2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 INTRODUCTION

The Council on Environmental Quality's (CEQ's) National Environmental Policy Act (NEPA) regulations describe the alternatives section as the "heart of an Environmental Impact Statement" and require exploration and evaluation of all reasonable alternatives (40 Code of Federal Regulations [CFR] 1502.14). CEQ further defines reasonable alternatives as "those that are practical or feasible from the technical and economic standpoint and using common sense" (CEQ 1981). Moreover, under the Clean Water Act (CWA) 404(b)(1) Guidelines, the U.S. Army Corps of Engineers (USACE) may only permit the least environmentally damaging practicable alternative (40 CFR 230.10(a)). Per the 404(b)(1) Guidelines, an alternative is considered practicable "if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes" (40 CFR 230.10(a)(2)). NEPA regulations (40 CFR 1502.14) and the Forest Service Handbook (FSH) 1909.15, Chapter 10, Section 14.4, also require consideration of a No Action Alternative in an Environmental Impact Statement (EIS).

Chapter 2 describes the action proposed by Midas Gold Idaho, Inc. (Midas Gold) in its Stibnite Gold Project Plan of Restoration and Operations (plan of operations) submitted in September 2016 (Midas Gold 2016a) and subsequent additional information and clarifications (Alternative 1), other action alternatives that meet the purpose and need identified in Chapter 1, and the No Action Alternative. Each alternative (including No Action) would result in different environmental effects, which are analyzed in detail in Chapter 4, Environmental Consequences, of this EIS. In addition, Section 2.8 includes a discussion of other alternatives considered but eliminated from further analysis. Section 2.9 of this chapter concludes with a comparative summary of the environmental effects of the alternatives focusing on the eight significant issues identified in Chapter 1. This comparative summary of environmental effects among the alternatives, combined with the more detailed disclosure and discussion of impacts in Chapter 4, provides the information necessary for the U.S. Forest Service (Forest Service) and the USACE to make informed decisions.

2.2 DEVELOPMENT OF ALTERNATIVES

2.2.1 Regulatory Setting for Alternatives Development

Alternatives were developed by the Forest Service and the USACE, with input from other cooperating agencies, guided by NEPA, CWA, and U.S. Department of Agriculture Forest

Service regulations (40 CFR 1502.14, 40 CFR 230, and 36 CFR 220.5, respectively), Forest Service Region 4 guidance, and the FSH. The Organic Administration Act, and Forest Service regulations at 36 CFR 228 Subpart A, governing mineral development on National Forest System (NFS) lands also provided guidance regarding alternatives development.

2.2.2 Alternatives Screening Criteria

As used in this EIS, an action “alternative” is a complete package of operations, activities, and facilities that comprise a functioning mine project. A complete mining plan has several “component” parts, each necessary to allow production. In many instances, operational components may be further comprised of “subcomponents.” To develop a range of reasonable alternatives, Midas Gold’s plan of operations, as supplemented by additional information and clarifications, was separated into components and subcomponents. Some components of each action alternative are independent of each other, such as the location of off-site buildings, and can be included or replaced in any of the action alternatives. Other components, such as the number, size, or location of development rock storage facilities (DRSFs) or the location of the tailings storage facility (TSF), are interrelated. Relocation, modification, or elimination of an interrelated component could require changes to accommodate other necessary components to complete a given alternative. Through the alternatives development process, one or more “options” were developed and evaluated for the components or subcomponents.

Public comments received during scoping provided early input into potential component and subcomponent options and alternatives to the proposed Stibnite Gold Project (SGP). An iterative review by the Forest Service and cooperating agencies, evaluated these comments to determine whether they were reasonable alternatives or component options to the proposed SGP using four basic screening criteria described below. In addition to alternatives and component options suggested during scoping, the Forest Service, cooperating agencies, and Midas Gold also completed an alternatives development and review process. This process incorporated a review of Midas Gold’s plan of operations, and included consideration of alternatives Midas Gold evaluated prior to submission (Appendix G of the plan of operations) (Midas Gold 2016a).

Potential alternatives and component/subcomponent options were screened based upon four criteria:

1. Does the alternative, including a combination of component options, meet the purpose and need of the project?
2. Would the alternative or component option potentially reduce environmental effects to at least one resource?
3. Is the alternative or component option technically feasible?
4. Is the alternative or component option economically feasible?

Options not meeting the purpose and need (Section 1.4, Purpose and Need) were documented and eliminated first. Each remaining option was then evaluated for technical and economic feasibility and potential environmental impacts using the significant impact issues identified through the scoping process (Section 1.8, Issues). Infeasible options or options lacking any environmental benefit were then eliminated. In addition, options similar in design to an alternative that was carried forward into detailed analysis were screened out to avoid duplication. Section 2.8, Alternatives Considered, Carried Forward, or Eliminated From Further Study, provides additional discussion of specific component alternatives and options that were considered.

2.2.3 Action Alternatives Overview

As described below, this Draft EIS analysis includes four action alternatives and the no action alternative. In general terms, these alternatives are:

Alternative 1 – Alternative 1 is based upon Midas Gold's plan of operations, with clarifications and supplemental information. Although Alternative 1 is no longer Midas Gold's preferred proposal, it continues to serve as an important baseline project description for impact analysis because the other action alternatives were developed based upon the proposed plan of operations.

Alternative 2 – Alternative 2 represents a modified version of Alternative 1 primarily developed by Midas Gold to provide additional avoidance and mitigation measures to address significant impact issues. Although Alternative 2 is, in practical effect, the proposed project for which Midas Gold is seeking approval, Midas Gold has not submitted a revised plan of operations premised upon this alternative. Accordingly, the description of Alternative 2 remains derivative of Alternative 1 as detailed in the plan of operations (Midas Gold 2016a).

Alternative 3 – Alternative 3 was developed to address issues related to waters of the United States and federally protected fish species by relocating the TSF and one of the DRSFs.

Alternative 4 – Alternative 4 was developed by the Forest Service and the cooperating agencies to incorporate several independent component options and evaluate potential reductions in effects concerning many of the significant issues identified during scoping. The primary focus of Alternative 4 is consideration of using an existing route for mine access instead of a route that under Alternative 1 requires new road construction in Inventoried Roadless Areas.

Alternative 5 – Alternative 5 is the No Action Alternative, which provides an environmental baseline for comparison of the action alternatives. Under the No Action Alternative, the mining, ore processing, and related activities under the action alternatives considered in this EIS would not take place. However, existing and approved activities (i.e., approved exploration activities and associated reclamation obligations) would continue and Midas Gold would not be precluded from subsequently submitting another plan of operations pursuant to the General Mining Law of 1872.

2.2.4 Components Common to and Primary Differences Between All Action Alternatives

There are several mine components that would be common to all the action alternatives:

- Mine pit locations, areal extents, and mining methods
- Pit dewatering
- Yellow Pine DRSF dimensions
- DRSF construction methods
- Ore processing
- TSF construction methods
- Water supply needs and uses
- Stibnite Gold Logistics Facility (SGLF)
- Surface and underground exploration

These components are described under Alternative 1 and would remain the same under Alternatives 2, 3, and 4. **Table 2.2-1** provides a summary of the differences among each of the action alternatives and the connected action of upgrading existing transmission lines and substations. Because **Table 2.2-1** describes primary differences, not all the components listed above are included in the table. Based on the information included in Chapter 4, as well as public and agency comments on this Draft EIS, the alternative selected by the Forest Service in the Record of Decision could include a combination of project component options analyzed in different alternatives in the Draft EIS.

Table 2.2-1 Primary Differences Between the Action Alternatives

SGP Phase	Component/Subcomponent	Alternative 1	Alternative 2	Alternative 3	Alternative 4
All Phases	SGP timeline	• Construction: Approximately 3 years • Operations: Approximately 12 years • Exploration: Approximately 15 years (during construction and operations) • Reclamation: Approximately 5 years • Environmental Monitoring: As long as needed	Same as Alternative 1	Same as Alternative 1 : .	Same as Alternative 1 except: Construction: Approximately 5 years
All Phases	Access Roads	Construction/Operations: • Yellow Pine Route for mine site access during early construction with minor improvements • Burntlog Route for mine site access during construction, mining and ore processing operations, and closure and reclamation. • Associated eight borrow areas developed along Burntlog Route for materials needed for road improvements and maintenance Closure and Reclamation • New sections of Burntlog Route to be reclaimed after the closure and reclamation period	Same as Alternative 1, except: • Reroute of a 5.3-mile segment of the Burntlog Route (Riordan Creek Segment)	Same as Alternative 1, except: • The Burntlog Route in the vicinity of the East Fork South Fork Salmon River (EFSFSR) TSF rerouted on a new road segment, to come into the mine site adjacent to Blowout Creek during operations • Rerouting of the Burntlog Route would eliminate access to two of the eight borrow areas	• Yellow Pine Route upgraded and used for mine site access throughout life of mine instead of the Burntlog Route • Access route around the Yellow Pine pit for employee access and deliveries of supplies and equipment to the processing, warehouse, worker housing facility, and administration areas • No improvements or construction of new segments for Burntlog Route • Associated borrow sources developed along the Yellow Pine Route for materials needed for road improvements and maintenance
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 • Cabin Creek Road Groomed OSV trail • Public roads remain open through the mine site with temporary closures as needed to accommodate construction • Off-highway vehicle (OHV) Trail from Horse Heaven/Powerline to Meadow Creek Lookout Road (National Forest System Road [FR] 51290) Operations: • Stibnite Road (County Road [CR] 50-412) / Thunder Mountain Road (FR 50375) closed through the mine site • Public access allowed on Burntlog Route to Thunder Mountain Road (FR 50375) through the mine site • OHV Trail from Horse Heaven/Powerline to Meadow Creek Lookout Road (FR 51290) • Cabin Creek Road Groomed OSV trail Closure and Reclamation: • New road constructed over the Yellow Pine DRSF (backfilled Yellow Pine pit) connecting Stibnite Road (CR 50-412) to Thunder Mountain Road (FR 50375)	Construction: Same as Alternative 1 Operations: Same as Alternative 1 except: • Public access through the mine site provided by constructing new road to link Stibnite Road (CR 50-412) to Thunder Mountain Road (FR 50375) with two options: ○ Option 1 - through Yellow Pine pit and below mine haul road ○ Option 2 - west of Yellow Pine pit and below mine haul road Closure and Reclamation: Same as Alternative 1	Construction: Same as Alternative 1 except: • Meadow Creek Lookout Road would be upgraded from Burntlog Route to Monumental Summit for public access • No OHV Trail from Horse Heaven/Powerline to Meadow Creek Lookout Road (FR 51290) Operations: Same as Alternative 1 except: • No public access through the mine site • Public access on Burntlog Route connecting to upgraded Meadow Creek Lookout Road (FR 51290) • No OHV Trail from Horse Heaven/Powerline to Meadow Creek Lookout Road (FR 51290) Closure and Reclamation: • Road established over Yellow Pine DRSF (same as Alt 1) to middle of mine site where public access provided around the TSF using one of two options: ○ Conversion of the temporary operational TSF access road along the TSF pipeline route to a permanent public access road connecting to the existing road at both ends ○ Retention of mine access road through Blowout Creek drainage for public access	Construction: Same as Alternative 1 except: • No OHV Trail from Horse Heaven/Powerline to Meadow Creek Lookout Road (FR 51290) • Groomed OSV trail on the west side of Johnson Creek from Wapiti Meadows to Landmark from construction through mine closure Operations: Same as Alternative 1 except: • No OHV Trail from Horse Heaven/Powerline to Meadow Creek Lookout Road (FR 51290) • Public access through the mine site provided on same route as mine access around the Yellow Pine pit. • Groomed OSV trail on the west side of Johnson Creek from Trout Creek to Landmark from construction through mine closure Closure and Reclamation: Same as Alternative 1

SGP Phase	Component/Subcomponent	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Operations	Development Rock Production and Storage	Four DRSFs: • Hangar Flats DRSF • Fiddle DRSF • West End DRSF • Yellow Pine DRSF (pit backfill)	Three DRSFs: • Hangar Flats DRSF • Fiddle DRSF • Yellow Pine DRSF (pit backfill) • Development rock used to backfill the Midnight pit portion of the West End pit • Development rock used to partially backfill the Hangar Flats pit	Same as Alternative 1 except: • Hangar Flats DRSF moved to the EFSFSR drainage	Same as Alternative 1
Operations	Tailings Storage Facility (TSF)	TSF located in Meadow Creek drainage. Tailings liner system[1] as follows: • Underdrain of geotextile-wrapped gravel with perforated high-density polyethylene (HDPE) pipe as needed • Prepared subgrade of compacted in situ materials or minimum 12-inch buffer/liner bedding fill • Secondary geosynthetic clay liner (or equivalent) • Primary 60-mil single-sided textured, linear low-density polyethylene geomembrane liner (or equivalent)	TSF location the same as Alternative 1. Tailings liner system[1] same as Alternative 1 except: • 60-mil HDPE AGRU MicroDrain® Liner as a combined secondary liner and added leakage collection layer • 60-mil HDPE geomembrane primary liner	TSF located in EFSFSR drainage. Tailings liner system the same as Alternative 1.[1]	TSF location the same as Alternative 1. Tailings liner system in compliance with Idaho Rules for Ore Processing by Cyanidation (Idaho Administrative Procedure Act [IDAPA] 58.01.13): • Underdrain system the same as Alternative 1; • A prepared subbase; • A compacted soil layer a minimum of twelve inches thick; • A secondary HDPE liner of a minimum thickness of 80 mils with a maximum coefficient of permeability of 10^{-11} centimeters per second (cm/sec); • A leak detection and collection system designed to remove process water to prevent greater than 12 inches of hydraulic head on the secondary liner. • A primary HDPE liner of a minimum thickness of 80 mils with a maximum coefficient of permeability of 10^{-11} cm/sec
Operations	Growth Media Stockpiles (GMSs)	9 GMSs located in close proximity to project facilities	Same as Alternative 1	Changes to the location of 2 GMSs to allow for growth medium storage in the EFSFSR drainge near the TSF, DRSF and near the worker housing facilities.	Same as Alternative 1
Operations	Ore Processing	• Crushing and Grinding Circuit • Antimony Flotation Circuit • Gold and Silver Flotation Circuit • Gold and Silver Pressure Oxidation Circuit • Gold and Silver Leaching and Carbon Adsorption Circuit • Gold and Silver Electrowinning and Refining Circuit • Tailings Neutralization Circuit	Same as Alternative 1 with addition of: • Limestone crushing plant • Associated lime generation equipment including lime kiln, lime stockpiles, conveyors, air quality controls	Same as Alternative 1	Same as Alternative 1
Operations	Reprocessing and Reuse of Legacy Materials	Reprocessing of legacy tailings and reuse of spent ore in Meadow Creek drainage	Same as Alternative 1	No reprocessing of legacy tailings in Meadow Creek drainage. Spent ore would not be reused	Same as Alternative 1

SGP Phase	Component/Subcomponent	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Operations	Mine Support Infrastructure	• Mine Administration Building • Maintenance Workshop • Worker Housing Facility • Haul Roads • Fuel and Explosive Storage • Service Roads and Trails	Same as Alternative 1 except: Haul road locations modified to accommodate DRSF changes and hauling of limestone from the West End pit including: • Elimination of West End DRSF haul roads • Addition of haul road for limestone from the West End pit to the processing facilities	Most support infrastructure the same as Alternative 1 except: • Worker housing facility located in Blowout Creek Changes to haul roads, service roads, and trails to accommodate relocated TSF/DRSF and relocated worker housing	Same as Alternative 1
Operations	Surface Water Management	During operations, management of contact and non-contact water via stream and stormwater diversions • EFSFSR routed around the Yellow Pine pit in a tunnel during operations with enhanced design for fish passage • Midnight Creek piped under GMS to enter EFSFSR upstream of the tunnel • Hennessy Creek diverted through several boreholes into the EFSFSR tunnel • Fiddle Creek diverted in a surface diversion around the Fiddle DRSF • West End Creek diverted in a surface diversion around the north side of the legacy West End development rock dumps, West End pit, and West End DRSF • Garnet Creek maintained in current alignment with culverts as needed • Meadow Creek diverted around the TSF and Hangar Flats DRSF on the south side with a smaller channel on the north side to catch runoff. Sinuous channel around Hangar Flats pit with enhancements for aquatic species and to create floodplains. Floodplain corridor lined with a geosynthetic material to prevent loss of flow • The channel of the East Fork of Meadow Creek (Blowout Creek) routed through a rock drain structure with a retention structure upstream.	The same as Alternative 1 except: • Hennessy Creek routed south toward Fiddle Creek in a surface diversion channel • With the elimination of the West End DRSF, the West End Creek diversion starts farther downstream • The Meadow Creek diversion channel on the south side of the Hangar Flats pit lined with a geosynthetic liner extending 1,050 feet farther down the drainage than Alternative 1 • Low flows in stream diversions around the DRSFs and TSF piped	• The same as Alternative 1 except: EFSFSR and tributaries routed around the TSF in surface diversion channels • No diversion of Meadow Creek upstream of Hangar Flats pit	Same as Alternative 1 except : • Step pools created in Blowout Creek in place of the rock drain • The EFSFSR routed in a tunnel designed to pass flows and sediment/debris but not enhanced for fish passage • Meadow Creek routed around Hangar Flats pit using a pipeline

SGP Phase	Component/Subcomponent	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Operations	Groundwater Management	• Dewatering of Yellow Pine, Hangar Flats, and West End pits via wells and sumps • Use of two rapid infiltration basins (RIBs) to manage dewatering water	Same as Alternative except: • Dewateirng water discharged to RIBs after water treatment • The Yellow Pine pit dewatering continues to operate and send treated water to the RIBs during seasonal low flows after the completion of mining in the Yellow Pine pit until the Hangar Flats pit lake is filled	Same as Alternative 1.	Same as Alternative 1.
Operations	Water Treatment	• Conceptual water treatment system located near the ore processing area for discharge of contact water, runoff from the Fiddle DRSF and Hangar Flats DRSF and Fiddle DRSF toe seepage, if needed, after treatment to meet Idaho Pollutant Discharge Elimination System (IPDES) discharge permit limits • Details of treatment system design and throughput not available but treatment system could be reverse osmosis or iron coprecipitation • Second treatment system for sanitary wastewater with discharge to EFSFSR	• A Centralized Water Treatment Plant (WTP) using iron coprecipitation would be established at the Ore Processing Area to treat contact water, mine drainage, pit dewatering water and process water at a maximum throughput of 4,000 gallons per minute (gpm). • Sanitary wastewater treatment the same as Alternative 1. • Temporary membrane treatment systems to be utilized during early operations as needed.	Same as Alternative 1 except: • Sanitrary wastewater treated at the worker housing facility in Blowout Creek and the IPDES-permitted outfall would be moved to Blowout Creek.	Same as Alternative 1.
Operations	Sanitary and Solid Waste	• Sanitary waste treatment • Solid waste collection areas • On-site landfill • Composting facilities • Recycling • On-site landfarm	Same as Alternative 1.	The same as Alternative 1 except: • Worker housing sanitary wastewater treatment facility and composting facilities located in Blowout Creek	Same as Alternative 1.
Operations	Mine Site Borrow Sources	• Legacy spent heap leach ore • Development rock in mine pits and from underground exploration • Alluvial soils within the TSF and Hangar Flats pit footprints (within Meadow Creek valley) • Outwash soils in lower Blowout Creek • Glacial materials in Fiddle Creek valley within footprint of Fiddle DRSF	Same as Alternative 1.	Same as Alternative 1 except: • Alluvial soils within footprint of the Meadow Creek valley TSF not used • Legacy spent heap leach not removed • Additional material obtained from the granular alluvial and colluvial materials within the EFSFSR TSF and DRSF footprints	Same as Alternative 1.
Operations	Utilities - Transmission Lines	• Upgrades to 42 miles of existing 69-kilovolt (kV) line and 21.5 miles of existing 12.5-kV line (**these are connected actions**) • New 8.5-mile-long 138-kV line • 24.9-kV lines within the mine site	Same as Alternative 1 except: • Approximately 5.4 miles of upgraded transmission line routed to avoid the Thunder Mountain Estates subdivision • Approximately 0.9 mile of upgraded transmission line routed to utilize an old railroad grade **These are connected actions.**	Same as Alternative 1, except: • 2.5 miles of the new 8.5-mile-long 138-kV transmission line aligned to be coincident with a minimally developed access road in the Meadow Creek drainage	Same as Alternative 1.

SGP Phase	Component/Subcomponent	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Operations	Utilities - Electrical Substations	• Upgrades to existing substations (**these are connected actions)** • New Johnson Creek and mine site substations • New Scott Valley and Thunderbolt Tap substations and new Cascade switching station (**these are connected actions**)	Same as Alternative 1 except: The proposed Cascade switching station located on Warm Lake Road **This is a connected action.**	Same as Alternative 1.	Same as Alternative 1.
Operations	Utilities - Communication Towers and Repeater Sites	• Cell towers (three location options, Meadow Creek Lookout, near Fiddle DRSF, ridge within Meadow Creek Inventoried Roadless Area (IRA) with associated access roads) • Very high frequency repeater sites • Communication site at the SGLF • Upgrades to existing communication site	Same as Alternative 1	Same as Alternative 1.	Same as Alternative 1 but constructed and maintained using helicopter (instead of constructing access roads) for cell tower sites within IRAs managed for Backcountry/Restoration
Operations	Offsite Maintenance Facility	Landmark Maintenance Facility (Warm Lake Road at Johnson Creek)	Maintenance facility (Burntlog Maintenance Facility) located on one of the access roads borrow source locations (4.4 miles east of the junction of Johnson Creek Road and Warm Lake Road along the proposed Burntlog Route)	Same as Alternative 1.	Location of maintenance facility west of Landmark on south side of Warm Lake Road
Closure and Reclamation	Mine Pits	Three open pits: • Yellow Pine pit backfilled with development rock • Hangar Flats pit lake created; once pit lake established, Meadow Creek routed through the pit • West End pit fills with water; a spillway provides for periodic overflow into West End Creek • Midnight pit (a small sub-pit contiguous with West End pit but draining away from it) fills with water and spills into Midnight Creek	Same as Alternative 1 except: • Hangar Flats pit partially backfilled with development rock to reduce the depth of the pit lake • Meadow Creek not routed through the partially backfilled Hangar Flats pit • The Midnight pit backfilled with development rock	Same as Alternative 1.	Same as Alternative 1.
Closure and Reclamation	DRSFs	Closure/reclamation of four DRSFs: • DRSFs graded, 12 inches of growth medium placed • Backfilled Yellow Pine pit regraded with 12 inches of growth medium placed	Closure/reclamation of three DRSFs Same as Alternative 1 except: • Low permeability geosynthetic placed over the top and side of Fiddle DRSF and over the top of Hangar Flats DRSF, followed by a layer of soil/rock and growth media	Closure/reclamation of four DRSFs the same as Alternative 1, except: • The Hangar Flats DRSF would be located in the EFSFSR drainage	Same as Alternative 1.
Closure and Reclamation	Surface Water Management – Stream Diversions	• EFSFSR channel reestablished in a surface channel routed across the reclaimed Yellow Pine pit backfill. • Hennessy Creek reestablished in a surface channel with 275 foot waterfall overYellow Pine pit highwall to EFSFSR • Fiddle Creek reestablished in a surface channel routed over the reclaimed Fiddle DRSF • West End Creek reestablished in a surface channel routed over the reclaimed West End DRSF	• Meadow Creek and Blowout Creek combined stream flows above 5 cubic feet per second diverted into the Hangar Flats pit lake until the pit lake fills to accelerate pit lake filling • Operational diversion of Meadow Creek around the Hangar Flats pit retained as the reclaimed channel	Same as Alternative 1.except: • EFSFSR routed over top of EFSFSR TSF and downstream DRSF	Same as Alternative 1.

SGP Phase	Component/Subcomponent	Alternative 1	Alternative 2	Alternative 3	Alternative 4
		• Meadow Creek reestablished in a surface channel routed over the reclaimed TSF and Hangar Flats DRSF • Meadow Creek flows routed into the Hangar Flats pit lake, pit lake discharges into lower Meadow Creek			
Closure and Reclamation	Water Treatment	• Passive water treatment in Fiddle Creek drainage treats Fiddle DRSF seepage, discharging to EFSFSR IPDES-permitted outfall.Treatment system under evaluation but could be passive biochemical reactor with wetland polishing • Passive water treatment near the TSFtreats TSF runoff during post closure for discharge to EFSFSR IPDES-permitted outfall. Treatment system under evaluation but could be passive biochemical reactor with wetland polishing.	• Centralized WTP continues to operate in perpetuity with the addition of a thickener for residual wastes. Treats water from tailings runoff and consolidation and Hangar Flats pit lake overflow. • Fiddle Creek toe seepage water treatment the same as Alternative 1 • Periodic West End pit lake discharges after lake filling treated through temporary treatment system and discharged through a permitted outfall to West End Creek	Same as Alternative 1, except: • Passive treatment of TSF consolidation water occurs in EFSFSR drainage.	Same as Alternative 1.

Table Sources: AECOM 2020a; Brown and Caldwell 2019a, 2020; Midas Gold 2016a, 2019a

Table Notes:

1 The liner system under Alternatives 1, 2, and 3 does not meet the regulatory requirements of IDAPA 58.01.13, Rules for Ore Processing by Cyanidation. At the request of the Idaho Mining Association, the Idaho Department of Environmental Quality (IDEQ) has entered into rulemaking on the existing regulation. No schedule has been determined for completion of the rulemaking. Midas Gold has committed to a liner system for the selected alternative that is in compliance with regulatory requirements in effect at the time of permit decisions for the SGP.

2.3 Alternative 1 – Action Identified in Midas Gold's Plan

2.3.1 Overview

Alternative 1 is based on Midas Gold's plan of operations (Midas Gold 2016a) and subsequent additional information and clarifications. Operations would occur on patented mining claims owned or controlled by Midas Gold and on unpatented mining claims and other areas of federal public lands comprised of NFS lands that are administered by the Payette National Forest (PNF). Supporting infrastructure corridors (access and transmission) are located in the Boise National Forest (BNF) and non-federal lands.

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

- 4 to 5 million ounces of gold
- 6 to 7 million ounces of silver
- 100 to 200 million pounds of antimony

Development of the mineral resources would include construction of access and haul roads within the mine site; construction of supporting infrastructure for the mine site; open pit mining; ore processing; placement of tailings in a TSF; and placement of development rock. New access to the mine site would be provided by the proposed Burntlog Route, which would be a combination of widening the existing Burnt Log Road (FR 447) and Meadow Creek Lookout Road (FR 51290) and constructing new connecting road segments of 15 miles (**Figure 2.3-1**).

Electric power for the mine site and supporting infrastructure and facilities would be provided by constructing a new transmission line from the new Johnson Creek substation to the mine. Additional offsite support facilities to be constructed along access corridors include the SGLF and the Landmark Maintenance Facility. The proposed facilities and access roads are shown on **Figure 2.3-1** Alternative 1 Overview and **Figure 2.3-2** Alternative 1 Mine Site Layout. The Operations Area Boundary shown on **Figures 2.3-1** and **2.3-2** is the boundary within which Midas Gold would control public access.

The components of Alternative 1 are listed in **Table 2.2-1** and described in the following sections in terms of overall land management and affected areas, and project phases: construction; operations; exploration; and closure and reclamation, including post closure monitoring.

2.3.2 Land Management and Affected Areas

Table 2.3-1 provides a summary of land management or ownership by estimated SGP component for the maximum affected area proposed. **Appendix C** provides detailed acreage calculations and includes acreages of currently disturbed land by SGP component and ownership.

Table 2.3-1 Land Management and Acreage By Component

Component Subtotal	Private	State	Boise National Forest	Payette National Forest	Bureau of Reclamation	Total Acres
Mine Site Subtotal	557	0	0	1,413[4]	0	**1,970**
Existing Access Roads Subtotal[1]	10	0	162	28	0	**200**
New Access Road Disturbance Subtotal	0	0	233	112		**345**
Utilities Subtotal[2]	288	62	523	92	25	**990**
Offsite Facilities Subtotal	25	0	3	0	0	**28**
Total[3]	**880**	**62**	**921**	**1,645[5]**	**25**	**3,533**

Table Source: AECOM 2020a

Table Notes:

1 Existing access roads with minor to major improvements would be used for the SGP. Existing access roads acreages reflect the current road configurations. Any additional disturbance to widen existing roads is included in the new access roads subtotal.

2 Utilities affected acres include both existing utility corridors and access routes, and new utility corridors and access routes. Some existing utility access routes would be upgraded. Utilities affected acres include upgrades to utilities that are part of the Connected Actions.

3 Subtotals may not add to totals due to rounding.

4 Approximately 65 affected acres associated with surface exploration pads and temporary roads (mine site component) have unknown land ownership because the exact locations of these exploration areas are not yet known. The surface exploration acres are included in the PNF mine site subtotal.

5 Approximately 5 acres of land listed under the PNF is administered by the PNF but is within the boundary of the Salmon Challis National Forest.

2.3.3 Phasing and Timeline

The actions proposed under Alternative 1 would take place over a period of approximately 20 years, not including the long-term environmental monitoring that would be required for reclamation and closure. The phases of the operation are described in subsequent sections and include: (1) Construction (approximately 3 years); (2) Mining and Ore Processing Operations (approximately 12 years); (3) Surface and Underground Exploration (approximately 15 years, beginning during construction and continuing concurrent with operations); and (4) Closure and Reclamation (approximately 5 years at the mine site). The environmental monitoring phase would continue for as long as needed to demonstrate that the site has been fully reclaimed. **Figure 2.3-3** provides an illustration of the timing of activities within each phase. The discussion in Chapter 2 uses approximately 12 years to describe the mining and ore processing phase; however Midas Gold's plan of operations indicates that the mining and ore processing phase could extend from 12 to 15 years. **Figure 2.3-3** as well as water quality modeling for the SGP are based on a 12-year mine life.

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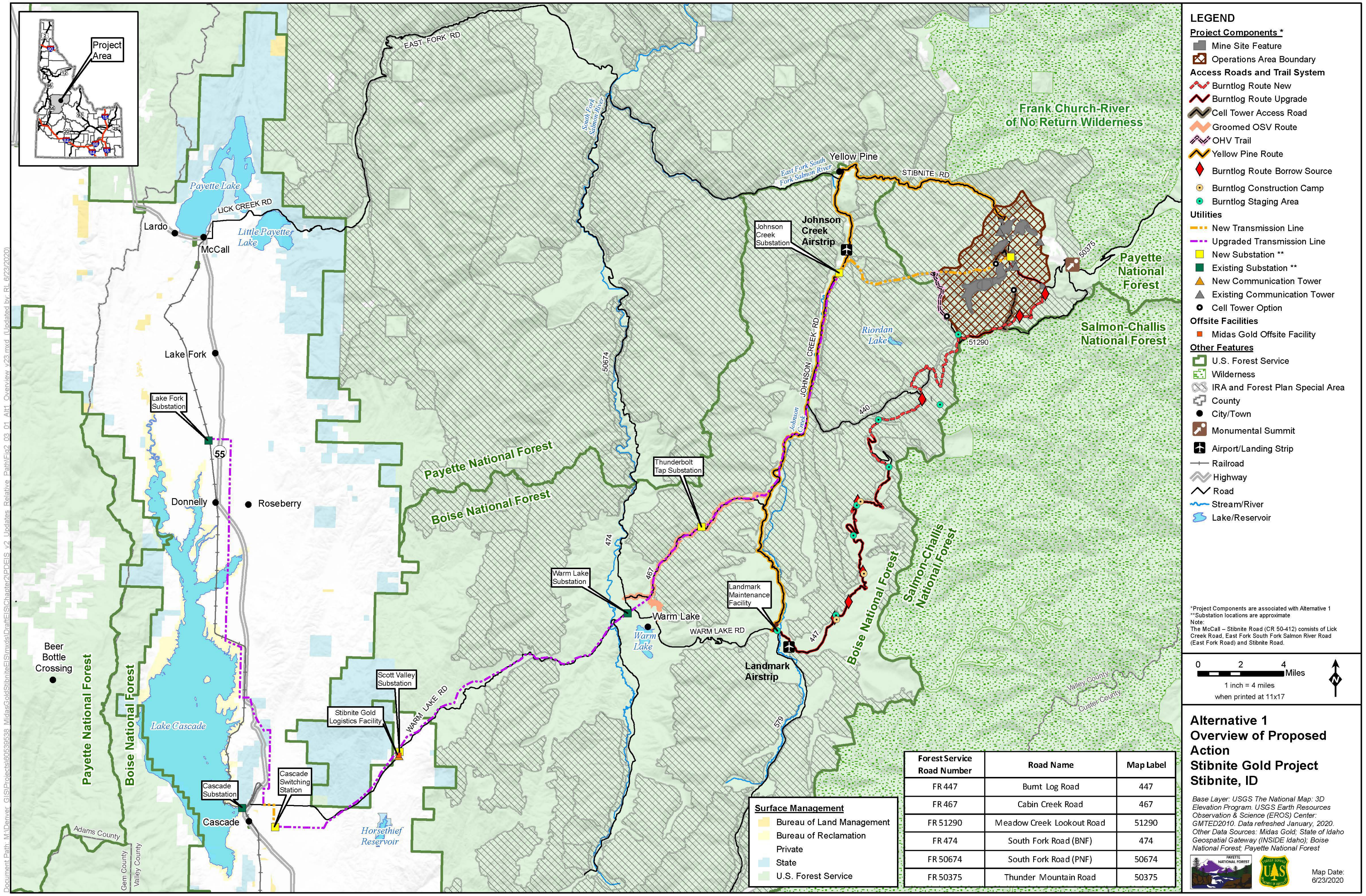

Figure Source: AECOM 2020a

Figure 2.3-1 Alternative 1 Overview of Proposed Action

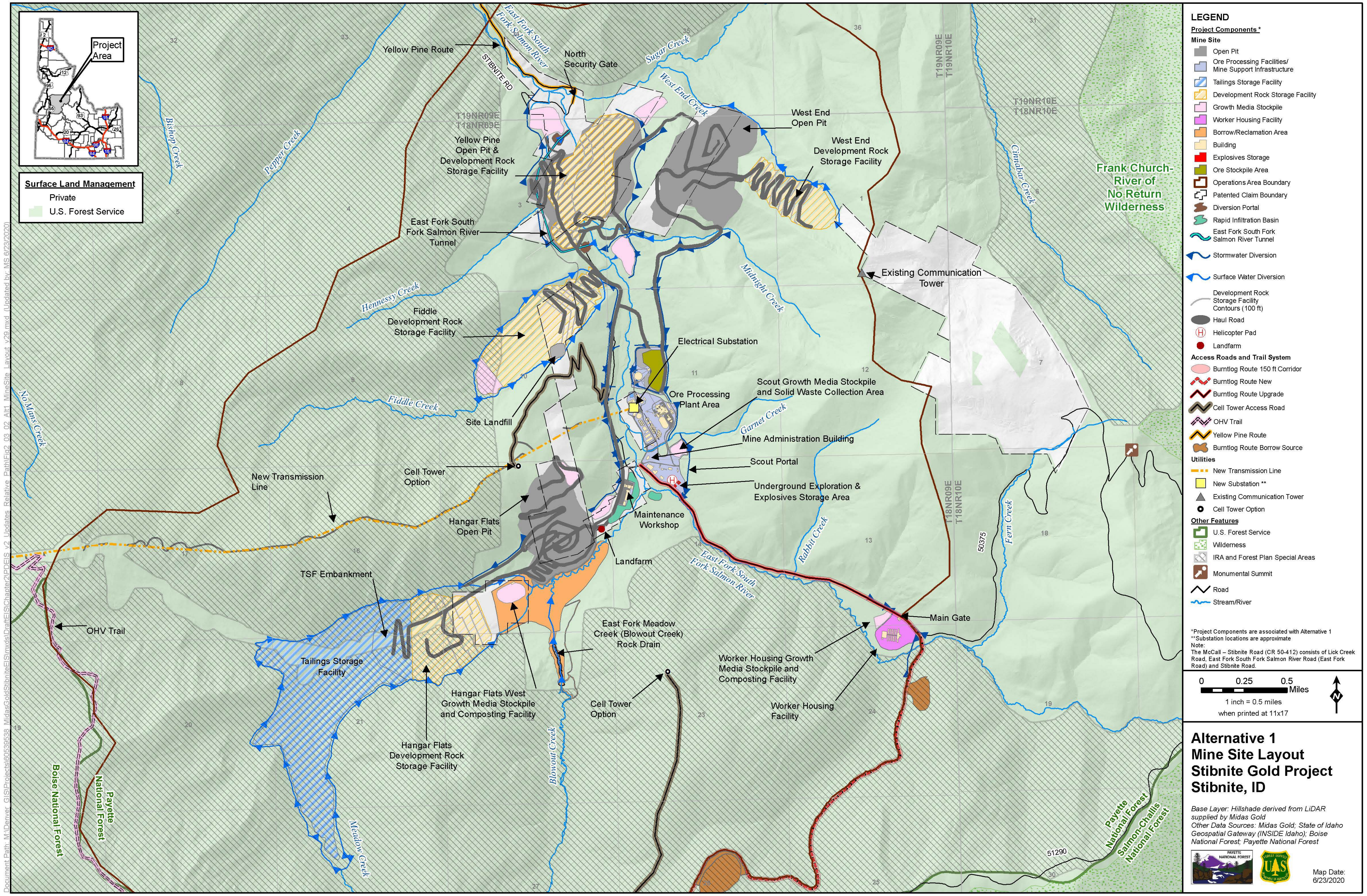

Figure Source: AECOM 2020a

Figure 2.3-2 Alternative 1 Mine Site Layout

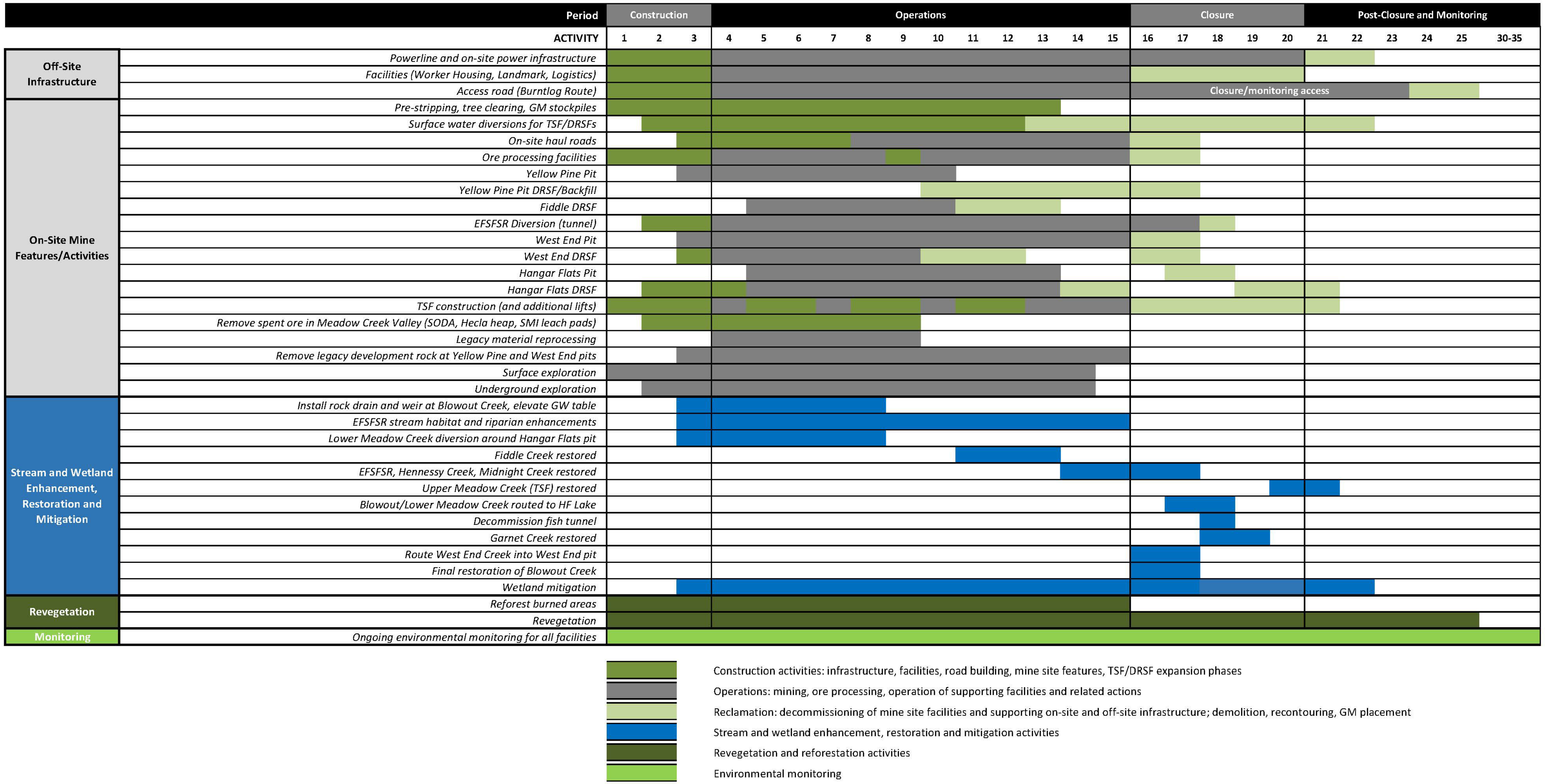

Figure Source: Midas Gold 2018a

Figure Notes:

1 The construction phase of 1 to 3 years represent the pre-production years. Operations – mining and ore processing, could extend another 3 years under certain circumstances.

2 Monitoring would continue for as long as needed to demonstrate that the closure and reclamation has been completed and post-closure land use objectives have been achieved.

3 Midas Gold timelines in supporting documents, including the plan of operations, are based on a timeline that starts with construction years listed as -3, -2, -1 for the construction period counting down to Year 1 which is the first operational year. The DEIS assumes Year 1 is the first year of any type of disturbance associated with the SGP.

Figure 2.3-3 Alternative 1 Estimated Phasing and Timeline

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2.3.4 Site Preparation and Construction Phase

2.3.4.1 Overview

Implementing Alternative 1 would require construction of surface facilities, mine site haul roads, and water management features. Supporting infrastructure to be developed during this phase would include: transmission lines, substations, communication sites, and access roads. Additionally, removal of some features from past mining activities (legacy mining features) would be initiated during the construction phase. Midas Gold would install 15 to 20 temporary trailers on private lands adjacent to the existing exploration camp (located in the proposed ore processing area) to accommodate construction crews.

Prior to site preparation and construction of surface facilities, vegetation would be removed from operating areas. Merchantable timber on NFS lands could be purchased from the Forest Service. Non-merchantable trees, deadwood, shrubs, and slash would be removed, and any remaining vegetation would be grubbed using a bulldozer. The resulting material would be chipped and stockpiled for use as mulch or blended to create a growth media additive. After vegetation removal, growth media would be salvaged and stockpiled. Stockpiles would be stabilized and seeded.

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

Construction of the Burntlog Route would occur from both ends of the route at the same time on a seasonal basis (May to November), but construction could occur outside of this time period if conditions allow. The southern portion workforce would be housed in three temporary trailer camps located within construction borrow sources or staging areas (**Figure 2.3-2**). The northern portion workforce would be housed at the temporary trailer construction camp at the mine site. Some construction workers could be housed in the city of Cascade.

Pre-construction water management activities would include the installation of water management features and best management practices to reduce erosion and sediment delivery to streams. These water management features and best management practices could include sedimentation ponds; run-on water diversion ditches, trenches, and/or berms; runoff water collection ditches; silt fence; water bars; culverts; energy dissipation structures; terraces; and other features specified in construction permits. In the second and third years of construction, contact water would be generated by stormwater runoff at the West End Pit, Yellow Pine Pit, TSF embankment and Hangar Flats DRSF, legacy Hecla heap leach, and the spent ore disposal area (SODA).

2.3.4.2 Growth Media Stockpiles

Suitable growth media material within the area proposed for operations would be salvaged following vegetation clearing for future reclamation and stockpiled at nine GMS locations within the mine site: Midnight, North Yellow Pine area, North Homestake, Hangar Flats East, Hangar Flats West, Scout, Truck Shop, Upper Fiddle, and Worker Housing Facility; as well as temporary GMSs within the footprint of the TSF. GMSs would be stabilized, seeded, and mulched to protect the stockpile from wind and water erosion.

2.3.4.3 Access Roads

YELLOW PINE ROUTE

During the initial construction period (approximately 1 to 2 years), mine-related traffic would access the mine site from State Highway 55, north of the city of Cascade, via Warm Lake Road (CR 10-579), then Johnson Creek Road (CR 10-413) to Yellow Pine, and from Yellow Pine to the mine site via the Stibnite Road segment of the McCall – Stibnite Road (CR 50-412). The portion of the route that includes Johnson Creek Road and Stibnite Road is known as the Yellow Pine Route. Minor surface improvements (e.g., ditch and culvert repair, adding gravel, winter snow removal, and summer dust suppression) would occur on the Yellow Pine Route to reduce sediment runoff and dust generation. There would be no road alignment modification or widening of these existing roads.

Portions of Johnson Creek Road are currently used as a groomed OSV trail during winter and use of the Yellow Pine Route by mine-related construction traffic would conflict with this existing groomed OSV trail. Thus, while the Burntlog Route is under construction, a temporary 15-foot-wide groomed OSV trail adjacent to Johnson Creek Road between the proposed Cabin Creek Groomed OSV Route and Landmark would be constructed (see Section 2.3.4.4, Public Access During Construction and **Figure 2.3-1**).

Once construction of the Burntlog Route has been completed, the Yellow Pine Route would no longer be used by mine-related traffic. While the Yellow Pine Route is in use, Midas Gold would coordinate with Valley County on the use and maintenance of the route for year-round access in accordance with Valley County's public road easement stipulations.

BURNTLOG ROUTE

During the first 2 years of construction, Midas Gold would widen and improve the existing Burnt Log Road (FR 447) and construct 15 miles of new road connecting with Meadow Creek Lookout Road (FR 51290). Improvements on the existing Burnt Log Road (FR 447) include:

- Straightening tight corners to allow for improved safety and traffic visibility;
- Maintaining grades of less than 10 percent in all practicable locations;
- Placing sub-base material and surfacing with gravel;

- Widening the existing road surface to a 20-foot-wide travel way (approximately 26 feet including shoulders); and
- Installing side-ditching, culverts, guardrails, and bridges, where necessary with design features to provide fish passage.

