other facilities also are located in the Big Creek and Landmark areas and along Johnson Creek Road around and south of Yellow Pine. Developed recreation facilities primarily include campgrounds, cabins/lookouts, trailheads, and trails.	Same as Baseline Condition	The Stibnite Mining District Interpretive Site would be closed until after mine reclamation. Mine components would alter the setting of recreation facilities adjacent to them to a more developed setting due to increased man-made development, noise, traffic, etc. These components include the mine and facilities within the Operations Area Boundary, Burntlog Route, upgraded transmission lines, new transmission line to the Operations Area, Johnson Creek substation, a small VHF repeater on Meadow Creek Lookout, use of Warm Lake Road, and temporary use of the Johnson Creek Route.	Similar to the 2021 MMP, except the Burntlog Route would not be built and therefore would not affect the setting of existing recreation facilities. In addition, changes to the setting of recreation facilities along the Johnson Creek Route would be affected through reclamation and not just temporarily during construction.
	Changes in recreation use, potentially due to changes in recreation facilities, opportunities, access, and setting.	Developed recreation use is limited to the developed recreation sites (i.e., overnight facilities) located primarily in the Warm Lake, Landmark and Johnson Creek Road areas. Most recreation in the analysis area is dispersed use, which occurs outside of developed recreation sites.	Existing recreation use would continue. Some unauthorized motorized use may continue to occur off of existing roads and motorized trails. Motorized winter use has expanded in recent years, and may continue to expand in the future, resulting in additional OSV routes and additional areas receiving winter motorized use.	There would be public access through the Operations Area Boundary, which may result in less displacement of use to areas/facilities accessed from Thunder Mountain Road (FR 50375). In addition, there could be increased dispersed recreation use along the Burntlog Route . Some recreation use may return to the Operations Area Boundary after reclamation; however, due to the changes in the recreation setting, some use may be displaced to areas where the recreation setting is more natural.	Similar to the 2021 MMP. The Burntlog Route would not be built; therefore, there would be no resulting displacement or increase in recreation use from this route.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
	Recreation special use permit use changes due to SGP construction, operation, or reclamation.	There are several current recreation-related special use permits in the analysis area for lodges, outfitters and guides, organizational camps, and recreation residences.	Activities, facilities, and uses allowed under current recreation-related special use permits would continue until the end of the permit term. Changes to the recreation setting due to additional motorized use may result in shifts in the use areas for permittees, particularly for non-motorized uses such as trail rides, fishing, hunting, etc.	Construction, operations, and reclamation activities would affect access to operating areas of three of the outfitters and guides, affect their ability to provide licensed activities, and may degrade customer's recreation experiences due to construction and operations noise and activity, mine traffic, and reduction of acreage available for recreation. Impacts to outfitters and guides from the closure of Stibnite Road (CR 50-412) would be temporary until the new access road through the Operations Area Boundary was constructed. Construction activities may interfere with bike events while Johnson Creek Road is utilized. Permits in the Warm Lake area may be affected by traffic, noise, and access changes from transmission line upgrades and use of Warm Lake Road. The recreation setting of the Paradise Valley recreation residence tract may be affected by the Cabin Creek Road OSV route in the winter.	Similar to the 2021 MMP, except there would be alternate impacts due to long-term use of the Johnson Creek Route during all phases of the SGP. There would be no impacts to outfitters and guides from the Burntlog Route.
	Changes in recreation opportunities available and/or the ability to participate in recreation opportunities.	Recreation opportunities such as hunting, fishing, hiking, adventures cycling, mountain bike riding, camping, and horseback riding also are popular throughout the analysis area, with opportunities available at developed facilities, and at dispersed locations.	Existing recreation opportunities would continue to be available. In general, areas that are inaccessible to motorized vehicles would continue to be inaccessible to vehicles or certain vehicle types in summer, both limiting the motorized recreation opportunities available in some areas and preserving the setting for non-motorized recreation opportunities in these areas. Motorized winter use has expanded in recent years, and may continue to expand in the future, resulting in additional winter recreation opportunities.	Recreation opportunities within the Operations Area Boundary would be eliminated until after reclamation. Construction, operation, and reclamation of all components may affect wildlife-related opportunities due to displacement of wildlife. Non-motorized and wilderness-related opportunities could be reduced by the SGP, new transmission line to the Operations Area Boundary, and the Burntlog Route. New access available from the Burntlog Route may provide additional recreation opportunities. The newly constructed portion of the Burntlog Route would have additional impacts on wilderness-related opportunities as it would pass closer to the wilderness boundary.	Similar to the 2021 MMP, except there would be no impacts to recreation opportunities from the Burntlog Route as it would not be built.
