Stibnite Gold Project

Noise Specialist Report

Prepared by:
USDA Forest Service
Payette National Forest

for:
Payette and Boise National Forests

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List of Acronyms

2021 MMP	2021 Modified Mine Plan
AADT	average annual daily traffic
AHI	Avalanche Hazard Index
ANFO	ammonium nitrate and fuel oil
ASAOC	Administrative Settlement Agreement and Order on Consent
ATV	all-terrain vehicle
dB	decibel
dBA	decibels on the A-weighted scale
CFR	Code of Federal Regulations
CR	County Road
East Fork SFSR	East Fork South Fork Salmon River
EMMP	Environmental Monitoring and Management Plan
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right to Know Act
FCRNRW	Frank Church-River of No Return Wilderness
FHA	Federal Housing Administration
FHWA	Federal Highway Administration
Forest Service	U.S. Forest Service
FR	Forest Road
FRTA	Forest Road and Trail Act
IPCo	Idaho Power Company
IRA	Idaho Roadless Area
ITD	Idaho Transportation Department
kV	kilovolt
L_{DN}	Day-Night Noise Level

L_{DN24h}	day-night sound level, expressed as dBA over a 24-hour period
L_{EQ}	equivalent sound level
L_{EQ1h}	average hourly noise level
L_{EQ24h}	average noise level over a 24-hour period
Midas Gold	Midas Gold Idaho, Inc.
mph	miles per hour
MSHA	Mine Safety and Health Administration
N/A	not available
NHPA	National Historic Preservation Act
NSR	noise sensitive receiver
OSHA	Occupational Safety and Health Administration
OSV	over-snow vehicle
Perpetua	Perpetua Resources Idaho Inc.
RAMP	Restoration and Access Management Plan
RCNM	Roadway Construction Noise Model
SGLF	Stibnite Gold Logistics Facility
SGP	Stibnite Gold Project
SH	State Highway
SPCC	spill prevention, control and countermeasure
SPL	sound pressure level
TL	transmission loss
TSF	tailings storage facility
U.S.	United States
UTV	utility task vehicle

1.0 Introduction

The United States (U.S.) Department of Agriculture Forest Service (Forest Service) received the Stibnite Gold Project (SGP) Plan of Restoration and Operations, (Midas Gold Idaho, Inc. 2016) for review and approval in accordance with regulations at 36 Code of Federal Regulations (CFR) 228 Subpart A for the proposed SGP in central Idaho. A revised Plan, also known as ModPRO,[1] was submitted to the Forest Service in 2019 (Brown and Caldwell 2019). A further modified Plan, also known as ModPRO2,[2] was then submitted in October of 2021 (Perpetua 2021a). Midas Gold changed their name to Perpetua Resources Idaho Inc. (Perpetua[3]) in February 2021.

The SGP would consist of mining operations, including an open pit hard rock mine and associated processing facilities, located within Valley County in central Idaho on federal, state, and private lands (**Figure 1 1**). The SGP would produce gold and silver doré, and antimony concentrate, for commercial sale by Perpetua. The SGP would have a life (construction, operation, closure, and reclamation), not including post-reclamation monitoring, of approximately 20 years, with active mining and ore processing occurring over approximately 15 years.

Noise is typically characterized as unwanted sound. Because the natural existing ambient sound is generally not considered a problem, it is not typically classified as noise. The ambient sound level is a composite of sound from all sources, including the natural background and anthropogenic sources. When measured, the ambient sound is the total sound received by the microphone of a sound level meter. Existing ambient sound levels are often the starting point for analyzing project-associated noise impacts because such environmental noise analysis typically compares project-associated noise to either existing ambient or natural background sound based on applicable adverse effect or impact assessment criteria. This section addresses the affected noise environment as it is related to humans and human activity. Effects of noise on non-human species is addressed in the specialist reports related to fish resources and fish habitat, and wildlife and wildlife habitat (Forest Service 2022a, 2022b).

The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and, in the extreme, hearing impairment. At any location, both the magnitude and frequency of environmental noise may vary considerably over the course of each day and throughout the week and year. This variation is caused not only by various noise source activities, but also by changing weather conditions, effects of seasonal vegetative ground cover, presence of ice or flowing water from nearby creeks and rivers, and wind.

Reference examples of outdoor and indoor noise levels are provided in **Table 1-1** as context for describing existing conditions. These levels are measured in terms of "A-weighted" decibels (dBA), which are used to quantify sound and its effect on people (U.S. Environmental Protection Agency [EPA] 1978), and emphasize frequencies best heard by humans. The equivalent noise levels (L_{EQ}) are the measured or calculated noise level energy average over a specific period of time (such as 1 hour or 24 hours). Noise levels listed in **Table 1-1** represent Day-Night sound levels (L_{DN}), an energy-averaged value over a 24-hour period that reflects increased sensitivity to noise when people are usually sleeping.

[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.

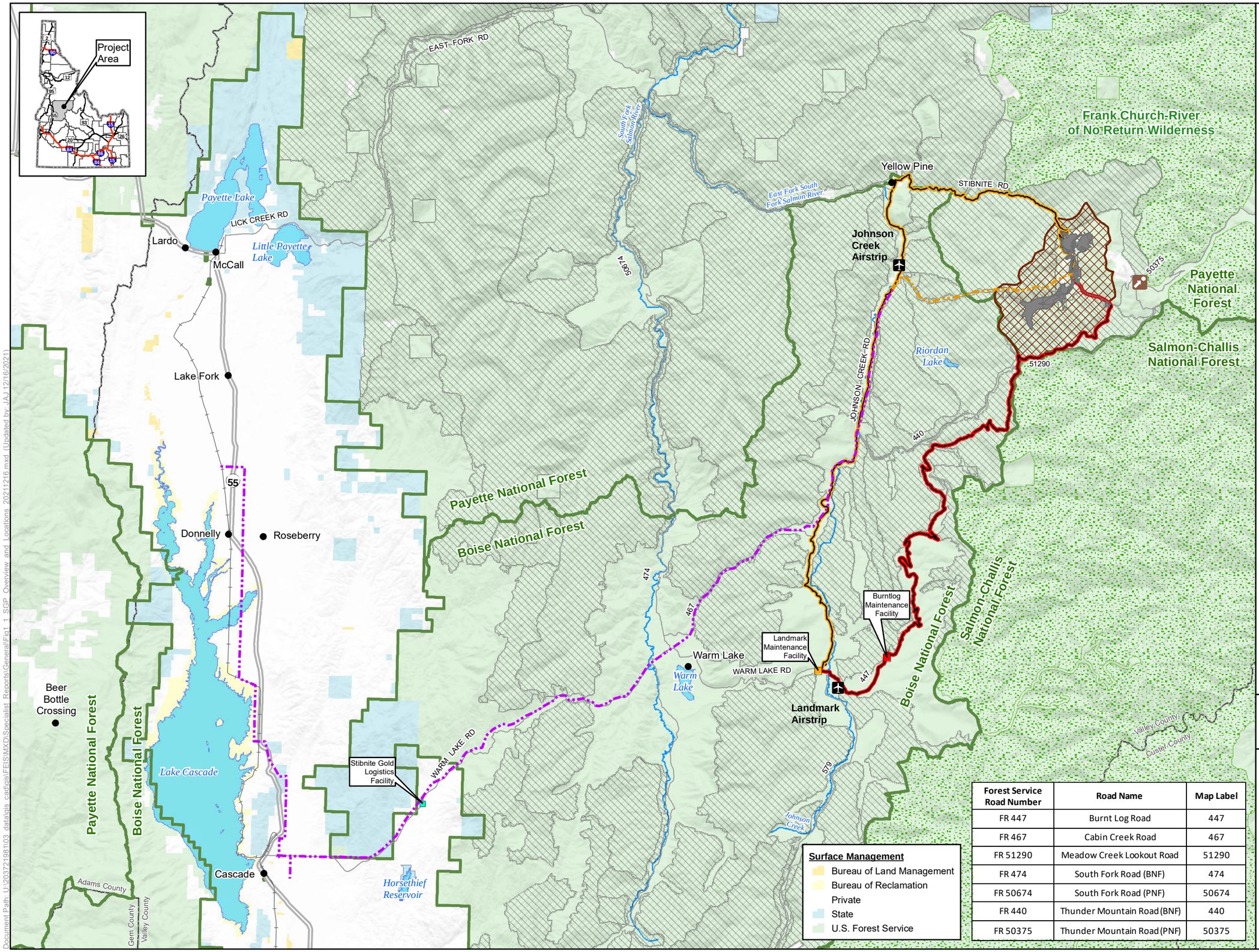
Table 1-1 Examples of Noise Levels

Outdoor	Noise Levels (dBA, L_{DN})	
Jet flying over at 1,000 feet	100	Rock band
Gas lawn mower at 3 feet	90	Blender at 3 feet
Next to busy highway	88	
0.75-mile from touchdown at major airport	86	Garbage disposal at 3 feet
Noisy urban area during the day	70	Vacuum cleaner at 10 feet
Wooded suburban residential	51	Refrigerator at 3 feet
Rural residential	39	
Wilderness Ambient	35	Library

Source: Caltrans 2009; EPA 1978
Key:
dBA = A-weighted decibel
L_{DN} = Day-night sound level, expressed in dBA

The following general terms are used in the noise analysis to describe different types of sound:

- Noise – Typically, unwanted sound
- Ambient sound – The combination of sound from all sound sources, natural or man-made, at any specific time or place.
- Background sound – The sound level that already exists before or without the SGP.
- SGP-attributed sound – Any sound produced by the SGP that was not already part of the existing background sound.
- Baseline plus SGP Sound – The sound energy sum of the existing background sound and the SGP-attributed sound. All other things remaining equal, the baseline plus SGP sound level would become the new ambient sound if the SGP was implemented.



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

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

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

* Associated with 2021 MMP only
** Associated with Johnson Creek Route Alternative only
Note:
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road.

0 2 4 Miles
1 inch = 4 miles when printed at 11x17

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

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

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2.0 Alternatives, including the Proposed Action

The SGP 2021 Modified Mine Plan (2021 MMP) Alternatives Report (Forest Service 2022c) contains the details of the alternatives that are being considered and fully analyzed in this report. For reader usability, the alternatives are briefly summarized here.

2.1 No Action Alternative

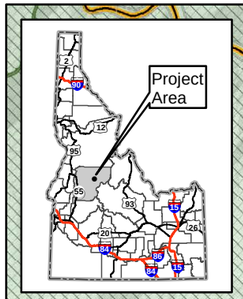
The No Action Alternative provides an environmental baseline for comparison of the action alternatives. Under the No Action Alternative, the mining, ore processing, and related activities under the 2021 MMP or the Johnson Creek Route Alternative would not take place. In addition, certain legacy and existing mining impacts would be 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 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.

2.2 2021 MMP

The 2021 MMP is based upon Perpetua's Revised Plan (ModPRO2) and is considered the Proposed Action. The description of this alternative has been updated per the Revised Plan submitted in 2021 (Perpetua 2021). The SGP operations footprint has been modified but would still be within the previously identified Operations Area Boundary (**Figure 2-1**).

The following mine components would be common to the 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
- Tailing 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
- Surface and underground exploration
- Stibnite Gold Project worker housing facility



Surface Land Management
- Private
- U.S. Forest Service

North Security Gate
Stibnite Lake
West End Pit
Yellow Pine Pit & Backfill
Midnight Backfill
Midnight Pond
Growth Media Stockpile
Crusher ROM Stockpile Area
Scout ROM Stockpile Area
Process Plant Area
Substation
Explosives Facility
Cell Tower
Transmission Line
Water Treatment Plant
Laydown
Hangar Flats Pit Backfill, & Stockpiles
Truck Shop Area
TSF Embankment
TSF Buttress
TSF Impoundment
SODA Pond
Radio Communications Tower
Main Gate
Growth Media Stockpile
Worker Housing Facility
Radio Communications Tower

East Fork South Fork Salmon River
Sugar Creek
West End Creek
Midnight Creek
Hennessy Creek
Fiddle Creek
Garnet Creek
Rabbit Creek
Blowout Creek
Meadow Creek
STIBNITE RD

T19NR09E
T18NR09E
T19NR10E
T18NR10E

Frank Church-River of No Return Wilderness
Boise National Forest
Payette National Forest
Payette National Forest
Salmon-Challis National Forest

LEGEND

Project Components *

SGP Features
- Pit Backfill
- Growth Media Stockpile
- Mining Pit
- Laydown
- Plant Site
- TSF Buttress
- TSF Liner
- Alluvial Stockpile
- Workers Housing
- Stockpile
- Explosive Facility
- Operations Area Boundary
- Patented Claim Boundary
- Tailings Pipeline
- Clean Water Diversion **
- Clean Water Diversion - Piped **
- East Fork South Fork Salmon River Tunnel ***
- Stream ****
- Pond
- Stibnite Lake
- Light Vehicle Road
- Haul Road
- Helicopter Pad

Access Roads
- Burntlog Route
- Johnson Creek Route
- Cell Tower Access Road
- Public Access Road *****

Utilities
- Transmission Line
- Substation ******
- New Cell Tower
- Existing Communication Tower

Other Features
- U.S. Forest Service
- Wilderness
- IRA and Forest Plan Special Areas
- Monumental Summit
- Road

* Project Components are associated with all Alternatives
** Some surface clean water diversions are not discernible at this figure scale (e.g., the diversions associated with the TSF/buttress north, Fiddle culvert, Midnight Outfall, Scout ROM). Please refer to Figures 2.4-14 and 2.4-15 which provide greater detail regarding the Water Management Plan and its facility/diversion locations.
*** The East Fork South Fork Salmon River Tunnel would only be utilized as a contingency to manage high flows upon completion of the restoration of the East Fork SFSR across the backfill in the Yellow Pine Pit.
**** Perennial streams are not depicted for the entire map area. Only perennial streams within the Operations Area Boundary are depicted.
***** Public Access Road associated with 2021 MMP
****** Substation locations are approximate.

0 0.35 0.7 Miles
1 inch = 0.7 miles when printed at 11x17

Figure 2-1
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: 4/10/2022

Document Path: U:\2023\21061\03_data\gis_cad\gis\FEIS\MXD\Specialist Reports\General\Fig2_4-2_SGP_MineSite_Layout_20220407.mxd (Updated by JAJ 4/6/2022)

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 utilized during operations and reclamation. The actions proposed under the 2021 MMP would take place over a period of approximately 20 years, not including the long-term, post-closure environmental monitoring or potential long-term water treatment.

2.3 Johnson Creek Route Alternative

The Johnson Creek Route Alternative was developed to evaluate potential reductions in impacts to various resources. 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 road for mine access through operations and reclamation instead of the Burntlog Route that under the 2021 MMP requires new road construction in Inventoried Roadless Areas. 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.

The action alternatives are summarized in **Table 2-1**.

Table 2-1 Action Alternatives Summary

SGP Phase	Component/ Subcomponent	2021 MMP	Johnson Creek Route Alternative
All Phases	SGP timeline	• Construction: Approximately3 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	• 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

SGP Phase	Component/ Subcomponent	2021 MMP	Johnson Creek Route Alternative
		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.	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.
All Phases	Public Access	Construction: • Temporary groomed over-snow vehicle (OSV) trail on the west side of Johnson Creek from Trout Creek to Landmark while Burntlog Route is constructed (8 miles). • OSV trail on west side of Johnson Creek from Wapiti Meadows to Trout Creek campground closed during construction (9 miles). • OSV trail from Warm Lake to Landmark closed during construction through operations (8.5 miles). • Cabin Creek Road Groomed OSV trail (11 miles). • Public roads remain open through the SGP with temporary closures as needed to accommodate construction. Operations: • Groomed OSV trail moves from west side of Johnson Creek Road to Johnson Creek Road from Landmark to Wapiti Meadows (16.7 miles).	Construction and Operations: Same as 2021 MMP except: • OSV trail 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 trail 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
		• Stibnite Road (County Road [CR] 50-412) / Thunder Mountain Road (FR 50375) closed through the SGP. • 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).	
Operations	Utilities – Transmission Lines	• Upgrade approximately63 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.

SGP Phase	Component/ Subcomponent	2021 MMP	Johnson Creek Route Alternative
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.

Table Source: Perpetua 2021

2.4 Applicable Environmental Design Features

The SGP must comply with all laws and regulations that apply to the proposed activities (Forest Service 2022c). Standards and guidelines in the Payette and Boise National Forest Land and Resource Management Plans (Forest Service 2003, 2010) 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 (Idaho Department of Lands 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. With extensive review and input from the Forest Service and cooperating agencies, there was 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 (Forest Service 2022c) to the project, regulatory requirements, standards and guidelines, best management practices, and likely permit conditions are listed in **Table 2-2**. The environmental design features that have been proposed and committed to by Perpetua are listed in **Table 2-3**. All of these environmental design measures have been assumed to be effective in conducting the environmental analysis presented in **Section 7.0**.

Table 2-2 Prominent Regulatory and Forest Plan Requirements for Noise

Description	Type	Reference
To minimize adverse effects of noise to TEPC, MIS, or Sensitive species, where necessary and in accordance with MSHA and OSHA, Perpetua 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

Table 2-3 Proponent Proposed Environmental Design Features for Noise

Description
The ore processing facility building would be enclosed.
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.
When practicable, pumps, generators, and engines would be turned off when not in use to avoid unnecessary noise generation and reduce energy consumption.
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.

In addition to the environmental design features listed in **Table 2-3** that are specific to noise, Perpetua has proposed additional environmental protection measures for the SGP as described in the following documents:

- Stibnite Gold Mitigation Plan (Perpetua 2021b); and
- Fisheries and Aquatic Resources Mitigation Plan (Perpetua 2021c)

3.0 Relevant Laws, Regulations, and Policy

3.1 Land and Resource Management Plan

Physical, social, and biological resources on National Forest System lands are managed to achieve a desired condition that supports a broad range of biodiversity and social and economic opportunity. National Forest Land and Resource Management Plans embody the provisions of the National Forest Management Act and guide natural resource management activities on National Forest System land.

In the SGP area, the Payette National Forest Land and Resource Management Plan (Payette Forest Plan; Forest Service 2003), and the Boise National Forest Land and Resource Management Plan (Boise Forest Plan; Forest Service 2010) provide management prescriptions designed to realize goals for achieving desired condition for noise and include various objectives, guidelines, and standards for this purpose.

3.2 Federal Laws, Regulations, and Policy

3.2.1 Noise Control Act of 1972

The Noise Control Act of 1972 established a national policy to promote an environment free from noise that jeopardizes public health or welfare. The Noise Control Act directed the EPA to identify acceptable limits under various conditions that would protect public health and welfare with an adequate margin of safety. EPA published a summary of these acceptable limits in 1978, as follows:

- Average hourly noise level (L_{EQ1h}) of less than or equal to 55 dBA for outdoor areas where people spend limited amounts of time, such as school yards or playgrounds.
- Day-night noise level (L_{DN}) of less than or equal to 55 dBA for outdoor areas at residences, farms, and other areas where people spend varying amounts of time, where quiet is a basis for the use of such areas.

However, EPA stressed that the protective levels should "not be viewed as standards, criteria, regulations, or goals. Rather, they should be viewed as levels below which there is no reason to suspect that the general population will be at risk from any identified effects of noise" (EPA 1978). Therefore, the EPA levels are guidance levels rather than enforceable standards or regulations. The EPA guidance levels do not apply to biological resources such as fish and wildlife. Methods used to evaluate noise impacts to fish and wildlife are discussed in the Fish Resources and Fish Habitat specialist report, and the Wildlife and Wildlife Habitat specialist report (Forest Service 2022a, 2022b).

3.2.2 EPA Guidance on Ambient Noise Levels

Guidance on safe noise levels, which can be used to assess impacts of a project on public health and welfare, is available from EPA (1974, 1978). **Table 3-1** shows outdoor and indoor noise levels identified by EPA to protect public health and welfare, expressed as $L_{EQ2}4h$ or L_{DN} (based on the dBA over a 24-hour period). Note that the acceptable noise levels listed in the table are not "peak," but are 24-hour averages over several years. These values are not standards but are levels where the general population would not be expected to be at risk from the identified effects of the noise (EPA 1978).