Figure 2.3-1 shows the proposed Burntlog Route, which includes the proposed new road construction. The new route includes construction of 14.3 miles of road through three IRAs. After construction is completed, public use would be allowed on Burntlog Route when other public access roads are blocked by mine operations.

BURNTLOG ROUTE BORROW SOURCES, STAGING AREAS, AND CONSTRUCTION CAMPS

Up to eight borrow sites would be established along the Burntlog Route (**Figure 2.3-1**) to meet construction and ongoing maintenance throughout the life of the operation and closure and reclamation. Additionally, eight staging areas would be located along the route for staging of construction equipment and supplies. Three construction camps would be located within existing disturbance for borrow sources or staging areas. The construction camps would be for trailer parking. Each trailer would need to be equipped with fresh water and sanitary waste storage.

2.3.4.4 Public Access During Construction

During construction of the SGP and completion of the Burntlog Route, to the degree practicable, the public would continue to have access on forest roads currently available to the public (**Figure 2.3-1**), including access through the mine site on Stibnite Road (CR 50-412) connecting to Thunder Mountain Road (FR 50375). Public access also would continue along Johnson Creek Road (CR 10-413) and Burnt Log Road (FR 447). Total closures of half-day to multiple-days could occur during construction work on Stibnite Road between Yellow Pine and the mine site, part of Thunder Mountain Road, and Burnt Log Road.

OHV CONNECTOR TRAIL FROM HORSE HEAVEN/POWERLINE ROAD TO MEADOW CREEK LOOKOUT ROAD

An OHV trail from Horse Heaven/Powerline Road to Meadow Creek Lookout Road (FR 51290) would be constructed. The approximately 4.5 miles long, 15-foot-wide OHV Connector Trail, including 3 miles of new road would be a trail open to all vehicles, as defined in FSH 2309.18 – Trails Management Handbook, Chapter 20, Section 23.23. The OHV trail would be a Class 3 trail open to all motor vehicles, including both highway-legal and non-highway-legal vehicles. The OHV trail would provide motorized vehicle access to Meadow Creek Lookout Road (**Figure 2.3-1**). The OHV trail would be removed at the end of mine operations after a public access road connecting to Thunder Mountain Road (FR 50375) is established through the mine site (Section 2.3.7.5, Yellow Pine Pit/DRSF).

CABIN CREEK ROAD GROOMED OSV TRAIL

Due to year-round access to the mine site along the Burntlog Route, an existing, approximately 11-mile groomed OSV trail from Warm Lake to Landmark would be closed. To replace the lost access of the OSV trail from Warm Lake to Landmark, culvert replacements and localized widening would accommodate a groomed trail using Cabin Creek Road (FR 467). Portions of this groomed trail could require blading the road surface and the addition of aggregate. The groomed OSV trail would be approximately 10.4 miles in length on the existing road and includes an approximately 2-acre parking area west of Cabin Creek Road, and a new 1.5-mile groomer access trail from the Forest Service Warm Lake Project Camp on Paradise Valley Road (FR 488) where the groomer would be stored. **Figure 2.3-1** shows the Cabin Creek Road groomed OSV trail.

TEMPORARY JOHNSON CREEK GROOMED OSV TRAIL

During construction of the Burntlog Route, Valley County's groomed OSV trail 433 on Johnson Creek Road would be unavailable. An approximately 7-mile temporary groomed OSV trail, on NFS lands adjacent to the west side of Johnson Creek Road (CR 10-413) from Landmark to Trout Creek, would be maintained during construction. Portions of the temporary groomed OSV trail would be established using a snowplow wing attachment requiring some vegetation and tree removal to allow for safe snowplowing. The precise location of this trail is not yet determined, and in areas where topography and vegetation prevent using the wing attachment to establish the groomed OSV trail, sections would be overland.

2.3.4.5 Construction Traffic

Initial construction activities are estimated to take approximately 2 to 3 years. Traffic associated with mine site construction work would occur year-round, depending upon road and weather conditions. Construction-related traffic and material hauling would be most concentrated from May through November, and personnel would be transported primarily using buses and vans. The total estimated annual average daily traffic (AADT) for construction activities is listed in **Table 2.3-2**. Supplies and deliveries for the mine site during construction would access the SGLF using State Highway 55 to Warm Lake Road and would use State Highway 55 through Cascade and other communities along State Highway 55 south of Cascade including Banks and Horseshoe Bend.

Table 2.3-2 Projected Construction Traffic

Transport	Vehicle Type[1]	Estimated Average No. of Round Trips Per Period[2]	Period[3]	Scheduled Days per Year[4]	Number of Round Trips per Year[5]	Annual Average Daily Traffic[6]
Crew bus/van transport to site	HV	28	14 days	365	730	4
Crew personal vehicles	LV	37	14 days	365	965	6
Salaried employees	LV	5	7 days	365	261	2
Salaried employees bus/van transport to site	HV	1	7 days	365	52	1
Steel and Cement	HV	3	day	152	456	3
Fuel and miscellaneous supplies	HV	2	day	261	522	3
Machine parts and consumables	HV	4	day	261	1,044	6
Pilot vehicle (fuel and hazardous loads)	LV	2	day	261	522	3
Equipment & supply representatives	LV	2	day	261	522	3
Food delivery	HV	2	day	261	522	3
Trash & recyclables	HV	3	7 days	365	156	1
Construction supply	HV	11	day	261	2,871	16
Miscellaneous traffic	LV	4	day	261	1,044	6
Road maintenance	HV	4	day	365	1,460	8
Total HV AADT						**45**
Total LV AADT						**20**
Total AADT						**65**

Tables Source: Midas Gold 2016a

Table Notes:

1 LV = Light Vehicle; HV = Heavy Vehicle

2 The estimated average number of round trips that would occur within a given time period. All figures have been rounded up to whole numbers.

3 The allocated time period.

4 Not all transport phases would occur daily; scheduled days per year indicate the days per year when a trip is expected.

5 The estimated average number of round trips that would occur in a given year.

6 AADT = estimated average number of round trips per period / period x scheduled days per year / 365 days x 2 trips

2.3.4.6 Water Use During Construction

Estimated gross fresh and recycled water usage during components of the construction phase are provided in **Table 2.3-5** in Section 2.3.5.9, Surface Water and Groundwater Management, subsection on Water Use and Water Balance.

2.3.5 Operations Phase Activities and Facilities

2.3.5.1 Mining

Mine operations would occur year-round for approximately 12 years, however, Midas Gold's plan of operations indicates that the mining and ore processing phase could extend from 12 to 15 years. Mining operations would occur in the area of two historical open pit mined areas (Yellow Pine and West End) and one new open pit (Hangar Flats) that includes former underground mining and mineral processing facilities.

OPEN PITS

Three open pits would be mined. **Figure 2.3-2** shows the location and extent of the three pits to be mined. A general sequence for mining, assuming 12 years of mining operations as shown on **Figure 2.3-3**, would be as follows:

- Yellow Pine pit – Year 3 through Year 10
- Hangar Flats pit – Year 5 through Year 13
- West End pit – Year 3 through Year 15

The Yellow Pine pit would be in the northern portion of the mine site, in the same general location as a historical open pit mining area. This area currently has a pit lake created by the EFSFSR flowing through the legacy pit.

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

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

Table 2.3-3 provides a summary of characteristics for each pit.

Table 2.3-3 Summary of Characteristics for Mine Pits

	Yellow Pine Pit	West End Pit	Hangar Flats Pit
Acreage	197	173	140
Bottom Elevation (ft amsl)	5,400	6,220	5,940
Depth (ft) below existing ground surface	460	400	660
Highwall Height Above Valley Bottom (ft)	550 for western highwall 700 for eastern highwall	800 to 1,250 highwalls	1,050 for northwestern highwall
Approximate Tonnage Mined (in million tons)	168	166	102
Disposal of Development Rock	TSF embankment, Fiddle DRSF, Hangar Flats DRSF	West End DRSF, Fiddle DRSF, Yellow Pine DRSF	TSF embankment, Hangar Flats DRSF, Fiddle DRSF

Table Source: Midas Gold 2016a

Table Notes:

ft = feet.

amsl = above mean sea level.

Dewatering of the alluvial and bedrock groundwater would need to occur prior to mining in the open pits. Dewatering would be accomplished by drilling a series of shallow alluvial and deeper bedrock wells located adjacent to the pit perimeters to intercept and pump groundwater before the water reaches the pit. In-pit surface water runoff also would need to be managed during mining. Additional details on pit water management can be found in Section 2.3.5.9, Surface Water and Groundwater Management.

2.3.5.2 Drilling and Blasting

Drilling and blasting would be used to remove ore and development rock from the mine pits. Following drilling, blasting uses explosives to break rock into fragments that are suitable for loading into equipment. An Explosives and Blasting Management Plan would be prepared for the SGP. Explosives storage, transport, handling, and use would comply with applicable Department of Homeland Security, Bureau of Alcohol, Tobacco, Firearms and Explosives, and Mine Safety and Health Administration regulations.

2.3.5.3 Rock Loading and Haulage

The ore would be hauled directly to the primary crusher or the run-of-mine ore stockpile at the ore processing facilities. Development rock (also known as waste rock) would be hauled to the TSF embankment or placed in one of four DRSFs.

2.3.5.4 Development Rock Production and Storage

Daily development rock production would vary based on the mine plan, and the grade and extent of the ore deposit. Approximately 350 million tons of development rock from active mining areas would be excavated and placed into the permanent DRSFs or used for the TSF embankment as described in **Table 2.3-4**.

Table 2.3-4 Development Rock Destination and DRSF Characteristics[1]

	Hangar Flats DRSF	Fiddle DRSF	West End DRSF	Yellow Pine DRSF	TSF Embankment[2]
Location	In Meadow Creek drainage southwest of Hangar Flats pit	In the Fiddle Creek drainage, north of the proposed Hangar Flats pit and south of the Yellow Pine pit	In the West End Creek drainage, east of the proposed West End pit	Backfill into the Yellow Pine pit	In the Meadow Creek drainage west of the Hangar Flats DRSF
Source of Material/ Development Rock	Hangar Flats pit and Yellow Pine pit	Yellow Pine pit, West End pit, and Hangar Flats pit	West End pit	West End pit	Hangar Flats pit, Yellow Pine pit SODA and Hecla heap leach legacy materials
Tonnage (in million tons)	81	68	25	111	61
Acreage	120	155	73	197	88
Height (ft)	460	480	400	460	Initial embankment: 245 Final embankment: 460
Constructed Outslopes (Horizontal: Vertical)	Overall 3:1	Overall 2.5:1	Overall 2.5:1	2.5:1 maximum	1.5:1

Table Source: Midas Gold 2016a

Table Notes:

1 Limited amounts of development rock would be used to construct haul roads, pad areas for site facilities, and the TSF embankment. In addition, some development rock may be crushed and screened for use as road surfacing material and/or concrete aggregate. The Development Rock Management Plan, to be developed once the preferred alternative is identified would specify testing to determine which development rock can be used for these uses.

2 The source of material includes development rock and spent ore from the SODA and Hecla heap, however the relative volume of material to be used in the TSF embankment has not been determined.

For the Hangar Flats, West End, and Fiddle DRSFs, the material would be built up in lifts or layers starting with a base and expanding upward and outward as the facility expands, providing control over material placement and establishing access to upper levels of the facility. The Hangar Flats DRSF would abut the downstream TSF embankment slope (constructed first from development rock) to act as a buttress to the embankment and portions of the DRSF would form part of the tailings embankment (Section 2.3.5.7, Tailings Storage Facility). Midas Gold has conducted geotechnical investigations supporting the design of the DRSFs including the Hangar Flats DSRF abutting the TSF embankment in Meadow Creek.

The Yellow Pine DRSF would be created by backfilling the proposed Yellow Pine pit. After mining of the Yellow Pine pit has ceased, development rock from the West End pit would be end-dumped into the pit as backfill. The dumped development rock would not be mechanically compacted, except as it nears the final reclaimed surface elevation of the backfilled area. The upper lifts of the backfill would be placed by direct dumping and compaction. The final backfilled surface would provide drainage to prevent the establishment of any ponding or a pit lake. Section 2.3.7.5, Yellow Pine Pit/DRSF, contains additional discussion of the backfilled pit and final reclamation configuration.

Surface water and groundwater management for the DRSFs are discussed in Section 2.3.5.9, Surface Water and Groundwater Management. A Development Rock Management Plan, which would provide active management for development rock produced and stored across the mine site during operations, would be prepared as part of the final mine plan.

2.3.5.5 Spent Ore and Legacy Tailings Removal in Meadow Creek Valley

Prior to advancing the Hangar Flats DRSF development rock placement down-valley, Midas Gold would remove and reuse the 7.5 million tons of spent ore within the SODA and other areas (Hecla and Stibnite Mine Inc leach pads) and remove and reprocess the Bradley tailings underlying the SODA. The legacy tailings would be mixed with water and then pumped to the ore processing facilities. The temporary water addition and pumping facility would be an enclosed, heated structure located within the limits of the SODA. The SODA materials would be excavated and hauled to the TSF for use as construction material. The historical Hecla and Stibnite Mine Inc. spent ore heap leach pads also would be excavated and could be used as construction materials. Physical and chemical testing of the legacy material would determine if the material is suitable for construction uses and determine the final placement of the material. If additional legacy materials are encountered during construction they would be removed and hauled offsite to an appropriate disposal facility, placed in the TSF or a DRSF, or left in place, depending on testing to determine physical and chemical suitability.

Any legacy rock material not used for TSF construction purposes or reprocessed would be disposed in a DRSF. Solid waste encountered such as metal, plastic, or wood would be hauled offsite for disposal in a solid waste disposal facility or stored in the on-site solid waste disposal facility located on private land.

2.3.5.6 Ore Processing Facilities

During operations, approximately 100 million tons of ore would be mined from the three proposed pits. At full operation, targeted ore production would range from 20,000 to 25,000 tons per day, which would be transported to the processing facility to separate the gold, silver, and antimony from the mineral rich rock.

Ore would be hauled directly to the primary crusher or the run-of-mine ore stockpile area and would proceed through a series of crushing and grinding steps to reduce the size of the rock to facilitate further processing. The ore processing facility and associated support infrastructure are shown on **Figure 2.3-2**.

The ore processing area would be designed to provide for containment of ore processing materials, chemicals, wastes, and surface runoff. Potentially hazardous chemicals and wastes would be stored within buildings or areas with both primary and secondary containment. Surface runoff within the ore processing area would be directed to a contact water pond for collection. Any leaks or spills escaping primary and secondary containment would flow to the contact water pond for collection and would not discharge off site. Containment for each stage of the ore processing is described below. The ore processing workflow is shown on **Figure 2.3-4**.

The processing would result in production of an antimony concentrate, gold- and silver-rich doré, tailings and other waste products. Tailings disposal is discussed in Section 2.3.5.7, Tailings Storage Facility.

CRUSHING AND GRINDING

Mined ore would be hauled to the crusher and typically direct-dumped into the crusher or stockpiled at the uncovered run-of-mine stockpile area near the crusher. Runoff from the run-of-mine ore stockpile would be captured within the ore processing area and combined with water used in the milling process, see Section 2.3.5.9, Surface Water and Groundwater Management.

Following crushing, additional size reduction of the ore would occur through grinding in a semi-autogenous mill followed by a ball mill. Grinding would occur within an enclosed building to reduce noise levels and facilitate maintenance of the milling equipment. Dust emission controls would reduce dust from crushing, conveying, and stockpiling. Grinding would reduce the ore to the size of fine sand for further processing.

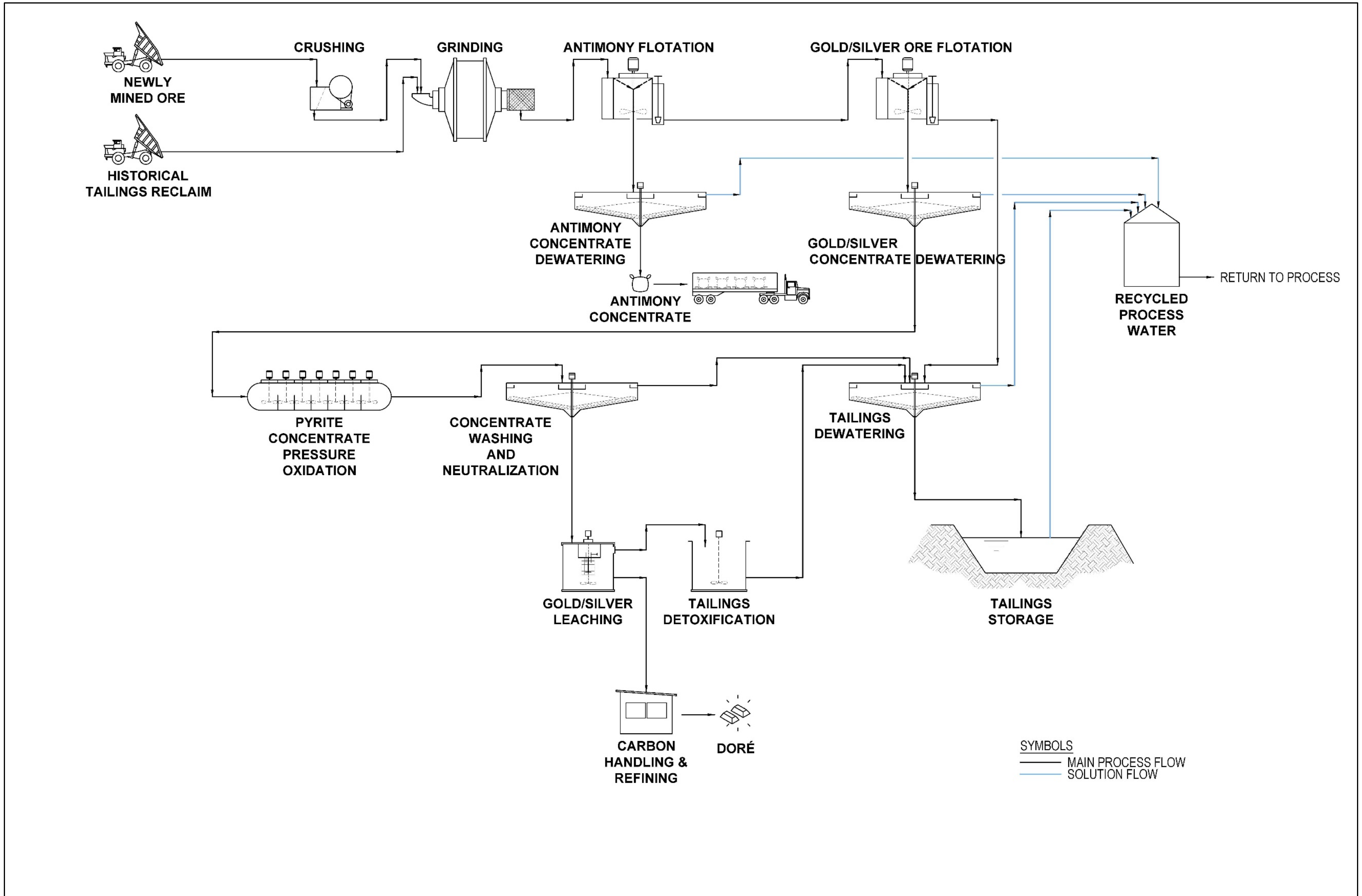

Figure Source: Midas Gold 2019b

Figure 2.3-4 Ore Processing Flowsheet

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ANTIMONY FLOTATION AND DEWATERING

The antimony flotation process would separate the mineral stibnite from the mineralized material feed where antimony grades are sufficient to warrant this step. An estimated 15 to 20 percent of the mill feed would have enough antimony to justify this step. Following grinding, the ground ore would be mixed with water, lime, and sodium cyanide to inhibit flotation of the gold-bearing minerals(pyrite and arsenopyrite). Lead nitrate or equivalent is added and then a sulfur- and phosphate-bearing organic chemical. These chemicals make the antimony-bearing particles hydrophobic where the particles then attach to air bubbles and float to the surface in the flotation tanks. The gold-bearing mineral particles which do not adhere to the bubbles in the flotation tanks would drop to the bottom of the flotation tanks and be routed to the gold flotation circuit for further processing. The antimony flotation facility would have interior curbing high enough to contain 110 percent of the volume of the largest tank.

The surface air bubbles are allowed to overflow, and the overflow is collected. It is further concentrated, and water content is reduced through thickening and filtering before bagging for shipment. The final antimony concentrate is approximately 8 percent water and ready for shipment off-site for further refining.

ANTIMONY CONCENTRATE TRANSPORT

The antimony concentrate would contain approximately 55 to 60 percent antimony by weight. The remaining balance, 40 to 45 percent by weight, of the concentrate includes common rock forming minerals with trace amounts of gold, silver, and mercury. The concentrate would be in 1 to 2 ton super sacks and transported on flatbed trailers from the mine site for off-site smelting and refining. An estimated one to two truckloads of antimony concentrate, containing up to 20 supersacks per truckload, would be hauled off site each day. The antimony concentrate would be transported via Burntlog Route to State Highway 55, and then to a commercial barge or truck loading facility depending upon the refinery location. It is assumed that the concentrate, when sold, would be shipped to facilities outside of the U.S. for smelting and refining because there are currently no smelters in the U.S. with capacity for refining the antimony concentrate.

GOLD AND SILVER FLOTATION

Housed in a steel frame building set on concrete foundations with curbing to provide secondary containment, flotation and leaching would be used to separate the gold and silver from other minerals. The gold and silver flotation facility would have interior curbing high enough to contain 110 percent of the volume of the largest tank. Gold and silver flotation is a process similar to that described for antimony flotation but using different chemicals to float pyrite and arsenopyrite, the minerals that contain the gold and silver. The flotation bubbles, with particles containing gold and silver, are collected and pumped to the concentrate thickener before processing by pressure oxidation. The particles from flotation that do not float become tailings. The gold and silver concentrations of the tailings would be regularly monitored and, if the concentrations are high enough to warrant further processing, they would be sent to the leaching circuit; otherwise, the tailings would be thickened and neutralized then routed to the TSF as described below.

Oxidation and Neutralization

An autoclave (pressure oxidation) system would be used to free the gold and silver from the gold and silver flotation concentrates. The oxidized gold and silver concentrate from the pressure oxidation system would be cooled in tanks. After pressure oxidation the acidic slurry containing gold and silver would be separated and neutralized using slurried lime and other chemicals. The neutralized solution would be sent to the leach circuit for recovery of gold and silver.

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

Gold and Silver Leaching and Carbon Adsorption

Gold and silver leaching and carbon adsorption would occur in a steel frame building set on concrete foundations, with secondary containment of 110 percent of the volume of the largest tank and could include audible alarms, interlock systems, and/or sumps, as spill control measures (Initiative for Responsible Mining Assurance 2018).

The gold and silver leaching component of the recovery process would be designed and operated consistent with the International Cyanide Management Code For the Manufacture, Transport, and Use of Cyanide in the Production of Gold. The leaching to recover gold and silver would occur in large tanks which would be fully contained to capture, retain, and recycle solutions. Sodium cyanide would be added to the tanks containing the neutralized solution to form a gold-cyanide complex and activated carbon would then be added to the tanks to promote the adsorption of the gold-cyanide complex onto the carbon.

The carbon with gold-cyanide complex attached would then be collected on screens and sent to the carbon stripping circuit. Inside sealed tanks, the carbon with the gold-cyanide complex would be washed with an acid solution to remove impurities, rinsed with fresh water, and stripped of the gold under pressure at approximately 190 degrees Fahrenheit using a hot alkaline solution. The resulting gold-bearing solution would be transferred to the electrowinning and refinery area.

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

GOLD AND SILVER ELECTROWINNING AND REFINING

The gold and silver electrowinning and refinery facility is a closed-circuit system with 110 percent containment of the largest vessel. The solution from gold and silver leaching and carbon adsorption would be transferred to electrowinning cells. The gold and silver precipitate would be mixed with flux then placed into an induction furnace and heated. The molten material from the induction furnace, principally gold and silver, would be poured into doré bars. The doré bars would be shipped off site to refineries for further processing and refining.

Air emissions from the induction furnace would be captured in a series of emission controls. Mercury from the induction furnace would be converted to liquid metallic state, and then securely stored prior to shipment to a certified hazardous waste disposal facility.

TAILINGS NEUTRALIZATION CIRCUIT

Cyanide-bearing solutions used in ore processing would be neutralized within the ore processing plant to less than approximately 10 milligrams per liter weak acid dissociable cyanide before the material is pumped to the TSF. Residual cyanide would be treated using a sulfur dioxide and air system to oxidize cyanide to form cyanate. After neutralization, tailings would be routed to one or more tailings thickeners, to partially dewater the tailings. The overflow water solution as the tailings are thickened would be recycled within the ore processing facility. The neutralized tailings slurry would be pumped from the ore processing plant to the TSF.

TAILINGS PIPELINE MAINTENANCE POND

The Tailings Pipeline Maintenance Pond would collect tailings in the tailings distribution and water reclaim pipelines when these pipelines need to be drained for maintenance or during an emergency. The pond would typically be empty except during maintenance or an emergency. The Tailings Pipeline Maintenance Pond would be constructed with a liner system anddesigned to contain the contents of the pipelines and the 100-year, 24-hour storm event plus snowmelt.

2.3.5.7 Tailings Storage Facility

The TSF would be located on NFS lands within the Meadow Creek drainage (**Figure 2.3-2**). The TSF, its embankment, and associated water diversions would occupy approximately 423 acres at final buildout with approximately 405 acres of new disturbance. Midas Gold has conducted geophysical investigations supporting the design of a TSF in Meadow Creek. An overview of the TSF is shown on **Figure 2.3-2**. The TSF at the end of operations would be capable of holding approximately 100 million tons of tailings, the operational water pool, and precipitation falling within the TSF up to the 24-hour Probable Maximum Precipitation event of 11.74 inches of rainfall.

The TSF includes an engineered, rockfill starter embankment. The starter embankment would be constructed to an elevation of approximately 6,850 feet (or approximately 245 feet above the existing ground surface). The final embankment height would be 460 feet.

Historical development (waste) rock, spent ore from the SODA and heap leach areas, and development rock from mine pits would be used for the TSF embankment construction. SODA and other spent heap leach ore would be placed beneath the TSF liner on the upstream face of the embankment or impoundment fill to minimize interaction with infiltrating surface water.

The upstream face of the TSF embankment and the Meadow Creek valley where the TSF facility would be located would include a fully lined engineered impoundment and water management features. The immediately downstream Hangar Flats DRSF would function as a buttress to the TSF embankment and provide additional geotechnical stability (**Figure 2.3-5**). The TSF would be surrounded by an 8-foot high, chain-link fence designed to keep wildlife, such as deer and elk, from entering the impoundment area.

A cyanide neutralization circuit would be used to treat the tailings before transport to the TSF; however, approximately 10 milligrams per liter of weak acid dissociable cyanide could remain in the tailings. The tailings also would contain metals which could leach into the groundwater system. A 60-mil, single-sided, textured, linear low-density polyethylene geomembrane liner (with a secondary geosynthetic clay liner) would be employed to contain the tailings. Before placement of the liner within the TSF, the subgrade would be re-worked and compacted, or a minimum of 12 inches of buffer/liner bedding fill would be placed. Drains placed on top of the linear low-density polyethylene liner (overdrains) would direct water that migrates through the tailings to a sump to be pumped to the tailings supernatant pond for reuse. Underdrains would collect groundwater that surfaces in springs and seeps beneath the TSF and convey the water beneath the TSF liner system and Hangar Flats DRSF. The underdrain flows would be collected in collection sumps, treated if necessary, and then discharged through the outfall on the EFSFSR. Underdrain collection sumps and downgradient monitoring wells would be used for TSF leak detection.

Facilities that use cyanide in their mineral extraction process are required to obtain a permit from the IDEQ and follow the Rules for Ore Processing by Cyanidation (IDAPA 50.01.13). The liner system proposed does not currently meet the regulatory requirements of IDAPA 50.01.13. At the request of the Idaho Mining Association, the IDEQ has entered into rulemaking on the existing regulations to change the regulatory requirements from prescriptive requirements to performance-based requirements. No schedule has been determined for completion of the rulemaking. Midas Gold has indicated that the TSF liner system would be modified to meet the IDAPA regulatory requirements in effect at the time of facility permitting.

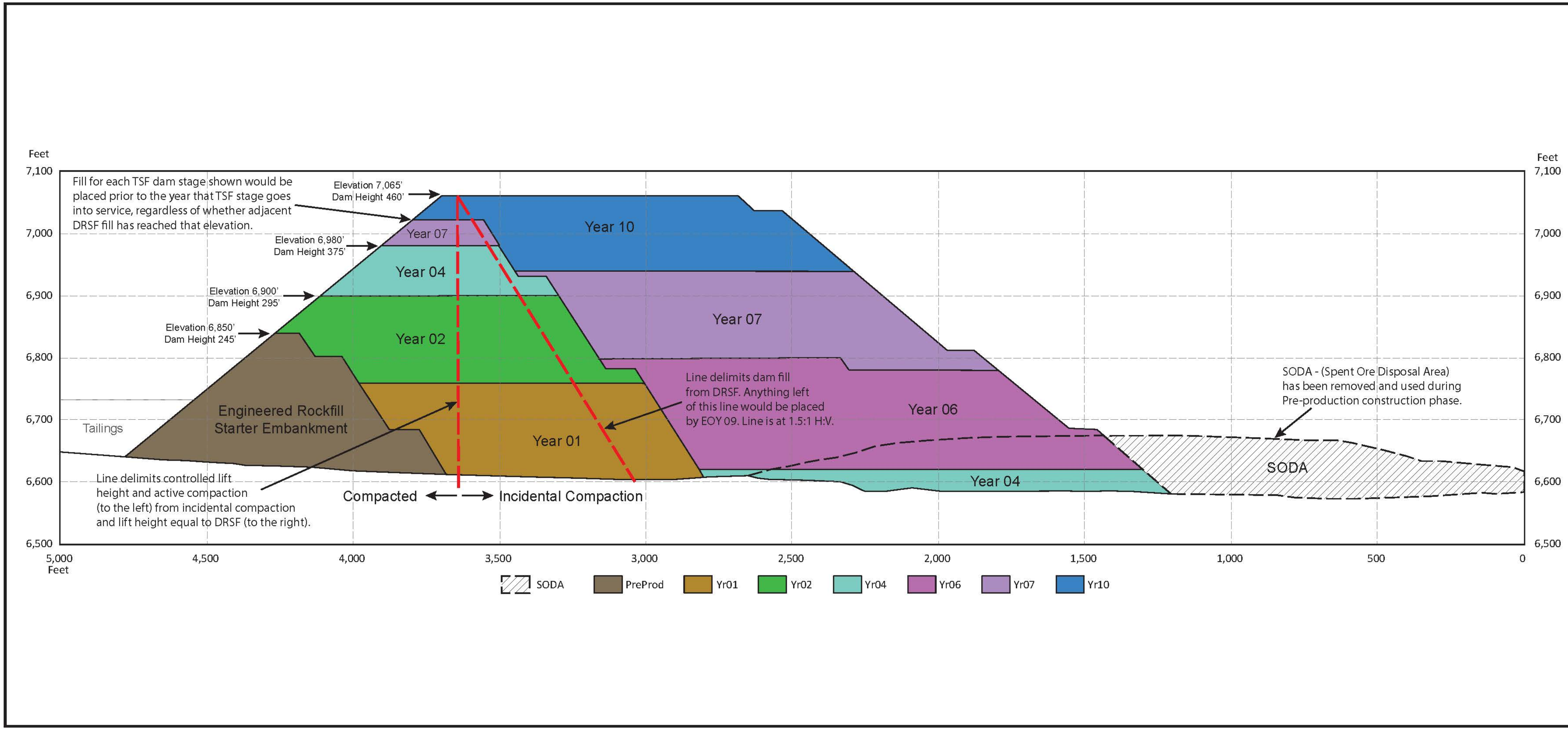

Figure Source: Midas Gold 2016a as modified by Midas Gold 2019c

Note: Years shown on the figure are based on Midas Gold's timeline as discussed In Section 2.3.3, Phasing and Timeline.

Figure 2.3-5 TSF and Hangar Flats DRSF General Cross Section

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TSF UNDERDRAIN SYSTEM

The TSF area would be evaluated for springs and seeps that would need to be conveyed beneath the TSF liner through underdrains. These underdrains would be a series of parallel drains, instead of a single valley bottom drain, due to the broad u-shaped nature of the Meadow Creek valley. Groundwater flowing in the underdrains would be considered contact water because minor leakage has been assumed to occur as a result of liner defects (see Chapter 4, Environmental Consequences; Section 4.9, Surface Water and Groundwater Quality). Prior to discharge, the underdrains would be directed to a dedicated sump, which would connect to the underdrain system upstream of the outlet and the flows would be tested for compliance with applicable standards. If underdrain flow develops, it would be monitored and treated and discharged as appropriate based on water quality.

TSF MANAGEMENT SUPPORT FACILITIES

A haul road would provide access between the ore processing facility and the TSF, and tailings delivery and reclaim water return pipelines would parallel the haul road in a geosynthetic-lined trench to provide secondary containment in the event of a pipeline break. Electrically-powered pumps would be located at the ore processing facility to pump tailings to the TSF.

TSF WATER MANAGEMENT

Thickened tailings slurry would be pumped to the TSF. The TSF would be designed and operated as a closed-circuit, zero-discharge facility meaning no tailings water would be discharged to the surface water or groundwater except in compliance with applicable laws. As the tailings consolidate, water collected in or falling on the surface of the TSF would form the supernatant pond on top of the tailings and be recycled for use in the process facilities. Cyanide levels in the TSF discharge would be monitored throughout operations to ensure they remain in compliance with issued approvals and permits.

2.3.5.8 Mine Support Infrastructure

Infrastructure to support surface mining would include the following:

- A one-story mine administration building that would be sided or painted and roofed in neutral colors.
- A maintenance workshop which would store materials and supplies as discussed in Section 2.3.5.18, Materials, Supplies, Chemical Reagents, and Wastes.
- A truck wash facility which would include an oil/water separation system and water treatment facilities to enable reuse of the wash water.
- A worker housing facility, which would be constructed on NFS lands adjacent to Thunder Mountain Road (FR 50375) and would accommodate up to 500, the expected average workforce. The worker housing facility could include indoor multiuse areas and outdoor recreation facilities such as a sports field and cross-country ski trails across federally-administered land.

- Haul roads which would be required within the mine site to transport ore, development rock, and reclamation materials from mining or storage areas, and to transport vehicles to the maintenance workshop. A typical haul road travelway would be approximately 87 feet wide. The haul roads would be built and maintained for year-round access and would be surfaced with gravel materials. Road maintenance activities would be conducted to manage fugitive dust emissions and maintain stormwater management features.
- Culverts would be installed where haul roads cross drainages or to direct stormwater to collection and retention structures. Culvert inlets and outlets would be lined with rock riprap, or equivalent, as needed to prevent erosion and protect water quality. Crossings of known fish-bearing streams would be constructed to support fish passage, with appropriately designed and constructed culverts or bridges.
- Service roads and trails that would provide an internal access system for employees and visitors to the site. The service roads would typically be 12 to 15 feet wide. Some would be graveled or covered with rock aggregate, while others would be dirt, two-track roads. There would be no planned public use of the mine site service roads or trails. The trail system would enable pedestrian traffic to move safely throughout the mine site operating area. Service roads and trails would be located within the overall disturbance area defined for the mine site and existing roads would be used to the extent possible.
- Employee and visitor parking that would be maintained during construction and operations. During construction, the gravel parking areas would be located at the new worker housing facility, near the contractor/construction laydown areas, and at the Scout Portal. As operations are initiated, gravel parking areas would be maintained for buses, vans, and other miscellaneous vehicles for employees, contractors, vendors, and visitors at the new worker housing facility, at the shop area, and near the mine administration office.

2.3.5.9 Surface Water and Groundwater Management

SURFACE WATER MANAGEMENT

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

Stream Diversions around Mining Features

Streams would be diverted around mine site facilities, such as the open pits, DRSFs, and the TSF; within constructed surface water channels. Stream diversion channels would be either: (1) rock-cut channels along steep slopes and in areas with shallow or at-surface bedrock, or

(2) excavated channels with berms. Channel segments constructed in erodible materials would be lined with riprap to prevent erosion. The rock-cut channels would have low erosion potential and not require riprap lining. Channel segments constructed over fill or excavated in permeable materials would be lined with a geosynthetic liner to prevent seepage. A transition layer of sand/gravel followed by riprap would be placed over the liner for erosion protection.

EFSFSR Temporary Diversion Tunnel

Currently, the EFSFSR flows into and through the Yellow Pine pit lake. The cascade at the inflow to the pit lake currently blocks upstream fish passage. A tunnel would be built to direct the EFSFSR around the west side of Yellow Pine pit to allow mining in the pit (**Figure 2.3-6**). The tunnel would be approximately 0.9 mile long and 15 feet high by 15 feet wide. The tunnel would include a fishway designed to provide for upstream and downstream passage of migratory and anadromous salmonid fish.

The tunnel would be designed so that fish could swim through its entire length in both directions (Brown and Caldwell, McMillen Jacobs and BioAnalysts 2019). To encourage fish passage, low-energy lighting would be installed in the tunnel and set on timers to simulate daylight. A trash rack would be constructed at or near the upstream entrance to the tunnel to prevent large wood and other debris from entering the tunnel. The spaces between the trash rack bars would be sized to allow passage of adult Chinook salmon.

The tunnel fishway would incorporate concrete weirs, designed to produce hydraulic conditions that could be successfully navigated by fish (McMillen Jacobs 2018).

Midnight Creek

The Midnight Creek stream diversion would reroute approximately 0.3 mile of the lower portion of Midnight Creek to the south, away from where it currently enters the Yellow Pine pit lake. The rerouted creek would be piped under a GMS so that it would enter the EFSFSR upstream of the proposed tunnel portal (**Figure 2.3-6**). The Midnight Creek diversion would manage flows in Midnight Creek during Yellow Pine pit operations and backfill activities until the newly developed EFSFSR alignment over the backfilled pit is complete and stabilized as described in Section 2.3.7.5, Yellow Pine Pit/DRSF. The Midnight Creek stream diversion would be designed to convey flows from a minimum 25-year storm event plus 2 feet of freeboard. Culverts would be designed to convey flows from a 100-year storm event (Midas Gold 2019d).

Hennessy Creek

Cased boreholes would be developed and maintained to intercept Hennessy Creek above the current channel and convey the creek flows directly into the EFSFSR tunnel during mining operations (**Figure 2.3-6**). Water would be managed through spacing of drill holes, baffles, energy dissipation structures, rock berms, and other velocity reducing methods to ensure that the fishway in the tunnel is not impeded by excessive turbulence, sediment, or flow introduced from Hennessy Creek. The boreholes entrance would be designed to convey flows from a minimum 25-year storm event plus 2 feet of freeboard.

Fiddle Creek

The Fiddle Creek stream diversion would reroute Fiddle Creek for approximately 1 mile around the Fiddle DRSF (**Figure 2.3-6**); a smaller diversion would route hillslope runoff around the opposite side of the DRSF. The diversions would consist of rock-cut channels in the segments along a steep hillside above the DRSF, and excavated channels and berms. The channels would be designed to convey flows from a minimum 25-year storm event plus 2 feet of freeboard.

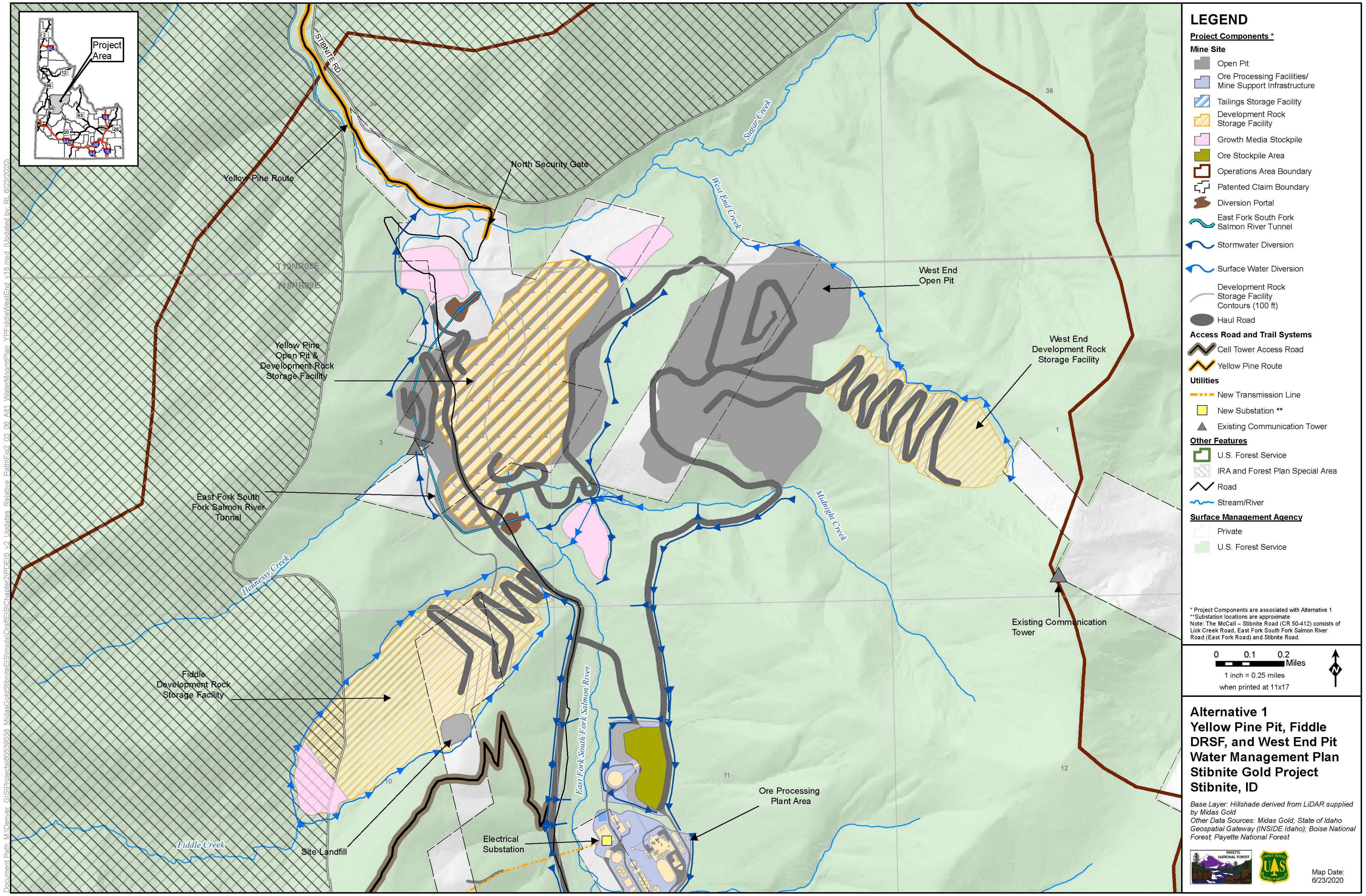

Figure Source: AECOM 2020a

Figure 2.3-6 Alternative 1 Yellow Pine Pit, Fiddle DRSF, and West End Pit Water Management Plan

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West End Creek

The West End Creek stream diversion would reroute the stream around the West End DRSF and West End pit. The approximately 1.5-mile-long diversion would reroute West End Creek around the north side of the legacy West End development rock dumps, West End pit, and West End DRSF (**Figure 2.3-6**). The diversion would consist of a rock-cut channel in the segments along a steep hillside above the West End pit and DRSF, and an excavated channel and berm. The channel would be designed to convey flows from a minimum 25-year storm event plus 2 feet of freeboard. A portion of the diversion could be piped to minimize the potential for erosion on steeply sloping terrain and to avoid historically disturbed mining areas.

Garnet Creek

The current stream channel alignment of Garnet Creek, through the ore processing facility to its confluence with the EFSFSR, would be maintained. Culverts would be used to convey the stream under ore processing facility roads, with best management practices to reduce sediment loading to the stream, and to protect water quality. Culverts would be designed to convey flows from a 100-year storm event.

Meadow Creek

Approximately 2 miles of Meadow Creek would be diverted around the TSF and Hangar Flats DRSF. The Meadow Creek diversion would flow around the south side of the TSF and Hangar Flats DRSF. The diversion would direct flows back into the existing stream channel upstream of the Hangar Flats pit. The diversion would consist of a rock-cut channel in segments along the steep hillsides above the TSF and Hangar Flats DRSF, and an excavated channel with berm. Channel segments excavated in erodible or permeable materials would be lined with rock riprap and/or geomembrane or a liner to prevent erosion and to minimize seepage where needed. The Meadow Creek diversion channel around the TSF and Hangar Flats DRSF would be designed to convey flows from a minimum 100-year storm event with 1 foot of freeboard.

The stream also would be diverted around the Hangar Flats pit. The Meadow Creek channel would be moved away from the pit to the south/southeast toward the valley wall and reconstructed as a sinuous channel and floodplain to allow potential for spawning habitat and establishment of riparian habitat within the floodplain. A liner would be installed under the stream corridor (**Figure 2.3-7**) to minimize water seepage into the Hangar Flats pit or the pit dewatering well system, and to avoid potential pit wall instability or loss of stream habitat as a result of stream dewatering. The Meadow Creek diversion channel/floodplain corridor around the Hangar Flats pit would be designed to convey flows from a minimum 100-year storm event with 3 feet of freeboard.

Blowout Creek

Blowout Creek (East Fork Meadow Creek) was impacted by the failure of a water storage dam in 1965 creating a steep actively eroding channelthat conveys Blowout Creek. Midas Gold proposes to stabilize and repair the failed area of Blowout Creek in the meadow areas upstream of the dam failure area and the eroded channel below. Approximately 0.25 mile of Blowout Creek would be stabilized through a retention structure to raise groundwater levels and a coarse rock drain to address ongoing erosion of the channel side slopes that currently deliver sediment directly to the creek.

During construction and early mining, Midas Gold would construct grade control and water retention features near the old reservoir water retention dam locationto elevate the groundwater level and stream water surface sufficiently to restore wetland hydrology in the surrounding meadow. The retention structure would function like a beaver-dam impounded system, slowly filling with sediment over time. A coarse rock drain would be constructed within the chute downstream of the failed dam to isolate the flow of Blowout Creek from the actively eroding chute side slopes and to prevent further erosion of the gully bottom. **Figure 2.3-7** shows the location of the coarse rock drain.

As the rock drain fills with sediment, it would become closed off from the stream channel. If the Blowout Creek coarse rock drain has not silted-in at the end of mine operations, additional fill would be added over the rock drain. The rock drain would be disconnected from surface inflow at the upstream end through excavation and replacement with less-permeable materials, or by grouting. The existing alluvial fan, located adjacent to Meadow Creek, would be removed, mostly during mine operations for borrow materials, and the area reclaimed.

