Reclamation and Closure Plan

Stibnite Gold Project
Valley County, Idaho

Prepared for

Midas Gold Idaho, Inc.

Boise, Idaho

July 26, 2019

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List of Abbreviations

2-D	two-dimensional
amsl	above mean sea level
AWHC	available water holding capacity
BC	Blowout Creek
BCY	bank cubic yard
BMP	Best Management Practice
BNF	Boise National Forest
BONAP	Biota of North America Program
CEC	cation exchange capacity
CFR	Code of Federal Regulations
CMP	Conceptual Stream and Wetland Mitigation Plan
CY	cubic yard
District	Stibnite-Yellow Pine Mining District
DRSF	development rock storage facility
EDTA	ethylenediaminetetraacetic acid
EFSFSR	East Fork of the South Fork of the Salmon River
EIS	environmental impact statement
EMMP	Environmental Monitoring and Management Plan (
GM	growth media
GMS	growth media stockpile
IDAPA	Idaho Administrative Code
IDEQ	Idaho Department of Environmental Quality
IDL	Idaho Department of Lands
IPCo	Idaho Power Company
kV	kilovolt
LRMP	Land and Resource Management Plan
Midas Gold	Midas Gold Idaho, Inc.
NAG	net acid generation
NEPA	National Environmental Policy Act
NF	National Forest (road)
NFS	National Forest System
NPDES	National Pollutant Discharge Elimination System
non-PAG/ML	non-potentially acid generating and metals leaching
NRCS	Natural Resources Conservation Service
Plan	Weed Management Plan
PLS	pure live seed
PMLU	post-mining land use
PNF	Payette National Forest
ppm	parts per million
PRO	Plan of Restoration and Operations
Project	Stibnite Gold Project
RCP	Reclamation and Closure Plan
RFAI	Request for Additional Information
RIB	rapid infiltration basin
SBM	seed bank material
SGLF	Stibnite Gold Logistics Facility
SMU	Soil Map Unit
SODA	spent ore disposal area
TSF	tailings storage facility
USDA	United States Department of Agriculture
USFS	United States Forest Service
WOTUS	Water of the United States

Section 1
Introduction

1.1 Purpose of Plan

This Reclamation and Closure Plan (RCP) describes proposed activities to reclaim upland areas that have been previously disturbed or will be disturbed by Midas Gold Idaho, Inc.'s (Midas Gold) proposed Stibnite Gold Project (Project) located in Valley County, Idaho (**Figure 1-1**). The planned mitigation for losses of jurisdictional wetlands located within Project-related disturbance is integrated with upland reclamation plans and, while they are summarized in this RCP, this document is not part of the jurisdictional wetlands and Waters of the United States (WOTUS) permitting process. This RCP revises and supersedes the draft Restoration Closure and Reclamation Plan which was presented in Chapter 14 in the Project's Plan of Restoration and Operations (PRO) (Midas Gold 2016). This RCP does not alter the remaining chapters of the PRO. Construction of the Project will permanently impact land surfaces subject to regulation under United States Forest Service (USFS; Code of Federal Regulations [CFR] 36 Chapter II Part 228) and State of Idaho (Idaho Administrative Code [IDAPA] 20.30.02) regulations. This RCP describes Midas Gold's approach for reclaiming Project-related disturbance and is intended to satisfy the reclamation requirements of USFS and State of Idaho regulations. This RCP will be supplemented by a cyanide operations and closure plan to be developed at a later date.

Midas Gold considers mine closure and reclamation, and restoration of jurisdictional wetlands (henceforth referred to as wetlands) and other WOTUS (henceforth referred to as streams) to be integral and important components of the Project proposal, as indicated by the naming of their Plan of Operations as a "Plan of Restoration and Operations." The overall purpose of the RCP is to reclaim and restore certain areas impacted by historical exploration, mining, and processing activities, as well as to return newly impacted areas to stabilized and productive conditions for long-term, post-Project protection of wildlife, fisheries, land, and water resources in a sustainable environment.

This RCP will be subject to review and modification as a result of the National Environmental Policy Act (NEPA) process for the Project. The Idaho Department of Environmental Quality (IDEQ) and the Idaho Department of Lands (IDL) are cooperating agencies on the environmental impact statement (EIS) along with five other federal and state agencies and entities as outlined in a Memorandum of Understanding dated August 2017 (USFS 2017), with IDL having specific responsibilities relative to reclamation activities and the US Army Corps of Engineers (USACE) for wetlands and streams. The EIS will be prepared by the lead federal agency, the Payette National Forest (PNF) of the USFS, under NEPA for the Project's PRO (Midas Gold 2016) to evaluate environmental effects of the proposed Project, alternatives, and associated mitigation measures. The EIS will evaluate and disclose the potential environmental effects from (1) approval of the PRO submitted by Midas Gold in September 2016, to occupy and use National Forest System (NFS) lands for operations associated with open-pit mining and ore processing; and (2) related amendments to the PNF Land and Resource Management Plan, which was finalized in 2003 and amended in 2010 (LRMP; USFS 2003/2010), and/or the Boise National Forest (BNF) LRMP, which was also finalized in 2003 and amended in 2010 (BNF 2003/2010).

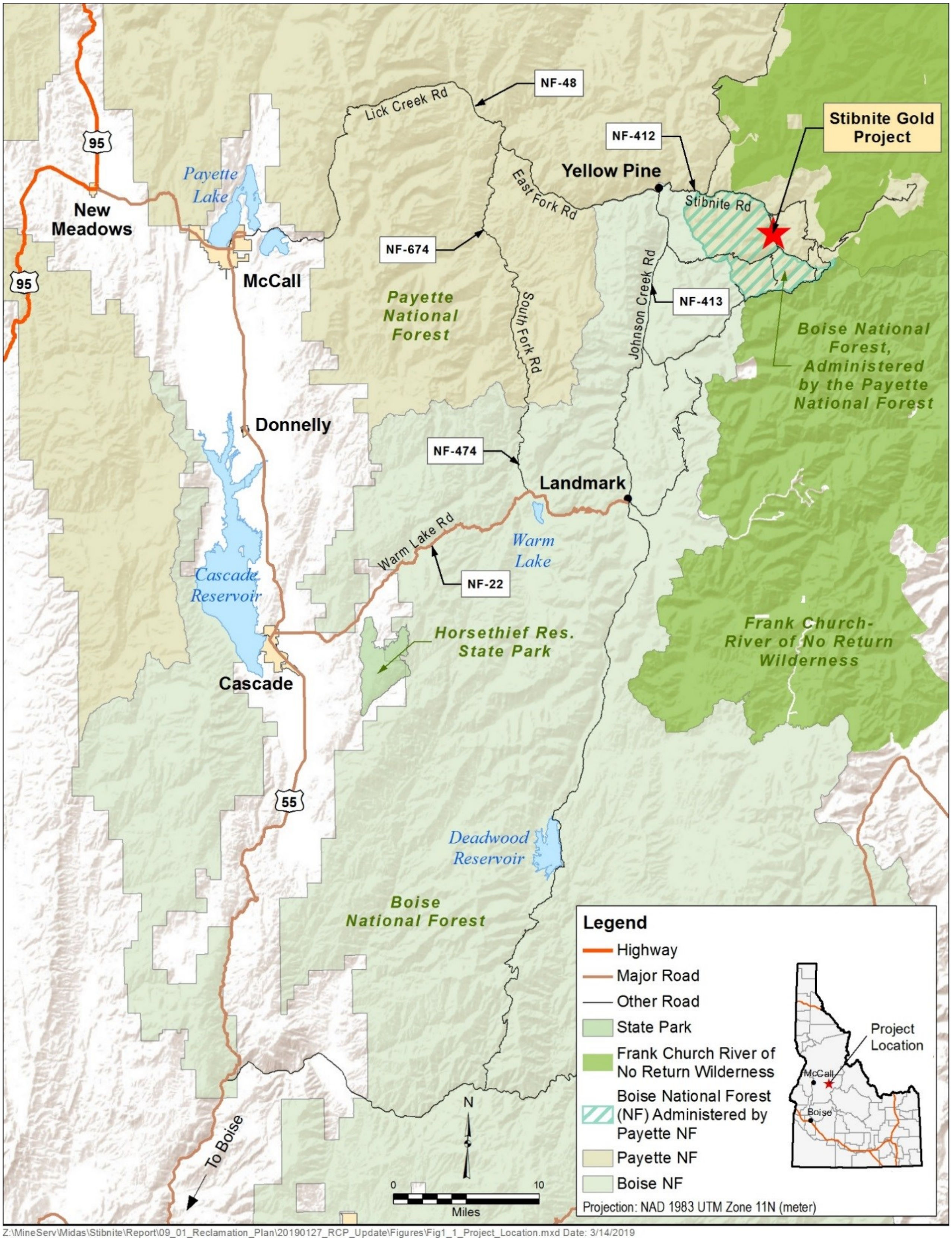

Figure 1-1. Project location

This RCP considers potential impacts from the Proposed Action as well as existing disturbances and includes measures designed to restore and reclaim some past disturbances and anticipated impacts from the Proposed Action; it does not address alternatives considered in the EIS. **Figure 1-2** shows previous surface disturbance that Midas Gold proposes to reclaim. Historical mine waste and impacted soil will also be excavated where it is necessary for the execution of the SGP and those materials will be used for construction of facilities, or, processed for metals recovery and disposed of in the TSF or DRSFs. Future versions of this RCP will address any changes made to the Proposed Action during the NEPA process. This RCP includes plans and designs for the reclamation and closure of major components and facilities of the Project to achieve the post-mining land uses (PMLUs) of wildlife and fisheries habitat and dispersed recreation (Midas Gold 2016). These plans and designs were developed based on input, designs, and analyses from key technical experts and design teams involved with the planning and design of mining, process, waste and fluids management, and operating systems and are consistent with good scientific and engineering practices and IDL and USFS regulations, compliance standards, and guidelines pertaining to the closure and reclamation of mineral mines.

1.1.1 Organization of the Reclamation Plan

Section 1.3 of this RCP includes a Project description. Section 2 discusses Midas Gold's reclamation strategy for the Project, Section 3 addresses general reclamation procedures, and Section 4 includes the proposed reclamation activities for each Project facility. Section 5 describes the actions planned by Midas Gold if the Project undergoes a temporary closure, and Section 6 presents an overview of the proposed schedule of reclamation activities. Finally, a glossary of terms used, and the references cited in this document are presented in Sections 7 and 8, respectively.

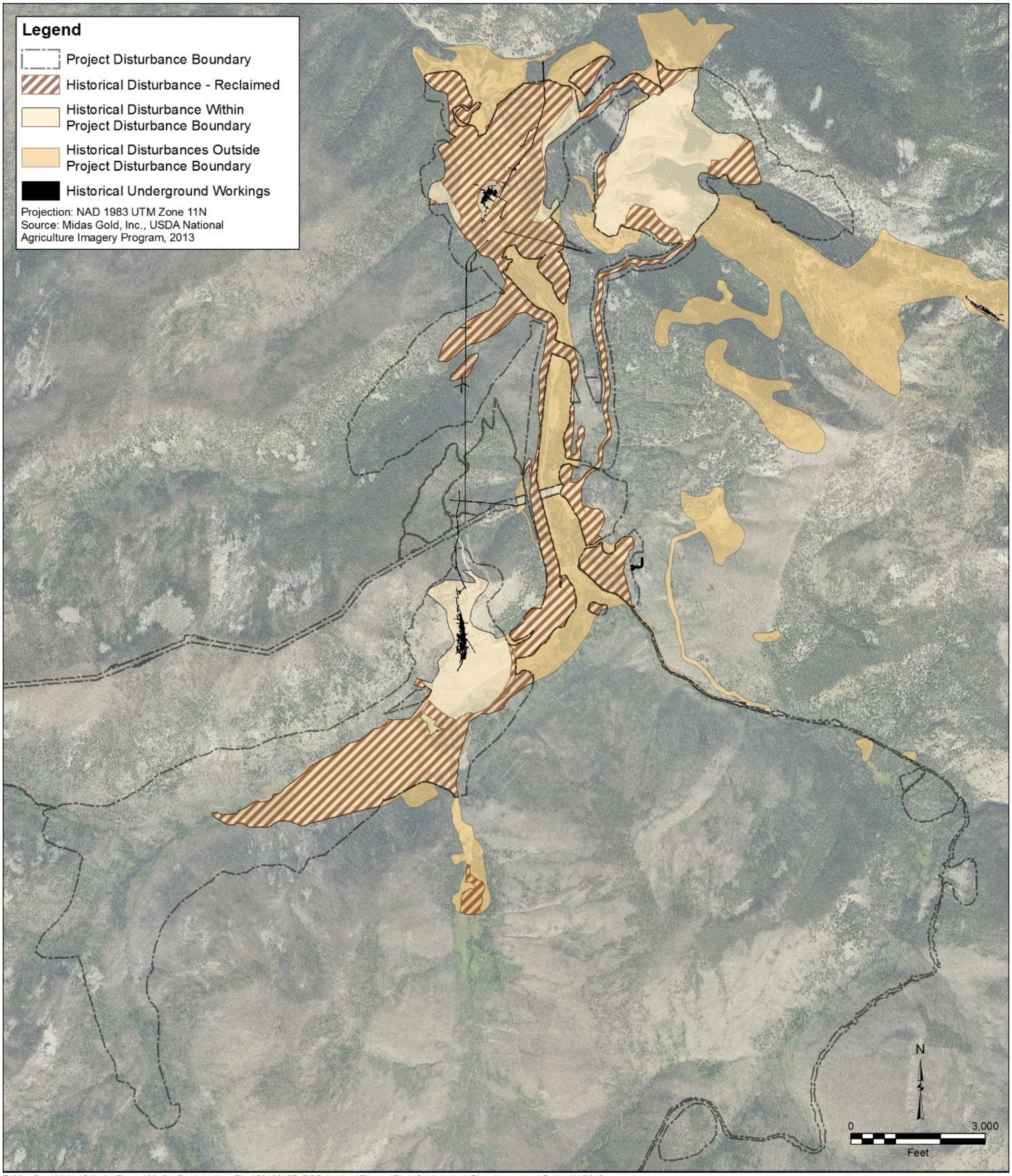

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Figure 1-2. Existing and proposed disturbances within project site

1.2 Project Definition and Level of Detail

The level of detail in closure and reclamation plans and designs depends on the level of project definition. This RCP therefore presents closure and reclamation plans commensurate with available mine plans, which are defined currently at a preliminary feasibility or AACE Class 4 level of detail (AACE, 2012). Accordingly, mining and reclamation methods have been established based on reasonable assumptions of technical, engineering, legal, operating, economic, social and environmental factors to support the assessment of environmental effects related to proposed mining and reclamation activities under NEPA. Site characterization, reclamation plans, and project financial estimates will be advanced to a Canadian National Instrument (NI) 43-101 Feasibility-level or AACE Class 3 level of detail (AACE, 2012) during the effects-analysis and will be completed concurrent with the Draft EIS. The Final EIS and Feasibility Study will be used to support development of the state closure and reclamation plans, financial sureties (bonds) and permits to the level of detail required in IDAPA 20.30.02 regulations.

Estimates of site characteristics and material properties and quantities relevant to the closure and reclamation of the Project that are presented in this RCP as well as in future feasibility studies and the Draft and Final EIS and state mining and reclamation permits will be confirmed or modified through information gathered during the monitoring and documentation of site development and commissioning activities. This information will then be used as basis for future refinements to closure and reclamation plans, designs, schedules, bond estimates and state permit renewals, amendments and supplementary plans. In addition, concurrent reclamation of, for example Fiddle and West End DRSFs, during production will enable Midas Gold to monitor the effectiveness and make adjustments to their approach to the closure and reclamation of the Project. This considerable amount of information, data and experience gained during the site development/pre-production and production phases of the Project will then be used to develop final closure, reclamation and restoration plans and construction-level drawing sets and technical specifications.

1.3 Project Background

Midas Gold plans to redevelop portions of the Stibnite-Yellow Pine Mining District (District), as outlined in the PRO (Midas Gold 2016), which was submitted to the USFS and the IDL in September 2016 and deemed complete by the USFS in December 2016. Midas Gold is simultaneously advancing Project engineering and design to the Feasibility Study level, providing information requested by the USFS to support preparation of the EIS and federal and state permits, and consulting with agency and stakeholders as required for approval of the PRO (Midas Gold 2016).

Located in Valley County in central Idaho, the District is characterized by historical mining activities and unpatented (federal land) and patented (private land) mining claims with known deposits of gold, silver, tungsten, and antimony. Although the District is in the BNF, it is administered by the Krassel Ranger District of the PNF.

Mining began in the District in the late 1800s and continued on and off through 1997. Two main phases of mining activity have occurred at the Project and include antimony, gold, and tungsten mining in the 1920s through the 1950s, and a second phase that began in 1974 and ended in 1997. Historical mining activities within the Project-related disturbance area created numerous legacy impacts including underground mine workings, multiple open pits, development rock dumps, tailings deposits, heap leach pads, spent heap leach ore piles, a mill and smelter site, three town sites, camp sites, a ruptured water dam (with its associated erosion and downstream sedimentation), and partially reclaimed or unreclaimed haul roads. **Figure 1-2** illustrates current conditions showing past mining and related activities and disturbances at the Project site, as provided in the PRO (Midas Gold 2016).

Beginning in 2009, Midas Gold began to acquire mining claims throughout the District from prior owners or by staking claims on its own behalf. With federal and state approval, Midas Gold initiated mineral exploration activities in 2009 as part of the Golden Meadows Exploration Project to better define the mineral deposit potential for the area (USFS 2015). This work included using the existing road network and construction of several temporary roads to access drill sites, build drill pads, drill on both NFS and private lands, and access disturbed areas for reclamation when exploration work ended (USFS 2015). Proposed Project development for mining is described in the PRO (Midas Gold 2016), and includes an ore processing facility, three open pits (Hangar Flats, West End, and Yellow Pine), a temporary tunnel diversion of the East Fork of the South Fork of the Salmon River (EFSFSR), four development rock storage facilities (DRSFs), a lined tailings storage facility (TSF), haul roads, an access road, upgrade and extension of an existing transmission line into the Project site, employee housing, and ancillary facilities and infrastructure. Additional details on proposed on-site and off-site Project activities, facilities, and infrastructure are provided in Sections 1.3.2 and 1.3.3, respectively.

The mine area (Project site, see definition below) is heavily affected by the past mining-related activity of prior operators, presenting opportunities for Midas Gold to improve the site beyond what would be required to simply mine the deposits that it owns. Midas Gold plans to undertake a variety of wetland and stream restoration, creation and enhancement; and water quality improvement projects over the course of mine construction, operation, and closure, many to repair legacy impacts, with the goal of producing a net benefit to wetlands, streams, water quality, and fisheries in the Project area. In the PRO (Midas Gold 2016), Midas Gold outlined its restoration goals to provide early and sustainable on-site compensatory mitigation to mitigate Project-related permanent impacts to wetlands and streams located within the Project site. Additionally and as outlined in Midas Gold's response to Request for Additional Information (RFAI) 102 (Brown and Caldwell, 2019), the Project will include cleanup of select legacy impacts from past mining activity, including reprocessing of legacy (the Bradley) tailings, repurposing of spent leach ore and development rock material, identification and proper disposal of contaminated soil and fill material where it is necessary to excavate for the execution of the SGP, repair of the East Fork of Meadow Creek (Blowout Creek), and restoration of anadromous fish passage at the Yellow Pine pit.

Further details about the Project area and on-site and off-site activities, facilities, and infrastructure associated with the Project are provided in the sections below.

1.3.1 Project Area Description

The Project is located near Stibnite, Idaho, approximately 100 miles northeast of Boise, Idaho, 38 miles east of McCall, Idaho, and approximately 10 miles east of Yellow Pine, Idaho. **Figure 1-1** illustrates the Project location.

The following terms are used throughout this document for Project features and locations:

- **Project area** includes all Project features, including both the mine area (Project site) and off-site infrastructure (**Figure 1-3**).
- **Project site** includes the mine area (**Figure 1-4**).
- **Off-site infrastructure** includes all infrastructure and facilities outside of the mine area.

Located in the Salmon River Mountains, a high-relief mountainous physiographic province in central Idaho, the terrain within the Project area consists of narrow valleys surrounded by steep mountains. Elevations along valley floors range from 6,000 to 6,600 feet above mean sea level (amsl). The surrounding mountains reach elevations over 8,500 feet amsl. The main drainage basin in the Project area is the EFSFSR. The EFSFSR is joined by Johnson Creek 16 miles downstream near Yellow Pine and flows into the South Fork of the Salmon River approximately 14.5 miles downstream of the Johnson Creek confluence.

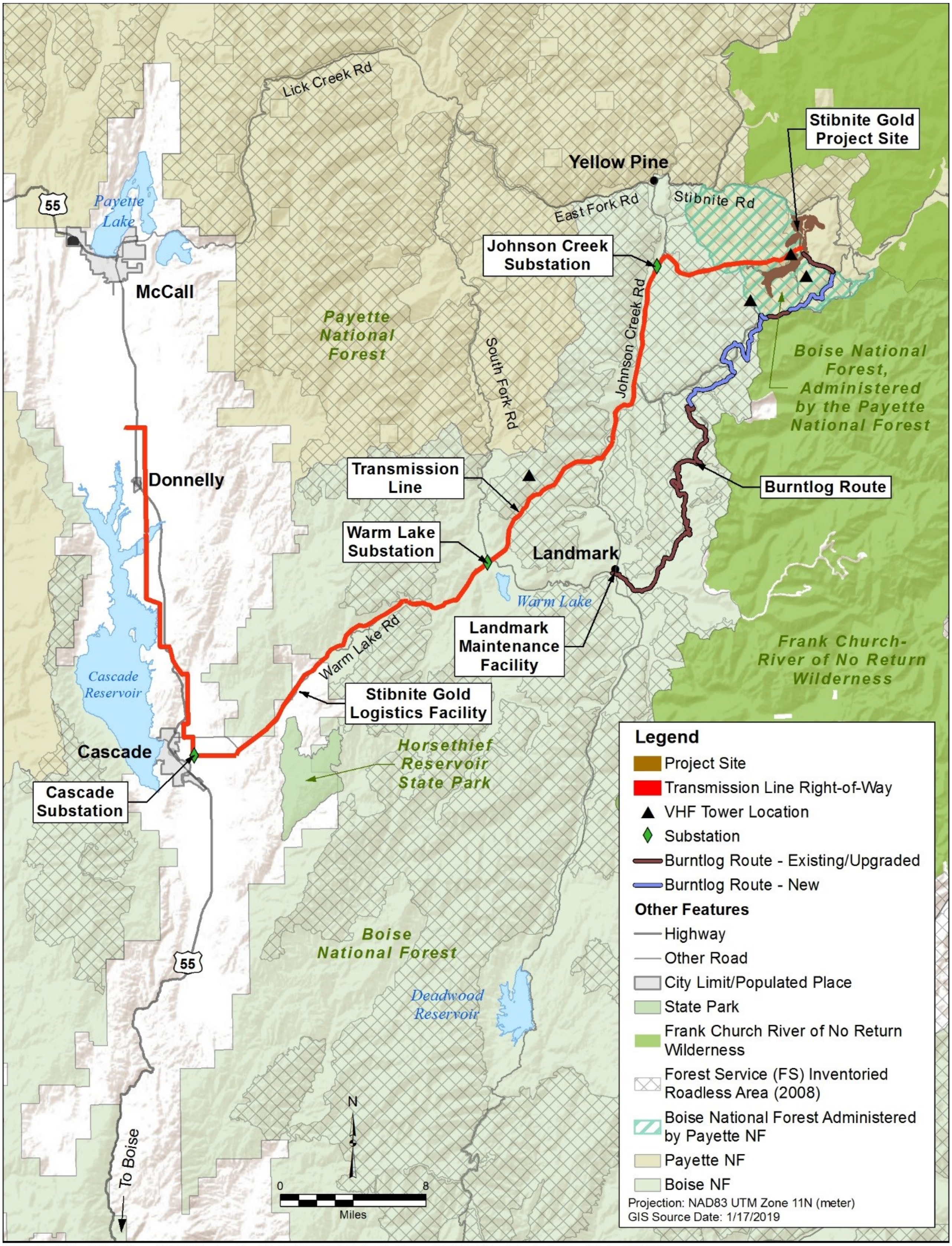

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Figure 1-3. Off-site infrastructure

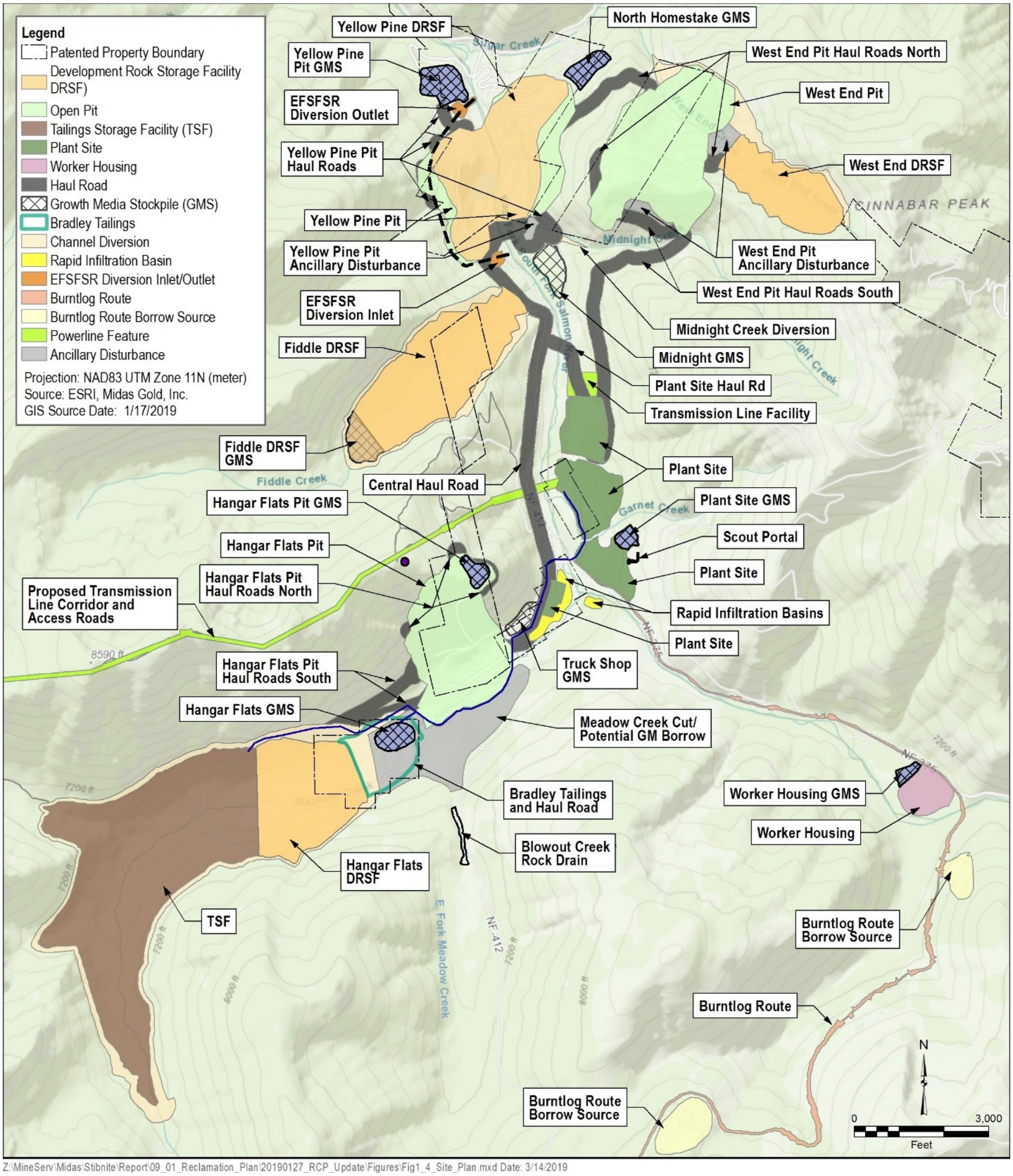

Figure 1-4. Site plan

The Project area is encompassed by the EFSFSR and its tributaries of Sugar Creek, Meadow Creek, Johnson Creek, Riordan Creek, Burntlog Creek, Trout Creek, Hennessy Creek, Midnight Creek, Fiddle Creek, Garnet Creek, and Rabbit Creek, with West End Creek being a tributary of Sugar Creek. The Project area also includes Cabin Creek and Warm Lake Creek, which are tributary streams to the South Fork of the Salmon River. The primary uses or activities in the area have been mineral exploration, mining, logging, and dispersed recreation.