Scenic					
The SGP may cause changes to scenic resources.	Visual contrast.	Landscape is characterized by valley floors surrounded by mountains with steep terrain broken up by narrow gorges and streams. Wildfires have continually altered the landscape, creating brush fields, large lodgepole pine stands, extensive snag patches, and variations in species and age classes of vegetation. Vegetation includes grass and evergreens. Existing modifications include the existing historical mining disturbances at the SGP, forest roads, transmission lines, and residences in the western portion of the analysis area.	Same as Baseline Condition.	New disturbances within the footprint of existing modifications would appear similar to existing modifications, but at a larger scale. Visual contrast would increase due to a new road and larger road width along existing segments, more vegetation removal, and new retaining walls. A new ROW for a new transmission line segment would introduce high visual contrast. SGP components would result in a high level of change to the characteristic landscape during operations; after reclamation there would remain permanent changes, although less than during operations.	Changes associated with the SGP would be similar to the 2021 MMP, except there would be no visual changes from the Burntlog Route because it would not be constructed. Landscape changes would result from the upgrades to the Johnson Creek Route. Visual change from utilities would be the same except for additional periodic impacts from helicopters during construction and maintenance activity for communication repeater sites.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
	SGP component visibility.	Nighttime lighting in the analysis area is minimal and generally limited to residential areas in the western portion of the analysis area.	Same as Baseline Condition.	Nighttime lighting would increase substantially in the vicinity of the SGP. Additional nighttime light sources would include the maintenance facility and vehicle headlights as they travel on mine access roads.	Similar to the 2021 MMP, except SGP vehicle lights from vehicles traveling to and from the SGP would occur along the Johnson Creek Route, rather than along the Burntlog Route.
Social and Economic					
The SGP may impact the socioeconomics of Valley and Adams counties and the State of Idaho.	Total national contributions to employment levels.	No change in recent employment trends.	Same as Baseline Condition.	Employment – National Total (annual) Construction: • Direct: 640 • Total: 4,690 Operations: • Direct: 583 • Total: 2,690 Closure and Reclamation: • Direct: 160 / 40 • Total: 330 / 90	Marginally higher than 2021 MMP due to increased construction and operations spending from use of the Johnson Creek Route. However, construction impacts spread over longer 5-year period of construction.
	Contributions to employment levels in Idaho.	No change in recent employment trends.	Same as Baseline Condition.	Employment – Idaho (annual) Construction: • Direct: 420 • Total: 1,820 Operations: • Direct: 470 • Total: 1,150 Closure and Reclamation: • Direct: 130 / 40 • Total: 190 / 60	Marginally higher than 2021 MMP due to increased construction and operations spending from use of Johnson Creek Route. However, construction impacts spread over longer 5-year period of construction.
	Contributions to employment levels in Valley and Adams counties.	No change in recent employment trends.	Same as Baseline Condition.	Employment – Valley and Adams counties (annual) Construction: • Direct: 190 • Total: 490 Operations: • Direct: 200 • Total: 470 Closure and Reclamation: • Direct: 90 / 20 • Total: 130 / 30	Marginally higher than 2021 MMP due to increased construction and operations spending from use of Johnson Creek Route. However, construction impacts spread over longer 5-year period of construction.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
	Contributions to employment levels in Valley and Adams counties.	No change in recent employment trends.	Same as Baseline Condition.	Employment – Valley and Adams counties (annual) Construction: • Direct: 190 • Total: 490 Operations: • Direct: 200 • Total: 470 Closure and Reclamation: • Direct: 90 / 20 • Total: 130 / 30	Marginally higher than 2021 MMP due to increased construction and operations spending from use of Johnson Creek Route. However, construction impacts spread over longer 5-year period of construction.
	Estimated value of local income contributions.	No change in recent employment trends.	Same as Baseline Condition.	Income – Valley and Adams counties (annual) Construction: • Direct: $17.4 million/year • Total: $28.1 million/year Operations: • Direct: $18.7 million/year • Total: $29.3 million/year Closure and Reclamation: • Direct: $3.6 million/year • Total: $5.3M/year Post-Closure: • Direct: $0.9 million/year • Total: $1.3 million/year	Marginally higher than 2021 MMP due to increased construction and operations spending from use of Johnson Creek Route. However, construction impacts spread over longer 5-year period of construction.
	Estimated value of goods and services procured in Valley and Adams counties.	No additional procured goods or services.	Same as Baseline Condition.	Direct Spending in Valley and Adams Counties (annual) Construction: • Total: $62.3 million/year Operations: • Total: $60.0 million/year Closure and Reclamation: • Total: $4.8 million/year Post-Closure: • Total: $1.4 million/year	Marginally higher than 2021 MMP due to increased construction and operations spending from use of Johnson Creek Route. However, construction impacts spread over longer 5-year period of construction.
	Change in populations of Valley and Adams counties.	No change in recent population growth trends. Valley County: 0.4%/year (35 people) Adams County: 0%/year (0 people)	Same as Baseline Condition.	In-migration by workers to Valley and Adams counties Construction: • SGP: 95 • Total: 198 Operations: Net construction change limited by local workers job transfers: • SGP: 100 • Total: 190 Closure and Reclamation: • No in-migration	Marginally higher than 2021 MMP due to increased construction and operations spending from use of Johnson Creek Route. However, construction impacts spread over longer 5-year period of construction.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
	Impacts to housing demand in Valley and Adams counties.	No increase in housing demand or population from current conditions.	Same as Baseline Condition.	Construction: Housing demand increase to accommodate estimated in-migration of 198 workers and their families (438 new residents total). Operations: Negligible net change from construction as many workers would transfer to fill the estimated 190 operating positions that would be filled by in-migration. Closure and Reclamation: No new residents.	Marginally higher than 2021 MMP due to increased construction and operations spending from use of Johnson Creek Route. However, construction impacts spread over longer 5-year period of construction.