Non-Contact Stormwater Diversions

Non-contact stormwater is meteoric water (i.e., precipitation) that does not contact tailings, open pits, DRSFs, spent heap leached ore and tailings from past mining operations, or any other mining related surfaces. Stormwater runoff from undisturbed areas upslope of mine features in the major drainages would be captured in the stream diversion channels described above or in other channels that would direct runoff away from disturbed areas. Smaller-scale diversion channels or earthen berms would be used, where necessary, to divert stormwater around other mine infrastructure.

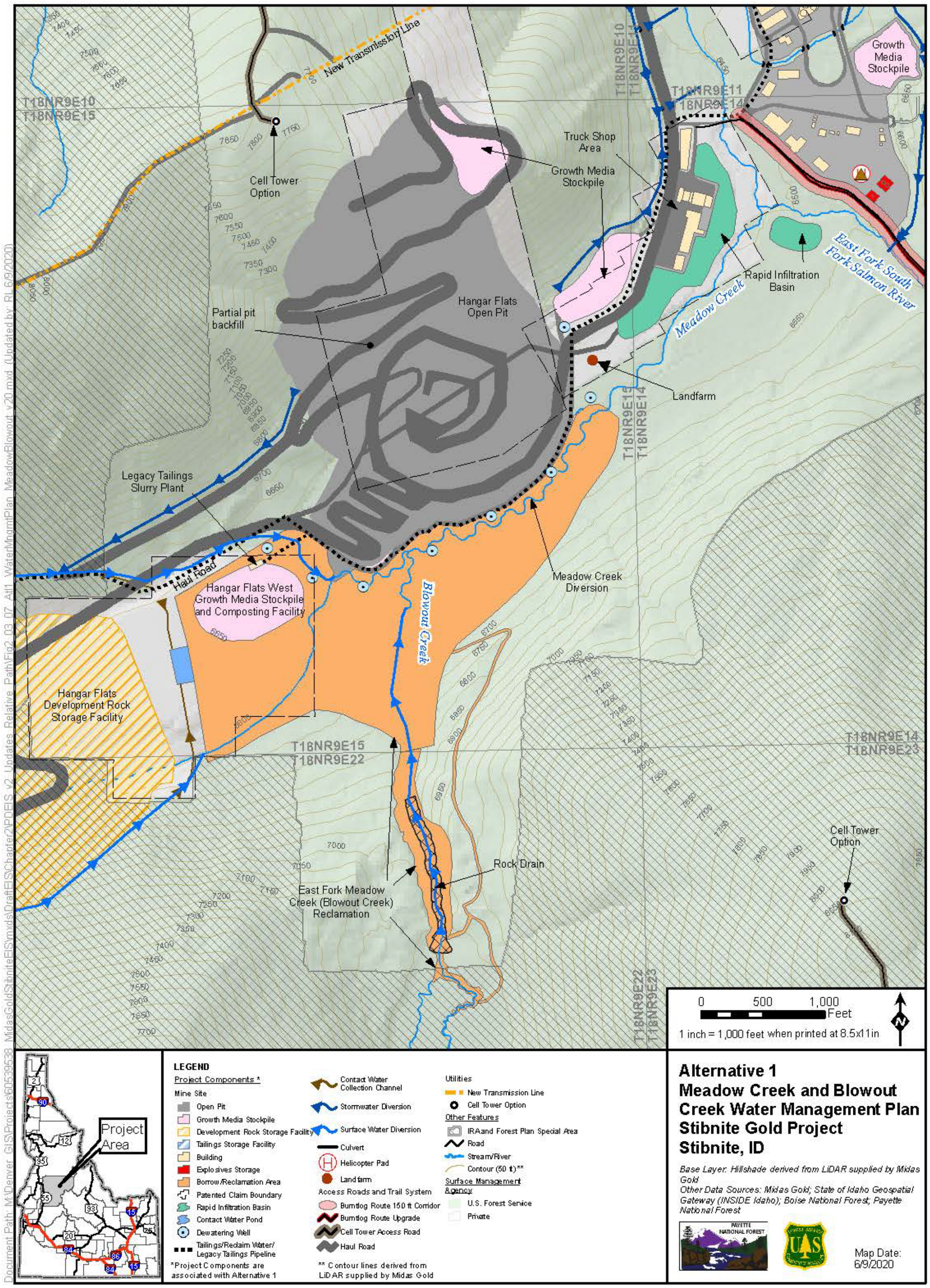

Figure Source: AECOM 2020a

Figure 2.3-7 Alternative 1 Meadow Creek and Blowout Creek Water Management Plan

Non-contact water would be managed with features to reduce erosion and sediment delivery to streams within the mine site. Non-contact stormwater diversions would discharge directly into the stream system, with erosion control and energy dissipation features. Where sedimentation is a concern, non-contact water stormwater diversions would be routed to sediment catch basins where the water can evaporate, infiltrate, or discharge into the stream system. Energy dissipation structures would be installed at the non-contact surface water diversion outfalls as needed.

Contact Water

Water that contacts mining disturbances and has the potential to impact water quality is termed contact water. Contact water includes, but is not limited to, runoff from mine facilities such as DRSFs, mine pits, haul roads constructed of development rock, toe seepage of precipitation infiltrating through the DRSFs, and underground exploration water. Collection of contact water would begin during the first year of on-site construction and would continue throughout operations and the closure and reclamation periods. Contact water would be collected and routed to contact water storage ponds. Contact water storage ponds would be lined to minimize leakage. Water in the contact water storage ponds could be pumped to the ore processing facility for use, treated and discharged in accordance with applicable requirements, or evaporated. Contact water in the mine pits (mine drainage) would be directed to in-pit sumps in the lowest part of the pit and piped to the mill for use as makeup water for the ore processing circuit, to other contact water storage ponds, to water treatment or evaporation, or into trucks for spraying for dust control within open pits and DRSFs. Any contact water used in the ore processing or for dust control would require water rights permitting through the Idaho Department of Water Resources (IDWR) prior to use. Contact water which exceeds regulatory discharge standards set by IDEQ and that cannot be used in ore processing or for dust control could be disposed through forced evaporation using sprayers located within the TSF or other managed areas or treated, if necessary, to meet IPDES standards and discharged through the permitted outfall to the EFSFSR.

Surface Water Outfalls

One IPDES surface water outfall would be permitted at the Ore Processing Area and would discharge treated contact water. The outfall would discharge to the EFSFSR. A second proposed outfall location would be at the worker housing sanitary wastewater treatment facility. Each outfall would be permitted through IDEQ and would be required to meet discharge limits and regulate the rate of discharge.

Draining the Yellow Pine Pit Lake

Development of the Yellow Pine pit would require draining of theYellow Pine pit lake prior to the start of mining. Draining of the pit lake would begin during construction. After the EFSFSR diversion tunnel is constructed and operational, the upstream end of the Yellow PIne pit lake would be closed. Once the water level falls below the outlet, the water would be pumped from the pit lake using a shoreline or floating intake to avoid disturbance of sediment that has settled at the bottom of the pit. The water would be discharged to the EFSFSR with appropriate turbidity controls as needed. Appropriate best management practices will be employed under Midas Gold's Multi-Sector General Permit, if necessary. Once mining operations commence in the Yellow Pine pit, any remaining water would be handled as contact water.

GROUNDWATER MANAGEMENT

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

Groundwater Spring and Seep Control

Underdrains beneath the DRSFs and the TSF would convey groundwater from seeps and springs beneath the facilities. The underdrains also would promote geotechnical stability by preventing saturation and excessive pore water pressure in overlying fill. For the TSF impoundment, the underdrain system also would protect liner integrity by preventing hydrostatic uplift on the liner.

The underdrains would be designed to follow major drainages, under each facility and would run the length of the DRSFs and TSF. The DRSF underdrains would be constructed of pipe or gravel wrapped with geotextile. Only inert materials, with limited potential to generate acid or leach metals would be used in the underdrain construction. The underdrains would convey spring and seep flows beneath the facilities to a collection sump at the DRSF toe where the flows would be monitored for water quality prior to release into the stream system or capture for use in the processing circuit, depending on water quality. Sampling would be from a dedicated sump (manhole) in line with the underdrain pipe upstream of the outlet.

Pit Dewatering

Lowering the water table in and surrounding the Yellow Pine, Hangar Flats, and West End pits would increase pit wall stability and provide dry working conditions in the pit bottoms. Dewatering mine pits would be accomplished by drilling a series of shallow alluvial and deeper bedrock wells adjacent to the pit perimeters to intercept and pump groundwater before the water reaches each pit. Yellow Pine pit and Hangar Flats pit dewatering wells would be situated primarily within the alluvium of portions of the EFSFSR and Meadow Creek valleys, respectively, to limit alluvial groundwater inflow to the pits and maintain stability of the pit walls.

West End pit dewatering would not be needed until the West End pit is mined below the level of West End Creek. The West End pit is primarily in bedrock with only a thin layer of alluvium in the vicinity of the pit and no alluvial dewatering is planned for that pit.

Groundwater pumped from pit dewatering would be managed by pumping to the ore processing plant with excess water not used at the plant pumped for discharge to the RIBs.

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

Groundwater not captured by the pit dewatering would be directed to an in-pit sump in the lowest part of the pit where it would combine with mine drainage (i.e., contact water) from precipitation falling within the pit. The combined groundwater and mine drainage water could be used for dust control within the pits, or transferred to a contact water pond.

Rapid Infiltration Basins

RIBs are a system of unlined, excavated, or constructed basins allowing for the quick infiltration of water into the underlying alluvial groundwater. Two RIBs are proposed in the alluvial material downstream of Hangar Flats pit near the confluence of the EFSFSR and Meadow Creek (**Figure 2.3-2**). The RIBs would be used to dispose of excess groundwater from the pit dewatering as needed. The RIBs would be fully contained basins with no direct surface water discharges under normal operations. Because the RIBs would be located within alluvium, some interaction between the discharge water and surface water would be expected to occur. Infiltration testing would be performed to determine appropriate infiltration rates for the RIBs.

Use of RIBs is considered a discharge to groundwater and requires permitting through the IDEQ under Idaho's Groundwater Quality Rule (IDAPA 58.01.11). According to IDEQ, permitting of RIBs may fall under a wastewater reuse permit; however, there could be potential groundwater - surface water connections. In such cases, these discharges may be permitted under an IPDES permit. IDAPA 58.01.11.150.03, Ground Water-Surface Water Interactions, requires that contaminates entering groundwater cannot impair the surface water beneficial uses. Considerations when assessing whether a groundwater discharge requires coverage under IPDES would include, but would not be limited to, distance and time of travel, pollutants of concern alteration during transit, pollutants of concern concentrations, and other considerations. Monitoring requirements would be part of the IDEQ issued permit and/or a separate water rights permit issued by IDWR.

WATER USE AND WATER BALANCE

The water balance is an estimate of inflows and outflows for various components of a system. Actual volumes for water balance inputs and outputs could vary seasonally and annually from the volumes estimated. A water balance flow diagram for the mining and ore processing operations phase is provided in **Figure 2.3-8** with components of the water balance described below.

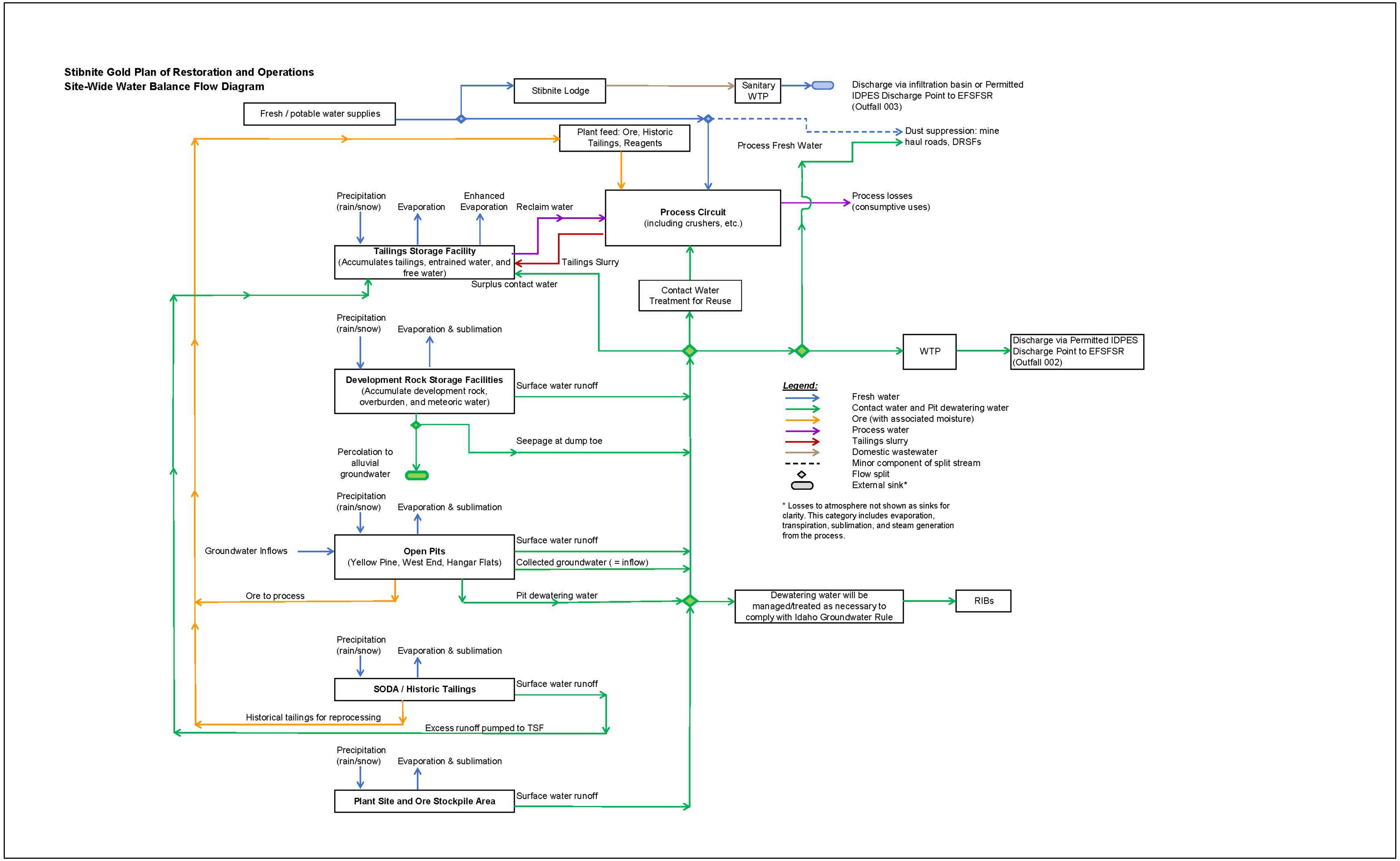

Figure Source: Midas Gold 2019e

Figure 2.3-8 Alternative 1 Water Balance Flow Diagram (Operations)

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Water Use and Supply

Water would be required for ore processing, surface and underground exploration, dust control, and potable use. Water for industrial and mining uses would be supplied from water pumped from the groundwater wells located around the Hangar Flats, Yellow Pine and West End pits; contact water storage ponds; and process water recycled within the ore processing and tailings circuit. Dedicated wells would provide potable water for worker consumption and sanitary use. Projected water use for the SGPis described in **Table 2.3-5**.

Table 2.3-5 Estimated Gross Fresh and Recycled Water Usage[1] in Gallons Per Minute

Component	Construction and Start-Up	Operations	Closure and Reclamation
Underground[2] and surface[3] exploration	50	50	0
Surface dust control (seasonal basis)[4]	208	416	104
Ore processing including tailings storage[5]	0	4,100	0
Potable or domestic use[6]	26	12	4
Sub-Total Use	**284**	**4,578**	**108**
Contingency (10%)	28	458	11
Total Estimated Use[7]	**312**	**5,036**	**119**

Table Source: Midas Gold 2016a

Table Notes:

1 Usage projections are best estimates using currently available information. Gross numbers do not account for recycling of process and other collected water, which would continually be recirculated.

2 Underground usage mainly for dust control, washing walls, removal of drill cuttings, and cooling the drill bits. Any runoff from these activities would be allowed to infiltrate in the underground mine. If infiltration rates are too slow to adequately dissipate the water, it will be pumped to the surface and sent to the reclaim water tank.

3 Water is used to lubricate drill bits and drill rods of the exploration drill rigs.

4 Assumed that during operations, two 15,000-gallon capacity water trucks apply their full water load in 1 hour for 15 to 20 hours per day during dry periods of the year. Usage is assumed to be half that of mine operations during construction, and one-fourth the operations usage during closure and reclamation. Water usage for dust control could be reduced through the application of dust control chemicals.

5 The major water use would be for ore processing facility operations, and this value represents the estimated water usage. Following initial start-up, water can be recycled back to the ore processing facility from the TSF pond and reduce the amount of fresh water make-up. It is anticipated that, on average, 20% (approximately 890 gpm used in the ore processing facility) would be fresh water make-up, while the remaining process water would be recycled from within the ore processing facility itself, contact water collection points, and/or from the TSF. The total water consumed by the process averages approximately 2,300 gpm over the life of the mining operation (included in the 4,100 gpm total above), and includes water entrained with the tailings, evaporated from the TSF, and evaporated or chemically combined in the process reactions.

6 Potable water demands are estimated based on 50 gallons per day per person usage on site.

7 Storage volumes and flow capacity would be available for fire suppression, but this water would only be used in emergency situations and is not accounted for under daily gpm values.

As shown in **Table 2.3-5**, ore processing facility operations would represent approximately 80 percent of water use associated with the SGP. Most of the water used for ore processing operations would be recycled from within the ore processing facility, and the supernatant pond at the TSF. The remaining water required for the ore processing facility would be fresh water, referred to as makeup water from collected contact water when available, and from pit dewatering wells. A separate wellfield of up to five wells would be developed in the EFSFSR drainage adjacent to the worker housing facility to provide potable water for the housing facility. The use of groundwater from pit dewatering, contact water from precipitation runoff, and development of a separate wellfield for potable water at the worker housing facility would require permitting through the IDWR as new water rights or transfer of the point of use for one of Midas Gold's existing water rights (see Section 3.8.3.3, Water Rights, for a discussion of existing water rights).

Water Balance

The water balance is an accounting of water inflows and outflows for various components of the mining and ore processing system. Actual volumes for water balance variables could vary seasonally and annually from the volumes estimated. A water balance flow diagram for the mining and ore processing operations phase is provided in **Figure 2.3-8** with components of the water balance described below.

Water for Ore Processing

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

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

The freshwater tanks could store approximately 360,000 gallons of water; 240,000 would be available for process uses, and the remaining 120,000 gallons would be maintained for fire suppression only. The use of water in the mining and ore processing operations would require permitting and approval of water rights from IDWR. The stormwater runoff contact water would be directed to a variety of equalization ponds. From there, the water would be directed to the process circuit for ore processing.

Water at the TSF

Inflows to the TSF include tailings slurry, and precipitation. The TSF would store tailings solids, water entrained with the tailings, and free water atop the tailings (supernatant pond). Stormwater falling directly on the TSF and water from the supernatant pond, that forms as the tailings consolidate, would be stored in the TSF and reclaimed for ore processing. Water infiltrating to the base of the TSF would be captured by the liner, enter a sump, and be pumped back to the supernatant pond. The volume of available reclaim water would be influenced by the ore processing volumes, precipitation, and evaporation. The reclaim water would be pumped from the TSF to the reclaim water tank located at the ore processing facility.

Contact Water

Water from precipitation (meteoric) water that contacts tailings, open pits, DRSFs, spent heap leached ore and tailings from past mining operations, and other mining related surfaces would be collected and used, to the extent possible, in mining and ore processing activities as makeup water for the ore processing circuit or for dust control. Contact water that cannot be used would be treated, if needed to meet applicable IPDES permit limits, prior to discharge. Inflows to the contact water component include DRSF runoff and toe seepage, pit wall runoff, water from underground exploration activities, runoff from processing facilities, in-pit haul roads, and direct precipitation on contact water storage ponds. Outflows from the contact water component include makeup water for ore processing, evaporation (including forced evaporation), dust suppression on in-pit haul roads and on DRSFs, and discharge following treatment, if necessary.

Pit Dewatering

Development of the mine pits would require dewatering to limit groundwater inflow to the pits and maintain stability of the pit slopes. Water from pit dewatering could be used as makeup water in ore processing operations, used for dust suppression, or discharged to the RIBs.

Water for Potable Use

Potable water would be needed for worker consumption and sanitary use. Groundwater would be the primary source of water for potable use at the mine site. An existing well located near the exploration camp in the EFSFSR drainage would be used to supply an independent water circuit, along with a separate wellfield in the EFSFSR drainage adjacent to the worker housing facility. Wells also would be drilled for potable water use at the Landmark Maintenance Facility and the SGLF. Midas Gold would apply to IDWR for water rights for these wells.

Other Water Uses

Other water uses associated with the SGP include dust control, exploration, and fire protection. Contact water could be used for dust control within disturbed areas such as the DRSFs and mine pits. In some areas, water volumes necessary for road dust suppression would be reduced by using dust control chemicals, such as magnesium chloride or lignin sulfonate. Water also would be used to support both surface and underground exploration activities. Fire suppression would be facilitated through fresh water storage tanks and hydrants.

WATER TREATMENT

For Alternative 1, evaluation of water treatment is ongoing and would continue to be refined to include the waters that could be expected to require treatment; the number of water treatment systems needed and throughput of each system; the type of systems needed; expected treatment levels; and how waste sludges would be disposed. Water potentially requiring treatment at the mine site during operation could include contact water from the mine pits and from DRSFs, toe seepage, and sanitary wastewater (Midas Gold 2019a). Additional water treatment that could be required during post-closure is discussed in Section 2.3.7.15, Post-Closure Water Treatment. Permit discharge limits would be developed according to IDEQ and CWA requirements and the limits would be established by the IPDES permit issued by the IDEQ. The sources proposed for operational water treatment by Midas Gold include:

- Contact water from Yellow Pine, Hangar Flats, and West End pits;
- Stormwater runoff from the Fiddle and Hangar Flats DRSFs; and
- Toe seepage from the Fiddle DRSF.

The conceptual water treatment system during operations would be an active treatment system at the ore processing area using either iron coprecipitation or reverse osmosis. Final treatment system selection, design, and operational throughput are under evaluation. The water treatment system would discharge to the EFSFSR through an outfall that would be permitted through IDEQ under the IPDES program.

2.3.5.10 Sanitary Waste Handling Facilities

Sanitary waste handling facilities would be present at mine site facilities and would be constructed and operated in accordance with Valley County, IDEQ, and Idaho Department of Health and Human Services standards.

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

On-site composting facilities would be permitted by IDEQ with oversight by the local Health District. These composting facilities would be fenced and located adjacent to multiple GMSs, which would provide easy mixing of completed compost into GMSs and reduce the need for re-handling and transportation of compost.

Any materials that cannot be composted or recycled would be collected in wildlife-resistant receptacles. Waste materials would either be hauled off site for disposal or be placed in an approximately 4-acre on-site landfill located within a patented mining claim on the Fiddle DRSF.

No materials meeting the definition of municipal or hazardous waste, nor any waste that could produce pollutants or contaminants that could travel off site would be placed in this facility. The on-site landfill would be designed to meet non-municipal solid waste landfill regulations (IDAPA 58.01.06).

2.3.5.12 On-site Landfarm

A landfarm (i.e., a biological waste treatment process for treating hydrocarbon contaminated soils via spreading and tilling/aerating) would be maintained on approximately 2 to 3 acres of private land. The landfarm and materials to be added would be sampled, characterized, constructed, operated, and monitored in accordance with all applicable local, state, and federal regulatory requirements.

2.3.5.13 Mine Site Borrow Sources

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

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

- The alluvial and glacial soils in the Meadow Creek valley floor within the footprint of the TSF, Hangar Flats DRSF, and Hangar Flats pit;
- The outwash soils in the lower Blowout Creek alluvial fan; and
- Glacial soils in the Fiddle Creek valley walls, within the footprint of the Fiddle DRSF.

2.3.5.14 Access Roads

Once it is completed during the construction phase, access to the mine site, mine activities and facilities would be via the Burntlog Route. Burntlog Route would be necessary for mining purposes, and would meet 36 CFR Section 228, Part A requirements. Public use would be allowed on Burntlog Route when other public access roads are blocked by mine operations. As described above (Section 2.3.4.3, Access Roads), up to eight borrow sites established during the construction phase would meet ongoing road maintenance requirements throughout the operations, closure and reclamation phases of the SGP.

2.3.5.15 Public Access

During operations, in Alternative 1, there would be no public access through the mine site. Stibnite Road (CR 50-412) and Thunder Mountain Road (FR 50375) would be closed near the confluence of Sugar Creek and EFSFSR, southeast through the mine site. Public use of Burntlog Route would provide motorized access to Meadow Creek Lookout Road (FR 51290) and Monumental Summit. Other routes to be made available for public use are shown on **Figure 2.3-1** and include the OHV trail from Horse Heaven/Powerline Road to Meadow Creek Lookout Road, and use of a groomed OSV trail using Cabin Creek Road to replace the lost access resulting from closure of the OSV trail from Warm Lake to Landmark during operations (see Section 2.3.4.4, Public Access During Construction).

During the operations phase (and during closure and reclamation) public access by foot or on roads would be restricted within the Operations Area Boundary shown on **Figure 2.3-1** and **Figure 2.3-2**. Security personnel, fencing (including wildlife exclusion fencing), and signs would restrict public access to the facilities and roadways inside the Operations Area Boundary.

2.3.5.16 Utilities

The SGP would require electricity to power the mine site and supporting infrastructure and facilities. Idaho Power Company would construct a new transmission line from the new Johnson Creek substation to the mine site, partially within a previously used transmission line right-of-way (ROW), to supply electric service to the mine site. Additional transmission line and substation upgrades would occur outside of the mine site and would be considered connected actions, discussed in Section 2.3.10, Connected Actions. Additional details regarding utilities necessary for SGP operations are addressed below.

TRANSMISSION LINES

Idaho Power Company would construct a new approximate 8.5-mile, 138-kV line from the new Johnson Creek substation to a new substation at the mine site. The ROW for the new transmission line would be approximately 100 feet wide. At the mine site, transformers would reduce the voltage to 24.9 kV for distribution to facilities through the new 24.9-kV electrical lines within the mine site. Individual mine infrastructure would receive power through overhead distribution lines or underground conduits.

Construction, operation, and maintenance of the transmission line would require use of Horse Heaven Road (FR 416W) and NFS Trail 233 (Horse Heaven Meadow), and construction of approximately 4 miles of new spur roads to transmission line structures. Maintenance of the transmission line also would require minor upgrades to Cabin Creek Road (FR 50467).

ELECTRICAL SUBSTATIONS

A new substation (Johnson Creek substation) would be built approximately 0.7 mile south of the Johnson Creek airstrip on NFS lands to provide electricity to the mine site. Another new substation would be constructed at the mine site to reduce the voltage to 24.9 kV for distribution (**Figure 2.3-1**).

COMMUNICATION TOWERS AND REPEATER SITES

Midas Gold installed a microwave relay tower in 2013, located on private land atop a 9,000-foot peak to the east of the mine site, for communications at the mine site. The existing microwave relay tower would be upgraded by anchoring the existing tower pad; extended the tower 20 feet in height; upgrading the antenna by adding a dish or second antenna; and installing new high frequency radios capable of increasing bandwidth to 1,000 megabits per second. The existing microwave relay tower is shown on **Figure 2.3-1**.

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

A series of very high frequency radio repeaters would be placed along the Burntlog Route as needed. The repeaters would be placed near the existing Meadow Creek Lookout and Thunderbolt Lookout communication sites (or alternatively a combination of repeaters could be placed at a high point near Trapper Creek-Burntlog Road intersection), the new Landmark Maintenance Facility, and on private parcels at the mine site, as needed. The 10-foot towers on 3-foot by 3-foot concrete pads would be supported by solar panels, support hardware, and a backup battery case. Each site would be accessed annually (at a minimum) or as required for maintenance. No additional disturbance for equipment installation or access would be required.

A cell tower also would be installed to facilitate area communications. The proposed cell towers would be approximately 60 feet tall and would include surface disturbance of approximately 30 feet by 60 feet and an access road. Three alternative cell tower locations include near the Meadow Creek Lookout, on a summit east of Blowout Creek drainage, or near the proposed transmission line alignment upslope of the Hangar Flats pit.

2.3.5.17 Offsite Facilities

Midas Gold would require offsite facilities to support mine-related activities. Administrative offices, a transportation hub, and warehousing and assay laboratory would be located at the proposed SGLF, while road maintenance and snow removal activities would be supported from the proposed Landmark Maintenance Facility.

STIBNITE GOLD LOGISTICS FACILITY

The SGLF would be located along Warm Lake Road on private land (approximately 7 miles northeast of Cascade), with access to State Highway 55 (**Figure 2.3-1**). The SGLF would require approximately 25 acres of disturbance to accommodate employee parking, an assay laboratory building, a core sampling logging storage facility, warehouses, laydown yards, equipment inspection areas, a truck scale, and an administration building for Midas Gold personnel. The parking and assembly area would accommodate approximately 250 light vehicles for employees using bus or van pooling to the mine site. Midas Gold would mandate the use of busing and vans for employee and contractor transportation to the mine site.

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

The SGLF would require a domestic groundwater well to service the facility. This well and associated water right would require permitting through the IDWR.

LANDMARK MAINTENANCE FACILITY

The Landmark Maintenance Facility would be located on NFS land near the intersection of Warm Lake and Johnson Creek roads, it would be accessed via Warm Lake Road. The maintenance facility would house sanding/snowplowing trucks, snow blowers, road graders, and support equipment. The facility would include three buildings: a 7,000-square-foot maintenance building; a 7,000-square-foot aggregates storage building; and a 4,050-square-foot equipment shelter.

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

Additional features of this facility could include covered stockpiles of coarse sand and gravel for winter sanding activities; temporary or emergency on-site housing for road maintenance crews during periods of heavy snow removal needs and other winter maintenance activities; and communications equipment. Midas Gold would coordinate with the BNF to determine the potential for housing of personnel and equipment during winter maintenance operations at the BNF's Landmark Ranger Station.

2.3.5.18 Materials, Supplies, Chemical Reagents, and Wastes

Table 2.3-6 lists the major materials, supplies, and chemical reagents to be used, including fuel, explosives, and ore processing reagents. A Spill Prevention, Control, and Countermeasures Plan would be developed to establish procedures for responding to accidental spills and releases of petroleum products. In addition, a Hazardous Materials Handling and Emergency Response Plan would be developed to address procedures for responding to accidental spills or releases of hazardous materials to minimize health risks and environmental effects.

DIESEL FUEL, GASOLINE, AND PROPANE

Aboveground storage tanks at the mine site would be used for fuels and other fluids, including gasoline, diesel fuel, lubricants, coolants, hydraulic fluids, and propane. Approximately 200,000 gallons of diesel fuel, 10,000 gallons of gasoline, and 30,000 gallons of propane would be stored at the mine site (**Table 2.3-6**). Storage management would be outlined in a Spill Prevention, Control and Countermeasures Plan required for the mine site under Section 311(j)(1)(C) of the CWA. The storage tank facility for gasoline, diesel fuel, and propane would be located near the maintenance workshop with additional propane storage at the ore processing facility area, the underground portal area, and the worker housing facility.

Table 2.3-6 Proposed Materials, Supplies, and Reagents

Common Name	Units	Annual Use	Delivery Form	Typical Vehicle Payload	On-site Storage Capacity	Storage Method	On Site Mine Uses	Estimated Deliveries per Year
Diesel Fuel	Gallons	5,800,000	Bulk liquid	10,000	200,000	Tanks	Mine Site	580
Lubricants	Gallons	296,000	Bulk liquid	3,000	30,000	Tanks, Totes, Drums	Truck Shop	99
Gasoline	Gallons	500,000	Bulk liquid	5,000	10,000	Tanks	Mine Site	100
Antifreeze	Gallons	40,000	Bulk liquid	3,000	4,000	Tanks, Totes, Drums	Truck Shop	13
Propane	Gallons	560,000	Bulk liquid	6,000	30,000	Tanks	Buildings	93
Solvents	Gallons	1,000	Bulk liquid	200	1,000	Totes or Drums	Truck Shop	5
Tires	Each	246	Bulk solid	Variable	59	Laydown	Mining	47
Batteries	Units	Variable	Pallets	Variable	500 units	Pallets	Mining	25
Light Ballasts	Pounds	~25	Pallets	Variable	1,000	Pallets	General Operations	5-10
Pesticides/ Insecticides	Pounds	~250	Pallets	Variable	1,000	Pallets, drums	General Operations	1
Herbicides	Pounds	~1,000	Pallets	Variable	2,000	Pallets, drums	Environmental	1
Fertilizer	Pounds	~2,500	Pallets	Variable	5,000	Pallets, drums	Reclamation	1
Ammonium Nitrate	Tons	7,300	Bulk solid	24	200	Secured Silos	Open Pits - blasting	304
Explosives (1)	Tons	100	Boxes	5	20	Secured Magazines	Open Pits - blasting	20
Grinding media (steel balls)	Tons	10,000	Bulk solid	24	200	Bins	Mine Process Area	417
Crusher and grinding liners	Tons	3,200	Bulk solid	24	50	Bins	Mine process Area	133
Sodium Cyanide	Tons	3,900	Bulk containers	24	300	Tanks, bins	Mine Process Area	163
Lime	Tons	70,000	Bulk solid	24	4,000	Silos	Mine Process Area	2,917
Activated carbon	Tons	470	Super sack solid	10	50	Bins	Mine Process Area	47
Copper sulfate	Tons	2,500	Bulk solid (crystal)	15	100	Bins or Tanks	Mine Process Area	167

Common Name	Units	Annual Use	Delivery Form	Typical Vehicle Payload	On-site Storage Capacity	Storage Method	On Site Mine Uses	Estimated Deliveries per Year
Lead nitrate	Tons	700	Bulk solid (crystal)	10	25	Bins or Tanks	Mine Process Area	70
Aerophine 3418A	Gallons.	10,000	Bulk liquid	200	300	Tanks	Mine Process Area	50
Methyl isobutyl carbonyl	Gallons	55,000	Bulk liquid	3,000	6,000	Tanks	Mine Process Area	18
Flocculent (Unnamed)	Tons	600	Dry Super-sacks	15	50	Bins	Mine Process Area	40
Sodium metabisulfite	Tons	14,000	Bulk solid	24	500	Bins	Mine Process Area	583
Potassium amyl xanthate	Tons	1,700	Bulk solid	15	40	Bins	Mine Process Area	113
Sodium hydroxide	Tons	300	Bulk solid	10	20	Bins	Mine Process Area	30
Nitric acid	Gallons	115,000	Bulk liquid	3,000	6,000	Tanks	Mine Process Area	38
Scale control reagents	Pounds	5,000	Bulk liquid	500	500	Tanks	Mine Process Area	10
Sulfuric acid	Gallons	60,000	Bulk liquid	3,000	8,000	Tanks	Mine Process Area	20
Hydrogen peroxide	Gallons	30,000	Bulk liquid	4,000	10,000	Tanks	Mine Process Area	8
Sodium hypochlorite	Pounds	1,000	50-pound bags	1,000	1,000	Dry Stacked	Water treatment	1
Magnesium chloride	Gallons	250,000	Bulk liquid	4,500	20,000	Tanks	Road surfaces	56

Table Source: Midas Gold 2016a

Explosives Storage

Ammonium nitrate would be received in bulk in tanker trucks and transferred into storage silos. Other blasting supplies used for mine blasting operations would include blasting emulsion products, detonating cord, cast primers, and blasting caps. These products would be delivered in boxes or other approved containers on trucks. Components of bulk explosive material would be stored in separate and isolated containers, sized and designed to meet Bureau of Alcohol, Tobacco, Firearms and Explosives and Mine Safety and Health Administration requirements. Explosive magazines for detonating cord, cast primers, and blasting caps also would be in a separate, fenced, and gated site away from the diesel fuel oil storage tanks and the ammonium nitrate silos, and other mine surface facilities.

Miscellaneous Oils, Solvents, and Lubricants

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

Miscellaneous Consumables

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

Miscellaneous consumables would consist of various reagents used in the ore processing facility not already described, along with wear parts for the crushing and grinding circuits. Miscellaneous reagents used in the ore process are shown on **Table 2.3-6**. Liquids would be shipped to the mine site in tank trucks designed for spill prevention and escorted to the mine site by pilot cars manned and equipped to handle spills. All reagents would be transported and stored in suitable containers in designated reagent storage areas.

Waste Handling

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

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

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

2.3.5.19 Operations Traffic

The estimated annual average traffic during mining and ore processing operations is provided in **Table 2.3-7**. Supplies and deliveries for the mine site during operations would access the SGLF using State Highway 55 to Warm Lake Road. Approximately two-thirds of all mine-related traffic would originate south of Warm Lake Road and would use State Highway 55 through Cascade and other communities along State Highway 55 south of Cascade including Banks and Horseshoe Bend. Approximately one-third of all mine-related traffic originating north of Warm Lake Road would use State Highway 55 through the communities of Donnelly, Lake Fork, and McCall. Through McCall, mine-related traffic would generally use Deinhard Lane and Boydstun Street.

2.3.5.20 Temporary Closure of Operations

There are no periods of temporary or seasonal closure currently planned; in the event of temporary suspension of mining activities, the operator would notify the Forest Service, IDEQ, IDWR, Idaho Department of Lands (IDL), and Valley County in writing within 30 days of the temporary stop of mining activities. This notification would include reasons for the shutdown and the estimated timeframe for resuming production.

During any temporary shutdown, the operator would continue to implement operational and environmental maintenance and monitoring activities to meet permit stipulations and requirements for environmental protection.

If ore processing is not occurring, excess water collected from the various facilities would need to be discharged to the TSF for storage. In the case of a longer-term closure, water treatment could be necessary to allow discharge to the area streams and prevent filling of the TSF. A plan would need to be developed, reviewed and approved by the appropriate regulatory authorities, and implemented at the time of any longer-term temporary closure.

Table 2.3-7 Projected Mining and Ore Processing Operations Traffic

Transport Phase	Vehicle Type[1]	Estimated Average No. of Round Trips Per Period[2]	Period[3]	Scheduled Days per Year[4]	Number of Round Trips per Year[5]	Annual Average Daily Traffic[6]
Crew bus/van transport to site	HV	11	14 days	365	287	2
Crew personal vehicles	LV	25	14 days	365	651	4
Salaried employees	LV	8	7 days	365	417	3
Salaried employees bus/van transport to site	HV	2	7 days	365	104	1
Fuel and miscellaneous supplies	HV	2	day	261	522	3
Machine parts and consumables	HV	2	day	365	730	4
Ore processing supplies	HV	20	day	261	5,220	29
Pilot vehicle (fuel and hazardous loads)	LV	2	day	261	522	3
Equipment and supply representatives	LV	2	day	261	522	3
Food delivery	HV	2	day	261	522	3
Trash & recyclables	HV	3	7 days	365	156	1
Ore concentrate haulage	HV	1	day	365	365	2
Miscellaneous traffic	LV	4	day	261	1,044	6
Road maintenance	HV	2	day	365	730	4
Total HV AADT						**49**
Total LV AADT						**19**
Total AADT						**68**

Tables Source: Midas Gold 2016a

Table Notes:

1 LV = Light Vehicle; HV = Heavy Vehicle

2 The estimated average number of round trips that would occur within a given time period. All figures have been rounded up to whole numbers.

3 The allocated time period.

4 Not all transport phases would occur daily; scheduled days per year indicate the days per year when a trip is expected.

5 The estimated average number of round trips that would occur in a given year.

6 AADT = estimated average number of round trips per period / period x scheduled days per year / 365 days x 2 trips.

2.3.6 Surface and Underground Exploration

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

2.3.6.1 SURFACE EXPLORATION

Alternative 1 includes 5 acres of new temporary road disturbance and 8 acres of drill site disturbance on NFS lands at the mine site at any one-time during construction and operations. Exploration sites would be reclaimed after completion of drilling. Reclaimed acres would become available for future exploration, never exceeding 13 acres of disturbance at any one time. Disturbance resulting from surface exploration would total approximately 25 acres of roads and 40 acres of drill pads. Any stream crossings could require additional Section 404 CWA permits beyond those required for development and operation of the mining operations.

The exploration roads and drill pads would be located, as practical, on historical disturbance to avoid any identified cultural resources, other sensitive areas such as wetlands or Riparian Conservation Areas, and potential impacts to the habitat of Endangered Species Act listed species. **Figure 2.3-9** shows the boundary of the area within which ongoing surface exploration during construction and operations would occur.

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

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

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

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

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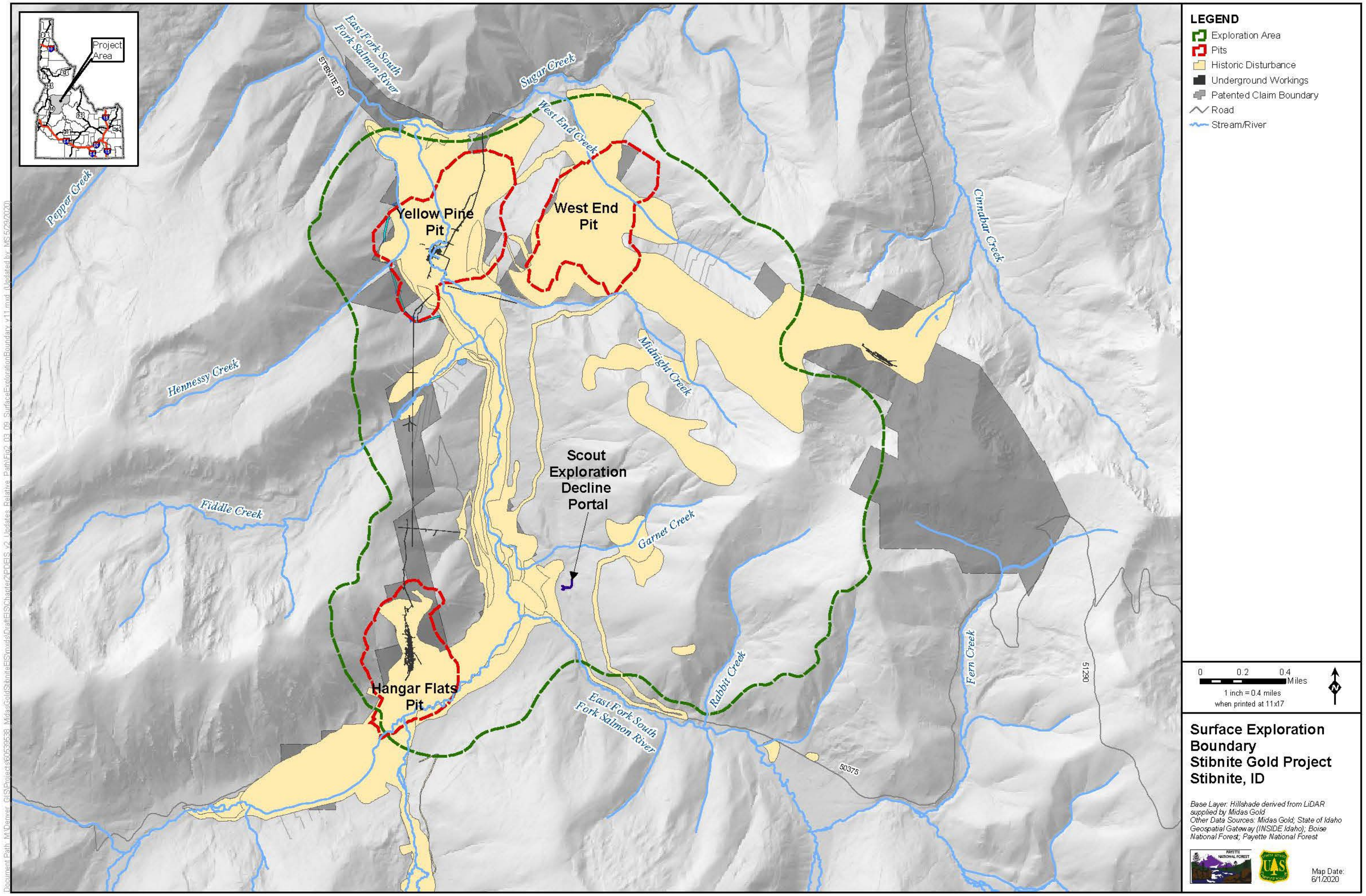

Figure Source: AECOM 2020a

Figure 2.3-9 Surface Exploration Boundary

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

2.3.6.2 UNDERGROUND EXPLORATION

Underground exploration activities would be conducted from a 1-mile, downward-sloping tunnel (a decline). The decline would be used to reach the subsurface mineralized zone known as the Scout Prospect. The decline would be accessed from a portal facility known as the Scout Portal, located south of the planned ore processing facility (**Figure 2.3-2**). Approximately 100,000 tons of rock would be excavated from the decline for development. Selected cuttings or core would be removed from underground for testing.

To construct the portal facility, the hillside would be cut into to develop a flat vertical slope using conventional underground drill and blast operations with mechanized equipment. Explosives would be used in the underground development process to construct the decline. The underground development rock could be used for surface pad construction, hauled to the ore stockpile area, or hauled for storage in a DRSF as appropriate.

Drilling is used in advance of the decline to ensure unexpected or unmanageable water pressures are not intersected. Water would be used in underground drilling or pumped from the collection point to the surface. Upon reaching the surface, this water would be piped to the ore processing facility.

2.3.7 Closure and Reclamation

2.3.7.1 Overview

Closure and reclamation at the site would include interim, concurrent, and final closure and reclamation (Reclamation and Closure Plan Stibnite Gold Project, Tetra Tech 2019a). Interim reclamation is intended to provide shorter-term stabilization to prevent erosion of disturbed areas and stockpiles that would be more fully and permanently reclaimed later.

Concurrent reclamation is designed to provide permanent, low-maintenance achievement of final reclamation goals on completed portions of the site prior to the overall completion of mining activities throughout the mine site.

Final closure and reclamation would involve removing all structures and facilities; reclamation of those areas that have not been concurrently reclaimed such as some DRSF surfaces; recontouring and improving drainages; creation of wetlands; reconstructing various stream channels; decommissioning of the EFSFSR diversion tunnel; final Blowout Creek repair; growth media placement; planting and revegetation on disturbance areas; and reopening Stibnite Road (CR 50-412) through the mine site.