During non-winter conditions (unmaintained roads clear of snow), the Project can be accessed from the city of Cascade by traveling northeast on Warm Lake Road (National Forest System Road [NFSR] NFSR-22) for about 37 miles to Landmark, then north on Johnson Creek Road (NFSR #50413) for 28 miles to Yellow Pine, and 14 miles east on Stibnite Road (NFSR #50412) (**Figure 1-1**). The site can also be accessed from McCall during non-winter conditions by traveling east on Lick Creek Road (NF-48) for 33 miles to East Fork Road, then 16 miles to Yellow Pine, and 14 miles on Stibnite Road (NF-412). During winter, the site can be accessed with highway vehicles only from Cascade by traveling 24 miles northeast on Warm Lake Road (NF-22) to the intersection with South Fork Road (NF-674), then north on South Fork Road for 32 miles to East Fork Road, 16 miles east on East Fork Road to Yellow Pine, and 14 miles east on Stibnite Road (NF-412).

Site access during construction, mine operation, and closure will be via Burntlog Road and portions of the Thunder Mountain Road, which is being called the Burntlog Route. These existing roads will be upgraded and improved, and some new roadway will be constructed to provide a safe and reliable all-season access route to the Project site (**Figure 1-3**).

Midas Gold will contract with Idaho Power Company (IPCo) to upgrade the electric service from the existing Lake Fork Substation to the existing Johnson Creek Substation and construct a new transmission line from the Johnson Creek Substation to the Project site (**Figure 1-3**).

1.3.2 Project Site Activities, Facilities, and Infrastructure

Conventional open pit mining is the proposed option for Project mining operations. Site preparation and cleanup and on-site facilities and infrastructure are needed to support Project construction and mining and ore processing operations, as well as to support proposed cleanup of select legacy impacts, restoration, and site closure and reclamation. Facilities and infrastructure required include 1) the primary Project access road (i.e., Burntlog Route); 2) utilities for ore processing and day-to-day activities (e.g., electric power supply and distribution, water supply and sewage disposal systems); 3) offices; 4) worker housing; and 5) workshops and warehouses. **Figure 1-4** depicts the Project and the proposed on-site Project features. Proposed on-site activities, facilities, and infrastructure include:

- Site Preparation – To allow for site operations, trees, vegetation, and topsoil (as practical) will be removed and stored for use as part of site reclamation and restoration. Initial site preparation will include removal of previously mined development rock in and around Yellow Pine pit, removal and disposal of soil contaminated by historical mining activities and leachate where it is necessary for the execution of the SGP (primarily located adjacent to the SODA and the southern segment of the Plant Site), removal and repurposing of spent leach ore comprising the spent ore disposal area (SODA) and Hecla heap leach pad, pre-stripping of Project disturbance footprints to collect salvageable topsoil that is suitable for reclamation (growth media – GM), and pre-production construction activities.
- Open Pits – Three open pits—Hangar Flats, West End, and Yellow Pine—will be developed with mining expected to occur for approximately 12 to 15 years. Yellow Pine pit will be developed first, followed by Hangar Flats pit, and then West End pit, in order to use development rock from the West End Pit to backfill the Yellow Pine Pit for restoration of the EFSFSR. Details on mining progression and procedures are included in the PRO (Midas Gold 2016).

- **Development Rock Storage Facilities** – Four DRSFs—Hangar Flats, Fiddle, West End, and Yellow Pine pit backfill—will be developed for storage of development rock. Development rock removal will occur during pre-production and concurrently with mining.
- **Legacy Tailings Removal** – Legacy tailings (the Bradley) that currently are uncontained in the Meadow Creek valley (beneath SODA) will be removed and reprocessed. The current project design does not propose to remove tailings prior to construction of the mill and TSF. If subsequent, more detailed project designs identify tailings that need to be removed before the mill and TSF are operational, the tailings will be stockpiled until they can be reprocessed.
- **Process Plant Area** – The process plant area will include development of ore processing facility buildings, tanks, ore stockpile areas and primary crusher.
- **Lined Tailings Storage Facility** – The lined TSF will be located west of the Hangar Flats DRSF. Historical heap leach ore and recycled and newly-generated development rock will be used to construct the TSF dam. Tailing will be pumped in a pipeline from the mill (Plant Site) to the TSF and make-up water for ore processing will be pumped from the supernatant on the TSF to the mill via a return (reclaim) water pipeline. Both the tailing and reclaim pipelines will be located in a geomembrane lined trench adjacent to the Central Haul Road between the mill and the TSF. The alignment of these pipelines will be identified following submittal of the Draft EIS.
- **Mine Support Facilities** – These facilities will include the mine administration office, maintenance workshop and truck wash, and fuel and explosive storage. Additionally, haul roads will be required to transport ore, development rock, and reclamation materials, or to transport vehicles to the mobile equipment maintenance shop.
- **Surface Exploration Drilling and Underground Exploration** – In addition to previously approved exploration activities, the PRO describes additional surface exploration drill site disturbance as well as proposed underground exploration. Underground exploration activities will occur in a mineralized zone known as the “Scout Prospect” located south of the proposed ore processing facility. Facilities associated with underground exploration will include portal pad access roads, administrative offices, dry facilities, ventilation facilities, maintenance shop and storage area, batch plant, power supply, compressor facility, and explosives and fuel storage, which are located within Admin Area (southern segment) of the plant area.
- **Worker Housing and Recreation Facility** – Existing exploration housing facilities will be expanded to house the construction workforce, and new on-site housing (Worker Housing Facility) and a recreational facility will be constructed near the main gate in the EFSFSR drainage above the confluence with Meadow Creek.
- **Employee and Visitor Parking** – Several on-site parking areas will be used during initial cleanup of select legacy impacts and construction; during operations and concurrent reclamation and restoration, parking areas will be maintained at the Worker Housing Facility, at the shop area and equipment ready lines, and near the mine administration office.
- **On-site Roads and Trail System** – In addition to haul roads, internal service roads and a trail system designed for smaller vehicles and foot traffic will be constructed and maintained.
- **Sanitary Waste Handling Facilities** – Existing sanitary waste handling facilities will be upgraded, and additional sanitary waste treatment facilities will be constructed.
- **Solid Waste Handling Facilities** – Existing materials management practices, which maximize reuse and recycling to minimize waste, will be continued and expanded. Methods for handling solid waste will include composting organic materials, recycling, on-site collection and landfill for non-compostable/recyclable inert waste materials, off-site disposal of municipal or hazardous waste material and some inert waste materials, and “landfarming” (i.e., a biological waste treatment process in which contaminated soils or sediments are spread and are periodically

tilled to aerate the mixture, allowing natural microbial action to break down contaminants, particularly petroleum hydrocarbons - PHC).

- **Warehouse Facilities** – In addition to the off-site warehousing at the Stibnite Gold Logistics Facility (SGLF), additional warehouse facilities will be constructed onsite.
- **Site Distribution of Electric Power** – Solar power and propane or diesel generators will be utilized during construction and as back-up power generation during operations and closure. During operations, electric power will be provided through a 138-kilovolt (kV) line connected to the IPCo electric grid system (see Section 1.3.3) and routed to the Project's main substation. Distribution from the substation to facilities within the Project area will primarily be via overhead 24.9-kV electric distribution lines, while electric power within the ore processing facility area will be in underground conduits. Additional solar arrays may be installed on the roofs of Worker Housing Facility and other buildings, if feasible.
- **Surface Water Management** – Water management will include constructing a tunnel to route the EFSFSR around the Yellow Pine Pit during operations; large stream diversions for Meadow Creek, Fiddle Creek, Hennessy Creek, West End Creek and Midnight Creek; small-scale stormwater diversions to intercept hill-slope runoff; and management of groundwater at the Yellow Pine and Hangar Flats Pits. A rock check structure will be installed across Blowout Creek to raise groundwater levels in existing wetlands. Diversion of stormwater, seeps, springs, and streams in the vicinity of the pits and DRSFs will minimize sediment and metals entering the water. Water coming into contact with mining facilities (hereinafter, contact water) will be collected in surface water runoff diversions and routed to lined contact water retention basins and recycled to the ore processing facility, used for dust control, or evaporated as practicable.
- **Water Use** – Additional water rights to support ore mining and processing and provide potable water for housing and maintenance facilities will be secured through the Idaho Department of Water Resources. Water supply for human consumption, mining-related activities, and ore processing activities will be provided by groundwater dewatering wells, reclaim water, and potable water wells. The PRO (Midas Gold 2016) estimates that water usage will be approximately 312 gallons per minute during construction and startup, 5,036 gallons per minute during operations, and 119 gallons per minute during closure and reclamation.
- **Water Supply and Storage** – Potable water will be provided through an existing well near the exploration housing facility and wellfields developed adjacent to the Worker Housing Facility. Water for ore processing will primarily be recycled from the TSF with additional fresh water or make-up water (any addition of fresh water for the ore processing facility is known as make-up water) supplied from groundwater dewatering wells around the Hangar Flats Pit and the Yellow Pine Pit or contact water retention basins. Water will be pumped into equalization tanks and then into 360,000-gallon freshwater/firewater head tanks via a buried or surface pipeline. The tank facilities will also be used for fire suppression and potentially for exploration drilling, development drilling, and road dust control. Reclaim water from the TSF, and contact water collected in retention basins, will be pumped to the reclaim water tank located at the ore processing facility.
- **Water Treatment** – Alluvium in the EFSFSR and Meadow Creek valleys will be dewatered prior to and during mining activities to maintain stability of pit slopes and limit water infiltration to the Yellow Pine and Hangar Flats Pits. Dewatering water will be sent to the ore processing facility as high-quality make-up water as needed. Excess dewatering water will be reintroduced to the groundwater system downstream of the Hangar Flats pit using rapid infiltration basins (RIBs). Treated water will be directed to the EFSFSR as surface discharge and/or to the alluvial groundwater downgradient of the Yellow Pine Pit area via infiltration basins or wells. Enhanced evaporation will potentially be used to manage excess water accumulated in the TSF or collected from the contact water retention basins.

- **Firefighting Equipment and Support Facilities** – Water for firefighting needs will be maintained in the water tanks at the ore processing facility.
- **Security and Fencing** – Security gates will be installed at the main entrance to the Project near Worker Housing Facility and near the existing bridge over Sugar Creek. A public turnaround area will be provided near the intersection of the Stibnite and Sugar Creek roads. Additionally, exclusion fencing (typically 6- to 8-foot-high chain-link fencing) will be installed around the perimeter of the ore processing facilities, the TSF, the explosive storage areas, and the composting area as well as at the security gates. The TSF security fencing will parallel the surface water diversion ditches that surround the TSF, and they will be accessed by the road built on top of the berm created by the diversion ditches.
- **Communications Facilities** – The existing communications system will be upgraded, and two VHF repeaters will be placed at existing US Forest Service fire tower sites. One or more cell towers may also be located at these repeater sites or elsewhere to facilitate area communications for safety and emergency communications.
- **Borrow Sources** – Borrow sources will be developed to provide various types of material required for construction and maintenance. Materials will primarily be sourced onsite from existing DRSFs, legacy spent heap leach ore in the SODA and Hecla heap, and from development rock removed as part of surface mining and underground exploration activities. Native alluvial and/or glacial materials will be obtained within the footprint of the TSF, Hangar Flats pit, and Fiddle DRSF, and from the lower Blowout Creek alluvial fan. The Environmental Monitoring and Management Plan (EMMP) will include a source material handling plan that identifies the sampling protocol and criteria for determining where borrow material can be used.

Additional details regarding Project components listed above, as well as mining procedures and techniques, are provided in Sections 8 through 13 of the PRO (Midas Gold 2016).

1.3.3 Off-site Activities, Facilities, and Infrastructure

Off-site infrastructure is necessary to support the proposed cleanup of select legacy impacts, exploration, mining and ore processing, closure, and for site reclamation and restoration. Off-site infrastructure includes upgrades to existing roads, bridges, and services as well as new off-site facilities required for the Project. Locations of proposed off-site facilities and infrastructure are depicted in **Figure 1-3**. Off-site Project activities and infrastructure will include:

- **Site Access** – Burntlog Road and portions of the Thunder Mountain Road will be upgraded, improved, extended, and connected to construct a safe and reliable all-season access route to the Project site (i.e., the Burntlog Route). Construction borrow sites will be established along the Burntlog Route corridor as needed to meet construction and maintenance needs. Upon Project closure and reclamation, the upgraded portions of the Burntlog and Thunder Mountain Roads will be reclaimed to approximately their present conditions, while the new part of the Burntlog Route will be removed and reclaimed. Additional details regarding upgrades to the existing Burntlog and Thunder Mountain Roads are provided in Section 7.1 of the PRO (Midas Gold 2016).
- **Solar Power and Electric Grid Power Supply** – The existing solar power generation system will be expanded by installing solar panels on rooftops of on-site buildings, as well as on the off-site Landmark Maintenance Facility. The majority of the Project's power supply will come from upgrades and improvements to the existing IPCo electrical distribution system. Midas Gold will contract with IPCo to upgrade the electric service to the Project site from the existing Lake Fork Substation. This will include upgrading an existing US Forest Service permitted 42-mile-long 69-kV electric transmission line and a 21.5-mile-long 12.5-kV electric transmission line to a 138-kV capacity; constructing 8 miles of Midas Gold owned, operated and maintained overhead 138-kV

line from the new Johnson Creek Substation to the new Stibnite Substation; and upgrading the switchgear at substations located at Oxbow Dam, Horseflat, McCall, Lake Fork, Cascade, and Warm Lake.

- **Stibnite Gold Logistics Facility** – The SGLF will house off-site administrative offices, a warehouse, parking and assembly areas for employees and contractors using buses or van pooling to the Project, and radio and microwave repeater equipment. The SGLF will be located on private land along Warm Lake Road east of Cascade and will be powered by a direct line connection to an IPCo powerline in the valley and a substation will potentially be constructed at the SGLF to transition power from the upgraded IPCo power line.
- **Landmark Maintenance Facility** – This facility will be located at Landmark along the Burnt Log Road and will house road maintenance and snow removal equipment for use during construction, operations, restoration and closure activities as well as housing for snowmobile trail grooming equipment as needed. Additional features may include covered stockpiles for winter sanding activities, housing for road maintenance crews during periods of heavy snow removal or other winter maintenance activities, and communications equipment.

Additional details regarding off-site Project activities and infrastructure are provided in Section 7 of the PRO (Midas Gold 2016). While the RCP focuses on land disturbance from on-site and off-site activities, facilities, and infrastructure associated with the PRO; refinements of several of these features have occurred as a result of public comment, agency inquiry, and additional baseline data collection. Continued refinement of GM/seed bank material (SBM) salvage and placement volumes, suitability analysis of development rock and tailings as root zone material and other engineering refinements has been ongoing by Midas Gold since the submittal of the PRO in 2016. **Table 1-1** presents a summary of actions where the overall disturbance footprint or sequencing for Project components and subcomponents analyzed in the RCP have changed from those presented in the PRO.

Table 1-1. Comparison of PRO Proposed Action (Alternative 1) and the RCP for Primary and Subcomponents

Primary Component	Sub-component	Alternative 1 (Proposed Action)	Changes in RCP
N/A	N/A	Operations proposed by Midas Gold	Based on the disturbance footprint associated with construction of the primary and subcomponents identified in the PRO with the following refinements: Responses to results of public scoping and public comments; Agency RFAIs; Advancement of engineering and design of mine components and subcomponents; and Additional baseline data provided as a result of identified data gaps.
Mine Site	Growth Media Stockpiles (GMS)	Hangar Flats West GMS North Homestake GMS North Yellow Pine Area GMS Midnight GMS Worker Housing GMS Hangar Flats East GMS Hangar Flats North GMS Upper Fiddle GMS Scout GMS	Borrow Sources along Burntlog Route identified as possible GMS. Fiddle GMS expanded to add capacity Grading Plan for YPP backfill modified to reduce pit highwall and increase reclaimed area.
Mine Site	Reprocessing	Legacy tailings in Meadow Creek drainage	Acreage of previous disturbance that will be reclaimed has been quantified.

Table 1-1. Comparison of PRO Proposed Action (Alternative 1) and the RCP for Primary and Subcomponents

Primary Component	Sub-component	Alternative 1 (Proposed Action)	Changes in RCP
Mine Site	DRSFs	Four (4) DRSFs: Hangar Flats DRSF Fiddle DRSF West End DRSF Yellow Pine DRSF (pit backfill)	Modified slope on face of DRSFs to narrow access road and reduce steepness of slope. Increased GM placement thickness on DRSFs from 6 inches to 1 ft. YPP backfill topography modified to reflect EFSFSR floodplain restoration design and to achieve desired maximum slope of reclaimed backfill.
Mine Site	Surface Water Management	Management of contact and non-contact water via stream and stormwater diversions and NPDES-permitted outfalls: 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 would be diverted through several boreholes into the EFSFSR tunnel Fiddle Creek would be diverted in surface diversions around the Fiddle DRSF West End Creek would be diverted in surface diversion around the north side of the legacy West End development rock dumps, West End pit, and West End DRSF Meadow Creek would be diverted around the TSF and Hangar Flats DRSF in surface water diversions with the main channel on one side and a smaller channel on the other side. Meadow Creek would be diverted around the Hangar Flats pit in a sinuous channel designed to provide aquatic habitat The channel of the East Fork of Meadow Creek (Blowout Creek) would be routed through a rock drain structure with a retention structure to raise the natural water table Non-contact stormwater would be diverted around mining activities	Hennessy Creek diverted to flow into Fiddle Creek instead of into EFSFSR tunnel. Location and size of disturbance from sediment and stormwater ponds are not identified and deferred to later Water Management Plan after designs of these features have been better defined. Midnight pit Lake within West End pit footprint added to post closure plan Change in timing of disturbance and soil salvage associated with Meadow Creek diversion around TSF/HF DRSF.
Mine Site	Tailings Storage Facility (TSF)	TSF located in Meadow Creek drainage	Increased GM placement thickness to 1 ft on upland areas. Increased GM placement to 6 inches of GM and 6 inches of seedbed material on MC1 wetland and Channel reach across TSF.
Mine Site	Surface and Underground Exploration	Surface Exploration disturbance not to exceed 5 acres at any one time Underground exploration through Scout Portal and Decline	Some minor changes to backfilling of Scout portal and bulkhead construction.
Mine Site	Mine Support Infrastructure	Mine Administration Building Maintenance Workshop Worker Housing Facility Haul Roads Fuel and Explosive Storage Service Roads and Trails	Modified how haul road disturbance acres are presented to account for early haul road construction that is subsequently consumed by a pit or DRSF.
Mine Site	Sanitary and Solid Waste	Onsite Landfill Composting	Location and size of onsite landfill at Fiddle DRSF is clarified.

Table 1-1. Comparison of PRO Proposed Action (Alternative 1) and the RCP for Primary and Subcomponents

Primary Component	Sub-component	Alternative 1 (Proposed Action)	Changes in RCP
Access Roads	Mine Access	Yellow Pine Route used for mine site access during construction with limited improvements Burntlog Route used for mine site access during mining and ore processing operations and closure and reclamation Associated borrow areas developed along Burntlog Route for materials needed for road improvements and maintenance	Additional details provided relative to typical road sections both during operation and post closure for both upgraded roads and new roads.
Access Roads	Public Access	Temporary groomed over snow vehicle (OSV) route adjacent to Johnson Creek Road until Burntlog Road complete Public access allowed on Burntlog Route to Thunder Mountain Road; OHV Trail from Horse Heaven/Powerline route to Meadow Creek Lookout Road Cabin Creek Road Groomed OSV Route Temporary groomed OSV route on the west side of Johnson Creek from Trout Creek to Landmark while Burntlog Road is constructed.	New location of post closure road across YPP and nearby area which doesn't measurably change disturbance acreage, just new location. Clarification of post closure public access Spur roads will not exist post closure off of main public access road, hence, no direct vehicle access to pits, DRSFs, etc. Foot traffic trails may be developed.
Utilities	Powerlines	Upgrades to 42 miles of existing 69 kilovolt (kV) line and 21.5 miles of existing 12.5 kV line; New 8.3-mile 138 kV line; 24.9 kV lines within the mine site	General location of T-line route provided. General description provided of how roads, laydown yards and tensioning areas will be utilized. Added preliminary estimates of acreages disturbed.
Utilities	Electrical Substations	Upgrades to existing substations; 3 new substations (Johnson Creek, Stibnite Gold Logistics Facility (SGLF), and Mine Site)	Added preliminary estimates of acreages disturbed.
Utilities	Communication Towers and Repeater Sites	Cell towers (3 location options with associated access roads); VHF repeater sites Communication site at the Stibnite Gold Logistics Facility Upgrades to existing communication site	Added location of two VHF towers at existing USFS Thunderbolt Lookout and Meadow Creek Lookout.
Growth Media	Placement Thickness	6 inches of GM placed on all reclaimed facilities	GM placement varies by facility as listed below: 6 inches on most natural disturbed ground, haul roads and ancillary facilities, TSF - 1 foot DRSFs - 1 foot Wetlands and Channel Reaches - 6 inches total of GM and SBM
Growth Media	Suitability Criteria	General Criteria	Table added with GM criteria. Root Zone (i.e., materials underlying applied GM/SBM layer[s]) suitability addressed in new Appendix A with detailed discussion of specific on-site materials that will be placed on DRSFs and TSF.

Table 1-1. Comparison of PRO Proposed Action (Alternative 1) and the RCP for Primary and Subcomponents			
Primary Component	**Sub-component**	**Alternative 1 (Proposed Action)**	**Changes in RCP**
Composting	Locations and volume	Composting operation at Worker Housing Facility or Hangar Flats.	Composting operations will be established at multiple GMS locations. Additional details added relative to estimated volume of composting source materials produced on site and potential off-site sources of source materials. Total volume of compost needed is updated Some outwash soils in lower Blowout Creek identified as possible GM material.
Reclamation Seed Mix	Plants selected	Tables 14-1 and 14-2 present Upland and Wetland seed mix	Table 3-11 add additional plant species to be seeded and designates different seed mixes for Cool aspect, General and Mesic areas. Table 3-12 added to include commitment to use plant stock in selected areas. Planting Prescription maps developed to show locations for use of different seed mix and plant stock types.
Reclamation Schedule	Timing of facility disturbance and reclamation	General plan for years facilities are constructed and reclaimed.	Facility by facility identification of disturbance acres and reclamation acres by year.

1.3.4 Proposed Reclamation Activities

General reclamation procedures are presented in RCP Section 3. Planned reclamation activities by facility are presented in RCP Section 4. **Table 1-2** includes a brief summary of the primary reclamation activities for each major Project facility or component. Additional reclamation design details will be included in later versions of RCP submitted following completion of the Draft EIS.