Table 3 1 Yearly Values that Protect Public Health and Welfare with a Margin of Safety

Effect	Safety Level	Area
Hearing Loss	L_{EQ24h} ≤70 dBA	All areas.
Outdoor Activity Interference and Annoyance	L_{DN24h} ≤55 dBA	Outdoors in residential areas and farms, and other outdoor areas where people spend widely varying amounts of time, and other places where quiet is a basis for use.
Indoor Activity Interference and Annoyance	L_{DN} ≤45 dBA L_{EQ24h} ≤45 dBA	Indoor residential areas. Other indoor areas with human activities, such as schools, etc.

Source: EPA 1978
≤ = less than or equal to
dBA = A-weighted decibel.
L_{EQ24h} = Equivalent sound level for 24-hour period, expressed as dBA.
L_{DN} = Day-night sound level, expressed as dBA.
L_{DN24h} = Day-night sound level, expressed as dBA over a 24-hour period.

3.2.3 29 CFR 1910.95

Under 29 CFR 1910.95, the Occupational Safety and Health Administration (OSHA) noise standards are described. **Table 3-2** describes the general permissible noise exposure limits on an A-weighted level. When an employee is exposed to noises exceeding these limits, engineering controls and/or personal protective equipment need to be put in place.

Table 3-2 Permissible Noise Exposures

Duration Per Day, Hours	Sound Level dBA Slow Response
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
0.5	110
≤0.25	115

Source: 29 CFR § 1910.95

3.2.4 30 CFR 62.130

Under 30 CFR 62.130, the Mine Safety and Health Administration (MSHA) noise standards are described. A miner cannot be exposed to noise exceeding the permissible exposure level of 115 dBA during any work shift without hearing protection.

3.3 State and Local Policy

The Idaho Administrative Procedures Act does not contain regulations relating to environmental noise. Therefore, there are no state noise regulations applicable to the SGP.

There are no applicable local county noise ordinances for Valley County, Idaho.

4.0 Issues and Resource Indicators

4.1 Significant Issues

Significant issues are those which are used to formulate alternatives to the Proposed Action and to develop mitigation measures. No significant issues were identified for noise concerns.

4.2 Resource Issues and Indicators

Although noise was not identified as a significant issue, it was identified by the public, the Forest Service, and cooperating agencies as a relevant consideration. The analysis of effects of noise includes the following issue and indicators:

Issue: The SGP construction and operations may cause disturbance to Noise Sensitive Receivers (NSRs) such as occupied residences and campgrounds.

Noise impacts from construction of mine facilities, roads, and the transmission line upgrade, as well as mine operations, mine traffic on haul roads, and mine traffic on area access roads, may affect area residents, recreationists, and wildlife.

Indicators:

- SGP-attributed noise exceeds a threshold of 55 decibels 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.
- SGP-attributed noise exceeds a threshold of 45 dBA L_{DN} at the interior portion of a residential NSR.
- SGP-attributed noise causes the baseline outdoor ambient (i.e., existing) noise level to increase by more than 5 dBA in the vicinity of an NSR.
- SGP-attributed noise causes the resulting indoor or outdoor ambient noise level to exceed 60 dBA equivalent sound level (L_{EQ}).

5.0 Methodology

5.1 Analysis Area

The analysis area for noise includes the area where effects (direct / indirect and cumulative) may be caused by the proposed activities (FSH.1909.15, 15.2a).

5.1.1 Direct/Indirect Effects Boundaries

The analysis area for noise includes areas within a 5-mile radius of the major SGP components (i.e., SGP, access routes, utilities, and off-site facilities) (**Figure 5-1**). This is the analysis area for noise because noise levels attenuate (i.e., decrease) as a function of the distance from the source (i.e., divergence), ground absorption, atmospheric conditions, and the presence of physical barriers. Due to these factors noise levels would vary throughout the analysis area.

5.1.2 Cumulative Effects Boundaries

The cumulative effects analysis area for noise is the same as the direct/indirect effects boundary as associated sound would not travel beyond that area.

5.2 Analysis Area Methodology

Predicted increases in outdoor noise levels due to the SGP were calculated at a given sensitive receiver using reference sound levels of typical equipment, with typical acoustical usage factors (i.e., its loudest condition) for each type of equipment (Federal Highway Administration [FHWA] 2006), and baseline ambient noise data. Except where otherwise specified, noise levels were calculated using the noise analysis tool developed by the U.S. Department of Transportation, FHWA Roadway Construction Noise Model (RCNM) version 1.1 (FHWA 2006), using the following equations:

To add equal sound pressure levels (SPL):
SPLTotal = SPL1 + 10Log10(N)
Where: SPLTotal = total sound pressure level produced by multiple identical sources
SPL1 = SPL of one source
N = number of identical sources to be added (must be more than 0)

To add unequal sound pressure levels:
SPLTotal = 10Log10[10SPL1/10 + 10SPL2/10 + 10SPLn/10]
Where: SPLTotal = total sound pressure level produced.
SPL1, SPL2, and SPLn represent the first, second, and nth SPL, respectively.

To calculate a noise level from a point source at a receiver (Caltrans 2009):
dBA2 = dBA1 + 20Log10(d1/d2)
Where: dBA1 = noise level at a distance d1 from the point source, not accounting for line-of-sight.
dBA2 = noise level at distance d2 from the same point source, not accounting for line-of-sight.

To calculate a noise level from a line source at a receiver (Caltrans 2009):
dBA2 = dBA1 + 10Log10(d1/d2)
Where: dBA1 = noise level at a distance d1 from the point source, not accounting for line-of-sight.
dBA2 = noise level at distance d2 from the same point source, not accounting for line-of-sight.

To calculate the transmission loss (TL) from a source and a receiver when a barrier stands in the line-of-sight (Caltrans 2009):
TL = 10Log10(Ef/Eb)
Where: Ef = the relative noise energy immediately in front (source side) of the barrier.
Eb = the relative noise energy immediately behind the barrier (receiver side).

Traffic noise levels are calculated using the noise analysis guidance provided in the Federal Transit Administration's (FTA) Transit Noise and Vibration Assessment Guidance, using the following equations (FTA 2018):

To calculate average hourly traffic noise levels:
L_{EQ} (h) = SELref + 10log(V) + CsLog(S/50) – 35.6
Where: SEL = Sound exposure level and SELref = Source exposure reference level at 50 feet from roadway, at 50 miles per hour (mph).
V = hourly volume of vehicle type, in vehicles per hour.
Cs = Speed constant.
S = average vehicle speed, in mph.
SELrefs provided in Table 4-11 of the FTA guidance (2018) for diesel-powered buses (82 dBA) and for automobiles and vans (74 dBA) is used to represent heavy and light trucks and light vehicles, respectively.

Blasting noise levels are calculated using guidance provided in Dyno Nobel 2010.

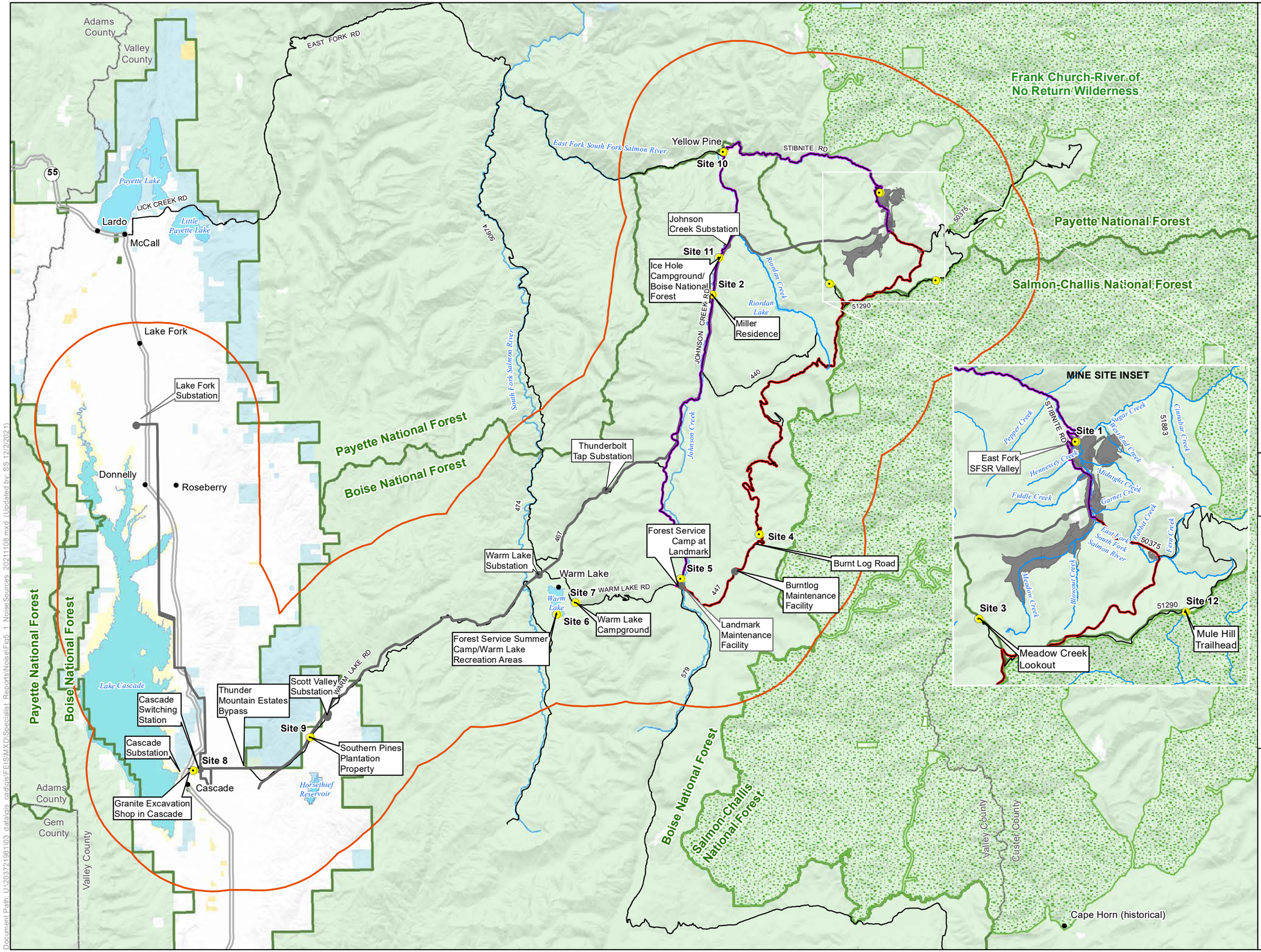
The following assumptions and approaches were used in the noise impact analyses:

- SGP-related noise levels and noise level increases at NSR locations are predicted by considering noise generated by major SGP-related noise sources (e.g., the SGP, access roads, utilities, and off-site facilities) during construction, operations, and closure activities, as well as the existing ambient or background noise levels at NSR locations. Generally, predicted noise levels conservatively apply only three attenuation (i.e., reduction) factors: geometric divergence (i.e., distance), ground absorption, and atmospheric absorption. This assumes there is line of sight between the noise source and the receiver. Any obstruction of this line of sight by terrain or vegetation would reduce the noise further.

- Measurements of noise were only obtained in the summer; therefore, calculations are based on summer measurements. Any winter calculations omit winter seasonal condition impacts and are solely based on equipment present at that time.

- The estimate of total average hourly noise levels from a noise source is considered to be conservative, assuming the simultaneous operation of all the equipment listed in the respective equipment list tables for a particular SGP component and/or SGP phase.

- L_{DN} levels are considered to be the baseline ambient noise levels at residential sites and campgrounds due to the sensitivity of these NSRs to nighttime noise levels. The average daytime ambient L_{EQ1h} level is considered to be the baseline ambient noise level at non-residential sites, and other recreational areas.



LEGEND

- Noise Analysis Area
- Noise Monitoring Site

Project Components

- SGP Features*
- Burntlog Route
- Johnson Creek Route

Other Features

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

Surface Land Management

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

* Mine Site Features are associated with both Alternatives

Note:
The McCall – Stibnite Road (CR 50-412) consists of Lick Creek Road, East Fork South Fork Salmon River Road (East Fork Road) and Stibnite Road

0 2 4 Miles

1 inch = 4 miles when printed at 11x17

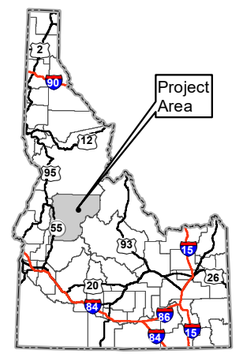


Figure 5-1
Noise Sources and Receptors in the Analysis Area
Stibnite Gold Project
Stibnite, ID

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

Document Path: U:\203721\81\03_data\gis_eng\gis\FEIS\MXD\Specialist Reports\Noise\Fig5_1_NoiseSources_20211108.mxd (Updated by: SS 12/2/2021)

- SGP-related noise levels at NSRs would depend upon the type and number of equipment operating at the same time in specific locations or areas, the exact distance between the noise source or sources and the NSR, in addition to atmospheric conditions and intervening ground, vegetation, and terrain conditions.
- The predicted SGP-related noise levels at NSRs are compared to the noise indicators listed above to assess the intensity of the noise impact.
- For purposes of this noise analysis, and because the distance between the SGP and the nearest NSR is considerably greater than the largest dimension of the area that encompasses the mine pits, backfills, development rock storage facilities, tailings storage facility, and processing facilities associated with the SGP, the entire SGP is represented by a single aggregate acoustical point source that is co-located with the rock crushing plant (in the Ore Processing Plant Area) exposed to the outdoors (**Figure 2-1** SGP Layout).

6.0 Affected Environment

6.1 Existing Condition

6.1.1 Noise-Sensitive Receptors

The SGP is located in the upper East Fork South Fork Salmon River (East Fork SFSR) drainage approximately 44 air miles northeast of the City of Cascade, Idaho. The current access from State Highway (SH) 55 to the SGP is via the Warm Lake Road (CR 10-579) to Johnson Creek Road (CR 10-413) (in summer) or South Fork Salmon River Road (FR 50674) (in winter), and then the Stibnite Road portion of the McCall-Stibnite Road (CR 50-412) (**Figure 5-1**).

At the SGP the primary human NSRs would be SGP workers. Outside the SGP, the primary human NSRs would be residents and recreational land uses (e.g., campgrounds, lookouts, trails, dispersed recreational uses in wilderness areas, including undeveloped campsites). Analyzed NSRs are listed in **Tables 6-1** to **6 3**, for locations with (NSR Sites 1 through 9) and without (NSR Sites 10 through 12) baseline noise measurements, respectively.

Table 6-1 Sound Levels Associated with Ordinary Noise Sources

Noise Source	Noise Level (dBA)	Subjective Description
Commercial jet take-off	120	Deafening
Road construction jackhammer	100	Deafening
Busy urban street	90	Very loud
Standard for hearing protection 8-hour exposure permissible exposure limit (mine safety and health administration [MSHA]) action level within active mining facilities	90 85	Very loud Loud – to very loud
Construction equipment at 50 feet	80-75	Loud
Freeway traffic at 50 feet	70	Loud
Noise mitigation level for residential areas federal housing administration (FHA)	67	Loud
Normal conversation at 6 feet	60	Moderate

Noise Source	Noise Level (dBA)	Subjective Description
Noise mitigation level for undisturbed lands	57	Moderate
Typical office (interior)	50	Moderate
Typical residence (interior)	30	Faint

Source: Federal Highway Administration Highway Construction Noise Handbook (FHWA 2006).

Table 6-2 Measured Baseline Ambient Sound Levels

ID	Name	Baseline dBA[1,2]	Location and Existing Noise Characterization
Site 1	East Fork SFSR Valley	40 L_{EQ1h}	Located in the East Fork SFSR valley near the mine pit locations to characterize baseline ambient noise levels where mining operations would occur.
Site 2	Miller Residence	50-51 L_{DN}	Located near a residence on Johnson Creek Road (CR 10-413) between Stibnite Road (CR 50-412) and Meadow Creek Lookout site to characterize baseline ambient noise levels near the highway that trucks would use to access the SGP via the Johnson Creek Route.[3]
Site 3	Meadow Creek Lookout	45 L_{EQ1h}	Located at the Meadow Creek Lookout site off Meadow Creek Lookout Road (FR 51290) to characterize baseline ambient noise levels in undeveloped areas and near the Burntlog Route;[4] general noise levels in adjacent wilderness areas.
Site 4	Burnt Log Road	40 L_{EQ1h}	Located approximately 100 feet from FR 50447 (Burnt Log Road) to characterize baseline ambient noise levels in undeveloped areas near the Burntlog Route, and for use in characterizing general noise levels in adjacent wilderness areas.
Site 5	Forest Service Camp at Landmark	34-40 L_{DN}	Located at a Forest Service campground near Johnson Creek Road (CR 10-413) and Landmark Airfield to characterize baseline ambient noise levels near this higher volume roadway along the Johnson Creek Route where other noise sources (e.g., aircraft) also are present.
Site 6	Forest Service Summer Home/ Warm Lake Recreation Areas	34-49 L_{DN}	Located on the southwest shoreline of Warm Lake to characterize baseline ambient noise levels near Forest Service summer home and recreation areas associated with Warm Lake.
Site 7	Warm Lake Road	47-52 L_{DN}	Located approximately 150 feet north of Warm Lake Road (CR 10-579) and directly east of Warm Lake to characterize baseline ambient noise levels along this frequently used road, at Warm Lake Campground, near the Burntlog Route.
Site 8	Granite Excavation Shop in Cascade	61-64 L_{DN}	Located at a commercial shop along Warm Lake Road (CR 10-579) in Cascade, with a residence nearby, to characterize baseline ambient sound levels near the highway.

ID	Name	Baseline dBA[1,2]	Location and Existing Noise Characterization
Site 9	Southern Pines Plantation Property	51-52 L_{DN}	Located approximately 7 miles east of SH 55 along Warm Lake Road (CR 10-579) to characterize baseline ambient noise levels along this frequently used highway near a group of private residences.

Source: HDR, Inc. 2017a, 2017b

[1] Presented hourly L_{EQ} values (L_{EQ1h}) are averaged from daytime (i.e., from 7:00 AM and 10:00 PM) hourly baseline measurement data collected over a period of multiple consecutive days.

[2] Presented L_{DN} values are calculated from 24-hour baseline measurement data collected over a period of multiple consecutive days (HDR, Inc. 2017a, 2017b).

[3] The Johnson Creek Route is the current summer access from SH 55 to the SGP via Warm Lake Road (CR 10-579), Johnson Creek Road (CR 10-413), and Stibnite Road (CR 50-412).

[4] The Burntlog Route includes Warm Lake Road (CR 10-579), FR 447 (Burnt Log Road), Thunder Mountain Road (FR 50375), and a new connector segment from Burnt Log Road (FR 447) to Thunder Mountain Road (FR 50375).

Noise measurement sites 2, 3, 5, 6, 8, and 9 are considered human use NSRs for this analysis because they represent residences or recreational land uses (e.g., campgrounds, lookouts, trails, dispersed recreation uses in wilderness areas, including undeveloped campsites). Site 1 represents ambient sound levels near the SGP. Site 4 is not considered an NSR, but the sound levels measured at Site 4 represent—like the levels measured at Site 3—ambient sound levels in adjacent wilderness areas. Site 7 also is not considered to be an NSR but characterizes traffic noise along Warm Lake Road (CR 10-579).

Residences are located near Warm Lake Road (CR 10-579) in Cascade and approximately 7 miles east of SH 55 on the Southern Pines Plantation Property. Recreational land uses located near Warm Lake Road (CR 10-579) include the Warm Lake Campground, a Forest Service summer home, and recreational areas along the southwest shoreline of Warm Lake. These noise-sensitive receptors are in the vicinity of both the Johnson Creek Route and the Burntlog Route.

Several residences, the Forest Service Camp at Landmark, and the Ice Hole Campground, are located near Johnson Creek Road (CR 10-413) between Warm Lake Road (CR 10-579) and Stibnite Road (CR 50-412), with additional residences located near Johnson Creek Road (CR 10-413) in the village of Yellow Pine.

The Meadow Creek Lookout is located just north of Meadow Creek Lookout Road (FR 51290), which would be used to access a portion of the Burntlog Route. The Frank Church-River of No Return Wilderness Area is located east of the Burntlog Route and there are several hiking trails in the vicinity. The closest is the Mule Hill Trailhead (National Forest System Trail #219).