Final reclamation of certain facilities could continue beyond the five-year closure and reclamation period. The Burntlog Route would be needed until the TSF is fully reclaimed, after which the newly constructed portions would be decommissioned and reclaimed, with the exception of removal of soil nail walls (concrete and bolted stabilizing walls), and the currently existing portions returned to their prior use.

Closure and reclamation activities would be intended to achieve post-mining land uses of wildlife and fisheries habitat and dispersed recreation at the mine site. Dispersed recreation uses would be accessible by the reopening of Stibnite Road (CR 50-412) (including establishment of a permanent service road through the backfilled Yellow Pine pit) that would facilitate recreational traffic. Concurrent, and final closure and reclamation for Alternative 1 are described in greater detail in the following sections.

2.3.7.2 Decommissioning, Demolition, and Disposal of Facilities

Midas Gold would dismantle or demolish structures and facilities not necessary for water management (e.g., certain culverts and pipelines). The materials from the dismantling or demolition of structures and facilities would be salvaged or disposed in the on-site private landfill at the Fiddle DRSF and/or in permitted off-site landfills. All reagents, petroleum products, solvents, and other hazardous or toxic materials would be removed from the site for reuse or would be disposed of according to applicable state and federal regulations. Foundations would be broken into pieces no larger than 6-foot square and covered in-place with a minimum of 2 feet of a combination of 1.5 feet of backfill and 0.5 feet growth media or would be broken up and buried a minimum of 2 feet deep in one of the site's DRSFs. Soil/rock beneath fuel storage areas and chemical storage buildings would be tested for contamination.

2.3.7.3 Underground Exploration and EFSFSR Tunnel

Midas Gold would decommission and close underground facilities and underground support facilities, including the portals of the EFSFSR Tunnel and Scout decline, and the Hennessy Creek diversion area boreholes that would connect to the EFSFSR Tunnel.

To prevent future access to underground workings, the underground portals (including the portals for the EFSFSR tunnel and the Scout prospect) would be closed and sealed through construction of an engineered seal. The boreholes used to transfer water from the area of the Hennessy Creek diversion into the EFSFSR Tunnel would be plugged and abandoned through their entire length.

2.3.7.4 Fiddle DRSF

As part of concurrent and final reclamation work for the DRSF, the top of the Fiddle DRSF would be graded to promote drainage over the top of the DRSF and prevent pooling of water. The final overall outslopes of the DRSF would be approximately 3.5 horzontal to 1 vertical, to blend with the surrounding terrain. A lined channel and floodplain corridor would be constructed across the top of the Fiddle DRSF exiting down the abutment to return to Fiddle Creek. The steeper stream channel on the abutment of the Fiddle DRSF would be a rock chute with intermittent energy dissipation structures and rock grade controls. The DRSF haul road alignment would be retained for access but narrowed with drainage controls established on the uphill side of the access road.

Toe seepage would be expected to continue from the Fiddle DRSF in perpetuity. This water would be collected in the operational contact water pond at the toe of the Fiddle DRSF, and then discharged to a passive treatment system before being discharged via an IPDES outfall to the EFSFSR.

2.3.7.5 Yellow Pine Pit/DRSF

The Yellow Pine pit would be partially backfilled with West End pit development rock. The backfill will be placed by end dumping from a number of locations around the pit, including highwall edges and also direct placement in the base of the pit as the backfill fills the pit. This material will not be compacted beyond any compaction that takes place during placement, subsequent routing of trucks, burial and consolidation. Portions of the highwalls on the east and west sides of the pit would remain above the backfilled portion of the pit and would not be reclaimed. A sinuous channel would be constructed through the backfilled area for the reconstructed EFSFSR with an average valley gradient approximating the original river gradient (Tetra Tech 2019a). The channel and floodplain corridor atop the Yellow Pine pit backfill would be lined with low-permeability geosynthetics. Above the stream liner a layer of relatively fine material would be placed to protect the stream liner from puncture, followed by coarse rock armor to protect from exposure via stream scour, followed by floodplain alluvium at a depth equal to the maximum estimated scour depth of the proposed stream channel. Growth media will be placed and the area revegetated. The lined corridor will be wide enough to accommodate future channel migration and evolution. Hennessy Creek would cascade over the approximately 275 feet tall west highwall of the Yellow Pine pit to a section of low-gradient channel on the edge of the constructed EFSFSR floodplain before joining the constructed EFSFSR channel. Midnight Creek would be constructed across the EFSFSR floodplain.

To accommodate migrating fish, including Chinook salmon and bull trout, step pools would be established within the constructed channel. The vertical relief (drop) between successive pools would not exceed published fish passage criteria. High flow events would help to guide the overall channel and floodplain design and construction, with channel bankfull width approximately 25 to 30 feet, and average depth of approximately 2 feet.

Access through the site to Thunder Mountain Road (FR 50375) would be reestablished with construction of an access road through the backfilled area.

2.3.7.6 West End DRSF and Pit Reclamation

The top and slopes of the West End DRSF would be graded to promote positive drainage and prevent ponding with an overall outslope of approximately 3.2 horizontal to 1 vertical although slopes at the top and toe of the facility may be shallower. Runoff water from West End Creek would first be routed into a lined channel on top of the DRSF and then into a lined rock channel on the DRSF downstream outslope.

A lake is anticipated to form in the north portion of the West End pit below the West End DRSF. The up-to 400 feet deep West End pit lake would be expected to fill with water within approximately 41 years of closure due to the limited nature of inflows. Overflow would be expected to occur for short durations in wet years, approximately 5 years out of 100 years.

Precipitation and surface runoff in the southern portion of the West End pit would form a 6-acre 100-foot deep pit lake in the Midnight Area of the West End pit. The Midnight pit would fill in approximately 10 years and is expected to discharge intermittently, during spring runoff of high snowpack years.

2.3.7.7 Tailings Storage Facility and Hangar Flats DRSF

Midas Gold proposes to complete tailings reclamation approximately 7 years after operations cease. Midas Gold anticipates that primary tailings consolidation and removal of the supernatant pond would be sufficiently completed during the first 5 years to allow for reclamation to begin.

At the end of ore processing operations, Midas Gold would remove the supernatant pond using spray evaporators (snowmaking misters) operated within the TSF boundary. If evaporation efforts do not adequately reduce the pond volume, the operational water treatment plant at the ore processing area could provide additional treatment of TSF supernatant water to meet IPDES discharge limits and allow or discharge of the water to the stream system. Water from the TSF requiring treatment and discharge would be piped to the operational treatment plant at the ore processing facility and discharged to the EFSFSR through an IPDES outfall.

When tailings consolidate sufficiently to allow for equipment traffic, althoughconsolidation would continue for decades at diminishing rates, Midas Gold would conduct minor grading of tailings and begin to spread development rock over the top of the tailings surface to enable equipment access and drainage from the facility. The soil-rock cover and material from the adjacent Hangar Flats DRSF and GMSs would be placed atop the TSF and revegetated. Midas Gold would construct low-gradient meandering stream channels (Meadow Creek and tributaries) within a synthetically-lined floodplain corridor on the top of the TSF. Pools, riffles, and gravel areas would be constructed within the channel. Measures to create fish habitat, such as side channels, oxbows, boulder clusters, root wads, and large woody debris would be created. This would allow for the post-closure development of riparian habitat, channel movement within the lined floodplain, convey water off the facility, and minimize potential interaction of surface water with the tailings. Given the nature of the surface of the TSF, the constructed channel would have a very shallow gradient.

To accommodate high-flow events a defined channel ranging from approximately 5 to 15 feet in bankfull width would be constructed, with average bankfull depth reaching approximately 2 feet. The synthetically lined floodplain corridor would be up to 200 feet wide to convey higher water depths during a 100-year flood event.

The goal for final overall out-slopes of the Hangar Flats DRSF would be variable, to blend with the surrounding terrain to the extent practicable, produce a permanent and stable landform, provide access for future maintenance on the DRSF or TSF, and provide for drainage across the reclaimed face of the DRSF. Similar to the TSF, a lined channel and floodplain corridor would be established for Meadow Creek across the top of the reshaped DRSF. The channel would enter a steep constructed stream channel on the north abutment of the Hangar Flats DRSF. The steep channel segment would consist of a rock-lined chute that would flow through an energy-dissipating basin at the toe of the Hangar Flats DRSF before being discharged to the downstream Meadow Creek channel.

2.3.7.8 Hangar Flats Pit

No backfilling would occur for the Hangar Flats pit. At closure, the haul road into the pit and access to highwalls would be blocked with large boulders and/or earthen berms to deter motorized vehicle passage into the pit.

Hangar Flats pit is anticipated to fill with water within approximately 7 years of closure from groundwater inflows, direct precipitation, and surface water runoff resulting in an approximately 68-acre, and up to 600-foot-deep Hangar Flats pit lake. Once reclamation activities are complete and the Hangar Flats pit lake has completely filled, surface water runoff from the TSF, the Hangar Flats DRSF, and Blowout Creek would be routed via a separate constructed channel to the Hangar Flats pit lake. Discharge from the pit lake would flow into the reclaimed Meadow Creek channel. Riparian vegetation would be planted along the southern portion of the Hangar Flats pit and within the Meadow Creek and Blowout Creek floodplain.

Downstream of the Hangar Flats pit, meander bends and large woody debris and boulder cluster habitat structures would be built in Meadow Creek to its confluence with the EFSFSR.

2.3.7.9 Transmission Line and Electrical Infrastructure

After mine closure activities requiring power are complete, Midas Gold, in coordination with Idaho Power Company, would disassemble the approximately 8.5-mile transmission line from the Johnson Creek substation to the mine site. The substation, switchgear, poles, and distribution lines would be removed from the mine site, but the Johnson Creek substation would remain in service. The transmission line ROW from Johnson Creek to the mine site, and spur roads used to access power pole structure sites, would be recontoured to match surrounding topography and revegetated. As part of revegetation, the transmission line ROW and access roads would be scarified, and at least 6 inches of growth media and/or mulching would be applied. The reclaimed areas would be seeded with species listed in the Reclamation and Closure Plan (Tetra Tech 2019a) or as approved by the Forest Service.

2.3.7.10 OHV Connector

The OHV Connector trail from the Powerline/Horse Heaven access road to Meadow Creek Lookout Road (FR 51290) would be closed. The trail surface would be recontoured to match the surrounding topography and drainage channels would be established. The trail surface would be scarified as necessary and seeded with plant species as described in the Reclamation and Closure Plan (Tetra Tech 2019a) or as approved by the Forest Service.

2.3.7.11 Burntlog Route

Once all final mine closure/reclamation work has been completed, the operator would reduce the 20-foot-wide travel way of 19.9 miles of Burntlog Road (FR 447), 1.3 miles of Meadow Creek Lookout Road (FR 51290), and 2 miles along Thunder Mountain Road (FR 375) of Burntlog Route to their approximate pre-mining width. Returning approximately 23.2 miles of existing road to pre-mining condition would entail grading and/or scarification along the outside edges of the road followed by seeding with the species listed in the Reclamation and Closure Plan (Tetra Tech 2019a) or as approved by the Forest Service. Midas Gold would remove ditches, cross drains, culverts, safety berms, mile markers, guardrails, and signs on roads if these features are no longer needed. These roads would retain the flatter grades and gentler curves constructed for mine operation

The 14.9 miles of Burntlog Route that was newly constructed for the project, connecting Burnt Log Road (FR 447) to Meadow Creek Lookout Road (FR 51290) and Thunder Mountain Road (FR 50375) would be decommissioned. The road would be decommissioned by pulling back and re-contouring road cuts to slopes that are similar to, but not necessarily matching, pre-project conditions, and that would be consistent with the surrounding terrain as practicable. Surface water diversions, cross drains, culverts, safety berms, mile markers, guardrails, and signs would be removed. Soil nail walls,constructed of anchors bolted into the ground with a sprayed concrete surface, would remain to support slopes in areas with soft soils or weathered rock. Water bars or other erosion and sediment control structures, armored stream crossings, and stormwater crossings would be included where necessary. The reclaimed areas would be scarified, and 6 inches of growth media would be placed in upland areas, followed by seeding and certified weed-free mulching on slopes over 30 percent.

2.3.7.12 Post Closure Public Access

A service road would be established over the backfilled Yellow Pine pit to allow public access through the reclaimed site and connect Stibnite Road (CR 50-412) to Thunder Mountain Road (FR 50375).

2.3.7.13 Offsite Facilities

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

Midas Gold has identified a “light industry” post-mining land use for the SGLF in which the facility could be maintained by a third party for future use, meaning the facility, located on private land, would not be reclaimed.

2.3.7.14 Contouring, Grading, Growth Medium Placement, and Seeding

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

A deficit of approximately 34,000 bank cubic yards of growth media, approximately 1.8 percent of the estimated total volume needed, is projected for reclamation. The operator would endeavor to make growth media material using screened fines, available mulched vegetation, and composted material. Off-site sources for composting feedstock materials could be required and would be in compliance with Forest Service requirements.

Planting, seeding, and mulching would be conducted in the fall and early winter to take advantage of snowpack and springtime moisture. Where cover crops are used in lieu of mulch, seeding would occur in the spring or fall followed by seeding of the permanent mixture. The Reclamation and Closure Plan lists the forb, grass species, seed amounts, and the trees and shrubs planned for planting on reclaimed areas (Tetra Tech 2019a). The reclamation seed mixes and rates would require approval by the Forest Service.

2.3.7.15 Post Closure Water Treatment

Evaluation of post closure water treatment is ongoing. For Alternative 1 Midas Gold has indicated that sources of water that could require treatment during closure and reclamation and through the post closure period include TSF runoff and Fiddle DRSF toe seepage. Two passive systems would be used during post closure. Passive water treatment systems using a biochemical rector and vertical wetlands polishing are being evaluated by Midas Gold for use at these locations. The biochemical reactor is expected to have a 5- to 15-year service life. No chemicals would be required for operation of the passive treatment system, although media such as sand, hay, straw, sawdust, manure, or limestone would need periodic replacement. The passive water treatment system also would require either periodic excavation and removal of accumulated contaminants, or closure in place. The throughput for each passive system is being evaluated. Discharge from the passive water treatment systems would be to an outfall to the EFSFSR.

2.3.7.16 Closure and Reclamation Financial Assurance

As part of the approval of a plan of operations for the SGP, the PNF Forest Supervisor would require Midas Gold to post financial assurance to ensure that NFS lands and resources involved with the mining operation are reclaimed in accordance with the approved plan of operations and reclamation requirements (36 CFR 228.8 and 228.13). This financial assurance would provide adequate funding to allow the Forest Service to complete reclamation and post closure operation, including continuation of any post closure active or passive water treatment, maintenance activities, and necessary monitoring for as long as required to return the site to a stable and acceptable condition. The amount of financial assurance would be determined by the Forest Service and would “address all Forest Service costs that would be incurred in taking over operations because of operator default” (Forest Service 2004). The financial assurance would be required in a readily available bond instrument payable to the Forest Service. To ensure the bond can be adjusted as needed to reflect actual costs and inflation, there would be provisions allowing for periodic adjustment on bonds in the final plan of operations prior to approval. Calculation of the initial bond amount would be completed following the Record of Decision, when enough information is available to adequately and accurately perform the calculation.

In addition to the Forest Service-held bond, mitigation under Section 404 of the CWA also requires financial assurance. The IDL would require a bond as part of their permitting authority. The IDWR is the state agency responsible for design review and approval of the TSF. IDWR also would hold a bond so that the TSF can be placed in a safe maintenance-free condition if abandoned by the owner. These assurances are separate from those required by the Forest Service.

2.3.7.17 Closure and Reclamation Traffic

Most closure and reclamation traffic would occur May through November. Mine traffic during closure and reclamation is detailed in **Table 2.3-8**.

2.3.8 Monitoring

Air emissions, groundwater, surface water, and aquatic parameters would be monitored during mine construction, operation, closure, and post-closure. Authorizations from federal and state agencies include monitoring requirements for resources (e.g., air emissions, surface water, and groundwater) during mine construction, operation, closure and reclamation, and post closure. Mitigation measures and monitoring actions would not be known fully until required permits have been issued.

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

Midas Gold has prepared a draft Environmental Monitoring and Management Plan (EMMP) (Brown and Caldwell 2019b). The final EMMP would consist of multiple component plans, each of which would be finalized upon issuance of the related permit(s) and would contain monitoring and management requirements from each permit. In some cases, if environmental outcomes may be uncertain, the EMMP could include adaptive management planning. Adaptive management requires identification of performance measures, impact thresholds, and operational adjustment options, all intended to achieve and demonstrate compliance with applicable permitting and/or consistency with the environmental analysis.

2.3.8.1 Environmental Monitoring

The draft EMMP (Brown and Caldwell 2019b) provides an overview of the actual or anticipated monitoring and/or management requirements for each of the regulatory permits and establishes Midas Gold's commitments to environmental monitoring and management of mine facilities and environmental resources. The EMMP would allow the Midas Gold operations team to monitor its operations and environmental commitments, document permit compliance, and reduce potential impacts to environmental resources. The draft EMMP describes the component monitoring and management plans that would be developed and used by Midas Gold to manage water resources, manage and monitor mine facilities, and monitor environmental and cultural resources. The draft EMMP includes environmental tasks and lists environmental permits, licenses, authorizations, and corresponding obligations. Brief descriptions of some of the proposed resource monitoring follows.

An existing meteorological station in the Hangar Flats area has measured baselines for temperature, solar radiation, relative humidity, precipitation, barometric pressure, wind speed and direction, and particulate matter (particulate matter with an aerodynamic diameter of 10 microns or less and 2.5 microns or less). Alternative 1 would re-locate this existing monitoring tower and instrumentation from the Hangar Flats area to a location approved by the Forest Service and IDEQ. Meteorological monitoring would be conducted at the mine site during initial site treatment, construction, operations, and closure and reclamation in accordance with requirements of any air quality permit.

Table 2.3-8 Projected Closure and Reclamation Traffic

Transport Phase	Vehicle Type[1]	Estimated Average No. of Round Trips Per Period[2]	Period[3]	Scheduled Days per Year[4]	Number of Round Trips per Year[5]	Annual Average Daily Traffic[6]
Crew bus/van transport to site	HV	4	14 days	365	104	1
Crew personal vehicles	LV	10	14 days	365	261	2
Salaried employees	LV	10	7 days	365	520	3
Fuel and miscellaneous supplies	HV	1	day	261	261	2
Reclamation supplies	HV	2	day	152	304	2
Pilot vehicle (fuel and hazardous loads)	LV	1	day	261	261	2
Equipment and supply representatives	LV	2	day	261	522	3
Food delivery	HV	1	day	261	261	2
Trash & recyclables	HV	1	7 days	365	52	1
Demolished & dismantled items	HV	3	day	152	456	3
Miscellaneous traffic	LV	1	day	365	365	2
Road maintenance	HV	1	day	365	365	2
Total HV AADT						**13**
Total LV AADT						**12**
Total AADT						**25**

Tables Source: Midas Gold 2016a

Table Notes:

1 LV = Light Vehicle; HV = Heavy Vehicle

2 The estimated average number of round trips that would occur within a given time period. All figures have been rounded up to whole numbers.

3 The allocated time period.

4 Not all transport phases would occur daily; scheduled days per year indicate the days per year when a trip is expected.

5 The estimated average number of round trips that would occur in a given year.

6 AADT = estimated average number of round trips per period / period x scheduled days per year / 365 days x 2 trips.

Baseline water resource information has been collected since 2012 from areas surrounding the mine site. This information supplements U.S. Geological Survey and other baseline data collected intermittently in association with past and current mining and mineral exploration projects in the mine area over the past 40 years. Groundwater and surface water monitoring would continue in the mine area as part of construction, operation, and closure and reclamation. An approved Water Resources Monitoring Plan would include monitoring locations, monitoring frequency, water sample collection procedures, laboratory analyses, verification of data records and transmittal of samples, data management, and reporting. The monitoring locations would meet the requirements in final permits. Records and results of water resources monitoring would be shared with the Forest Service and IDEQ. Fisheries and fish habitat information within and surrounding the mine site has been collected since 2012 for habitat conditions, cobble embeddedness, free Matrix, McNeil Core Sampling, fish surveys, and macroinvertebrates.

The draft EMMP (Brown and Caldwell 2019b) includes the following plans for monitoring fish resources and fish habitat: Stream and Wetlands Monitoring Plan and Fisheries and Aquatic Habitat Monitoring Plan. These plans will be reviewed by the Idaho Department of Fish and Game; National Oceanic and Atmospheric Administration, National Marine Fisheries Service; the U.S. Fish and Wildlife Service; and the Forest Service.

Mine site facilities would be monitored in accordance with the draft EMMP (Brown and Caldwell 2019b) for the presence and potential mortality of birds, mammals, reptiles, and amphibians. Sightings of rare or sensitive wildlife, along with any wildlife mortalities, would be recorded and provided in periodic reports to the Forest Service, U.S. Fish and Wildlife Service, and Idaho Department of Fish and Game.

2.3.8.2 Reclamation Monitoring

Prior to reclamation monitoring and maintenance programs, the Forest Service and IDL would agree to specific quantitative and qualitative reclamation monitoring plans and standards.

Reclamation monitoring would begin during concurrent reclamation at mine site facilities. Quantitative and qualitative monitoring of reclamation success would begin the first growing season after final reclamation is completed and would continue until success criteria are satisfied. Section 3.3.6 of the Reclamation and Closure Plan (Tetra Tech 2019a) presents the quantitative and qualitative reclamation monitoring that would be conducted and the performance standards that would be used (with Forest Service and IDL approval) to determine when maintenance activities are necessary, or reclamation is complete. These monitoring requirements are summarized below.

EROSION AND SEDIMENT CONTROL MONITORING

Soil stability would be estimated for all reclaimed areas using qualitative descriptors. A reclamation specialist would observe each reclaimed area and assign qualitative descriptors. The designations would be completed twice annually for erosion control purposes, once in the spring and once in the fall; and after 3 years for performance monitoring purposes. For performance monitoring, the observations would be made at the same time the vegetation success observations are made. The monitoring results would be used to aid in determining the cause of any failures that are encountered and to locate problem areas before erosion becomes widespread enough to affect reclamation success.

Slope Stability Monitoring

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

Reclamation Maintenance Procedures

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

- Sediment removal from sediment basins, stormwater drainage channels, and diversions as necessary to maintain their design capacity;
- Diverting surface water away from reclaimed areas where erosion jeopardizes attainment of reclamation standards;
- Stabilizing rills, gullies, and other erosion features or slope failures that have exposed development rock;
- Noxious weed and invasive plant species control; and
- Re-seeding or re-applying reclamation treatments in areas where it is determined through monitoring and agency consultation that reclamation would not meet standards.

Annual Report

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

2.3.9 Mitigation Measures

Mitigation measures, as defined by the CEQ regulations (40 CFR 1508.20), include the following:

- Avoiding the impact altogether by not taking a certain action or parts of an action;
- Minimizing impacts by limiting the extent or magnitude of the action and its implementation;
- Reducing or eliminating an impact over time, through preservation and maintenance operations during the life of the action; and
- Compensating for an impact by replacing or providing substitute resources or environments.

Mitigation measures meeting CEQ guidelines and Forest Service definitions from the Payette National Forest Land and Resource Management Plan (Forest Service 2003) include: (1) design features of the proposed project or alternatives; (2) requirements from federal, state, or local agencies for the proposed action or connected actions, and; (3) potential mitigation measures identified during analysis. The Forest Service has developed mitigation measures and monitoring actions to be included as project design features in the proposed action and action alternatives. **Appendix D-1**, Mitigation Measures and Environmental Commitments, includes the mitigation measures considered in this EIS. The mitigations listed in **Table D-1** were developed by the Forest Service for the SGP. **Table D-2**, Mitigation Measures Proposed by Midas Gold as Project Design Features, summarizes Midas Gold's proposed mitigation in terms of project design features and resource protection measures. The effectiveness of the mitigation measures included in **Appendix D-1** has been evaluated as part of the project impacts analyses for the proposed action and action alternatives as presented in Chapter 4, Environmental Consequences.

Appendix D-2 includes the Conceptual Stream and Wetland Mitigation Plan (CMP) developed by Midas Gold to describe proposed stream and wetland mitigation to compensate for unavoidable impacts to jurisdictional waters of the U.S. (WOTUS) associated with activities that would be authorized by a Department of the Army permit. All action alternatives include activities that would result in permanent impacts to WOTUS, which would result in a loss of aquatic function. The Conceptual Stream and Wetland Mitigation Plan in **Appendix D-2** addresses compensation for lost fish resources and fish habitat. Specific actions described into the CMP have been incorporated into the analysis of each alternative. Section 4, Environmental Consequences includes additional discussion of the CMP-related mitigation. The Forest Service is responsible for determining whether the implementation of mitigation and the results of monitoring comply with the decision that would be documented in the Record of Decision and in compliance with the final Plan of Operations.

Unless noted otherwise in the Record of Decision, the SGP design features, resource protection measures, and mitigation measures are required. If it is determined in the analysis in Chapter 4, Environmental Consequences, that the SGP design features are not sufficient to avoid and/or reasonably minimize the potential impact, then additional mitigation measures could be identified to further reduce the potential adverse effects.

Following is a discussion of the mitigation plan Midas Gold has prepared for the SGP and the specific individual plans developed to further mitigate potential resource-specific impacts.

2.3.9.1 Stibnite Gold Mitigation Plan

Applicant-committed environmental design measures are features incorporated into the design of the project by Midas Gold. These measures are included in the project design, and their effects are accounted for in the analysis of environmental consequences disclosed in each resource section of Chapter 4, Environmental Consequences. The Stibnite Gold Mitigation Plan (Brown and Caldwell 2019c) is Midas Gold's plan for mitigating potential impacts of the SGP.

The basis of the Stibnite Gold Mitigation Plan is impact avoidance and minimization. The potential impacts of the SGP remaining after applying the avoidance and minimization measures were addressed by Midas Gold on a resource-basis by further avoidance, minimization, and compensation described in component mitigation plans:

- Fisheries and Aquatic Resources Mitigation Plan (Brown and Caldwell, Rio Applied Science and Engineering, and Midas Gold 2019);
- Fishway Operations and Management Plan (Brown and Caldwell, McMillen Jacobs Associates and BioAnalysts 2019);
- Conceptual Stream and Wetland Mitigation Plan (CMP) (Tetra Tech 2019b); and
- Wildlife Habitat Mitigation Plan (Tetra Tech 2019c).

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

Following the Record of Decision, Midas Gold would integrate all required mitigation commitments into the current draft EMMP (Brown and Caldwell 2019b). This EMMP consists of a program framework and appendices containing component monitoring and management plans. Midas Gold would use the EMMP to guide monitoring, document permit compliance, implement impact reduction procedures, and address adaptive management thresholds and responses where impacts and mitigation effectiveness carry substantial uncertainty.

2.3.9.1.1 Fisheries and Aquatic Resources Mitigation Plan

The Fisheries and Aquatic Resources Mitigation Plan (Brown and Caldwell, Rio Applied Sicence and Engineering, Midas Gold 2019) describes the measures that Midas Gold has proposed to minimize and mitigate adverse impacts on fisheries and aquatic resources, with particular attention to fish species listed as threatened under the Endangered Species Act: Columbia River bull trout (*Salvelinus confluentus*), Snake River spring/summer Chinook salmon (*Oncorhynchus tshawytscha*), and Snake River Basin steelhead (*Oncorhynchus mykiss*). The Fisheries and Aquatic Resources Mitigation Plan also addresses westslope cutthroat trout *(Oncorhynchus clarki lewisi),* considered a sensitive species by the Forest Service and Idaho Department of Fish and Game, and other resident fish species.

The Fisheries and Aquatic Resources Mitigation Plan mitigation actions would begin during construction and continue throughout mine operations and into closure and reclamation. The Fisheries and Aquatic Resources Mitigation Plan and its components would be refined in accordance with agencies' mitigation requirements.

2.3.9.1.2 Fishway Operations and Management Plan

Midas Gold has proposed a fishway for safe upstream and downstream passage of anadromous and migratory fish in the EFSFSR during construction and mine operations, to be part of the tunnel that diverts the EFSFSR around the Yellow Pine pit.

The Fishway Operations and Management Plan (Brown and Caldwell, McMillen Jacobs Associates and BioAnalysts, Inc. 2019) describes the purpose of the tunnel and fishway, general timeline for construction, the flows expected to occur through the tunnel, the target species, and the goals and objectives for the fishway operation. Additionally, it describes the operational and design criteria and overall function of the tunnel fishway, how it would be operated, the anticipated operation and maintenance requirements for the SGP and serves as the basis for developing a detailed operation and maintenance manual in future design phases. The Fishway Operations and Management Plan also defines the monitoring and evaluation plan elements and describes how the hydraulic conditions, fish use, and performance of the tunnel fishway would be measured and evaluated.

2.3.9.1.3 Conceptual Stream and Wetland Mitigation Plan

Construction of the SGP would permanently impact wetlands and other WOTUS subject to regulation under Section 404 of the CWA and requires a Department of the Army permit pursuant to Section 404. The CMP (Tetra Tech 2019b) provides detailed descriptions of proposed restoration, establishment, enhancement, and/or preservation of aquatic resources to compensate for unavoidable impacts to WOTUS associated with activities that would be authorized by a Department of the Army permit (Tetra Tech 2019b). The existing CMP is conceptual because the actual final impacts of the SGP will not be known until a preferred alternative is identified and the USACE has determined all mitigation requirements.

The CMP will be revised as the Forest Service proceeds through the NEPA process and develops the final EIS and Records of Decision. Additional CMP revisions also are expected based on analysis and direction from the USACE.

2.3.9.1.4 Wildlife Habitat Mitigation Plan

The Wildlife Habitat Mitigation Plan (Tetra Tech 2019c) describes the potential effects on upland wildlife habitat functionality and the compensatory mitigation proposed by Midas Gold to offset and replace the loss or modification of upland habitat functionality.

2.3.10 Connected Actions

There is one Connected Action that is closely related to the SGP and would not be considered at this time but for the SGP.

The SGP would require upgrades and new construction to electric infrastructure outside of the mine site and subject to different approvals. Changes to electric infrastructure include:

- New construction of the Scott Valley and Thunderbolt Tap substations, and a new switching substation near Cascade (Cascade switching station) (**Figure 2.3-1**). The existing Scott Valley substation would be removed.
- Power to Yellow Pine would come from the Johnson Creek substation instead of the Warm Lake substation.
- Upgrade approximately 63 miles of the existing 12.5-kV and 69-kV transmission lines between the Lake Fork and Johnson Creek substations to 138-kV service. The ROW corridor would be 50 to 100 feet and existing structures would be replaced with taller structures along the existing ROW.
- Upgrade the substations located at Oxbow Dam, Horse Flat, McCall, Lake Fork, and Warm Lake (**Figure 2.3-1**).

2.4 ALTERNATIVE 2

2.4.1 Overview

Alternative 2 includes agency and Midas Gold proposed modifications to Alternative 1 developed to address potential issues associated with surface water and groundwater, wetlands and riparian areas, and federally-listed fish species. This alternative also includes modifications that could minimize effects to other resources such as cultural resources, recreation, and public health and safety. Midas Gold has adopted these additions and modifications to the plan of operations described in Alternative 1 (Brown and Caldwell 2019a). Further, components of Alternative 2 as described below or modified, could be incorporated as components of, or mitigation measures for, other action alternatives.

The Alternative 2 modifications are listed in **Table 2.4-1** along with a brief rationale. The proposed facilities and access roads are shown on **Figure 2.4-1** Alternative 2 Overview and **Figure 2.4-2** Alternative 2 Mine Site Layout. Phases, activities, or facilities that are not separately addressed under Alternative 2 would be the same as under Alternative 1.

Table 2.4-1 Alternative 2 Component Alternatives and Rationale for Inclusion

Phase - Component/ Subcomponent	Facility or Process Change	Rationale
Construction – Access Roads	A portion of the Burntlog Route known as the Riordan Creek Segment would be rerouted.	Rerouting the Burntlog Route in the Riordan Creek area could reduce wetland and IRA impacts.
Construction/ Operations – Public Access	A new road through the mine site to link Stibnite Road to Thunder Mountain Road would be constructed.	Public access roads through the mine site would provide motorized access to Thunder Mountain Road (FR 50375) when other public access roads are blocked by mine operations.

Phase - Component/ Subcomponent	Facility or Process Change	Rationale
	There are two options for travel through the mine site.	
Operations – DRSFs	The West End DRSF would be eliminated.	West End pit development rock would be backfilled directly into the Midnight pit and placed into Hangar Flats pit as partial backfill. Elimination of West End DRSF could improve surface water and groundwater quality.
Operations – DRSFs	The Midnight pit would be backfilled.	Discharge from the Midnight pit lake could adversely affect water quality in Midnight Creek. Backfilling the Midnight pit and grading the backfill to prevent ponding of water could avoid this potential adverse impact.
Operations – DRSFs	The Hangar Flats pit would be partially backfilled.	With the elimination of the West End DRSF, additional storage of development rock is needed. Placement in the Hangar Flats pit as partial backfill would decrease the time required for the Hangar Flats pit lake to fill. Reducing the time needed to fill the pit lake would reduce the duration of impacts to streamflow during the pit filling.
Operations – Ore Processing Facilities	Limestone and lime generation would occur at the mine site.	On site lime generation would reduce the number of vehicles hauling supplies to the mine during operation. This would reduce traffic and related vehicle emissions. However, emissions at the mine site would increase from limestone mining and processing.
Operations – TSF	A different TSF liner system would be used.	The TSF liner would include placement of two geosynthetic liners, one with a microdrain to act as a leakage collection system. This could potentially avoid adverse environmental impacts to groundwater quality.
Operations – Mine Support Infrastructure – Haul Roads	Haul road routes would be modified.	Changes to the haul road routes would be needed due to the elimination of the West End DRSF and hauling of limestone from the West End Pit.
Operations – Surface Water Management	Hennessy Creek would be diverted into Fiddle Creek in an open channel.	During mine operation the open channel would be easier to maintain, would eliminate the introduction of additional sediment into the EFSFSR tunnel, would allow for the stream flow to be routed away from existing legacy disturbance, and could improve surface water and groundwater quality.
Operations – Surface Water Management	The Meadow Creek diversion channel liner would extend approximately 1,050 feet further downtream.	Extending the liner would reduce the streamflow losses and could reduce impacts to surface water, wetlands, and riparian areas.
Operations – Surface Water Management	With the elimination of the West End DRSF, the West End Creek diversion would start further downstream.	Elimination of the West End DRSF would allow West End Creek to remain in the existing channel further downstream.
Operations – Surface Water Management	Low flows in Meadow Creek stream diversion around the Hangar Flats DRSF and TSF, Fiddle Creek diversion around Fiddle DRSF, and West End Creek around West End pit, would be piped.	Piping stream diversions during low flow would reduce the potential for temperature increases in surface water that could adversely impact federally-listed fish species.

Phase - Component/ Subcomponent	Facility or Process Change	Rationale
Operations and Closure and Reclamation – Water Management and Treatment	Designed water treatment facilities would be used including a Centralized WTP, temporary water treatment systems, and passive water treatment.	Water treatment is needed to meet water quality standards during construction, operations, and closure and reclamation.
Operations – Utilities/Transmission lines	The upgraded transmission line would be rerouted in two locations (**connected action**).	0.9 mile of the transmission line would be rerouted during upgrades to an old railroad grade to reduce impacts to fish resources, fish habitat, and wetlands. As part of the connected action, a 5.4-mile portion of transmission line would be rerouted to avoid impacts to the Thunder Mountain Estates subdivision.
Operations – Utilities/ Electrical Substations	The Cascade switching station would be relocated (**connected action**).	In order to accommodate the connected action transmission line upgrade reroute, the Cascade switching station would need to be relocated.
Operations – Off-site Facilities	The Landmark Maintenance Facility would be relocated 4.4 miles east of the Johnson Creek Road and the Warm Lake Road.	Relocating the maintenance facility could avoid impacts to the Landmark historic site.
Closure and Reclamation – Fiddle and Hangar Flats DRSFs	Fiddle DRSF top and outslopes, and the top of the Hangar Flats DRSF would be covered with a low permeability geosynthetic cover at reclamation.	The low-permeability geosynthetic material would limit infiltration of water through the DRSF and could reduce potential impacts to surface water and groundwater quality.
Closure and Reclamation – Hangar Flats Pit Lake	Meadow Creek and Blowout Creek high flows would be diverted temporarily into the Hangar Flats pit lake.	Meadow Creek and Blowout Creek flows above 5 cubic feet per second would be diverted into the Hangar Flats pit lake to accelerate filling of the pit lake. This could minimize potential impacts to groundwater and surface water during pit lake filling.
Closure and Reclamation – Hangar Flats Pit Lake	Yellow Pine pit dewatering wells would continue to operate and send water to the RIBs during seasonal low flows until the Hangar Flats pit lake is filled.	The continued use of the RIBs could maintain alluvial groundwater levels and prevent loss of surface water to the alluvial groundwater during pit lake filling and potentially reduce associated impacts to downstream federally-listed fish species, wetlands, and riparian areas.
Closure and Reclamation – Surface Water Management/ Stream Diversions	The operational diversion of Meadow Creek at Hangar Flats pit would be retained as the final reclaimed channel.	Maintaining the operational diversion of Meadow Creek could reduce potential changes to temperature and water quality and associated impacts to federally-listed fish species, which could occur if Meadow Creek was routed through the Hangar Flats pit lake.
Closure and Reclamation – Water Treatment	Water treatment, including the Centralized WTP used during operations and passive treatment systems would continue to operate as long as needed.	Quality of water exiting certain mine site facilities including water discharging from the Hangar Flats pit lake is expected to require continuing treatment.
Closure and Reclamation – Utilities/Transmission Lines	The transmission line from the Johnson Creek substation to the mine site would remain in place.	Utilites would be needed to allow ongoing operation of the Centralized WTP.

Phase - Component/ Subcomponent	Facility or Process Change	Rationale
Closure and Reclamation – Access Roads	The Yellow Pine Route would be used for mining related water treatment as long as treatment is needed.	Site access, including maintenance and plowing of Stibnite Road to the mine site, would be needed to allow ongoing operation of water treatment systems.
Closure and Reclamation – Traffic	Truck traffic for the delivery of water treatment chemicals and removal of water treatment residuals would continue until treatment is no longer required.	Chemical deliveries and off site disposal fr waste residuals would be needed to allow ongoing operation of the Centralized WTP.

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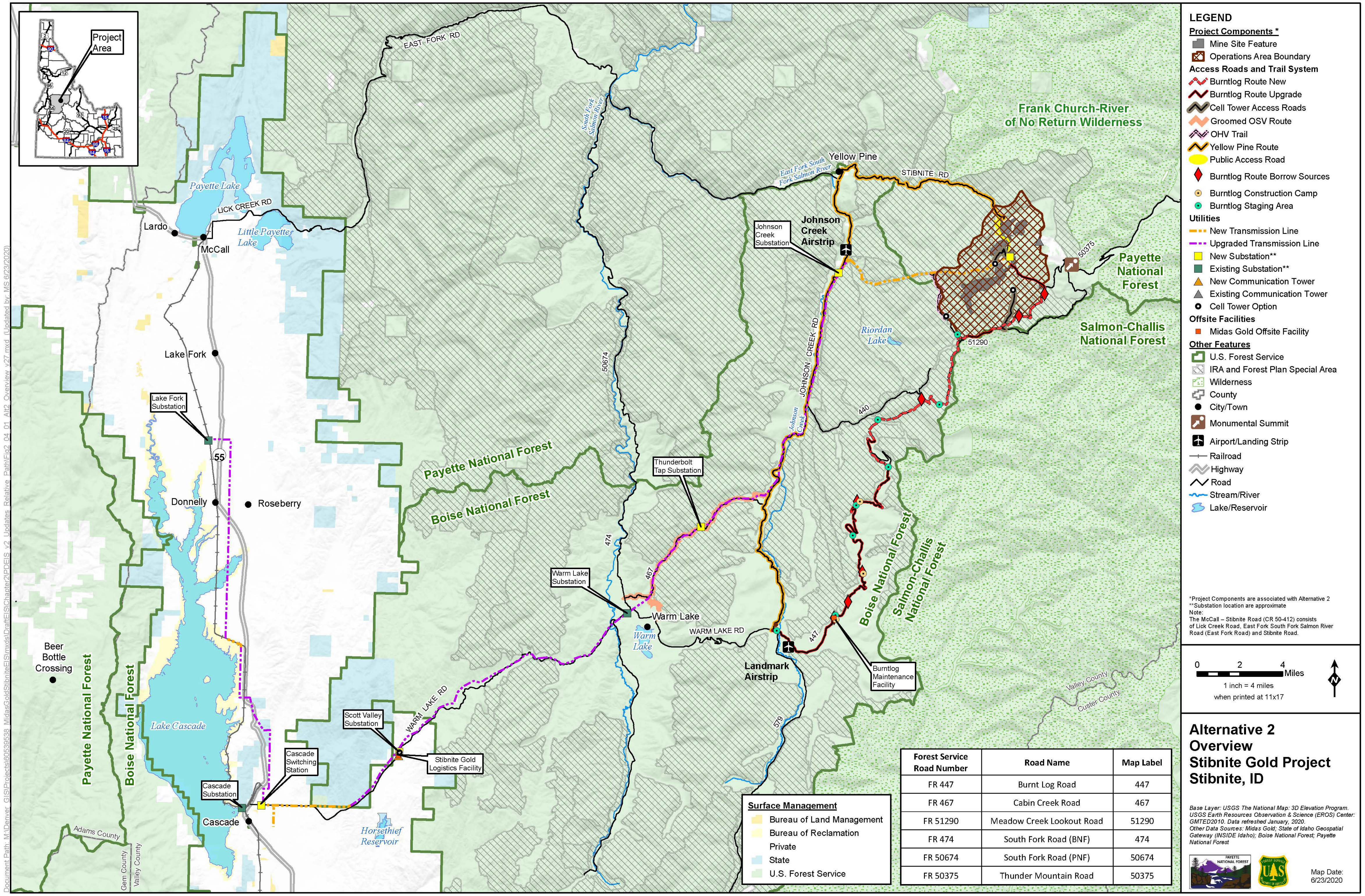

Forest Service Road Number	Road Name	Map Label
FR 447	Burnt Log Road	447
FR 467	Cabin Creek Road	467
FR 51290	Meadow Creek Lookout Road	51290
FR 474	South Fork Road (BNF)	474
FR 50674	South Fork Road (PNF)	50674
FR 50375	Thunder Mountain Road	50375

Figure Source: AECOM 2020a

Figure 2.4-1 Alternative 2 Overview

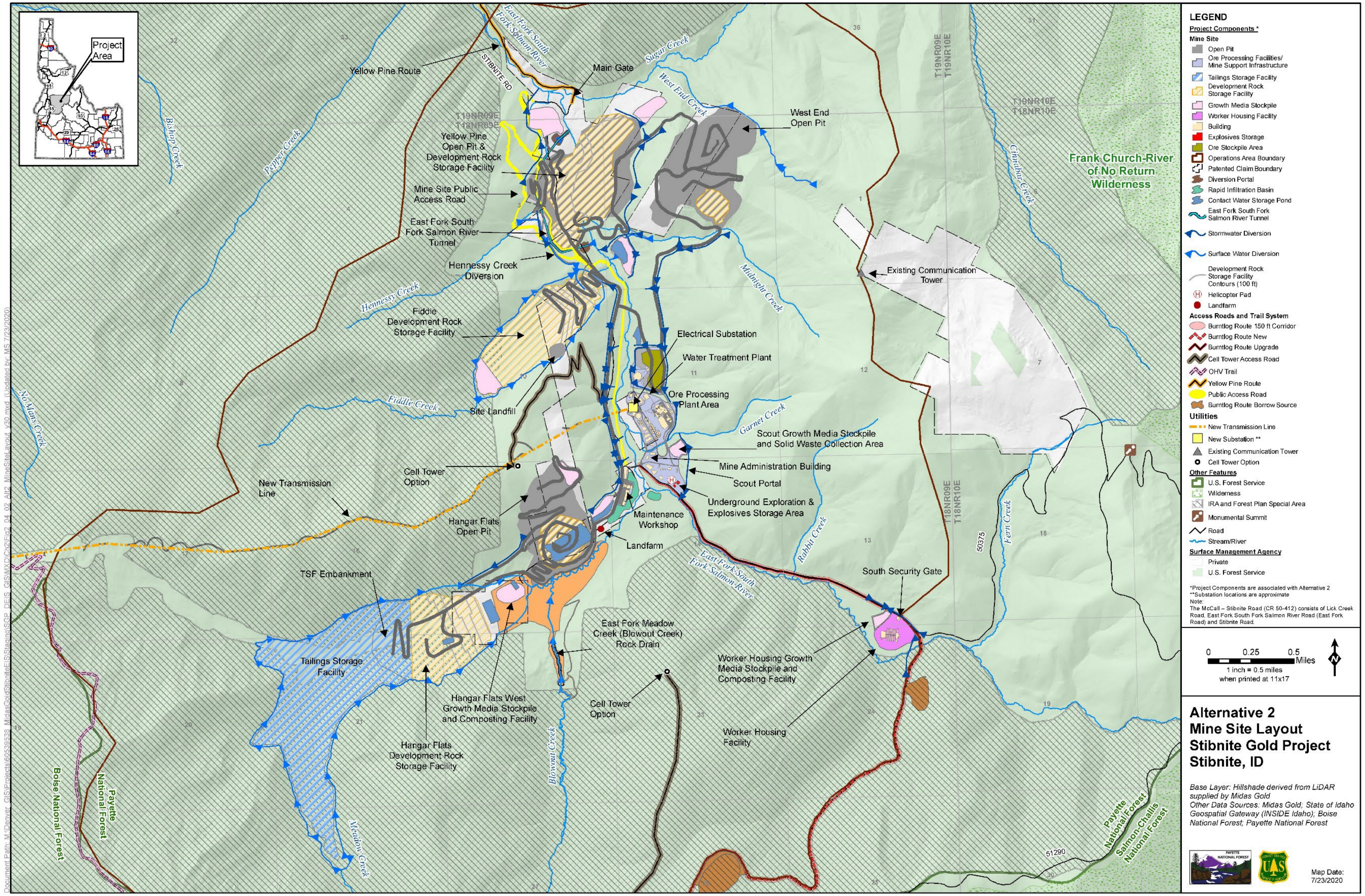

Figure Source: AECOM 2020a

Figure 2.4-2 Alternative 2 Mine Site Layout

2.4.2 Land Management and Affected Areas

The estimated affected areas by component and land ownership are shown in **Table 2.4-2** for Alternative 2. **Appendix C** provides detailed acreage calculations and includes acreages of currently disturbed land by component and ownership. **Appendix C** also contains a comparison of affected areas under Alternative 1 to affected acres under Alternative 2.