Table 1-2. Summary of Reclamation/Restoration Activities by Project Facility/Component

Facility/ Component	Reclaimed/ Restored (Project Year)[b]	Major Concurrent and Final Reclamation/Restoration Activity[a]																										
		Decommission Demolish Disposal & Remediate	Remove Accumulated Sediments	Install/Operate Enhanced Evaporation System	Install Bulkhead, Plug or Seal	Break Concrete Foundation & Place 18" Fill/6" GM	Remove/Plug Culverts & Pipes	Re-Establish Drainages	Passive Filling w/Water	Partial Backfill with Development Rock	Grading/Re-contour	Place Cover - Development Rock	Install Cover System - Stream Reach/ Wetland	Install Liner/Cover System - Landfill	Scarify (Deep Rip)	Place 12" GM/0" SBM	Place 6" GM/0" SBM	Place 6" GM/6" SBM	Place 2" GM/4" SBM	Install Surface (Storm) Water Drainage System	Apply Compost	Apply Fertilizer (if necessary)	Plant Woody Species	Plant Herbaceous Species	Apply Seed	Apply Surface Mulch (≥ 30% Slopes)	Install Temporary Erosion/ Control BMPs to Erosion Prone Areas	Control Invasive/Noxious Weeds
Central Haul Road	18						X	X			X				X		X			X	X	X	X		X	X	X	X
Plant Site (Crusher & Mill)	13	X				X	X	X			X				X		X			X	X	X	X		X	X	X	X
Plant Site (Admin & Truck Shop)	18	X				X	X	X			X				X		X			X	X	X	X		X	X	X	X
Plant Site Haul Road	13						X	X			X				X		X			X	X	X	X		X	X	X	X
Rapid Infiltration Basin	13		X				X	X			X				X		X			X	X	X	X		X	X	X	X
Truck Shop GMS	18							X			X				X		X			X	X	X	X		X	X	X	X
Fiddle DRSF	8							X			X				X	X				X	X	X	X		X	X	X	X
Fiddle DRSF Diversion	10						X	X			X				X		X			X	X	X	X		X	X	X	X
Fiddle Landfill	18					X[c]					X			X	X		X			X	X	X	X		X	X	X	X
FC1/FC2 Wetlands & Channel Reaches	8							X			X		X						X		X	X	X	X	X		X	X
Hangar Flats DRSF	18							X			X				X	X				X	X	X	X		X	X	X	X
Hangar Flats Pit Highwalls	NR																											
Hangar Flats Pit Haul Road North	7						X	X			X				X		X			X	X	X	X		X	X	X	X
Hangar Flats Pit Haul Road South	7						X	X			X				X		X			X	X	X	X		X	X	X	X
Hangar Flats Pit Lake	NR								X																			
Meadow Creek Cut/Potential GM Borrow	15							X			X				X		X			X	X	X	X		X	X	X	X
MC2 Wetland & Channel Reach	18							X			X		X						X		X	X	X	X	X		X	X
MC4 Wetland & Channel Reach	15							X			X		X						X		X	X	X	X	X		X	X
MC5 Wetland & Channel Reach	15							X			X		X						X		X	X	X	X	X		X	X
TSF	18			X			X	X			X	X			X	X				X	X	X	X		X		X	X
TSF and Hangar Flats DRSF Diversion	20						X	X			X				X		X			X	X	X	X		X	X	X	X
MC1/MC3 Wetlands & Channel Reaches	18							X			X	X	X					X			X	X	X	X	X		X	X
Midnight Pit Lake	NR								X																			

Table 1-2. Summary of Reclamation/Restoration Activities by Project Facility/Component

Facility/ Component	Reclaimed/ Restored (Project Year)[b]	Major Concurrent and Final Reclamation/Restoration Activity[a]																										
		Decommission Demolish Disposal & Remediate	Remove Accumulated Sediments	Install/Operate Enhanced Evaporation System	Install Bulkhead, Plug or Seal	Break Concrete Foundation & Place 18" Fill/6" GM	Remove/Plug Culverts & Pipes	Re-Establish Drainages	Passive Filling w/Water	Partial Backfill with Development Rock	Grading/Re-contour	Place Cover - Development Rock	Install Cover System - Stream Reach/ Wetland	Install Liner/Cover System - Landfill	Scarify (Deep Rip)	Place 12" GM/0" SBM	Place 6" GM/0" SBM	Place 6" GM/6" SBM	Place 2" GM/4" SBM	Install Surface (Storm) Water Drainage System	Apply Compost	Apply Fertilizer (if necessary)	Plant Woody Species	Plant Herbaceous Species	Apply Seed	Apply Surface Mulch (≥ 30% Slopes)	Install Temporary Erosion/ Control BMPs to Erosion Prone Areas	Control Invasive/Noxious Weeds
West End Ancillary Disturbance (West Parcel)	11						X	X			X				X		X			X	X	X	X		X	X	X	X
West End Ancillary Disturbance (East Parcel)	NR																											
West End DRSF	7						X	X			X				X	X				X	X	X	X		X	X	X	X
West End DRSF Diversion	9						X	X			X				X		X			X	X	X	X		X	X	X	X
West End Pit Haul Road North	8						X	X			X				X		X			X	X	X	X		X	X	X	X
West End Pit Haul Road South	11						X	X			X				X		X			X	X	X	X		X	X	X	X
West End Pit Highwalls	NR																											
West End Pit Lake	NR								X																			
WE1 Wetland & Channel Reach	7							X			X		X						X		X	X	X	X	X		X	X
Worker Housing	18	X				X	X	X			X																	
Worker Housing GMS	18							X			X				X		X			X	X	X	X		X	X	X	X
EFSFSR Diversion Inlet	13				X						X				X		X			X	X	X	X		X	X	X	X
EFSFSR Diversion Outlet	13				X						X				X		X			X	X	X	X		X	X	X	X
Midnight Creek Diversion	13						X	X			X				X		X			X	X	X	X		X	X	X	X
Midnight GMS	9							X			X				X		X			X	X	X	X		X	X	X	X
North Homestake GMS	18							X			X				X		X			X	X	X	X		X	X	X	X
Yellow Pine Pit GMS	18							X			X				X		X			X	X	X	X		X	X	X	X
Yellow Pine DRSF	14							X			X				X	X				X	X	X	X		X	X	X	X
Yellow Pine Pit Ancillary Disturbance	11						X	X			X				X		X			X	X	X	X		X	X	X	X
Yellow Pine Pit Haul Road	7						X	X			X				X		X			X	X	X	X		X	X	X	X
Yellow Pine Pit Highwalls[e]	NR									X																		
EF3/MNC2/HC2 Wetlands & Channel Reaches	12							X			X		X						X		X	X	X	X	X		X	X
BC1 Wetland	1							X															X	X	X		X	X
Blowout Creek Rock Drain	13									X[d]	X				X		X			X	X	X	X		X	X	X	X
Burntlog Route	18	X	X				X	X			X				X		X			X	X	X	X		X	X	X	X

Table 1-2. Summary of Reclamation/Restoration Activities by Project Facility/Component

Facility/ Component	Reclaimed/ Restored (Project Year)[b]	Major Concurrent and Final Reclamation/Restoration Activity[a]																										
		Decommission Demolish Disposal & Remediate	Remove Accumulated Sediments	Install/Operate Enhanced Evaporation System	Install Bulkhead, Plug or Seal	Break Concrete Foundation & Place 18" Fill/6" GM	Remove/Plug Culverts & Pipes	Re-Establish Drainages	Passive Filling w/Water	Partial Backfill with Development Rock	Grading/Re-contour	Place Cover - Development Rock	Install Cover System - Stream Reach/ Wetland	Install Liner/Cover System - Landfill	Scarify (Deep Rip)	Place 12" GM/0" SBM	Place 6" GM/0" SBM	Place 6" GM/6" SBM	Place 2" GM/4" SBM	Install Surface (Storm) Water Drainage System	Apply Compost	Apply Fertilizer (if necessary)	Plant Woody Species	Plant Herbaceous Species	Apply Seed	Apply Surface Mulch (≥ 30% Slopes)	Install Temporary Erosion/ Control BMPs to Erosion Prone Areas	Control Invasive/Noxious Weeds
Burntlog Route Borrow Sources	1-18[f]							X			X				X		X			X		X	X		X	X	X	X
Transmission Line & Access Roads	18	X	X				X	X			X				X		X			X		X	X		X	X	X	X
Underground Exploration and Tunnel	12	X			X		X	X			X				X		X			X	X	X	X		X	X	X	X
Water and Sediment Retention Basins	18		X				X	X			X				X		X			X	X	X	X		X	X	X	X

[a] *Includes major categories of reclamation/restoration only. Excludes site/facility development, operations, and maintenance activities.*

[b] *NR = Not Reclaimed*

[c] *Includes placement of 18" of fill only.*

[d] *Includes backfill with rock only.*

[e] *See Yellow Pine DRSF*

[f] *The total volume available for growth media (GM) storage in Burntlog Route borrow areas greatly exceeds the amount of GM and SBM that will be harvested during Burntlog Road construction. Consequently, not all available borrow areas will be required for GM and SBM storage. As a result, some Burntlog borrow areas may be either entirely or partially reclaimed in year 1. Similarly, at least one and probably more of the Burntlog borrow areas will hold GM and SBM until year 18 when it is needed for Burntlog Route closure. Burntlog borrow areas might also be used for growth media generation particularly during years 3 through 11 when little space is available at stockpile areas on the mine site.*

Section 2

Reclamation Goals, Objectives, and Strategies

Midas Gold considers closure, reclamation, and restoration to be integral and important components of the Project proposal, as indicated by the naming of their Plan of Operations as a "Plan of Restoration and Operations."

The overall goal of the RCP is to provide effective site closure, reclamation, and post-closure management and to stabilize and reclaim certain areas impacted by historical and proposed exploration, mining and processing activities to productive conditions that sustain long-term, post-Project wildlife, fisheries, land, and water resources. The primary goal of the revegetation component of the RCP is not the establishment of forest vegetation throughout reclaimed areas of the SGP; rather, it is to establish wetlands and upland grassland, shrub, and treed communities, which vary with respect to substrate depth and quality (i.e., GM/SBM underlain by development rock, tailing, or regolith), aspect, topographic position, soil moisture, and nutrient regime.

To facilitate the Project goal, an adaptive management strategy will be employed by Midas Gold during mine operations to ensure that the best final pit configurations, DRSF configurations, channel design and water quality considerations are emplaced for long-term physical and chemical stability of the Project-related features. As a part of this strategy, the EMMP will identify site monitoring plans, trigger points (or thresholds above which actions or development of action plans to address the identified issue are required) and contingencies related to mine operations as well as reclamation activities. It will be produced after the DEIS is published.

The proposed on-site compensatory mitigation and closure and reclamation avoid, minimize, rectify, and compensate for Project-related impacts on natural resources. The activities identified in this RCP are designed to be durable, and limit and/or eliminate long-term operations and monitoring and maintenance following closure. The plan that follows is designed to achieve overall net benefits and other environmental goals in conjunction with the Stibnite Gold Mitigation Plan (Brown and Caldwell 2018).

The objectives of the RCP are to outline a series of actions (as discussed in later section of this report) that, when implemented, will:

- Complete reclamation and restoration activities early and concurrent with construction and ongoing mining operations, including cleanup of certain impacts related to legacy activities;
- Limit incremental impact levels by locating facilities on previously impacted lands when it fits into mine operations (including appropriate remediation of certain legacy impacts before reusing these areas);
- Stabilize DRSFs, the TSF, and other project-related surface disturbances by:
  - Diverting, collecting, conveying, storing, treating (if necessary), reusing, and/or releasing non-contact, stormwater, and contact water as appropriate via adequately sized and designed engineered structures;
  - Grading slopes and drainages to stable configurations;

  - Controlling wind and water erosion and the off-site transport of sediments, wind-borne dust, and mine waste; and
  - Establishing persistent vegetation cover in the reclaimed areas.
- Prevent the potential release of storm and contact water that contains regulated contaminants in concentrations that exceed applicable National Pollutant Discharge Elimination System (NPDES) discharge standards at designated point(s) of compliance.
- Return disturbed areas to self-sustaining perennial vegetation by:
  - Creating dry to wet shrub and grassland vegetation community structure with some areas that are composed of tree species; and
  - Planting and seeding shrub, grass, and tree species that are present in the existing dominant vegetation communities within and adjacent to the Project.
- Establish productive lands that support wildlife and fisheries habitat and dispersed recreation PMLUs on Project-related surface disturbances;
- Establish conditions on off-site facilities that support transportation and light industry PMLUs;
- Protect the public and wildlife through proper policies, procedures, and practices during construction, operations, site closure, and reclamation;
- Prevent the establishment and spread of noxious weeds and invasive plant species;
- Maintain consistency with applicable provisions of the PNF and BNF LRMPs, IDL reclamation regulations, and other applicable standards; and
- Limit and/or eliminate long-term maintenance following reclamation to the extent practicable.

Midas Gold's PRO includes activities designed to improve certain existing conditions at the Project site that are due to legacy disturbance that has affected habitat, vegetation, soil, water quality, wetlands and riparian vegetation, and sediment transport. Such improvements include:

- Removing historical development rock and spent ore material from the Stibnite heap leach pads, Hecla heap leach pad, and SODA areas from in or near stream channels and wetlands and reusing this material for construction, where suitable;
- Removing (and re-processing) the Bradley tailings underlying the SODA and placing them into a lined TSF to reduce potential sources of metals leaching into groundwater and surface water, thereby enhancing water quality and fish habitat;
- Removing select existing development rock at the historical Yellow Pine and West End Pits and contaminated soil present on site will be removed, just materials that Midas Gold identifies as needing to be removed, the removal of which is necessary for execution of the SGP, and which are located within the disturbance footprint;
- Backfilling the Yellow Pine Pit with suitable material to reestablish a sustainable natural riverine flow system and allow permanent passage for fish species of concern into the headwaters of the EFSFSR as described in the Conceptual Mitigation Plan for Streams and Wetlands (CMP) (Midas Gold, 2019);
- Closing and decommissioning the ore processing facilities at the end of mine life;
- Removing surface facilities and infrastructure at the end of mine life (except where retention of selected facilities (e.g., septic system and power line) located on private land will benefit future private business activities such as a potential light industrial business located at the SGLF);
- Re-contouring certain historically impacted sites and newly disturbed sites to reduce sediment runoff, enhance vegetative growth and habitat development, and enhance reclaimed areas' ability to blend into the natural environment;

- Placing GM to encourage healthy vegetative growth, which will reduce erosion and sediment runoff and improve water quality and fish habitat;
- Reforesting select legacy impacted and burned areas in and around the Project area with appropriate native species to likewise reduce erosion and sediment runoff that degrade water quality and fish habitat; and
- Establishing a vegetative community on areas disturbed by select legacy and new operations that is reflective of species native to the area and that will encourage and support the development of healthy wildlife populations.

Closure, reclamation, and restoration practices planned for the Project follow industry best practices. As reclamation practices and technology are evolving and improving over time, Midas Gold will take advantage of future opportunities to evaluate new reclamation techniques and potentially implement these improved measures if appropriate. An adaptive management approach will be used for mine operations and the EMMP will outline specific monitoring programs as well as trigger points and contingencies resulting from monitoring.

The RCP is designed to return the land disturbed by mining activities to a stabilized condition that achieves productive PMLUs. The PMLUs for the Project have been identified in the PRO or are proposed by this document to be as follows:

- Stibnite Mine Area (Project site): Wildlife and Fisheries Habitat and Dispersed Recreation.
- Off-site Facilities on private land: Light Industry
- Electrical Transmission Lines:
  - Stibnite Gold Project to Johnson Creek Substation: Wildlife Habitat and Dispersed Recreation
  - Johnson Creek Substation to Lake Fork Substation: Electrical Transmission
- Burntlog Route:
  - New segments removed and reclaimed: Wildlife Habitat and Dispersed Recreation
  - Upgraded segments narrowed and excess width reclaimed: Transportation

Following mining, the SGLF east of Cascade adjacent to the Warm Lake Road, which is on private property, may remain unreclaimed and be maintained by a third-party in an operational status post-closure to support a light industrial PMLU for these facilities. The sections of the Burntlog Route that were upgraded for the Project will be narrowed to approximate the present road width, but the post-mine condition will exceed the current condition due to the improved road layout (flatter grades and gentler curves, Project-related upgrades that will be retained), which will improve traffic flow and safety. Following this reclamation, the operation and maintenance of the narrowed and reclaimed section of the Burntlog Route will be resumed by the USFS. The newly-constructed segment of the Burntlog Route, connecting the existing Burntlog Road with the Thunder Mountain Road, will be removed and reclaimed to attain a PMLU of wildlife habitat. The electrical transmission line segment from the Project to the Johnson Creek Substation will be reclaimed, and the segment from the Johnson Creek Substation to the Lake Fork Substation will be left intact to service current and future utility customers along the route, including in the Yellow Pine area.

Midas Gold's strategy for selecting feasible reclamation and closure strategies, plans, and designs has included:

- Identification and characterization of potential reclamation and closure issues related to site development, mining, and processing plans;
- Identification of potential technologies that can be used to prevent, treat, or reduce the severity of the identified reclamation and closure issues;

- Evaluation of the effectiveness of available strategies or treatment technologies; and
- Selection of preferred closure and reclamation activities.

Section 3

General Reclamation Procedures

Midas Gold will implement reclamation on an interim basis and reclamation and restoration on a concurrent, and final basis throughout the Project life. This section describes Midas Gold's general methods and approaches to the following:

- Site development to facilitate reclamation
- Concurrent Reclamation
- Final Closure and Reclamation
  - Soil and Growth Media Management and Balance
  - Nutrient Analyses of Soil Material
  - Seeding, Planting and Mulching
  - Reclamation Success Monitoring
- Stormwater Management
- Invasive Plant and Noxious Weed Control

The closure, reclamation and restoration plans, and designs included in the RCP are expected to be modified as more information becomes available and mining, processing, and tailings, development rock, and water management plans are finalized. In addition, Midas Gold will continually evaluate and customize approaches and designs based on site-specific conditions encountered during site development, mining, and interim and concurrent closure, reclamation, and restoration. Monitoring and tracking systems will be employed to assess stabilization and ecological mitigation measures, their functionality, and their ability to meet design criteria and comply with applicable regulatory standards/requirements. Monitoring data will be used to analyze how various approaches, measures, and materials contribute to closure, reclamation, and restoration success or to isolate and modify underperforming elements of the RCP.

3.1 Measures Implemented Prior to and During Production to Facilitate Concurrent and Final Reclamation

Prior to and during the production period Midas Gold will facilitate concurrent and final reclamation by:

- Installing, monitoring and maintaining:
  - Surface water run-on diversions around major facilities at the Project site (e.g., TSF, DRSFs, open pits); and
  - Erosion and sediment control Best Management Practices (BMPs) such as berms, slope drains, slope armoring, rock check dams, silt fences, wattles, water bars, detention basins, surface water channels, and stormwater ponds , the details of which will be identified in the Stormwater Pollution Prevention Plan (SWPPP) that is anticipated to be completed following the Record of Decision;

- Salvaging and stockpiling of logs, shrubs and herbaceous vegetation during construction for chipping and incorporation into reclamation activities as described immediately below and in Sections 3.3.3.3;
- Cutting and pushing small trees, shrubs, and herbaceous vegetation into windrows at the edge of disturbance to function as a sediment barrier. These windrows of vegetation may also be chipped and used for the creation of GM amendments (e.g., compost);
- Salvage of soils prior to initiation of facility construction for either direct haulage to, and placement on, areas prepared for reclamation without stockpiling (live-handling) or, for placement and temporary storage in GM stockpiles, which will contain both GM and seed bank material (SBM) for use in concurrent and final reclamation of Project-related disturbances;
- Temporarily reclaiming Project-related surface disturbance that will be re-disturbed by mining, concurrent or final reclamation activities, which cannot be permanently reclaimed concurrent with mining (i.e. interim reclamation), See Section 7 for definitions of interim, concurrent and final reclamation;
- Reclaiming disturbed areas, on interim basis, prior to the onset of winter where final construction of a facility or concurrent reclamation will not occur for a year or more; and
- Applying water and other dust suppressant to haul roads and frequently used roads and other exposed surfaces prone to dust generation.

Instead of the final reclamation seed mixture, an interim reclamation seed mixture will be applied following USFS approval. The interim reclamation seed mixture (which is presented in Section 3) includes fewer plant species than the final reclamation seed mixture and is instead composed of those that provide a relatively high erosion protection level and/or are nitrogen-fixing species, both of which are beneficial for ultimate reclamation success. The reclamation seed mixtures for the Project are discussed in Section 3.3.5. Interim reclamation procedures will also include:

- Creation of micro-topographic features as discussed in Sections 3.3.2, 3.3.3, and 4.4; and
- Application of surface mulch and erosion control fabric to erosion-prone areas as described in Sections 3.3.3.4 and 3.3.5.

Inorganic and organic fertilizer will only be sparingly (if at all) applied to areas reclaimed on an interim basis to improve the establishment and diversity of vegetation as described in Section 3.3.4.

Surface disturbance within borrow areas, water supply pipeline and powerline rights-of-way, and the cut and fill slopes of access roads, haul roads, run-on diversions, and facility yards will be reclaimed on an interim basis following construction and during the first available seeding period. GMSs will also be reclaimed on an interim basis and retained for use during concurrent and final reclamation. Temporary stormwater control structures and BMPs will be constructed and installed as needed until permanent vegetation is reestablished and sediment loads to EFSFSR and its tributaries are limited to acceptable levels.

Construction or interim reclamation measures will be implemented by dozers, road graders, farm tractors, straw blowers, hydroseeders, manual labor, loaders, trucks, and excavators as appropriate.

The methods to limit invasive plant and weed establishment in Project-related disturbances during concurrent and final reclamation are included in Section 3.6.

During construction, development and operations Midas Gold will also complete the following:

- Remove SODA materials for use as TSF embankment and liner bedding materials;
- Remove and reprocessing the Bradley tailings underlying SODA. (Note: Materials underlying the Bradley tailings will not be excavated, reprocessed or used in anyway by Midas Gold for the execution of the SGP.);

- Place the reprocessed Bradley and newly-generated tailings in a TSF lined with a geomembrane;
- Place contaminated soil excavated by Midas Gold as a result of the execution of the SGP in the engineered DRSFs; and
- Place legacy development rock located in Yellow Pine and West End pit areas and development rock produced by the Project in engineered DRSFs.

These activities and the reintroduction of excess mine pit dewatering water (i.e., water not used in ore processing) to alluvial aquifers via RIBs are anticipated to improve water quality through reduced sediment and metal loading to EFSFSR and its tributaries.

3.2 Concurrent Reclamation

Reclamation completed during active construction, mining, and mineral processing is termed "concurrent" reclamation. Concurrent reclamation differs from interim reclamation in that concurrent reclamation will be conducted in areas that will not be re-disturbed by mining activities and is designed to achieve the same permanent and low-maintenance goals as final reclamation (see Section 7).

The most substantial concurrent reclamation and restoration work will include:

- Restoration of wetlands and streams in West End Creek, Fiddle Creek, Meadow Creek, and the EFSFSR; and
- Reclamation of the following facilities:
  - West End and Fiddle DRSFs and run-on diversions;
  - Portion of backfilled Yellow Pine pit;
  - The Bradley tailings (following removal of tailings);
  - Haul roads that are located outside and adjacent to the perimeters of the Hangar Flats, Yellow Pine, and West End pits; and
  - Ancillary disturbance.

To restore the EFSFSR to approximate conditions that existed prior to mining, the Yellow Pine pit will be partially backfilled with development rock direct hauled from the West End pit. The restoration of wetlands and channel reach which is adjacent to the Project site at the site of the reservoir that failed in the East Fork of Meadow Creek (a.k.a. Blowout Creek), will be completed concurrent with mining and ore processing. Approximately 30 percent of the overall planned reclamation acreage will be completed concurrent with the production period. This estimate does not include off-site compensatory mitigation and wetland restoration, creation, enhancement, or preservation that will be completed adjacent to the Project site during the construction and production periods. The location, timing, and amount of concurrent reclamation anticipated is summarized in Section 6. Final reclamation of GMS areas will be conducted as materials are removed from these facilities unless GMS area(s) is/are needed for composting. Estimates of disturbed and reclaimed areas and GM/SBM material balance calculations include the ground under GMSs. Interim and final reclamation of GMSs is included in interim and final seeding and planting plans and area estimates.

3.3 Final Closure and Reclamation

At the time of permanent cessation of mining and ore processing activities, Midas Gold will implement final closure and reclamation activities that include:

- Decommissioning, demolition, or disposal of facilities;

- Installation of long-term water management facilities/measures, including wetland and stream restoration;
- Final contouring and grading;
- GM and SBM placement;
- Nutrient analyses of soil materials;
- Seeding, planting, and mulching; and
- Post-closure reclamation performance monitoring.

The objective of final reclamation activities is to meet the ultimate environmental goals for the Project, including establishing an improved, self-sustaining ecosystem. Some activities described above may have been completed as part of concurrent reclamation activities. Final reclamation is used to convey two separate meanings in this report—reclamation activities performed during mining and processing on areas that will not be re-disturbed and reclamation activities that will be performed on facilities that cannot be reclaimed until active mining and processing is complete.

Surface disturbance and concurrent and final reclamation will occur in phases as presented in **Table 3-1** and shown on **Figure 3-1** and **Figure 3-2**, respectively. Based on the current mine plan, the surface disturbance associated with the development and operation of planned facilities is approximately 1,896 acres (ac) (two-dimensional [2-D] area). Approximately 840 acres of this estimate is land disturbed by historical mining activities. The anticipated area of surface disturbance that will be reclaimed is approximately 1,539 acres (based on 2-D area). Of this total, 574 acres are land disturbed by historical mining activities that is ultimately reclaimed through execution of the Project. The difference between the areas of disturbance and reclamation is primarily because reclamation will not be conducted on pit highwalls and lakes. These estimates include GMSs located outside other Project site facility disturbance (which are estimated to cover an area of approximately 46 acres) and soil located within the footprint of GMSs will be salvaged prior to stockpiling of GM and then reclaimed following removal of stored GM. Six inches of GM will remain in the GMS footprints for reclamation.

In **Table 3-1**, estimates of disturbed areas are assigned to the initial activity (facility) that causes the disturbance and reclaimed areas are assigned to final disposition of the land at the time of concurrent or final reclamation. For example, surface disturbance caused by mining the Yellow Pine Pit is assigned to the Yellow Pine Pit, but that area of reclamation is assigned (in part) to the backfilled portion of the Yellow Pine Pit or Yellow Pine DRSF. Another example are Hangar Flats pit haul roads. These haul roads will be constructed before the pit is mined, therefore, the area of surface disturbance is assigned to the Hangar Flats pit Haul Roads North and South. The majority of these pit haul roads will be obliterated (where practicable) by the Hangar Flats Pit. Since Project-related open pits will not be reclaimed, there are no reclaimed areas assigned to open pits with the exception of Hangar Flats pit where MC5 wetland and channel reach (**Figure 3-3**) will be restored. Since approximately 29 acres of Hangar Flats pit haul roads will exist outside the Hangar Flats pit perimeter, these segments of the haul roads will be reclaimed and are accordingly assigned to the Hangar Flats pit Haul Roads North and South.