	Impacts to housing affordability in Valley and Adams counties.	Prevailing factors affecting housing affordability would continue.	Same as Baseline Condition.	In-migration is likely to contribute to adverse impacts on local affordable housing availability beyond the existing prevailing factors.	Marginally higher than 2021 MMP due to increased construction and operations spending from use of Johnson Creek Route. However, construction impacts spread over longer 5-year period of construction.
	Impacts to school enrollment in Valley and Adams counties.	No increase in school enrollment from current conditions.	Same as Baseline Condition.	Estimated school enrollment demand increase of 80 students. If these new students are evenly distributed across grades, then the average enrollment increase per grade would be approximately six additional students in each grade. However, if in-migrating students concentrated in an area, up to six full-time equivalent teaching positions would be needed to maintain current student-teacher ratios.	Same as 2021 MMP.
	Impacts to telecommunication and internet infrastructure in Valley and Adams counties.	No increase in telecommunications and internet infrastructure demand from current conditions.	Same as Baseline Condition.	Estimated telecommunication and internet infrastructure demand for 198 new households. Adams and Valley counties' telecommunications and internet infrastructure operate at near capacity and, therefore, may have difficulty in maintaining service levels from increased service demand in some locations.	Same as 2021 MMP.
	Impacts to public services in Valley and Adams counties.	No increase in public service demand from current conditions.	Same as Baseline Condition.	Estimated public services demand for 198 new households. Public service impacts would depend on both the location of any SGP-related population growth and the specific circumstances of the affected public services. If concentrated in individual communities such as McCall, there could be localized, long-term, substantial adverse impacts to those public services. However, if not highly concentrated, in-migration could have regional, long-term, minor or negligible adverse impacts on most of the local area's public services.	Same as 2021 MMP.
	Impacts to government provision of services	No increase in public service demand from current conditions.	Same as Baseline Condition.	Wage inflation and local worker shortages for lower paying jobs with the local area could result in adverse impacts on government provision of services contingent on the ability of agencies and contractors to backfill staff losses.	Same as 2021 MMP.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
	Estimated tax revenue contributions.	No tax revenue increase from current conditions.	Same as Baseline Condition.	Total Tax Revenues (annual) Construction: • State/Local: $9.3M • Federal: $61.5M Operations: • State/Local: $10.1M • Federal: $51.6M Closure and Reclamation: • State/Local: $0.4M • Federal: $1.1M	Same as 2021 MMP.
	Changes in tourism and recreational based businesses.	No increase in tourism sector from current conditions and trends.	Same as Baseline Condition; including no improvement of the lingering effects of historic mining on the environment.	Limited displaced recreation due to low use levels and likely local area relocation. Negligible adverse impact to local area tourism economy expected. Potential for adverse impacts to specific individual recreation businesses and/or communities.	Long-term traffic growth in proximity to campgrounds, dispersed camping areas, trailheads, and recreational residences would increase activity and noise which could change the recreational setting and reduce visitor recreation experience.
	Changes in transportation and infrastructure.	No major changes expected that would result in economic activity or development changes that would substantially impact the local area's current economic conditions.	Same as Baseline Condition.	Local area infrastructure and/or roadway use changes would not result in any major changes in economic activity or development that would result in substantial impacts on the local area's economy.	The village of Yellow Pine would experience an increase in future traffic (estimated to average 65 vehicles daily) from SGP vehicle use of the Johnson Creek Route to the mine site during SGP operations.
SGP mineral extraction revenue.	Market values of extracted minerals.	No mineral extraction.	Same as Baseline Condition.	SGP mineral production projected value (after refining) is approximately $7 billion over the SGP operating life.	Similar to 2021 MMP.
Incremental costs to the SGP as a result of proposed facility and operation modifications.	Changes in the SGP's construction costs and/or future operating expenses.	The SGP is not built, and no mine operations occur.	No costs for SGP construction or future operations and maintenance (O&M) expenses.	Total initial construction of SGP estimated to cost approximately $1.1 billion. Total annual operations estimated to cost approximately $270 million/year.	Marginal increase in construction costs compared to 2021 MMP from upgrade of Johnson Creek Route instead of Burntlog Route construction. SGP total construction, O&M, and financial costs from use of Johnson Creek Route would increase by up to $174 million. Marginal net increase in future annual O&M cost due to longer haul distances.