Table 2.4-2 Land Management and Acreage by Component for Alternative 2

Component Subtotal	Private	State	Boise National Forest	Payette National Forest	Bureau of Reclamation	Total Acres
Mine Site Subtotal	554	0	0	1,325[4]	0	**1,879**
Existing Access Roads Subtotal[1]	10	0	162	28	0	**200**
New Access Road Disturbance Subtotal	0	0	232	97	0	**329**
Utilities Subtotal[2]	265	76	532	92	19	**985**
Off-site Facilities Subtotal	25	0	5	0	0	**30**
Total[3]	**854**	**76**	**931**	**1,542[5]**	**19**	**3,423**

Table Source: AECOM 2020a

Table Notes:

1 Existing access roads with minor to major improvements would be used for the SGP. Existing access roads acreages reflect the current road configurations. Any additional disturbance to widen existing roads is included in the new access road disturbance subtotal.

2 Utilities affected acres include both existing utility corridors and access routes, and new utility corridors and access routes. Some existing utility access routes would be upgraded. Utilities affected acres include upgrades to utilities that are part of the Connected Actions.

3 Subtotals may not add to totals due to rounding.

4 Approximately 65 affected acres associated with surface exploration pads and temporary roads (mine site component) have unknown land ownership because the exact locations of these exploration areas are not yet known. The surface exploration acres are included in the PNF mine site subtotal.

5 Approximately 5 acres of land listed under the PNF is administered by the PNF but is within the boundary of the Salmon-Challis National Forest.

2.4.3 Timeline

Timelines for construction, operations, and closure and reclamation for Alternative 2 would be the same as for Alternative 1.

2.4.4 Construction Phase

Construction activities and timing under Alternative 2 would be essentially the same as under Alternative 1. However, the modifications described in **Table 2.4-1** above would eliminate, relocate or modify interrelated construction activities.

2.4.4.1 Access Roads

BURNTLOG ROUTE – RIORDAN CREEK SEGMENT

Under Alternative 2, a section of new road construction along Burntlog Route (**Figure 2.4-3**) would be located on the south side of the Riordan Creek drainage and cross Riordan Creek north of Black Lake. The approximately 5.3-mile road segment would have 12 stream crossings, 3 of which cross perennial streams. The elevation of this road segment is approximately 8,000 to 8,600 feet and the average grade of this road segment would be 5 to 6 percent. The new construction portion of Burntlog Route under Alternative 2 would be approximately 13.5 miles and under Alternative 1 would be approximately 15 miles.

2.4.4.2 Public Access

STIBNITE ROAD TO THUNDER MOUNTAIN ROAD LINK

During mine site construction, a new 12-foot-wide gravel road would be constructed to provide public access from Stibnite Road (CR 50-412) to Thunder Mountain Road (FR 50375). The public access road would be constructed prior to the removal of development rock from Yellow Pine pit.

There are two options for a public access road through the mine site:

- Option 1 (**Figure 2.4-4**) – Constructed along a widened bench of the western portion of Yellow Pine pit (**Figure 2.4-5**). South of Yellow Pine pit this road would parallel a mine haul road and use a partially revegetated portion of the former Bradley mine haul road (**Figure 2.4-6**). The public access road portion through Yellow Pine pit would include a rockfall catchment area. This road would be approximately 3 miles in length.
- Option 2 (**Figure 2.4-7**) – Constructed west of the Yellow Pine pit. South of Yellow Pine pit, this road would parallel a mine haul road and use a partially revegetated portion of the former Bradley mine haul road (**Figure 2.4-8**). This road would be approximately 4 miles in length.

Based on assessment of impacts and public and agency feedback, one of these two options would be selected.

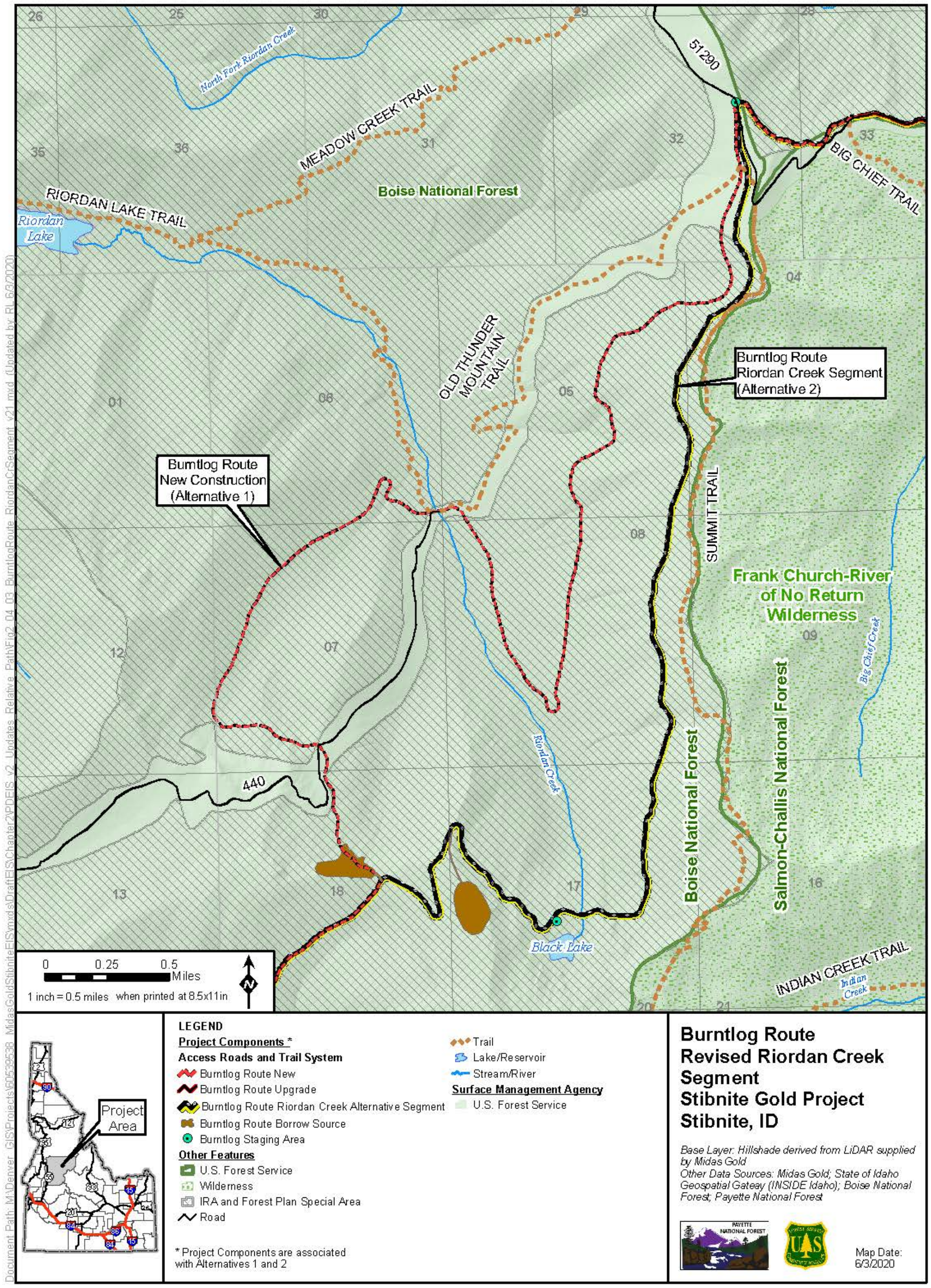

Figure Source: AECOM 2020a

Figure 2.4-3 Burntlog Route Revised Riordan Creek Segment

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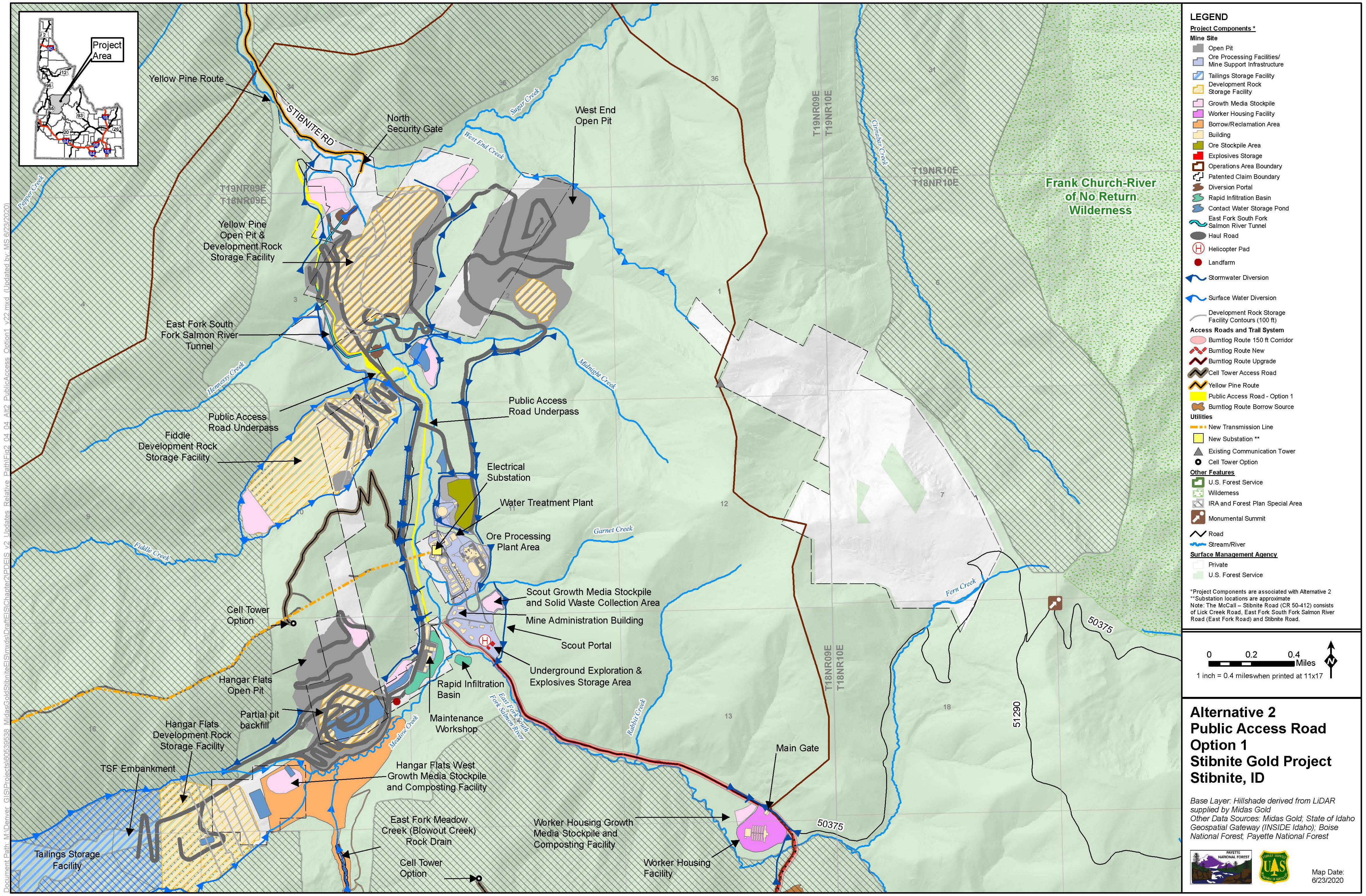

Figure Source: AECOM 2020a

Figure 2.4-4 Alternative 2 Public Access Road Option 1

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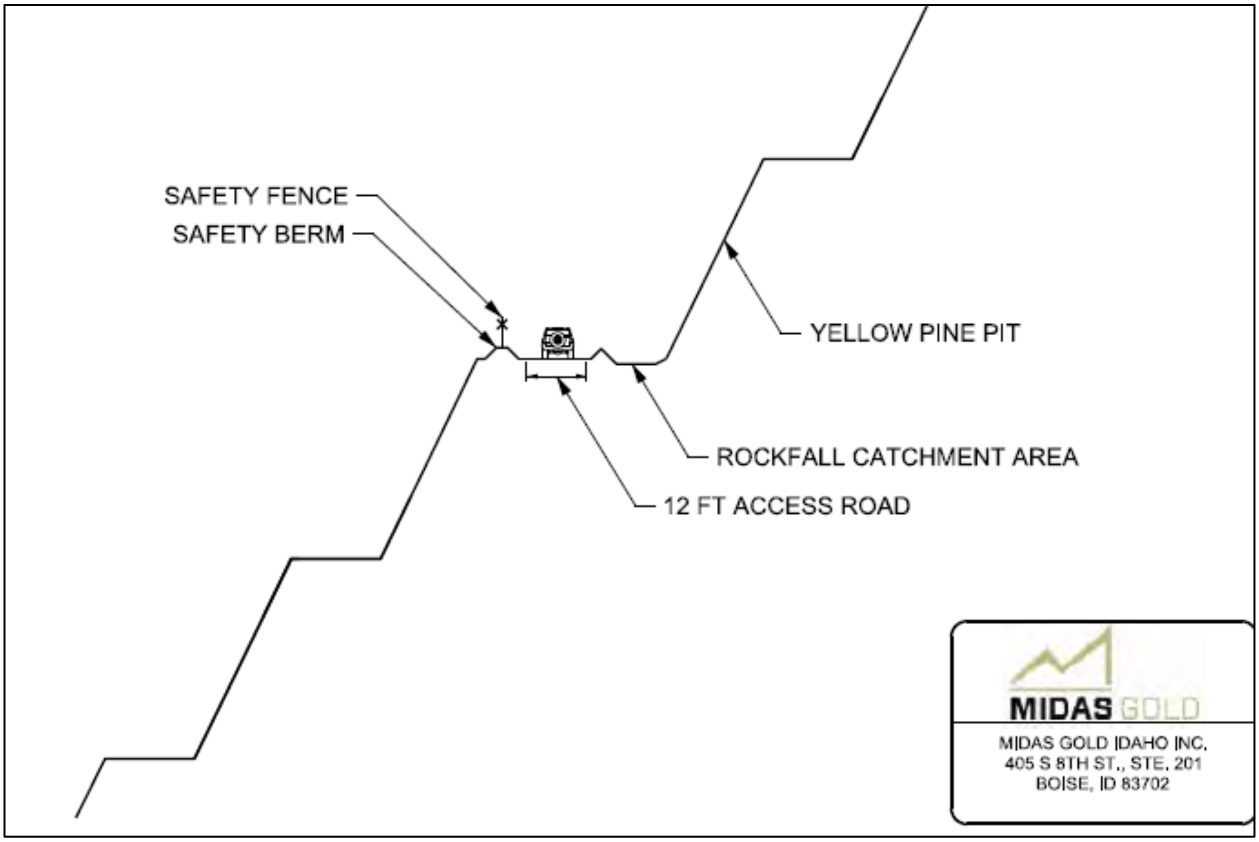

Figure Source: HDR 2018

Figure 2.4-5 Cross Section of Public Access Option 1 - Through Yellow Pine Pit

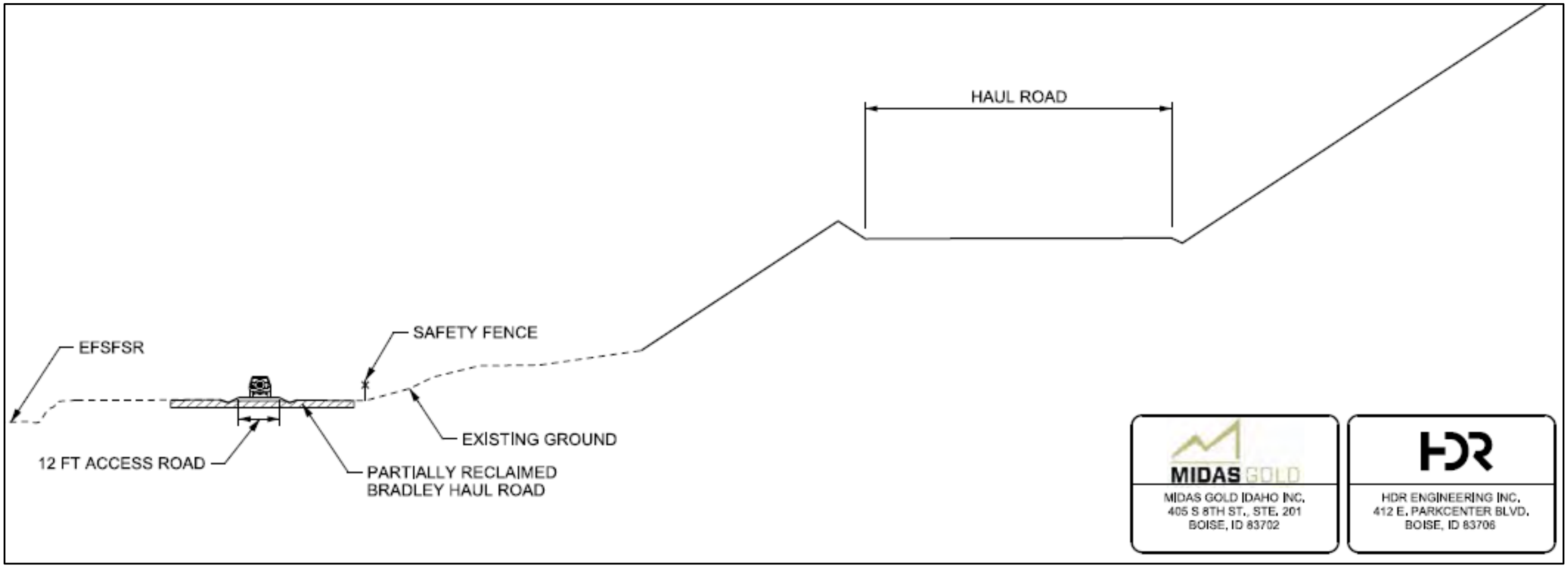

Figure Source: HDR 2018

Figure 2.4-6 Public Access Below Mine Haul Road – Options 1 and 2

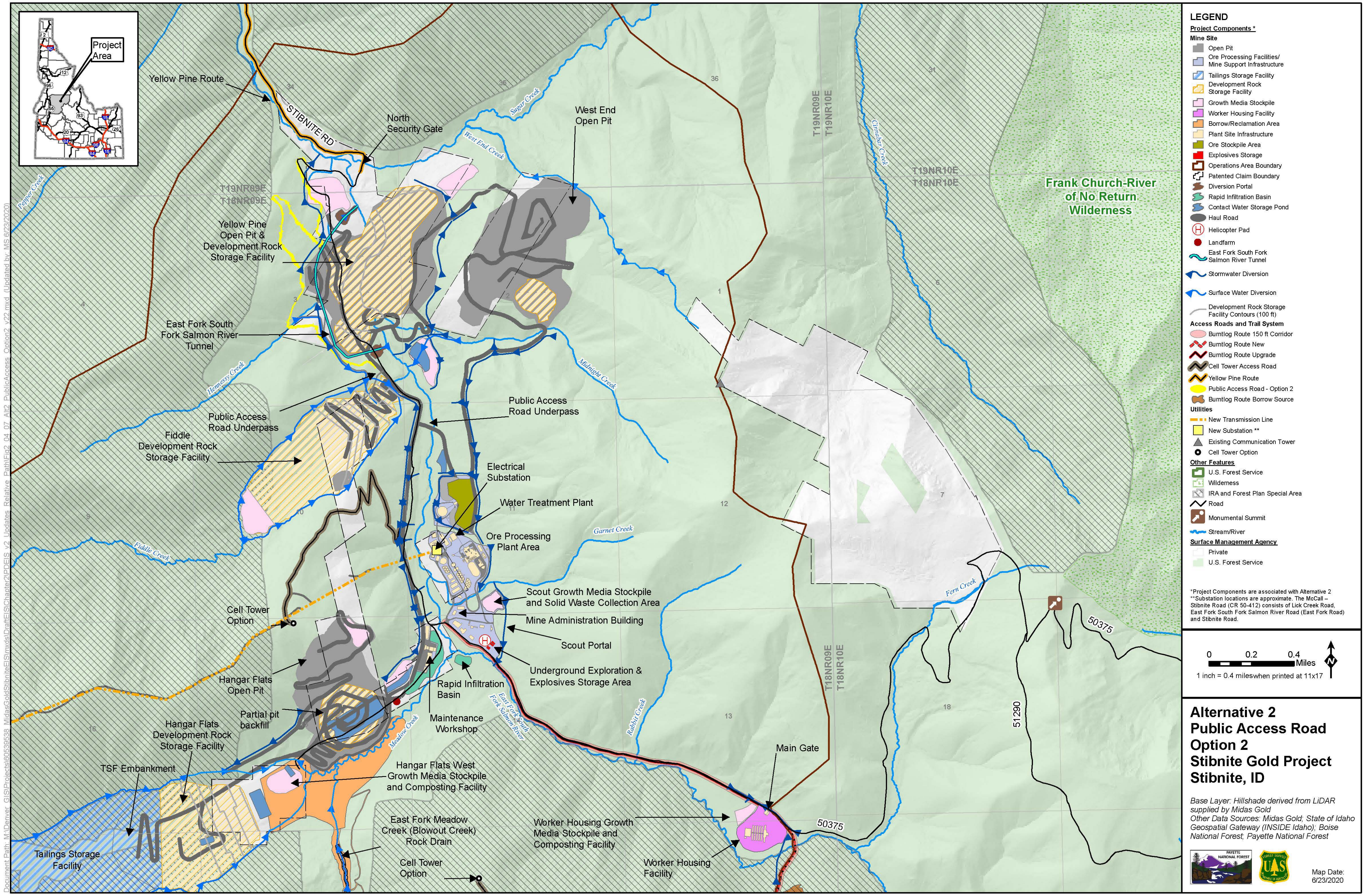

Figure Source: AECOM 2020a

Figure 2.4-7 Alternative 2 Public Access Option 2

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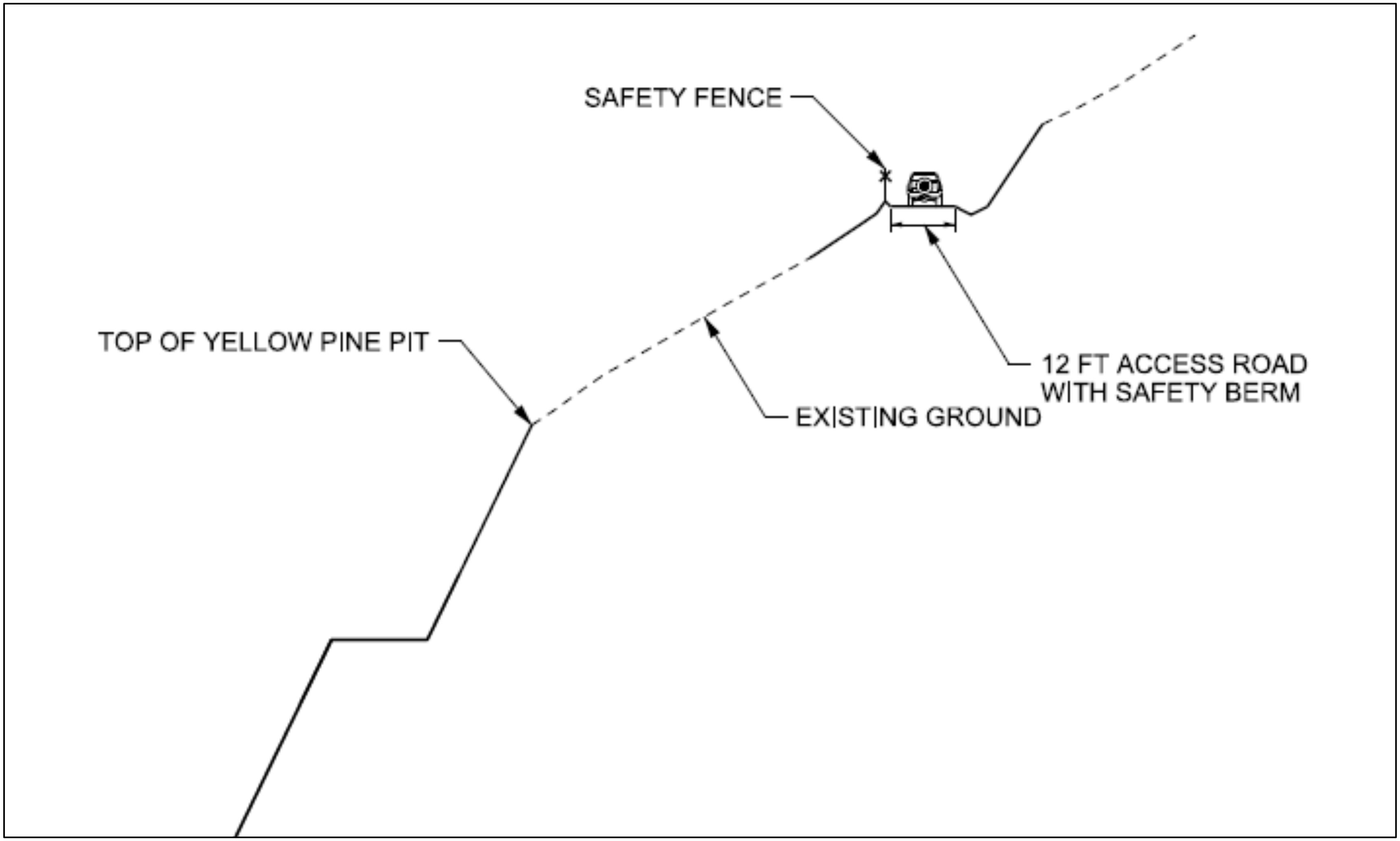

Figure Source: HDR 2018

Figure 2.4-8 Public Access West of Yellow Pine Pit – Option 2

2.4.5 Operations Phase

2.4.5.1 Mining

OPEN PITS

Mining methods and open pit dimensions for Alternative 2, would be the same as outlined for Alternative 1. Mining would start in the West End pit during construction and continue throughout the 12- to 15-year span of mining operations to obtain limestone for the on-site lime generation facilities as described in Section 2.4.5.3, Ore Processing Facilities. The sequence for mining ore from the three pits would be the same as described in Section 2.3.5.1, Mining.

2.4.5.2 Development Rock Storage Facilities

WEST END DRSF

Under Alternative 2, the West End DRSF would not be constructed. The approximate 25 million tons of development rock proposed to be placed in the West End DRSF under Alternative 1 would be placed in other DRSFs or used for pit backfill.

MIDNIGHT PIT DRSF

Under Alternative 1 the Midnight pit (which is within the West End pit) would not be backfilled. Under Alternative 2, the Midnight pit would be backfilled with approximately 6 million tons of development rock from the West End pit. The backfill would be placed to achieve a mounded surface to promote drainage away from the West End pit. The Midnight pit backfill would be covered with 1 foot of growth media from the Midnight GMS and revegetated.

HANGAR FLATS PIT DRSF

After mine operations in Hangar Flats pit cease, approximately 21 million tons of development rock would be used to partially backfill the open pit. Approximately 18 million tons of development rock would come primarily from the West End pit. Development rock would be placed to an elevation of approximately 6,390 feet, and the resulting depth of Hangar Flats pit lake would be approximately 150 feet. After backfilling operations have been completed, the Hangar Flats pit would fill with water. The partial backfill would not change the pit lake elevation level (6,540 feet), but the lake would form more quickly with the smaller pit volume and the inflow of peak flows described in Section 2.4.6.3, Hangar Flats Pit. Depending on stream flow, an estimated 1.5 years would be required to fill the pit lake compared to an estimated 7 years under Alternative 1.

2.4.5.3 Ore Processing Facilities

ON-SITE LIME GENERATION

Under Alternative 2, lime and crushed limestone would be produced on-site from mining a limestone/marble formation in the West End pit. Over the life of the mine, approximately 130,000 to 318,000 tons of limestone/marble would be mined annually, averaging approximately 240,000 tons per year. Approximately 25 to 30 percent of the limestone mined annually would be run through the lime kiln with the remainder crushed and stockpiled for direct use as limestone. Both ore and limestone would be temporarily stored at the run-of-mine stockpile.

The on-site lime generation would require additional equipment, which would be placed within the ore processing area. This equipment would include: limestone crusher and conveyor; propane-fired kiln with the capacity to generate up to approximately 200 tons per day; kiln combustion air system including preheat heat exchanger; 30,000-gallon propane storage tank plus vaporizer; air compressor, receivers, and dryers for plant air and instrument air at kiln area; roll crusher for kiln product discharge; six conveyors for moving feed and product materials; off-gas fume filter for kiln discharge; dust collector kiln feed bin; 500-ton storage bin for kiln feed material; and 1,000- to 11,000-ton storage bin for lime products.

The limestone crusher, screens, conveyors, and feed bins would not be enclosed. Dust would be controlled in a similar manner to the ore crushing and conveying process through the use of water sprays and/or bag house dust collectors.

2.4.5.4 Tailings Storage Facility

The TSF would be constructed, operated, and reclaimed as described under Alternative 1, except for the liner system. The TSF (including the upstream, or internal, embankment face) would be lined with a composite liner. The TSF liner system would consist of primary and secondary geomembranes containing leakage collection and recovery media. The composite liner would consist of the following layers starting from the ground surface, which would be cleared of vegetation:

- Underdrain
- Prepared subgrade
- Geosynthetic clay liner
- 60-mil HDPE AGRU MicroDrain® Liner[1]
- 60-mil HDPE geomembrane primary liner

The 60-mil HDPE AGRU MicroDrain® Liner[1] functions as a combined secondary liner and leakage collection layer and allows any leaks to flow toward the area of the TSF embankment where a collection sump would be located. The sump would contain a level control and a

[1] Mention of product by name does not imply endorsement by U.S. Department of Agriculture of any product to the exclusion of others that may be suitable.

submersible pump. A pipe would run up the embankment to the surface to allow monitoring for leakage and pumping if needed. Any water pumped from the collection sump would be released into the supernatant pond on the top of the TSF.

As is the case with Alternative 1, the liner system under Alternative 2 does not meet the current regulatory requirements of IDAPA 50.01.13, Rules for Ore Processing by Cyanidation. However, IDEQ has entered into rulemaking on the existing regulations to change the regulatory requirements from prescriptive requirements to performance-based requirements. Midas Gold has indicated that the TSF liner system would be modified to meet the IDAPA regulatory requirements in effect at the time of facility permitting.

2.4.5.5 Mine Support Infrastructure

Mine Haul Roads

Implementation of Alternative 2 would result in changes in the mine site haul roads. The haul road to the West End DRSF would be eliminated because the West End DRSF would be eliminated. The haul road from the West End pit to the processing facilities under Alternative 1 would be constructed earlier under Alternative 2 to allow hauling of limestone during the last year of construction. This haul road would be in use for the life of the mining operations. The haul road from the Yellow Pine pit to the Fiddle DRSF would be separated from the public access routes through the mine site as described in Section 2.4.4.2, Public Access. The public access would be routed through an underpass at two locations with the haul road traffic crossing over.

2.4.5.6 Water Management

Stream Diversions around Mining Features

Hennessy Creek

Under Alternative 2, the Hennessy Creek diversion would be an approximately 5,490-foot-long surface diversion channel with capacity to convey a 25-year flood event. Hennessy Creek diversion would include an impounding structure, overflow weir, and diversion cleanout basin to divert streamflow. A 40-foot section of 24-inch pipe would divert stream flow into a channel connecting to a Fiddle DRSF diversion (**Figure 2.4-9**).

West End Creek

The West End Creek diversion inlet would be located further downgradient in the existing stream channel due to the elimination of the West End DRSF (**Figure 2.4-9**).

Meadow Creek

Under Alternative 2, the Meadow Creek diversion and geosynthetic liner would be extended an additional 1,050 feet downstream (**Figure 2.4-10**).

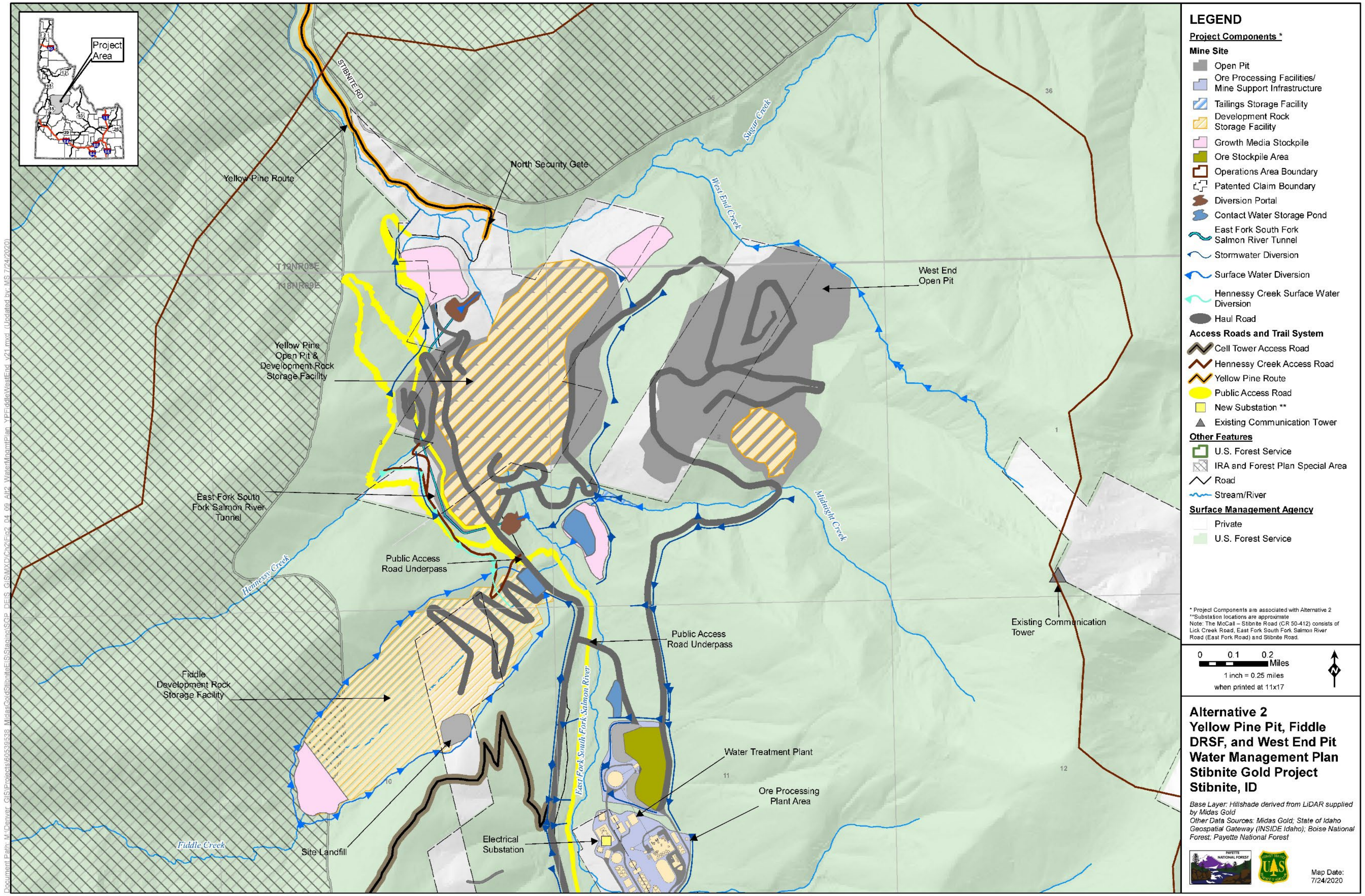

Figure Source: AECOM 2020a

Figure 2.4-9 Alternative 2 Yellow Pine Pit, Fiddle DRSF, and West End Pits Water Management Plan

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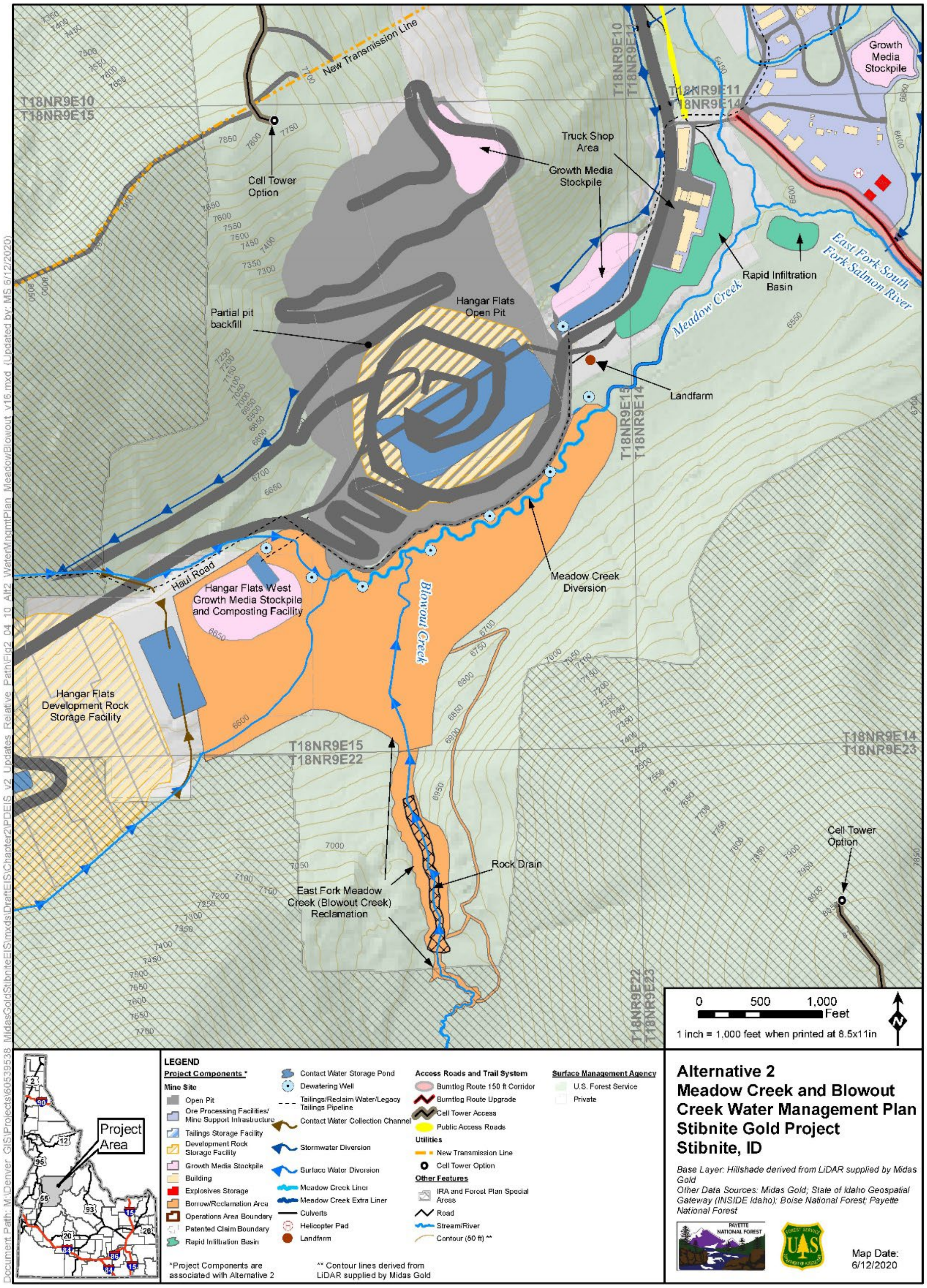

Figure Source: AECOM 2020a

Figure 2.4-10 Alternative 2 Meadow Creek and Blowout Creek Water Management Plan

Low Streamflow Diversion

During mine operation, low stream flows in diversion channels around the TSF, Hangar Flats DRSF, Fiddle DRSF, and West End pit would be piped underground. Eight- to 12-inch-diameter pipes would be installed under the diversion channels in the riprap channel lining or under the adjacent access road to carry low flows. The pipe would be sized to convey August baseflow. Stream flow would enter pipe through inlets where the stream is diverted into the channel.

PIT DEWATERING

Pit dewatering would be the same as described under Alternative 1 except that dewatering of the Yellow Pine pit would continue through the first three years of closure and reclamation in order to supply water to the RIBs to maintain alluvial groundwater levels while the Hangar Flats pit lake is filling.

Groundwater pumped from pit dewatering would be used as makeup water in ore processing to the extent possible. Dewatering water not used in the ore processing circuit would be treated at the Centralized WTP to meet IPDES permit limits, and would then be discharged to the RIBs.

As described for Alternative 1, groundwater not captured by the pit dewatering would be directed to an in-pit sump in the lowest part of the pit where it would combine with mine drainage (i.e., contact water) from precipitation falling within the pit and used for dust control within the pits, or transferred to a contact water pond.

RAPID INFILTRATION BASINS

The RIBs would function the same as Alternative 1. However, RIBs would receive treated water from the Centralized WTP, primarily treated pit dewatering water, Analysis is still underway to determine the volumes of dewatering water to be pumped to the RIBs.

WATER USE AND WATER BALANCE

Under Alternative 2, the projected water industrial, mining, and potable use would be the same as Alternative 1. A water balance flow diagram for the mining and ore processing operations phase is similar to Alternative 1 and is provided in **Figure 2.4-11.**

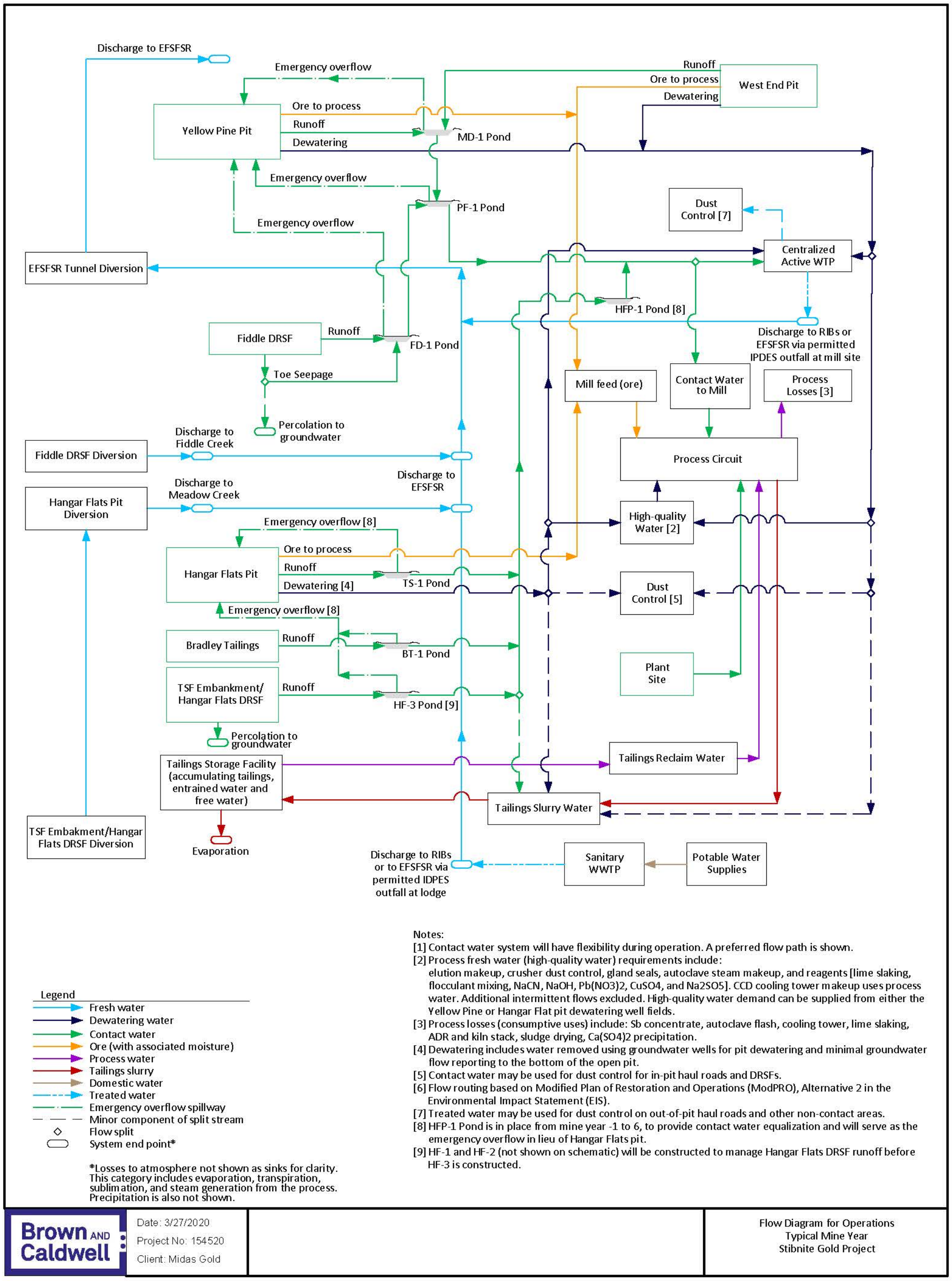

Figure Source: Brown and Caldwell 2020

Figure 2.4-11 Alternative 2 Water Balance Flow Diagram (Operations)

WATER TREATMENT

For Alternative 2, the Water Quality Management Plan (Brown and Caldwell 2020) establishes water management objectives for the construction, operations, and closure and reclamation of the mine, and describes the infrastructure and procedures proposed to accomplish those objectives. Although the Water Quality Management Plan was developed by Midas Gold for Alternative 2, and is presented in this Draft EIS as specific to Alternative 2, the components could be scaled to any alternative.

Alternative 2 would include many of the same types of water quality management as described for Alternative 1. These include minimizing erosion and generation of sediment through implementation of engineering controls and best management practices; managing non-contact surface water and stormwater flows; separating contact from non-contact stormwater runoff and dewatering of groundwater; and closure and reclamation to provide a stable configuration.

The Water Quality Management Plan provides details on additional components that would be implemented under Alternative 2.The following describes the components of the water management program that differ from Alternative 1.

- Enhanced evaporation for contact water beginning the first year of construction and continuing through the closure and reclamation period.
- Temporary iron coprecipitation water treatment for up to 250 gpm would be used, as needed, during years 2 and 3 (the last 2 years of the construction period) to treat and discharge contact water. Residuals would be tested and disposed in an appropriately permitted off-site disposal area.
- Temporary membrane treatment would be used to treat and discharge contact water when flows are expected to be less than 1,000 gpm. Based on water projections, this is expected to be the early years of operation (years 4 through 6). During this period, if a heavier snowpack occurs, additional treatment could be mobilized for the spring runoff period. Residuals would be disposed in the TSF.
- A Centralized WTP would be constructed to handle peak monthly flows exceeding 1,000 gpm, expected in year 7 and beyond. The Centralized WTP would treat up to 4,000 gpm using iron coprecipitation to remove arsenic, antimony, and mercury. If needed, an additional step to precipitate mercury using organic sulfide precipitant would be employed.