Table 3-1. Site-Wide Surface Disturbance and Reclamation Schedule

Project Phase	Project Year	Disturbance or Reclamation (ac)	Disturbance and Reclamation Area (ac) by Project Site Facility																															Annual Total (ac)	Cumulative Total (ac)
			TSF *(MC1 to MC3 Wetlands & Channel Reaches)*	Hangar Flat DRSF *(MC2 Wetland & Channel Reach)*	Bradley Tailing & Haul Road *(MC4 Wetland & Channel Reach)*	Meadow Creek Cut/ Potential GM Borrow	Hangar Flats Pit Haul Roads South	Hangar Flats Pit *(MC5 Wetland & Channel Reach)*	Hangar Flats Pit Haul Road North	Rapid Infiltration Basins	Plant Site (Mill/Crusher/Admin/ Truck Shop)	Worker Housing	Central Haul Road	Plant Site Haul Road	West End Pit Haul Road South	West End Pit	West End Pit Haul Road North	West End Pit Ancillary Dist.	West End DRSF *(WE1 Wetland & Channel Reach)*	Fiddle DRSF *(FC1 & FC2 Wetlands & Channel Reaches)*	Yellow Pine Pit Ancillary Dist.	Yellow Pine Pit	Yellow Pine DRSF *(EF3 Wetland & Channel Reach)*	Yellow Pine Pit Haul Roads	EFSFSR Diversion Outlet	Midnight Creek Diversion	Truckshop GMS	Worker Housing GMS	Midnight GMS	North Homestake GMS	Yellow Pine Pit GMS	EFSFSR Diversion Inlet	Blowout Creek Rock Drain		
Construction	-3	Dist.										21.8																3.2						25.0	25.0
		Recl.																																0.0	0.0
	-2	Dist.	26.5								105.8																5.8							138.1	163.1
		Recl.																																0.0	0.0
	-1	Dist.	32.7				43.3	29.2	62.2				65.9	11.0	50.8	16.7	65.3	12.0	34.3		2.4	15.7		91.8	2.8	1.1					15.9	1.4		554.4	717.5
		Recl.																																0.0	0.0
Production Period	1	Dist.	136.8	47.0		60.5		2.0								8.4			16.4			43.8							11.4					326.4	1043.9
		Recl.																																0.0	0.0
	2	Dist.	5.9	12.4	7.3			7.0								4.0			4.3	61.5		33.3												135.8	1179.7
		Recl.																																0.0	0.0
	3	Dist.		8.5	12.4			5.4								0.3			3.0	59.7		39.2								9.4				137.9	1317.7
		Recl.																																0.0	0.0
	4	Dist.	57.2	2.7	23.5			1.4								0.3			3.1	28.7		5.0												121.8	1439.5
		Recl.																																0.0	0.0
	5	Dist.	63.3	4.8				4.3								22.2			9.0	29.6														133.2	1572.7
		Recl.																																0.0	0.0
	6	Dist.		8.1				5.5								21.3			26.9	8.6														70.4	1643.1
		Recl.																																0.0	0.0
	7	Dist.	48.0	13.5				30.1		8.5						8.8																		109.0	1752.1
		Recl.					22.2		6.3										72.7					28.9										130.1	130.1
	8	Dist.	1.0	5.2												2.7																		8.9	1761.0
		Recl.															23.2			156.1														179.3	309.5
	9	Dist.		2.7												23.1																		25.8	1786.8
		Recl.																	24.2										11.4					35.7	345.1
	10	Dist.	86.5													22.0																		108.5	1895.3
		Recl.																		30.0														30.0	375.1
	11	Dist.		1.0																														1.0	1896.3
		Recl.													49.5			4.6			2.4													56.4	431.6
	12	Dist.																																0.0	1896.3
		Recl.																					25.2											25.2	456.7

Table 3-1. Site-Wide Surface Disturbance and Reclamation Schedule

Project Phase	Project Year	Disturbance or Reclamation (ac)	Disturbance and Reclamation Area (ac) by Project Site Facility																															Annual Total (ac)	Cumulative Total (ac)
			TSF (*MC1 to MC3 Wetlands & Channel Reaches*)	Hangar Flat DRSF (*MC2 Wetland & Channel Reach*)	Bradley Tailing & Haul Road (*MC4 Wetland & Channel Reach*)	Meadow Creek Cut/ Potential GM Borrow	Hangar Flats Pit Haul Roads South	Hangar Flats Pit (*MC5 Wetland & Channel Reach*)	Hangar Flats Pit Haul Road North	Rapid Infiltration Basins	Plant Site (Mill/Crusher/Admin/ Truck Shop)	Worker Housing	Central Haul Road	Plant Site Haul Road	West End Pit Haul Road South	West End Pit	West End Pit Haul Road North	West End Pit Ancillary Dist.	West End DRSF (*WE1 Wetland & Channel Reach*)	Fiddle DRSF (*FC1 & FC2 Wetlands & Channel Reaches*)	Yellow Pine Pit Ancillary Dist.	Yellow Pine Pit	Yellow Pine DRSF (*EF3 Wetland & Channel Reach*)	Yellow Pine Pit Haul Roads	EFSFSR Diversion Outlet	Midnight Creek Diversion	Truckshop GMS	Worker Housing GMS	Midnight GMS	North Homestake GMS	Yellow Pine Pit GMS	EFSFSR Diversion Inlet	Blowout Creek Rock Drain		
Closure Period	13	Dist.																																0.0	1896.3
		Recl.						3.0		10.4	70.5			11.0											2.8	1.1						2.0	2.7	103.5	560.2
	14	Dist.																																0.0	1896.3
		Recl.																					129.4											129.4	689.6
	15	Dist.																																0.0	1896.3
		Recl.			25.1	80.8																												105.9	795.5
	16	Dist.																																0.0	1896.3
		Recl.																																0.0	795.5
	17	Dist.																																0.0	1896.3
		Recl.																																0.0	795.5
	18	Dist.																																0.0	1896.3
		Recl.	376.1	119.9							35.3	21.8	60.8							4.2							5.8	3.2		9.4	15.9			652.4	1448.0
Post-Closure Period	19	Dist.																																0.0	1896.3
		Recl.																																0.0	1448.0
	20	Dist.																																0.0	1896.3
		Recl.	91.4																															91.4	1539.4
	21	Dist.																																0.0	1896.3
		Recl.																																0.0	1539.4
	22	Dist.																																0.0	1896.3
		Recl.																																0.0	1539.4
	23	Dist.																																0.0	1896.3
		Recl.																																0.0	1539.4
Disturbed Area (ac)			457.8	106.0	43.2	60.5	43.3	85.0	62.2	8.5	105.8	21.8	65.9	11.0	50.8	129.8	65.3	12.0	97.0	188.1	2.4	137.0	0.0	91.8	2.8	1.1	5.8	3.2	11.4	9.4	15.9	1.4	0.0	1896.3	
Reclaimed Area (ac)			467.6	119.9	25.1	80.8	22.2	3.0	6.3	10.4	105.8	21.8	60.8	11.0	49.5	0.0	23.2	4.6	97.0	190.3	2.4	0.0	154.5	28.9	2.8	1.1	5.8	3.2	11.4	9.4	15.9	2.0	2.7	1539.4	

ac = acre; Dist. = disturbed; Recl. = reclaimed; GMS = Growth Media Stockpile

[a]All estimates based on 2D area (i.e., facility footprint). Includes new disturbance and re-disturbed area for planned facilities. Excludes unplanned inter-facility and exploration disturbance.

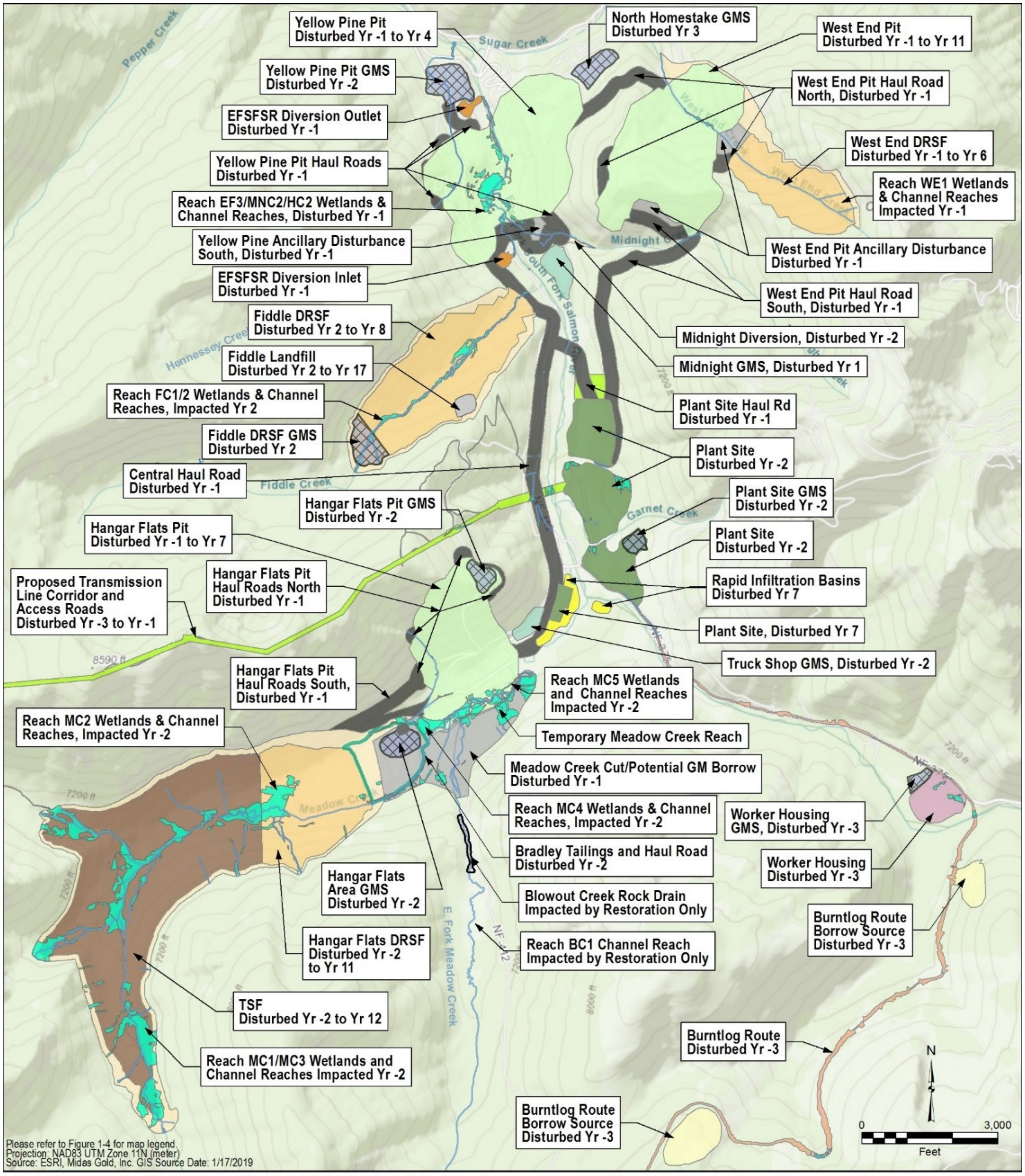

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Figure 3-1. Surface disturbance schedule

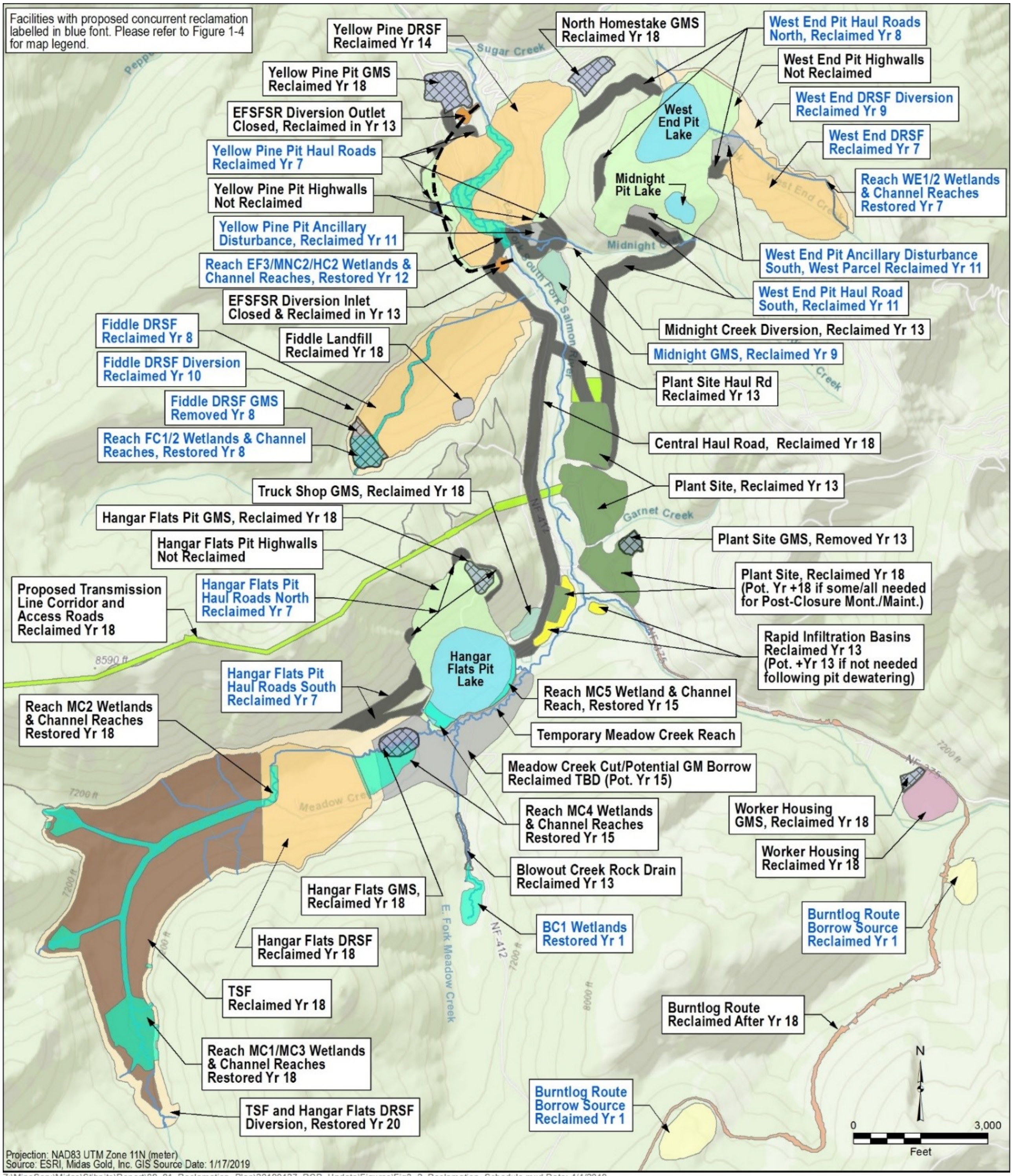


Figure 3-2. Reclamation schedule

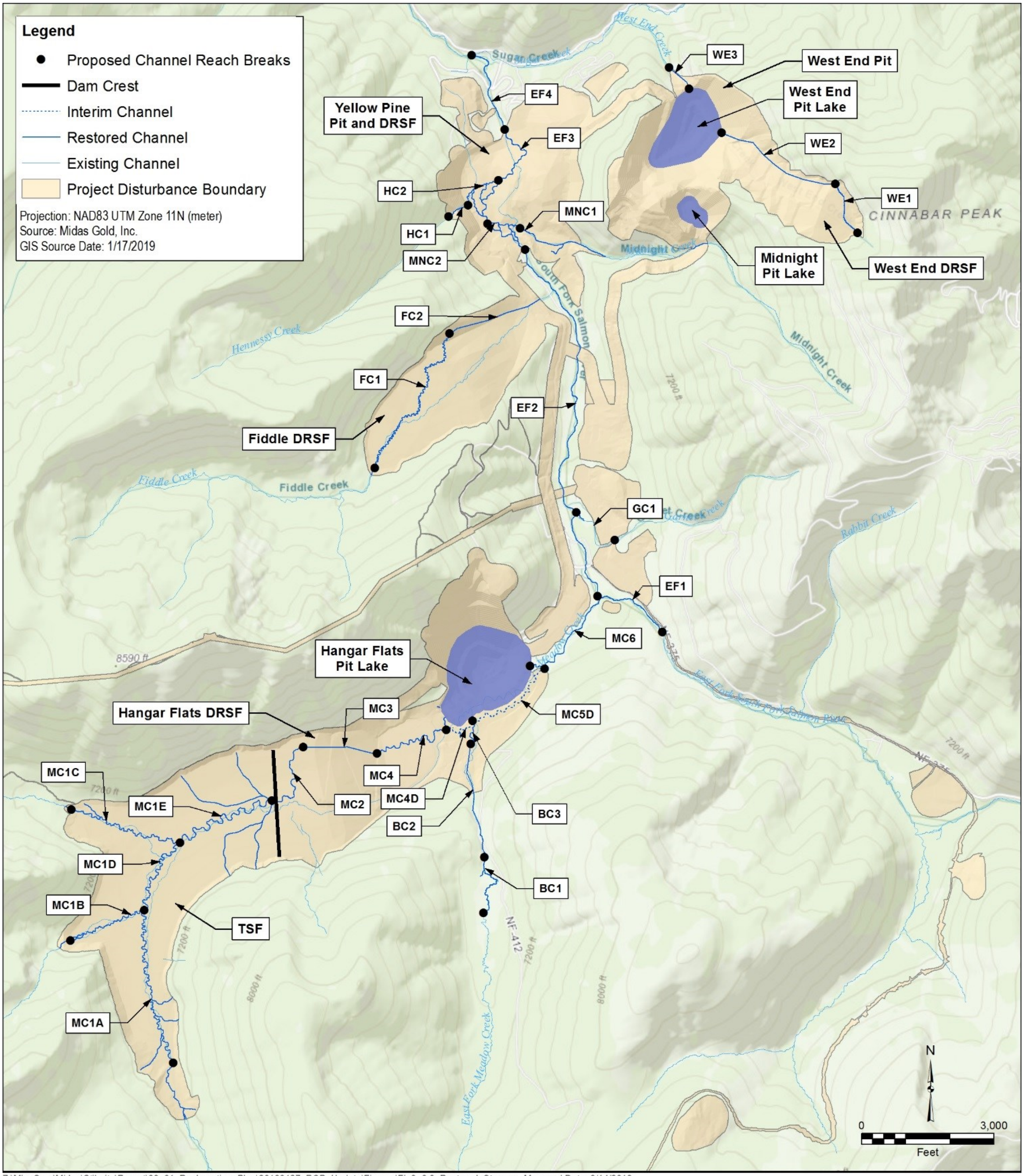


Figure 3-3. Stream restoration segments

3.3.1 Decommissioning, Demolition or Disposal of Facilities

Midas Gold will dismantle, demolish and dispose of structures and facilities that are not necessary for closure water management such as sediment basins, spillways, drainage channels and culverts. The structures and facilities to be removed will, for example, include the ore processing facility, office and maintenance buildings and structures, communication towers and associated wiring, water and fuel storage tanks, generators, substations, switchgear, power lines, temporary trailers, and ancillary and storage facilities. Demolition debris from dismantling and demolition of facilities will be salvaged or disposed of in permitted on-site landfills on private land (i.e. Fiddle DRSF), USFS land and off-site landfills.

Concrete foundations will be broken and buried in place. Most buildings are located on private property; hence, foundations will be buried in place. Idaho Solid Waste rules classify concrete as an “inert waste” (IDAPA 58.01.06.005), which can be buried in place on private property without the need for a solid waste permit. Some buildings are located on USFS lands. The foundation of these buildings will also be buried in place as USFS handbooks and manuals discourage disposal of solid waste on NFS lands, but do not prohibit the activity.

During final mine closure, salvageable equipment, instrumentation, furniture, and personal property will be removed from the site prior to actual removal of structures and facilities. Temporary trailers and structures will likely be sold and removed; otherwise, they will be dismantled or demolished, and materials will be salvaged or disposed of at a permitted on-site or off-site landfill.

Fuel tanks will be emptied of fuel (either used onsite or hauled offsite), dismantled as necessary, salvaged, and hauled offsite. Fuel storage areas will be tested for contamination, as will areas where the chemical storage buildings were located. All reagents, petroleum products, solvents, and other hazardous or toxic materials in the ore processing facility and truck shop areas will be removed from the site for reuse or will be disposed of according to applicable state and federal regulations.

Equipment, tanks and materials that had contact with acids, PHCs or process chemicals will be drained and dried prior to transport offsite. They will be rinsed or otherwise cleaned offsite at a facility located off USFS land that is permitted to conduct these activities using methods appropriate for the chemicals present and the ultimate disposition of the material (e.g., recycled steel may not need cleaning while a tank sold for reuse may require rinsing).

Upon completion of, demolition and salvage of facilities, soil and fill materials will be inspected for spills and sampled using appropriate methods to evaluate the extent of any contamination that requires state or federal reporting and clean up. Fill materials will also be visually inspected for residual ore, or tailings that may have been spilled or inadvertently used during construction. These residual ore and tailings will be excavated, transported, and placed in DRSFs or the TSF during final closure.

With final closure of facilities (including off-site facilities like Landmark Maintenance), their associated sewage system and septic tanks will be decommissioned. Any sewage remaining in the septic tanks will be pumped out by a licensed contractor and hauled to an appropriate site for disposal. Exposed components of the sewage system will be dismantled, removed and disposed of in an approved off-site facility.

Unsalvageable portions of any facilities, such as concrete pads used for foundations, will be broken/fractured into pieces to prevent retention of percolating water and permit root penetration. The pieces will be no larger than 6 feet square and will be covered in-place with a minimum of 2 feet of a combination of 1.5 feet of backfill and 0.5 feet GM or will be broken up and buried in one of the site’s DRSFs. If placed in one of the site’s DRSFs, then burial will occur prior to final contouring and will utilize a minimum of 2 feet of rock-soil cover to ensure that the materials are not exposed in the future.

Prior to concrete demolition and disposal, concrete foundations and walls will be inspected for visual indications or odors of acid, PHC or process chemicals. Testing of concrete for the presence of hazardous substance will be conducted according to the suspected source of contamination. Should the concrete be subjected to a hazardous substance or PHC contamination during operations, rinsing with fresh water and/or a cleaner or polymer appropriate to neutralize or reduce the risk of any deleterious residue will be conducted prior to disposal in one of the site's DRSFs or, if unable to be adequately decontaminated then, in an authorized off-site facility.

Rinse solution produced from the decontamination of processing equipment, tanks, concrete and other equipment will be will be tested to determine requirements for disposal. These solutions will be captured, managed, treated or properly disposed of at permitted facilities according to rinse solution properties.

Following demolition and disposal of Project structures and facilities, grading will occur to promote drainage, prevent ponding and generally mimic the surrounding terrain. Additional descriptions of the reclamation activities that will occur following facility and structure decommissioning, demolition and disposal are presented in Section 4.

3.3.2 Contouring and Grading

With the exception of the Hangar Flats and West End Pit highwalls, portions of the Yellow Pine Pit highwall and the eastern parcel of the West End Ancillary Disturbance, Midas Gold will contour and grade Project-related disturbed areas (re-disturbed historical and new disturbance) to blend into the surrounding topography and terrain. The Hangar Flats pit will have a highwall approximately 1,000 feet above the pit lake and the pit lake will be approximately 500 feet deep. The West End pit will have a highwall approximately 1,000 feet above the northern pit lake, which will be approximately 400 feet deep, and the southern and smaller pit lake will be approximately 100 feet deep. The depths of the West End pit lakes are based on preliminary estimates of the steady-state groundwater elevations post-closure. These estimates will be updated during production based on groundwater monitoring and future investigations. The smaller pit lake is designated as the Midnight pit Lake due to its proximity to the preexisting Midnight pit. After the Yellow Pine pit is partially backfilled, it will have highwalls approximately 300 and 600 feet on the east and west sides of the pit, respectively. Additional descriptions of these pit features are presented in Section 4.

Compacted areas such as roads, ore stockpile areas, and parking lots will be scarified (i.e., deep ripped) with a dozer-mounted ripper shank or disk, or otherwise left in a roughened condition prior to GM/SBM placement and revegetation. Haulage and access roads will be re-contoured to establish natural drainage patterns.

Roadway cuts, berms, and loose, unconsolidated material below the road cuts will be reconfigured to re-establish drainages and blend the road surface with adjacent topography. Culverts will be removed or plugged and buried to re-establish drainage. Riprap or other armoring methods are anticipated to be necessary in re-established drainages to limit scour and headcutting. Sources of durable rock for riprap will include inert development rock, screened and unscreened regolith obtained within the footprint of proposed disturbance and borrow areas such as the Meadow Creek Cut/Borrow Area adjacent to the Hangar Flats pit. In general, contouring and grading of mine facilities will be performed to blend into the adjacent topography to the extent practicable and produce visually pleasant and geomorphically stable final surfaces. This will include reducing the width of access roads on the faces of DRSFs from a width of approximately 125 feet during mining to 25 feet on final reclamation for example, moderating steep slopes to the extent practicable, building complex slopes consisting of upper convex slopes with lower concave slopes, and linking floodplains and adjacent upland surfaces with natural transitions. While the overall objective for post closure surfaces is to have slopes of 3H:1V or less, there are small portions of the DRSF faces that exceed these slope criteria due to physical restrictions such as proximity to wetlands targeted for restoration, proximity to open pit highwalls, etc. Microtopography designs will be incorporated into the steep surfaces to provide erosionally stable surfaces. Micro-topographic features may include pitting and gouging of soil surfaces, deep ripping or excavation of dozer basins or discontinuous contour furrows. The purpose of these microtopographic features is discussed in Section 3.3.3, and the additional erosion control BMPs proposed to be applied to slopes greater that 30 percent are identified in Section 3.3.5. As the Project progresses through permitting and design, the DRSF designs will be refined with a priority given to reducing these slopes where feasible. These grading and contouring improvements will be made while maintaining site drainage and preserving access roads for future monitoring and maintenance of reclaimed facilities. The Hangar Flats and West End Pit highwalls will not be backfilled, regraded, or reclaimed with placement of GM and revegetation because these will be high angle rock slopes. Portions of the Yellow Pine Pit highwall that will likewise remain exposed above the backfill will also not be regraded or reclaimed with placement of GM and revegetation because these will be high angle and long rock slopes.

The Burntlog Route (which consists of an existing section of Burntlog Road, an existing section of Thunder Mountain Road and a newly constructed segment connecting the two existing sections) (see **Figure 1-3**) will also be reclaimed. Some portions of the existing Burntlog Road will be abandoned in areas where sharp corners or steep slopes require short new road segments to be constructed. These abandoned road segments will be obliterated as part of the construction process. The existing portions of the Burntlog and Thunder Mountain roads that were improved for mine access will have their active road surface returned to their approximate pre-mine width; however, road layout improvements (curves and grade) will be retained. The portion of the Burntlog access route created as part of improved mine access will be obliterated (where practicable) and returned to its approximate original condition. Obliteration of created roads will consist of partially filling cut sections or partially removing fill from fill sections to create erosionally stable slopes that mimic surrounding slopes as practicable, as well as , removing culverts and creating armored stream crossings in their place, roughening disturbed surfaces and seeding all disturbance. Additional descriptions of the recontouring of the Burntlog Route are presented in Section 4.8.

After decommissioning and demolition of the poles and conductor, the transmission line corridor from the Project site to the Johnson Creek Substation will be reclaimed. The access roads, tensioning areas, laydown yards, and other disturbances created to construct and maintain the transmission line will be reclaimed in a manner similar to mine roads where compacted areas will be scarified (i.e., deep ripped) with a dozer-mounted ripper shank or disk, or otherwise left in a roughened condition prior to GM/SBM placement and revegetation. These areas will also be re-contoured to their approximate original condition by re-establishing drainages and grading disturbed areas to blend with adjacent topography. Culverts will be removed or plugged and buried to re-establish drainage. Riprap or other armoring methods are anticipated to be necessary in re-established drainages to limit scour and headcutting. The construction-specific disturbances (tensioning areas, laydown yards, etc.) will be regraded and reclaimed after construction, while the access roads will be reclaimed as part of final reclamation. The transmission line from the Lake Fork Substation to the Johnson Creek Substation will be upgraded to support the Project; however, after closure of the mine it will continue to service utility customers along the route, including to the Yellow Pine area. The access roads, tensioning areas, laydown yards, and other disturbances that are only needed to construct the transmission line will be obliterated (where practicable) and returned to their approximate original condition. The construction-specific disturbances (e.g., tensioning areas, laydown yards, etc.) will be regraded and reclaimed after construction, while the access roads will remain and be managed by IPCo. Specific contouring and grading measures for each type of facility are described in Section 4.