6.1.2 Baseline Ambient Noise Level Measurements

Outdoor baseline ambient sound levels were measured at five locations in the analysis area in July and August of 2014 and at four additional locations in July and August of 2016 (HDR, Inc. 2017a, 2017b). **Table 6-2** provides a description of each site along with summarized baseline sound levels. The noise measurement locations (Sites 1 through 9) are shown in **Figure 5-1**. Sites with assumed nighttime human use, such as residences and campgrounds, are reported in dBA, L_{DN}; those with assumed daytime-only use are reported in dBA, L_{EQ}.

Three additional locations have been identified as human use NSRs for this analysis. **Table 6-3** provides a description of these additional NSRs along with reference baseline sound levels. Measured noise levels were not available for these areas, but baseline levels were estimated based on similarity to other sites with measurements.

Table 6-3 Additional Human Use NSRs and Estimated Ambient Baseline Sound Levels

ID	Name	Baseline dBA[1,2]	Location and Existing Noise Characterization
Site 10	Yellow Pine	50-51 L_{DN}	Located in Yellow Pine village. No noise measurements were taken from this site, but baseline sound levels assumed to be similar to Site 2, on the basis of similar distance to shared nearby roadway(s) and proximity of residences.
Site 11	Ice Hole Campground/ Boise National Forest	50-51 L_{DN}	Located at Ice Hole Campground in the Boise National Forest. No noise measurements were taken from this site, but baseline sound levels assumed to be similar to Site 2, on the basis of similar distance to shared nearby roadway.
Site 12	Mule Hill Trailhead	40-45 L_{EQ1h}	Located at the Mule Hill Trailhead. No noise measurements were taken from this site, but ambient sound levels assumed to be in the range of Site 3 and Site 4 sound levels.

Source: AECOM 2020

[1] Presented hourly L_{EQ} values (L_{EQ1h}) are averaged from daytime (i.e., from 7:00 AM and 10:00 PM) hourly baseline measurement data collected over a period of multiple consecutive days.

[2] Presented L_{DN} values are calculated from 24-hour baseline measurement data collected over a period of multiple consecutive days (HDR, Inc. 2017a, 2017b).

6.1.3 Landscape Features

The SGP is located in the Payette National Forest in the upper drainage basin for the East Fork SFSR. The SGP area is characterized by narrow valleys surrounded by steep mountains. Elevations along the valley floors range from 6,000 to 6,600 feet above mean sea level. The surrounding mountains and areas in the Frank Church-River of No Return Wilderness area reach elevations over 9,000 feet above mean sea level. Off-site facilities, much of the Burntlog Route, and the transmission line corridor are in the Boise National Forest with a similar topography and terrain. On the western edge of the SGP area, access routes and transmission lines are in wider valley bottoms. Noise levels attenuate (i.e., decrease) as a function of the distance from the source (i.e., divergence), ground absorption, atmospheric conditions, and the presence of physical barriers obstructing the line-of-sight path of noise propagation. Tall, dense trees and terrain obstructing the line-of-sight propagation of noise can reduce or eliminate the transmission of noise.

6.1.4 Avalanches

With the surrounding terrain of the SGP, avalanches hazards are present. Avalanche risk abatement via explosive is an option for the SGP. Explosives would be used in higher elevations at the upper portions of the potential avalanche paths, as to dislodge the avalanche with the minimum impact. The choice of explosive used and the mechanism of delivery, would affect noise levels (DAC 2021). **Tables 6-4** and **6-5** describe several methods of avalanche control and their associated noise levels.

Table 6-4 Avalanche Control Noise Levels

Noise Event	Noise Level (dBA) at 100 feet*
Gazex explosion	124.0
2-pound hand charge	107.2
4-pound hand charge	107.8

Source: DAC 2021
dBA = A-weighted decibels

Table 6-5 Predicted Decibel Levels

Distance from Source (feet)	1 kg Explosive (dCB) PK15(met)1/Day/Night Focus/Average Met	2 kg Explosive (dCB) PK15(met)1/Day/Night Focus/Average Met
1,000	143.0/142.5/133.5	145.5/145.0/136.0
2,000	133.5/132.0/122.5	136.0/134.5/125.0
4,000	123.5/122.0/111.0	126.0/124.5/113.5
8,000	116.0/113.5/102.5	118.5/116.0/105.0

Source: DAC 2021
[1] The metric PK 15(met) accounts for statistical variation in received single event peak noise levels due to weather. It is the calculated peak noise level, without frequency weighting, expected to be exceeded by 15 percent of all events that might occur.

Based on the location of the SGP and the avalanche paths investigated, the probability of noise complaints would be expected to be low. A remote avalanche control system would be used to deploy the explosives. The nearest residential area to a potential avalanche risk abatement measure would be Yellow Pine, a minimum of four miles away from any explosive. Another control measure would be via helicopter bombing, which would occur a minimum of one mile from Yellow Pine residents (DAC 2021).

In **Section 7.0**, avalanches are classified further for each alternative. The following descriptions will aid in learning the language used. The Avalanche Hazard Index (AHI) method is commonly used to quantify risk to road traffic from a series of avalanche paths. The AHI is considered a risk index because it includes consideration of both the exposure and vulnerability of moving and waiting vehicles to avalanches (DAC 2021). Hazard categories are classified as defined in **Table 6-6**.

Table 6-6 Hazard Categories as Defined by the Avalanche Hazard Index

Hazard Category	Avalanche Hazard Index
Very Low	<1
Low	1-10
Moderate	10-40
High	40-150

Source: DAC 2021
dBA = A-weighted decibels

Avalanche magnitude and frequency is dependent on snow supply and terrain. The frequency is typically described in avalanche return periods, as described in **Table 6-7**. Frequency can be related to a specific location within the avalanche path. Frequency decreases with distance travelled from the starting zone down the avalanche path (DAC 2021).

Table 6-7 Avalanche Frequency

Average Return Period (Years)	Range (Years)	Frequency Descriptor	Comments
1	>1 to 3	High	Active in most winters
10	3 to 20	Moderate	Active in major storms or widespread avalanches cycles
30	20 to 50	Low	Long return period avalanches
100	50 to 300	Very Low	Very long return period avalanches

Source: DAC 2021

Magnitude can often be related to frequency; generally, large, destructive avalanches occur less frequently within an avalanche path, whereas smaller avalanches occur more frequently. Magnitude estimates are described in terms of destructive force classification (**Table 6-8**).

Table 6-8 Avalanche Size – Destructive Force

Size	Avalanche Destructive Potential	Typical Mass (Tonnes)	Typical Path Length (m) (ft)	Typical Impact Pressure (kPa) (lbs/ft^2)
D1	Relatively harmless to people	<10	10 (30)	1 (20)
D2	Could bury, injure, or kill a person	10^2		
100 (300)	10 (200)			
D3	Could bury and destroy a car, damage a truck, destroy a wood frame house, or break a few trees	103	1,000 (3,000)	100 (2,000)
D4	Could destroy a railway car, large truck, several buildings, or substantial amount of forest	104	2,000 (6,000)	500 (10,000)

Source: DAC 2021

7.0 Environmental Consequences

7.1 Impact Definitions

The impacts definitions for intensity, duration (FSH 1909.15, 152b), and context are provided in **Table 7-1**.

Table 7-1 Impact Definitions

Attribute	Term	Description
Intensity	Negligible	Impacts would result in a change in current conditions that would be too small to be physically measured using normal methods or would not be perceptible. There is no noticeable effect on the natural or baseline setting. There are no required changes in management or utilization of the resource.
Intensity	Minor	Impacts would result in a change in current conditions that would be just measurable with normal methods or barely perceptible. The change may affect individuals of a population or a small portion of a resource, but it would not result in a modification in the overall population, or the value or productivity of the resource. There are no required changes in management or utilization of the resource.
Intensity	Moderate	Impacts would result in an easily measurable change in current conditions that is readily noticeable. The change affects a large percentage of a population, or portion of a resource which may lead to modification or loss in viability, value, or productivity in the overall population or resource. There are some required changes in management or utilization of the resource.
Intensity	Major	Impacts are considered significant. Impacts would result in a large, measurable change in current conditions that is easily recognized. The change affects a majority of a resource or individuals of a population, which leads to significant modification in the overall population, or the value or productivity of the resource. This impact may not be in compliance with applicable regulatory standards or impact thresholds, requiring large changes in management or utilization of the resource.
Duration	Temporary	Impacts that are anticipated to last no longer than 1 year.
Duration	Short-Term	Impacts that are anticipated to begin and end within the first 3 years during the construction phase.
Duration	Long-Term	Impacts lasting beyond 3 years to the end of mine operations and through reclamation, approximately 20 years.
Duration	Permanent	Impacts that would remain after reclamation is completed.
Context	Localized	Impacts would occur within the analysis area or the general vicinity of the Operations Area Boundary.
Context	Regional	Impacts would extend beyond the Operations Area Boundary and local area boundaries.

Intensity is the severity or levels of magnitude of an impact.
Duration is the length of time an effect would occur.
Context is the effect(s) of an action that must be analyzed within a framework, or within physical or conceptual limits.

7.2 Direct and Indirect Effects

7.2.1 No Action Alternative

Under the No Action Alternative, there would be no large-scale mining operations by Perpetua, and existing noise from exploration-related activities of the previously approved Golden Meadows Exploration Project, per the Golden Meadows Exploration Project Plan of Operations and the Golden Meadows Exploration Project Environmental Assessment (Forest Service 2015) would continue through reclamation of disturbances. These approved activities include construction of several temporary roads (approximately 0.32 mile of temporary roads) to access

drill sites (total of 28 drill sites), drill pad construction (total of 182 drill pads) and drilling on both National Forest System and private lands at and in the vicinity of the SGP. This includes continued use of the existing man camp, office trailers, truck maintenance shop area, potable water supply system, wastewater treatment facility, helipad and hangar, and airstrip.

7.2.2 2021 MMP

7.2.2.1 Construction

Noise generated during the construction phase would include noise from construction activities at the SGP, in addition to noise from the construction of off-site access roads, utilities, and facilities. Noise levels generated by these activities are described below, followed by a discussion of noise impacts on identified NSRs. A threshold noise level of 55 dBA is applied to the predicted noise levels to evaluate the environmental impact to humans. This report evaluates SGP noise impacts to humans. Noise impacts to fish and wildlife are discussed in the Fish Resources and Fish Habitat specialist report and the Wildlife and Wildlife Habitat specialist report (Forest Service 2022a, 2022b).

Environmental protection measures and design features as presented in **Section 2.4** would be implemented and have been considered in the analysis of construction noise impacts.

Operations Area Boundary

Construction activities at the SGP would require the use of a variety of heavy industrial-type equipment. **Table 7-2** lists noise levels for construction equipment that would likely be used at the SGP during the construction phase.

The estimated total average hourly noise levels from the SGP during the construction phase would be 94 dBA L_{EQ} at the reference distance of 50 feet. Noise from the SGP would attenuate to the threshold of 55 dBA approximately 0.8 mile from the source of activity based on distance alone. Accounting for ground absorption and atmospheric absorption, noise from the SGP would attenuate to 55 dBA approximately 0.38 miles from the source of activity. Mine development and associated noise during the construction phase would be limited to daytime hours (between 7:00 a.m. and 10:00 p.m.).

Table 7-2 Major Noise Sources and Estimated Maximum Noise Levels at the SGP During the Construction Phase

Equipment[1]	Total number of Units (max)[2]	Acoustical Usage Factor (%)[3]	Maximum Noise Levels per Unit, MAX at 50 feet (dBA)[4]	Predicted Total Noise Level, L_{EQ} at 50 feet (dBA)[5]
Front-end wheel loader (Cat 994 or equivalent)	1	40	79	75
Front-end loader (Cat 990 or equivalent)	1	40	79	75
Haul trucks (Cat 789 or equivalent w/200-ton capacity)	3	40	76	77
Haul Trucks (Cat 740 or equivalent)	3	40	76	77
Dozers (D10 or equivalent)	2	40	82	81
Dozers (D6 or equivalent)	1	40	82	78
Water trucks (Cat 777 chassis or equivalent)	1	40	76	72
Motor Graders (Cat 160M or equivalent)	2	40	85	84
Excavator (Cat 349 or equivalent)	1	40	81	77
Low-boy tractor (Cat 777 chassis or equivalent)	1	40	84	80
Vibratory compactor (Cat CS76 or equivalent)	1	20	83	76
Mobile Light Plants	6	50	81	86
Fuel Service Truck	1	40	76	72
Mechanics Service Truck	2	40	75	74
Lube Service Truck	1	40	76	72
Welding Service Truck	2	40	74	73
Boom Truck	2	40	74	70
Skid Steer Truck	1	40	79	75
Tire Handler Truck	1	40	79	75
Crew vans	7	40	75	77
Pickups	25	40	75	83
ATVs & UTVs	20	50	75	85
Front end loader (Cat 992 or equivalent)	1	40	79	75
Small wheel loader (Cat 930 or equivalent)	1	40	79	75
Off-road extended boom forklift	2	20	75	71
Standard forklifts	2	20	75	71
Skid steer loader (S160 Bobcat or equivalent)	2	40	79	78
Mobile crane	1	16	81	73

Equipment[1]	Total number of Units (max)[2]	Acoustical Usage Factor (%)[3]	Maximum Noise Levels per Unit, MAX at 50 feet (dBA)[4]	Predicted Total Noise Level, L_{EQ} at 50 feet (dBA)[5]
Flatbed supply and stake trucks (flatbed truck)	2	40	74	73
Service trucks with compressors and welders	2	40	74	73
Trash truck	1	40	76	72
Total Average Hourly Noise Level[6]				94

Source: AECOM 2020

[1] Equipment lists as provided in Midas Gold 2016, **Table 9-2** and **Table 10-1**, assuming the minimum number of units of each equipment type would be operating at the SGP during the construction phase.

[2] The total number of equipment units represents an estimated total number of units that would be operating at the SGP during different stages of construction.

[3] The acoustical usage factor is used to estimate the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during equipment operation. Acoustical usage factors provided in the table are equivalent to default values in FHWA RCNM version 1.1.

[4] The noise levels listed represent A-weighted maximum sound level (L_{MAX}) (per equivalent measured level provided in FHWA RCNM version 1.1,) measured at a distance of 50 feet from the equipment. The provided L_{MAX} reference values are for general categories of equipment, not specific models.

[5] Estimated total noise levels emitted by multiple units of the same type, using the equation in **Section 5.2** for adding equal sound pressure levels.

[6] Total Average Hourly Noise Level is calculated using the equation in **Section 5.2** for adding unequal sound pressure levels.

ATV = all-terrain vehicle
N/A = not applicable
UTV = utility task vehicle.

Access Roads

Access roads associated with the SGP include the Johnson Creek Route and Burntlog Route. The Johnson Creek Route is the current summer access and includes access from SH 55 via Warm Lake Road (County Road [CR] 10-579). The actual Johnson Creek Route is defined as the Johnson Creek Road (CR 10-413), and then the Stibnite Road portion of the McCall-Stibnite Road (CR 50-412). The Burntlog Route includes a combination of existing roads and new road connector segments. The Burntlog Route includes access from SH 55 via Warm Lake Road (CR 10-579). Additionally, for the Burntlog Route, segments of Burnt Log Road (FR 447) and Thunder Mountain Road (FR 50375) would be upgraded, and the Burnt Log Road would be extended to connect to Thunder Mountain Road. The Johnson Creek Route would be used to access the SGP during the first two years of construction only, while the Burntlog Route is being constructed. After which, all SGP-related traffic would use the Burntlog Route to access the SGP.

The evaluation of noise impacts from the access roads includes separate analyses for road construction activities along the Burntlog Route, for SGP-related traffic on both the Johnson Creek Route (during construction) and on the Burntlog Route once it is completed, and from borrow areas along the Burntlog Route.

Road Construction

Road construction activities along the Burntlog Route would involve upgrading existing roads (Burnt Log Road [FR 447] and Thunder Mountain Road [FR 50375]) and constructing a new section of roadway to connect the Burnt Log Road to Thunder Mountain Road. Road construction would include cut and fill; embankment stabilization; laying road base and surfacing material;

installing new bridges, drainage channels and culverts; replacing or upgrading existing bridges, culverts, and drainages; and associated activities. Construction activities along the Burntlog Route would be limited to the first year of the construction phase. Construction noise would be short-term, intermittent, and transitory in any one location. **Table 7-3** lists noise levels for construction equipment that would likely be used along the Burntlog Route during the construction phase. In the absence of a detailed schedule of equipment for road construction, it was assumed that equipment used would be similar to road maintenance mobile equipment detailed for use during the operations phase, along with a dozer, crane, and two haul trucks.

Table 7-3 Major Noise Sources and Estimated Maximum Noise Levels at the Mine Access Road (Burntlog Route) During the Construction Phase

Equipment[1]	Total Number of Units (max)[2]	Acoustical Usage Factor (%)[3]	Maximum Noise Levels per Unit, L_{MAX} at 50 feet (dBA)[4]	Predicted Total Noise Level, L_{EQ} at 50 feet (dBA)[5]
Motor Graders (Cat 160M or equivalent)	2	40	85	84
Plow Trucks	2	40	85	84
Snow Blower	1	50	85	82
Water trucks (Cat 725 or equivalent)	2	40	76	75
Binding Agent Application Truck	1	40	76	72
Vibratory compactor (Cat CS76 or equivalent)	1	20	83	76
Fuel Service Truck	1	40	76	72
Light Vehicles	2	40	75	74
Rock Rakes (all other equip.)	2	50	84	84
Dozer	1	40	82	78
Crane	1	16	81	73
Haul trucks	2	40	76	75
Total Average Hourly Noise Level[6]				**91**

Source: AECOM 2020

[1] Equipment list as provided in Midas Gold 2016, **Table 7-1**, with the addition of a dozer, crane, and two haul trucks. Assumes the maximum number of units of each equipment type listed in **Table 7-1** would be operating along the access road during the construction phase.

[2] The total number of equipment units represents an estimated total number of units that would be operating along the access road during different stages of construction.

[3] The acoustical usage factor is used to estimate the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during equipment operation. Acoustical usage factor provided in the table are equivalent to default values in FHWA RCNM version 1.1.

[4] The noise levels listed represent L_{MAX} (per equivalent specifications provide in FHWA RCNM version 1.1, except as noted) measured at 50 feet from the equipment. The provided L_{MAX} reference values are for general categories of equipment, not specific models.

[5] Estimated total noise levels emitted by multiple units of the same type, using the equation in **Section 5.2** for adding equal sound pressure levels.

[6] Total Average Hourly Noise Level is calculated using the equation in **Section 5.2** for adding unequal sound pressure levels.

A 5.3-mile segment of the Burntlog Route would be along Riordan Creek, with a distance of 27,157 feet to Site 2, a distance of 5,100 feet to Site 3, a distance of 33,638 feet to Site 11, and would be the closest segment to the FCRNRW. Though Sites 2, 3, and 11 are located closest to Riordan Creek, Sites 2 and 11 fall in a valley and have steep terrain dividing them from Riordan Creek. Site 4 is 65 feet from Burntlog Route and 46,279 feet from Riordan Creek. Site 5 is only 220 feet from Burntlog Route and 66,456 feet from Riordan Creek. Sites 4 and 5 are located closer to the noise impacts due to construction and traffic on Burntlog Route. Sites 3 and 12 are closest to the FCRNRW at distances of 7,103 feet and 334 feet, respectively. The alignment of the 5.3-mile Riordan Creek section of the Burntlog Route would be the closest portion to the FCNRNW, resulting in the potential for elevated noise levels to extend further into the FCNRNW along this segment.

The estimated total average hourly noise levels from construction on the Burntlog Route would be 91 dBA L_{EQ} at the reference distance of 50 feet. Noise from access road construction would attenuate to the threshold of 55 dBA approximately 0.57 miles from the source of activity based on distance alone. Accounting for ground absorption and atmospheric absorption, noise from access road construction would attenuate to 55 dBA approximately 0.28 mile from the source of activity. Road construction and associated noise would be limited to daytime hours (between 7:00 a.m. and 10:00 p.m.).