The Centralized WTP would be a permanent facility. The facility is currently proposed to be located on NFS land. Midas Gold would investiage moving the system to private land before construction in order to avoid a permanent feature on NFS land. The Centralized WTP would treat contact water, including pit dewatering water, and also could be used to treat process water, if needed. A separate facility would be maintained at the worker housing facility for treatment of domestic wastewater.

When the volume of water needing treatment in the Centralized WTP exceeds 4,000 gpm, such as during spring runoff, contact water ponds would be used to equalize the flows through the Centralized WTP. For high water years, mine pits also could be temporarily used to hold water for treatment.

During mine operation, the Centralized WTP is expected to require the following chemicals and reagents on an annual basis.

Sodium Hypochlorite – 15,000 gallons

Ferric Sulfate – 125,000 gallons/year

Hydrated Lime – 250 tons

Organic Flocculant (polymer) – 1,900 gallons

Sulfuric Acid – 2,400 gallons

Sodium Bisulfite – 2,000 gallons

Organic sulfide precipitant, if needed

Transport of these chemicals and reagents would add approximately 40 round trips for delivery to the operational AADT presented in **Table 2.4-3**. An estimated 2 to 4 employees would be required to operate the Centralized WTP.

The resulting solids from the Centralized WTP are not expected to be classified as a hazardous waste, and would be disposed in the TSF. Treated water would be discharged through the RIBs and/or direct discharge to the EFSFSR through an IPDES permitted outfall.

2.4.5.7 Access Roads

Access during operations would be the same as described in Alternative 1, except that a portion of the Burntlog Route would be relocated as described in Section 2.4.3.1, Access Roads.

2.4.5.8 Public Access

STIBNITE ROAD TO THUNDER MOUNTAIN ROAD LINK

Public Access during operations would be the same as described in Alternative 1, except that a new 12-foot-wide gravel road would be constructed to provide public access from Stibnite Road (CR 50-412) to Thunder Mountain Road (FR 50375) as described in Section 2.4.4.2, Public Access. The public access road would be used to travel through the mine site and would provide seasonal use, open to all vehicles. Vehicles passing through the mine site would be required to check-in with mine personnel at the Main or North Gates guard shacks upon entering the mine site and would receive a safety briefing. Vehicles on the public access road would be required to pass through the mine site without stopping or deviating from the public access road and would be required to check-out with mine site personnel upon exiting the mine site, to ensure they are clear of the site for safety purposes. Midas Gold would have the option to restrict mine site access to any vehicles due to concerns related to public or employee health and safety, such as during blasting, mining in the immediate area of the road and other similar operations.

Berms, security fencing, and two underpasses, to allow the public road to pass beneath the mine haul road, would separate the public access road from other mine site roads. One underpass would be located north of the Fiddle DRSF and a second underpass would be located near the ore processing facility area. The public access road would be temporarily closed during construction and maintenance, and during other mining activities that would be considered public safety hazards (e.g., highwall scaling, blasting). Signs would be placed to inform the public of temporary closures and the public access road would not be plowed in the winter.

2.4.5.9 Off-site Facilities

Under Alternative 2, a maintenance facility (Burntlog Maintenance Facility) would be constructed within a borrow source site 4.4 miles east of the junction of Johnson Creek Road and Warm Lake Road (**Figure 2.4-1**). The relocated maintenance facility would include the same components as described in Alternative 1.

2.4.5.10 Traffic

The production of lime on-site would reduce lime deliveries to the site by 2,032 trips per year and would require an average of 133 additional propane deliveries per year (Midas Gold 2018b).

Table 2.4-3 shows the expected operational supply and haulage traffic under Alternative 2. The AADT for Alternative 2 is 50 vehicles.

2.4.6 Closure and Reclamation

Closure and Reclamation activities under Alternative 2 would be the same as under Alternative 1, except as described below.

2.4.6.1 Hangar Flats DRSF

Upon completion of final grading of the Hangar Flats DRSF, a low permeability geosynthetic cover would be placed on the top of the DRSF, which would be designed to limit infiltration through the DRSF. The geosynthetic liner would be overlain by placement of an inert soil/rock layer and growth media and revegetated.

2.4.6.2 Fiddle DRSF

Upon completion of final grading of the Fiddle DRSF, a low permeability geosynthetic cover would be placed on the top and outslopes of the DRSF that is designed to limit infiltration through the DRSF. The geosynthetic liner would be overlain by placement of an inert soil/rock layer and growth media and revegetated.

Table 2.4-3 Alternative 2 Projected Operations Supply and Haulage Traffic

Transport Phase	Vehicle Type[1]	Estimated Average No. of Round Trips Per Period[2]	Period[3]	Scheduled Days per Year[4]	Number of Round Trips per Year[5]	Annual Average Daily Traffic (AADT)[6]
Crew bus/van transport to site	HV	11	14 days	365	287	2
Crew personal vehicles	LV	25	14 days	365	651	4
Salaried employees	LV	8	7 days	365	417	3
Salaried employees bus/van transport to site	HV	2	7 days	365	104	1
Fuel (including propane) and miscellaneous supplies	HV	2.5	day	261	655	2
Machine parts and consumables	HV	2	day	365	730	4
Ore processing supplies	HV	9.3	day	261	2,436	13
Pilot vehicle (fuel and hazardous loads)	LV	2	day	261	522	3
Equipment and supply representatives	LV	2	day	261	522	3
Food delivery	HV	2	day	261	522	4
Trash & recyclables	HV	3	7 days	365	156	1
Ore concentrate haulage	HV	1	day	365	365	2
Miscellaneous traffic	LV	4	day	261	1,044	6
Road maintenance	HV	2	day	365	730	4
Total HV AADT						**33**
Total LV AADT						**17**
Total AADT[7]						**50**

Table Source: Midas Gold 2018b

Table Notes:

1 LV = Light Vehicle; HV = Heavy Vehicle.

2 The estimated average number of round trips that would occur within a given time period. All figures have been rounded up to whole numbers.

3 The allocated time period.

4 Not all transport phases would occur daily; scheduled days per year indicate the days per year when a trip is expected.

5 The estimated average number of round trips that would occur in a given year.

6 AADT = estimated average number of round trips per period / period x scheduled days per year / 365 days x 2 trips.

7 The AADT does not include the estimated 40 annual trips to supply chemicals for the Centralized WTP.

2.4.6.3 Hangar Flats Pit

During mine closure, and after partially backfilling Hangar Flats pit with development rock from the West End pit, Meadow Creek streamflow (including flows from Blowout Creek) above 5 cubic feet per second would be diverted into Hangar Flats pit to expedite pit filling. Once water levels in Hangar Flats pit reach an elevation of 6,390 feet in an estimated 1.5 years, dependent on stream flows, Meadow Creek and Blowout Creek stream flows would not be diverted into the Hangar Flats pit.

2.4.6.4 Meadow Creek

The interim Meadow Creek diversion channel and floodplain would be retained around Hangar Flats pit as the final channel and Meadow Creek would not be routed through the Hangar Flats pit lake once full.

Under Alternative 2 during low flows in Meadow Creek, pit dewatering wells would continue to operate through closure and reclamation. Water from the dewatering wells would be sent to the Centralized WTP for treatment. Treated water from Meadow Creek would be discharged to the RIBs until the Hangar Flats pit water levels reach an elevation of 6,390 feet and water levels in the Meadow Creek alluvium have recovered to pre-mining levels.

2.4.6.5 Hennessy Creek

After closure of the EFSFSR tunnel and backfilling of the Yellow Pine pit, the Hennessy Creek diversion channel, 24-inch pipe, and impoundment structure would be reclaimed. As described in Alternative 1, the Hennessy Creek channel would cascade over the approximately 275-foot tall west highwall of the Yellow Pine pit to a section of low-gradient channel on the edge of the constructed floodplain before joining the constructed EFSFSR channel.

2.4.6.6 Water Treatment

Sources of water that could require treatment during closure and reclamation and post closure would include:

- Yellow Pine Pit dewatering water that continues through year 18;
- TSF consolidation water and meteoric water falling on the TSF;
- Fiddle DRSF toe seepage;
- Hangar Flats pit lake overflow; and
- Intermittent discharges from the West End pit.

The Centralized WTP would provide treatment for contact water for an indefinite period of time post closure. The Yellow Pine pit dewatering would continue to be treated through year 18, dewatering ceasing once the pit lake is filled. Treatment of TSF consolidation water and meteoric water falling on the TSF would continue through approximately year 24. Treatment of Hangar Flats pit water prior to discharge would begin once the pit lake is filled and overflow is expected to occur. Treatment of Hangar Flats pit lake overflow water would continue for as long as needed to maintain water quality standards. Water would be pumped from the Hangar Flats pit to the Centralized WTP for treatment and discharged through a permitted IPDES discharge point to the EFSFSR. Flows in Meadow Creek would be maintained throughout the permanent diversion described in Section 2.4.5.4, Meadow Creek. After dewatering of the Yellow Pine pit ceases and the TSF consolidation water and Fiddle DRSF toe seepage are directed into passive water treatment systems, the volume of water requiring treatment in the Centralized WTP is expected to be approximately 760 gpm, well within the design capacity of 4,000 gpm discussed in Section 2.4.5.6, Water Management.

In approximately year 24, once flows from the TSF through the Centralized WTP have dropped below 750 gpm, water from the TSF consolidation and stormwater runoff would be directed to a separate passive treatment system in the Meadow Creek drainage. Treatment using a biochemical reactor with polishing through a vertical wetland system is being evaluated by Midas Gold. No chemicals would be required for operation of the treatment system. Discharge would be through a permitted IPDES discharge point to Meadow Creek. Treatment of consolidation and meteoric water from the TSF is expected to be needed for 30 years.

The Fiddle DRSF toe seep water would be treated in a similar passive water system. The system would be designed for a 400 gpm flow rate. Flows above that rate could be temporarily stored in the Fiddle DRSF contact water pond. The discharge from the passive system for the Fiddle DRSF toe seepage would be through an outfall to the EFSFSR. If the passive treatment does not meet IPDES permit standards, the water from the Fiddle DRSF toe seep would be sent to the Centralized WTP.

The West End pit is expected to take 41 years to fill and is expected to overflow and discharge intermittently based on spring runoff conditions. Due to the intermittent nature of these discharges, temporary water treatment plants would be used if needed. The temporary discharge system would release to an IPDES permitted discharge point on West End Creek.

Material and supplies for active water treatment at the Centralized WTP during closure and reclamation and the post closure period are listed in **Table 2.4-4**.

Table 2.4-4 Material and Supplies for Active Water Treatment During Closure/Reclamation and Post Closure

Material	Quantity Required During Closure and Reclamation	Quantity Required Post Closure and Reclamation
Sodium Hypochlorite (gallons/year)	5,000	2,600
Ferric Sulfate (gallons/year)	65,000	44,800
Hydrated Lime (pounds/year)	260,000	180,000
Organic Sulfide Precipitant	To be determined if required	
Organic Flocculant (gallons/year)	1,300	670
Sulfuric Acid (gallons/year)	1,700	870
Sodium Bisulfite (gallons/year)	1,400	690

Table Source: Brown and Caldwell 2020

Transport of these chemicals and reagents would add approximately 30 truck round trips per year during closure and reclamation and an estimated 20 truck round trips per year post closure. To minimize the potential for accidents and spills during transport, materials and supplies would be transported to the mine site and stockpiled on site for use during the winter. Once the TSF is closed and reclaimed, residuals would be tested and transported off-site for disposal in an appropriately permitted landfill. Residuals to be transported during the post closure period are estimated to require approximately 14 trucks trips per year. During the winter residuals would be stockpiled and sent for off-site disposal in the spring.

The Water Quality Management Plan (Brown and Caldwell 2020) provides additional details on water treatment for closure and reclamation and the post closure period.

2.4.6.7 Transmission Line and Electrical Infrastructure

Operation of the Centralized WTP would require electrical power during the post closure period. Under Alternative 2, the transmission line and access roads from Johnson Creek substation to the mine site would remain in place during the post-closure period.

2.4.7 Connected Actions

Two sections of upgraded transmission line as described under Alternative 1 would be relocated under Alternative 2.

2.4.7.1 Railroad Grade Reroute

Between Donnelly and Cascade, approximately 0.9 mile of the upgraded transmission line would be relocated to an abandoned railroad grade on private property in order to avoid impacts to wetlands during construction and maintenance. The relocated line would be approximately 600 feet north of the existing transmission line location and approximately 1 mile south of the intersection of Old State Road and Kantola Lane (see **Figure 2.4-1**).

2.4.7.2 Thunder Mountain Estates Bypass

Approximately 1 mile east of Cascade, an approximately 5.4 miles of the upgraded transmission line would be relocated to avoid the Thunder Mountain Estates Subdivision (see **Figure 2.4-11**). The 5.4-mile segment of the upgraded transmission line would be routed along Warm Lake Road within Valley County's road ROW. The Thunder Mountain Estates Bypass would create the need to relocate the Cascade switching station to Warm Lake Road approximately 0.6 mile east of State Highway 55. The bypass would require approval through the IDL because it crosses state lands. A portion of the bypass also crosses the BNF.

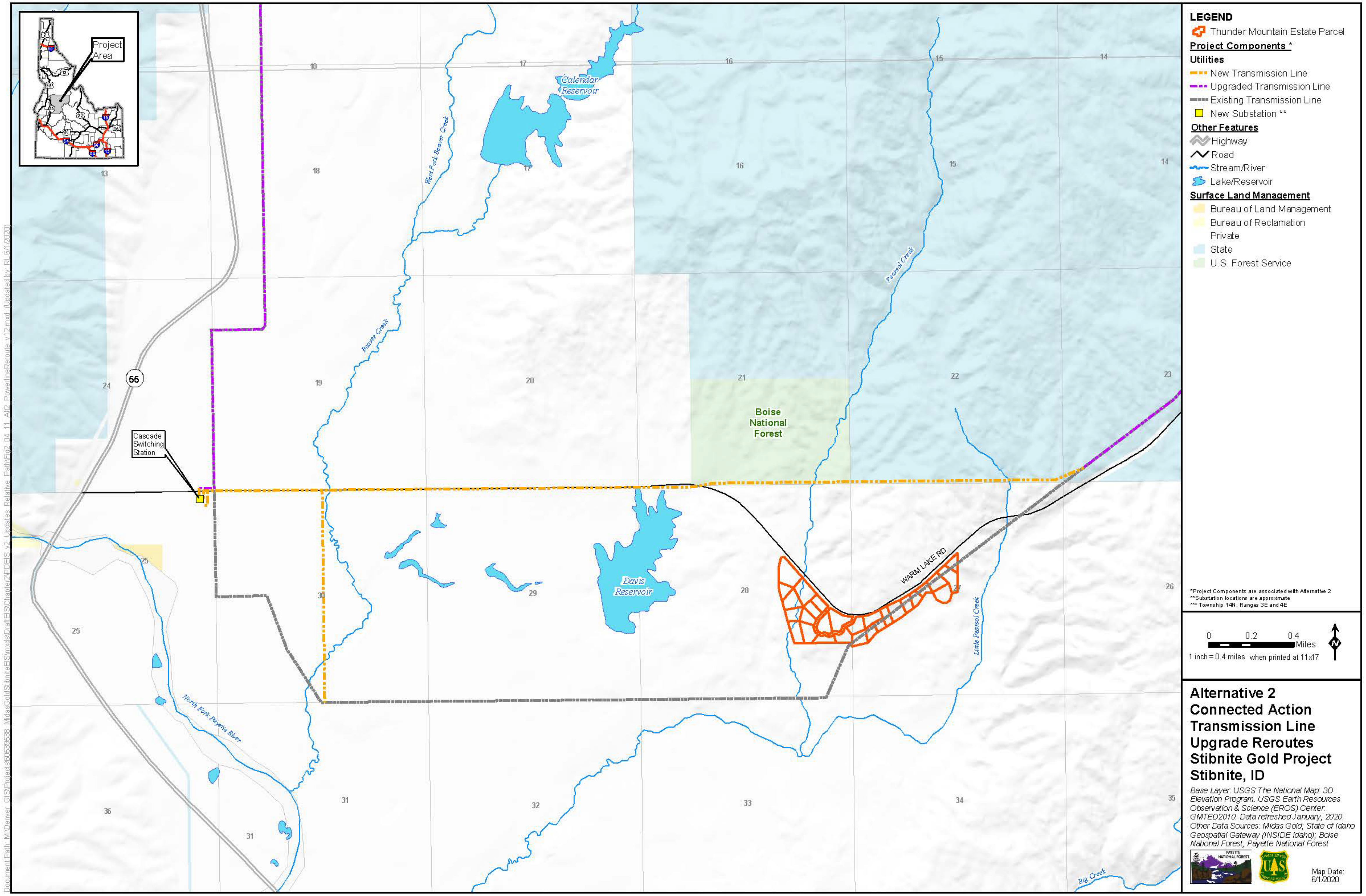

Figure Source: AECOM 2020a

Figure 2.4-12 Alternative 2 Connected Action Transmission Line Upgrade Reroutes

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2.5 ALTERNATIVE 3

2.5.1 Overview

Alternative 3 was developed to determine if an alternative location for the TSF would avoid or reduce potential impacts to federally-listed fish species; wetland and riparian areas; surface water and groundwater; and potential candidate plant species (whitebark pine). This section describes only the modifications from Alternative 1 that have been incorporated into Alternative 3. The modifications in Alternative 3 are listed in **Table 2.5-1** along with a brief rationale for the suggested component alternative. The proposed facilities and access roads are shown on **Figure 2.5-1**, Alternative 3 Overview; and **Figure 2.5-2**, Alternative 3 Mine Site Layout.

Table 2.5-1 Alternative 3 Components and Rationale for Inclusion

Phase – Component/ Subcomponent	Facility or Process Change	Rationale
Construction – GMSs	The Hangar Flats West and worker housing GMSs and associated composting facilities would be relocated adjacent to the Alternative 3 DRSF and worker housing facility locations.	Construction of the TSF and Hangar Flats DRSF in the EFSFSR and the worker housing Facility in the Blowout Creek valley would require locating the GMSs adjacent to these facilities in their Alternative 3 locations.
Construction/Operations – Mine Access	Mine site access would be through Blowout Creek valley.	Construction of the TSF in the EFSFSR valley would require mine access to be routed through Blowout Creek valley, and could reduce IRA impacts.
Construction/Operations – Public access	Public access around the mine site by Meadow Creek Lookout Road from Burntlog Route to Monumental Summit	Improve Meadow Creek Lookout Road (FR 51290) to provide public access from Burntlog Route to Monumental Summit and Thunder Mountain Road.
Construction – Access Route Borrow Sources	Location of mine access through Blowout Creek valley would eliminate acces to two borrow sources	Two borrow sources, located with an IRA, would not be accessible along the mine access through Blowout Creek valley and would not be developed.
Construction – Utilities/ Transmission lines	A portion of the transmission line would be relocated.	A portion of the new transmission line from the Johnson Creek substation to the mine site would be located in Meadow Creek valley and could, avoid some impacts on IRAs and areas that could include a sensitive plant species (whitebark pine).

Phase – Component/ Subcomponent	Facility or Process Change	Rationale
Operations – TSF/DRSF	The TSF and Hangar Flats DRSF would be located in the EFSFSR valley.	Locating the TSF in the EFSFSR valleycould reduced impacts to federally-listed fish species, and surface water quality and temperature. The Hangar Flats DRSF would be located downgradient of the TSF to buttress the embankment.
Operations – Spent Ore and Legacy Tailings Removal in Meadow Creek Valley	There would be no removal of the SODA or reprocessing of the Bradley tailings.	Location of the TSF in the EFSFSR drainage would mean that removal of the SODA or Bradley tailings is not necessary.
Operations – Surface Water Management	The EFSFSR would be diverted around the TSF/DRSF.	EFSFSR would be diverted around the TSF located in the EFSFSR valley.
Operations – Surface Water Management	Meadow Creek would be diverted around Hangar Flats pit.	Meadow Creek would be diverted around the Hangar Flats pit, however upstream of Hangar Flats pit, Meadow Creek diversion would not be needed.
Operations – Mine Support Infrastructure	The worker housing facility and mine entrance would be located in the Blowout Creek valley.	Due to location of the TSF in the EFSFSR drainage, the main gate and worker housing would be located in Blowout Creek valley.
Closure and Reclamation – Water Treatment	Passive treatment of TSF consolidation water occurs in EFSFSR drainage.	The TSF and DRSF would be in the EFSFSR drainage, the passive treatment of consolidation water from the TSF would occur in that drainage.

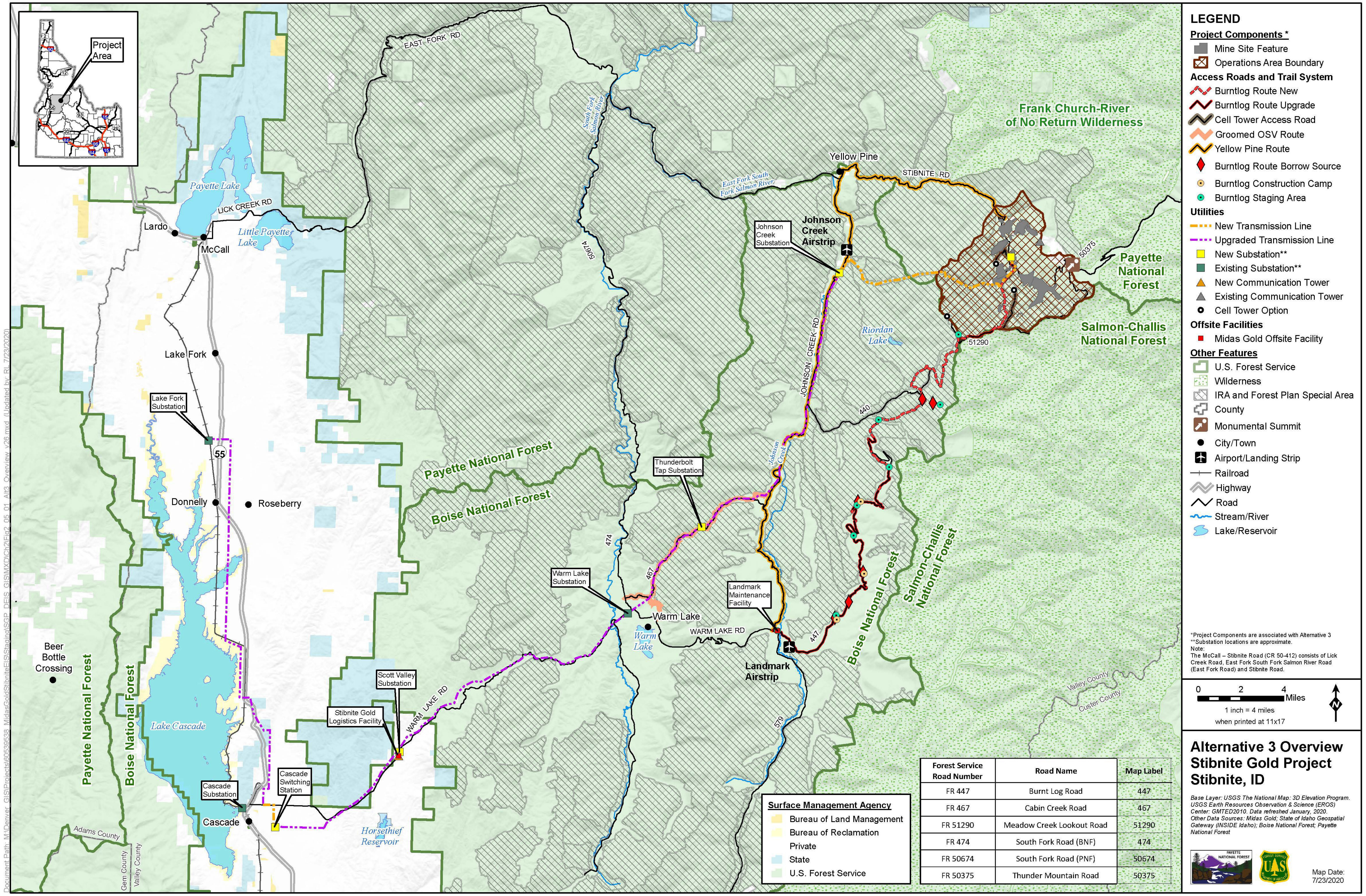

Figure Source: AECOM 2020a

Figure 2.5-1 Alternative 3 Overview

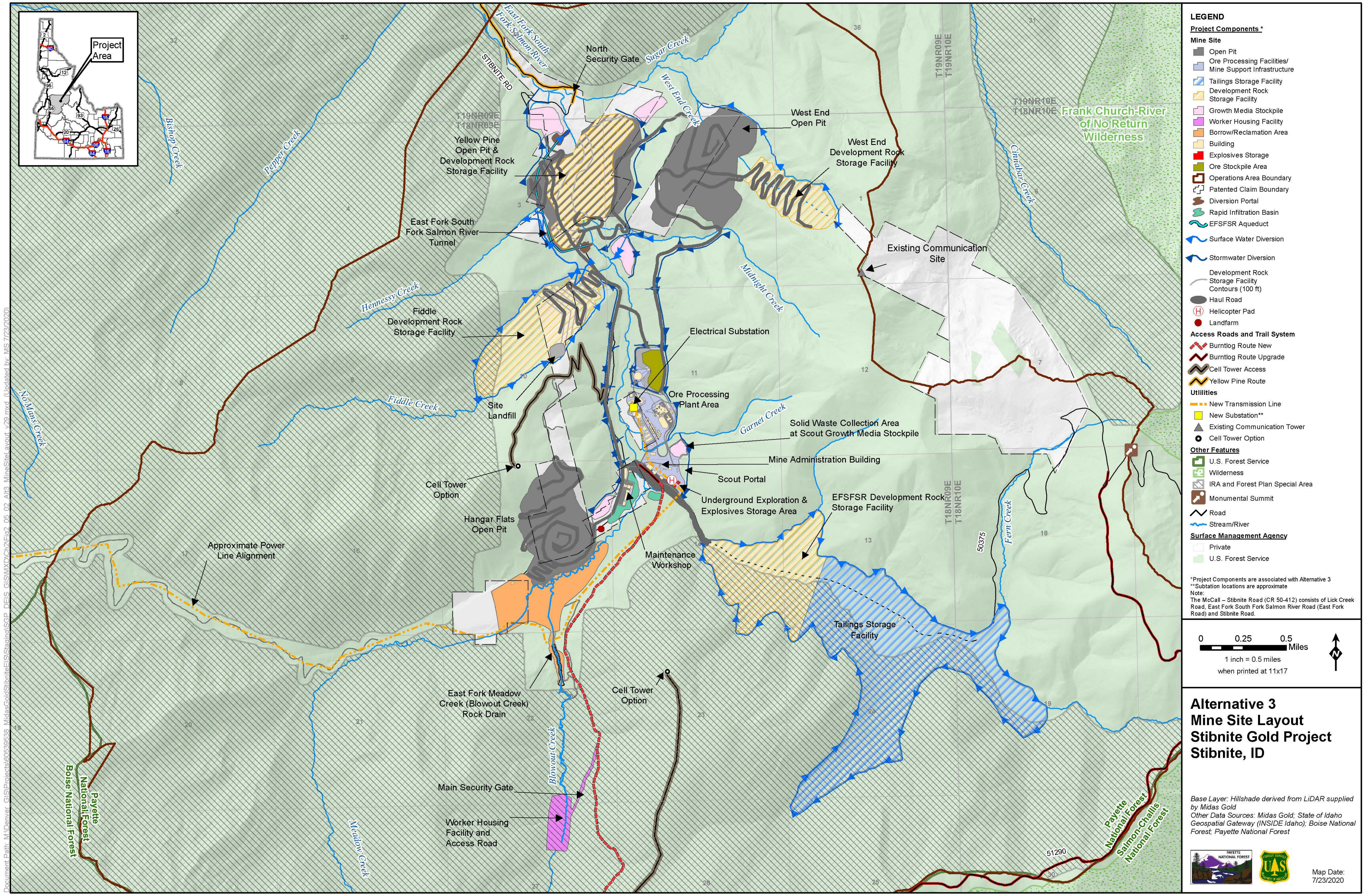

Figure Source: AECOM 2020a

Figure 2.5-2 Alternative 3 Mine Site Layout

2.5.2 Land Management and Affected Areas

For Alternative 3, the estimated maximum land affected by component and land ownership is shown in **Table 2.5-2**.

Table 2.5-2 Land Management and Acreage by Component for Alternative 3

Component Subtotal	Private	State	Boise National Forest	Payette National Forest	Bureau of Reclamation	Total Acres
Mine Site Subtotal	511	0	0	1,560[4]	0	**2,071**
Existing Access Roads Subtotal[1]	10	0	162	39	0	**211**
New Access Road Disturbance Subtotal	0	0	246	63	0	**310**
Utilities Subtotal[2]	287	62	524	92	25	**990**
Off-site Facilities Subtotal	25	0	3	0	0	**28**
Total[3]	**833**	**62**	**935**	**1,754[5]**	**25**	**3,610**

Table Source: AECOM 2020a

Table Notes:

1 Existing access roads with minor to major improvements would be used for the SGP. Existing access roads acreages reflect the current road configurations. Any additional disturbance to widen existing roads is included in the new access road distrbance subtotal.

2 Utilities affected acres include both existing utility corridors and access routes, and new utility corridors and access routes. Some existing utility access routes would be upgraded. Utilities affected acres include upgrades to utilities that are part of the Connected Actions.

3 Subtotals may not add to totals due to rounding.

4 Approximately 65 affected acres associated with surface exploration pads and temporary roads (mine site component) have unknown land ownership because the exact locations of these exploration areas are not yet known. The surface exploration acres are included in the PNF mine site subtotal.

5 Approximately 19 acres of land listed under the PNF is administered by the PNF but is within the boundary of the Salmon Challis National Forest.

2.5.3 Timeline

Baseline geotechnical technical data equivalent to that available for Alternative 1 in Meadow Creek is not available for Alternative 3 in the EFSFSR drainage. Accordingly, if Alternative 3 were selected, the engineering design and permitting timeframe would need to be extended by up to 2 years relative to Alternative 1 in order to obtain this information. The time period for SGP phases would be unchanged, but the start of construction and the subsequent operations and closure and reclamation would be delayed by up to 2 years to collect this data.

2.5.4 Construction Phase

Construction activities under Alternative 3 would be the same as under Alternative 1 except the modifications described in **Table 2.5-1** above would eliminate, relocate, or modify interrelated construction activities. As noted in **Table 2.5-1** and in the following sections, construction plans would need to be developed for different component locations due to the location of the TSF in the EFSFSR. Note that some of the phases in **Table 2.5-1** have been combined into construction/operation. They are described in this construction section, but continue into operations.

2.5.4.1 Growth Media Stockpiles

The Hangar Flats West GMS, worker housing GMS, and associated composting facilities would be moved to accompany the move of the Hangar Flats DRSF, TSF, and worker housing. These facilities would be moved to adjacen to these facilities.

2.5.4.2 Access Roads

The design and construction of Burntlog Route would be the same as in Alternative 1. The location of the TSF and DRSF in the EFSFSR would require routing a 3.2-mile segment of Burntlog Route and the main gate entrance though the Blowout Creek valley (**Figure 2.5-1**). In addition, the location of the site access route through the Blowout Creek drainage would make two of the Burntlog Route borrow sources described under Alternative 1 inaccessible. As a result, there would be fewer borrow sources to provide materials for road construction and maintenance.

2.5.4.3 Public Access

The Burntlog Route would be available for public access when other routes are not available.Under Alternative 3, the Meadow Creek Lookout Road (FR 51290), from Burntlog Route at the upper portion of Blowout Creek drainage to the intersection with Thunder Mountain Road a short distance from Monumental Summit, would be improved for public access. Improvements on approximately 7.6 miles would include a 14-foot-wide travelway, 24-inch-diameter culverts and road surfacing with 4 inches of gravel. The cut/fill slopes and road would be approximately 40 feet wide.

The OHV connector trail from from Horse Heaven/Powerline Road to Meadow Creek Lookout Road (FR 51290) would not be constructed.

2.5.4.4 Utilities

Under Alternative 3, the new transmission line from the new Johnson Creek substation to the mine site would have the same design and construction methods as described in Alternative 1. Approximately 2.5 miles of the new transmission line would be realigned to avoid the Horse Heaven and Meadow Creek IRAs as shown on **Figure 2.5-2**. Additionally, the new 24.9-kV lines within the mine site would be realigned to accommodate the relocated EFSFSR TSF, DRSF, and worker housing facility.

2.5.5 Operations Phase

2.5.5.1 Tailings Storage Facility

The Alternative 3 TSF operation would be the same as described under Alternative 1; however, the TSF would be in the EFSFSR drainage instead of the Meadow Creek drainage (**Figure 2.5-2**). The EFSFSR TSF would store approximately 100 million tons of tailings within the 579-acre footprint. The embankment would be constructed in the same manner as Alternative 1, using earth and rock within the proposed TSF footprint, development rock sourced from mining operations, and legacy materials.

The EFSFSR tailings embankment would have a maximum width of approximately 2,250 feet and would be 446 feet high when completed to an elevation of 7,220 feet (during operations phase). The TSF would be designed to contain the Probable Maximum Precipitation storm event with 2 feet of freeboard and would be underlain by an impermeable liner system with the same composition as described for Alternative 1. The location of the tailings and reclaim water pipelines for the EFSFSR TSF are shown on **Figure 2.5-3**.

The TSF liner system would be the same as described for Alternative 1 (Section 2.3.5.7, Tailings Storage Facility). As discussed in Alternative 1, this liner system is not currently in compliance with the existing Rules for Ore Processing by Cyanidation (IDAPA 50.01.13). Midas Gold has indicated that the TSF liner system would be modified to meet the IDAPA regulatory requirements in effect at the time of facility permitting.

2.5.5.2 Development Rock Storage Facility

The Hangar Flats DRSF would be relocated immediately downgradient of the EFSFSR TSF and, as in Alternative 1, would buttress the downstream slope of the TSF. This DRSF would be constructed in the same manner as described for Alternative 1.

2.5.5.3 Spent Ore and Legacy Tailings Removal in Meadow Creek Valley

Under Alternative 3, because the Hangar Flats DRSF would be relocated to the EFSFSR, there would be no need to remove the SODA and legacy tailings materials in the Meadow Creek Valley.

2.5.5.4 Surface Water Management

EFSFSR Stream Diversion

Under Alternative 3, diversion of the EFSFSR would be required to allow placement of the EFSFSR TSF and DRSF. For mine operation, the EFSFSR stream channel and tributaries would be diverted along either side of the TSF and DRSF. Two surface water diversion channels would be constructed to intercept runoff water from the EFSFSR watershed around the TSF and DRSF. The temporary EFSFSR stream diversion would be located on the north side of the TSF and DRSF and be directed back into the existing EFSFSR channel downgradient of the DRSF outslope. A surface water diversion channel would be located on the south side of the TSF and DRSF and would collect precipitation runoff and divert several smaller stream channels. Both diversions would be designed to handle the 100-year storm event with 1-foot of freeboard and would be lined to minimize infiltration. The diversion channels would be constructed as described in Alternative 1. These diversion channels are shown on **Figure 2.5-3.**

MEADOW CREEK DIVERSION

Under this alternative, no diversion or alteration of Meadow Creek would be necessary upstream of Hangar Flats pit. Meadow Creek would be diverted around the Hangar Flats pit just upgradient of the pit as shown on **Figure 2.5-2**.

2.5.5.5 Mine Support Infrastructure

Under Alternative 3, the following changes would be made to mine support infrastructure:

- The 22-acre worker housing facility would be relocated to Blowout Creek valley near the main gate; and
- Haul road changes would be needed to access the EFSFSR TSF and associated DRSF. Preliminary locations of haul roads for the EFSFSR TSF are shown on **Figure 2.5-3**.

2.5.5.6 Sanitary and Solid Waste

The sanitary wastewater treatment facility, co-located with the worker housing facility, would be relocated to the Blowout Creek valley. Relocation of sanitary wastewater treatment facility would result in relocating the proposed IPDES wastewater outfall to Meadow Creek drainage instead of EFSFSR drainage.

2.5.5.7 Mine Site Borrow Sources

Mine site borrow sources would remain the same as with Alternative 1, except there would be no removal of the SODA or Bradley (legacy) tailings.

2.5.5.8 Access Roads

Access during operations would be the Burntlog Route described in Section 2.5.4.2, Access Roads, to the connection with Meadow Creek Lookout Road. Burntlog Route under Alternative 3 would be routed down the Blowout Creek valley.

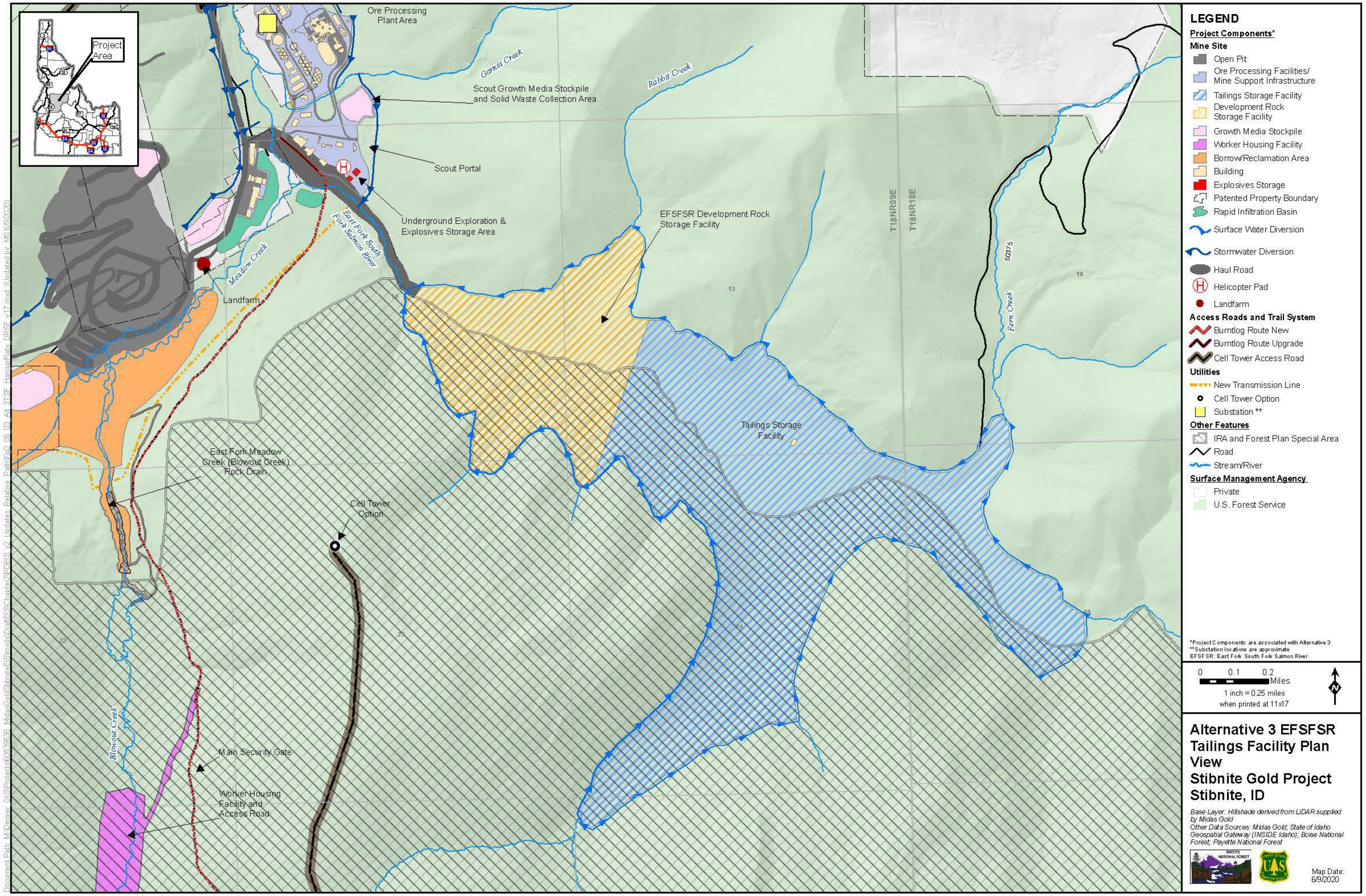

Figure Source: AECOM 2020a

Figure 2.5-3 Alternative 3 EFSFSR Tailings Facility Plan View

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2.5.5.9 Public Access Road

Under Alternative 3, there would be no public access roads through the mine site during mine operation. Location of the TSF in the EFSFSR would remove portions of Thunder Mountain Road (FR 50375). Consistent with 36 CFR 261.13, public motor vehicle use of Burntlog Route would be allowed when other public access roads connecting to Meadow Creek Lookout Road (FR 51290) and Thunder Mountain Road are blocked by mine operations as shown on **Figure 2.5-1**. The Meadow Creek Lookout Road would be maintained during operations, as described in Section 2.5.4.5, Public Access.

2.5.6 Closure and Reclamation

Under Alternative 3, decommissioning, demolition, or disposal of mine site facilities, off site facilities, and the new transmission line would be the same as Alternative 1, except as modified below.

2.5.6.1 Tailings Storage Facility

Under Alternative 3 the EFSFSR TSF and DRSF would be reclaimed in a similar manner to the Alternative 1 TSF and Hangar Flats DRSF. The EFSFSR channel would be constructed over the top of the DRSF and TSF using the same design criteria as outline for the construction of Meadow Creek over the top of the TSF and Hangar Flats DRSF under Alternative 1.

2.5.6.2 Passive Water Treatment

The passive water treatment of tailings consolidation water in Alternative 3 TSF operation would be the same as described under Alternative 1; however, the TSF, and therefore the treatment system, would be in the EFSFSR drainage instead of the Meadow Creek drainage (**Figure 2.5-2**).

2.5.6.3 Public Access

Upon mine closure and reclamation of the EFSFSR TSF, options for a permanent public access road through the mine area include:

- Convert a temporary access road along the operational TSF pipeline route to a permanent public access road. The permanent access road constructed over the reclaimed Yellow Pine DRSF would connect to a road constructed along the EFSFSR DRSF face and the EFSFSR TSF following the operational pipeline route and then connect to Thunder Mountain Road (FR 50375) near Fern Creek.
- Convert approximately 3.6 miles of Burntlog Route through Blowout Creek valley to a permanent public access road connecting from Meadow Creek Lookout Road to Thunder Mountain Road.

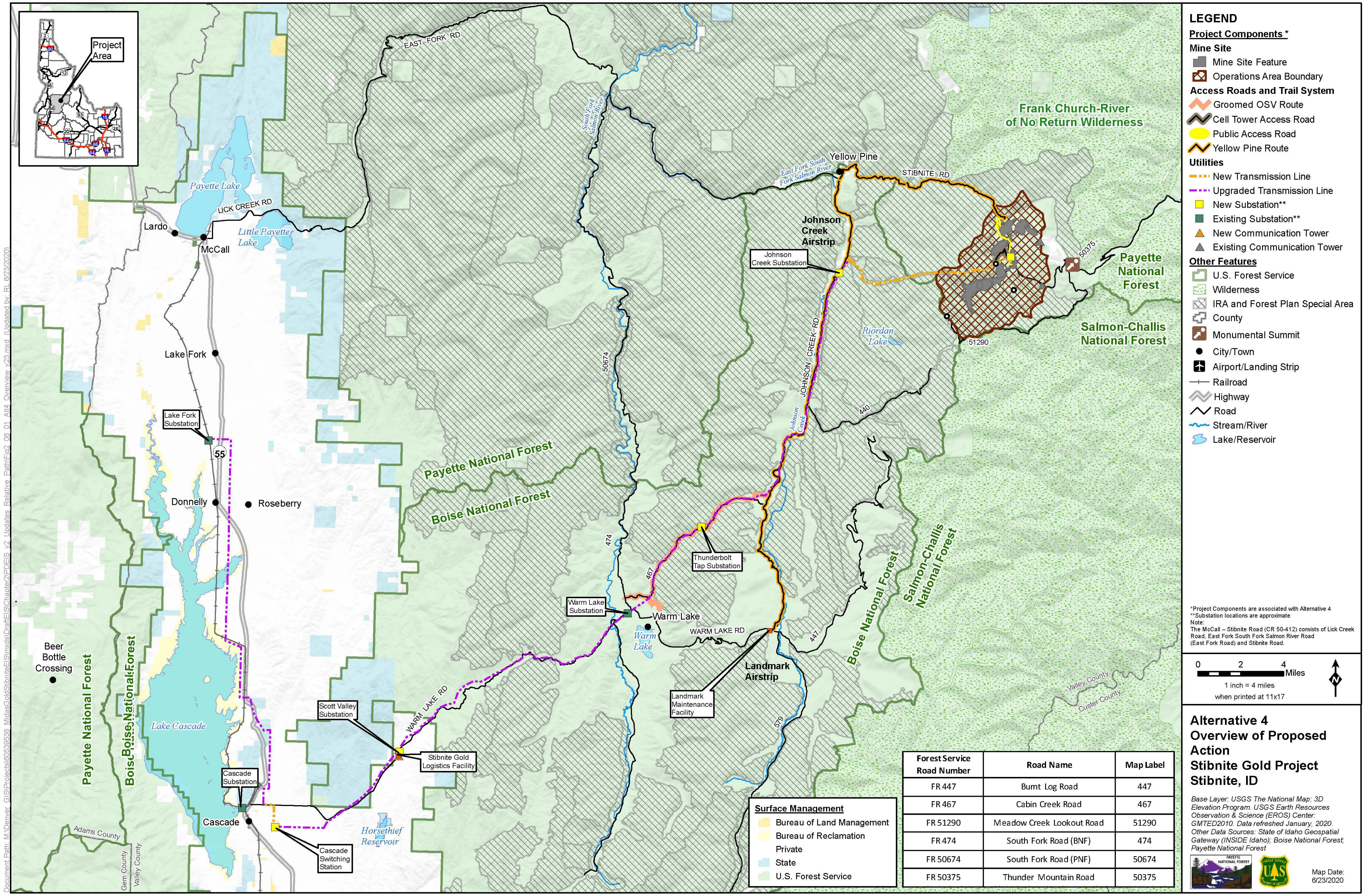
2.6 ALTERNATIVE 4

2.6.1 Overview

Alternative 4 was developed to evaluate potential to avoid or reduce likely impacts to IRAs, sensitive plant species, water quality and quantity, wetlands, fish resources and fish habitat, and cultural resources. This section describes only the modifications from Alternative 1 that have been incorporated into Alternative 4. Under this alternative mining, ore processing, and development rock storage would be the same as described in Alternative 1. The modifications in Alternative 4 are listed in **Table 2.6-1** and include the rationale for inclusion of each component. The proposed facilities and access roads are shown on **Figure 2.6-1**, Alternative 4 Overview; and **Figure 2.6-2**, Alternative 4 Mine Site Layout.