3.3.3 Soil or Growth Media Replacement

The recommended GM replacement depths for the reclamation of the Project are based on the expected quality of the GM placed on areas that have been prepared for reclamation and the quality of near surface materials underlying the GM layer. The quality of material underlying the GM layer is important because plants grown in shallow soil over materials that restrict root extension (e.g., phytotoxic materials, concrete slabs, asphalt, and unfractured bedrock,) are generally more susceptible to drought and, to a lesser degree, nutrient deficiencies. Ryel and Caldwell (2010) postulate that the evolution of cold-adapted plants has converged on a general pattern of rapidly utilizing soil moisture in shallow depths (“growth pool”), in part to take advantage of nutrient availability, while deep vadose zone water or water at low water potentials is used primarily to ensure survival during unfavorable drought conditions (“maintenance pool”). Other studies have also documented that a majority of plant species rapidly deplete water from shallow soils (e.g., Woods and O'Neal 1965; Arya et al. 1975; Herkelrath et al. 1977; Waring and Schlesinger 1985; Yoder et al. 1998) and then either become senescent or rely to varying degrees on deeper soil water for maintenance (Comstock et al. 1988; Manning and Groenveld 1989). Typical replacement profiles for GM/SBM and other materials on the major facility types are presented on **Figure 3-4**.

A literature search was conducted to identify the approximate rooting depths of plant species proposed for the revegetation of Project-related facilities and disturbance. Generally, grasses have shallow fibrous and highly branched root systems while forbs and wood species usually develop both fibrous and tap roots. Rooting depths reported in the literature vary considerably; however, for some of the reclamation species currently considered, rooting depth may range from less than 1 foot (herbaceous species) to 8 feet and more (e.g., lodgepole pine, Engelmann spruce, quaking aspen). These rooting depths are only approximations, however, as overall plant root morphology and depth varies according to the following factors:

- Availability and location of soil water,
- Fertility of growth media,
- Soil texture and bulk density,
- Presence of physically and/or chemically restrictive material,
- Associated plant species, and
- Other environmental conditions such as fire and herbivory.

Sustained revegetation success depends on the quality of both GM and near surface materials; therefore, site-specific criteria for rating the quality or suitability of soil, regolith, and mine waste as GM and “root zone material” for reclamation were developed. GM and root zone material suitability ratings and criteria corresponding to each rating category are presented in **Table 3-2** and **Table 3-3**, respectively. The basis of the root zone arsenic and coarse fragment content guidelines for the Project is presented in Appendix A, which suggests that materials that are anticipated to underlie placed GM/SBM will not prohibit root penetration and exploitation, and as such should not inhibit the growth and development of deep-rooted woody species on reclaimed areas of the SGP. Appendix A includes an assessment of soil properties that currently support natural plant communities in the Stibnite-Yellow Pine Mining District and vegetation growing on previously reclaimed mined land adjacent to the Projects in comparison to the estimated last lift and average concentration of trace metals projected to be present in the DRSFs and the TSF.

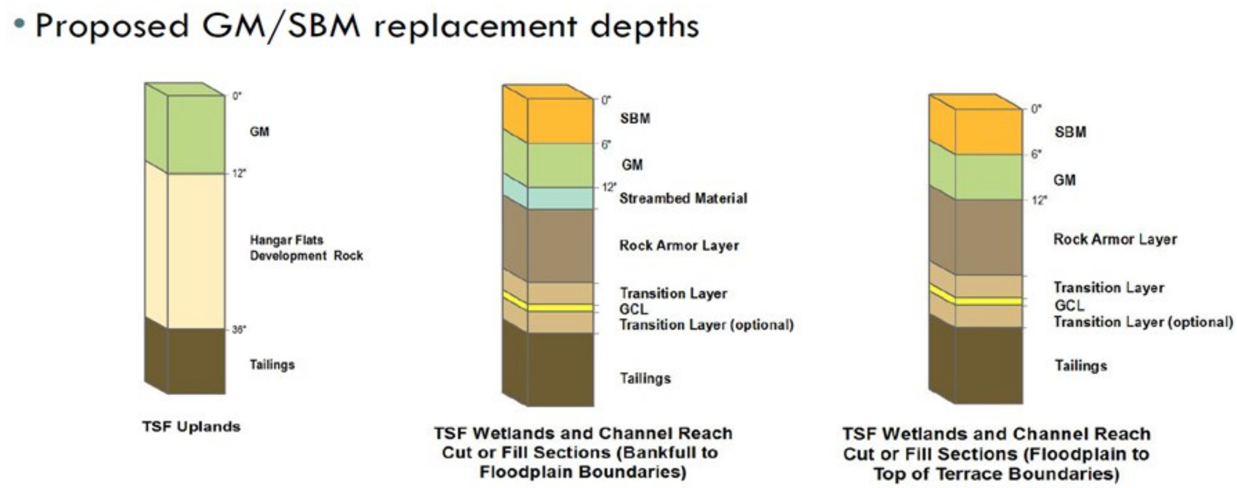


Figure 3-4. Proposed GM/SBM replacement depths

Table 3-2. Growth Media Suitability Criteria

Property	Good	Fair	Poor	Unsuitable
USDA Texture if <3% Organic Matter[a]	L	LCOS, LS, LFS, LVFS, SCL, CL, SICL	COS, S, FS, VFS, SIC, C	>65% Clay content
USDA Texture if >3% Organic Matter and <35% clay[a&b]	SCL, CL, SICL	---	---	---
Coarse Fragment Volume %[c]	<15	15 to 30	30 to 60	>60
Soil Acidity (pH)	6 to 8	5 to 6 8 to 8.5	4.5 to 5 8.5 to 9.0	<4.5 >9.0
Slope %[d]	<8	8-25	25 to 45	>45

[a] *LCOS = Loamy coarse sand; COS = Coarse sand; SCL = Sandy clay loam; SICL = Silty clay loam; SIC = Silty clay; CL = Clay loam; C = Clay; LS = Loamy sand; S = Sand; LFS = Loamy fine sand; FS = Fine sand; VFS = Very fine sand; LVFS = Loamy very fine sand; L = Loam.*

[b] *Criteria for clay content greater than 35% were not developed as the content of clay in soils observed at the Project site is below 35% (Tetra Tech 2017)*

[c] *Coarse fragments are soil particles > 2mm diameter or particles that do not pass through a U.S. Mesh # 10 sieve.*

[d] *While slope gradient it not a criteria of soil material, it is included here as a criteria to define slopes where it is and is not practical and safe to salvage soil using conventional heavy equipment.*

Table 3-3. Root Zone Material Suitability Guidelines (0 to 3 feet below Growth Media)				
Property	**Good**	**Fair**	**Poor**	**Unsuitable**
USDA Texture [a]	L, LCOS, LS, LFS, LVFS	SCL, CL, SICL, COS, S, FS, VFS,	SIC, C	>75% Clay content
Coarse Fragment Volume %[b&c]	<15	15 to 45	45 to 70	>70
Soil Acidity (pH)	6 to 8	5 to 6 8 to 8.5	4.5 to 5 8.5 to 9.0	<4.5 >9.0
Electrical Conductivity (*millimhos per centimeter* - mmhos/cm)	<2	2 to 4	4 to 8	>8
Total Arsenic (parts per million [ppm]) [c]	<450	450 to 1,000	1,000 to 3,000	> 3,000
Sodium Adsorption Ratio	<4	4 to 10	10 to 12 Fine Texture 10 to 15 Coarse Texture	> 12 Fine Texture > 15 Coarse Texture
NAG pH [d]	≥ 4	–	–	–
Bulk Density of < 0.8 inch or 2 mm fraction (*grams per cubic centimeter* - g/cm³)	–	–	–	>GLBD[e]

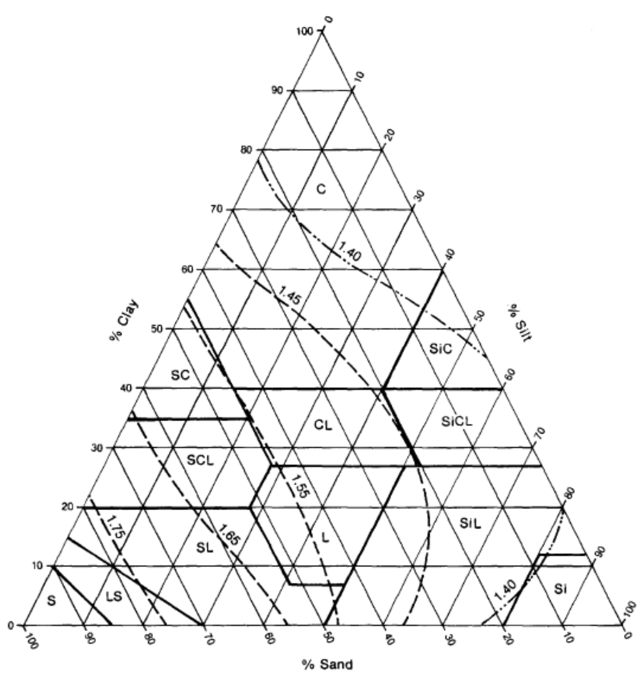
[a] LCOS = Loamy coarse sand; COS = Coarse sand; SCL = Sandy clay loam; SIC = Silty clay; SICL= Silty CL = Clay loam; C = Clay; LS = Loamy sand; S = Sand; LFS = Loamy fine sand; FS = Fine sand; VFS = Very fine sand; LVFS = Loamy very fine sand; L = Loam

[b] Coarse fragments are soil particles > 2mm diameter or particles that do not pass through a U.S. Mesh # 10 sieve.

[c] See Appendix A - Development Rock and Tailing Root Zone Suitability Analysis for explanation of total arsenic and coarse fragment guidelines.

[d] Net Acid Generation (NAG) test

[e] GLBD – Growth Limiting Bulk Density (Daddow and Warrington 1983). GLBD triangle suggests soil compaction limits or GLBD criteria based on soil texture, above which root penetration and plant-available soil water may be severely limited. The soil textural triangle below shows isodensity lines that represent equal GLBD values and are used to estimate the GLBD of a soil. Considerable professional judgment should be used when apply the GLBD textural triangle and limitation and assumptions apply as defined in Daddow and Warrington (1983).



The site-specific GM suitability criteria presented in **Table 3-2** were originally published in the report that summarized the soil survey of the Project site (Tetra Tech, 2017), and were developed through direct consultation with agency personnel to define and rate soil as suitable (good, fair, or poor) or unsuitable.

Existing soils within the proposed disturbance areas are shallow to very deep, contain a high amount of coarse rock fragments, and are coarse textured. The primary factors limiting soil salvage in the disturbed area are high rock fragments, surface boulders, rock outcrops, and steep slopes. The percentage of coarse rock fragments (by volume) increase with soil depth in 2 of the five soil map units (SMU) identified at the Project site as follows:

- mTC: Sandy-skeletal/loamy-skeletal, mixed Typic Cryorthents; and
- S45+: sandy-skeletal/loamy-skeletal, mixed Typic Cryorthents, Slopes >45%.

The coarse fragment and soil texture suitability criteria presented in **Table 3-3** were developed based on the GM suitability criteria with slight modification based on review of technical literature and western United States reclamation guidelines (Montana Department of State Lands 1994; Wyoming Department of Environmental Quality 1984; Utah Department of Natural Resources 2008; New Mexico Mining and Minerals Division 2009). Midas Gold intends to use the criteria presented in **Table 3-3** as general guidance (not as compliance standards) to assess the suitability of materials 0 to 3 feet below GM. For example, following grading and placement of materials in preparation for GM application on vehicle running surfaces and the tops of the DRSFs, Midas Gold will assess their bulk density by determining the texture of the fine-earth fraction within the root zone (i.e. particle size > 2 mm) and weighing a known volume of root zone material. If the measured bulk density of root zone material exceeds the GLBD presented above, then Midas Gold will scarify and re-measure the bulk density of these materials prior to GM placement to confirm that the bulk density of root zone materials will not severely limit root penetration and plant-available soil water. Caution will be practiced however to achieve root zone material in-place densities that also limit the potential for settling and slumping. As the optimal combination of these factors cannot be determined with confidence at this time, the optimal in-place density of root zone materials will be determined by Midas Gold during production to achieve the benefits of material compaction without jeopardizing the viability of vegetation development and growth. As another example of the application of the criteria presented in Table 3-3, development rock located within 3 feet of surfaces prepared for placement of GM/SBM will be sampled and subject to total arsenic analysis. These data will be compared to the total arsenic criteria presented in Table 3-3. Development rock that exceed 3,000 ppm total arsenic will be buried a minimum of 3 feet below the surface prepared for placement of GM/SBM.

Sixty-nine of the surface soil samples collected by Midas Gold for the purposes of mineral exploration (see Appendix A) are located in the three SMUs where GM and SBM will be salvaged for the reclamation of the SGP. The maximum concentration of total arsenic in these soil samples is 442 ppm. These soil samples would be rated as “Good” if they were to be compared to the total arsenic guidelines presented in Table 3-3. To supplement this dataset, additional soil samples will be collected from the SMUs where GM and SBM that will be salvaged for the reclamation of the SGP and analyzed for total metals. These data will be presented in a subsequent version of the RCP. Additional analysis of salvaged GM and SBM will be completed to assess the potential for GM loss into development rock voids (see discussion below in this section) and as discussed in Section 3.3.4, and to identify nutrient deficiencies following placement of GM/SBM in areas prepared for reclamation.

Midas Gold will implement measures to limit the transport of and exposure to soil-borne arsenic as follows:

- Surface water runoff from Project-related disturbance will be routed to sediment basins to capture sediments;
- Erosion and sediment control BMPs will be implemented, monitored, and maintained during soil salvage and GM/SBM stockpiling and placement activities;
- Dust suppression, BMPs will be implemented, monitored, and maintained throughout the mine construction, production and closure periods; and
- Mine Safety and Health Administration and National Institute for Occupational Safety and Health and safety standards for mine workers will be complied with during mine construction, production and implementation of closure.

These and other measures that will implemented during the mine life to limit the transport of and exposure to soil-borne arsenic will be identified in the EMMP.

The average thickness and volume of GM and SBM that will be applied to DRSFs, the TSF, and other Project-related disturbance are presented in **Table 3-4**. The GM thicknesses prescribed and the exploitation by plant root of materials underlying the GM layer are sufficient for the establishment and persistence of desirable perennial vegetation on reclaimed and restored Project-related disturbance, which will meet the designated PMLU goals and consistent with the thicknesses of GM prescribed at mines in Montana (Montana Department of Environmental Quality 2018). The thicknesses of GM prescribed at mines in Montana according to a search of Montana Department of Environmental Quality records is presented in **Table 3-5**. The recommended thicknesses of GM applied site-wide are also designed to conserve available GM present onsite. The recommended thickness of GM applied to upland areas of the TSF outside the wetland and stream channel liner system is 12 inches. The recommended thicknesses of GM and SBM applied for the restoration of wetlands on the TSF (i.e., MC 1 and MC 3 wetland and channel reaches shown on **Figure 3-3**) within the wetland and stream channel liner system are 6 and 6 inches, respectively. The recommended thicknesses of GM and SBM applied for the restoration of all other wetlands and channel reaches at the Project site are (for soil mass balance calculation and materials management purposes)2 and 4 inches, respectively, which will be comingled during application as it is impracticable to place soil layers at these thicknesses using heavy equipment. The recommended thickness of GM applied to the DRSFs is 12 inches. Application of a 6-inch-thick layer of GM to all other site facilities that will be reclaimed is recommended to support establishment of self-sustaining desirable perennial vegetation.

Table 3-4. Growth Media Thicknesses Applied at Mines in Montana[1]

Statistic	Growth Media Placed on Non-Acid or Capped Tailing[b] (inches)	Growth Media Placed on Waste (Development) Rock[c] (inches)	Growth Media Placed on Miscellaneous Disturbance[d] (inches)
Average	22	14	12
Minimum	8	11	6
Maximum	48	16	18
Median	24	14	12
Standard Deviation	12	2	4
n	9	4	7

[a]*All information from Montana Department of Environmental Quality*

[b]*Golden Sunlight Gold Mine (n=2), Montanore Silver Mine Project, Troy Silver Mine, Stillwater Mine (n=4), Montana Tunnels Gold Mine*

[c]*Golden Sunlight Gold Mine, Rock Creek Mine (n=2), Montana Tunnels Gold Mine*

[d]*Montanore Silver Mine Project, Rock Creek Mine (n=3); Garnet USA Garnet Mine, Troy Silver Mine, Graymont - Indian Creek*

Table 3-5. Growth Media and Seed Bank Material Replacement Depths and Quantities by Project Site Facility

Facility	New & Re-Disturbed Area (ac)[a]	Reclaimed Area (ac)[b]	Growth Media Replacement Depth (ft)[c]	Seed Bank Material Replacement Depth (ft)	Growth Media Replacement Volume (BCY)	Seed Bank Material Replacement Volume (BCY)	Material(s) Underlying Growth Media
TSF[c]	457.8	388.2	1.0		552,476		Development rock; tailings
MC1 and MC3 Wetlands and Channel Reaches		79.4	0.50	0.50	64,049	64,049	Wetland & channel bed & liner; development rock; tailings
Hangar Flat DRSF	106.0	115.3	1.0		186,071		Development rock
MC2 Wetland and Channel Reach		4.6	0.17	0.33	1,240	2,479	Wetland & channel bed (& liner); development rock or regolith
Bradley Tailing & Haul Road	43.2	0.0	0.5				Regolith
MC4 Wetland and Channel Reach		25.1	0.17	0.33	6,746	13,492	Wetland & channel bed; regolith
Meadow Creek Cut/Potential GM Borrow	60.5	80.8	0.5		65,209		Regolith
Hangar Flats Pit Haul Roads South	43.3	22.2	0.5		17,895		Regolith
Hangar Flats Pit	85.0		0.0				Not applicable (na)
MC5 Wetland and Channel Reach		3.0	0.17	0.33	799	1,598	Wetland & channel bed; regolith
Hangar Flats Pit Haul Road North	62.2	6.3	0.5		5,111		Regolith
Rapid Infiltration Basins	8.5	10.4	0.5		8,429		Regolith
Plant Site (Mill /Crusher/Admin/Truck Shop)	105.8	105.8	0.5		85,347		Regolith
Worker Housing	21.8	21.8	0.5		17,561		Regolith
Central Haul Road	65.9	60.8	0.5		49,019		Regolith
Plant Site Haul Road	11.0	11.0	0.5		8,834		Regolith
West End Pit Haul Road South	50.8	49.5	0.5		39,927		Regolith
West End Pit	129.8	0.0	0.0				Na
West End Pit Haul Road North	65.3	23.2	0.5		18,742		Regolith
West End Pit Ancillary Dist.	12.0	4.6	0.5		3,688		Regolith
West End DRSF[c]	97.0	96.4	1.0		135,927		Development rock

Table 3-5. Growth Media and Seed Bank Material Replacement Depths and Quantities by Project Site Facility							
Facility	New & Re-Disturbed Area (ac)[a]	Reclaimed Area (ac)[b]	Growth Media Replacement Depth (ft)[c]	Seed Bank Material Replacement Depth (ft)	Growth Media Replacement Volume (BCY)	Seed Bank Material Replacement Volume (BCY)	Material(s) Underlying Growth Media
WE 1 Wetland and Channel Reach		0.6	0.2	0.3	160	320	Wetland & channel bed (& liner); development rock
Fiddle DRSF[c]	188.1	175.5	1.0		258,845		Development rock
FC1 and FC2 Wetlands and Channel Reaches		14.9	0.2	0.3	3,999	7,998	Wetland & channel bed (& liner); development rock
Yellow Pine Pit Ancillary Dist.	2.4	2.4	0.5		1,909		Regolith
Yellow Pine Pit	137.0	0.0	0.0				Na
Yellow Pine DRSF	-	129.4	1.0		208,758		Development rock
EF3 Wetland and Channel Reach		25.2	0.2	0.3	6,764	13,528	Wetland & channel bed (& liner); development rock
Yellow Pine Pit Haul Roads	91.8	28.9	0.5		23,280		Regolith
EFSFSR Diversion Outlet	2.8	2.8	0.5		2,238		Regolith
Midnight Creek Diversion	1.1	1.1	0.5		874		Regolith
Truckshop GMS	5.8	5.8	0.5		4,708		Regolith
Worker Housing GMS	3.2	3.2	0.5		2,587		Regolith
Midnight GMS	11.4	11.4	0.5		9,227		Regolith
North Homestake GMS	9.4	9.4	0.5		7,588		Regolith
Yellow Pine Pit GMS	15.9	15.9	0.5		12,837		Regolith
EFSFSR Diversion Inlet	1.4	2.0	0.0		1,612		Regolith
Blowout Creek Rock Drain	-	2.7	0.5		2,183		Imported rock
TOTAL	1,896.3	1,539.4	-	-	1,814,637	103,464	

ac = feet; BCY = bank cubic yard; ft = feet

[a] Estimates based on two-dimensional (2-D) area (i.e., facility footprint)

[b] Estimates based on 2-D area (i.e., facility footprint). Includes new disturbance and re-disturbed areas of planned Project-site facilities. Excludes unplanned inter-facility and exploration disturbance.

[c] Diversion channels around TSF and DRSFs will receive 6 inches of GM instead of the 1 foot placed on facility.

Midas Gold will investigate further existing reclaimed areas on and immediately adjacent to the SGP to determine the plant species and GM/SBM and root zone profile thicknesses and properties that are necessary to meet the vegetation and habitat PMLU goals established for the SGP. The knowledge gained from this investigation will be applied as adaptive management throughout the production period. The proposed GM/SBM and root zone profiles and seeding and planting plans contained in this RCP will be adapted and adjusted according to the findings and conclusions of these investigations. To facilitate propagation of plant species that would be planted or installed in reclaimed areas, if feasible, Midas Gold may develop a seed collection program and reclamation nursery. Such a nursery may be located onsite (or in close proximity of the Project area) and may be developed prior to or during construction or operations. Seeds of native forb, graminoid, shrub, and tree species could be collected onsite, to the extent possible, and grown to a seedling condition in the nursery. These nursery-grown seedlings would then be planted in the reclamation areas. Additionally, plugs or sprigs of riparian and wetland graminoid species could potentially be harvested and grown-out or stored short term in the nursery for transplanting into the reclamation areas. Cuttings of native shrub species, such as willows and redosier dogwood (*Cornus sericea*), could also be harvested and propagated and/or stored short term in the nursery prior to use as live-stakes for revegetation purposes. In addition to plant material collected and propagated at the onsite nursery, supplemental plant material would also be purchased, as necessary, through commercial, offsite nurseries.

GM/SBM will normally be moved by hauling, in trucks, from GMSs or, in the case of Live Handled material, from areas where GM/SBM has been salvaged, to disturbed areas that have been prepared for reclamation and then redistributed with dozers. Alternate methods may include placing GM/SBM using scrapers. To ensure placement of the recommended depths of GM/SBM, areas that have been prepared for reclamation will be staked. The depth of GM/SBM to be applied will be marked on each stake. The particle size distribution of development rock is anticipated to be coarse relative to GM. A slight reduction in the thickness of the GM layer applied to the DRSFs, or in the case of the TSF, layer of development rock (see Section 4.3.2, Post-Closure Tailings Cover System) may occur over time as fine particles from the GM layer migrate into the underlying development rock. The GM and SBM thicknesses prescribed for the DRSFs and the TSF are therefore greater than other facilities at the Project site.

The particle size distribution of development rock is anticipated to decline (i.e. lesser proportion of boulders) due to dumping and grading activities and exposure to atmospheric conditions, freeze/thaw and other weathering processes. This anticipated decline may not be sufficient to prevent fines migration from GM overlying development rock; therefore, consideration will be given to decreasing the proportion of boulders in the development rock that will be present at the surface of the DRSFs and TSF through enhanced blasting techniques and implementation of criteria and analysis to assess the potential for significant fines migration from GM into development rock. One criteria used for soil/rock filter layers over a capillary break or in this case, development rock, to prevent the migration of fines from the overlying GM is as follows:

Diameter $(D)_{15}$ (filter or development rock)/D_{85} (GM layer) < 4 to 5 (USEPA, 2004)

Midas Gold will apply this criteria by comparing the particle size distributions of development rock (following regular blasting, loading, dumping, and grading activities) produced and GM salvaged prior to the initiation of concurrent reclamation activities at the Fiddle and West End DRSFs prior. If the criteria above are satisfied, then Midas will proceed with GM application as proposed. If not, then additional blasting of development rock (or other methods of particle size reduction) constituting the last lift of the DRSF (or TSF cover) would be done. Midas will also consider conducting slake/durability tests or field tests on development rock using heavy equipment to assess that in-place PSDs of development rock following reclamation grading are sufficient to prevent significant migration of GM into underlying development rock. Following the completion of grading activities, compacted root zone materials will be deep ripped prior to GM placement to reduce compaction and prevent GM slippage. Following GM redistribution, the surface of the seedbed will be left in a roughened condition to create microsites that facilitate burial of seed and establishment of seedlings. Micro-topographic features excavated in the redistributed GM include, for example, pitting and gouging, deep ripping, excavation of dozer basins, or discontinuous contour furrows. These microtopographic features will enhance soil water storage and uptake by plants, decrease slope length and gradient and create microclimatic variability on re-contoured slopes to enhance vegetation diversity and control erosion and sediment transport. Application of GM (or seeding and planting) to the West End and Hangar Flats Pit highwalls and Yellow Pine Pit highwall exposed above the backfilled portion of the pit is not proposed.

3.3.3.1 Growth Media Balance

Prior to the initiation of mining activities, soils that are suitable for reclamation that can be practicably salvaged using heavy equipment will be salvaged and then stockpiled or "live-handled." The salvageable depth and location of suitable GM within planned surface disturbance was estimated based on the soil survey of the Project site (Tetra Tech 2017), subsequent review of soil survey data and profile descriptions by Tetra Tech, and exclusion of unsalvageable areas due to size, inaccessibility and presence of soil contamination. The recommended depth of GM salvage from SMU *mTC* was increased from 6 inches to 18 inches based on a reassessment of soil profile characteristics for the following reasons:

- For the soil profiles observed within SMU *m*TC, the average depth where coarse rock fragments exceeded 60% (by vol.) = 13.75 inches;
- Six of 14 (or 43% of the observed) soil profiles exceeded 60% (by vol.) coarse rock fragments at 18+ inches or greater;
- Mixing of shallow soils horizons with soil horizons at depths may result in the bulk of GM with a coarse rock fragment content less than 60%;
- Forested vegetation communities currently grow within and adjacent to Stibnite where the content of coarse rock fragments within the root zone exceed 60 percent (vol.);
- Information presented in Appendix A indicate that successful reclamation of mined land at Stibnite is possible using GM with coarse rock fragments in excess of 60 percent (vol.); and
- Soil profile characteristics, including profile depth and coarse rock fragment content vary considerably across complex landscapes similar to the Project area.