SGP-Related Traffic During Construction

During the first year of construction, while the Burntlog Route is being built, access to the SGP would be via the Johnson Creek Route. Once construction of the Burntlog Route is completed, SGP-related traffic is assumed to be on the mine access road 24 hours per day.

During the first year of the construction phase, SGP-related traffic volumes on the Johnson Creek Route access roads are estimated at 65 average annual daily traffic (AADT). Heavy vehicles are estimated at 45 AADT and light vehicles at 20 AADT (Midas Gold 2016, Perpetua 2021a). Vehicles per peak hour were assumed to be 10 percent of AADT (Washington State Department of Transportation 2018). Based on the estimated traffic volumes and vehicle mix, and typical vehicle speeds of 25 mph, estimated average hourly noise levels from SGP-related traffic on the mine access route during the construction phase would be 48 dBA L_{EQ} at 50 feet from the roadway. This is well below the impact threshold level of 55 dBA. Noise impacts from, SGP-related traffic during the first year of the construction phase would be negligible, short-term, and localized.

After it is completed, SGP-related traffic would move from the Johnson Creek Route to the Burntlog Route. SGP-related traffic volumes during this portion of the construction phase are estimated at 68 AADT (48 heavy vehicles and 20 light vehicles; vehicles per hour is assumed to be 10 percent of AADT for peak hour traffic). Estimated average hourly traffic noise levels would be approximately 49 dBA L_{EQ} at 50 feet from the roadway, also below the impact threshold of 55 dBA. Noise impacts from SGP-related traffic on the Burntlog Route during the construction phase would be negligible, short-term, and localized.

Borrow Areas

The extraction and processing of various types of granular material at borrow sites during the construction phase would require an excavator, loader, and portable rock crusher. **Table 7-4** lists noise levels for construction equipment that would likely be used at the borrow sites.

Table 7-4 Major Noise Sources and Estimated Maximum Noise Levels from Borrow Sources During the Construction Phase

Equipment[1]	Total Number of Units (max)[2]	Acoustical Usage Factor (%)[3]	Maximum Noise Levels per Unit, L_{MAX} at 50 ft (dBA)[4]	Predicted Total Noise Level, L_{EQ} at 50 feet (dBA)[5]
Front-end loader	1	40	79	75
Excavator	1	40	81	77
Mobile/portable rock crusher	1	50	85	82
Total Average Hourly Noise Levels[6]				**84**

Source: AECOM 2020

[1] Equipment lists as provided in Midas Gold 2016.

[2] The total number of equipment units represents an estimated total number of units that would be operating at the borrow site during different stages of construction.

[3] The acoustical usage factor is used to estimate the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during equipment operation. Acoustical usage factor provided in the table are equivalent to default values in FHWA RCNM version 1.1.

[4] The noise levels listed represent L_{MAX} (per measured levels provided in FHWA RCNM version 1.1, except as noted) measured at 50 feet from the equipment. The provided L_{MAX} reference values are for general categories of equipment, not specific models.

[5] Estimated total noise levels emitted by multiple units of the same type, using the equation in **Section 5.2** for adding equal sound pressure levels.

[6] Total Average Hourly Noise Level is calculated using the equation in **Section 5.2** for adding unequal sound pressure levels.

The estimated total average hourly noise levels from each borrow site during the construction phase would be 84 dBA L_{EQ} at the reference distance of 50 feet. Noise from the borrow sites during construction would attenuate to the threshold of 55 dBA approximately 0.26 mile from the source based on distance alone. Accounting for ground absorption and atmospheric absorption, noise from the borrow sites during construction would attenuate to 55 dBA approximately 0.15 mile from the source of activity. Facilities construction and associated noise would be limited to daytime hours (between 7:00 a.m. and 10:00 p.m.). Noise impacts from borrow areas would be negligible to minor, short-term, and localized.

Utilities

Utilities associated with the SGP include transmission lines, substations, and radio and cell phone communications towers. The SGP involves upgrading 63 miles of Idaho Power Company's existing transmission lines from its Lake Fork Substation south of McCall along its existing right-of-way to the Warm Lake Substation to 138 kV and constructing approximately 9 miles of transmission line from the new Johnson Creek substation to the SGP. Transformers would reduce the voltage to 34.9 kV for distribution to facilities within the SGP. The SGP also would involve upgrades to the existing microwave relay tower located atop a 9,000-foot peak to the east of the SGP and installing radio repeaters and cell phone towers at existing communications sites, including the Meadow Creek Lookout, the Thunderbolt Lookout, the new Burntlog Maintenance Facility, and on additional private parcels as needed. Noise impacts associated with utilities would occur primarily during the construction phase. Construction activity associated with the transmission line upgrade and new transmission line construction work is expected to generate the highest noise levels. Substations and communications tower upgrades and construction work is expected to generate lower noise levels; therefore, these are not assessed as separate subcomponents.

Upgrading the existing 63 miles of transmission lines between Lake Fork and the Johnson airstrip would involve replacing existing utility poles and associated equipment (e.g., transformers, cross arms, guy wires, fuses, switches, insulators, etc.). Tree removal and incidental brush and tree trimming also may be required. Constructing the 9-mile transmission line between the Johnson Creek Substation to the SGP would involve construction of new permanent and temporary access roads, improvements to existing access roads, removal of danger trees, and the placement of utility poles, conductor, and associated equipment. Helicopters may be used to install utility poles and conductor. Construction noise associated with material and equipment staging, site preparation, brush and danger tree removal, right-of-way clearing, construction of access roads, installation of transmission line structures including tensioning, and construction-related traffic would be short-term, intermittent, and localized, as construction proceeds along the transmission line corridor.

In the absence of a detailed schedule of equipment for utility construction, it was assumed that the equipment used would be similar to other transmission line projects. **Table 7-5** lists equipment for typical construction projects, and associated noise levels. Equipment and noise levels for the construction of permanent or temporary access roads to the transmission line are the same as provided in **Table 7-3** for construction of the mine access road.

The estimated total average hourly noise levels for the Lake Fork to Johnson Creek substations transmission line upgrade and Johnson Creek Substation to the SGP transmission line construction would be 84 dBA L_{EQ} at the reference distance of 50 feet. Noise from transmission line construction would attenuate to the threshold of 55 dBA approximately 0.28 mile from the source of activity based on distance alone. Accounting for ground absorption and atmospheric absorption, noise from transmission line construction would attenuate to 55 dBA approximately 0.15 mile from the source of activity.

Johnson Creek Substation to the SGP construction may require helicopter use, which would temporarily increase average hourly noise levels up to 100 dBA L_{EQ} for short periods of time. Noise from transmission line construction with helicopter use would attenuate to the threshold of 55 dBA approximately 1.70 miles from the source of activity based on distance alone. Accounting for ground absorption and atmospheric absorption, noise from transmission line construction with helicopter use would attenuate to 55 dBA approximately 0.66 mile from the source of activity.

Assuming similar equipment usage as for the Burntlog Route construction, the estimated total average hourly noise levels from transmission line access road construction or upgrades would be 91 dBA L_{EQ} at the reference distance of 50 feet. Noise from transmission line access road construction would attenuate to the threshold of 55 dBA approximately 0.57 mile from the source of activity based on distance alone. Accounting for ground absorption and atmospheric absorption, noise from utility access road construction would attenuate to 55 dBA approximately 0.28 mile from the source of activity. The Lake Fork to Johnson Creek substations transmission line upgrade is not expected to include new access road work. Transmission line work and associated noise would be limited to daytime hours (between 7:00 a.m. and 10:00 p.m.).

The relocation of the Cascade Switching station to 1,217 feet from Site 8 affects estimated noise levels at the site. Additionally, approximately 1 mile east of Cascade includes the Thunder Mountain Estates Bypass as part of the upgraded transmission line, which relocates a 5.4-mile segment of the transmission line to avoid the Thunder Mountain Estates Subdivision.

Table 7-5 Major Noise Sources and Estimated Maximum Noise Levels for Transmission Line Upgrade and Construction During the Construction Phase

Equipment[1]	Total Number of Units (max)[2]	Acoustical Usage Factor (%)[3]	Maximum Noise Levels per Unit, L_{MAX} at 50 feet (dBA)[4]	Predicted Total Noise Level, L_{EQ} at 50 feet (dBA)[5]
Bucket Truck	1	20	75	68
Backhoe	1	40	78	74
Auger Drill	1	20	84	77
Excavator	1	40	81	77
Tensioner/Puller Truck	1	40	76	72
Boom crane	2	16	81	76
Flatbed supply trucks	2	40	74	73
Crew vans	2	40	75	74
Pickup trucks	2	40	75	74
Total Average Hourly Noise Level without Helicopter Use[6]				**84**
Total Average Hourly Noise Level with Helicopter Use[6]				**100**

Source: AECOM 2020

[1] Equipment list based on similar transmission line projects.

[2] The total number of equipment units represents an estimated total number of units that would be operating along the transmission line corridor during different stages of construction.

[3] The acoustical usage factor is used to estimate the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during equipment operation. Acoustical usage factor provided in the table are equivalent to default values in FHWA RCNM version 1.1.

[4] The noise levels listed represent L_{MAX} (per measured levels provided in FHWA RCNM version 1.1, except as noted) measured at 50 feet from the equipment. The provided L_{MAX} reference values are for general categories of equipment, not specific models.

[5] Estimated total noise levels emitted by multiple units of the same type, using the equation in Section 5.2 for adding equal sound pressure levels.

[6] Total Average Hourly Noise Level is calculated using the equation in Section 5.2 for adding unequal sound pressure levels.

Off-Site Facilities

Off-site facilities associated with the 2021 MMP include the SGLF on Warm Lake Road and the Burntlog Maintenance Facility located along Burntlog Route, approximately 4.4 miles east of the junction of Johnson Creek Road and Warm Lake Road, approximately midway between Sites 4 and 5.

Construction of the off-site facilities would require the use of a variety of heavy construction equipment. **Table 7-6** lists noise levels for construction equipment that would likely be used over the course of the off-site facility construction.

Table 7-6 Major Noise Sources and Estimated Maximum Noise Levels from Off-site Facilities During the Construction Phase

Equipment[1]	Total Number of Units (max)[2]	Acoustical Usage Factor (%)[3]	Maximum Noise Levels per Unit, L_{MAX} at 50 ft (dBA)[4]	Predicted Total Noise Level, L_{EQ} at 50 feet (dBA)[5]
Dozer	1	40	82	78
Dump Truck	1	40	77	73
Grader	1	40	85	81
Man Lift	1	20	85	68
Paver	1	50	85	74
Flat Bed Truck	1	40	84	70
Generator	1	50	82	78
Pickup Trucks	3	40	75	76
			Total Average Hourly Noise Levels[5]	**85**

Source: AECOM 2020

1 The total number of equipment units represents an estimated total number of units that would be operating at the off-site facilities during different stages of construction.

2 The acoustical usage factor is used to estimate the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during equipment operation. Acoustical usage factor provided in the table are equivalent to default values in FHWA RCNM version 1.1.

3 The noise levels listed represent L_{MAX} (per equivalent measured level provided in FHWA RCNM version 1.1, except as noted) measured at 50 feet from the equipment. The provided L_{MAX} reference values are for general categories of equipment, not specific models.

4 Estimated total noise levels emitted by multiple units of the same type, using the equation in Section 5.2 for adding equal sound pressure levels.

5 Total Average Hourly Noise Level is calculated using the equation in Section 5.2 for adding unequal sound pressure levels.

The estimated total average hourly noise levels from each facility during the construction phase would be 85 dBA L_{EQ} at the reference distance of 50 feet. Noise from facility construction would attenuate to the threshold of 55 dBA approximately 0.67 mile from the source based on distance alone. Accounting for ground absorption and atmospheric absorption, noise from facility construction would attenuate to 55 dBA approximately 0.32 mile from the source of activity. Facilities construction and associated noise would be limited to daytime hours (between 7:00 a.m. and 10:00 p.m.). Noise impacts from the off-site facilities during construction would be minor, short-term, and localized.

Avalanches

During construction under the 2021 MMP, size D2, D3, or D4 avalanches to roads are presented in **Table 7-7**. There are no size D5 avalanche paths that exist in the SGP area under either alternative. **Table 7-8** describes the expected number and frequency of avalanche control measures to be used.

Table 7-7 Summary of Avalanche Hazards: 2021 MMP

Zone	Miles affected	# Paths Affecting Road	Frequency Descriptor	Frequency Range (Years)	Size at Road	Comments
Warm Lake – Landmark	1.6	11	High	1-3	D2-D3	High snowfall area, south facing short slopes produce small (D2) loose avalanches, larger north facing paths can produce mixed flow to D3.
Landmark – Black Lake	0.5	7	Very Low – Moderate	10-11	D2-D3	Burnt forest with mostly low frequency south facing terrain. Typically, small (D2) loose avalanches.
Black Lake – Meadow Creek	1.3	13	Low – High	1-30	D2-D3	High frequency D2 and low frequency D3 terrain. The exception is path BKL-7 which will produce frequent D3 avalanches.
Meadow Creek Ridge	0.2	1	High	1	D2-D3	One path (MCR-1) will produce frequent D2 and infrequent D3 avalanches.
Stibnite Mine East	0.9	6	Very Low – Moderate	10-100	D2-D3	Very low frequency area, with the exception of path SE3.
Totals	**4.5**	**38**				

Source: DAC 2021 (includes map of avalanche paths)

Avalanche risk abatement via explosive methods would be implemented for the SGP. Explosives would be used in higher elevations at the upper portions of the potential avalanche paths to dislodge the avalanche with minimum impact. Noise levels would be affected depending on the choice of explosive used and mechanism of delivery, as shown in **Table 7-8**, and the expected number and frequency of avalanche control measures used are provided in **Table 7-9**.

Table 7-8 Avalanche Control Method Noise Levels

Noise Event	Noise Level (dBA) at 100 feet*
Gazex explosion	124.0
2-pound hand charge	107.2
4-pound hand charge	107.8

Table Source: DAC 2021

* If not implemented using portable methods, Gazex explosions would involve placing charge installations at control locations during operations and closure.

dBA = A-weighted decibels

Table 7-9 Expected Number and Frequency of Use of Avalanche Control for Each Access Route Option

Road Segment	# Targets[1]	# Targets/ Mission[1,2]	# Missions/ Year[2]	# Charges/ Year[3]	Road Total # Charges/Year[3]
Warm Lake Summit (Warm Lake to Landmark)	23	15	4.0	61	61
Burntlog South (Landmark to Black Lake)	8	7	0.3	2	85
Burntlog North (Black Lake to Stibnite Mine)	32	24	3.1	82	
Stibnite Mine (Burntlog Route Segment)	11	8	0.1	1	
Johnson Creek Road (Landmark to Yellow Pine)[4]	26	15	0.3	4	85
Stibnite Road South (Yellow Pine to Stibnite Mine)[4]	97	71	1.0	81	

Source: DAC 2021

[1] Targets (control points) per path that may be used per mission.

[2] Missions are a function of the frequency estimate. Typically, control frequency was assumed to be three times more frequent than the natural return period of avalanches to the road. The relationship between return period and control frequency was adjusted for some paths.

[3] Charges are the targets per mission multiplied by missions per year, summed over all the paths on a road segment.

[4]The Johnson Creek Road and Stibnite Rod South would be used for site access until completion of the Burntlog Route construction.

The amount of avalanche control needed each winter would vary depending on winter conditions of the year. Depending on the type of control measure used, the maximum noise level would be 124.0 dBA at 100 feet away (**Table 6-4**), based on the Gazex explosive method. For a single blast at 50 feet away, the maximum noise level would be 130.0 dBA. Under **Section 7.2.2** Noise Impacts, a single blast at 50 feet away causes a maximum noise level of 144.0 dBA. There are approximately 7.5 missions per year, limiting the amount of avalanche abatement measures to a narrow timeframe of the year, with long-term, minor, and localized impacts. Based on the location of the SGP components (i.e., Operations Area Boundary, access roads) and the avalanche paths investigated, the probability of noise complaints would be expected to be low. The nearest residential areas to areas where potential avalanche risk abatement measures might be implemented would be the village of Yellow Pine, a minimum of four miles away from any explosive area, and the Warm Lake recreation tract, a minimum of two miles away from any explosive area.

Noise Impacts

Table 7-10 provides predicted noise levels at NSR locations during the construction phase under the 2021 MMP, followed by a discussion of predicted noise levels and source-specific impacts at each NSR.

A threshold noise level of 55 dBA is applied to the predicted noise levels to evaluate the environmental impact to humans. This report evaluates SGP noise impacts to humans. Noise impacts to fish and wildlife are discussed in the SGP Fish Resources and Fish Habitat specialist report, and the SGP Wildlife and Wildlife Habitat specialist report (Forest Service 2022a, 2022b).

Table 7-10 2021 MMP – SGP-Attributed Noise Level at Analysis Locations During the Construction Phase

ID	Name	Baseline Ambient Noise Level (dBA L_{EQ})	Baseline Ambient Noise Level (dBA L_{DN})	SGP-Attributed Daytime Noise Level (dBA L_{EQ})[1]	SGP-Attributed Day-Night Noise Level (dBA L_{DN})
Site 2	Miller Residence	N/A	50	84 / 84 [2]	82 / 82[2]
Site 3	Meadow Creek Lookout	45	N/A	41 / 25	39 / 23
Site 5	Forest Service Camp at Landmark	N/A	34	52/512	50/49
Site 6	Forest Service Summer Camp/Warm Lake Recreation Areas	N/A	34	21 / 21	19 / 19
Site 7	Warm Lake Road/Warm Lake Camp	N/A	47	21 / 21	19 / 19
Site 8	Granite Excavation Shop in Cascade	N/A	61	51 / 51	49 /49
Site 9	Southern Pines Plantation Property	N/A	51	64 / 64[2]	62 / 62[2]
Site 10	Yellow Pine	N/A	50	33 / 6	31 / 4
Site 11	Ice Hole Campground/Boise National Forest	N/A	50	63 / 63[2]	61 / 61[2]
Site 12	Mule Hill Trailhead	40	N/A	40 /31	38 / 29

Source: AECOM 2020
[1] Noise level with SGP-related traffic on Johnson Creek Route / Burntlog Route.
[2] Temporary Short-term exceedance of the recommended noise level, shaded in gray.
N/A = not available

Site 2 Miller Residence Adjacent to Johnson Road

Transmission line upgrade work, including utility access roads in the immediate vicinity, would be the only SGP-related activity that would contribute to the noise environment at Site 2 during the construction phase. Noise from the SGP, access road construction along the Burntlog Route, utility access road construction, off-site buildings, and borrow sites would not contribute to noise

levels at Site 2 during the construction phase due to distance. SGP-related traffic on the Johnson Creek Route would generate average hourly noise levels of approximately 41 dBA at Site 2. This is below background ambient levels at the site and would have no effect on noise levels at Site 2.

Daytime noise levels at Site 2 could temporarily reach as high as 84 dBA when work is occurring at the closest location along the transmission line but would be lower as the distance increases. The closest distance between Site 2 and transmission line work would be 53 feet. Noise levels at Site 2 would fall below the 55-dBA impact threshold when transmission line work is approximately 800 feet away. Helicopter use would not be anticipated in this area. Average L_{DN} at Site 2 would be 82 L_{DN} and would fall to 53 dBA L_{DN} when transmission line work moves at least 800 feet away.

Absent transmission line work, daytime noise levels at Site 2 are estimated to be 41 dBA and average L_{DN} are estimated at 39 dBA L_{DN} during the construction phase, both below existing ambient noise levels.

The 2021 MMP would have a temporary impact on the noise environment at Site 2 during the construction phase while transmission line work is occurring in the immediate vicinity. Noise levels at Site 2 would fall below the 55 dBA L_{DN} impact threshold when transmission line work moves approximately 800 feet away.

Site 3 Meadow Creek Lookout

Construction activity on the Burntlog Route would be the greatest contributor of SGP noise at Site 3 during the construction phase. However, combined noise levels would still be well below the 55-dBA threshold and background ambient noise levels. The 2021 MMP would have a short-term, negligible, localized impact on the noise environment at Site 3 during the construction phase.