Table 2.6-1 Alternative 4 Components and Rationale for Inclusion

Phase – Component/ Subcomponent	Facility or Process Change	Rationale for Inclusion
Construction/Operations – Access Roads	The Yellow Pine Route would be the mine access route as well as the public access route.	Using Yellow Pine route for mine access could avoid impacts from construction of approximately 15 miles of new road for the Burntlog Route, including rimpacts to IRAs, sensitive plant species (whitebark pine), federally-listed fish species, and wetlands and riparian areas.
Construction/Operations – Public Access	The Johnson Creek temporary groomed OSV Trail would be maintained through operations.	Keeping the temporary groomed OSV trail open during construction and operations would provide for public access each winter and connect to other OSV routes during construction and mine operation.
Operations – Off-site Facilities	The Landmark Maintenance Facility would be relocated.	Relocating the maintenance facility could avoid impacts at the Landmark Historic site.
Operations – TSF	A TSF liner system compliant with IDAPA 50.01.13, Rules for Ore Processing by Cyanidation would be used for the TSF.	The TSF liner system would be in compliance with current state regulations.
Operations – Surface Water Management	Steps pools would be created in Blowout Creek.	Step pools could reduce water velocity and sediment in Blowout Creek and restore the eroded channel.
Operations – Surface Water Management	A pipeline would divert Meadow/Blowout Creek around Hangar Flats pit.	Routing Meadow/Blowout creek in a pipeline could avoid impacts on wetlands and riparian areas from constructing a surface diversion channel.
Operations – Surface Water Management	The EFSFSR diversion tunnel would be constructed without a fishway.	Not facilitating fish passage in the EFSFSR diversion tunnel could reduce impacts on federally-listed fish species as the potential benefits of the fishway are not certain.
Operations – Public Access	Public access would be by the Yellow Pine Route. Public Access Road would be established through mine site.	An extension of the Yellow Pine Route through the mine site would provide motorized access to Thunder Mountain Road (FR 50375).
Operations – Utilities/Communication Towers and Repeater Sites	Cell tower construction within IRAs would be by helicopter.	Helicopter construction could reduce impacts to IRAs, and candidate plant species (whitebark pine).



Forest Service Road Number	Road Name	Map Label
FR 447	Bumt 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 50375	Thunder Mountain Road	50375

Figure Source: AECOM 2020a

Figure 2.6-1 Alternative 4 Overview

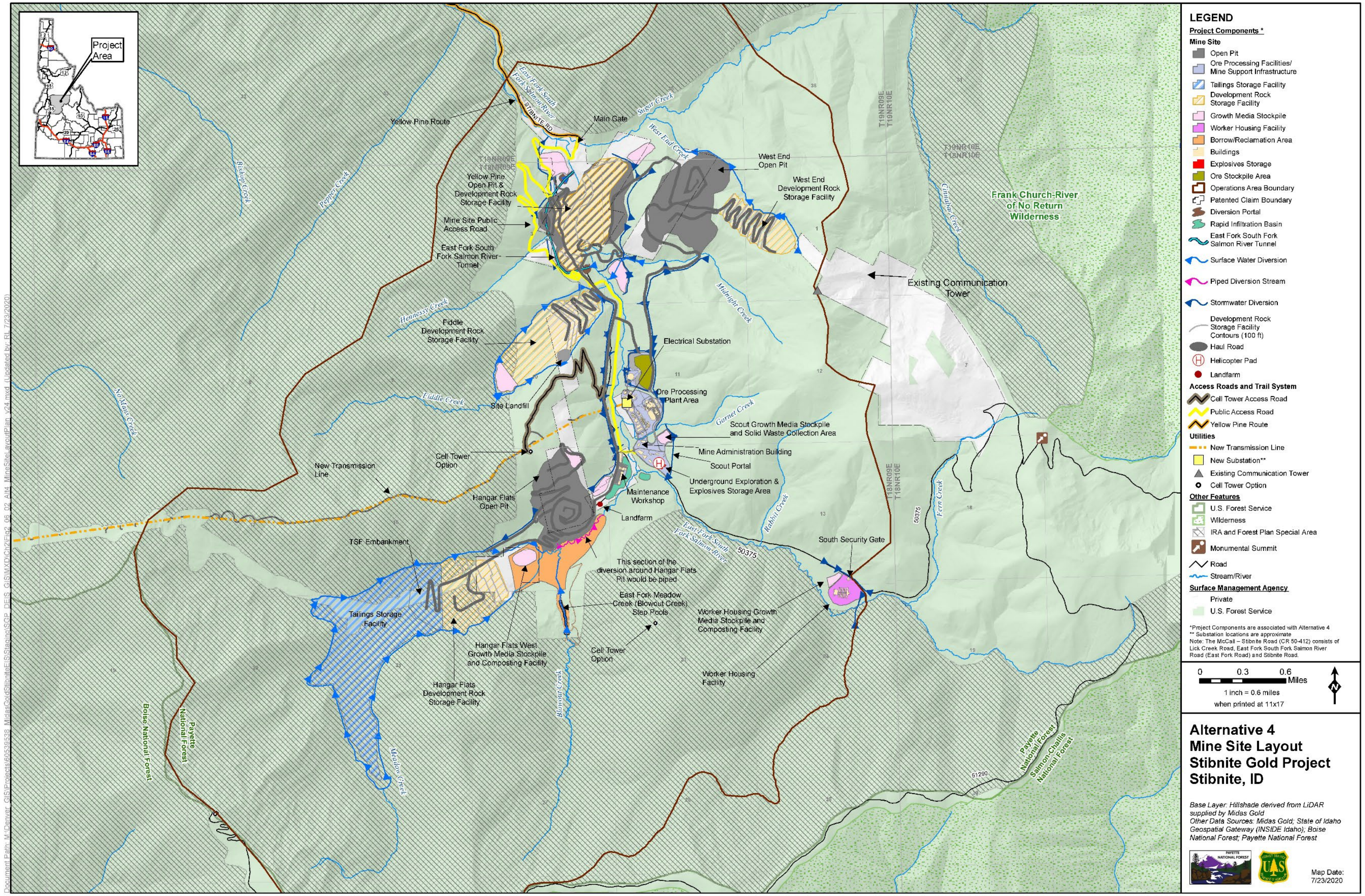


Figure Source: AECOM 2020a

Figure 2.6-2 Alternative 4 Mine Site Layout

2.6.2 Land Management and Affected Areas

For Alternative 4, the estimated maximum land affected by component and land ownership is shown in **Table 2.6-2**.

Table 2.6-2 Land Management and Acreage by Component for Alternative 4

Component Subtotal	Private	State	Boise National Forest	Payette National Forest	Bureau of Reclamation	Total Acres
Mine Site Subtotal	560	0	0	1,429[4]	0	**1,989**
Existing Access Roads Subtotal[1]	11	0	91	21	0	**123**
New Access Road Disturbance Subtotal	0	0	77	17	0	**94**
Utilities Subtotal[2]	288	62	522	86	25	**984**
Off-site Facilities Subtotal	25	0	4	0	0	**29**
Total[3]	**885**	**62**	**694**	**1,553[5]**	**25**	**3,219**

Table Notes:

1 Existing access roads would be used for the SGP with minor to major improvements. Existing roads acreages reflect the current road configurations. Any additional disturbance to widen existing roads is included in the new access road disturbance subtotal.

2 Affected acres for utilities include both existing utility corridors and access routes, some of which would be upgraded, and new utility corridors and access routes. Utilities affected acres include upgrades to utilities that are part of the Connected Actions.

3 Subtotals may not add to totals due to rounding.

4 Approximately 65 acres associated with surface exploration pads and temporary roads (mine site component) have unknown land ownership breakdown because the exact locations of these exploration areas are not yet known; however, these are included in the PNF mine site subtotal.

5 Approximately 14 acres of land listed under the PNF is administered by the PNF but is within the boundary of the Salmon Challis National Forest.

2.6.3 Timeline

The upgrades to Yellow Pine Route, particularly along portions of the Johnson Creek Road and Stibnite Road, would take longer. Construction at the mine site could not start until the Yellow Pine Route is sufficiently upgraded. Accordingly, if Alternative 4 were selected, the overall construction timeframe would need to be extended by a minimum of 2 years relative to Alternative 1 in order to upgrade the Yellow Pine Route and complete construction at the mine site. The time period for SGP operations and closure and reclamation phases would be unchanged, but the start of operations would be delayed in comparison to Alternative 1.

2.6.4 Construction Phase

Construction activities under Alternative 4 would be the same as under Alternative 1 except for construction/operations of the Yellow Pine Route as described below. However, the modifications described in **Table 2.6-1** above would eliminate, relocate or modify interrelated construction activities.

2.6.4.1 Access Roads

Under Alternative 4, the Yellow Pine Route would be improved and used to access the mine site through 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 Yellow Pine Route. The Stibnite Road (CR 50-412) portion would be improved by straightening curves, constructing retaining walls, and installing 182 18-inch culverts and 2 60-inch culverts. Approximately 1 mile of road through the Village of Yellow Pine would be paved.

Construction of facilities at the mine site would be completed following upgrades to the Yellow Pine Route. Construction of the Yellow Pine Route would require approximately 4 years due to the nature of the topography and terrain and the inability to construction from both ends simultaneously.

During construction, Johnson Creek Road would require periodic temporary road closures. To complete upgrades to Stibnite Road daily road closures would be required from 10 a.m. to 4 p.m during a 3-year construction period.

2.6.4.2 Public Access

During construction the public would share Yellow Pine Route with mine related traffic hauling materials and supplies.

Alternative 4 would include constructing a road to accommodate public access and delivery of mining materials and supplies. The road would be constructed around the Yellow Pine pit and into the mine site as shown on **Figure 2.6-3**.

The Johnson Creek groomed OSV trail would be located on the west side of Johnson Creek Road (CR 10-413) as described for Alternative 1 but the route would be extended from Wapiti Meadows to Warm Lake Road.

2.6.4.3 Utilities

Helicopters would be used to construct and maintain very high frequency radio repeater and cell tower sites located within IRAs managed for Backcountry/Restoration. Other utilities would be the same as Alternative 1.

2.6.4.4 Off-site Facilities

The Landmark Maintenance Facility would be constructed on a site on the south side of Warm Lake Road just south of the Landmark historic site. This location would include the same components as described in Alternative 1.

2.6.5 Operations Phase

Under Alternative 4, mining, ore processing, and development rock storage would be the same as described in Alternative 1.

2.6.5.1 Tailings Storage Facility

Under Alternative 4, the TSF would include a liner system that is in compliance with IDAPA 50.01.13, Rules for Ore Processing by Cyanidation as of the date of the Draft EIS. The liner system would include an underdrain system that would be the same as Alternative 1; a prepared subbase; a compacted soil layer a minimum of twelve inches thick; a secondary liner of a minimum thickness of 80 mil HDPE with a maximum coefficient of permeability of 10^{-11} cm/sec; a leak detection and collection system designed to remove process water to prevent greater than 12 inches of hydraulic head pressure on the primary liner; and a primary liner of a minimum thickness of 80 mil HDPE with a maximum coefficient of permeability of 10^{-11} cm/sec.

2.6.5.2 Surface Water Management

STREAM DIVERSIONS AROUND MINING FEATURES

EFSFSR Diversion Tunnel

Under Alternative 4, the EFSFSR would be routed in an approximately 15-foot by 15-foot tunnel around the west side of the Yellow Pine pit, the same diversion as proposed under Alternative 1. However, unlike Alternative 1, the tunnel would not be designed to facilitate fish passage.

MEADOW CREEK DIVERSION AROUND HANGAR FLATS PIT

As in Alternative 1, 2,350 feet of Meadow Creek would be diverted around the Hangar Flats pit.Under Alternative 4 Meadow Creek would be diverted into a pipeline downstream of the confluence of Blowout Creek with Meadow Creek. The pipeline would be designed to convey a 100-year peak flood discharge with 3 feet of freeboard during peak flows within the pipe. A sediment trap would be constructed to slow the flow in Meadow Creek and capture sediment before the flows enter the pipeline.

BLOWOUT CREEK

Instead of the coarse rock drain described in Alternative 1, Blowout Creek would be reworked to provide grade controls in the form of a series of step pools in the steep channel. The step pools would use large rocks in alternating short steep drops and longer low-grade sections. The average slope of the step pools would be 3 to 7 percent within the stream channel. The exact number and spacing of step pools would be determined during final design. The step pools would be designed to convey both low flows and high flows up to the 100-year, 24-hour storm event. During construction of the step pools, the surface flow of Blowout Creek would be temporarily diverted to a gravity pipeline to allow modification of the existing channel.

2.6.5.3 Mine Access

Under Alternative 4, the Yellow Pine Route would be improved and used to access the mine site during operations as described in Section 2.6.4.1, Access Roads. The 36-mile Yellow Pine Route consists of Johnson Creek Road and Stibnite Road; this would be the sole access route to the mine site.

2.6.5.4 Public Access

The public would share Yellow Pine Route with mine related traffic transporting personnel, materials, and supplies to the mine site during operations. Public access through the mine and around the Yellow PIne pit is shown on **Figure 2.6-3**.

Under Alternative 4 the Johnson Creek groomed OSV trail would be on the west side of Johnson Creek Road from Wapiti Meadows to Warm Lake Road during operations.

2.6.6 Final Closure and Reclamation

The improvements to Yellow Pine Route would remain after mine operations end. Johnson Creek Road and Stibnite Road would not be returned to the pre-mine width. Rock cuts, 9-foot-high retaining walls, 182 18-inch culverts, and the two 60-inch culverts would remain. Under Alternative 4, the pipeline used to divert Meadow Creek flows around the Hangar Flats pit during operations would be fully removed and recycled or disposed of in an appropriate disposal facility. The Meadow Creek channel would be reclaimed in the same manner as described for Alternative 1.

Post-closure public access through the mine site would be the same as Alternative 1.

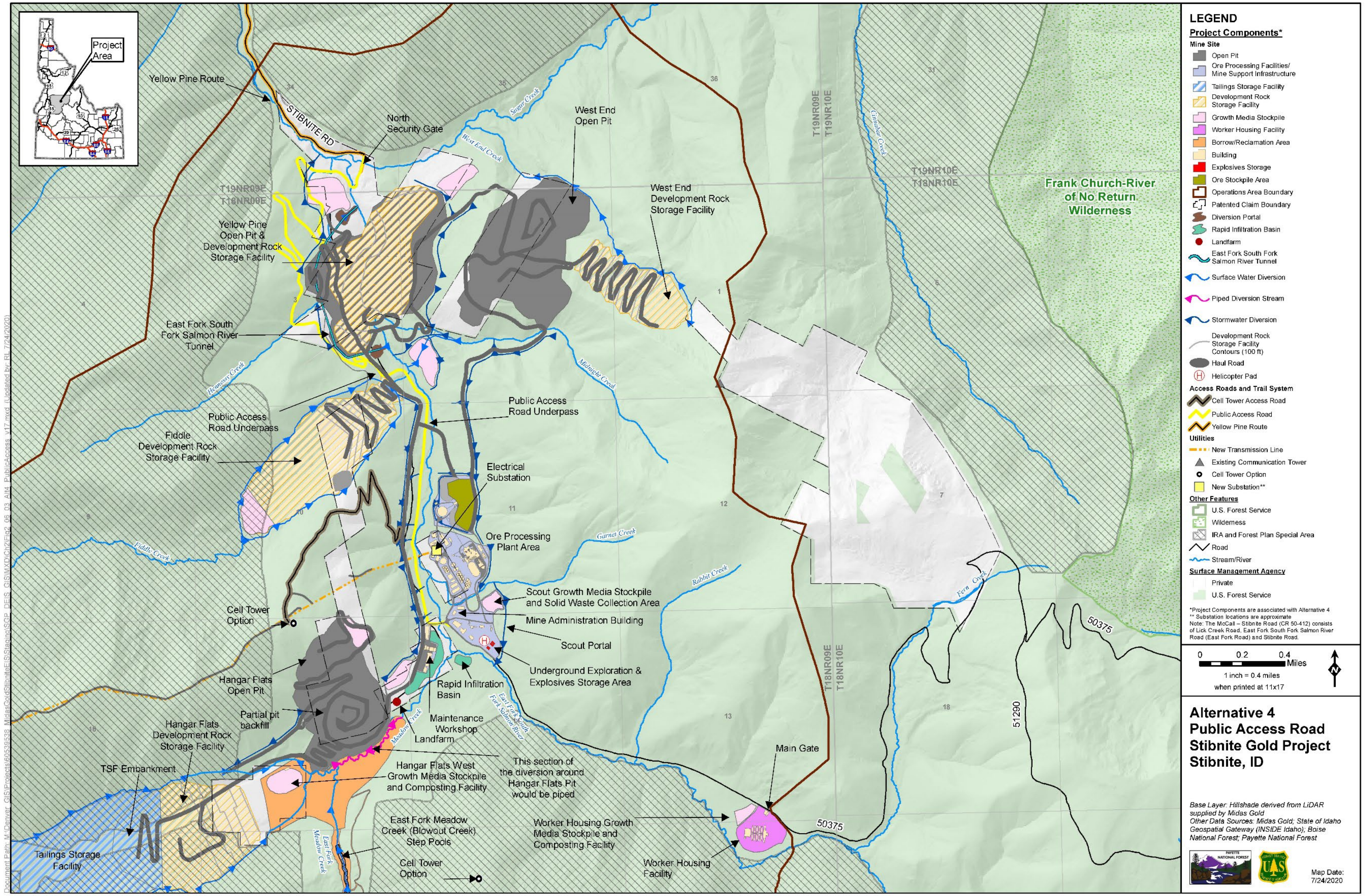


Figure Source: AECOM 2020

Figure 2.6-3 Alternative 4 Public Access Road

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2.7 Alternative 5 – No Action

As addressed in Section 2.1, Introduction, consideration of a No Action Alternative is a requirement of NEPA. The No Action Alternative means that no permits would be issued, and the proposed project would not be undertaken. The No Action Alternative applies to all phases and components of this project. There would be no surface mining or ore processing to extract gold, silver, and antimony, no new or upgraded access roads or utilities, and no offsite support facilities. There also would be no associated closure and reclamation activities.

"No action" in this case would mean the proposed activity would not take place, and the resulting environmental effects from taking no action would be compared with the effects of permitting the proposed activity or an alternative activity to go forward (CEQ 1981).

Previously approved surface exploration activities are considered part of the existing site conditions but there would be no underground exploration, sampling, or related operations and facilities on NFS lands under the No Action Alternative. Additionally, there would be no removal and/or relocation of legacy materials (tailings and waste rock), backfilling of the Yellow Pine pit, rebuilding of the EFSFSR, or re-establishing fish passage to the headwaters of the EFSFSR. Midas Gold could continue to implement surface exploration and associated activities on NFS lands as previously approved through the Golden Meadows Exploration Project Plan of Operations (Midas Gold 2011, 2016b) and the Golden Meadows Exploration Project Environmental Assessment (Forest Service 2015). Approved land disturbance associated with the Golden Meadows exploration is 7.1 acres. In addition, this approval authorized use of 3.7 miles of road including 0.3 mile of new road construction.

2.8 Alternatives Considered, Carried Forward, or Eliminated from Further Study

Federal agencies are required under NEPA to rigorously explore and objectively evaluate a reasonable range of alternatives that could both meet the project purpose and need and potentially reduce environmental impacts from the project. The alternatives development and evaluation process also should briefly discuss the reasons for any alternatives eliminated from further analysis and thus, not developed in detail (40 CFR 1502.14). FSH 1909.15, Chapter 10, Section 14.4 provides further guidance on the evaluation and elimination of alternatives: "Alternatives not considered in detail may include, but are not limited to, those that fail to meet the purpose and need, are technologically infeasible or illegal, or would result in unreasonable environmental harm."

The alternatives development process for the SGP was conducted in accordance with the CEQ and Forest Service regulations (40 CFR 1502.14 and 36 CFR 220.5, respectively) and Forest Service alternatives development guidance.

The component options that comprise the alternatives evaluated by the Forest Service and the cooperating agencies were focused on addressing one or more of the significant issues listed in Section 1.8, Issues.

Potential alternatives and component/subcomponent options were screened based upon four criteria:

1. Does the alternative, including a combination of component options, meet the purpose and need of the project?
2. Would the alternative or component option potentially reduce environmental effects to at least one resource?
3. Is the alternative or component option technically feasible?
4. Is the alternative or component option economically feasible?

If an alternative or component option would not have the potential to provide at least one environmental advantage as compared to the actions described in Alternative 1, it was eliminated from further study.

It should be noted that the emphasis for alternatives development is what is a reasonable alternative rather than whether the proponent or applicant likes or is itself capable of carrying out a particular alternative. Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant (46 FR 18026). Potential component and subcomponent options that were considered, carried forward for further study, or eliminated from detailed alternatives analysis using the criteria discussed in Section 2.2.2, Alternatives Screening Criteria, are briefly discussed below. Component options carried forward are identified as such. Additional detail of the alternative development process and elimination of various options for detailed analysis is available in the Alternatives Development Report (AECOM 2020b).

2.8.1 Mine Production/Processing Component Alternatives

Component options for mine production/processing that were evaluated included:

- Decreasing the rate of production for the mine;
- Increasing the rate of production for the mine;
- Regenerating cyanide on-site;
- Recover gold and silver through heap leaching; and
- Process the gold ore off-site.

These component options each met the purpose and need but none were economically feasible, and none offered environmental advantages over Alternative 1 (AECOM 2020b). Accordingly, these options were not carried forward for further analysis.

2.8.2 Transportation and Access Road Alternatives

Nineteen potential transportation and access road component options were evaluated including:

- Access to the mine site during construction, operations, and closure and reclamation would use Warm Lake Highway/Johnson Creek Road (CR 10-413/FR 413) and Stibnite Road (CR 50-412).
- Access to the mine site during operations and closure and reclamation would be using Warm Lake Road to Johnson Creek Road (CR 10-413) to Old Thunder Mountain Road (FR 440); reconstructing a portion to connect with a new road to be constructed along a portion of the same alignment as the Burntlog Route as part of Alternative 1, connecting to Meadow Creek Lookout Road (FR 51290) and then to Thunder Mountain Road (FR 50375).
- No OHV connector would be constructed.
- To facilitate travel a shared road use guide would be posted at the visitor centers, recreation sites, and other points of public contact; a Forest Roads Guide for Safe Travel would be published; and signs would be posted about the heavy vehicle traffic.
- A gate would be installed at the end of existing Burnt Log road (FR 447) to restrict motorized access to the new portion of Burntlog Route to mine and administration related traffic only.
- Access to the mine site during construction, operation, and closure would be via Cabin Creek/Trout Creek road with grades of 10 percent or less.
- A public access road would be constructed around the west side of Yellow Pine pit that connects to Thunder Mountain Road (FR 50375).
- A portion of the Burntlog Route would be realigned to cross Riordan Creek north of Black Lake and follow the eastern edge of the Riordan Creek valley.
- During construction and operation all mine workforce, supply and haulage, and miscellaneous traffic would be transported in convoys of approximately six vehicles.
- Transportation routes would be used Monday through Friday from approximately 6:00 a.m. to 8:00 p.m.
- Cyanide would be generated at the mine site as an alternative to transporting cyanide in briquettes.
- Limestone would be mined and processed at the mine site as an alternative to transporting lime in 24-ton trucks.

- The Burntlog Route would be constructed as the access route to the mine site prior to pre-production mine development.
- A parking lot would be developed for public use at Project Camp and a snowmobile grooming equipment storage shed would be constructed.
- A parking lot would be developed for public use at Knox Ranch and a snowmobile grooming equipment storage shed would be constructed.
- A parking lot would be developed for public use at Project Camp and snowmobile trail grooming equipment would be hauled from Cascade.
- A parking lot would be developed for public use at Knox Ranch and grooming equipment would be hauled from Cascade.
- A snowmobile trail would be groomed adjacent to Johnson Creek road during the construction of Burntlog Route running from Landmark to Wapiti Meadows.
- Burnt Log Road (FR 447) would be managed as open for mine related traffic and during the winter Warm Lake Road would open to mine related traffic from where Valley County stops plowing east of the Town of Warm Lake but closed for public traffic.

Each of these component options met the purpose and need. Several were carried forward as component options including access to the mine site during construction, operations, and closure and reclamation using Warm Lake Highway/Johnson Creek Road (CR 10-413/FR 413) and Stibnite Road (CR 50-412) which is a component of Alternative 4; not constructing the OHV connector which is a component of Alternatives 3 and 4; constructing public access around the west side of Yellow Pine pit that connects to Thunder Mountain Road (FR 50375) is a component of Alternatives 2 and 4; realignment of a portion of the new construction for Burntlog Route to cross Riordan Creek which is a component of Alternative 2; and on-site processing of limestone which is a component of Alternative 2.

The remaining potential component options were not carried forward due to technical or economic infeasibility and/or the fact that the component options did not offer an environmental advantage over Alternative 1 (AECOM 2020b).

2.8.3 Tailings Storage Facility Alternatives

Seven potential component options were evaluated for the TSF component. These included:

- Thicken and filter the tailings to eliminate more water than planned for Alternative 1 and allow for use of the dry stack method of tailings disposal.
- Construct the TSF in a series of facilities separated by TSF embankments in a phased manner.
- Thicken and filter the tailings to eliminate more water than planned for under Midas Gold’s Plan and dispose of the tailings as paste tailings.
- Construct the TSF within the EFSFSR valley upstream of Fern Creek.

- Construct a tailings liner system in compliance with the State of Idaho's current Ore Processing by Cyanidation regulations (IDAPA 58.01.13).
- Provide a TSF cover system at reclamation to cover the TSF and minimize infiltration of surface water.
- A TSF would be located in the EFSFSR east of Meadow Creek in areas previously undisturbed by mining.

These potential component options each met the purpose and need. Constructing a TSF in the EFSFSR in areas previously undisturbed by mining is a component of Alternative 3.

Constructing a TSF liner system that is in compliance with current IDAPA 58.01.13 regulations is a component of Alternative 4.

The use of the dry stack method of tailings disposal was evaluated and determined to be technically and economically infeasible. Paste tailings disposal was evaluated and determined to be technically feasible but not economically feasible and did not offer environmental advantages over Alternative 1. Additional information on the evaluation of tailings disposal methodologies is included in the Technical Memorandum titled "Review of Midas Gold Tailing Technology for the Stibnite Gold Project and Alternatives, Valley County, Idaho (AECOM 2020c).

Constructing the TSF in a series of facilities separated by TSF embankments was considered both technically and economically infeasible and did not offer environmental advantages over Alternative 1. Constructing the TSF in the EFSFSR valley upstream of Fern Creek was not economically feasible. Covering the TSF at reclamation did not offer environmental advantages over Alternative 1 (AECOM 2020b).

2.8.4 Development Rock Storage Facility Alternatives

Five potential component options were evaluated for the DRSFs. These alternatives included:

- Reduce the size of the Hangar Flats DRSF and place the development rock into the Yellow Pine pit and Hangar Flats pit.
- Relocate the Fiddle DRSF GMS from the Horse Heaven IRA to the Hangar Flats reclamation and stockpile area.
- Revise the surface mine sequencing to partially backfill the Hangar Flats pit after active mining has ceased in this pit.
- Construct a DRSF buttress for the EFSFSR TSF embankment similar to the buttress for the proposed TSF embankment.
- Backfill the Hangar Flats and West End pits with development rock during final reclamation.

These five component options each met the purpose and need. Of these five potential component alternatives, two were carried forward; revising the mine sequencing to partially backfill the Hangar Flats pit is a component of Alternative 2 and constructing a DRSF buttress for the EFSFSR TSF embankment is a component of Alternative 3.

Backfilling the Hangar Flats and West End pits at reclamation is not economically feasible and did not offer an environmental advantage over Alternative 1 (AECOM 2020b), although the Hangar Flats pit and the Midnight pit portion of the West End pit is proposed to be backfilled as part of Alternative 2. The remaining component options (reducing the size of the Hangar Flats DRSF and placing the development rock into the Yellow Pine pit and Hangar Flats pit and relocating the Fiddle DRSF GMS) were considered as potential mitigation measures.

2.8.5 Transmission Line Upgrade and Extension Alternatives

Two potential transmission line extensions were evaluated including:

- Locating the transmission line segment from the Johnson Creek substation to the mine on the north side of the TSF, following a former jeep trail alignment between the Horse Heaven and Meadow Creek IRAs.
- Extending the existing 138-kV transmission line from the Yellow Pine substation to FR 458 east of Golden Hill road and then along Stibnite Road (CR 50-412) to the mine site.

These potential component options each met the purpose and need. Extending the existing 138-kV transmission line from Yellow Pine substation to the mine site was not economically feasible and did not offer environmental advantages over Alternative 1 (AECOM 2020b). Locating the segment of new transmission line from Johnson Creek substation between the Horse Heaven and Meadow Creek IRAs was carried forward as a component of Alternative 3.

2.8.6 Surface Water Management Alternatives

Four potential surface water management component options were evaluated for inclusion as a component alternative including:

- Meadow Creek would be permanently relocated to the south side of the TSF and Hangar Flats DRSF.
- The post-closure Meadow Creek channel would be constructed with a series of step pools on the outslope of the Hangar Flats DRSF to promote fish passage.
- Blowout Creek would be constructed by grading the slopes to improve hydrologic functioning without the constructing the French drain.
- The EFSFSR would be conveyed around the Yellow Pine pit in either a surface channel or a tunnel as proposed, but without consideration of fish passage.

Each of these potential component options met the purpose and need. The post-closure Meadow Creek channel constructed with step pools on the outslope of the Hangar Flats pit was not carried forward as a component option but could be considered as a mitigation measure, if appropriate. Changing the configuration of Blowout Creek to improve hydrologic functioning did not have an environmental advantage over Alternative 1 and was not carried forward as a component option (AECOM 2020b).

The permanent relocation of Meadow Creek to the south side of the TSF and Hangar Flats DRSF was partially carried forward in Alternative 2 which includes retention of the operational diversion of Meadow Creek around Hangar Flats DRSF as the post-closure configuration. Conveying the EFSFSR around the Yellow Pine pit in a tunnel without consideration of fish passage is carried forward as a component of Alternative 4.

2.8.7 Pit Water Management Alternatives

Two potential component options for management of pit water were evaluated including:

- An engineered structure including a head gate and pipe would be placed in the bottom of the West End pit to convey water from the pit bottom into West End Creek.
- An engineered structure including a head gate and pipe would be placed in the bottom of the Hangar Flats pit to convey water from the pit bottom into Meadow Creek.

These potential component options each met the purpose and need and were considered technically and economically feasible. These two component options did offer some potential environmental advantages over Alternative 1 related to temperatures of water discharged downstream. However, neither was carried forward as the measures align more closely with mitigation measures and were considered as potential mitigation measures in the Draft EIS.

2.8.8 Stormwater Management Alternatives

Two potential component options were considered for stormwater management, both related to selection of an alternate method of tailings storage:

- Stormwater management would be required for a dry stack tailings storage area.
- Stormwater management would be required for a paste tailings storage area.

Both of these component options were evaluated in the context of tailings storage facility changes discussed in Section 2.8.3, Tailings Storage Facility Alternatives. Because the alternate tailings storage methods did not move forward as component alternatives, these potential component alternatives also were not carried forward.

2.8.9 Facilities Alternatives

Potential component options that were evaluated for both on-site and off-site facilities included:

- Locate Landmark Maintenance Facility on lands under administration by the BNF near Warm Lake existing waste refuse site.

- Locate the Landmark Maintenance Facility on lands under administration by the BNF northeast of the Landmark airstrip and adjacent to FR 477.
- Relocate the worker housing facility.
- All repeater sites would be constructed and maintained by helicopter.
- Repeater sites within IRAs managed for back country restoration would be constructed and maintained by helicopter.
- Locate the off-site maintenance facility on lands under administration by the BNF near Yellow Pine.
- Use electric mine equipment.

Two of these potential facilities options were carried forward in the EIS. Alternative 4 includes the alternate location for the Landmark Maintenance facility northeast of the Landmark airstrip and Alternative 3 includes a relocated worker housing facility. Construction of all repeater sites and construction of repeater sites within IRAs managed for back country restoration were not carried forward as component options but could be considered as possible mitigation for impacts from construction of these sites. The remaining potential facilities alternatives were not considered economically feasible or did not offer an environmental advantage over Alternative 1 and were not carried forward.

2.8.10 Reclamation Alternatives

Three potential component options to reclamation plan components were evaluated:

- Collect whitebark pinecones along the transmission line upgrades/extensions.
- Plant 2-year-old whitebark pine seedlings during reclamation.
- Purchase topsoil or growth media to make up material deficits.

These potential component options each met the purpose and need and were considered feasible. However, these measures more closely align with mitigation measures than project components and would be considered as potential mitigation for project-related impacts as part of the permitting.

2.9 COMPARATIVE ANALYSIS OF ALTERNATIVES

Table 2.9-1 provides a summary and comparison of the potential environmental impacts of the alternatives compared to the No Action Alternative and each other based upon the eight significant impact issues identified in Section 1.8, Issues. Detailed descriptions of potential impacts regarding all resource issues evaluated in this Draft EIS are presented in Chapter 4, Environmental Consequences.

Table 2.9-1 Summary and Comparison of the Potential Environmental Impacts Associated with the Significant Issues by Alternative

Issue	Indicator	Baseline Conditions	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Surface Water and Groundwater Quantity							
The SGP may cause changes in quantity of surface water and groundwater in all drainages within the analysis area.	Stream flow characteristics (daily, seasonal, annual).	Surface waters include: the EFSFSR, Rabbit Creek, Meadow Creek, East Fork Meadow Creek (also known as Blowout Creek), Garnet Creek, Fiddle Creek, Midnight Creek, Hennessy Creek, West End Creek, and Sugar Creek. Monthly average seasonal low flows: Meadow Creek between TSF and Hangar Flats pit = 2.7 cfs. Meadow Creek below the diversion and above EFSFSR (mine years 7-10) = 3.8 cfs.	Meadow Creek monthly average low flow during operations = 2.3 cfs (15% reduction from baseline conditions). The primary predicted impact: reduction in streamflow along Meadow Creek near the Hangar Flats pit and pit lake close to the end of the mine operation and early post closure. Simulated flows vary from no predicted change to a 45% reduction in low flows during the mine operational period. Flows vary from no predicted change to a 100% reduction during the early post- closure period. In most areas, groundwater in the alluvial aquifers recover within 10 years after the cessation of mining. Large areas of the bedrock aquifer are also expected to recover. However, there is less confidence about overall long-term recovery of the bedrock aquifer.	Stream flow impacts partially mitigated for Meadow Creek in the vicinity of the Hangar Flats pit and pit lake relative to Alternative 1. Predicted stream low flows for Alternative 2 two times higher than the low flows under Alternative 1 during mine years 7 through 12. Across these years, the average monthly flow reduction relative to the existing conditions was predicted to be 32% for Alternative 2 and 47% for Alternative 1. In early post closure when the section of Meadow Creek is predicted to go dry under Alternative 1, predictions for Alternative 2 are a 26% reduction in the average monthly flow. Surface flows are generally predicted to recover to pre-mine conditions by approximately mine year 15 (3 years after operations cease).	Stream flow would be impacted by Alternative 3 within the analysis area. Simulated flows are similar to Alternative 1.	Stream flow would be impacted by Alternative 4 within the analysis area. Simulated flows are similar to Alternative 1.	Alternative 5 would result in no changes to existing stream flow characteristics.
The SGP may cause changes in quantity of surface water and groundwater in all drainages within the analysis area.	The extent, magnitude, and duration of groundwater level changes.	Groundwater flow in the analysis area occurs primarily in the Quaternary unconsolidated deposits filling the valleys and through the unconsolidated deposits covering the mountainsides.	Dewatering of the pits lowers groundwater levels in the alluvial and bedrock formations during the mining and post closure periods, and reduces flows in surface water streams that receive groundwater discharge. In most areas, groundwater in the alluvial aquifers recover within 10 years after the cessation of mining. Large areas of the bedrock aquifer are also expected to recover. However, there is less confidence about overall long-term recovery of the bedrock aquifer. Development of DRSFs and TSF within Meadow Creek valley would result in lowering water table levels by more than ten feet in some areas within their footprint, and in area close around, during production and post closure periods.	The extended liner reduces stream loss from Meadow Creek near the Hangar Flats pit, and reduces that pit's dewatering rates by more than 25%. Partial backfill of Hangar Flats pit with West End Development Rock and diversion of Meadow Creek high flow to the pit lake reduces the time of filling the pit with water from the Hangar Flats pit lake.	The TSF and Hangar Flats DRSF constructed in the EFSFSR valley would lower groundwater levels within their footprint. Hangar Flats pit dewatering rates and the rate of water infiltrating via the RIBs somewhat higher compared to Alternative 1. Hangar Flats pit fills with water somewhat quicker.	The extent, magnitude, and duration of groundwater level changes would be similar to Alternative 1.	Alternative 5 would result in no changes to existing (baseline) groundwater flow conditions.

Issue	Indicator	Baseline Conditions	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
The SGP may affect water rights.	Change in water rights availability in the SGP area.	Four existing water rights at the mine site owned by Midas Gold.	No changes in water rights availability in the SGP area.	No changes in water rights availability in the SGP area.	No changes in water rights availability in the SGP area.	No changes in water rights availability in the SGP area.	No changes in water rights availability.
The SGP may affect water rights.	New water rights needed.	Existing water rights held by Midas Gold: 77-7285 - Groundwater right for storage and mining with diversion of 0.5 cfs for a maximum total usage of 39.2 acre-feet. 77-7141 – Groundwater right for domestic with diversion of 0.2 cfs for a maximum total usage of 11.4 acre-feet. 77-7293 – Surface water right for storage and mining for diversion of 0.25 cfs and a maximum total usage of 20 acre-feet. 77-7122 – Surface water right for storage and mining for diversion of 0.33 cfs for a maximum total usage of 7.1 acre-feet.	An additional 2.39 cfs and 1,730 acre-feet of groundwater rights needed to support ore processing. An additional 0.34 cfs and 10 acre-feet of groundwater rights needed for potable water supply. During drought conditions, temporary seasonal withdrawal of up to 5.63 cfs from groundwater. An additional water right for 3.47 cfs diversion of surface would be needed.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.	No new water rights required.
Surface Water and Groundwater Quality							
The SGP may affect soil and water resources through acid rock drainage and/or metals leaching from mineralized rock in the mine pits, DRSFs, and TSF.	Volume and disposition of mineralized waste generated.	No new mining waste generated.	Development Rock: • TSF embankment (61 MT). • Hangar Flats DRSF and TSF buttress (81 MT). • Fiddle DRSF (68 MT). • West End DRSF (25 MT). • Yellow Pine Pit backfill (111 MT). Tailings: • TSF (100 MT).	Development Rock: • TSF embankment (61 MT). • Hangar Flats DRSF and TSF buttress (81 MT). • Fiddle DRSF (68 MT). • Yellow Pine Pit backfill (111 MT). • Midnight Pit backfill (6 MT). • Hangar Flats Pit partial backfill (18 MT). • On-site lime generation (1 MT). Tailings: • TSF (100 MT).	Development Rock: • TSF embankment (61 MT). • EFSFSR DRSF and TSF buttress (81 MT). • Fiddle DRSF (68 MT). • West End DRSF (25 MT). • Yellow Pine Pit backfill (111 MT). Tailings: • EFSFSR TSF (100 MT).	Same as Alternative 1.	No new mining waste generated.
The SGP may affect soil and water resources through acid rock drainage and/or metals leaching from mineralized rock in the mine pits, DRSFs, and TSF.	Lithologic composition of final pit walls and exposure of potentially acid-generating material.	No known mapped extent of exposed lithologies in existing Yellow Pine and West End pits.	Area of Potentially acid-generating rock exposed in pit walls: • Hangar Flats Pit (37,076 m^2, 5.1% of total surface area). • West End Pit. (3,333 m^2, 0.4%). • Midnight Area Pit (262 m^2, 0.1%). • Yellow Pine Pit (120,424 m^2, 10.5%).	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1.	Not applicable.

Issue	Indicator	Baseline Conditions	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
The SGP may affect soil and water resources through acid rock drainage and/or metals leaching from mineralized rock in the mine pits, DRSFs, and TSF.	Removal of legacy mine tailings and waste rock. Predicted leachate chemistry of development rock and tailings.	Legacy waste in Meadow Creek valley from historical mining operations, including SODA and Bradley tailings. Not Applicable.	SODA and Bradley tailings removed and repurposed. Development Rock: • Generally non-acid generating but capable of leaching arsenic, antimony, aluminum, manganese, sulfate, total dissolved solids, copper, cadmium and zinc above water quality criteria (Section 4.9.2.1.1.4). Tailings: • Anticipated tailings process water chemistry and leachate chemistry provided in **Table 4.9-9.**	SODA and Bradley tailings removed and repurposed. Same as Alternative 1.	No removal of SODA and Bradley Tailings. Same as Alternative 1.	SODA and Bradley tailings removed and repurposed. Same as Alternative 1.	No removal of SODA and Bradley Tailings. Not applicable.
The SGP may cause changes in surface water and groundwater quality.	Surface water quality parameters (e.g., pH, temperature, major ions, total dissolved solids, metals, sediment content, and organic carbon).	EFSFSR[1]: • Aluminum (0.010 to 0.016 mg/L). • Antimony (**0.012** to **0.031** mg/L). • Arsenic (**0.025** to **0.063** mg/L). • Copper (0.00023 to 0.00032 mg/L). • Mercury (2.4E-6 to 5.7E-6 mg/L). • Summer Max Temperature (13.4 to 17.4°C). Access Roads: • No mine-related traffic on existing Forest Service roads. Utilities: • No power line upgrades or new lines constructed.	EFSFSR Post Closure[1,2]: • Aluminum (0.003 to 0.014 mg/L). • Antimony (**0.009** to **0.026** mg/L). • Arsenic (**0.059** to **0.09** mg/L). • Copper (0.00005 to **0.00268** mg/L). • Mercury (**2.04E-4** to **3.9E-4** mg/L). • Summer Max Temperature (13.9 to 22.3°C). Access Roads: • Mine access roads would cross 71 different streams. • 1.69 miles (4 percent) of mine operations access route w/in 100 feet of streams. • Sedimentation and fugitive dust predicted to be within the normal range of properly maintained Forest Service roads. Utilities: • Mine utility work would cross 37 different streams. • Potential for transmission line-related erosion and sedimentation would be minimal.	EFSFSR Post Closure[1,2]: • Aluminum (0.007 to 0.018 mg/L). • Antimony (**0.009** to **0.026** mg/L). • Arsenic (**0.016 to 0.049** mg/L). • Copper (0.00005 to 0.00029 mg/L). • Mercury (5.9E-6 to **1.8E-5** mg/L). • Summer Max Temperature (13.9 to 21.7°C). Access Roads: • Mine access roads would cross 69 different streams. • 1.56 miles (4 percent) of mine operations access route within 100 feet of streams. • Sedimentation and fugitive dust likely lower than Alternative 1 due to approximate 31 percent reduction in heavy vehicle trips during mine operations. Utilities: • Mine utility work would cross 36 different streams. • Potential for transmission line-related erosion and sedimentation would be minimal.	EFSFSR Post Closure[1,2]: • Aluminum (0.00047 to 0.020 mg/L). • Antimony (**0.017** to **0.033** mg/L). • Arsenic (**0.083** to **0.13** mg/L). • Copper (0.000033 to **0.010** mg/L). • Mercury (**7.7E-5** to **0.00014** mg/L). • Summer Max Temperature (23 to 25.5°C). Access Roads: • Stream crossings same as Alternative 1. • 1.24 miles (2.8 percent) of mine operations access route within 100 feet of streams. Utilities: • Same as Alternative 1.	EFSFSR Post Closure: • Same as Alternative 1 Access Roads: • Mine access roads would cross 50 different streams. • 6.5 miles (16 percent) of mine operations access route within 100 feet of streams. • Sedimentation and fugitive dust similar in magnitude to Alternative 1, but would differ in location due to exclusive use of YPR for mine access. Utilities: • Same as Alternative 1 except for communication sites that would be constructed/maintained using helicopters, limiting the need for new access roads to these facilities.	Same as existing conditions.