Values and benefits associated with ecosystem conditions including water quality and aquatic habitat. (The reader is also referred to summaries for other resource areas in this table.)	Removal of legacy mine tailings and waste rock. Volume and disposition of mineralized wastes from operations Fish habitat and fish population conditions.	Legacy mine waste in Meadow Creek valley from historical mining. SGP area streams currently provide habitat for fish species, however, barriers associated with historical mining affect volitional fish access to portions of that habitat.	Same as Baseline Condition.	Removal of legacy mine waste, management of project mineralized wastes, and active water treatment result in water quality conditions in the mine area with lower dissolved antimony and arsenic concentrations compared to baseline. These activities utilize O&M expenditures during operations that continue into the post-closure period. Long term impacts to fish habitat and fish populations associated with project construction, operations, and closure. Restored fish passage to habitat available upstream of the existing Yellow Pine pit.	Similar to 2021 MMP.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
Impacts to an IRA from SGP construction and operations	Roadless characteristics	There is an existing IRA in the vicinity of the proposed Burntlog Route	Same as Baseline Condition.	Development and use of the Burntlog Route would affect roadless characteristics in three IRAs.	The use of the Johnson Creek Route would not incur any impacts to roadless area characteristics that would be associated with the construction of the Burntlog Route.
Environmental Justice					
The SGP may disproportionately affect minority or low-income populations.	Number and size of minority populations affected.	The Nez Perce Census County Subdivision, Duck Valley Indian Reservation, and Fort Hall Reservation meet the definition of minority populations.	Same as Baseline Condition.	There are no minority communities within the SGP area. There would be no direct effect to reservation lands and their Tribal minority populations that are outside of the SGP area, but there would potentially be indirect effects.	Same as 2021 MMP.
	Number and size of low-income populations affected.	The Duck Valley Indian Reservation (1,353 residents) meets the definition of a low-income population.	Same as Baseline Condition.	There are no low- income communities within the SGP area. There would be no direct effect to Duck Valley Indian Reservation lands and their Tribal low-income populations that are outside of the SGP area, but there would potentially be indirect effects.	Same as 2021 MMP.
	Location of SGP facilities, including roads and transmission lines in relation to minority or low- income residents.	There are no environmental justice communities in the SGP area.	Same as Baseline Condition.	There would be no direct effect of SGP facilities on environmental justice communities. None of the SGP facilities would be on reservation lands; therefore, there would be no direct effect of SGP facilities on Tribal environmental justice communities.	Same as 2021 MMP.
	Differences in access to federal lands.	Public and Tribal member access is available throughout the SGP area except in areas previously used for mining. There are no minority and low- income populations in the SGP area that would be affected by differences in public and Tribal member access. Tribal members use federal lands within the PNF and BNF to access cultural and subsistence resource areas.	Same as Baseline Condition.	Construction and operations could impact access to traditional use areas and subsistence resources through habitat loss; behavioral disturbance to resources from increased noise and human activity; and concerns about contamination of resources. Burntlog Route and new OSV groomed trails would provide new and/or improved access to the SGP Operations Area and vicinity, which could have a positive impact by providing motorized access to cultural sites and subsistence resources. Public and Tribal member access also would be provided through the mine site by constructing new road to link Stibnite Road to Thunder Mountain Road. Access and use increases could result in potential indirect adverse impacts to Tribal members due to increased human activity.	Same as 2021 MMP, except for: No new and/or improved access from construction or use of the Burntlog Route. Upgrades to Johnson Creek Route and use of Warm Lake, Johnson Creek, and Stibnite roads as the primary access route to the mine site would result in greater impacts to Tribal environmental justice communities.
	Change in traditional Tribal practices and/or access to Tribal resources.	Tribal access and use of the region have long-standing and on-going current cultural importance and subsistence value for many Tribal members.	Same as Baseline Condition.	Restricted access to traditional use areas would occur in the 14,221 acres of land within the Operations Area Boundary. Additional use of the area caused by road improvements could impact Tribal members by potentially increasing unauthorized motorized use, causing distractions, and changing natural conditions of traditional Tribal practices.	Same as 2021 MMP.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
	Change in traditional Tribal practices and/or access to sacred sites.	Based on ethnographic information received from the Nez Perce Tribe, Shoshone-Bannock Tribes, and Shoshone-Paiute Tribes, sacred sites do exist in the analysis area, although exact locations are not public information.	There would be no potential impact to sites of cultural significance.	Specific information from the Tribes regarding the exact nature, duration, and location of impacts on sacred sites is confidential. Based on the information provided to the Forest Service by the Tribes, it is expected that the SGP-related impacts would be of a type and/or magnitude to represent an adverse environmental justice impact to the Tribal environmental justice communities.	Same as 2021 MMP.