Site 5 Forest Service Camp at Landmark

Access road construction on the Burntlog Route, facilities construction at the Burntlog Maintenance Facility, and SGP-related traffic on the Johnson Creek Route would be the greatest contributors of SGP noise at Site 5 during the construction phase. Noise from all SGP-related activities combined would attenuate to approximately 56 dBA at Site 5, resulting in a temporary increase in noise levels above the 55-dBA threshold.

SGP-related noise would decrease to approximately 54 dBA once construction activity on the Burntlog Route and Burntlog Maintenance Facility is completed and SGP-related traffic moves from the Johnson Creek Route to the Burntlog Route. This is below the threshold of 55 dBA.

The 2021 MMP would have a temporary impact on the noise environment at Site 5 during the access road and facilities construction phase. The closest distance between Site 5 and the access road is approximately 0.4 mile. When access road work moves approximately 0.5 mile away, noise levels from all SGP-related activities combined would fall to the 55-dBA impact threshold.

Site 6 Forest Service Summer Camp at Warm Lake

Transmission line upgrade work is the only SGP-related activity that would contribute to the noise environment at Site 6 during the construction phase. However, daytime noise levels would still be well below the 55-dBA threshold and background ambient noise levels at the site. The 2021 MMP would have a short-term, negligible, localized impact on the noise environment at Site 6 during the construction phase.

Site 7 Warm Lake Camp

Transmission line upgrade work and construction activity on the Burntlog Route are the only SGP-related activities that would contribute to the noise environment at Site 7 during the construction phase. However, combined noise levels would still be well below the 55-dBA threshold and background ambient noise levels at the site. The 2021 MMP would have a short-term, negligible, localized impact on the noise environment at Site 7 during the construction phase.

Site 8 Granite Excavation Shop in Cascade

Transmission line upgrade work is one of the only SGP-related noise activity that would contribute to the noise environment at Site 8 during the construction phase. The Cascade Switching station would be moved to the west, closer to Site 8. Noise from the SGP, access road construction along the Burntlog Route, off-site buildings and borrow sites would not contribute to noise levels at Site 8 during the construction phase due to distance. Estimated noise levels would be at approximately 51 dBA, well below the 55-dBA threshold and background ambient noise levels at the site. The 2021 MMP would have a short-term, negligible, localized impact on the noise environment at Site 8 during the construction phase.

Site 9 Southern Pine Plantations Property

Transmission line upgrade work, including utility access roads in the immediate vicinity, and facilities construction at the SGLF are the only SGP-related activities that would contribute to the noise environment at Site 9 during the construction phase. Noise from the SGP, access road construction along the Burntlog Route, and borrow sites would not contribute to noise levels at Site 9 during the construction phase due to distance.

Transmission line upgrade work would be the primary contributor of SGP noise. Daytime noise levels at Site 9 could reach as high as 64 dBA when transmission line work is occurring at the closest location along the transmission line but would be lower as the distance increases. The closest distance between transmission line work and Site 9 is 317 feet. When transmission line work is 800 feet away, SGP-related noise levels would fall to 55 dBA. Helicopter use is not anticipated in this area. Average L_{DN} at Site 9 would be 62 L_{DN} when transmission line work is the closest and would fall to 53 L_{DN} when transmission line work moves at least 800 feet away.

Absent transmission line work, noise from facilities construction would attenuate to approximately 38 dBA at Site 9 and average L_{DN} are estimated at 36 L_{DN} during the construction phase, well below the 55-dBA threshold and background ambient levels.

The 2021 MMP would have a temporary impact on the noise environment at Site 9 during the construction phase while transmission line work is occurring in the immediate vicinity. Noise levels at Site 9 would fall below the 55 dBA L_{DN} impact threshold when transmission line work moves approximately 800 feet away.

Site 10 Yellow Pine

SGP-related traffic on the Johnson Creek Route access road would be the greatest contributor of SGP noise at Site 10 during the construction phase. Noise would attenuate to approximately 33 dBA at Site 10, well below the 55-dBA threshold and background ambient noise levels. The 2021 MMP would have a short-term, negligible, localized impact on the noise environment at Site 10 during the construction phase.

Site 11 Ice Hole Campground in Boise National Forest

Transmission line upgrade work, including utility access roads in the immediate vicinity, and SGP-related traffic on the Johnson Creek Route are the only SGP-related activities that would contribute to the noise environment at Site 11 during the construction phase. Noise from the SGP, access road construction along the Burntlog Route, off-site buildings, and borrow sites would not contribute to noise levels at Site 11 during the construction phase due to distance.

Transmission line upgrade work would be the primary contributor of SGP noise. Daytime noise levels at Site 11 could reach as high as high as 63 dBA at Site 11 when work is occurring at the closest location along the transmission line but would be lower as the distance increases. The closest distance between Site 11 and transmission line work is 370 feet. When transmission line work is at approximately 850 feet away, noise levels would fall to below 55 dBA. Average L_{DN} at Site 11 would be 61 dBA L_{DN} when transmission line work is closest and would fall to 53 dBA L_{DN}.

Absent transmission line work, noise from SGP-related traffic on the Johnson Creek Route would attenuate to approximately 45 dBA L_{EQ} and 43 dBA L_{DN} at Site 11, well below the 55-dBA threshold and background ambient levels.

The 2021 MMP would have a temporary impact on the noise environment at Site 11 during the construction phase while transmission line work is occurring in the immediate vicinity. Noise levels at Site 11 would fall below the 55 dBA L_{DN} impact threshold when transmission line work is approximately 800 feet away.

Site 12 Mule Hill Trailhead

SGP-related noise at Site 12 during the construction phase would be highest during the first year when construction is occurring on the Burntlog Route. Noise from access road construction on the Burntlog Route, the nearest borrow site, and the SGP would be the greatest contributors of SGP noise at Site 12 during the construction phase. Noise from the transmission line upgrade work, and SGP-related traffic on the Johnson Creek Route would not contribute to noise levels at Site 12 during the construction phase due to distance. However, combined noise levels would still be well below the 55-dBA threshold and background ambient noise levels at the site. The 2021 MMP would have a short-term, negligible to minor, localized impact on the noise environment at Site 12 during the construction phase.

Frank Church-River of No Return Wilderness Areas

To evaluate potential noise impacts at dispersed recreational resource areas in the Frank Church-River of No Return Wilderness (FCRNRW) east of the Burntlog Route, noise levels from three construction-related scenarios/sources at a range of distances from the roadway were calculated (**Table 7-10** through **Table 7-12**). Based on sound levels measured at the Meadow Creek Lookout and along Burnt Log Road (FR 447), ambient sound levels within the FCRNRW are estimated at 40 to 45 dBA L_{EQ1h}. The alignment of the 5.3-mile Riordan Creek section of the Burntlog Route would be the closest portion to the FCNRNW, resulting in the potential for elevated noise levels to extend further into the FCNRNW along this segment.

In these and subsequent tables regarding FCRNRW, noise levels were calculated at incremental distances of 500 up to 8,000 feet into the area since there are no discrete NSRs identified within the FCRNRW. The baseline ambient is assumed to be 40 to 45 dBA L_{EQ} throughout the FCRNRW. The ‘SGP-Attributed Noise Level’ column is the calculated SGP only noise level; the ‘SGP Plus Baseline Level’ column is the energy sum of the assumed baseline (40 to 45 dBA

L_{EQ1h}) and the calculated SGP level; and the 'Increase above Baseline Noise Level' column is the difference between the assumed baseline noise level and the energy sum of SGP plus baseline level. For the 8,000-foot distance from Burntlog Route in **Table 7-10** for example, the lower range of the baseline ambient is 40 dBA, the predicted SGP-only level is 34 dBA, the energy sum of 40 and 34 dBA is 41 dBA, resulting in the difference between the combined SGP + background ambient as 41 minus 40, or 1 dBA. These predicted noise levels assume line-of-sight noise transmission and do not take into account obstructions of this path due to terrain which would reduce the noise levels from those predicted.

Road construction activities (**Table 7-11**) along the Burntlog Route would result in noise level increases ranging from 10 to 26 dBA above ambient noise levels approximately 500 to 1,500 feet from the roadway and would be at or above the recommended noise level of 55 dBA L_{EQ1h} for outdoor use areas. Roadway construction noise would dominate the noise environment at these distances and would be similar to noise levels in a busy commercial or urban environment. Resulting noise levels approximately 1,500 to 2,000 feet from the roadway would be below the recommended noise level of 55 dBA L_{EQ1h} for outdoor use areas; however, noise increases above ambient sound levels would be readily noticeable to twice as loud, depending upon actual distance. Direct effects on recreationists could include general annoyance or sleep annoyance at campsites in wilderness areas. Indirect effects could include a reduction in the overall quality of the remote wilderness experience. Resulting noise levels would attenuate to ambient levels at approximately 8,000 feet (**Table 7-11**).

Overall, the greatest potential noise impacts from road construction would occur where the Burntlog Route closely borders the FCRNRW Area. These potential noise impacts would be temporary (lasting only through the construction phase), and local (would impact a discrete area of the FCRNRW that is within approximately 4,000 feet of the Burntlog Route).

In the vicinity of the Meadow Creek Lookout, a section of the Burnt Log Road (FR 447) closely borders the FCRNRW Area. To evaluate potential noise impacts at dispersed recreational resource areas in this region of the FCRNRW, noise levels at a range of distances from the roadway also were estimated (**Table 7-12**). SGP-related traffic noise from the Burntlog Route would attenuate to well below the average ambient daytime sound levels within the FCRNRW Area, within 500 feet from the roadway.

Table 7-11 Estimated Noise Levels with Distance from the Mine Access Road Construction (Burntlog Route)

Distance from Access Route (feet)	SGP-Attributed Noise Level (dBA L_{EQ})	SGP Plus Baseline Level[1] (dBA L_{EQ})	Increase above Baseline Noise Level[2] (dBA L_{EQ})
500	66	66	21-26
1,000	59	59	14-19
1,500	55	55	10-15
2,000	52	52-53	8-12
4,000	44	45-48	3-5
8,000	34	41-45	0-1

Source: AECOM 2020

[1] Based on ambient sound levels measured at the Meadow Creek Lookout and along Burnt Log Road, average ambient daytime sound levels within the FCRNRW Area are estimated at 40 to 45 dBA L_{EQ1h}.

[2] Reported increase over baseline is increase in combined SGP + baseline over baseline.

Table 7-12 Estimated Noise Levels with Distance from Traffic on the Mine Access Road (Burntlog Route) During the Construction Phase

Distance from Access Route (feet)	SGP-Related Traffic Noise Level (dBA L_{EQ})	SGP Plus Baseline Level[1] (dBA L_{EQ})	Increase above Baseline Noise Level[2] (dBA L_{EQ})
500	34	41-45	0-1
1,000	30	40-45	0
2,000	26	40-45	0
3,000	23	40-45	0
4,000	20	40-45	0

Source: AECOM 2020

[1] Based on ambient sound levels measured at the Meadow Creek Lookout and along Burnt Log Road, average ambient daytime sound levels within the FCRNRW Area are estimated at 40 to 45 dBA L_{EQ1h}.

[2] Reported increase over baseline is increase in combined SGP + baseline over baseline.

Several potential borrow areas are located along the Burntlog Route close to the FCRNRW. To evaluate potential noise impacts at dispersed recreational resource areas in the FCRNRW east of the Burntlog Route and the potential borrow areas, noise levels at a range of distances from the borrow areas also were calculated (**Table 7-13**).

Table 7-13 Estimated Noise Levels from Borrow Areas along the Burntlog Route During the Construction Phase

Distance from Access Route (feet)	SGP-Related Borrow Area Noise Level (dBA L_{EQ})	SGP Plus Baseline Level1 (dBA L_{EQ})	Increase above Ambient Noise Level2 (dBA L_{EQ})
500	59	59	14-19
1,000	52	52-53	8-12
2,000	45	46-48	3-6
3,000	41	44-46	1-3
6,000	31	41-45	0-1

Source: AECOM 2020

[1] Based on ambient sound levels measured at the Meadow Creek Lookout and along Burnt Log Road, average ambient daytime sound levels within the FCRNRW Area are estimated at 40 to 45 dBA L_{EQ1h}.

[2] Reported increase over baseline is increase in combined SGP + baseline over baseline.

Borrow area activities along the Burntlog Route would result in noise level increases ranging from 8 to 19 dBA above baseline noise levels within approximately 1,000 feet from a borrow area. SGP-related noise levels would be at or above the recommended noise level of 55 dBA for outdoor use areas within 500 feet, but below this level farther way. Resulting noise levels approximately 3,000 feet from the roadway would be within the range of average ambient L_{EQ} levels in the area, and below the recommended noise level of 55 dBA for outdoor use areas. Direct effects on recreationists within 1,000 to 2,000 feet of borrow areas could include general annoyance or sleep disturbance at campsites in wilderness areas. Indirect effects could include a reduction in the overall quality of the remote wilderness experience.

Overall, potential noise impacts on recreationists from borrow areas would be limited to a discrete area within approximately 1,000 to 2,000 feet of borrow areas located along the Burntlog Route where it closely borders the adjacent wilderness area. Noise from these borrow areas would likely be periodic or intermittent, but ongoing throughout the construction phase.

7.2.2.2 Operations

Noise generated during the operations phase would include noise from the SGP, in addition to noise from traffic and maintenance activities on the mine access road, utility operations, and off-site facilities and borrow site operations. Noise levels generated by these activities are described below, followed by a discussion of noise impacts on identified NSRs. A threshold noise level of 55 dBA is applied to the predicted noise levels to evaluate the environmental impact to humans. This report evaluates SGP noise impacts to humans. Noise impacts to fish and wildlife are discussed in the Fish Resources and Fish Habitat specialist report, and the Wildlife and Wildlife Habitat specialist report (Forest Service 2022a, 2022b).

Environmental design features as presented in **Section 2.4** would be implemented and have been considered in the analysis of operations impacts.

Operations Area Boundary

Operations at the SGP would involve development rock and legacy tailings removal, ore mining, materials loading and transport, ore processing and legacy tailings reprocessing, and routine maintenance of mine-site support facilities and infrastructure. Major noise-generating activities would include: the operation of heavy industrial-type earth moving equipment; drilling and blasting activities to extract rock from the ground; materials loading, hauling, and unloading activities; and rock crushing and grinding at the process plant area. The primary rock crusher would be located outside at the process plant area, while rock grinding and other ore processing activities would be located inside a series of buildings. **Table 7-14** lists noise levels for equipment that would be used at the SGP during the operations phase.

The estimated total average hourly noise levels, without blasting, from the SGP during the operations phase would be 99 dBA L_{EQ} at the reference distance of 50 feet. Noise from the SGP would attenuate to the threshold of 55 dBA at approximately 1.5 miles away based on distance alone and not considering terrain effects. Accounting for ground absorption and atmospheric absorption, noise from the SGP would attenuate to 55 dBA approximately 0.60 mile from the source of activity.

During blasting, noise levels could temporarily increase to 102 dBA L_{EQ}. Noise from the SGP with the addition of blasting would attenuate to the threshold of 55 dBA at approximately 2.2 miles based on distance alone and not considering terrain effects. Accounting for ground absorption and atmospheric absorption, noise from the mine with the addition of blasting would attenuate to 55 dBA at approximately 0.78 mile from the source of activity. Mine operations and associated noise would occur 24 hours per day. Blasting noise would occur intermittently, in daytime, for short periods of time.

Table 7-14 Major Noise Sources and Estimated Maximum Noise Levels at the SGP During the Operations Phase

Equipment[1]	Total Number of Units (max)[2]	Acoustical Usage Factor (%)[3]	Maximum Noise Levels per Unit, L_{MAX} at 50 feet (dBA)[4]	Predicted Total Noise Level, L_{EQ} at 50 feet (dBA)[5]
Primary crusher	1	100[6]	95[7]	95
Front end loader	1	100[6]	79	79
Blast-hole drills (Cat MD6290 or equivalent)	5	20	84	84

Equipment[1]	Total Number of Units (max)[2]	Acoustical Usage Factor (%)[3]	Maximum Noise Levels per Unit, L_{MAX} at 50 feet (dBA)[4]	Predicted Total Noise Level, L_{EQ} at 50 feet (dBA)[5]
Pioneer drill (Cat MD 5150 or equivalent)	3	20	84	82
Front-end wheel loader (Cat 994 or equivalent)	4	40	79	81
Front-end loader (Cat 990 or equivalent)	3	40	79	80
Haul trucks (Cat 789 or equivalent w/200-ton capacity)	20	40	76	85
Haul Trucks (Cat 740 or equivalent)	5	40	76	79
Dozers (D10 or equivalent)	5	40	82	85
Dozers (D6 or equivalent)	2	40	82	81
Water trucks (Cat 777 chassis or equivalent)	2	40	76	75
Motor Graders (Cat 160M or equivalent)	3	40	85	86
Excavator (Cat 349 or equivalent)	2	40	81	80
Low-boy tractor (Cat 777 chassis or equivalent)	2	40	84	83
Vibratory compactor (Cat CS76 or equivalent)	2	20	83	79
Mobile Light Plants	10	50	81	88
Fuel Service Truck	2	40	76	75
Mechanics Service Truck	3	40	75	76
Lube Service Truck	2	40	76	75
Welding Service Truck	3	40	74	75
Boom Truck	2	40	74	73
Skid Steer Truck	3	40	79	80
Tire Handler Truck	2	40	79	78
Crew vans	8	40	75	80
Pickups	25	40	75	85
ATVs & UTVs	25	50	75	86
Front end loader (Cat 992 or equivalent)	2	40	79	78
Small wheel loader (Cat 930 or equivalent)	2	40	79	78
Off-road extended boom forklift	3	50	75	77
Standard forklifts	3	50	75	77
Skid steer loader (S160 Bobcat or equivalent)	3	40	79	80
Boom truck	2	40	74	73

Equipment[1]	Total Number of Units (max)[2]	Acoustical Usage Factor (%)[3]	Maximum Noise Levels per Unit, L_{MAX} at 50 feet (dBA)[4]	Predicted Total Noise Level, L_{EQ} at 50 feet (dBA)[5]
Mobile crane	2	16	81[8]	76
Flatbed supply and stake trucks	3	40	74	75
Service trucks with compressors and welders	2	40	74	73
Trash truck	2	40	76	75
Crew vans	5	40	75	78
Pickup trucks	15	40	75	83
Blasting	1	0.0035[9]	144[10]	144
Total Average Hourly Noise Level (L_{EQ1h}) without Blasting[12]				**99**
Total Average Hourly Noise Level (L_{EQ1h}) with Blasting Included[11,12]				**102**

Source: AECOM 2020

[1] Equipment lists as provided in Midas Gold 2016, **Table 9-2** and **Table 10-1**, assuming the maximum number of units of each equipment type would be operating at the SGP during the construction phase.

[2] The total number of equipment units represents an estimated total number of units that would be operating at the SGP during different stages of construction.

[3] The acoustical usage factor is used to estimate the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during equipment operation. Acoustical usage factor provided in the table are equivalent to default values in FHWA RCNM version 1.1.

[4] The noise levels listed represent L_{MAX} (per measured levels provided in FHWA RCNM version 1.1, except as noted) measured at 50 feet from the equipment. The provided L_{MAX} reference values are for general categories of equipment, not specific models.

[5] Estimated total noise levels emitted by multiple units of the same type, using the equation in **Section 5.2** for adding equal sound pressure levels.

[6] Acoustical factors for primary crusher and front-end loader at the ore processing facility as provided in Midas Gold 2016, pp. 10-4.

[7] Reference noise level for primary crusher as provided in Chuitna Coal Project Supplemental Environmental Impact Statement (EPA 1990).

[8] Reference noise level as provided in FHWA Noise Construction Handbook, **Table 9.9**, FTA Construction Equipment Noise Levels (FHWA 2006).

[9] Acoustical usage factors as provided in Midas Gold 2016.

[10] Estimated noise level from blasting event using airblast calculation method as provided in Dyno Nobel 2010.

[11] Blasting events are impulsive noise events that would be initiated near midday or during mid to later afternoon.

ATV = all-terrain vehicle

N/A = not applicable

UTV = utility task vehicle.

[12] Total Average Hourly Noise Level is calculated using the equation in **Section 5.2** for adding unequal sound pressure levels.

Access Road

The evaluation of noise impacts from the access roads during the operations phase includes road maintenance and SGP-related traffic along the Burntlog Route.