Modifications to SMU boundaries presented in the soil survey for the Project (Tetra Tech 2017) were also made to encompass the disturbed area presented in the RCP, which varies slightly from the disturbed area presented in the PRO. In addition, GM will not be salvaged from: areas where soil is unsuitable because of historical mining; areas of previous surface disturbance; and isolated, small or inaccessible areas where soil salvage using heavy equipment is impractical. These soils will be used for construction purposes (if suitable) or placed into a DRSF.

The areas with salvageable soil and quantities by Project site facility are presented in **Table 3-6**.

Table 3-6. Average Soil Salvage Depth and Growth Media/Seed Material Quantities by Project Site Facility						
Facility Name	Average Soil Salvage Depth (feet)	New & Re-Disturbed Area [a] (ac)	Area w/Salvageable GM/SBM[b] (ac)	Growth Media[c] (BCY)	Seed Bank Material[d] (BCY)	Total (BCY)
TSF	1.9	457.8	232.4	596,651	127,501	724,152
Hangar Flat DRSF	2.0	106.0	11.4	29,398	8,037	37,435
Bradley Tailing & Haul Road	3.0	43.2	0.1	315	158	473
Meadow Creek Cut/Potential GM Borrow	2.1	60.5	45.5	122,060	33,460	155,520
Hangar Flats Pit Haul Roads South	1.9	43.3	10.0	26,101	4,854	30,954
Hangar Flats Pit	2.1	85.0	20.4	52,796	16,477	69,274
Hangar Flats Pit Haul Road North	1.8	62.2	3.2	7,831	1,510	9,341
Rapid Infiltration Basins	1.5	8.5	2.2	5,325	177	5,503
Plant Site (Mill Area/Crusher/Admin/Truck Shop)	1.6	105.8	57.7	141,189	4,515	145,703
Worker Housing	1.6	21.8	21.8	53,529	1,734	55,263
Central Haul Road	1.5	65.9	37.8	91,688	2,079	93,767
Plant Site Haul Road	1.6	11.0	7.7	18,649	980	19,630
West End Pit Haul Road South	1.6	50.8	7.6	18,417	1,617	20,033
West End Pit	2.3	129.8	1.5	3,737	2,001	5,738
West End Pit Haul Road North	1.5	65.3	0.6	1,548	0	1,548
West End Pit Ancillary Dist.	0.0	12.0	0.0	0	0	0
West End DRSF	2.2	97.0	7.5	18,203	8,936	27,139
Fiddle DRSF	1.6	188.1	104.2	253,731	22,049	275,780
Yellow Pine Pit Ancillary Dist.	2.0	2.4	0.7	1,742	559	2,302
Yellow Pine Pit	1.8	137.0	24.9	62,762	7,603	70,365
Yellow Pine DRSF[e]	-	-	-	-	-	-
Yellow Pine Pit Haul Roads	1.7	91.8	29.8	72,664	10,897	83,562
EFSFSR Diversion Outlet	1.5	2.8	0.0	86	0	86
Midnight Creek Diversion	2.0	1.1	1.0	2,475	826	3,301
Truckshop GMS	0.0	5.8	0.0	0	0	0
Worker Housing GMS	1.5	3.2	3.2	7,762	0	7,762
Midnight GMS	1.5	11.4	8.5	20,688	0	20,688
North Homestake GMS	0.0	9.4	0.2	466	0	466
Yellow Pine Pit GMS	1.8	15.9	5.8	14,048	3,071	17,119
EFSFSR Diversion Inlet	1.5	1.4	0.5	1,168	0	1,168
Blowout Creek	-	-	-	-	-	-
TOTAL	1.6	1,896.3	646.4	1,625,030	259,042	1,884,072

[a] Estimates based on two-dimensional area (i.e., facility footprint). Includes new disturbance and re-disturbed area for planned facilities. Excludes unplanned inter-facility and exploration disturbance.

[b] Based on Soil Salvage Report: Stibnite Project Area (Tetra Tech 2017) and Section 3.3.3.1 introductory paragraphs.

No GM or SBM salvaged from slopes greater than 45 percent or isolated, small or inaccessible slopes < 45%.

No GM or SBM salvaged from previously disturbed or reclaimed areas or contaminated areas, with the exception of soils located in the existing Yellow Pine pit mapped as - fTH: Euic, frigid Typic Haplosaprists.

No GM or SBM salvaged from SMU – sTC (excessive rock): stoney Typic Cryorthents

[c] GM = Growth Media, which is considered SMU fOD: Coarse-silty, mixed, frigid Oxyaquic Dystrocryepts from 1.0 to 2.5 ft; fTH from 1.0 to 3.0 ft; and mTC from 0 to 1.5 ft. See Figure 3-4 and Table 3-7.

[d] SBM = Seed Bank Material, which is considered SMU fOD & fTH from 0 to 1.0 ft. See Figure 3-4.

[e] Yellow Pine DRSF is located within and partially backfills the Yellow Pine pit

Generally, soil will not be salvaged when one or more of the following criteria are met: coarse rock fragments exceed 60 percent by volume, slope exceeds 45 percent, soil is located on isolated, small or inaccessible slopes at or below 45 percent, or soils are contaminated by historical mining or remediation activities. In addition, soil located on previously disturbed or reclaimed areas was not included in soil salvage calculations with the exception of soils located in the existing Yellow Pine pit mapped as – fTH as shown on **Figure 3-5**. If suitable GM is identified during clearing and stripping of previously disturbed areas, then those materials will be salvaged.

The recommended average depths of GM and SBM salvage by Soil Map Unit (SMU) are presented in **Table 3-7** and shown on **Figure 3-5**. The recommended combined depth of GM and SBM salvage varies from 0.5 to 3.0 feet. Soil salvage operations will be phased according to the planned mining sequence. As such, soil salvage will be delayed as long as practicable so as to limit the total area of surface disturbance at any one time during the Project life and limit the duration of soil storage in stockpiles.

Table 3-7. GM/SBM Salvage Depth by Soil Map Unit

Soil Map Unit	Salvageable Soil		Material Category
	Depth Below Ground Surface (feet)	Depth of Salvage (feet))	
fOD: (stream channels)	0-1.0	1.0	SBM
	1.0-2.5	1.5	GM
fTH: (wetlands)	0-1.0	1.0	SBM
	1.0-3.0	2.0	GM
mTC: (uplands)	0-0.5	0.5	GM
	0.5-1.5	1.0	GM
S45+: (slopes > 45%)	0.0	0.0	Not Applicable (NA)
sTC: (excessive rock)	0.0	0.0	NA
AoD: (areas of previous disturbance)	0.0	0.0	NA

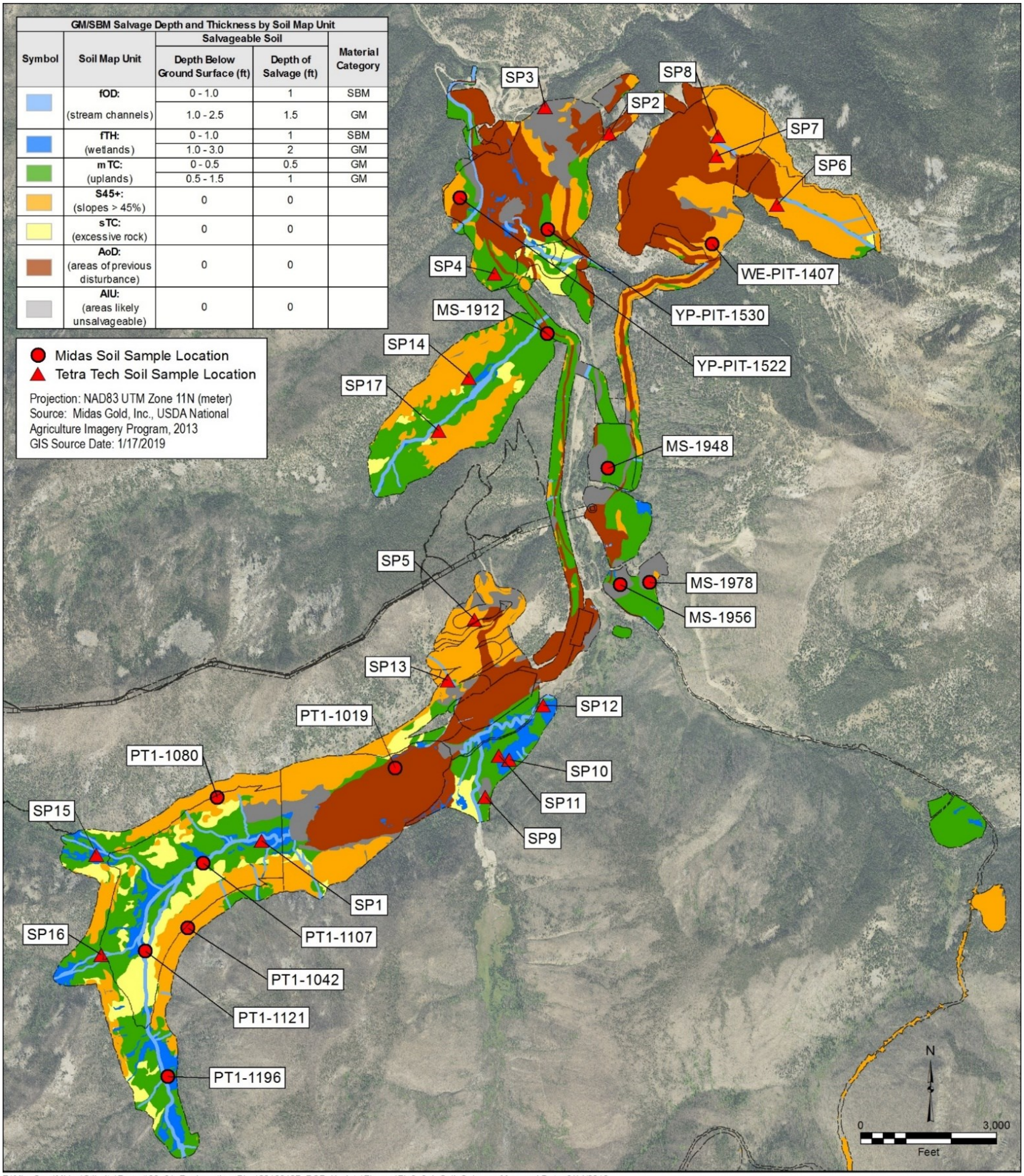


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Figure 3-5. Soil salvage depths by soil map unit

The estimated volume of GM and SBM that would be salvaged from and applied to disturbed areas that will be reclaimed (GM/SBM mass balance) is presented in **Table 3-8**. This table includes the anticipated schedule of disturbance and reclamation and the volume of GM salvaged, stockpiled, and redistributed for reclamation on an annual basis. **Table 3-9** includes the anticipated volume and schedule of "live-handled" soil. Live-handled soil refers to the removal of soil from a disturbed area and the direct haul and placement of the soil on an area that has been prepared for reclamation.

Approximately 1,884,000 bank cubic yards (BCY) of soil are estimated to be available for reclamation (**Table 3-6**) and approximately 1,918,000 BCY of GM and SBM will be needed for the reclamation of disturbed areas and restoration of wetlands (**Tables 3-4**). The GM/SBM mass balance calculations are based on the estimated bank yardage so that enough soil is redistributed on a disturbed area to attain the soil thicknesses specified in **Table 3-4** following consolidation.

According to current GM/SBM mass balance estimates (**Table 3-8**), a deficit of approximately 34,000 BCY of GM will exist following final reclamation. Variation is anticipated between the estimated and actual volume of salvageable soil from disturbed areas. Throughout the Project life, Midas Gold will record and track the volume of GM/SBM that is salvaged, stockpiled, redistributed and "live-handled."

3.3.3.2 Growth Media Handling and Placement Sequence

There will be a few opportunities for live hauling or direct haul of salvaged GM to a destination undergoing reclamation at the same time as salvage (**Table 3-9**). These opportunities tend to occur between production years 7 and 11 when some facilities are being reclaimed concurrently with GM salvage from other facilities. However, these opportunities are relatively small – only about 150,000 BCY of GM and SBM can be handled this way. The remainder (about 1.7 million BCY) must be stockpiled between its salvage (or generation onsite) and its subsequent placement for reclamation of a facility.

Nine GMSs have been identified as listed on **Table 3-10** and shown on **Figure 1-4**: three near the Hangar Flats Pit, one near the Worker Housing, one at the Plant Site, one on the Fiddle DRSF, and two north and one south of the Yellow Pine Pit. The approximate volume of each GMS is presented in **Table 3-10**. In general, salvaged soil would ideally be hauled to and stockpiled in the nearest GMS. However, the relative and absolute sizes of the stockpiles prevent this. The following general sequence of haulage and storage will occur with the current arrangement of stockpiles and the estimated depths and amounts of salvaged soil. The actual placement of material in GMSs will be determined during mine operations based upon actual timing of GM salvage, haul distances, and other factors.

GM salvaged from the Worker Housing area will be placed in the stockpile adjacent to the housing area and will remain there until it is needed for reclamation. This stockpile site is remote from the rest of the Project-related disturbance so there is no plan to store salvaged soils from other facilities at this stockpile.

GM salvaged from the TSF and Hangar Flats DRSF will be stockpiled at the three GMSs near Hangar Flats pit. However, it is estimated that during production year 1 these three stockpiles will be filled, and during following years salvaged GM from the TSF, Hangar Flats DRSF, and Meadow Creek Cut/Potential GM Borrow Area will be stockpiled at the Midnight and Fiddle GMSs.

GM salvaged from the Plant Site will initially be stockpiled at the Plant Site GMS until it fills in Project Year -2, then the material will be hauled to the Midnight GMS, along with GM from the centrally located haul roads. GM salvage from the West End pit and DRSF will be stockpiled at the Midnight stockpile location. It is estimated that the Midnight stockpile would be filled sometime during production year 6.

Table 3-8. Mine-Life Growth Media and Wetland Seed Bank Material Balance

Project Phase	Project Year	GM/SBM Salvage Schedule					GM/SBM Placement Schedule							Cumulative GM/SBM Balance & Reclamation/On-site Restoration			
		TOTAL – Annual GM/SBM Salvaged			Cumulative GM/SBM Salvaged (BCY)		Total – Annual GM/SBM Placed					Cumulative GM/SBM Placed (BCY)		Cumulative GM/SBM Balance (BCY)		Cumulative Reclamation & Restoration	
							Uplands		Wetlands							Uplands	Wetlands
		Area w/ Salvageable GM (ac)	Salvaged GM[a&c] (BCY)	Salvaged SBM[b&c] (BCY)	GM1	SBM2	Reclamation Surface Area (ac)	Placed GM[a] (BCY)	Reclamation Surface Area (ac)	Placed GM[a] (BCY)	Placed SBM2 (BCY)	GM[a]	SBM[b]	GM[a&c]	SBM[b&c]	Reclamation Surface Area (ac)	Reclamation Surface Area (ac)
CONSTRUCTION	-3	25.0	61,291	1,734	61,291	1,734	0.0	0	0.0	0	0	0	0	61,291	1,734	0.0	0.0
	-2	66.5	163,015	9,191	224,306	10,925	0.0	0	0.0	0	0	0	0	224,306	10,925	0.0	0.0
	-1	126.1	311,598	39,667	535,905	50,591	0.0	0	0.0	0	0	0	0	535,905	50,591	0.0	0.0
PRODUCTION	1	147.7	382,285	89,583	918,190	140,175	0.0	0	0.0	0	0	0	0	918,190	140,175	0.0	0.0
	2	57.2	140,088	12,069	1,058,278	152,244	0.0	0	0.0	0	0	0	0	1,058,278	152,244	0.0	0.0
	3	33.3	80,948	7,303	1,139,226	159,547	0.0	0	0.0	0	0	0	0	1,139,226	159,547	0.0	0.0
	4	32.6	80,146	9,926	1,219,372	169,473	0.0	0	0.0	0	0	0	0	1,219,372	169,473	0.0	0.0
	5	43.7	111,580	18,993	1,330,952	188,466	0.0	0	0.0	0	0	0	0	1,330,952	188,466	0.0	0.0
	6	9.9	23,964	5,433	1,354,916	193,899	0.0	0	0.0	0	0	0	0	1,354,916	193,899	0.0	0.0
	7	47.5	122,720	31,748	1,477,635	225,648	129.5	162,662	0.6	160	320	162,822	320	1,314,813	225,327	129.5	0.6
	8	0.6	1,385	230	1,479,021	225,878	164.5	246,602	14.9	3,999	7,998	413,423	8,319	1,065,597	217,559	294.0	15.5
	9	0.4	973	196	1,479,993	226,074	35.7	28,778	0.0	0	0	442,201	8,319	1,037,792	217,755	329.7	15.5
	10	55.9	144,774	32,864	1,624,767	258,938	30.0	24,215	0.0	0	0	466,416	8,319	1,158,352	250,619	359.7	15.5
	11	0.1	263	104	1,625,030	259,042	56.4	45,525	0.0	0	0	511,940	8,319	1,113,090	250,723	416.1	15.5
	12	0.0	0	0	1,625,030	259,042	0.0	0	25.2	6,764	13,528	518,704	21,846	1,106,326	237,196	416.1	40.6
CLOSURE	13	0.0	0	0	1,625,030	259,042	100.5	81,076	3.0	799	1,598	600,579	23,444	1,024,452	235,598	516.6	43.6
	14	0.0	0	0	1,625,030	259,042	129.4	208,758	0.0	0	0	809,336	23,444	815,694	235,598	646.0	43.6
	15	0.0	0	0	1,625,030	259,042	80.8	65,209	25.1	6,746	13,492	881,292	36,936	743,739	222,106	726.9	68.7
	16	0.0	0	0	1,625,030	259,042	0.0	0	0.0	0	0	881,292	36,936	743,739	222,106	726.9	68.7
	17	0.0	0	0	1,625,030	259,042	0.0	0	0.0	0	0	881,292	36,936	743,739	222,106	726.9	68.7
	18	0.0	0	0	1,625,030	259,042	568.4	794,313	84.0	65,288	66,528	1,740,893	103,464	(115,863)	155,578	1295.3	152.7

Table 3-8. Mine-Life Growth Media and Wetland Seed Bank Material Balance

Project Phase	Project Year	GM/SBM Salvage Schedule					GM/SBM Placement Schedule							Cumulative GM/SBM Balance & Reclamation/On-site Restoration			
		TOTAL – Annual GM/SBM Salvaged			Cumulative GM/SBM Salvaged (BCY)		Total – Annual GM/SBM Placed					Cumulative GM/SBM Placed (BCY)		Cumulative GM/SBM Balance (BCY)		Cumulative Reclamation & Restoration	
							Uplands		Wetlands							Uplands	Wetlands
		Area w/ Salvageable GM (ac)	Salvaged GM[a&c] (BCY)	Salvaged SBM[b&c] (BCY)	GM1	SBM2	Reclamation Surface Area (ac)	Placed GM[a] (BCY)	Reclamation Surface Area (ac)	Placed GM[a] (BCY)	Placed SBM2 (BCY)	GM[a]	SBM[b]	GM[a&c]	SBM[b&c]	Reclamation Surface Area (ac)	Reclamation Surface Area (ac)
POST-CLOSURE	19	0.0	0	0	1,625,030	259,042	0.0	0	0.0	0	0	1,740,893	103,464	(115,863)	155,578	1295.3	152.7
	20	0.0	0	0	1,625,030	259,042	91.4	73,744	0.0	0	0	1,814,637	103,464	(189,607)	155,578	1386.7	152.7
	21	0.0	0	0	1,625,030	259,042	0.0	0	0.0	0	0	1,814,637	103,464	(189,607)	155,578	1386.7	152.7
	22	0.0	0	0	625,030	259,042	0.0	0	0.0	0	0	1,814,637	103,464	(189,607)	155,578	1386.7	152.7
	TOTAL	646.4	1,625,030	259,042	1,625,030	259,042	1386.7	1,730,881	152.7	83,756	103,464	1,814,637	103,464	(189,607)	155,578	1386.7	152.7
		Total GM/SBM Salvaged (BCY)		**1,884,072**			**Total GM/SBM Placed (BCY)**			**1,918,101**			**Total GM/SBM Balance (BCY)**		**(34,029)**		

[a] *GM = Growth Media, which is considered SMU fOD from 1.0 to 2.5 ft; fTH from 1.0 to 3.0 ft; and mTC from 0 to 1.5 ft. See Figure 3-4 and Table 3-7.*

[b] *SBM = Seed Bank Material, which is considered SMU fOD and fTH from 0 to 1.0 ft.*

[c] *Quantity of GM and SBM does not include reduction in GM/SBM volume to account for material loss during haulage and/or stockpiling.*

Notes:

Based on: Soil survey of the Stibnite Project Area (Tetra Tech, 2017); Subsequent review of soil survey data and profile descriptions by Tetra Tech; and exclusion of unsalvageable areas due to size, inaccessibility and presence of soil contamination.

No GM or SBM salvaged from slopes greater than 45 percent or isolated, small or inaccessible slopes < 45%.

No GM or SBM salvaged from previously disturbed or reclaimed areas or contaminated areas mapped as - AoD: Areas of previous disturbance and AIU: Areas likely unsalvageable, with the exception of soils located in the existing Yellow Pine pit mapped as - fTH: Euic, frigid Typic Haplosaprists.

No GM or SBM salvaged from SMU – sTC (excessive rock)

No GM or SBM salvaged or placed for BC 1 Wetland (Restored Yr. 1) with the exception of Blowout Creek Rock Drain where a 6-inches thick layer if GM will be applied (Reclaimed Yr. 1).

Table 3-9. Live Handled Soil Source, Volume and Placement Location

GM (SBM) HAUL FROM →	TSF			Hangar Flats DRSF			Hangar Flats pit			Rapid Infiltration Basins			Fiddle DRSF			West End pit				Total SBM (BCY)
GM (SBM) HAUL TO ↓	GM1 (BCY)	SBM2 (BCY)	Prod Yr.	GM1 (BCY)	SBM2 (BCY)	Prod Yr.	GM1 (BCY)	SBM2 (BCY)	Prod Yr.	GM1 (BCY)	SBM2 (BCY)	Prod Yr.	GM1 (BCY)	SBM2 (BCY)	Prod Yr.	GM1 (BCY)	SBM2 (BCY)	Prod Yr.	Total GM (BCY)	
TSF																				0
Hangar Flats DRSF																			0	0
Bradley Tailings																			0	0
Meadow Creek Cut/Potential GM Borrow																			0	0
Hangar Flats Pit Road South							17,895		7										17,895	0
Hangar Flats Pit																			0	0
Hangar Flats Pit Road North							5,111		7										5,111	0
Rapid Infiltration Basins																			0	0
Plant Site – Annual GM/SBM Salvaged																			0	0
Worker Housing Facility																			0	0
Central Haul Road																			0	0
Plant Site Haul Road																			0	0
West End Pit Haul Road South																			0	0
West End Pit																			0	0
West End Pit Haul Road North																			0	0
West End DRSF Ancillary Disturbance																			7,341	0
West End DRSF	69,240		7	1,304		8	1,407	320	7/9							40		9	71,991	320
Fiddle DRSF	24,215		10		230	8													24,215	230
Yellow Pine Ancillary Disturbance South				263		11													263	0
Yellow Pine Pit							23,280		7										23280	0
Yellow Pine Pit Haul Roads				1,389		7				5,325		7							6,714	0
Yellow Pine Ancillary Disturbance North																				0
North Yellow Pine GMS Road																			0	0
																			0	0
Subtotal	69,321	-		2,956	230		47,693	320		5,325				6		24,255				
																TOTAL DIRECT HAUL			**150,106**	**550**

Table 3-10. Growth Media & Seed Bank Material Stockpile Volumes and Dimensions					
Soil Stockpile ID	Base Area (ac)	Side Slope Horizontal (H):1 (V)	Height (ft)	Bottom Perimeter (ft)	Storage Volume (CY)
Truck Shop	5.8	2.5	28	2,011	156,175
Hangar Flats	9.6	2.5	28	2,587	276,329
Hangar Flats pit	5.8	2.5	28	2,011	156,175
Worker Housing	3.2	2.5	28	1,493	77,506
Midnight	11.4	2.5	28	2,819	334,418
Yellow Pine	15.9	2.5	28	3,300	482,000
North Homestake	13.3	2.5	28	2952	339,000
Fiddle	12.5	2.5	28	2,952	370,175
Plant Site	4.2	2.5	28	1,711	107,228
Total	77.8			21,471	2,229,576

GM salvaged from the Fiddle DRSF will be placed on the Fiddle GMS. GM salvage from the Yellow Pine Pit and ancillary facilities will be placed on the Yellow Pine GMS. Overflow from the other GMSs would be placed on the North Homestake GMS. By production year 8, the Fiddle stockpile is anticipated to be exhausted and can be reclaimed.

The GMSs near Hangar Flats pit would be used to cover the TSF, Hangar Flats DRSF, former location of the Bradley tailings (which will be removed during operations), portions of Meadow Creek restoration, and associated haul roads. As such, they would not be exhausted until Project Year 18. The Fiddle DRSF would be covered with GM from the Fiddle GMS. The West End DRSF and associated haul roads and the Yellow Pine Pit would be covered with GM from the Midnight and Yellow Pine GMSs.

The salvageable volume of GM within the planned surface disturbance associated new segments of the Burntlog Route and Landmark Maintenance Facility were calculated separately from the Project site. Soil survey information for this maintenance facility is not available. Soil survey information for the Burntlog Route are available and are summarized as follows:

1. There are four mapped soil units (SMU) identified within the planned Burntlog Route corridor - fOD*, fTH, mTC,* and "*S45+*" (slopes > 45%);
2. Of the four SMUs identified, one was assumed to be present - "mTC" and three are based on the data sources as follows:
   a) *fTH* - Field Inventory of Wetlands (HDR Engineering, Inc, in 2011-2017);
   b) fOD - Standards for National Hydrography Dataset High Resolution (U.S. Geological Survey, 1999); and
   c) *S45+* (slopes > 45%) - National Elevation Dataset (U.S. Geological Survey, 1999).
3. The four SMUs identified above were mapped within the Project site as well and the recommended GM/SBM salvage depth for each of these SMUs are presented in Table 3-7
4. Three SMUs mapped within the Project site where not identified within the Burntlog Route -sTC (excessive rock), *AoD* (areas of previous disturbance) and AIU (areas likely unsalvageable).