Special Designations					
The SGP could change the quality of wilderness character in designated or recommended wilderness areas.	Distance of SGP facilities from designated or recommended wilderness.	The FCRNRW and recommended wilderness areas contain diverse vegetation and wildlife species. Vegetation varies from ponderosa pine/bluebunch wheatgrass or Idaho fescue, and Douglas- fir/ninebark or snowberry at lower elevations, to near-alpine habitat in the highest elevation areas. Wildfires have continually altered the wilderness landscape, creating brush fields, large lodgepole pine stands, extensive snag patches, and variations in species and age classes of vegetation.	Same as Baseline Condition.	Surface disturbance and vehicles used during the 2 years to construct Burntlog Route would increase the potential for non-native plant species to spread into the FCRNRW. Construction and maintenance of approximately 1.3 miles of the Burntlog Route between 170 and 300 feet of the FCRNRW boundary could result in sediment deposited in the headwater tributaries to Big Chief Creek. Disturbance from the cut and fill slopes on approximately 5.3 miles of Burntlog Route in the headwaters of Riordan Creek would increase the risk of non-native plant species spreading into the FCRNRW. The use of the Johnson Creek Route during construction and construction of the Burntlog Route could disturb wildlife and change the distribution of big game within the FCRNRW. During the 3 years of construction, the increase in human activity near the western FCRNRW boundary could change ecological processes in areas where non-native plant species establish. During the 15 years of operation, mine traffic and recreation use on the Burntlog Route could increase the potential for non-native plant species to spread into the FCRNRW. Where established, non-native plants could alter ecological processes. The 65 vehicles per day, the Burntlog Route road maintenance, and recreation use of access roads adjacent to the FCRNRW western boundary could displace wildlife from areas within the FCRNRW. Mine and forest visitor traffic using the Burntlog Route during the 15 years of operations and 5 years of mine reclamation and closure could increase the potential for non-native plant species to spread into the FCRNRW. Recontouring slopes and seeding during the 2 years of decommissioning the Burntlog Route also would increase the potential for non-native plant species to spread into the FCRNRW.	Using the Johnson Creek Route would reduce the potential for non-native plant species to spread into the FCRNRW, reduce the miles of road near the FCRNRW, and help retain existing wildlife distribution. Using the Johnson Creek Route for mine access during the 15 years of mine operation would reduce the miles of road near the FCRNRW and reduce the potential for non-native plant species to spread into the FCRNRW. Mine vehicles and recreation use would be on existing roads. The use of existing roads for mine traffic would reduce the area adjacent to the FCRNRW where vehicle traffic could disturb big game species. Surface disturbance from mineral exploration, reseeding disturbed areas, and monitoring activities would be 3 miles from the FCRNRW boundary. The natural quality of wilderness character would be the same as existing conditions.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
The SGP could change the quality of" wilderness character in designated or recommended wilderness areas.	Distance of designated or recommended wilderness from sights and sounds of human activity from SGP activities.	The FCRNRW and recommended wilderness areas contain diverse vegetation and wildlife species. Vegetation varies from ponderosa pine/bluebunch wheatgrass or Idaho fescue, and Douglas- fir/ninebark or snowberry at lower elevations, to near-alpine habitat in the highest elevation areas. Wildfires have continually altered the wilderness landscape, creating brush fields, large lodgepole pine stands, extensive snag patches, and variations in species and age classes of vegetation.	Sights and sounds of human activity from mineral exploration and monitoring activities would be 3 miles from the FCRNRW boundary.	Noise from the construction of the Burntlog Route would be audible along the boundary of the FCRNRW. Decreasing the distance between the Burntlog Route and the FCRNRW boundary would increase the area where noise from construction activities would be audible. Noise from road maintenance activities and recontouring slopes during closure on the Burntlog Route could be heard along the boundary of the FCRNRW depending upon topography and weather conditions and would reduce opportunities for solitude within the FCRNRW. Decreasing the distance between existing roads through utilization of the Burntlog Route and the FCRNRW boundary would increase the area where noise from recontouring slopes and seeding activities would be audible during reclamation.	Using the Johnson Creek Route during construction, operation, and closure and reclamation would eliminate impacts on the FCRNRW associated with the Burntlog Route.
	Reduced opportunities for self-reliant recreation within designated or recommended wilderness.	The FCRNRW and recommended wilderness areas provide opportunities for solitude and primitive recreation.	Opportunities for solitude would be the same as existing conditions.	The decreased distance between existing roads through utilization of the Burntlog Route and the FCRNRW boundary would increase the area where noise from SGP activities is audible. The extent where noise is audible would reduce opportunities for solitude within the FCRNRW. If wilderness visitors avoid the FCRNRW areas accessed through the SGP Operations Area or adjacent to the Burntlog Route, increased recreation in recommended wilderness areas could reduce opportunities for solitude within the FCRNRW. Where audible, during the 15 years of mine operation noise from road maintenance would reduce opportunities for solitude within the FCRNRW. The Burntlog Route could facilitate an increase in wilderness visits in the Big Chief Creek and Pistol Creek drainages of the FCRNRW. During the 20 years of mine operation and mine closure, if wilderness visitors avoid the FCRNRW areas accessed through the SGP or adjacent to the Burntlog Route, recreation use in recommended wilderness areas could increase. Increased recreation use in recommended wilderness areas could reduce opportunities for solitude.	Using the Johnson Creek Route during construction, operation, and closure and reclamation would eliminate impacts on the FCRNRW associated with the Burntlog Route. Using Johnson Creek Route during the 15 years of mine operation could increase wilderness visits to recommended wilderness areas or other areas of the FCRNRW. If recreation use increases, it could reduce opportunities for solitude within the recommended wilderness areas.
The SGP may affect the value of eligible or suitable WSRs.	Impacts to free-flowing characteristics of eligible and suitable WSRs.	Free-flowing conditions currently not impacted.	Same as Baseline Condition.	Same as Baseline Condition	Same as the 2021 MMP.