Road Maintenance

Table 7-15 shows a typical list of road maintenance equipment that would be operating on the Burntlog Route periodically during the operations phase.

Table 7-15 Major Noise Sources and Estimated Maximum Noise Levels from Maintenance of the Mine Access Road (Burntlog Route) During the Operation Phase

Equipment[1]	Total Number of Units (max)[2]	Acoustical Usage Factor (%)[3]	Maximum Noise Levels per Unit, L_{MAX} at 50 feet (dBA)[4]	Predicted Total Noise Level, L_{EQ} at 50 feet (dBA)[5]
Motor Graders (Cat 160M or equivalent)	2	40	85	84
Water trucks (Cat 725 or equivalent)	2	40	76	75
Binding Agent Application Truck	1	40	76	72
Vibratory compactor (Cat CS76 or equivalent)	1	20	83	76
Fuel Service Truck	1	40	76	72
Light Vehicles	2	40	75	74
Rock Rakes (all other equip.)	2	50	84	84
Plow Trucks	2	40	85	84
Snow Blower	1	50	85	82
Total Average Hourly Noise Level – Summer[6]				**88**
Total Average Hourly Noise Level – Winter[6,7]				**90**

Source: AECOM 2020

[1] Equipment list as provided in Midas Gold 2016, **Table 7-1**. Assumes the maximum number of units of each equipment type listed in **Table 7-1** would be operating periodically along the access road during the operations phase.

[2] The total number of equipment units represents an estimated total number of units that would be operating along the access road during different stages of construction.

[3] The acoustical usage factor is used to estimate the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during equipment operation. Acoustical usage factor provided in the table are equivalent to default values in FHWA RCNM version 1.1.

[4] The noise levels listed represent L_{MAX} (per measured noise levels provided in FHWA RCNM version 1.1, except as noted) measured at 50 feet from the equipment. The provided L_{MAX} reference values are for general categories of equipment, not specific models.

[5] Estimated total noise levels emitted by multiple units of the same type, using the equation in **Section 5.2** for adding equal sound pressure levels.

[6] Total Average Hourly Noise Level is calculated using the equation in **Section 5.2** for adding unequal sound pressure levels.

[7] Accounting for when snow removal is required.

The estimated total average hourly noise levels from road maintenance activity on the Burntlog Route would range from 88 dBA L_{EQ} at the reference distance of 50 feet during the summer months to 90.2 dBA L_{EQ} during the winter months when snow removal is required. Noise from access road summer maintenance would attenuate to the threshold of 55 dBA at approximately 0.42 miles based on distance alone and noise from access road winter maintenance would attenuate to the threshold of 55 dBA approximately 0.54 mile from the source of activity. Accounting for ground absorption and atmospheric absorption, noise from summer access road maintenance would attenuate to 55 dBA approximately 0.22 mile away and noise from winter access road maintenance would attenuate to 55 dBA approximately 0.27 mile from the source of activity. Access road maintenance and associated noise would be limited to daytime hours (between 7:00 a.m. and 10:00 p.m.). Noise impacts from road maintenance during operations would be minor, long-term but intermittent, and localized.

SGP-Related Traffic During Operation

During the operations phase, SGP-related traffic volumes on the mine access road (the Burntlog Route) are estimated at 50 AADT. Heavy vehicles are estimated at 33 AADT and light vehicles at 17 AADT between the SGLF and the SGP (Perpetua 2021a). Heavy vehicles are estimated at 25 AADT and light vehicles at 131 AADT between the SH 55 and the SGLF (Perpetua 2021a). Based on the estimated traffic volumes and vehicle mix, and assuming typical vehicle speed of 25 mph and 10 percent of AADT traffic volume at peak hours conditions, estimated average hourly noise levels from SGP-related traffic on the Burntlog Route during the operations phase would be 49 dBA L_{EQ}. This is below the threshold of 55 dBA. SGP-related traffic is assumed to be on the mine access road 24 hours per day. Noise impacts from SGP-related traffic during operation would be minor, long-term, and localized from SH 55 to the SGLF. Noise impacts from SGP-related traffic during operation would be minor, long-term, and localized from the SGLF to the SGP on the Burntlog Route.

Borrow Areas

Activity, equipment, and noise levels at borrow areas would be the same as during the construction phase (**Table 7-4**). The estimated total average hourly noise levels from each borrow site would be 84 dBA L_{EQ} at the reference distance of 50 feet. Noise from the borrow sites during operations would attenuate to the threshold of 55 dBA approximately 0.26 mile from the source based on distance alone. Accounting for ground absorption and atmospheric absorption, noise from the borrow sites would attenuate to 55 dBA approximately 0.15 mile from the source of activity. Noise impacts from borrow areas would be negligible to minor, long-term but intermittent, and localized.

Utilities

The existing transmission lines and substations that would be used to serve the SGP are not new sources of noise within the affected environment. New sources of noise associated with the operation of utilities would be limited to the Johnson Creek substation to the SGP transmission line and new substations. During stormy or very humid weather, audible corona noise from a wetted transmission line operating at 230 kV or greater can contribute to ambient noise and, under the right conditions and at distances close enough to the conductors, be audible to a listener on the ground. But under such poor weather conditions (e.g., precipitation) that cause corona noise to be more audible, other acoustical contributors to the outdoor ambient sound environment like rainfall on leafy vegetation, road surfaces, and structure surfaces (rooves) also rise in magnitude. Under fair weather conditions, audible corona noise is much less and likely inaudible

under most conditions. Hence, audible corona noise from the transmission line operating at 138 kV would likely not increase ambient levels beyond the transmission line right-of-way.

A typical operating substation might be expected to generate combined noise levels (due to on-site transformer hum, cooling fans, etc.) of up to 80 dBA L_{EQ1h} at 3 feet from a geographic acoustical center-point position. Substation noise would attenuate to the 55-dBA threshold approximately 53 feet from the substation.

Noise impacts from utilities during operations would be negligible to minor, long-term, and localized.

Off-Site Facilities

Operational noise sources associated with off-site facilities (Burntlog Maintenance Facility and SGLF) would generally be limited to vehicles entering and leaving these facilities, and heating, ventilation, and air conditioning equipment associated with facility buildings, but no heavy equipment routinely operating at these facilities. The combined noise generated by these sources would be substantially less than SGP traffic and/or the road maintenance noise presented in **Table 7-14**, which would occur along the access roads that these facilities would be located immediately adjacent to. Noise impacts would be negligible to minor, long-term, and localized.

Avalanches

During operations under the 2021 MMP, the same impacts as during construction would be present.

Noise Impacts

Table 7-16 provides estimated noise levels at noise receiver locations during the operations phase under the 2021 MMP, followed by a discussion of estimated noise levels and impacts at each NSR.

Table 7-16 2021 MMP – SGP-Attributed Noise Levels at NSRs During the Operations Phase

ID	Name	Baseline Ambient Noise Level (dBA L_{EQ})	Baseline Ambient Noise Level (dBA L_{DN})	SGP-Attributed Daytime Noise Level (dBA L_{EQ})	SGP-Attributed Day-Night Noise Level (dBA L_{DN})
Site 2	Miller Residence	N/A	50	14	12
Site 3	Meadow Creek Lookout	45	N/A	40	38
Site 5	Forest Service Camp at Landmark	N/A	34	51 / 51[1]	49[2]
Site 6	Forest Service Summer Camp/ Warm Lake Recreation Areas	N/A	34	<1	<1
Site 7	Warm Lake Road/Warm Lake Camp	N/A	47	5	3
Site 8	Granite Excavation Shop in Cascade	N/A	61	46	44

ID	Name	Baseline Ambient Noise Level (dBA L_{EQ})	Baseline Ambient Noise Level (dBA L_{DN})	SGP-Attributed Daytime Noise Level (dBA L_{EQ})	SGP-Attributed Day-Night Noise Level (dBA L_{DN})
Site 9	Southern Pines Plantation Property	N/A	51	25	23
Site 10	Yellow Pine	N/A	50	0	7
Site 11	Ice Hole Campground/ Boise National Forest	N/A	50	35	33
Site 12	Mule Hill Trailhead	40	N/A	33	31

Source: AECOM 2020

[1] Long-term, periodic, or intermittent exceedance of the recommended noise level.

[2] Value does not exceed the 55 dBA threshold but does exceed the ambient noise level.

Site 2 Miller Residence adjacent to Johnson Road

Average hourly noise from all SGP-related activities combined, both with and without blasting, would attenuate to approximately 14 dBA at Site 2, and would have no effect on background ambient noise levels. The 2021 MMP would have no impact on the noise environment at Site 2 during the operations phase.

Site 3 Meadow Creek Lookout

Average hourly noise from all SGP-related activities combined, both with and without blasting, would attenuate to approximately 40 dBA at Site 3, and would have no effect on the background ambient noise levels. Access road maintenance on the Burntlog Route would be the greatest contributor of SGP noise at Site 3 during the operations phase. However, combined noise levels would still be well below the 55-dBA threshold and background ambient noise levels at the site. The 2021 MMP would have negligible impact on the noise environment at Site 3 during the operations phase.

Site 5 Forest Service Camp at Landmark

In the absence of blasting, access road maintenance on the Burntlog Route is the greatest contributor of SGP-related noise at Site 5 during the operations phase. Average hourly noise from all SGP-related activities combined, both with and without blasting, would attenuate to approximately 51 dBA at Site 5 during access road maintenance, below the 55-dBA threshold, but well above background ambient noise levels.

In the absence of access road maintenance activity, SGP-related noise would attenuate to approximately 26 dBA at the site, well below background ambient noise levels. Access road maintenance is expected to be temporary in any single location and intermittent throughout the year, though more frequent during the winter.

The 2021 MMP would have negligible to minor, long-term, periodic impacts at Site 5 during road maintenance activity throughout the operations phase.

Site 6 Forest Service Summer Camp at Warm Lake

Average hourly noise from all SGP-related activities combined, both with and without blasting, would attenuate to 0 dBA at Site 6 during the operations phase, and would have no effect on

background ambient noise levels. The 2021 MMP would have negligible impact on the noise environment at Site 6 during the operations phase.

Site 7 Warm Lake Camp

Access road winter maintenance and SGP-related traffic on the Burntlog Route is the only SGP-related activity that would contribute to the noise environment at Site 7 during the operations phase. However, average hourly noise from all SGP-related activities combined, both with and without blasting, would attenuate to 5 dBA at Site 7, well below the 55-dBA threshold and background ambient noise levels. The portion of the road influencing Site 7 is currently used and plowed under existing conditions; the only additional SGP-related noise source would be up to 50 AADT using the access road. The 2021 MMP would have negligible impact on the noise environment at Site 7 during the operations phase.

Site 8 Granite Excavation Shop in Cascade

Substation noise is the only SGP-related noise that would contribute to the noise environment at Site 8 during the operations phase. The Cascade Switching station would be 1,242 feet away from Site 8. However, average hourly noise from all SGP-related activities combined, both with and without blasting, would attenuate to 46 dBA at Site 8 due to distance, and would have no effect on background ambient noise levels. The 2021 MMP would have negligible impact on the noise environment at Site 8 during the operations phase.

Site 9 Southern Pine Plantation

Substation noise is the only SGP-related noise that would contribute to the noise environment at Site 9 during the operations phase. However, average hourly noise from all SGP-related activities combined, including blasting, would attenuate to 25 dBA at Site 9 due to distance, and would have no effect on background ambient noise levels. The 2021 MMP would have negligible impact on the noise environment at Site 9 during the operations phase.

Site 10 Yellow Pine

Average hourly noise from all SGP-related activities combined, including blasting would attenuate to 0 dBA at Site 10 during the operations phase, and would have no effect on background ambient noise levels. The 2021 MMP would have negligible impact on the noise environment at Site 10 during the operations phase.

Site 11 Ice Hole Campground in Boise National Forest

Substation noise is the only SGP-related noise that would contribute to the noise environment at Site 11 during the operations phase. However, average hourly noise from all SGP-related activities combined, including blasting, would attenuate to 33 dBA at Site 11, and would have no effect on background ambient noise levels. The 2021 MMP would have negligible impact on the noise environment at Site 11 during the operations phase.

Site 12 Mule Hill Trailhead

Noise from all SGP-related activities combined, including blasting, would attenuate to approximately 33 dBA at Site 12 during the operations phase, below the 55-dBA threshold and background ambient sound levels. The 2021 MMP would have negligible impact on the noise environment at Site 12 during the operations phase.

Frank Church-River of No Return Wilderness Areas

Noise levels at a range of distances from the Burntlog Route also were estimated to evaluate SGP-related noise from road maintenance activity in portions of the adjacent FCRNRW Area east of the Burntlog Route that closely borders the roadway (**Table 7-17**). The 5.3-mile Riordan Creek segment of Burntlog Route would be the closest portion to the FCRNRW, resulting in the potential for elevated noise levels to extend further into the FCNRNW area along this segment.

Based on ambient sound levels measured at the Meadow Creek Lookout and along Burnt Log Road (FR 477), average ambient daytime sound levels within the FCRNRW area are estimated at 40 to 45 dBA L_{EQ}. Road maintenance noise from the Burntlog Route would result in maximum noise level increases of 24 to 26 dBA (summer-winter) above ambient sound levels 500 feet from the roadway (higher winter levels due to assumed additional equipment used for roadway snow removal). Areas within approximately 4,000 feet (0.75 of a mile) from the roadway would experience increases approximately 5 dBA L_{EQ1h} or greater. Direct effects on recreationists within approximately 4,000 feet from the roadway could include general annoyance. Indirect effects could include a reduction in the overall quality of the remote wilderness experience. Noise level impacts would be lower farther from the Burntlog Route and would attenuate to a less than perceptible difference (1 to 2 dBA) at approximately 6,000 feet (1.15 miles). These predicted noise levels assume line-of-sight noise transmission and do not take into account obstructions of this path due to terrain which would reduce the noise levels from those predicted.

Table 7-17 Estimated Road Maintenance Noise Levels from the Mine Access Road (Burntlog Route) During the Operations Phase

Distance from Access Route (feet)	SGP-Related Road Maintenance Noise Level (dBA L_{EQ}, summer-winter)	SGP plus Baseline Noise Level[1] (dBA L_{EQ}, summer-winter)	Increase above Baseline Noise Level[2] (dBA L_{EQ}, summer-winter)
500	64-66	64-66	24-26
1,000	57-59	57-59	17-19
2,000	49-52	50-52	10-12
3,000	45-47	46-48	6-8
4,000	41-43	44-45	4-5
5,000	38-40	42-43	3-4
6,000	36-38	41-42	1-2

Source: AECOM 2020

[1] Based on ambient sound levels measured at the Meadow Creek Lookout and along Burnt Log Road, average ambient daytime sound levels within the FCRNRW area are estimated at 40 dBA L_{EQ1h}.

[2] Reported increase over baseline is increase in combined SGP + baseline over baseline. Overall, the greatest potential noise impacts from road maintenance would occur where the Burntlog Route closely borders the FCRNRW. These potential noise impacts would be minor and long-term, but periodic or intermittent, and local (would impact a discrete area of the FCRNRW that is within approximately 4,000 feet of the Burntlog Route).

Noise levels at a range of distances from the Burntlog Route also were estimated to evaluate SGP-related traffic noise in portions of the adjacent FCRNRW that closely border the roadway (**Table 7-18**). Based on ambient sound levels measured at the Meadow Creek Lookout and along Burnt Log Road, average ambient daytime sound levels within the FCRNRW Area are estimated at 40 to 45 dBA L_{EQ1h}. SGP-related traffic noise from the Burntlog Route would attenuate to well below the average ambient daytime sound levels within the FCRNRW 500 feet from the roadway. Overall, aside from the noise impact predicted for Site 5, SGP-related traffic during the

operations phase would have negligible to no effect on the ambient sound environment at nearby NSRs.

If the borrow areas along the Burntlog Route adjacent to the FCRNRW are utilized during the operations phase, potential impacts to recreationists within approximately 1,000 to 2,000 feet of these borrow areas would be the same as during the construction phase (**Table 7-12**).

Table 7-18 Estimated SGP-Related Traffic Noise Levels from the Mine Access Road (Burntlog Route) During the Operations Phase

Distance from Access Route (feet)	SGP-Related Traffic Noise Level (dBA, L_{EQ})	SGP Plus Baseline Noise Level[1] (dBA, L_{EQ})	Increase above Baseline Noise Level[2] (dBA, L_{EQ})
500	34	41-45	0-1
1,000	30	40-45	0
2,000	26	40-45	0
3,000	23	40-45	0
4,000	21	40-45	0

Source: AECOM 2020

[1] Based on ambient sound levels measured at the Meadow Creek Lookout and along Burnt Log Road, average ambient daytime sound levels within the FCRNRW Area are estimated at 40 to 45 dBA LEQ1h.

[2] Reported increase over baseline is increase in combined SGP + baseline over baseline.

7.2.2.3 Closure and Reclamation

Operations Area Boundary

Major noise-generating activities at the SGP during the closure phase would include the operation of heavy industrial-type earth moving equipment for the placement of materials, grading, contouring, and similar activities associated with reclamation. In the absence of a detailed list of equipment to be used during the closure phase, a conservative assumption was made that equipment and numbers of each equipment type would be the same or similar to the construction phase, as listed in **Table 7-2**. The estimate total average hourly noise levels and noise attenuation from the SGP during the closure and reclamation phase would be the same as during the construction phase found in **Section 7.2.2.1**.

Access Roads

During the closure phase, the Burntlog Route would continue to be in use. Potential noise sources from the access road during the closure phase would include road maintenance, SGP-related traffic, borrow areas, and road decommissioning of the Burnt Log Road-Thunder Mountain Road Connector.

Road Maintenance

Road maintenance activity and equipment are assumed to be the same as during the operation phase described in **Section 7.2.2.2**. Noise impacts from road maintenance during closure and reclamation would be minor, short-term, and localized.

SGP-Related Traffic During the Access Road Closure Phase

During the closure phase, SGP-related traffic would continue to utilize the Burntlog Route. Traffic volumes would be lower than during the operation phase. Total average annual daily

traffic is estimated at 27 AADT (versus 50 ADDT during the operation phase). Heavy vehicle volumes are estimated to be 15 AADT (versus 33 ADDT during the operation phase) and light vehicle volumes are estimated to be 12 AADT (versus 17 AADT during the operation phase) (Perpetua 2021a). Assuming 10 percent of AADT at peak hour and vehicle speeds of 25 mph, traffic noise levels 50 feet from the mine access road would be 43 dBA L_{EQ}, 5 dBA lower than during the operations phase, primarily due to the substantially lower volume of heavy vehicles on the roadway. Noise impacts from SGP-related traffic during the access road closure phase would be minor, short-term, and localized from SH 55 to the SGLF. Noise impacts from SGP-related traffic during the access road closure phase would be minor, short-term, and localized from the SGLF to the SGP on the Burntlog Route.

Borrow Areas

Activity, equipment, and noise levels at borrow areas are expected to be similar to the construction and operations phases. It is unknown which borrow areas would be active within each SGP phase. Noise impacts from borrow areas would be negligible to minor, short-term but intermittent, and localized.

Road Decommissioning

Decommissioning the Burnt Log Road-Thunder Mountain Road Connector section of the Burntlog Route would likely involve the same or similar set of equipment as construction and would generate similar noise levels as described in **Section 7.2.2.1** Road Construction. However, road decommissioning activity would be limited to just this section of the mine access road. Noise impacts from road decommissioning would be negligible to minor, short-term, and localized.

Utilities

Under the 2021 MMP, the new transmission line into the SGP would be decommissioned and reclaimed. In the absence of a detailed schedule of equipment being operated for decommissioning and reclamation at the transmission line during closure, it was assumed that equipment used during this phase would be similar to equipment detailed in environmental documents for other transmission line projects. The estimate of total average hourly noise levels is considered conservative, assuming the simultaneous operation of all the equipment listed in **Table 7-19**.

The estimated total average hourly noise levels generated from the transmission line decommissioning would be 81 dBA L_{EQ} at the reference distance of 50 feet, slightly lower than noise levels generated during the construction phase. Noise from transmission line decommissioning would attenuate to the threshold of 55 dBA approximately 0.19 mile from the source of activity based on distance alone. Accounting for ground absorption and atmospheric absorption, noise from transmission line decommissioning would attenuate to 55 dBA approximately 0.11 mile from the source of activity. Noise impacts from utilities during closure and reclamation would be negligible to minor, long-term, and localized.