The estimated quantities of GM/SBM available for salvage from the new segments of the Burntlog Route are summarized in Table 3-11. Estimates of the suitability and quantity of existing soil within the Burntlog Route that are practically salvageable using heavy equipment are based on the information presented immediately above and the primary assumptions as follows:

- Soil from SMU *fTH*, *fOD* and 40% of *mTC* will be salvageable and stored from the new segments of the Burntlog Route as follows;

- Soil will be salvaged from 0 to 15% slopes and stored in GMSs located within BLR Borrow Sources (following removal of road construction materials from the borrow sources); and
- Soil will be salvaged from 15 to 45% slopes and stored in windrows located along the toe of and parallel to BLR fill slopes and other locations that are suitable for GM storage;

- Soil will not be salvaged from widened segments of the existing Burntlog Road;
- Soil located on previously disturbed areas will not be salvaged; and
- SMU - *mTC* is mapped correctly within the new segments of the Burntlog Route and 40 % of the area covered by this SMU contains soil that is practically salvageable using conventional heavy equipment.

A total of approximately 321,000 BCY of GM/SBM are estimated to be available for reclamation from the Burntlog Route as presented in **Table 3-11**. Of this total approximately 66,000 BCY would be stored in GMSs located within Borrow Sources and approximately 255,000 BCY would be stored in windrows along the toe of BLR fill slopes and other locations suitable for GM storage.

Prior to construction of the new segment of the Burntlog Route GM salvaged from 0-15 percent slopes will be stockpiled within the Burntlog Borrow Source Areas where construction materials have been removed and are closest to where GM will be needed for reclamation. The capacity of Burntlog Borrow Source Areas to store salvaged GM is approximately 2.2 million CY based on the following assumptions: 80 percent of borrow area disturbance is available for stockpiling GM; and GMS height, slope gradient, and shape will be the same as the Project site GMSs (**Table 3-10**). For example, the two Burntlog Borrow Source Areas nearest to the Project site will have (based on the assumptions described in this section) the capacity to store GM in excess of that needed to reclaim the Burntlog Road. Ample capacity within the disturbance created by Burntlog Borrow Source Areas therefore exists to store GM salvaged from the Burntlog Route expansion.

Prior to construction of the new segments of the Burntlog Route, GM salvaged from 15-45 percent slopes will be placed into windrows along the edge of the road disturbance. Where practicable GM will be salvaged from widened segments of the Burntlog Route and placed into windrows along the edge of the widened road segments. GM balance calculations exclude GM salvaged from widened road segments (if any).

The area of Burntlog Route disturbance that will be reclaimed consists of all borrow sources, staging areas, and cut/fill areas (including road beds) within entirely new segments of road where slopes allow access for grading and placement of GM. In areas where the Burntlog Route generally follows an existing road, no final reclamation will be completed; however, interim reclamation activities will be conducted in these areas.

The PMLU for the SGLF is “Light Industry,” hence, no final reclamation will be completed at this facility; however, interim reclamation activities will be conducted within portions of this area. Interim reclamation at the Landmark Maintenance Facility will entail seeding slopes and other disturbed areas that will not be actively used for vehicle traffic, equipment or materials storage. Final reclamation of the Landmark facility will entail grading to smooth slopes, placement of GM and reseeding.

Table 3-11. GM/SBM Salvage (by Soil Map Units) from New Segments, Borrow Sources and Staging Areas of Burntlog Route

Project Year	Slope Gradient (%)	Soil Map Unit: fOD: (stream channels)			fTH: (wetlands)			mTC: (uplands)			Total		
		Area w/ Salvageable GM (ac)	Salvaged GM (CY)	Salvaged SBM (CY)	Area w/ Salvageable GM (ac)	Salvaged GM (CY)	Salvaged SBM (CY)	Area w/ Salvageable GM (ac)	Salvaged GM (CY)	Salvaged SBM (CY)	Area w/ Salvageable GM (ac)	Salvaged GM (CY)	Salvaged SBM (CY)
New Burntlog Road Cut/Fill Segments - GM/SBM Salvaged													
-2 and -1	<15	1.6	3,921	2,614	1.0	3,162	1,581	17.0	41,150	0	19.6	48,233	4,195
-2 and -1	15-45	1.3	3,141	2,094	11.1	35,742	17,871	60.1	145,321	0	72.4	184,204	19,965
Subtotal		2.9	7,061	4,708	12.1	38,905	19,452	77.1	186,471		92.0	232,437	24,160
New Burntlog Borrow Sources - GM/SBM Salvaged													
-2 and -1	<15	0.0	0	0	0.0	0	0	2.0	4,828	0	2.0	4,828	0
-2 and -1	15-45	0.1	163	108	0.0	0	0	19.0	45,996	0	19.1	46,158	108
Subtotal		0.1	163	108	0.0		0	21.0	50,824		21.1	50,986	108
New Burntlog Staging Areas - GM/SBM Salvaged													
-2 and -1	<15	0.0	0	0	0.0	0	0	3.4	8,332	0	3.4	8,332	0
-2 and -1	15-45	0.0	0	0	0.0	0	0	2.0	4,896	0	2.0	4,896	0
Subtotal		0.0		0	0.0		0	5.5	13,228		5.5	13,228	0
TOTAL New Burntlog Road Segments, Borrow Sources and Staging Areas - GM/SBM Salvaged													
-2 and -1	<15	1.6	3,921	2,614	1.0	3,162	1,581	22.4	54,310	0	25.0	61,393	4,195
-2 and -1	15-45	1.4	3,303	2,202	11.1	35,742	17,871	81.1	196,213	0	93.5	235,258	20,073
	TOTAL	**3.0**	**7,224**	**4,816**	**12.1**	**38,905**	**19,452**	**103.5**	**250,523**	**0**	**118.6**	**296,651**	**24,268**

Notes:

GM = Growth Media which is considered salvageable from Soil Map Units (SMU) fOD from 1.0 to 2.5 ft; fTH from 1.0 to 3.0 ft; and mTC from 0 to 1.5 ft.

SBM = Seed Bank Material which is considered salvageable from SMU fOD & fTH from 0 to 1.0 ft.

Assumes no GM/SBM salvaged from slopes > 45%

Assumes no GM/SBM salvaged from previously disturbed areas.

Assumes that no salvageable GB/SBM exist at Landmark Maintenance Facility.GM/SBM salvaged from 0 to 15% slope placed in Growth Media Stockpiles located within borrow source areas following removal/processing of construction materials.

GM/SBM salvaged from 15 to 45% slopes placed in windrows along and parallel the toe of road fills slopes and other locations that are suitable for storing GM/SBM.

40 % of the area covered by this SMU mTC contains soil that is practically salvageable using conventional heavy equipment.

The area of the Burntlog Road that will be reclaimed may be up to approximately 227 acres and the average depth of GM placement on areas prepared for reclamation is 6 inches, which will require up to approximately 183,000 BCY of GM. A surplus of perhaps as much as 138,000 BCY of GM is therefore anticipated to exist and could be used potentially to reclaim portions of the Project site to address the Project site GM deficiency. These volumes are based on soil survey information presented above in this RCP section.

Soil survey information for the substations and electric transmission line are not available. Estimates of the suitability of existing soil within these areas that are practically salvageable using heavy equipment were therefore not developed. It is assumed the GM present at the locations of surface new surface disturbance caused by roads, structures and other features along the transmission line corridor will be salvaged and placed into windrows along the edges of the new disturbance. Non-merchantable timber and slash from these areas will be treated in a similar manner, unless it poses unacceptable fire hazard. If so these piles will be burned at the appropriate time and under appropriate USFS oversight. Otherwise windrowed GM and timber and slash will be reapplied to those portions of the transmission line corridor that will be reclaimed, and these areas will be seeded with General seed mixtures shown on **Table 3-12** to the areas disturbed. Soil handling operations will be conducted using dozers, front-end loaders, excavators, haul trucks, and other equipment.

3.3.3.3 Growth Media Generation and Amendment

According to the current GM/SBM mass balance estimate, a deficit of approximately 34,000 BCY of GM will exist. The actual volume of soil salvaged from planned surface disturbances will vary from current estimates due to the intrinsic variability in soil depth and quality throughout this and other landscapes and the level of accuracy provided by the scope and detail of soil surveys. We have also assumed that SBM and GM are equally capable of supporting plant growth, but GM will not be a suitable SBM for wetland mitigation.

The feasibility of using materials from off-site borrow areas to address GM volume deficits has been investigated previously by Midas Gold. The cost and impacts related to GM excavation and transport and borrow area reclamation is considered prohibitive.

To achieve the reclamation success criteria discussed in Section 2 and address the current GM deficit, Midas Gold is considering other options to generate GM as follows:

- Salvage cover materials from areas within the Project site that have been previously reclaimed that are suitable GM (if any):
- Utilize excess GM salvaged from the Burntlog Route disturbance that will not be needed for reclamation of the route; and/or
- Utilize alluvial lithology that will be excavated during mining of the Hangar Flats ore deposit that would otherwise be disposed in the Hangar Flats DRSF.

Efforts by the University of Idaho, IDEQ, Midas Gold, and others to establish a self-sustaining cover of vegetation on previously mined lands at Stibnite have met with limited success (Midas Gold staff, personal communication 2018). This limited success has been attributed to the low nutrient retention capacity (cation exchange capacity [CEC]) and plant-available water holding capacity (AWHC) of soil and other materials used to cover mine waste and other types of disturbance onsite. Low CEC and AWHC are typical characteristics of coarse textured soil with low organic matter content. To address these limitations of existing soil onsite and optional sources of substitute GM, Midas Gold proposes to amend GM with compost and potentially other soil amendments.

Regardless of the type and source of GM used for the reclamation of Project-related disturbance, Midas Gold anticipates that compost (and potentially other soil amendments) will be applied to salvaged GM to improve their suitability. Soil amendment application rates will vary according to the source and quality of suitable GM available and the properties of the compost generated at the Project site as well as the other soil amendments considered.

The composting program currently envisioned by Midas Gold is discussed in the remainder of this section. Feedstock materials for composting may come from on-site sources such as vegetation and kitchen wastes (estimated at 2,500 tons over life of the Project) and slash from harvested trees (estimated at 5,000 tons or more); however, they may also include materials from offsite. Midas Gold will first allow merchantable timber within USFS administered land to be harvested and sold to Midas (for use in engineered log jams for stream enhancement and restoration) and others. Non-merchantable timber and slash from Burntlog Route, West End DRSF and other SGP disturbed areas will be considered as sources of material to generate GM and soil amendments.

Sources for off-site materials may include the following items:

- Manure from dairy or feedlot operations in southern Idaho;
- Biosolids from wastewater treatment systems in the McCall area or, if necessary due to volume needs, the Boise area; or
- Certified weed free alfalfa hay from the Cascade-McCall area.

Other sources for feedstock have been investigated. These include spent mash from local breweries, paper wastes, and wood wastes from sawmills. Local breweries tend to produce small amounts of spent mash and tend to have established markets for the mash they do produce. Paper wastes are available, but the nearest source is in Lewiston and it is believed to be infeasible to transport as much volume as will be needed from Lewiston (a road distance of over 250 miles to the Project site). Wood wastes are generally available from sawmills in the McCall area, but wood wastes can be created from on-site sources so there does not seem to be a need for off-site wood wastes.

Instead of at one or two large facility(ies), as proposed in the PRO, composting facilities will be located adjacent to and within multiple GMSs prior to GM addition to GMSs and as GM is removed from GMSs. The GMS areas will represent available work space during the early stages of the project before they are filled up, and they will also provide for easy mixing of completed compost into GM and reduce the need for re-handling and transportation of compost. This is also true later in the Project as more facilities are reclaimed, and GMSs begin to dwindle, once again providing available space for composting operations to be set up. This is likely to occur before production year 3 and following production year 11. Between production year 3 and production year 11, additional composting facilities will need to be located and prepared for composting. Options for these composting facilities may include stockpile and borrow areas along the proposed Burntlog access route.

Regardless of where the composting will occur, the methods by which it will be performed are likely to be as follows:

- Feedstock will be hauled from on-site or off-site locations using covered trucks and blended in the correct proportions to produce a suitable product to improve the quality of salvaged GM or to generate GM.
- Mixed feedstock will be placed in long, linear mounds and covered either with a geofabric or a clean layer of granular material to prevent vectors from transporting pathogens from the site.
- Mounds will be actively aerated with either perforated pipelines placed at the base of the mound (through which air will travel into the interior of the mound) or by frequent turning of each mound.

- Mounds will be moisture conditioned to provide adequate moisture for maximum decomposition of organic material.
- The surface below compost mounds will be composed of 3 to 6 inches of wood chips.
- Temperatures in the mound will be monitored to ensure that sufficiently hot temperatures for a sufficient duration exist to destroy pathogens and undesirable weed seeds.
- The surface of composting facilities will be graded to drain towards stormwater basins.
- Runoff from the composting facilities will be captured in stormwater basins and used for moisture conditioning the compost.
- The composting facility will be fenced to eliminate contact with local fauna and to prevent vectors for spreading pathogens.

Equipment that is likely to be used for composting includes blowers, loaders, graders, pumps, and sprinklers. Depending on the source of feedstock, trucks bringing feedstock to the composting site are likely to be highway legal trucks. Depending on the location of the composting facility, trucks that take composted material away from the composting areas could be either highway legal or off-highway haul trucks.

Midas Gold will create the volume of compost necessary to amend the GM to provide suitable quality of GM to cover the areas to be reclaimed. Following placement of suitable GM in areas prepared for concurrent and final reclamation 10 tons/acre of compost will be incorporated into the top 3 to 6 inches of GM. Approximately 1,539 acres of disturbance will be reclaimed using GM salvaged from the Project site. Therefore, approximately 15,390 tons of compost (which represents roughly 22,000 CY) will need to be generated at the Project site to improve the quality of GM placed on disturbed areas. This compost amendment total is in addition to the 34,000 CY GM deficit identified earlier, hence, at total of 56,000 CY of compost may be needed for the SGP if other options being considered by Midas Gold to generate GM are not feasible.

3.3.3.4 Soil Salvage and Growth Media Stockpiling and Placement

GM and SBM handling will include salvaging following clearing and grubbing of existing vegetation, stockpiling, and placing stockpiled or live-handled GM on disturbed areas that have been prepared for reclamation. GM and SBM sources are shown on **Figure 3-5** and the locations of their stockpiles and placement are generally shown on **Figure 3-2**. Replacement thicknesses, volumes, and acreages are presented in **Table 3-4**. These plans are subject to change as mine plans and construction designs are advanced and the volume of salvageable soil is refined.

GM and SBM derived from “wetlands” will be separately salvaged and placed in distinct zones within GMSs during stockpiling operations. SBM may be dried prior to stockpiling to preserve seed viability.

To improve the quantity and quality of salvaged GM and SBM from disturbed areas, survey stakes will be driven into the soil surface and clearly marked prior to GM and SBM salvage operations. This will indicate to equipment operators the depth of GM and SBM salvage in an area. A qualified soils specialist or a person trained to identify the salvageable depth of suitable GM and SBM and the characteristics that differentiate SBM from GM will be present during salvage operations. To the degree practical, salvage and storage operations will be conducted during dry periods to reduce the likelihood of soil compaction.

Salvaged soil will be hauled to one of the nine GMSs shown on **Figure 3-2** or live-handled as discussed previously. Soil will be stored in stockpiles for varying lengths of time, which will range from approximately 1 to possibly 20 years.

The approximate dimensions and storage capacity of each GMS are presented in **Table 3-10**. The maximum total stockpile capacity is based on the anticipated schedule of disturbance, closure and reclamation, and volume of GM/SBM salvaged and redistributed for reclamation on an annual basis. The storage capacity of the GMSs is designed to hold the estimated BCY of soil with an additional 25 percent storage capacity to account for swell. Stockpiles will vary in size and volume stored during the Project life.

GMSs will be shaped similar to a flat-topped (frustum) pyramid with a rectangular base. Stockpile height will be approximately 25 to 30 feet and side slopes will not exceed 2.5H:1V. Stockpile side slopes will be similar to DRSF inter-bench slope gradients. Opportunities will therefore exist to test the effective use of various erosion control BMPs and other reclamation methods used for the reclamation of the downstream slopes of the DRSFs. Small catchment berms and ditches will be constructed to route surface runoff away from GMSs or GMSs may be strategically placed and constructed to allow runoff to be routed around stockpile locations rather than pond against a stockpile.

GM/SBM from disturbed areas will normally be hauled in trucks to GMSs. GM/SBM will be dumped from trucks in heaped (overlapping) piles, then redistributed across the footprint of GMSs in lifts using dozers. Subsequent loads of GM/SBM will be placed directly on the underlying lift of GM/SBM until the desired GMS dimensions are achieved. The surface of the GMS will be roughened using excavators, pitting and gouging equipment or dozers to deep rip the surface of the GMS. An alternate method of placing GM/SBM in GMSs may include use of scrapers, in which case GM/SBM will be dumped from scraper buckets along the long axis of the GMS. Dozers or excavators will then be used to construct perimeter berms and roughen the surface of the GMS.GMSs will be reclaimed on an interim basis and protected from run-on and wind and water erosion. Berms will be constructed around the perimeters of each GMS to retain sediments transported from the stockpile surface. Following seeding of the GMSs with the interim seed mixture, a bonded wood fiber matrix, wood straw or straw mulch will be applied to protect the GM/SBM from wind and water erosion prior to vegetation establishment. If it is determined that wind and water erosion are not adequately controlled, these and other surface mulches will be reapplied to the GMSs. Signs will be placed on GMSs indicating the area is a GMS. Following removal of GM/SBM from stockpiles for concurrent reclamation purposes, the exposed cut face of the remaining GMS will be periodically graded to a maximum slope of 2.5H:1V and reclaimed on an interim basis as discussed above. Where all stockpiled GM/SBM has been removed, the area will be deep-ripped, GM will be redistributed, and the area will be seeded with a final reclamation seed mixture.

Anaerobic conditions approximately 2 to 3 feet below the surface of the GMSs are anticipated to predominate and will likely lead to a decline in microbial respiration and a shift from an aerobic respiration endpoint of carbon dioxide (CO_2) to an anaerobic endpoint of anhydrous ammonia (NH_3) or, depending on the soil moisture content, nitrogen gas (N_2) or nitrous oxide (N_2O). Oxygen may, however, penetrate to a greater depth in stockpiles composed of coarse-textured soils when compared to stockpiles composed fine-textured soils, thereby slightly reducing the impacts of stockpiling on soil productivities. Regardless, soil productivity within the majority of the GM/SBM mass stored with stockpiles is expected to decline during the time of residence within stockpiles.

Midas Gold will implement measures to avoid or mitigate the temporary loss of soil productivity within stockpiled GM/SBM. These include:

- Live handling of soil, when and where practicable, to avoid placement of GM/SBM in stockpiles;
- Maximizing the surface area of the stockpiles according to GM/SBM volume and stockpile area constraints;
- Conducting soil salvage and storage operations when and where practicable during dry periods, which should limit soil compaction, and thereby maintain diffusion of oxygen into the surface of stockpiles. In addition, mycorrhizae spores are most numerous when soil moisture is minimal,

and the fungi is stressed, which may improve mycorrhizae inoculation of seeded and volunteer vegetation; and

- When GM/SBM are removed from stockpiles for reclamation, mixing the upper 2 to 3 feet of the excavated portions of the GMSs with the lower, non-rhizosphere excavated portion of the stockpiled material.

By following these procedures, the loss in soil productivity is expected to be temporary as a rapid return to predominantly aerobic respiration is expected upon the redistribution of GM onto disturbed areas that have been prepared for reclamation. In addition to these procedures, productivity will be improved following redistribution of stockpiled GM/SBM by applying compost and fertilizer (if necessary) as described in Sections 3.3.3.3 and 3.3.4, respectively.

3.3.4 Nutrient Analyses of Soil Material

Prior to seeding, GM that has been graded or contoured will be analyzed for pH, nitrogen, phosphorus, potassium and other parameters to determine its fertility and nutrient status. Based on this analysis, Midas Gold will amend the GM with fertilizer, if needed. Soil fertilizer will only be applied sparingly to encourage the establishment and diversity of native plant species and to prevent establishment of noxious weed species. The objective of soil fertilization is to provide a short-term nutrient supply to promote the establishment and growth of desirable plant species. Subsequently, long-term nutrient requirements will be satisfied through the development of natural nutrient cycling and plant communities that are not fertilizer dependent.

Site-specific factors will influence fertilizer recommendations for the Project. Fertilizer recommendations (if any are used) will be based on local climate factors, the nutrient requirements of species to be planted, types of compost applied (see Section 3.3.3.2), fertilizer availability, GM/SBM type and the nutrient deficiencies as determined by sampling and analysis and vegetation response to cultural treatments.

The behavior of arsenate (AsO_4^{3-}) resembles that of phosphate, and application of phosphate fertilizer is reported to decrease arsenic bioavailability (Kabata 1992). The application of phosphatic fertilizers to tailings and near surface materials in Hangar Flats and potentially Fiddle DRSF will therefore be investigated during operations and implemented if it is demonstrated to improve the suitability of these materials as root-zone materials. This is one method that will be evaluated during operations to mitigate the potential adverse effect of elevated arsenic in soil on plant growth. The analysis in Appendix A indicates that the plant species common to the Yellow Pine-Stibnite Mining District are tolerant of elevated arsenic concentration in soil. Therefore, Midas Gold will also evaluate these plant tolerances, and select and propagate desirable plant species (i.e., not-weed, non-invasive species whose establishment is aligned to the PMLUs identified for the SGP) that are tolerant of elevated arsenic in GM and underlying root zone materials for the reclamation of the SGP.

The status of plant-available nitrogen in cover soil may be related to the inconsistent success of previous reclamation conducted onsite. One option to address nitrogen deficiency, while limiting the potential for noxious weed invasion, is to broadcast apply nitrogenous fertilizers (or compost) following seeding, 4 to 6 weeks after perennial species have emerged or the onset of active growth of established plants. Appropriate investigation and mitigation measures will be taken if monitoring of interim and concurrent reclamation indicates poor establishment of seeded or nitrogen-fixing plants included in the final reclamation seed mixture. Consideration will also be given to the potential adverse effects of application of fertilizer and compost ("topdressing") including:

- Increased soil salinity,
- Nutrient loading to the EFSFSR and its tributaries, and

- Reduction in the numbers of mycorrhizae-spores and propagules encountered in soil with high fertility (especially phosphorus) status.

Fertilizer application will be achieved with a hand-operated, cyclone-type or mechanical broadcast spreader attached to a farm tractor or dozer on steeper slopes. Incorporation of fertilizer into the top 3 to 6 inches of soil will be done if placement of, for example, insoluble phosphate fertilizer within the root zone is necessary. Incorporation of fertilizer will likely be done with chisel plows, disk, ripper shank, or other equipment as appropriate.

3.3.4.1 Sampling and Analysis to Identify Nutrient Deficiencies

The fertilization program for the Project site will assess the need for supplemental fertilization of GM materials after its redistribution. This program will include observations of the performance of interim reclamation and concurrent reclamation in project year 7. The nutrient status of the redistributed GM and SBM will be determined by soil sampling and laboratory analysis. The objective of the sampling plan is to identify basic soil chemistry and deficiencies of macronutrients and micronutrients known to be deficient in regional and site-specific soils.

Representative soil samples will be collected in a grid pattern from GM following placement on areas prepared for concurrent and final reclamation and prior to seeding. Some areas may be subdivided based on site-specific conditions that indicate distinct soil properties (e.g., soil type, soil color). The top 6 to 12 inches of redistributed GM will be sampled and analyzed to characterize the nutrient status of the GM. The GM samples will be sent to a qualified laboratory and analyzed.

GM samples will be analyzed for constituents that substantially influence plant growth including, for example:

- pH (saturated paste);
- Electrical conductivity (saturated paste extract);
- Texture (hydrometer);
- Organic carbon;
- Nitrate-nitrogen;
- Available phosphorus;
- Soluble potassium; and
- Copper, iron, manganese, zinc and other trace metal by ethylenediaminetetraacetic acid (or EDTA) extraction.

Based on interpretation of lab data, fertilizer (and compost), recommendations will be formulated (if any).

3.3.5 Seeding, Planting, and Mulching

Proposed revegetation efforts include a combination of seeding and planting, with the end goal being to set trajectories that facilitate the establishment of appropriate future ecosystems using natural successional patterns. The landscapes that will be created as part of restoration, closure, and reclamation activities are anticipated to be variable with respect to relative soil moisture, nutrient regime, substrate depth, and overall substrate quality. The approach taken when developing the revegetation plan was to select plant species that would be sufficiently flexible to adapt to these potentially variable landscapes but are still capable of developing into self-sustaining plant communities (Cooke and Johnson 2002).

Seeding and planting plans have been developed to encourage the establishment of grassland, shrub, and treed communities throughout the Project site as shown on **Figures 3-6, 3-7,** and **3-8**.

Two ecological conditions have been identified for differential treatment: cool aspects, which include areas of late snowmelt and potentially higher relative soil moistures; and "general site" condition, which includes a range of slopes, aspects, and dry to mesic relative soil moisture regimes (**Table 3-12**). Areas identified for tree and shrub planting (in addition to seeding with grass and forb species) were selected, in part, on relative topographic position (such as the cool aspects described above, which could be more conducive to supporting denser covers of woody vegetation such as trees and shrubs due to potentially higher soil moistures). Imagery available for the site was reviewed and areas that were shown to support trees (either as a continuous canopy or more open, parkland conditions), shrubs, previously burned areas, and riparian zones, were targeted as potential planting areas, as were azimuth aspects ranging between 285 to 360 degrees and 0 to 135 degrees (west/northwest to east/southeast), which were identified through GIS analysis. Areas not within this range of azimuth aspects but that did display some degree of tree cover (according to the imagery) were also identified as potential woody species planting areas.

The result is the identification of five revegetation classes: cool aspect grasslands, general grasslands, trees and shrubs, parkland trees and shrubs (a wider spacing of planted trees and shrubs that represents the transition between the more dense trees and shrubs vegetation class and a shrubland community), and shrubs (representing communities that would be planted with shrubs only). Each of the planting areas would be supplemented by either the cool aspect or general grassland seed mixes (**Figures 3-6, 3-7,** and **3-8**).