	Impacts to water quality of eligible, suitable, and designated WSRs.	Water quality to improve as a result of improved management, site cleanups, and watershed restoration projects.	Water quality to improve as a result of improved management, site cleanups, and watershed restoration projects.	Area-wide water quality to improve, except for Burntlog Creek where water quality may be adversely impacted. Erosion and sediment control BMPs would reduce water quality impacts.	Area-wide water quality to improve, except for Johnson Creek where water quality may be adversely impacted. Erosion and sediment control BMPs would reduce water quality impacts.
	Impacts to ORVs for which eligible, suitable, and designated WSRs are recognized.	Heritage ORVs likely to decline over time. Fish ORVs anticipated to remain stable or improve.	Heritage ORVs likely to naturally decline over time. Fish ORVs anticipated to remain stable or improve.	Heritage ORVs likely to naturally decline over time. No impacts to Heritage ORVs anticipated. Fish ORVs anticipated to remain stable or improve, with possible exception of Burntlog Creek. Impact to Scenery ORV at existing crossing of SFSR by the transmission line from the upgrade would be negligible.	Heritage ORVs likely to naturally decline over time.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
	Impacts to the preliminary Wild, Scenic, or Recreational classification for eligible and suitable WSRs.	No impacts to preliminary Wild, Scenic or Recreational classifications anticipated.	No impacts to preliminary Wild, Scenic, or Recreational classifications anticipated.	Likely impacts to Wild classification of Burntlog Creek, possible impacts to recreation access to Burntlog Creek.	No impacts to preliminary Wild, Scenic, or Recreational classifications anticipated.
The SGP may impact roadless character in IRAs and lands contiguous to unroaded areas.	Miles and acres of new roads in IRAs or contiguous unroaded lands.	Thirteen IRAs within the analysis area are managed for roadless character.	No new roads within IRAs.	During construction and mine operation, new disturbance would occur within five IRAs (Meadow Creek, Horse Heaven, Black Lake, Burnt Log, and Reeves Creek). Within the Meadow Creek, Black Lake, and Burnt Log IRAs, soil nail walls would be constructed in association with the Burntlog Route and after mine closure, retaining walls would remain within the IRAs.	No access roads within IRAs.
	Acres/miles of SGP facilities in IRAs or contiguous unroaded lands.	Thirteen IRAs within the analysis area are managed for roadless character.	No new facilities within IRAs.	Total of 674 acres of SGP facilities within six IRAs (Meadow Creek, Horse Heaven, Black Lake, Burnt Log, Caton Lake, and Reeves Creek). After mine closure, the TSF and TSF Buttress would remain in the Meadow Creek and Horse Heaven IRAs.	Total of 473 acres (a reduction of approximately 200 acres) of SGP facilities within four IRAs (Meadow Creek, Horse Heaven, Caton Lake, and Reeves Creek) would occur. After mine closure, the TSF and TSF Buttress would remain in the Meadow Creek and Horse Heaven IRAs.
The SGP could impact research values or ecosystem conditions within RNAs.	Change in vegetation community composition and structure within an RNA. Change in number of vehicles using roads and human activity within or immediately adjacent to an RNA. Changes to water quality (chemistry, temperature) or quantity within an RNA.	The six RNAs within the analysis area provide opportunities to conduct research and provide a control site to evaluate ecological conditions and processes within the Intermountain West.	Surface exploration and seeding of disturbed areas at the SGP would be over 5 miles from the six RNAs. The research values and ecological site conditions within the RNAs would be the same as existing conditions.	Areas where non-native plant species become established would reduce the Chilcoot Peak RNA values in the long term. Changes to the vegetation community composition would result in a loss of research values and ecological conditions within an RNA. Dust deposited on vegetation could change vegetation conditions and ecological processes within the Chilcoot Peak RNA. Human caused fire ignitions that spread into the Chilcoot Peak RNA could change the existing fire regime and reduce the RNA's research values related to ecological process. Indirectly, if forest visitors avoid areas near the Burntlog Route or the SGP there could be an increase in recreation use on trails and roads adjacent to an RNA. Culverts along a segment of FR 447 of the Burntlog Route could change the movement of sediment, woody debris, and other organic material. Additional culverts installed along the Burntlog Route could indirectly change local hydrologic conditions within the Chilcoot Peak RNA and alter ecological process long term. Changes in ecological processes would reduce the Chilcoot Peak RNA values.	The use of the Johnson Creek Route for mine access could increase recreation use along the South Fork Salmon River and Big Creek drainages from forest visitors avoiding the SGP. Increased recreation use on trails could increase the potential for non-native invasive plant species into RNAs. The potential loss of RNA values could be less than the 2021 MMP as the roads and trails open to public use are several miles from the closest RNA. The Johnson Creek Route Alternative would occur farther away from the Chilcoot Peak RNA. Potential impacts to the Chilcoot Peak RNA would be fewer and of lesser intensity under this alternative.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
Tribal Rights and Interests					
The SGP would affect tribal rights and interests through physical, audible, and visual disturbances to tribal resources, through restricting access of tribal members from usual and accustomed fishing places; hunting, pasturing and plant gathering areas; and through changes to the viability and availability of culturally significant fish, wildlife, and plant species.	Presence of TCPs, CLs, sacred sites or places, usual and accustomed fishing places, and resource harvesting and gathering areas impacted by an increase in ground disturbance.	Tribal resource harvesting and gathering areas and traditional use sites are in the analysis area, including the Old Thunder Mountain Road (FR 440) travel route, portions of the historic Burnt Log Road travel route, the Johnson Creek Road travel route, the East Fork SFSR watershed system associated with a potential TCP, and the Riordan Lake shore. Ground disturbance is currently from approved activities confined to a small area of private and NFS lands and use of existing roads and facilities.	Same as baseline conditions.	Direct ground disturbances would increase over baseline and would physically impact the East Fork SFSR watershed system, plus an undisclosed number of other tribal resources, such as tribal travel routes along the Burntlog Route (Old Thunder Mountain Road, Burnt Log Road) and Johnson Creek Road.	Same as 2021 MMP except: Tribal resources, such as tribal travel routes, along Burntlog Route would be avoided. Potential impacts to the tribal travel route along Johnson Creek Road.