Table 7-19 Major Noise Sources and Estimated Maximum Noise Levels from Disassembly of the Johnson Creek Substation to SGP Transmission Line During the Closure Phase

Equipment[1]	Total Number of Units (max)[2]	Acoustical Usage Factor (%)[3]	Maximum Noise Levels per Unit, L_{MAX} at 50 feet (dBA)[4]	Predicted Total Noise Level, L_{EQ} at 50 feet (dBA)[5]
Reel Truck	1	40	76	72
Boom Crane	2	16	81	76
Flatbed supply Truck	2	40	74	73
Crew Vans	2	40	75	74
Pickup Trucks	2	40	75	74
Total Average Hourly Noise Level[6]				**81**

Source: AECOM 2020

[1] Equipment list as provided in Midas Gold 2016, **Table 7-1**. Assumes the maximum number of units of each equipment type listed in **Table 7-1** would be operating periodically along the access road during the operations phase.

[2] The total number of equipment units represents an estimated total number of units that would be operating along the access road during different stages of construction.

[3] The acoustical usage factor is used to estimate the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during equipment operation. Acoustical usage factor provided in the table are equivalent to default values in FHWA RCNM version 1.1.

[4] The noise levels listed represent LMAX (per measured noise levels provided in FHWA RCNM version 1.1, except as noted) measured at 50 feet from the equipment. The provided LMAX reference values are for general categories of equipment, not specific models.

[5] Estimated total noise levels emitted by multiple units of the same type, using the equation in **Section 5.2** for adding equal sound pressure levels.

[6] Total Average Hourly Noise Level is calculated using the equation in **Section 5.2** for adding unequal sound pressure levels.

Off-Site Facilities

The sound sources associated with the closure and reclamation of the Burntlog Maintenance Facility was conservatively assumed to be similar to those associated with construction activities, as listed in **Table 7-10**. There would be no reclamation-related noise associated with the SGLF. The facility has a post-mining land use designated as light industry, where it would remain un-reclaimed after mining operations and transferred to a third-party for light industrial uses. Noise impacts from off-site facilities during closure and reclamation would be minor, short-term, and localized.

Avalanches

During closure and reclamation under the 2021 MMP, the same impacts as during construction would be present.

Noise Impacts

Table 7-20 provides estimated noise levels at noise receiver locations during the closure and reclamation phase under the 2021 MMP, followed by a discussion of estimated noise levels and impact at Site 5.

Table 7-20 2021 MMP – SGP-Attributed Noise Levels at Analysis Locations During the Closure and Reclamation Phase

ID	Name	Baseline Ambient Noise Level (dBA L_{EQ})	Baseline Ambient Noise Level (dBA L_{DN})	SGP-Attributed Daytime Noise Level	ID
Site 2	Miller Residence	N/A	50	6	4
Site 3	Meadow Creek Lookout	45	N/A	41	39
Site 5	Forest Service Camp at Landmark	N/A	34	47 [1,2]	45
Site 6	Forest Service Summer Camp/Warm Lake Recreation Areas	N/A	34	18	16
Site 7	Warm Lake Road/Warm Lake Camp	N/A	47	18	16
Site 8	Granite Excavation Shop in Cascade	N/A	61	<1	<1
Site 9	Southern Pines Plantation Property	N/A	51	<1	<1
Site 10	Yellow Pine	N/A	50	54[2]	52[2]
Site 11	Ice Hole Campground/Boise National Forest	N/A	50	38	36
Site 12	Mule Hill Trailhead	40	N/A	40	38

Source: AECOM 2020

[1] Temporary short-term exceedance of the recommended noise level.

[2] Value does not exceed the 55 dBA threshold but does exceed the ambient noise level.

Site 5 Forest Service Camp at Landmark

Access road decommissioning work on the Burntlog Route would be the greatest contributor of SGP noise at Site 5 during the closure phase. Noise from all SGP-related activities combined would attenuate to approximately 47 dBA at Site 5, resulting in a temporary increase in noise levels above the 55-dBA threshold.

2021 MMP would have a temporary, minor, localized impact on the noise environment at Site 5 during the closure phase while access road decommissioning and facilities decommissioning work is occurring in the immediate vicinity.

7.2.3 Johnson Creek Route Alternative

7.2.3.1 Construction

Avalanches

During construction under the Johnson Creek Route Alternative, there are 94 potential avalanche paths present (**Table 7-21**). The number and frequency of use of avalanche control measures are included in **Table 7-22**.

Table 7-20 Summary of Avalanche Hazards: Johnson Creek Route Alternative

Zone	Miles Affected	# Paths Affecting Road	Frequency Descriptor	Frequency Range (Years)	Size at Road	Comments
Warm Lake – Landmark	1.6	11	High	1-3	D2-D3	High snowfall area, south facing short slopes produce small loose avalanches (D2), larger north facing paths can produce mixed flow to D3.
Johnson Creek South	1.2	8	Very Low – Moderate	10-100	D2-D3	Small south facing terrain can produce D2 loose avalanches with a ~ 10-year return period and very low frequency D3 avalanches.
Johnson Creek Central	0.3	3	Moderate	10-30	D2	Three steep talus slopes immediately above path NF-413 can produce 10-year return period D2 avalanches.
Johnson Creek North	0.9	0	Very Low – Moderate	10-100	D2-D3	Steep rocky terrain can produce D2 loose avalanches with moderate frequency, and very low frequency D3 avalanches.
Yellow Pine East (Mile 1 to 3)	0.6	10	Very Low – High	3-100	D2-D3	Zone is characterized by low to moderate frequency D2 loose avalanches. Very low frequency D3 mixed flow avalanches are possible.
Profile Creek (Mile 3 to 6)	0.8	11	Low – High	1-30	D2-D3	Generally small south facing terrain with moderate to high frequency D2 loose avalanches. Some paths are capable of low frequency D3.

Zone	Miles Affected	# Paths Affecting Road	Frequency Descriptor	Frequency Range (Years)	Size at Road	Comments
Tamarack Creek (Mile 6 to 8)	1.4	27	Very Low – High	1-100	D2-D4	Large north-facing paths, D4 mixed flow, can leave large deposits of snow/trees/rocks on the road. The south-facing terrain is similar to the Profile Creek zone.
Salt Creek (Mile 8 to 10.5)	1.0	11	Low – High	1-30	D2-D3	Small, south-facing terrain with moderate to high frequency D2 loose avalanches. Two paths could produce low frequency D3.
Stibnite Mine West (Mile 10.5 to 13.5)	0.2	4	Very Low – Moderate	3-100	D2-D3	One high frequency short slope, and three very low frequency forested paths.
Total	**8.0**	**94**				

Source: DAC 2021(includes map of avalanche paths)

Table 7-22 Expected Number and Frequency of Use of Avalanche Control for Each Access Route Option

Road Segment	# Targets[1]	# Targets/ Mission[1,2]	# Missions/ Year[2]	# Charges/ Year[3]	Road Total # Charges/Year[3]
Warm Lake Summit (Warm Lake to Landmark)	23	15	4.0	61	61
Johnson Creek Road (Landmark to Yellow Pine)	26	15	0.3	4	85
Stibnite Road South (Yellow Pine to Stibnite Mine)	97	71	1.0	81	

Source: DAC 2021

[1] Targets (control points) per path that may be used per mission.

[2] Missions are a function of the frequency estimate. Typically, control frequency was assumed to be three times more frequent than the natural return period of avalanches to the road. The relationship between return period and control frequency was adjusted for some paths. For example, even though Stibnite Road has many more control targets, many of these are on the south facing paths with lower frequency (10-30 years typically) and thus would require infrequent avalanche control during major winters (e.g., 10-year or greater).

[3] Charges are the targets per mission multiplied by missions per year, summed over all the paths on a road segment.

The amount of avalanche control needed each winter would vary depending on winter conditions of the year. Depending on the type of control measure used, the maximum noise level would be 124.0 dBA at 100 feet away (**Table 6-4**), based on the Gazex explosion. At 50 feet away, using the Gazex explosion, the maximum noise level would be 130.0 dBA. Under **Table 7-14**, a single blast at 50 feet away causes for a maximum noise level of 144.0 dBA. There are approximately five missions per year, limiting the amount of avalanche abatement measures to a narrow timeframe of the year, with long-term, minor, and localized impact.

Noise Impacts

Under the Johnson Creek Route Alternative, the Burntlog Route would not be constructed or used to access the SGP and no road improvements or road construction would take place in that area. The Johnson Creek Route would be improved and used to access the SGP during construction, operations, and closure and reclamation. 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 (CR 50-412) portion would be improved by straightening curves, constructing retaining walls, and installing culverts. During the construction phase, SGP-related traffic volumes on the Johnson Creek Route access road is estimated at 65 AADT. Heavy vehicles are estimated at 45 AADT and light vehicles at 20 AADT (Perpetua 2021a). Vehicles per peak hour were assumed to be 10 percent of AADT (Washington State Department of Transportation 2018). Based on the estimated traffic volumes and vehicle mix, and typical vehicle speeds of 25 mph, estimated average hourly noise levels from SGP-related traffic on the mine access route during the construction phase would be 48 dBA LEQ at a distance of 50 feet from the roadway. This is well below the impact threshold level of 55 dBA.

Environmental design features as presented in **Section 2.4** would be implemented and have been considered in the analysis of construction impacts of the Johnson Creek Route Alternative. **Table 7-23** provides estimated noise levels at NSRs during the construction phase under the Johnson Creek Route Alternative.

The Johnson Creek Route Alternative would have temporary impacts on the noise environment at Site 2, Site 9, Site 10, and Site 11 during transmission line work in the immediate vicinity.

Table 7-23 Johnson Creek Route Alternative – SGP-Attributed Noise Level at Analysis Locations During the Construction Phase

ID	Name	Baseline Ambient Noise Level (dBA L_{EQ})	Baseline Ambient Noise Level (dBA L_{DN})	SGP-Attributed Daytime Noise Level (dBA L_{EQ})	SGP-Attributed Day-Night Noise Level (dBA L_{DN})
Site 2	Miller Residence	N/A	50	84[1]	82[1]
Site 3	Meadow Creek Lookout	45	N/A	24	22
Site 5	Forest Service Camp at Landmark	N/A	34	48[2]	46[2]
Site 6	Forest Service Summer Camp/Warm Lake Recreation Areas	N/A	34	21	19
Site 7	Warm Lake Road/Warm Lake Camp	N/A	47	21	18

ID	Name	Baseline Ambient Noise Level (dBA L_{EQ})	Baseline Ambient Noise Level (dBA L_{DN})	SGP-Attributed Daytime Noise Level (dBA L_{EQ})	SGP-Attributed Day-Night Noise Level (dBA L_{DN})
Site 8	Granite Excavation Shop in Cascade	N/A	61	48	46
Site 9	Southern Pines Plantation Property	N/A	51	64[1]	62[1]
Site 10	Yellow Pine	N/A	50	64[1]	62[1]
Site 11	Ice Hole Campground/Boise National Forest	N/A	50	63[1]	61[1]
Site 12	Mule Hill Trailhead	40	N/A	20	18

Source: AECOM 2020
[1] Temporary Short-term exceedance of the recommended noise level, shaded in gray.
[2] Value does not exceed the 55 dBA threshold but does exceed the ambient noise level.

Frank Church-River of No Return Wilderness Areas

The potential noise impacts at dispersed recreational resource areas within the FCRNRW would be the same as reported for the 2021 MMP (see **Tables 7-10**, **7-11**, and **7-12**), provided in terms of predicted noise level and noise level increases over existing at distances between 500 and 8,000 feet. The difference for Johnson Creek Route Alternative is that the primary access road would access the SGP from the north along the existing Stibnite Road (CR 50-412) and would approach close to the FCRNRW area for a very limited distance about midway between the SGP and the village of Yellow Pine, which would represent a much more limited exposure than the Burntlog Route under the 2021 MMP (**Figure 5-1**).

7.2.3.2 Operations

Avalanches

During operations under the Johnson Creek Route Alternative the same impacts as during construction would be present.

Noise Impacts

Under the Johnson Creek Route Alternative, SGP-related traffic and road maintenance activities would occur along the Johnson Creek Route instead of the Burntlog Route. SGP-related traffic would contribute some noise levels during the operations phase. However, road maintenance activities would temporarily increase daytime noise levels at Site 2, Site 5, Site 10, and Site 11 as high as 75 to 84 dBA.

The Johnson Creek Route Alternative would have periodic impacts on the noise environment at Site 2, Site 5, Site 10 and Site 11 during road maintenance throughout the operations phase. The estimated noise levels and noise impacts at all other noise receivers would be the same as the 2021 MMP.

Environmental design features as presented in **Section 2.4** would be implemented and have been considered in the analysis of operations impacts of the Johnson Creek Route Alternative. **Table 7-**

24 provides estimated noise levels at NSRs during the construction phase under the Johnson Creek Route Alternative.

Table 7-24 Johnson Creek Route Alternative – SGP-Attributed Noise Levels at Analysis Locations During the Operations Phase

ID	Name	Baseline Ambient Noise Level (dBA L_{EQ})	Baseline Ambient Noise Level (dBA L_{DN})	SGP-Attributed Daytime Noise Level (dBA L_{EQ})	SGP-Attributed Day-Night Noise Level (dBA L_{DN})
Site 2	Miller Residence	N/A	50	78[1]	76[1]
Site 3	Meadow Creek Lookout	45	N/A	40	38
Site 5	Forest Service Camp at Landmark	N/A	34	75[1]	73[1]
Site 6	Forest Service Summer Camp/Warm Lake Recreation Areas	N/A	34	<1	<1
Site 7	Warm Lake Road/Warm Lake Camp	N/A	47	6	4
Site 8	Granite Excavation Shop in Cascade	N/A	61	25	23
Site 9	Southern Pines Plantation Property	N/A	51	25	23
Site 10	Yellow Pine	N/A	50	61[1]	59[1]
Site 11	Ice Hole Campground/Boise National Forest	N/A	50	84[1]	82[1]
Site 12	Mule Hill Trailhead	40	N/A	27	25

Source: AECOM 2020
[1] Temporary Short-term exceedance of the recommended noise level.

7.2.3.3 Closure and Reclamation

Avalanches

During closure and reclamation under the Johnson Creek Route Alternative the same impacts as during construction would be present.

Noise Impacts

Table 7-25 provides estimated noise levels at NSRs during the closure and reclamation phase under the Johnson Creek Route Alternative. The Johnson Creek and Stibnite roads would not be decommissioned and would remain as built under the Johnson Creek Route Alternative. SGP-related closure and reclamation noise would be greater than ambient levels at Site 5 and Site 10; however, it would be intermittent or periodic as mine traffic moves through those areas. The sound sources associated with the closure and reclamation of the Landmark Maintenance Facility was conservatively assumed to be similar to those associated with construction activities. Noise impacts under closure and reclamation would be short-term, localized, and negligible to minor.

Table 7-25 Johnson Creek Route Alternative – SGP-Attributed Noise Levels at NSRs During the Closure and Reclamation Phase

ID	Name	Baseline Ambient Noise Level (dBA L_{EQ})	Baseline Ambient Noise Level (dBA L_{DN})	SGP-Attributed Daytime Noise Level (dBA L_{EQ})	SGP-Attributed Day-Night Noise Level (dBA L_{DN})
Site 2	Miller Residence	N/A	50	37	35
Site 3	Meadow Creek Lookout	45	N/A	21	19
Site 5	Forest Service Camp at Landmark	N/A	34	54[1]	52[1]
Site 6	Forest Service Summer Camp/Warm Lake Recreation Areas	N/A	34	18	16
Site 7	Warm Lake Road/Warm Lake Camp	N/A	47	18	16
Site 8	Granite Excavation Shop in Cascade	N/A	61	<1	<1
Site 9	Southern Pines Plantation Property	N/A	51	<1	<1
Site 10	Yellow Pine	N/A	50	54[1]	52[1]
Site 11	Ice Hole Campground/Boise National Forest	N/A	50	42	40
Site 12	Mule Hill Trailhead	40	N/A	20	17

Source: AECOM 2020

[1] Temporary Short-term exceedance of the recommended noise level.

7.3 Mitigation and Monitoring

Mitigation measures required by the Forest Service would represent reasonable and effective means to reduce the impacts identified in the previous section or to reduce uncertainty regarding the forecasting of impacts into the future. These mitigation measures are in addition to the prominent regulatory and Forest Plan requirements and project design features (**Section 2.4**) accounted for in the preceding impact analysis.

Mitigation measures may be added, revised, or refined based on public comment, agency comment or continued discussions with Perpetua regarding this specialist report or subsequent analysis under NEPA. The adopted mitigation measures will be finalized in the Final EIS.

7.4 Cumulative Effects

7.4.1 Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis

Cumulative noise impacts typically occur when sensitive receivers are exposed to multiple noise sources at approximately the same time, such as cumulative noise from residential uses, industrial and commercial activities, agriculture, forestry, mining activities, highway traffic, and construction traffic and activities. The SGP, access roads, utilities (transmission lines), and off-site facilities would each contribute to the noise environment at varying levels, durations, and locations during each SGP phase.

Past actions include activities that may have been initiated in the past but also could involve present operations such as mineral exploration, infrastructure development, and non-mining related actions. They may have lingering effects in degrading the environment or may influence trends in the physical, biological, or social environment.

Present actions include mining projects and their related activities (i.e., exploration, reclamation) that may have just commenced or are currently underway and are causing impacts. They also may include other non-mining related projects currently in progress, such as timber sales or vegetation treatment; recreation; other utility lines (e.g., powerlines) and roads; maintenance and use of the existing transportation network; urban development in Valley County; private land development and uses; and sand and gravel extraction.

Past and present actions that have an interactive, synergistic, and/or additive effect (per 40 CFR 1508.7) with a specific resource (such as lingering effects or influencing trends) in the SGP area are described below:

Mineral Exploration and Mining Activities – Past and present mineral exploration and mining have occurred in the vicinity of the SGP, including prospecting, exploration, underground mining, and open pit mining. To support past mining, other related activities occurred in the vicinity, including ore milling and processing, tailings disposal, smelting, heap leaching of ore, spent heap leach ore disposal, development rock disposal, hydropower generation, water retention dam construction, sawmill operations, electric power transmission line construction, and occupancy by thousands of people in housing camps and later in the town of Stibnite.

Two major periods of mineral exploration, development, and operations have occurred in the past century, and have left behind substantial environmental impacts. Between the mid-1920s and the 1950s, the area was mined for gold, silver, antimony, and tungsten mineralized materials by both underground and, later, open pit mining methods. The second period of major activity started with exploration activities in 1974 and was followed by open pit mining and seasonal on-off heap leaching and one-time heap leaching from 1982 to 1997, with ore provided by multiple operators from several locations, and processed in adjacent heap leaching facilities (Forest Service 2015).

The mining, milling, and processing activities created numerous legacy impacts including underground mine workings, multiple open pits, development rock dumps, tailings deposits, heap leach pads, spent heap leach ore piles, a mill and smelter site, three town sites, camp sites, a ruptured water dam (with its associated erosion and downstream sedimentation), haul roads, an abandoned water diversion tunnel, and an airstrip.

Other past and/or present mining projects considered in the cumulative effects analysis include:

- **Fourth of July Mine** – Located in Government Creek on National Forest System land, Fourth of July Mine has been inactive (Forest Service 2012).

- **Camp Bird Mine** – Located in Logan Creek on private land, Camp Bird Mine has been inactive for more than 30 years (Forest Service 2012).

- **Valley County Quarry Development** – Development and operation of an aggregate source to support the road maintenance activities on McCall-Stibnite Road (CR 50-412), Johnson Creek Road (CR 10-413), and other backcountry roads as determined by Valley County (Forest Service 2017).

- **Walker Millsite** – Located in Logan Creek on private land, the plan of operations approved in 1990 included a 50 ton per day ball mill and gravity milling process with the following components: a 50-foot by 100-foot by 8-foot-deep tailings impoundment, 1,000 feet of access road, a water transmission line, and explosives magazine. The millsite on NFS land has been reclaimed (Forest Service 2012).