Issue	Indicator	Baseline Conditions	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
The SGP may cause changes in surface water and groundwater quality.	Groundwater quality parameters (e.g., pH, major ions, total dissolved solids, metals).	TSF[1]: • pH (7.57). • Arsenic (0.006 mg/L). • Antimony (0.0020 mg/L). • Mercury (5.6E-7 mg/L). Hangar Flats DRSF[1]: • pH (6.90). • Arsenic (0.006 mg/L). • Iron (**2.63** mg/L). • Manganese (**2.63** mg/L). West End DRSF[1]: • pH (8.15). • Arsenic (**0.30 mg/L).** • Antimony (**0.019** mg/L). • Nitrate+nitrite (0.050 mg/L). Fiddle DRSF[1]: • pH (7.21). • Arsenic (**0.087** mg/L). Yellow Pine Pit Backfill[1]: • pH (**8.54**). • Arsenic (**0.32** mg/L). • Antimony (**0.010** mg/L). • Mercury (3.8E-6 mg/L).	TSF[1]: • pH (7.57). • Arsenic (0.007 mg/L). • Antimony (0.002 mg/L). • Mercury (1.8E-6 mg/L). Hangar Flats DRSF[1]: • pH (6.75). • Arsenic (**0.23** mg/L). • Iron (**1.75 to 2.01** mg/L). • Manganese (**2.41 to 2.50** mg/L). West End DRSF[1]: • pH (8.15). • Arsenic (0.**70** mg/L). • Antimony (**0.13** mg/L). • Nitrate+nitrite (0.05 to **19.7** mg/L). Fiddle DRSF[1]: • pH (7.45). • Arsenic (0.015 mg/L). Yellow Pine Pit Backfill[1]: • pH (**8.6 to 8.9**). • Arsenic (**2.12** mg/L). • Antimony (**0.45** mg/L). • Mercury (**0.0034** mg/L).	TSF: • Same as Alternative 1 Hangar Flats DRSF[1]: • pH (6.76). • Arsenic (**0.36** mg/L). • Iron (**1.69** mg/L). • Manganese (**2.39** mg/L). West End DRSF: • Eliminated (same as existing conditions). Fiddle DRSF[1]: • pH (7.37). • Arsenic (0.02 mg/L). Yellow Pine Pit Backfill[1]: • Same as Alternative 1. Midnight Area Pit Backfill[1]: • pH (**8.7 to 8.9**). • Arsenic (**2.2** mg/L). • Mercury (**0.0042** mg/L). • Antimony (**0.42** mg/L).	TSF[1]: • No change to existing groundwater conditions in the upper. EFSFSR EFSFSR DRSF[1]: • pH (7.1). • Arsenic (**0.089** mg/L). • All other constituents below groundwater standards. West End DRSF: • Same as Alternative 1. Fiddle DRSF: • Same as Alternative 1. Yellow Pine Pit Backfill: • Same as Alternative 1.	Same as Alternative 1.	Same as existing conditions.
The SGP may cause increased mercury methylation in adjacent waterbodies through SGP-related emissions and activities.	Predicted impact on methylmercury production.	Methylmercury *not detected* in 90 percent of baseline stream samples (<0.1 ng/L).	Post closure Methylmercury concentrations up to 7.8 ng/L in the EFSFSR without water treatment.	No detectable change in Methylmercury with water treatment.	Post closure Methylmercury concentrations up to 2.8 ng/L in the EFSFSR without water treatment.	Same as Alternative 1.	Same as existing Conditions.
Vegetation							
The SGP would remove whitebark pine individuals, and habitat conversion associated with the SGP would impact seed production, dispersal, and establishment of this species.	Number of acres of whitebark pine occupied habitat impacted by the SGP.	Approximately 2,310 acres of occupied whitebark pine habitat were identified within the analysis area.	Alternative 1 would remove an estimated 257.8 acres of occupied whitebark pine habitat (11.2% of occupied habitat in the analysis area). This would be the largest extent of removal under the action alternatives.	Alternative 2 would remove an estimated 243.2 acres of occupied whitebark pine habitat (10.5% of occupied habitat in the analysis area). This would be the second largest extent of removal under the action alternatives.	Alternative 3 would remove an estimated 237.2 acres of occupied whitebark pine habitat (10.2% of occupied habitat in the analysis area). This would be the second smallest extent of removal under the action alternatives.	Alternative 4 would remove an estimated 123.6 acres of occupied whitebark pine habitat (5.4% of occupied habitat in the analysis area). This would be the smallest extent of removal under the action alternatives.	None.

Issue	Indicator	Baseline Conditions	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
The SGP would remove whitebark pine individuals, and habitat conversion associated with the SGP would impact seed production, dispersal, and establishment of this species.	Estimated number of mature whitebark pine trees to be cut during SGP construction.	Approximately 2,310 acres of occupied whitebark pine habitat were identified within the analysis area.	An estimated 1,027 individual trees, 50 of which would be cone-bearing trees, would be removed under Alternative 1. This would be the largest number of total whitebark pine individuals removed and cone-bearing individuals removed under the action alternatives.	An estimated 997 individual trees, 15 of which would be mature, cone-bearing trees, would be removed under Alternative 2. This would be the second largest number of total whitebark pine individuals removed and the lowest number of cone-bearing individuals removed under the action alternatives.	An estimated 892 individual trees, 48 of which would be mature, cone-bearing trees, would be removed under Alternative 3. This would be the second smallest number of total whitebark pine individuals removed and the second highest number of cone-bearing individuals removed under the action alternatives.	An estimated 613 individual trees, 48 of which would be mature, cone-bearing trees, would be removed under Alternative 4. This would be the smallest number of total whitebark pine individuals removed and the second highest number of cone-bearing individuals removed (the same as Alternative 3) under the action alternatives.	None.
The SGP would impact known occurrences of sensitive and forest watch plant species.	Presence of known occurrences of special status plants or occupied habitat within 300 feet of the SGP disturbance area.	Rare Plant Geographic Information System Data are available for the SGP area (Idaho Fish and Wildlife Information System).	Alternative 1 would impact known occurrences of bent-flowered milkvetch, least moonwort, Sacajawea's bitterroot, Blandow's helodium, sweetgrass, and Rannoch-rush.	Same as Alternative 1.	Same as Alternative 1.	Alternative 4 would impact known occurrences of bent-flowered milkvetch, least moonwort and Sacajawea's bitterroot.	None.
The SGP would result in a direct loss of modeled potential habitat for sensitive and forest watch plant species.	Acres of modeled potential habitat for sensitive and forest watch plant species disturbed by the SGP.	Modeled potential habitat for special status plant species is available for the SGP area. Maps are included in **Appendix H-4**.	Alternative 1 would impact the largest extent of modeled potential habitat for scalloped moonwort, Cascade reedgrass, livid sedge, Idaho douglasia, Yellowstone draba, spoonleaf sundew, Kruckeberg's swordfern, Sierra sanicle, Tolmie's saxifrage, and Rannoch-rush. Alternative 1 would be equal to Alternative 2 in having the greatest extent of impacts to modeled potential habitat for bent-flowered milkvetch and swamp willow weed. Overall, Alternative 1 would impact the largest extent of modeled potential habitat for sensitive and forest watch species under the action alternatives.	Alternative 2 would impact the largest extent of modeled potential habitat for candystick, Shasta sedge, bulblet-bearing water hemlock, Blandow's helodium, sweetgrass, bank monkeyflower, and white beaksedge. Alternative 2 would be equal to Alternative 1 in impacting the largest extent of modeled potential habitat for bent-flowered milkvetch and swamp willow weed. Overall, Alternative 2 would impact the second largest extent of modeled potential habitat for sensitive and forest watch species under the action alternatives.	Alternative 3 would have the greatest extent of impacts to modeled potential habitat for slender moonwort and least moonwort, Sacajawea's bitterroot, Borch's stonecrop and Leiberg stonecrop, and short-style tofieldia. Overall, Alternative 3 would impact the second smallest extent of modeled potential habitat for sensitive and forest watch species under the action alternatives.	Alternative 4 would impact the largest extent of modeled potential habitat for beautiful bryum, green bug moss, giant helleborine orchid, and tufted penstemon. Overall, Alternative 4 would impact the smallest extent of modeled potential habitat for sensitive and forest watch species under the action alternatives.	None.
Wetlands and Riparian Areas							
Loss of wetland and riparian areas.	***Within the mine site focus area-*** Acres of wetland and riparian habitat lost through construction of Project alternative components – within the mine site.	There are 429 acres of wetlands delineated in the mine site focus area (**Table 3.11-3a**). Figures of these features and impacts under the alternatives are in **Appendix I**.	130.9 acres of wetlands would be lost at the mine site (31% of wetlands at the mine site) 675.6 acres of riparian areas would be lost at the mine site	131.2 acres of wetlands would be lost at the mine site (31% of wetlands at the mine site). 630.3 acres of riparian areas would be lost at the mine site.	132.3 acres of wetlands would be lost at the mine site (31% of wetlands at the mine site). 820.5 acres of riparian areas would be lost at the mine site.	130.2 acres of wetlands would be lost at the mine site (31% of wetlands at the mine site). 673.4 acres of riparian areas would be lost at the mine site.	None.
Loss of wetland and riparian areas.	***Within the off-site focus area -*** Acres of wetland and riparian habitat lost through construction of SGP alternative components.	Figures of these features and impacts under the alternatives are in **Appendix I**.	41.2 acres of wetlands would be lost within the off-site focus area. 453.5 acres of riparian areas would be lost within the off-site focus area.	31.3 acres of wetlands would be lost within the off-site focus area. 449.6 acres of riparian areas would be lost within the off-site focus area.	41.2 acres of wetlands would be lost within the off-site focus area. 472.6 acres of riparian areas would be lost within the off-site focus area.	28.0 acres of wetlands would be lost within the off-site focus area. 429.2 acres of riparian areas would be lost within the off-site focus area.	None.

Issue	Indicator	Baseline Conditions	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Impacts on wetland and riparian functions.	Functional units of wetlands, including high-value wetlands (i.e., Category I and II per Montana Wetland Assessment Method), lost due to SGP construction.	Existing Wetland Functions and Values of AAs assessed for the SGP are presented in **Appendix I** (**Table I-1-1**).	759.3 functional units would be lost, including 486.1 high-value functional units.	761.5 functional units would be lost, including 488.1 high-value functional units.	Based on partial availability of functional assessment data, 444.6 functional units would be lost, including 142.5 high-value functional units. However, as wetland functional assessment information is not available for wetlands potentially impacted by the EFSFSR DRSF and TSF (Alternative 3-specific components), the total functional units lost under Alternative 3 is not comparable to total functional units lost under other action alternatives.	756.3 functional units would be lost, including 485.4 high-value functional units.	None.
Wetland and riparian area fragmentation.	Number of wetlands crossed by new roads.	Figures of these features and impacts under the alternatives are in **Appendix I**.	139 wetlands would be crossed by new roads.	86 wetlands would be crossed by new roads.	181 wetlands would be crossed by new roads.	62 wetlands would be crossed by new roads.	None.
Wetland and riparian area fragmentation.	Total area (in acres) of wetlands that would be lost.	Extents of wetlands and riparian resources are presented in Chapter 3 (**Table 3.11-3a** through **Table 3.11-3e**). Figures of these features and impacts under the alternatives are in **Appendix I**.	172.2 wetland acres lost.	162.5 wetland acres lost.	173.4 wetland acres lost.	158.3 wetland acres lost.	None.
Alteration of wetland and riparian areas due to changes in water balance.	Wetland acres within indirect impact area that would be affected by groundwater drawdown (maximum extent of drawdown under all years).	Extents of wetlands are presented in Chapter 3. Figures of simulated alluvial drawdown at years 6, 7 and 12 are presented in Section 4.8 (**Figures 4.8-23** to **4.8-25**).	48.6 acres of wetlands would be affected by drawdown. The entirety of these wetlands also would be subject to direct impacts from alternative component construction.	46.7 acres of wetlands would be affected by drawdown. The entirety of these wetlands also would be subject to direct impacts from alternative component construction.	40.3 acres of wetlands would be affected by drawdown. The entirety of these wetlands also would be subject to direct impacts from alternative component construction.	48.6 acres of wetlands would be affected by drawdown. The entirety of these wetlands also would be subject to direct impacts from alternative component construction.	None.
Alteration of wetland and riparian areas due to changes in water quality.	Quantitative analysis of estimated changes in water quality parameters based on predictive water modelling in areas coincident with wetlands within the indirect impact area.	Refer to Water Quality section (Section 4.9) for anticipated baseline and predicted water quality parameters.	The SGP would impact water quality, which would in turn impact wetlands and RCAs. See Surface Water and Groundwater Quality section (Section 4.9).	Water quality effects on wetlands and riparian areas would be similar as under Alternative 1 though design features would minimize water quality impacts.	Water quality effects on wetlands and riparian areas would be similar to as described under Alternative 1 with slight differences due to location of SGP features. Alternative 3 would experience greater impacts to water quality from the lack of reprocessing of spent ore disposal area and Bradley tailings.	Water quality effects on wetlands and riparian areas would be similar as under Alternative 1, though no construction or use of Burntlog Route would eliminate water quality impacts in that area, but would increase the impacts along the Yellow Pine Route that is parallel and near EFSFSR and Johnson Creek.	None.

Issue	Indicator	Baseline Conditions	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Fish Resources and Fish Habitat							
The SGP may cause changes in fish habitat in the analysis area that may affect aquatic species, including federally listed fish species and aquatic habitat (e.g., critical habitat) and Management Indicator Species within and downstream of the SGP area.	Length (km) of stream and lake habitat directly impacted by removal.	Not applicable.	EFSFSR: 1.6 km. Fiddle Creek: 1.8 km. Meadow Creek: 5.6 km. East Fork Meadow Creek: 1.8 km. Yellow Pine Pit Lake: 1.9 hectares.	Same as Alternative 1.	EFSFSR: 9.5 km. Fiddle Creek: 1.8 km. Meadow Creek: 0.6 km. East Fork Meadow Creek: 7.7 km. Rabbit Creek: 0.8 km. Fern Creek: 0.6 km. Yellow Pine Pit Lake: 1.9 hectares.	EFSFSR: 2.9 km. Fiddle Creek: 1.8 km. Meadow Creek: 6.3 km. East Fork Meadow Creek: 1.8 km (surface diversion would incorporate step pool channel enhancements rather than a rock drain). Yellow Pine Pit Lake: 1.9 hectares.	No stream channel changes.
	Change in amount of total useable Chinook salmon Intrinsic Potential (IP) habitat in km.	18.61 km.	Loss of 1.78 km (9.6 percent).	Loss of 0.93 km (5 percent).	Loss of 5.17 km (27 percent).	Same as Alternative 1.	No changes from baseline.
	Direct loss of Chinook salmon critical habitat.	26.49 km.	Loss of 5.5 km (20.8 percent) – permanent barrier from Meadow Creek TSF/DRSF.	Loss of 5.5 km (20.8 percent) – permanent barrier from Meadow Creek TSF/DRSF.	Loss of 6.9.km (26.0 percent) – permanent barrier from EFSFSR TSF/DRSF.	Same as Alternative 1.	No changes from baseline.
The SGP may cause changes in fish habitat in the analysis area that may affect aquatic species, including federally listed fish species and aquatic habitat (e.g., critical habitat) and Management Indicator Species within and downstream of the SGP area.	Change in total useable steelhead trout IP habitat.	17.90 km.	Gain of 1.41 km (8 percent).	Gain of 2.3 km (13 percent).	Gain of 0.8 km (4.4 percent).	Same as Alternative 1.	No changes from baseline.
	Length of bull trout habitat (km).	Baseline Stream Reach 1: 10.45 km. Stream Reach 2: 15.10 km. Stream Reach 3: 16.15 km. Stream Reach 5: 41.70 km.	Post-closure (EOY 112) Stream Reach 1: 10.43 km. Stream Reach 2: 14.61 km. Stream Reach 3: 16.15 km. Stream Reach 5: 41.19 km.	Post-closure (EOY 112) Stream Reach 1: 10.92 km. Stream Reach 2: 14.72 km. Stream Reach 3: 16.16 km. Stream Reach 5: 41.80 km.	Post-closure (EOY 112) Stream Reach 1: 10.88 km. Stream Reach 2: 13.86 km. Stream Reach 3: 17.20 km. Stream Reach 5: 41.94 km.	Same as Alternative 1.	No changes from baseline.
	Bull trout occupancy probability (percent).	Baseline Stream Reach 1: 9.51%. Stream Reach 2: 6.27%. Stream Reach 3: 9.34%. Stream Reach 5: 8.31%.	Post-closure (EOY 112) Stream Reach 1: 8.40%. Stream Reach 2: 4.76%. Stream Reach 3: 8.81%. Stream Reach 5: 7.27%.	Post-closure (EOY 112) Stream Reach 1: 6.56%. Stream Reach 2: 4.37%. Stream Reach 3: 7.40%. Stream Reach 5: 6.11%.	Post-closure (EOY 112) Stream Reach 1: 7.16%. Stream Reach 2: 5.22%. Stream Reach 3: 3.77%. Stream Reach 5: 5.13%.	Same as Alternative 1.	No changes from baseline.
	Direct loss of bull trout critical habitat	17.11 km.	Loss of 4.7 km (27.5 percent).	Loss of 4.7 km (27.5 percent).	Loss of 11.9 km (69.5 percent).	Same as Alternative 1.	No changes from baseline.

Issue	Indicator	Baseline Conditions	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	Change in access to bull trout lake habitat.	Bull trout can currently use the Yellow Pine pit lake.	The existing bull trout habitat in the Yellow Pine pit Lake would be permanently lost. Access to the Hangar Flats pit lake would begin in year 20; however, potentially warmer water temperatures and less foraging habitat in comparison to the Yellow Pine pit lake may make the lake habitat less suitable for bull trout.	Under Alternative 2, Meadow Creek would not be routed through the Hangar Flats pit lake so there would be no connection between Meadow Creek and the Hangar Flats pit lake except as occasional outflow from the lake through a channel that would reconnect with lower Meadow Creek downstream of the lake, which may be insufficient to provide for passage of bull trout for most of the year.	Alternative 3 would have similar conditions for bull trout access to lakes as Alternative 1.	The EFSFSR Tunnel would not be designed as fish passable, so bull trout would have no access to Hangar Flats pit lake habitat until after the EFSFSR stream is fully constructed in Mine Year 13.	Bull trout would continue to use Yellow Pine pit lake.
	Length of cutthroat trout habitat (km).	Baseline Stream Reach 1: 10.45 km. Stream Reach 2: 15.10 km. Stream Reach 3: 16.15 km. Stream Reach 5: 41.70 km.	Post-closure (EOY 112) Stream Reach 1: 10.43 km. Stream Reach 2: 14.61 km. Stream Reach 3: 16.15 km. Stream Reach 5: 41.19 km.	Post-closure (EOY 112) Stream Reach 1: 10.92 km. Stream Reach 2: 14.72 km. Stream Reach 3: 16.16 km. Stream Reach 5: 41.80 km.	Post-closure (EOY 112) Stream Reach 1: 10.88 km. Stream Reach 2: 13.86 km. Stream Reach 3: 17.20 km. Stream Reach 5: 41.94 km.	Same as Alternative 1.	No changes from baseline.
	Cutthroat trout occupancy probability (percent).	Baseline Stream Reach 1: 63.73%. Stream Reach 2: 64.06%. Stream Reach 3: 63.59%. Stream Reach 5: 63.79%.	Post-closure (EOY 112) Stream Reach 1: 64.40%. Stream Reach 2: 62.90%. Stream Reach 3: 63.65%. Stream Reach 5: 63.57%.	Post-closure (EOY 112) Stream Reach 1: 63.66%. Stream Reach 2: 63.90%. Stream Reach 3: 63.04%. Stream Reach 5: 63.51%.	Post-closure (EOY 112) Stream Reach 1: 63.37%. Stream Reach 2: 64.62%. Stream Reach 3: 62.83%. Stream Reach 5: 63.57%.	Same as Alternative 1.	No changes from baseline.
The SGP may cause changes in fish habitat in the analysis area that may affect aquatic species, including federally listed fish species and aquatic habitat (e.g., critical habitat) and Management Indicator Species within and downstream of the SGP area.	Changes in monthly discharge during the August-March low flow period (percent change in cfs).	Mean monthly discharge at baseline at 6 locations: EFSFSR above Meadow: 5.0 cfs. EFSFSR at Stibnite: 10.6 cfs. EFSFSR above Sugar Creek: 15.4 cfs. Sugar Creek: 11.7 cfs. Meadow Creek: 3.1 cfs. Meadow Creek MC-6: 5.3 cfs.	Change in mean monthly discharge from baseline to post-closure at 6 locations: EFSFSR above Meadow: -0.2%. EFSFSR at Stibnite: +1.3%. EFSFSR above Sugar Creek: -4.5%. Sugar Creek: -3.5%. Meadow Creek: -83.1%. Meadow Creek MC-6: +1.5%.	Change in mean monthly discharge from baseline to post-closure at 6 locations: EFSFSR above Meadow: +1.9%. EFSFSR at Stibnite: +2.5%. EFSFSR above Sugar Creek: +1.7%. Sugar Creek: -0.9%. Meadow Creek: -78.6%. Meadow Creek MC-6: +0.1%.	Change in mean monthly discharge from baseline to post-closure at 6 locations: EFSFSR above Meadow: -0.8%. EFSFSR at Stibnite: +2.7%. EFSFSR above Sugar Creek: +2.0%. Sugar Creek: -1.8%. Meadow Creek: -2.5%. Meadow Creek MC-6: +3.1%.	Same as Alternative 1.	Trends in baseline stream flows would continue.

Issue	Indicator	Baseline Conditions	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	Changes in water temperature (ºC).	Summer Maximum Temperatures (ºC): Upper EFSFSR (above MC): 13.4. Meadow Creek (above EFMC): 17.9. Meadow Creek (below EFMC): 19.8. Middle EFSFSR (between Meadow and Fiddle Creeks): 17.4. Lower EFSFSR (between Fiddle and Sugar Creek): 17.4. EFSFSR downstream of Sugar Creek: 14.9.	Change in Summer Maximum from Baseline to post-closure (ºC): Upper EFSFSR (above MC): +0.5. Meadow Creek (above EFMC): +2.0. Meadow Creek (below EFMC): +1.4. Middle EFSFSR (between Meadow and Fiddle Creeks): +2.6. Lower EFSFSR (between Fiddle and Sugar Creek): +4.2. EFSFSR downstream of Sugar Creek: +4.4.	Change in Summer Maximum from Baseline to post-closure (ºC): Upper EFSFSR (above MC): +0.5. Meadow Creek (above EFMC): +4.8. Meadow Creek (below EFMC): +2.6. Middle EFSFSR (between Meadow and Fiddle Creeks): +2.4. Lower EFSFSR (between Fiddle and Sugar Creek): +3.3. EFSFSR downstream of Sugar Creek: +4.1.	Change in Summer Maximum from Baseline to post-closure (ºC): Upper EFSFSR (above MC): +9.0. Meadow Creek (above EFMC): +0.9. Meadow Creek (below EFMC): +1.4. Middle EFSFSR (between Meadow and Fiddle Creeks): +4.9. Lower EFSFSR (between Fiddle and Sugar Creek): +4.8. EFSFSR downstream of Sugar Creek: +4.5.	Same as Alternative 1.	Not applicable.
	Chinook Salmon - Changes in Lengths (km) of Stream Reaches within Temperature Threshold Categories at EOY 112 Note: + = added length within threshold from baseline; - = less length within threshold from baseline	Adult Migration - Lethal (1-week exposure) – (0.00 km) Adult Spawning - Field Observed Spawning Temperature – (16.72 km) Incubation/Emergence – Optimal – (4.99 km) Juvenile Rearing – Optimal – (16.72 km) Common Summer Habitat Use – Optimal – (16.72 km) Total Available Habitat – (16.72 km)	Adult Migration - Lethal (1-week exposure) – (+2.65 km) Adult Spawning - Field Observed Spawning Temperature – (-5.63 km) Incubation/Emergence – Optimal – (+2.58 km) Juvenile Rearing – Optimal – (-9.05 km) Common Summer Habitat Use – Optimal – (-9.05 km) Total Available Habitat – (-4.02 km)	Adult Migration - Lethal (1-week exposure) – (0.00 km) Adult Spawning - Field Observed Spawning Temperature – (-4.6 km) Incubation/Emergence – Optimal – (-0.58 km) Juvenile Rearing – Optimal – (-6.43 km) Common Summer Habitat Use – Optimal – (-6.43 km) Total Available Habitat – (-4.6 km)	Adult Migration - Lethal (1-week exposure) – (+6.49 km) Adult Spawning - Field Observed Spawning Temperature – (-6.11 km) Incubation/Emergence – Optimal – (-4.99 km) Juvenile Rearing – Optimal – (-11.13 km) Common Summer Habitat Use – Optimal – (-11.13 km) Total Available Habitat – (-4.5 km)	Same as Alternative 1	Not applicable
	Steelhead Trout – Changes in Lengths (km) of Stream Reaches within Temperature Threshold Categories at EOY 112 Note: + = added length within threshold from baseline; - = less length within threshold from baseline	Juvenile Rearing – Optimal – (2.13 km) Common Summer Habitat Use – Optimal – (2.13 km) Total Available Habitat – (2.13 km)	Juvenile Rearing – Optimal – (+5.54 km) Common Summer Habitat Use – Optimal – (+5.54 km) Total Available Habitat – (+10.57 km)	Juvenile Rearing – Optimal – (+8.16 km) Common Summer Habitat Use – Optimal – (+6.98 km) Total Available Habitat – (+9.99 km)	Juvenile Rearing – Optimal – (+3.46 km) Common Summer Habitat Use – Optimal – (+3.46 km) Total Available Habitat – (+10.09 km)	Same as Alternative 1	Not applicable
	Bull Trout - Changes in Lengths of Stream Reaches within Temperature Threshold Categories at EOY 112 Note: + = added length within threshold from baseline; - = less length within threshold from baseline	Adult Spawning – Functioning Appropriately – (1.61 km) Adult Spawning – Functioning at Risk – (8.69 km) Adult Spawning – Functioning at Unacceptable Risk – (18.69 km) Incubation/Emergence – Functioning at Unacceptable Risk – (28.99 km) Juvenile Rearing – Functioning Appropriately – (13.66 km) Juvenile Rearing – Functioning at Risk – (12.89 km)	Adult Spawning – Functioning Appropriately – (-1.61 km) Adult Spawning – Functioning at Risk – (-4.28 km) Adult Spawning – Functioning at Unacceptable Risk – (-7.01 km) Incubation/Emergence – Functioning at Unacceptable Risk – (-12.9 km) Juvenile Rearing – Functioning Appropriately – (-7.80 km) Juvenile Rearing – Functioning at Risk – (-10.31 km)	Adult Spawning – Functioning Appropriately – (-1.61 km) Adult Spawning – Functioning at Risk – (-4.28 km) Adult Spawning – Functioning at Unacceptable Risk – (-6.98 km) Incubation/Emergence – Functioning at Unacceptable Risk – (-12.87 km) Juvenile Rearing – Functioning Appropriately – (-7.25 km) Juvenile Rearing – Functioning at Risk – (-9.85 km)	Adult Spawning – Functioning Appropriately – (-1.61 km) Adult Spawning – Functioning at Risk – (-7.10 km) Adult Spawning – Functioning at Unacceptable Risk – (+0.13 km) Incubation/Emergence – Functioning at Unacceptable Risk – (-8.58 km) Juvenile Rearing – Functioning Appropriately – (-8.71 km) Juvenile Rearing – Functioning at Risk – (-6.95 km)	Same as Alternative 1	Not applicable

Issue	Indicator	Baseline Conditions	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
		Juvenile Rearing – Functioning at Unacceptable Risk – (2.44 km) Common Summer Habitat – Use – Spawning Initiation – (8.66 km) Total Available Habitat – (28.99 km)	Juvenile Rearing – Functioning at Unacceptable Risk – (+5.21 km) Common Summer Habitat – Use – Spawning Initiation – (-2.80 km) Total Available Habitat – (-12.9 km)	Juvenile Rearing – Functioning at Unacceptable Risk – (+4.23 km) Common Summer Habitat – Use – Spawning Initiation – (-2.25 km) Total Available Habitat – (-12.87 km)	Juvenile Rearing – Functioning at Unacceptable Risk – (+7.08 km) Common Summer Habitat – Use – Spawning Initiation – (-3.71 km) Total Available Habitat – (-8.58 km)		
	Changes in water chemistry (above analysis criteria), at the mine site	Refer to **Table 3.12-24** for baseline measurements.	Predicted post-closure exceedance by constituent of concern: Aluminum: No exceedance. Copper: EFSFSR – 0.00265 mg/L and Meadow Creek – 0.005 mg/L. Antimony: Exceedance at YP-T-27 (0.225 mg/L) and YP-SR-4 (0.051 mg/L). Arsenic: Exceeds at all but 2 nodes, highest concentration at YP-T-11:Fiddle Creek (0.79 mg/L). Mercury: Exceeds at all but 1 node, highest concentration at YP-T-6:West End Creek (9.0E-06).	During post-closure YP-SR-4 seasonally exceeds the analysis criteria for antimony, arsenic, and mercury. YP-SR-2, YP-T-11, and YP-T-6 exceed the analysis criteria for mercury.	Similar to Alternative 1, except the spent ore and legacy tailings in Meadow Creek Valley would not be removed. Chemical constituent levels in Meadow Creek would likely be similar to baseline conditions.	Same as Alternative 1.	No changes from baseline.
The SGP may affect fish species by degrading water quality in waterways adjacent to access roads.	Amount of increased traffic (average daily traffic).	Refer to **Table 3.16-2**.	Increases in AADT over baseline: Construction Phase = 65 vehicles. Operations Phase = 68 vehicles. Closure and Reclamation Phase = 25 vehicles. Post Closure Phase = 6 vehicles.	Increases in AADT over baseline: Construction Phase = 65 vehicles. Operations Phase = 50 vehicles. Closure and Reclamation Phase = 25 vehicles. Post Closure Phase = 6 vehicles. Water Chemical Delivery = 40 trucks per year (Operations and Closure and Reclamation phases).	Same as Alternative 1.	Same as Alternative 1 except the traffic level on Burnt Log Road would remain at baseline since it would not be used for mine site access. The access road traffic during operations would shift from the Burntlog Route to the Yellow Pine Route.	No change from baseline.

Issue	Indicator	Baseline Conditions	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
The SGP may affect fish populations through establishment of fish access upstream of the Yellow Pine pit.	Changes in migratory patterns of fish.	Several barriers exist on the EFSFSR and Meadow Creek, including the gradient barrier at the Yellow Pine pit lake, which currently blocks 10.4 km of Chinook salmon habitat, 8.8 km of steelhead trout habitat, and 39.7 km of bull trout and cutthroat trout habitat.	Fish passage at Yellow Pine pit lake would initially be provided in a the EFSFSR tunnel, then ultimately by backfilling the Yellow Pine pit and building a new stream channel over the top of the backfill, thereby providing permanent fish passage through the area. The Meadow Creek diversions and then construction and operation of TSF/DRSF and the construction/operation of the DRSF in Fiddle Creek would create new barriers to natural fish movement that would be permanent.	Same as Alternative 1, except Meadow Creek would be permanently routed around the Hangar Flats pit lake likely creating a barrier to bull trout lake habitat.	Same as Alternative 1, except the existing partial barrier in Meadow Creek would remain in perpetuity, blocking 9.5 km of fish habitat, and the TSF/DRSF would be located in the upper EFSFSR drainage where it would create a barrier that would permanently block 15.7 km of fish habitat to natural migration.	Same as Alternative 1, except the EFSFSR tunnel would not be designed as fish passable. Natural migration up or downstream through the Yellow Pine pit area would not be available until after full reclamation of the EFSFSR through the Yellow Pine pit area is complete in Mine Year 13. The Yellow Pine pit barrier would continue to block access to 10.4 km of Chinook salmon habitat, 8.8 km of steelhead habitat, and 39.7 km of bull trout and cutthroat trout habitat.	No change from baseline.
	Length of suitable habitat upstream of the Yellow Pine pit lake (km).	Chinook salmon IP modeled habitat:11.4 km Steelhead trout IP modeled habitat: 8.8 km. Bull trout and cutthroat trout OM habitat: 39.7 km.	Chinook salmon IP modeled habitat: 6.9 km. Steelhead trout IP modeled habitat: 8.9 km. Bull trout and cutthroat trout OM habitat: 39.8 km.	Same as Alternative 1.	Same as Alternative 1.	Same as Alternative 1, except that access to all fish habitat upstream of the Yellow Pine pit lake would remain blocked until Mine Year 13.	Same as Baseline.
The SGP may affect fish health through hazardous material spills at the mine site or along the access roads.	Length of Chinook salmon IP habitat within 91 meters of access routes.	Not applicable.	Yellow Pine Route: 36 km. Burntlog Route: 7.3 km. Warm Lake Road: 9.2 km.	Yellow Pine Route and Warm Lake Road, same as Alternative 1. Burntlog Route: 5.91 km.	Yellow Pine Route and Warm Lake Road, same as Alternative 1. Burntlog Route: 4.83 km.	Yellow Pine Route and Warm Lake Road, same as Alternative 1. Potential impacts would be for all phases of SGP. The Burntlog Route would not be constructed under Alternative 4.	Not applicable.
	Length of critical habitat for steelhead and bull trout within 91 meters of access routes.	Not applicable.	Yellow Pine Route: Steelhead Trout-32.3 km, and Bull Trout - 33.7 km. Burntlog Route: Steelhead Trout – 1.62 km, and Bull Trout – 8.87 km. Warm Lake Road: Steelhead Trout – 4.06 km, and Bull Trout – 9.05 km.	Yellow Pine Route and Warm Lake Road, same as Alternative 1. Burntlog Route: Steelhead Trout – 1.23 km, and Bull Trout – 7.67 km.	Yellow Pine Route and Warm Lake Road, same as Alternative 1. Burntlog Route: Steelhead Trout – 1.23 km, and Bull Trout – 5.74 km.	Yellow Pine Route and Warm Lake Road, same as Alternative 1. Potential impacts would be for all phases of SGP. The Burntlog Route would not be constructed under Alternative 4.	Not applicable.
Access and Transportation							
The SGP may affect access to public lands during mine construction, operations, and closure and reclamation.	Number, location, and description of changes in access due to new and improved roadways.	See **Table 3.16-1** and **Figure 3.16-1.**	- Burnt Log Road (plowed). - No public access through the mine site during operations. Loss of winter groomed OSV trail on Warm Lake Road to Landmark.	Same as Alternative 1 except: - Mine site public access during operations (Option 1 and 2) (not plowed). Rerouted Riordan Creek Segment on Burntlog Route (plowed).	Same as Alternative 1 except: EFSFSR TSF public access or mine access route upon closure and reclamation.	Same as Alternative 1 except: - no Burntlog Route, only Yellow Pine Route (plowed).	No change from baseline conditions.

Issue	Indicator	Baseline Conditions	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
The SGP may change the miles of roads and trails, the amount of use, and types of vehicles on each road or trail.	Miles of new road for public use.	Forest Service = 1,557 miles. Valley County = 278 miles. State = 131 miles.	Forest Service = no change. Valley County = 2.5 miles[1]. State = no change. Private = 15 miles[2].	Forest Service = no change. Valley County = 2.5 miles[1]. State = no change. Private = 13.5 miles (with an additional 3 to 4 miles through the mine site)[3].	Forest Service = 7.6-9 miles[4]. Valley County = 2.5 miles[1]. State = no change. Private = 19.6 miles[2].	Forest Service = no change. Valley County = 2.5 miles[1]. State = no change. Private = 4 miles through the mine site[5].	No change from baseline conditions.
The SGP may affect public safety on the roads used by mine vehicles during construction, operations, and closure and reclamation activities.	Approximate miles of roads used by mine vehicles.	Yellow Pine Route = 70 miles South Fork Salmon River Road = 83 miles. Burntlog Route = 0 mile (does not exist).	Yellow Pine Route = 70 miles. Burntlog Route = 73 miles.	Yellow Pine Route = 70 miles. Burntlog Route = 71 miles.	Yellow Pine Route = 70 miles. Burntlog Route = 75 miles.	Yellow Pine Route = 70 miles. Burntlog Route = 0 mile.	No change from baseline conditions.
The SGP may affect public safety on the roads used by mine vehicles during construction, operations, and closure and reclamation activities.	Change in traffic volume. (AADT).	Refer to **Table 3.16-2**.	Construction = 65 (45 HV). Operations = 68 (49 HV). Closure-Reclamation = 25 (13 HV). Post-Closure = 6 (0 HV).	Construction = 65 (45 HV). Operations = 50 (33 HV). Closure-Reclamation = 25 (13 HV). Post-Closure = 6 (0 HV). *Additional 40 truck trips (O and C-R) per year required to deliver chemicals for water treatment.	Same as Alternative 1.	Same as Alternative 1.	No change from baseline conditions.
The SGP may change the miles of roads and trails, the amount of use, and types of vehicles on each road or trail.	Change in amount of use.	See **Table 3.16-1** for existing roads.	**Yellow Pine Route** = 5 mine-related vehicles/hr (Construction). **Burntlog Route** = 5 mine-related vehicles/hr (Operations); 2 mine-related vehicles/hr (Closure-Reclamation).	Same as Alternative 1 except: **Burntlog Route** = 4 mine-related vehicles/hr (Operations).	Same as Alternative 1.	Same as Alternative 1 except all phases occurring on Yellow Pine Route.	No change from baseline conditions.
The SGP may affect public safety on the roads used by mine vehicles during construction, operations, and closure and reclamation activities.	Number of accidents, both current and projected.	Warm Lake Road = 8/year. Johnson Creek Road = 2/year. Stibnite Road = 1/year.	Midas Gold would implement safety measures to reduce accidents including radio communication.	On-site lime generation would result in fewer mine-related vehicle trips and a decrease in the likelihood of being in an accident.	Same as Alternative 1.	Yellow Pine Route has a steeper topography and terrain that would require wider roads, more cut/fill sections, and more switchbacks.	No change from baseline conditions.
The SGP may affect public safety on the roads used by mine vehicles during construction, operations, and closure and reclamation activities.	Change in emergency access.	N/A.	Additional access routes via public access through the mine site upon closure (Closure-Reclamation). Removal of Warm Lake OSV (Construction/Operations/Closure-Reclamation) and Johnson Creek OSV (Construction).	Same as Alternative 1 except: - public access through mine site.	Same as Alternative 1.	Same as Alternative 1.	N/A.

Issue	Indicator	Baseline Conditions	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Scenic Resources							
The SGP may cause changes to scenic resources.	Visual contrast.	Landscape is characterized by valley floors surrounded by mountains with steep terrain broken up by narrow gorges and streams. Vegetation includes grass and evergreens. Existing modifications include the existing mine site, forest roads, transmission lines, and residences in the western portion of the analysis area.	New disturbances within the footprint of existing modifications would appear similar to existing modifications but at a larger scale. Visual contrast would increase due to larger road width, more vegetation removal, and new retaining walls. New right-of-way for a new transmission line and wider right-of-way of the upgraded transmission line would introduce high visual contrast. SGP components would result in a high level of change to the characteristic landscape during operations; permanent changes, although less than during operations, would result.	Similar to Alternative 1, except there would be slightly less visual contrast from the mine site due to absence of West End DRSF, and residents of the Thunder Mountain Estates development would experience fewer changes due to location of the transmission line away from the development.	Similar to Alternative 1 except visibility of changes from the mine site would differ as the Hangar Flats TSF would be located in the EFSFSR drainage and not visible from the Meadow Creek Lookout. There would be no public access through the mine site and, therefore, no new viewing platform providing foreground views of the mine site. The new transmission line would result in a lower level of visual change than Alternative 1 where it would follow an existing access road.	Changes associated with the mine site would be the same as Alternative 1. There would be no visual changes from Burntlog Route, because that would not be constructed. Landscape changes would result from the upgrades to Yellow Pine Route. Visual change from utilities would be the same except for additional periodic impacts from helicopters during construction and maintenance activity for communications sites.	The landscape character would not be changed by mine site activity or new or improved access roads, transmission lines, or offsite facilities associated with the mine.
The SGP may cause changes to scenic resources.	SGP component visibility.	Nighttime lighting in the analysis area is minimal and generally limited to residential areas in the western portion of the analysis area.	Nighttime lighting would increase substantially in the mine site. Additional nighttime light sources would include the maintenance facilities and vehicle headlights as they travel on mine access roads.	Similar to Alternative 1, except lighting from vehicles would occur to a slightly different area as a result of the 5.28-mile re-route of Burntlog Route. Lighting from the maintenance facility would be further east due to the different location of the maintenance facility.	Similar to Alternative 1, except lighting from worker housing would be located further west in the East Fork Meadow Creek drainage. Effects to skyglow would be the same.	Similar to Alternative 1, except SGP vehicle lights from vehicles traveling to and from the mine site would occur along the Yellow Pine Route, north and west of the Burntlog Route.	Nighttime lighting in the analysis area would not change as a result of the mine site or associated traffic or maintenance buildings.
Inventoried Roadless Areas (IRAs)							
The SGP may impact roadless character in IRAs and lands contiguous to unroaded areas.	Miles and acres of new roads in IRAs or contiguous unroaded lands.	Thirteen IRAs within the analysis area are managed for roadless character.	During construction and mine operation a total of 17 miles (215 acres) of access roads within five IRAs (Meadow Creek, Horse Heaven, Black Lake, Burnt Log, and Reeves Creek). Within Meadow Creek, Black Lake, and Burnt Log IRAs, 1.5 miles of soil nail walls would be constructed in association with Burntlog Route. After mine closure 1.5 miles of retaining wall (soil nail wall) would remain within the IRAs.	During construction and mine operation a total of 13 miles (204 acres) of access roads within five IRAs (Meadow Creek, Horse Heaven, Black Lake, Burnt Log, and Reeves Creek). Within Meadow Creek, Black Lake, and Burnt Log IRAs, 0.5 miles of soil nail walls would be constructed in association with Burntlog Route. After mine closure, 0.5 miles of retaining walls, and 3.1 miles of access road for the new transmission line would remain within the IRAs.	Total of 17 miles (167 acres) of access roads within five IRAs (Meadow Creek, Horse Heaven, Black Lake, Burnt Log, and Reeves Creek). Within Meadow Creek, Black Lake, and Burnt Log IRAs, 1.5 miles of soil nail walls would be constructed in association with Burntlog Route. After mine closure 1.5 miles of retaining walls and 2.2 miles of Burntlog Route would remain in the IRAs.	No access roads within IRAs.	No new roads within IRAs.

Issue	Indicator	Baseline Conditions	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
The SGP may impact roadless character in IRAs and lands contiguous to unroaded areas.	Number and acres of proposed SGP facilities in IRAs or contiguous unroaded lands.	Thirteen IRAs within the analysis area are managed for roadless character.	Total of 752 acres of SGP facilities within six IRAs (Meadow Creek, Horse Heaven, Black Lake, Burnt Log, Caton Lake, and Reeves Creek). After mine closure 491 acres of TSF and DRSFs structures would remain in Meadow Creek and Horse Heaven IRAs.	Total of 740 acres of SGP facilities within six IRAs (Meadow Creek, Horse Heaven, Black Lake, Burnt Log, Caton Lake, and Reeves Creek). After mine closure 524 acres of TSF and DRSFs and transmission line structures would remain in Meadow Creek and Horse Heaven IRAs.	Total of 650 acres of SGP facilities within six IRAs (Meadow Creek, Horse Heaven, Black Lake, Burnt Log, Caton Lake, and Reeves Creek). After mine closure 455 acres of TSF and DRSFs structures would remain in Meadow Creek and Horse Heaven IRAs.	Total of 531 acres of SGP facilities within four IRAs (Meadow Creek, Horse Heaven, Caton Lake, and Reeves Creek). After mine closure 491 acres of TSF and DRSFs structures would remain in Meadow Creek and Horse Heaven IRAs.	No new facilities within IRAs.
Tribal Rights and Interests							
The SGP would impact tribal resources, restrict tribal access, and reduce viability and/or availability of culturally significant fish, wildlife, and plants.	Changes in tribal access due to the restricted access Operations Area Boundary.	Tribal access and use of the region has long-standing and on-going cultural importance and subsistence value. Currently there is no restricted access on NFS lands in the SGP area. Some restrictions are in place on private lands.	The SGP would restrict tribal access in the 3,533-acre SGP footprint and the 13,446 acres of public land within the Operations Area Boundary. Burntlog Route, a new off-highway vehicle connector, and new over-snow vehicle groomed trails would provide new and/or improved access to the SGP area and vicinity, which could have a positive impact by providing tribes year-round access to previously inaccessible traditional use areas. There would not be a public access road through the mine. Length of time of restricted access is 20 years. This could result in loss of tribal cultural practices important to tribal identity.	Same as Alternative 1, except for: • The SGP footprint would occupy 3,423 acres. • Public access would be provided through the mine site. The Riordan Creek Segment of the Burntlog Route could result in increased use of the Black Lake area and No Return Wilderness by recreational users, impacting tribal members if there is an actual or perceived decrease in their access to, availability, and/or quality of tribal resources.	Same as Alternative 1, except for: • The SGP footprint would occupy 3,610 acres. • The public land within the SGP Operations Area Boundary would occupy a larger area of 17,034 acres. • Closure and reclamation would include a permanent roadway around the TSF that would provide improved SGP area access.	Same as Alternative 1, except for: • The Project footprint would occupy 3,219 acres. • Burntlog Route would not be constructed. • Public access would be provided through the mine site. Stibnite Road would not be returned to its pre-mining width and traffic would be greatly reduced. This could encourage use of tribal resources east of the mine.	Except for the Golden Meadows Exploration mine site area, future access to subsistence resources and for cultural uses in the existing SGP area would remain unchanged.

Acronyms:

AADT = annual average daily traffic; cfs = cubic feet per second; °C = degrees Celsius; DRSF = development rock storage facility; EFSFSR = East Fork South Fork Salmon River; EOY = end of year; hr = hour; HV = heavy vehicles; IP = intrinsic potential; IRA = inventoried roadless area; km = kilometers (1 km = .62 mile); m^2 = meters squared; mg/L = milligrams per liter; MT = million tons; N/A = not applicable; NFS = National Forest System; ng/L = nanograms per liter; OHV = off-highway vehicle; OSV = over-snow vehicle; % = percent; SODA = spent ore disposal area; TSF = tailings storage facility

Table Notes Surface and Groundwater Quality:

1 **Bolded** concentration values exceed the respective water quality standard.

2 Concentration data for the EFSFSR represent the maximum annual average (Alternatives 1 and 2) or the average (Alternative 3) post closure concentrations predicted for the EFSFSR assessment nodes (YP-SR-10, YP-SR-8, YP-SR-6, YP-SR-4, and YP-SR-2), and do not include effects of water treatment. (Concentration summaries for each individual node by alternative are provided in **Figures 4.9-1, 4.9-12, 4.9-14**, and **Tables 4.9-10, 4.9-18,** and **4.9-22**). Although not discussed in the text of Section 4.9, Surface Water and Groundwater Quality, predicted concentrations are presented in the summary table above for aluminum since aluminum concentrations are relevant to the fish impacts analysis (Section 4.12, Fish Resources and Fish Habitat).

Table Notes Access and Transportation:

1 Additional miles of new road for public access post-closure would require revision to the existing FRTA easement with Valley County.

2 The newly constructed Burntlog Road would be a temporary road necessary for mining purposes (pursuant to 36 CFR 228A[f]). The duration for public access on private roads outside of the mine site (i.e., temporary mining access roads associated with the Project) when other public access roads are blocked by mine operations would only occur during the life of the mine.

3 The newly constructed Burntlog Road would be a temporary road necessary for mining purposes (pursuant to 36 CFR 228A[f]). The duration for public access on private roads outside of and through the mine site (i.e., temporary mining access roads associated with the Project) when other public access roads are blocked by mine operations would only occur during the life of the mine.

4 Additional miles of new road for public access post-closure attributed to the EFSFSR TSF public access or mine access routes.

5 During the life of the mine, mine traffic would utilize the existing road network. No new roads would be constructed outside of the mine site; however, public access would be provided on private roads through the mine site (i.e., temporary mining access roads associated with the Project) when other public access roads are blocked by mine operations for the duration of the Project.