	Presence of TCPs, CLs, sacred sites or places, usual and accustomed fishing places, and resource harvesting and gathering areas impacted by an increase in audible elements (noise and vibrations).	Tribal resource harvesting or gathering areas and traditional use sites are in the analysis area, including the Old Thunder Mountain Road (FR 440) travel route, Burnt Log Road travel route, the Johnson Creek Road travel route, the East Fork SFSR watershed system associated with a potential TCP, and the Riordan Lake shore. Currently the only noise and vibrations disturbance is from approved activities, including underground exploration on private land, with occasional blasting (short-term high noise levels and ground vibrations).	Same as baseline conditions.	Noise and vibrations would increase and include blasting, drilling, and ore crushing at the mine site; temporary increases during construction; and increases due to use of roads during construction and operations (Forest Service 2023h). The increase in noise and vibrations would likely be perceived by tribal members as a reduction in the integrity of setting and solitude and may discourage or detract from potential TCPs, CLs, sacred sites or places, usual and accustomed fishing places, and tribal use of traditional areas.	Same as 2021 MMP except: Upgrades to Johnson Creek Route and use of Johnson Creek and Stibnite roads as the primary route to the mine site for the life of the SGP would result in greater impacts to tribal resources, including the tribal travel route along Johnson Creek Road, due to increased noise and traffic. The Burntlog Route would not be constructed, therefore there would be no noise and vibrations related to construction, use, and maintenance of that route.
	Presence of TCPs, CLs, sacred sites or places, usual and accustomed fishing places, and resource harvesting and gathering areas impacted by an increase in visual intrusions caused by SGP components.	Tribal resource collection areas and traditional use sites are in the analysis area, including the Old Thunder Mountain Road (FR 440), the East Fork SFSR system, and the Riordan Lake shore. The Yellow Pine pit and tailings piles from historical mining activities are present along with a large, capped heap leach pile from mining in the 1980s. The transmission line already exists between Cascade and the village of Yellow Pine.	Same as baseline conditions.	The 2021 MMP would include increased visual components through new open pits, a TSF, and TSF Buttress; new access routes; and a segment of new transmission line. The viewsheds of portions of the East Fork SFSR watershed system, Riordan Lake, and the tribal travel route along the Burntlog Route, would be altered (Forest Service 2023i). The increase in visual impacts would likely be perceived by tribal members as a reduction in the integrity of setting and solitude and may discourage or detract from potential TCPs, CLs, sacred sites or places, and tribal use of traditional areas. Changes to the landscape would have localized, long term to permanent, negligible to major impacts on nearby ceremonial or traditional use sites.	Same as 2021 MMP, except: Johnson Creek Route Alternative would not include the Burntlog Route, which would reduce visual effects at Riordan Lake and other traditional use areas along that route. Addition of potential long-term impacts to the tribal travel route along Johnson Creek Road.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
	Changes in access to TCPs, CLs, sacred sites or places, usual and accustomed fishing places, and resource harvesting and gathering areas due to the restricted access to Operations Area Boundary.	Tribal access and use of the region has had long-standing and on-going cultural importance and subsistence value. Currently there is no restricted access on NFS lands in the SGP area. Some restrictions are in place on private lands.	Same as baseline conditions.	The SGP would restrict tribal access to 14,221 acres within the Operations Area Boundary, potentially restricting access to usual and accustomed fishing places, streams and fountains, and potential TCPs, CLs, sacred sites or places within that area. However, public and tribal access would be provided through the mine site (Forest Service 2023b). Burntlog Route and new OSV groomed routes would provide new and/or improved access to the Operations Area and vicinity, including the Riordan Lake area and FCRNRW, which could impact tribal members if there is an actual or perceived decrease in their access to, availability, and/or quality of tribal resources or by providing Tribes year-round access to previously inaccessible traditional use areas. Length of time of restricted access is 20 years. This could result in loss of tribal cultural practices important to tribal identity.	Same as 2021 MMP, except: Burntlog Route would not be constructed. Addition of potential long-term impacts to the tribal travel route along Johnson Creek Road. Stibnite Road would not be returned to its pre-mining width and traffic would be greatly reduced. This could encourage use of tribal resources east of the mine.