- **Golden Hand No. 1 and No. 2 Lode Mining Claims** – Located in the Big Creek drainage on 1,309 acres of NFS land, approximately 19 miles north of Yellow Pine, the plan of operations included drilling operations, trenching and sampling, and reopening the caved Ella Mine adit. The project also would include the collection of subsurface geological information to prepare for a new mineral examination. The claims encompass approximately 20 acres each and are adjacent to Coin Creek (Forest Service 2012).

- **Cinnabar Mine** – Located 15 miles east of Yellow Pine and approximately 50 acres in extent, most of the mining occurred during the 1950s. No reclamation has been performed at the site and contaminants of concern include mercury, methylmercury, and arsenic (EPA 2020).

Exploration activities for potential future mining development have been occurring for the last decade and are ongoing at or within the vicinity of the SGP. Affiliates of Midas Gold initiated mineral exploration activities in 2009 as part of the Golden Meadows Exploration Project to better define the mineral deposit potential for the area. Activities associated with the Golden Meadows Exploration Project included the use of the existing road network, and construction of several temporary roads to access drill sites, drill pad construction, drilling on both NFS and private lands, and reclamation (Forest Service 2015). The following is a brief summary of the activities:

- **Midas Gold Exploratory Drilling (2009-2012)** –Exploratory drilling consisting of approximately 6 to 122 drill pads mostly occurred on private land. Crews were housed on private property in Yellow Pine. All equipment was staged on private property and drilling activities generally occurred 24 hours per day. Water withdrawal sites included existing sediment retention ponds and streams. Private and Forest Service temporary roads were used and/or authorized to access drill pads located on NFS lands. Road maintenance was needed to open the existing roads. For winter activities, chained rubber-tired vehicle, helicopter, snowcat, or snowmobile provided access. Where drill pads were located next to roads, some snow plowing occurred at select locations. During snow-free periods, access occurred by helicopter, and where there was authorized access on NFS land or on private land, rubber-tired vehicles also were used for access. Midas Gold also drilled 16 new groundwater alluvial and bedrock monitoring wells on 8 pads in 2012 (Forest Service 2015).

- **Monitoring Wells for the Golden Meadows Project (2013)** – Midas Gold drilled four new groundwater alluvial and bedrock monitoring wells on two pads in 2013. Exploration drilling was conducted in 26 drill areas within NFS land. Twenty-four of the drill areas were accessed by helicopter (i.e., for transport of equipment and crew) and contained temporary helicopter-supported drill pads. No temporary roads were needed for these 24 drill areas (Forest Service 2015).

- **Midas Gold Baseline Studies (2013-2017)** – Baseline data collection studies including water quality, fishery surveys, wildlife surveys, and vegetation mapping were conducted (Forest Service 2015).

- **Winter Geotechnical Study (2017)** – Exploration drilling was conducted in 26 drill areas within NFS land. Twenty-four of the drill areas were accessed by helicopter (i.e., for transport of equipment and crew) and contain temporary helicopter-supported drill pads. No temporary roads were needed for these 24 drill areas (Forest Service 2015).

- **Geotechnical Studies along Meadow Creek (2017)** – Geotechnical study field work program was conducted in support of feasibility level engineering work on the proposed tailings impoundment and impoundment dam foundation conditions. Midas Gold utilized a track mounted Cone-Penetrometer Test rig to access eight locations along Meadow Creek in September/October 2017 (Forest Service 2015).

- **Operations Exploratory Drilling (2016-2019)** – In addition to exploratory drilling for the winter geotechnical study in 2017, expansion of an existing borrow source on NFS land just east of the camp and shop area also occurred. The borrow material supplied approximately 7,000 cubic yards of crushed rock to support the exploration program, including road maintenance and site reclamation activities and also was used by previous operators and the Forest Service. Approximately 141,000 gallons of fuel (diesel, gasoline, and jet fuel) per calendar year was transported on existing Valley County roads to the fuel storage facility (located on private land) (Forest Service 2015).

- **Exploration and Geotechnical Drilling (2018)** – Midas Gold drilled 62 exploration and geotechnical drilling pads within the project area. Fifty-six of the pads are track-supported and the remaining six are helicopter-supported. None of the pads are steep slope drill pads. The 62 proposed pads are located in the vicinities of the following water bodies: Upper East Fork South Fork Salmon River, Meadow Creek, Middle East Fork South Fork Salmon River, Lower East Fork South Fork Salmon River, Upper Meadow Creek, and West End Creek (HDR 2017c).

- **On-going Monitoring for Golden Meadows Project** – Monitoring for weeds, water quality, minerals and geology, access and haul route water quality monitoring, monitoring of water quality best management practices and project standard operating procedures associated with haul and access road use, wildlife and rare plants continue to be conducted (Forest Service 2015).

- **Burntlog Route Geophysical Investigation Field Work (2020-2021)** – Midas Gold collected geophysical data at proposed rock quarries, bridge abutments, cut slopes, and soil nail/mechanically stabilized earth wall locations using four methods including a Dynamic Cone Penetrometer Test, a track mounted excavator, a truck/track mounted hollow stem auger/core rig, and a helicopter assisted casing advancer/core drill rig. Midas Gold is investigating 24 locations by drilling or excavating 40 borings/test pits along the proposed Burntlog Route. The geophysical investigation field work will last

approximately 40 days. Nearly half of the locations are situated along the existing Burnt Log Road and the remaining sites are located along the proposed new alignment of the Burntlog Route between Trapper Creek and Stibnite (Midas Gold 2019).

Transportation Projects – Road maintenance, improvement projects, airstrip operations and maintenance, and culvert and bridge replacements have occurred in the past and are expected to continue in the future. Installation or improvement of culverts and bridges may impact aquatic habitat due to construction-related effects and erosion. Maintenance of existing roadways, culverts, and bridges will likely be short-term, while new roadways, culverts, and bridges would have a larger effect. More information regarding current and future road maintenance and airstrip operations are provided below:

- **Road Maintenance of NFS Roads** – Thunder Mountain Road (FR 50375) and Meadow Creek Lookout Road (FR 51290) are both NFS maintenance level 2 roads that received maintenance in 2014 and are on a regular maintenance schedule. Road maintenance activities include blading, slough removal, and culvert cleaning. It is assumed that private landowners on private lands keep roads open and maintained to meet their needs.

- **Road Maintenance of County Roads** –Warren Profile Gap Road (CR 50-340) and the road to the Big Creek Trailhead are currently maintained by Valley County under a cooperative agreement; both roads are on an annual or biannual maintenance schedule. Road maintenance activities include blading, slough removal, and culvert cleaning. Smith Creek and Pueblo Summit Roads have not received any maintenance for years (Forest Service 2016).

    - McCall-Stibnite Road (CR 50-412) is currently maintained by Valley County under a cooperative agreement, on a regular maintenance schedule. There is an agreement between Valley County and Midas Gold to allow Perpetua to provide maintenance along the road from Yellow Pine to Perpetua 's property, “the road will be continuously maintained during the open period. Maintenance will, in all respect, be subject to review and approval by the Valley County Road Superintendent. The Owner/Contractor will abide by the Schedule 8: Payette National Forest; Road Maintenance Best Management Practices. During winter operations the Owner/Contractor will maintain a vehicle and trailer parking and turn around area at Profile Creek and Stibnite. The Owner/Contractor will place a temporary Valley County owned and signed gate above the Profile Creek Road during the Spring Breakup to prohibit any full-size vehicles from entering the Yellow Pine-Stibnite Road, unless otherwise authorized. All-terrain vehicles (ATV), utility-terrain vehicles, and snow mobile access on the Yellow Pine-Stibnite Road will still be permitted for the public at large during this temporary travel restriction.”

- **Road Maintenance of State Roads** – SH 55 is maintained by the Idaho Transportation Department (ITD). Recent upgrades and improvements included the Banks Beach parking study and the ongoing Smiths Ferry safety improvements (ITD 2020). SH 55 was recently repaved between Donnelly and McCall (ITD 2021). The project addressed wear and tear to increase the service life of the roadway.

- The ITD, Division of Aeronautics maintains and operates the Johnson Creek, Warm Springs, and Bruce Meadows airstrips which are located on NFS land.

Mine Closure and Reclamation – Closure and reclamation of Hecla and SMI mining and processing facilities located in the headwaters of East Fork SFSR and Sugar Creek occurred between 1993 and 2000. Several Comprehensive Environmental Response, Compensation, and Liability Act Removal Actions also were conducted in the same area by the Forest Service, Environmental Protection Agency, and Exxon-Mobil Corporation to minimize risks to human health and the environment from legacy mining and processing activities during the 1930s, 40s, and 50s.

Recreation and Tourism – Past and present recreation and tourism activities include sport hunting, fishing, trapping, boating and river recreation, camping, hiking, backpacking, outfitter/guide operations, tourist services – Big Creek Lodge, Elk Springs Outfitters, and Juniper Mountain Outfitters. These activities take place primarily from late spring to late fall, and there may be small plane, helicopter, and vehicle traffic associated with access.

Infrastructure Development – Past and present community infrastructure projects include the transmission line upgrades in the West Central Mountain Electric Plan 2014, which follows the general location of the SGP upgraded transmission line route (Idaho Power Company [IPCo] 2014). In 2020, IPCo rerouted approximately 2.5 miles of the existing Warm Lake Feeder overhead 7.2kV distribution line with approximately 2.75 miles of single-phase underground line in the Yellow Pine area (Forest Service 2020c).

Water Diversions and Hydro Power Projects – There are eight water diversions on federal and private lands in vicinity of the SGP area. There also are three residential, small-scale hydroelectric operations (0.4 to 0.9 cubic feet per second permitted), and one hydroelectric operation at Big Creek Lodge.

Wildland Fire, Noxious Weed Control, and Firewood Harvest – There have been numerous wildland fires in vicinity of the SGP area and it is likely more will occur in the future. Past fires within the headwaters of the East Fork SFSR and Sugar Creek include Indian Creek Point (12,204 acres); Tamarack (2,348 acres); Bishop Creek (2,610 acres); Cascade Complex (299,930 acres); Thunder City (13,263 acres), and Buck Fire (19,474 acres). In fall of 2021, the Krassel Ranger District conducted prescribed burns to areas east of Yellow Pine (Bald Hill project area) and along the SFSR (Four Mile project areas). Removal of firewood for non-commercial use has occurred in the past and is expected to continue in the future on NFS land, in compliance with general permit requirements for the Payette National Forest. Several noxious weed species have been identified in the vicinity of the SGP including spotted knapweed, Canada thistle, yellow toadflax, and rush skeletonweed. Treatment of noxious weeds occurs regularly throughout the area. Treatments include chemical spraying and pulling. Main areas of treatment for noxious weeds include Chamberlain area, Beaver Creek, and Big Creek trails, and along road access areas. The Lost Horse vegetation management project was completed within the Clear Creek drainage along FRs 405, 406, 407, 409, and 433; the objective of this project was to restore species composition and stand structure while reducing undesirable tree densities and favoring retention of larger diameter, more fire-resistant trees (Forest Service 2020b).

Authorized in May 2021 (Forest Service 2021a), the Big Creek Hazardous Fuel Reduction was a community protection project for Edwardsburg/Big Creek area using commercial and noncommercial treatments and prescription fire to reduce hazardous fuels. Treatments were on Forest Service lands along public roads and adjacent to private property, outside of wilderness. The project implementation reduced wildfire risk and fire severity/intensity on NFS lands around Big Creek and Edwardsburg and private property using commercial timber harvest, understory treatment, and prescribed burning. Approximately 10,290 acres were treated including, approximately 631 acres of mastication and/or hand thin, no removal; 847 acres of commercial

and pre-commercial thinning; 1,047 acres of hand-thinning, no removal; 7,765 acres of natural fuel prescribed fire burn blocks; and less than 1 mile of temporary road constructed to facilitate equipment access and product removal reclaimed after vegetation management treatments were completed.

Forest Management - These activities include easements and other management actions. There are several easements in the SGP area and vicinity that are granted and maintained by the Forest Service including: Road Right-of-Way, Forest Road and Trail Act (FRTA) on McCall-Stibnite Road (CR 50-412), Road Right-of-Way and Linear Utility easement to the IPCo. The Yellow Pine Blowdown Project near Yellow Pine was conducted to remove down material from camping and recreating areas, reduce the risk of insect outbreak, and to reduce the fuel loading to help to ensure the safety of the Yellow Pine community. In 2020, the BNF decommissioned approximately 18 miles of non-system routes in the Six-bit Creek and Curtis Creek subwatersheds, part of the SFSR subbasin (Forest Service 2020b).

The South Fork Restoration and Access Management Plan (RAMP) is in the implementation phase with the decision dated July 13, 2021. The project's objective is to determine the minimum road system, improve watershed condition, provide ATV and motorcycle trail opportunities, and provide dispersed camping and parking opportunities. The project includes numerous actions relating to watershed restoration, motorized and non-motorized access, and improvements of recreation facilities within the SFSR watershed within a 329,000-acre project area (http://www.fs.usda.gov/project/?project=51257). Target dates for implementation are 2022-2027 (Forest Service 2021b).

Commercial and Subsistence Harvest of Fish and Wildlife – Past and present harvest of fish and wildlife for recreational and subsistence purposes puts some degree of pressure on those resources. Legal hunting, fishing, and trapping has occurred and is currently occurring in the SGP area and vicinity. Fish and wildlife resources are managed by the Idaho Department of Fish and Game and federal agencies to maintain sustainable populations. Managers use management tools such as harvest limits and areas open and closed to sport and commercial harvest of fish and wildlife to maintain sustainable resources and allocate harvest.

Reasonably foreseeable future projects in the vicinity of the SGP area that could affect the noise environment are described in **Tables 7-26** and **7-27**. These include road projects, mining projects, and forestry projects. Each of these activities would contribute to noise levels in the noise analysis area. Construction projects would likely contribute noise levels similar to the SGP but over discrete and likely short timeframes. The spatial distance between cumulative SGP sites would make it less likely that noise would be detectable at a given point from more than one reasonably foreseeable future action; the impacts from noise are not expected to be additive because the SGP would not occur in the same place or the same time as most reasonably foreseeable future actions.

The SGP has the greatest potential to contribute to cumulative noise impacts in the vicinity of the FCRNRW. However, given the mountainous topography, cumulative impacts would likely only occur if other ongoing or future actions in the general area occur within the same mountain valley or on nearby ridgelines.

Table 7-26 Foreseeable Activities Considered Regarding Cumulative Noise Emissions – Specific Planned Projects

Project or Activity Name	Agency Document /District	Brief Description	Approximate Implementation/ Construction/ Operation Dates
Stibnite Mine Site ASAOC	EPA and Forest Service ASAOC	Address legacy mining impacts, including time critical removal actions consisting of stream diversion ditches and removal of about 325,000 tons of development rock and tailings.	2022 - 2024
East Fork Salmon River RAMP	PNF	Scoping for the East Fork Salmon River (EFSR) RAMP estimated to start late 2021. The spatial extent of the EFSR RAMP could include Yellow Pine, Big Creek, and Thunder Mountain within the PNF. The purpose of the EFSR RAMP is travel management. The Forest Service would conduct travel planning to identify a Minimum Road System (36 CFR 212 Subpart A) and the routes open for public use (36 CFR 212 Subpart B), including motorized trail opportunities, dispersed camping, and parking opportunities and update the Forest Motor Vehicle Use Map. http://www.fs.usda.gov/project/?project=60889	Expected Decision: 10/2022 Expected Implementation: 11/2022
Burntlog Route Geophysical Investigation	CE (BNF SOPA)	- Minerals and geology The purpose of the investigation is to collect crucial geophysical data along the existing Burnt Log Road and proposed new alignment between Trapper Creek and Stibnite.	Scoping Start: 02/10/2020 Expected Decision: 03/2022 Expected Implementation: 09/2022
Nez Perce Tribe Research Equipment	CE / PNF SOPA	Replacement of an existing propane tank servicing a fish detection system (PIT array) with a 1,000-gallon tank in an existing hardened area to ensure fuel supply through winter months.	Scoping initiation: 11/2021 Expected Decision: 04/2022 Expected Implementation: 07/2022
Stallion Gold – Horse Heaven Project		Surface exploration of gold and antimony deposits. The project consists of 695 unpatented federal mining claims and mineral rights on 13,950 acres. This project would share its eastern boundary with the SGP.	

Table 7-27 Foreseeable Activities Considered Regarding Cumulative Noise Emissions – Ongoing Projects and Foreseeable Emission Sources

Project Type	Project Names/Description	Nature of Noise Contribution to Cumulative Effects
Construction Projects	Creek restoration Trail construction and maintenance Bridge and culvert replacement projects, generally located more than 10 miles north of SGP area Hydroelectric projects: small residential projects for power generation Road maintenance	Short-term noise emissions during construction with no long-term noise impacts that would overlap with impacts related to the SGP.
Mining Activities	Ongoing mining activities on patented land Mineral exploration and mining have occurred in several locations around the SGP area. Exploration activities area ongoing for potential future mining development.	Local noise from drilling equipment (e.g., compressor engines), and vehicles. Known mining operations are of small size (50 tons per day or less) or are inactive.
Recreation and tourism	Recreation and Tourist activities: Sport hunting, fishing, trapping Snowmobile trails Traffic on unpaved roads Boating and river recreation Camping, hiking, backpacking Outfitter/Guide Operations Tourist Services – Big Creek Lodge OHV use Tourist Services – e.g., Big Creek Lodge	Collectively substantial noise from vehicles on unpaved roads and trails, boats, and generators.

7.5 Short-term Uses and Long-term Productivity

Modeled noise levels did not rise beyond threshold of concern under most conditions, and the noise related to mining and associated activities would represent a temporary use (during the estimated 20-year life of the mine between construction and reclamation) expected to end with mine reclamation and would not affect long-term productivity.

Under the No Action Alternative, the SGP would not be undertaken. Consequently, there would be no short-term use that would affect the ambient noise environment, and no effect on long-term productivity.

7.6 Irreversible and Irretrievable Commitments of Resources

The SGP would not contribute to irretrievable and irreversible commitment of public resources as it relates to the ambient noise environment. All noise sources and noise impacts associated with the SGP would cease upon final closure of the SGP and noise levels would return to ambient conditions without acoustical contribution of the SGP. The future non-SGP ambient sound environment is likely to be similar to the reported baseline, adjusted only by changes in non-SGP

acoustical contributors such as roadway traffic flows and the potential for new residential, commercial, and industrial development in the SGP vicinity.

Under the No Action Alternative, the SGP would not be undertaken. Consequently, there would be no irretrievable and irreversible commitment of public resources as it relates to the ambient noise environment.

7.7 Summary

The noise analysis conducted for the SGP examined impacts on 12 defined 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, only ten were evaluated for their noise impacts, 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 (L_{DN} and/or L_{EQ}), as well as the SGP-set 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.

Table 7-28 provides a summary comparison of noise impacts by issues and indicators for each alternative. 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. For the 2021 MMP, Sites 2, 9, and 11 exceed the 55 dBA threshold, whereas Site 5 only exceeds the baseline ambient noise level. Sites 2, 9, 10, and 11 exceed the 55 dBA threshold, whereas Site 5 only exceeds the baseline ambient noise level for the Johnson Creek Route 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 8,000 feet (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.

Impacts to Site 5 under the 2021 MMP and Sites 2, 5, 10, and 11 under the Johnson Creek Route Alternative during operations would have long-term and periodic noise level exceedances due mainly to road maintenance activities. Site 5 under the 2021 MMP would only exceed the baseline ambient noise level, whereas Sites 2, 5, 10, and 11 under the Johnson Creek Route Alternative would exceed the 55 dBA threshold. Most of the operational activities (i.e., road maintenance and off-site facilities) would experience 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.

During closure activities, there would be short-term noise impacts from transmission line and access road decommissioning to two NSRs. Sites 5 and 10 under both alternatives exceed 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.

Table 7-28 Comparison of Noise Impacts by Alternative

Issue	Indicator	Baseline Conditions	No Action Alternative	2021 MMP	Johnson Creek Route Alternative
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, LDN over the 12 identified NSRs as summarized **Tables 3-1** and **6-1**.	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. Site 12 would have the highest impacts during the first year of Burntlog Route construction. The impacts	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
				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.	

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