	Changes to water quality and quantity of both surface water and groundwater in relation to how it affects wildlife, fisheries, vegetation, or other resources.	The East Fork SFSR watershed supports wildlife, wildlife habitat, and fisheries. The 1863 Treaty with the Nez Perce Tribe reserved the use of springs and fountains including perpetual rights-of-way to and from them.	Same as baseline conditions.	Long-term reduction in flows of streams, springs, and seeps receiving groundwater recharge. Water quality of surface flow departing from the Operations Area Boundary would be the same or better than baseline conditions (Forest Service 2023c).	Same as 2021 MMP.
	Changes to species viability and/or availability for tribal harvest of fish.	Tribes fish, hunt, and gather plants in the SGP area. Currently the Yellow Pine pit passage barrier blocks fish passage, and there are legacy chemical contaminants in downstream waters from historic mining. The SFSR and tributaries are an aquatic stronghold and recovery area for fish species of cultural significance. Tribes are managing fish and restoring habitat within this area.	Same as baseline conditions.	The SGP would affect fish and fish habitat through stream channel changes, increased stream temperature, loss of habitat, and behavioral changes (Forest Service 2023e). This could impact a Tribe's ability to harvest fish in their usual and accustomed fishing places. Population-level effects are not expected from construction, but after reclamation the net effect would be: A net gain of habitat quantity and less optimal habitat quantity for Chinook salmon. A loss of habitat quality and quality for bull trout and cutthroat trout. A net gain of habitat quality and quantity for steelhead trout. Water quality improvements from removal of legacy mine materials would partially, but not completely, be offset geochemical impacts associated with the SGP (Forest Service 2023c). Use of Johnson Creek Route during construction, may impede tribal fisheries restoration activities along Johnson Creek Road.	Same as 2021 MMP, except: A loss of habitat quality and quantity of habitat for steelhead trout. Use of Johnson Creek Route for the life of the mine (approximately 20 years), may impede tribal fisheries restoration activities along Johnson Creek Road.

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
	Changes to species viability and/or availability for tribal harvest of wildlife.	Tribes fish, hunt, and gather plants in the SGP area.	Same as baseline conditions.	The SGP would affect wildlife, including special-status species and species of cultural importance, through loss of habitat (Forest Service 2023g). Loss of habitat may in turn impact a Tribe's ability to harvest and manage their traditional wildlife resources in the SGP area. Ground disturbance/Direct habitat impacts: 3,266 acres.	Same as 2021 MMP, except: Ground disturbance/Direct habitat impacts: 3,095 acres Burntlog Route would not be constructed, therefore no habitat fragmentation or wildlife displacement in this area.
	Changes to species viability and/or availability for tribal harvest of plants.	Tribes fish, hunt, and gather plants in the SGP area.	Same as baseline conditions.	The SGP would affect plant species of cultural importance through varying degrees of impacts to vegetation and special status plants that would contribute to an adverse cumulative impact on these resources (Forest Service 2023f). Loss of habitat may in turn impact a Tribe's ability to harvest and manage their traditional plant resources in the SGP area. Revegetation in these areas would contribute to cumulative benefits, including ability of Tribes to harvest and manage their traditional plant resources in the SGP area. Acres of vegetation disturbance/clearing: 3,266 acres.	Same as 2021 MMP, except: Acres of vegetation disturbance/ clearing: 3.095 acres
	Acres of access and traditional use areas of tribal importance that would be unavailable for the duration of mining activities to exercise treaty rights.	Tribes access their usual and accustomed fishing places, hunting areas, and plant gathering areas consistent with their reserved rights.	Same as baseline conditions.	The long-term loss of approximately 13,441 acres of federal land within the 14,221-acre Operations Area Boundary. A localized impact for access to specific use areas. Public and tribal access would be provided through the mine site (Forest Service 2023b).	Same as 2021 MMP.
	Known archaeological, cultural resource, and traditional use sites impacted by the Project and visibility of disturbances to these areas.	Known pre-contact archaeological resources within the physical and VAV APE for heritage resources.	Same as baseline conditions.	Operations Area Boundary – 1 pre-contact site to be avoided by protective measures Burntlog Route – intersects 2 tribal travel routes (Old Thunder Mountain Road, Burnt Log Road) Transmission Line upgrade – 4 pre-contact sites to be avoided by design or protective measures	Same as 2021 MMP except: Tribal travel routes not intersected by Burntlog Route access road. Potential long-term impacts to tribal travel route along Johnson Creek Road.
	Changes in air quality in relation to how that affects wildlife, fisheries, and vegetation, or visibility impacts from fugitive emissions to areas of tribal importance.	Air quality is designated as in attainment for all NAAQS and Idaho Ambient Air Quality Standards.	Same as baseline conditions.	Air quality impacts would not exceed NAAQS. Impacts to tribal treaty rights and tribal resources due to haze would be localized, long term, and negligible to minor.	Same as the 2021 MMP.