The plant species selected for the seeding and planting plans are native, have either been documented as occurring within or adjacent to the Project site (HDR 2017) or within Valley County (Biota of North America Program [BONAP] 2018), and were researched (using sources compiled within USDA NRCS 2011, 2012 and 2018) for their likely commercial availability, successful use in similar restoration, reclamation, slope stabilization, and/or erosion control scenarios, and their relative ease of establishment (**Table 3-12**). Consideration was also given to species with the ability to tolerate the expected substrate underlying the GM layer. Pounds of seed per acre by species was calculated per the following example:

Silky lupine contains 13,000 pure live seed (PLS) per pound. Recommended broadcast seeding rate is 60 seeds per square foot. Silky lupine makes up 10 percent of the recommended seed mix. Therefore, it is proposed that there are 6 seeds per square foot (10 percent of 60 seeds). Given that there are 43,560 square feet in an acre, 261,360 (6 X 43,560) seeds are needed for one acre. Given silky lupine has 13,000 PLS/pound, 20.1 (261,360/13,000) pounds of silky lupine are needed to seed one acre at the recommended rate and composition within the seed mix.

The seed mixes also include nitrogen-fixers (American vetch [*Vicia americana*] and silky lupine [*Lupinus sericeus*]) to assist with soil conditioning and a minor component of the hybrid plant ReGreen™ (developed by Rainier Seeds) which serves as a cover or "nurse" crop and has been successful at facilitating the establishment of perennial species on difficult soils in the western United States.

Should wetter receiving sites (e.g., at the base of relatively extensive slopes or in localized depressions) form following reclamation activities, a mesic seed mix could be applied to these areas. This seed mix is not currently represented in the planting plan but is listed in **Table 3-12** and would be available in the event it is needed. An interim reclamation seed mix has also been developed for areas that will be disturbed in the future but would require soil stabilization and a means of discouraging weed establishment over the short term (e.g., multiple years but not decades). The species are a subset of those already identified for use at the Project site.

All seeding application rates are based on broadcast seeding; should drill seeding (for example) be used, the seeding rates could be reduced. The seed mixes may be subject to change closer to the time of implementation, depending on factors such as seed availability and cost. Similarly, the seeding rates shown serve as a starting point, and may require adjusting depending on the final species and proportions that are secured as reclamation efforts begin.

Seed will be obtained from primarily commercial seed suppliers. Seed will be certified weed-free, and seeds will be tested for purity and percent live seed prior to use. To the degree practical, seed used at the SGP will be Natural Resources Conservation Service (NRCS) foundation seed or sourced collection sites located at elevations and within vegetation communities that are similar to the SGP. As discussed in Appendix A, plant species common to the Yellow Pine-Stibnite Mining District are tolerant of elevated arsenic concentration in soils. Midas Gold will therefore evaluate these plant tolerances and select and propagate seeds that are tolerant of elevated arsenic in GM and underlying root zone materials for the reclamation of the SGP.

Table 3-12. Seed Mixes and Seeding Rates

Seed Mix Type	Plant Type	Scientific Name[a]	Common Name	% of Mix	Pure Live Seeds (PLS)/ pound[b]	Recommended Seeding Rate (PLS/ft²)[c]	Adjusted PLS/ft² using % of mix)	PLS/acre based on seeding rate and % of mix	PLS pound[d]/ acre
Final (and Concurrent) Reclamation Seed Mixtures									
Cool aspect	Herb	*Lupinus sericeus*	Silky Lupine	10%	13,000	60	6	261,360	20.1
	Herb	*Senecio triangularis*	Arrow leaf ragwort	5%	500,000	60	3	130,680	0.3
	Herb	*Vicia americana*	American vetch	20%	33,000	60	12	522,720	15.8
	Grass	ReGreen™	N/A	10%	11,000	60	3	130,680	11.9
	Grass	*Agrostis scabra*	Ticklegrass	15%	5,000,000	60	9	392,040	0.1
	Grass	*Bromus marginatus*	Mountain brome	10%	78,000	60	6	261,360	3.4
	Grass	*Elymus trachycaulus*	Slender wheatgrass	15%	160,000	60	9	392,040	2.5
	Grass	*Deschampsia caespitosa*	Tufted hairgrass	15%	1,300,000	60	9	392,040	0.3
				100%					**54.3**
General	Herb	*Linum lewisii*	Lewis flax	15%	295,000	60	9	392,040	1.3
	Herb	*Lupinus sericeus*	Silky Lupine	5%	13,000	60	3	130,680	10.1
	Herb	*Vicia americana*	American vetch	20%	33,000	60	12	522,720	15.8
	Grass	ReGreen™		4%	11,000	60	2.4	104,544	9.5
	Grass	*Bromus marginatus*	Mountain brome	10%	78,000	60	6	261,360	3.4
	Grass	*Elymus trachycaulus*	Slender wheatgrass	15%	160,000	60	9	392,040	2.5
	Grass	*Festuca idahoensis*	Idaho fescue	16%	450,000	60	9.6	418,176	0.9
	Grass	*Poa secunda*	Sandberg bluegrass	15%	925,000	60	9	392,040	0.4
				100%					**43.9**

Table 3-12. Seed Mixes and Seeding Rates

Seed Mix Type	Plant Type	Scientific Name[a]	Common Name	% of Mix	Pure Live Seeds (PLS)/ pound[b]	Recommended Seeding Rate (PLS/ft²)[c]	Adjusted PLS/ft² using % of mix)	PLS/acre based on seeding rate and % of mix	PLS pound[d]/ acre
Mesic	Herb	*Senecio triangularis*	Arrow leaf groundsel	15%	500,000	60	9	392,040	3.2
	Herb	*Vicia americana*	American vetch	25%	33,000	60	15	653,400	1.4
	Grass	*Agrostis scabra*	Ticklegrass	30%	5,000,000	60	18	784,080	0.5
	Grass	*Deschampsia caespitosa*	Tufted hairgrass	30%	1,300,000	60	18	784,080	0.6
				100%					**18.8**
Interim Reclamation Seed Mixture									
Temporary Cover	Herb	*Vicia americana*	American vetch	40%	33,000	60	24	1,045,440	31.7
	Grass	*Elymus trachycaulus*	Slender wheatgrass	50%	160,000	50	25	1,089,000	6.8
	Grass	ReGreen™		10%	11,000		3	130,680	11.9
				100%					**50.4**

[a] *Scientific name based on the PLANTS Database (USDA NRCS 2018).*

[b] *Sources: NRCS 2011, 2012*

[c] *Sources: Hoag et al 2011; Strom et al. 2010*

[d] *Application seeding rate.*

Figure 3-6. Planting prescription map – north

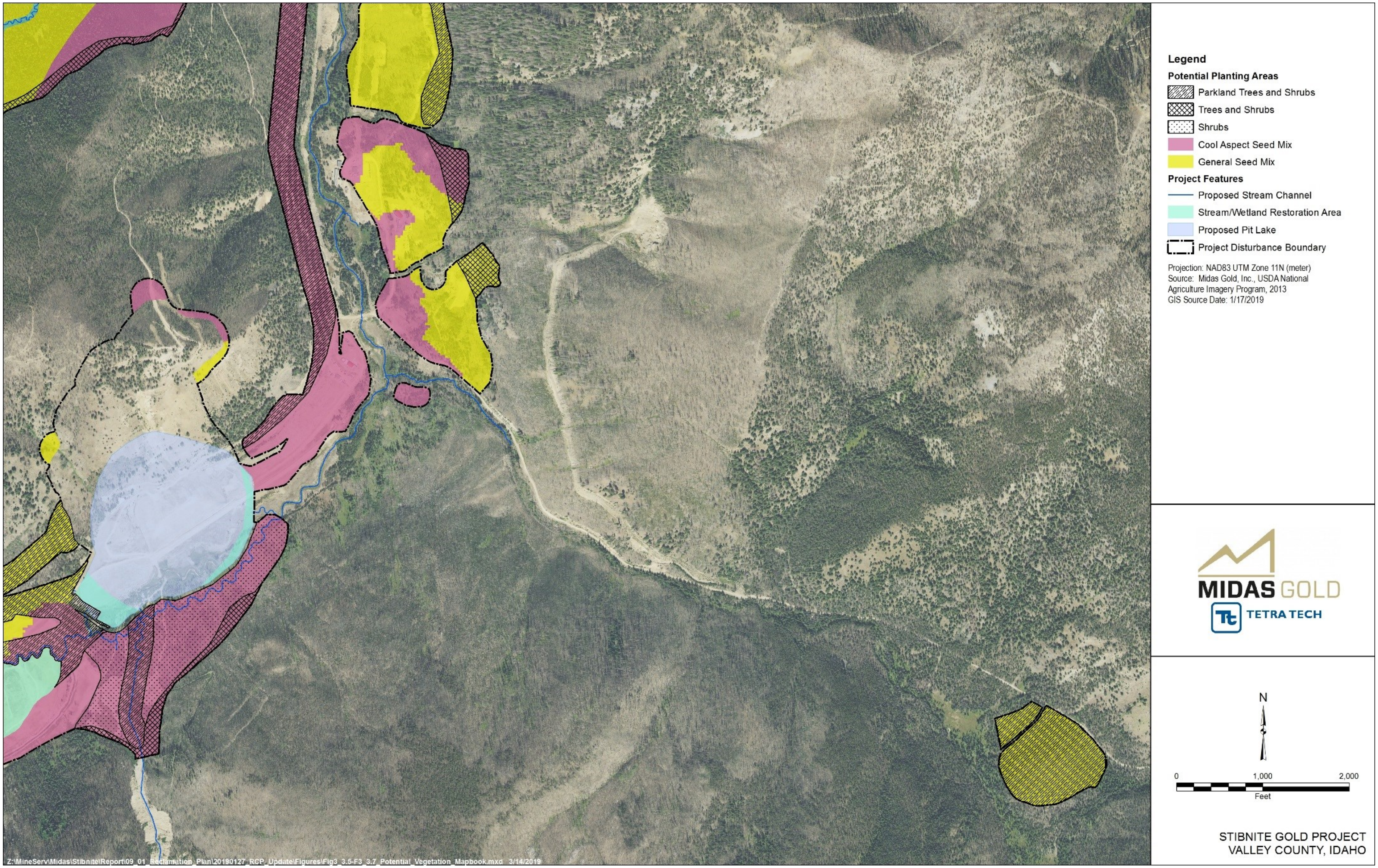

Figure 3-7. Planting prescription map – middle

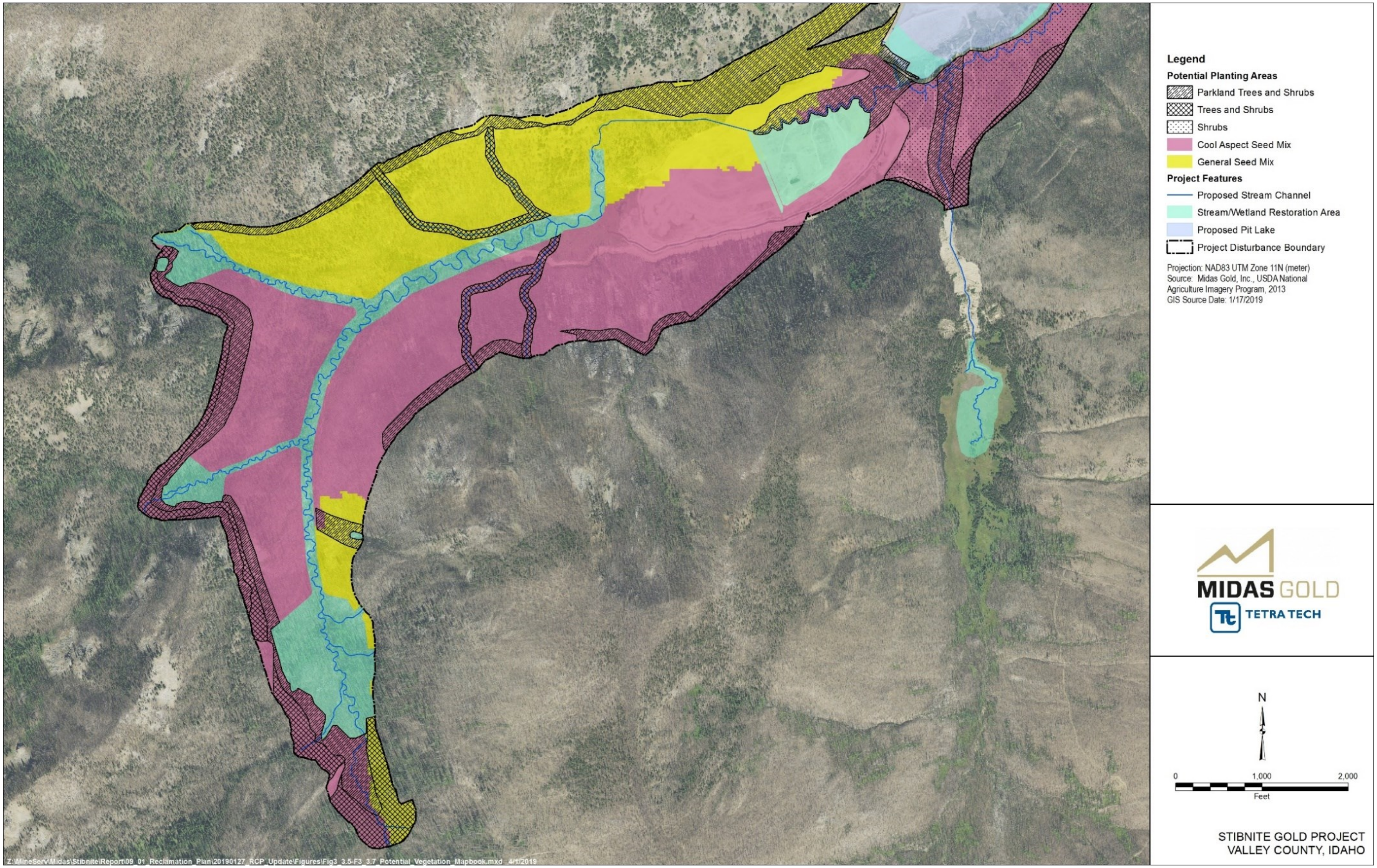

Figure 3-8. Planting prescription map – south

Supplementary revegetation with woody species makes use of a combination of container-grown stock or local transplants (**Table 3-13**). On cool aspects, species would include a combination of trees (such as Douglas fir [*Pseudotsuga menziesii*), lodgepole pine [*Pinus contorta*), and potentially Engelmann spruce [*Picea engelmanii*]) and native shrubs such as Sitka alder (*Alnus viridis* ssp. *sinuata*) and saskatoon (*Amelanchier alnifolia*). In more dry to mesic environments, tree species would be restricted to Douglas fir and lodgepole pine while shrubs include snowbrush ceanothus (*Ceanothus velutinus*), Wood's rose (*Rosa woodsii*), and snowberry (*Symphoricarpos albus*). Conditions on areas to be reclaimed within the Project site are not considered to be conducive to propagation of whitebark pine (*Pinus albicaulis*); hence, it is not included in the proposed seed or planting mixes.

Where practicable, trees would be planted in clusters or islands and linear or grid spacing would be minimized. Planting densities will vary as indicated in the On-Center Spacing column in **Table 3-13**. **Table 3-13** also presents the expected woody species needs based on the planting prescriptions proposed across the Project site.

On disturbed slopes greater than 30 percent in grade, Midas Gold will apply surface mulch to aid in stabilizing the area to minimize or prevent erosion, as well as to promote revegetation. Midas Gold will use wood, straw, bonded fiber matrix, fabric or other types of surface mulch. If straw mulch is used, it will be certified as weed-free, applied at a rate of up to approximately 3,000 pounds per acre, and applied over a roughened seedbed. Fabric mulches may include jute netting, Excelsior™ (or similar) erosion control blankets and other types of fabric mulches if necessary to control erosion. These will be tacked, crimped, or otherwise secured to withstand windy conditions common in the mountainous areas of Idaho.

Planting, seeding, and mulching will 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 will occur in the spring or fall, followed by a fall seeding of the recommended permanent mixture.

Consistent with Midas Gold's reclamation efforts during exploration work to date, tree seedlings will be cultivated and planted across the site in appropriate areas to jumpstart the re-establishment of viable forest cover and woody species development. Midas Gold will coordinate such plantings and species with USFS and IDL representatives.

Table 3-13. Proposed Planting Prescriptions and Stock Estimates

Mix[a]	Plant Type	Scientific Name[b]	Common Name	Plant Size/ Propagule Type	% of Species in Planting Prescription			On-Center Spacing (ft)			Plants per Acre			Acres			Number of Plants			
					Forested	Parkland	Shrubland	Forested	Parkland	Shrubland	Forested	Parkland	Shrubland	Forested	Parkland	Shrubland	Forested	Parkland	Shrubland	Totals
Cool aspect (879.5 Acres)	Tree	*Pseudotsuga menziesii*	Douglas Fir	D 40[c]	25	25	N/A	8	16	0	681	170	0	101.7	158.3	36.4	17,314	6,728	0	66,252
	Tree	*Pinus contorta*	Lodgepole Pine	D 40	25	25	N/A	8	16	0	681	170	0	101.7	158.3	36.4	17,314	6,728	0	
	Tree	*Picea engelmanii*	Engelmann Spruce	D 40	10	10	N/A	8	16	0	681	170	0	101.7	158.3	36.4	6,926	2,691	0	
	Tree	*Populus tremuloides*	Quaking aspen	D 40 or transplants	5	5	N/A	6	12	0	1,210	303	0	101.7	158.3	36.4	6,153	2,398	0	
	Shrub	*Alnus viridis ssp. sinuata*	Sitka alder	D 40 or transplants	20	20	55	6	6	6	1,210	1,210	1,210	101.7	158.3	36.4	24,611	38,309	24,224	154,154
	Shrub	*Amelanchier alnifolia*	Saskatoon/ serviceberry	D 40 or transplants	10	10	30	6	6	6	1,210	1,210	1,210	101.7	158.3	36.4	12,306	19,154	13,213	
	Shrub	*Sambucus racemosa*	Elderberry	D 40	5	5	15	6	6	6	1,210	1,210	1,210	101.7	158.3	36.4	6,153	9,577	6,607	
	Cool Aspect Totals				**100**	**100**	**100**	N/A	N/A	N/A	N/A	N/A	N/A	**101.7**	**158.3**	**36.4**	**90,777**	**85,585**	**44,044**	**220,406**
General Aspect (447.7 Acres)	Tree	*Pseudotsuga menziesii*	Douglas Fir	D 40	25	25	N/A	8	8	0	681	681	0	33.2	178.8	0	5,652	30,441	0	77,793
	Tree	*Pinus contorta*	Lodgepole Pine	D 40	20	20	N/A	8	8	0	681	681	0	33.2	178.8	0	4,522	24,353	0	
	Tree	*Populus tremuloides*	Quaking aspen	D 40 or transplants	5	5	N/A	6	6	0	1,210	1,210	0	33.2	178.8	0	2,009	10,817	0	
	Shrub	*Alnus viridis ssp. sinuata*	Sitka alder	D 40 or transplants	20	20	40	6	6	6	1,210	1,210	1,210	33.2	178.8	0	8,034	43,270	0	128,260
	Shrub	*Ceanothus velutinus*	Snowbrush ceanothus	D 40 or transplants	10	10	20	6	6	6	1,210	1,210	1,210	33.2	178.8	0	4,017	21,635	0	
	Shrub	*Rosa woodsii*	Wood's rose	D 40 or transplants	10	10	20	6	6	6	1,210	1,210	1,210	33.2	178.8	0	4,017	21,635	0	
	Shrub	*Symphoricarpos albus*	Snowberry	D 40 or transplants	5	5	10	6	6	6	1,210	1,210	1,210	33.2	178.8	0	2,009	10,817	0	
	Shrub	*Vaccinium scoparium*	Grouse huckleberry	D 40	5	5	10	6	6	6	1,210	1,210	1,210	33.2	178.8	0	2,009	10,817	0	
	General Aspect Totals				**100**	**100**	**100**	N/A	N/A	N/A	N/A	N/A	N/A	**33.2**	**178.8**	**0.0**	**32,269**	**173,785**	**0**	**206,053**
PLANTING TOTALS																	**123,046**	**259,370**	**44,044**	**426,460**

[a]Acreages include growth media stockpile areas and exclude wetland restoration areas described in the 2019 Conceptual Mitigation Plan.

[b]Scientific name based on the PLANTS Database (USDA NRCS 2018).

[c]D 40 represents plant stock in a 40-cubic-inch container.

3.3.6 Reclamation Monitoring and Performance Standards

The proposed reclamation performance monitoring and success standards used to demonstrate compliance with CFR 36 Chapter II Part 228 and the SGP reclamation and closure plan that would be developed by Midas Gold and approved by IDL in accordance with IDAPA 20.30.02 are discussed in this section. Water quality, air quality, and other monitoring programs, while they may be affected by reclamation success, are not presented in the RCP. These monitoring programs are instead outlined in PRO Section 15.7 [Midas Gold 2016]) and additional details will be provided in the EMMP to be submitted by Midas Gold after completion of the Draft EIS. Prior to initiation of the reclamation monitoring program for the Project, the USFS, IDL and Midas Gold will formally agree to specific quantitative reclamation monitoring plans and performance standards. Examples of maintenance procedures that may be completed based on the result of reclamation monitoring and to facilitate compliance with USFS and IDL reclamation standards are also discussed briefly in this section.

Monitoring and maintenance of reclaimed lands at the Project will be a continuation of and integrated with compliance and site maintenance programs conducted during production. Qualitative, and at Midas Gold's discretion, quantitative monitoring of reclamation performance will be completed during production since concurrent reclamation of Project facilities is planned and Midas Gold may pursue partial and full bond release for certain reclamation activities and concurrently reclaimed facilities during the production period. In addition, the experience gained from the monitoring and maintenance of concurrently reclaimed lands will be applied to the monitoring and maintenance of reclamation of conducted following production cessation.

Quantitative reclamation monitoring results will be compared to the specific reclamation performance standards agreed to by USFS, IDL, and Midas Gold. When these monitoring results demonstrate compliance with all applicable standards, Midas Gold will request full bond release from the appropriate agency. Upon agency approval of Midas Gold's request for full bond release, reclamation monitoring and maintenance activities will end in any one area of the SGP that is reclaimed concurrently or the entire SGP following operation cessation and final reclamation, as appropriate.

3.3.6.1 Completion Reports

Completion reports will be prepared by Midas Gold that document concurrent and final reclamation activities and the condition of reclaimed lands immediately following completion of construction activities. These reports will describe the following:

- Equipment, structure, solution tanks and spill containments, liner and other facility decommissioning and decontamination activities;
- Solid and hazardous waste handling and on- or off-site disposal and treatment;
- Installation of geosynthetic and other cover materials used to restore wetlands and channel reaches;
- Portal, tunnel, and adit closure activities;
- Measures specifically designed to maintain and protect fisheries and wildlife habitat;
- Road closure and decommissioning activities, and bridge, culvert, drainage control, slope stabilization removal and construction activities;
- Backfilling, regrading, GM replacement, drainage and seepage controls, revegetation and other reclamation activities; and
- Fire prevention and suppression activities implemented during and following reclamation.

Confirmation that concurrently reclaimed land will not be directly affected (i.e. re-disturbance of reclaimed area) by planned mining activities in the future will also be described in the completion reports.

Completion reports will be used to demonstrate that reclamation was performed in accordance with the Project reclamation and closure plan approved by IDL. They will also be used to support Midas Gold's requests for partial and full bond release.

3.3.6.2 Reclamation Monitoring

Reclamation monitoring will be both qualitative and quantitative. Monitoring of concurrent reclamation will be used to refine future reclamation plans, designs and activities and quantitative monitoring will support bond release requests as discussed above.

Quantitative monitoring of reclamation performance will begin after final reclamation activities are completed in any one area of the SGP and will continue for a minimum of 5 years, or until the reclamation performance standards identified in Section 3.3.6.3 are satisfied.

3.3.6.2.1 Qualitative Monitoring

Annual qualitative monitoring of multiple key indicators of site "stability" will be conducted on areas reclaimed concurrently as well as following operation cessation. These key stability indicators include multiple vegetation, surface erosion, sedimentation, and slope stability parameters. Annual qualitative monitoring of reclaimed areas will include:

- Inspection and documentation of GM surfaces and cut and fill slopes for indications of soil erosion features such as rills, inter-rills, gullies, pedestalling and dunes. The locations, dimensions, and connectivity of significant erosion features such as gullies will also be documented.
- Inspection and documentation of slope movement and other indications of deep-set slope instability. Indications of slope failure may include, but are not limited to, surficial fractures that progressively widen and elongate, and/or surface cracks that are located above prominent, recently observed surface bulges.
- Inspection and documentation of surface water run-on diversions, drainage channels and BMPs for nonpoint source control on reclaimed areas for indication of natural channel evolution as well as instability such as headcutting, dislodged armoring or other structures (e.g. check dams, silt fences); retention of sediments and presence of overbank sediment deposition.
- Revisiting significant erosion, slope failures and channel scour and sedimentation features documented in previous years to determine if new accretion, erosion or movement has occurred since last observed.
- Qualitative assessment of the presence, abundance, frequency, and importance of:
  - Plant species observed in the reclaimed area,
  - Plant species recognized as indicators of more mature vegetation communities (e.g., long-lived shrub and tree species), and
  - Desirable and undesirable volunteer plant species (species that were not in the reclamation seed mixture).

The following reclamation performance management guidelines will be used with qualitive monitoring results to prescribe and direct maintenance activities:

- Rills, gullies, or other erosion features or slope failures that have exposed development rock will be stabilized to prevent further exposure and transport of development rock;

- Scour and sedimentation of surface drainage channels and impoundments will be prevented; and
- Reclaimed areas where attainment of, or progress toward, a self-sustaining plant community structure is not evident will be addressed.

If the performance guidelines are not satisfied, appropriate maintenance activities will be implemented, examples of which are presented in Section 3.3.6.4.

3.3.6.2.2 Quantitative Monitoring

Slope Stability Monitoring

Slope stability will be monitored twice annually during the soil stability inspections (see Soil Stability Monitoring below). A geotechnical, civil or other qualified person will look for signs of slope movement, cut slope and rock face failures, and other indications of deep-set slope instability. If significant surficial cracks and fill slope bulges are observed, then their location and dimensions will be documented and potentially surveyed or instrumented with inclinometer and other similar device to monitor slope movement over time. This information will be used to determine if surface cracks are the result of differential settling of fill material, surficial sloughing or deep-set slope instability. Surficial fractures that progressively widen and elongate, or surface cracks that are located above a prominent, recently observed surface bulge, will be considered an indication of slope failure. The appropriate regulatory agency will be notified, and corrective plans will be formulated.

Soil Stability Monitoring

Soil stability will be estimated for reclaimed areas using the descriptors listed in **Table 3-14**. A soil scientist, environmental specialist or other qualified person will inspect each reclaimed area or logical portions thereof and assign one of the listed descriptors. The designations will be completed twice annually for erosion control purposes, once in the spring and once in the summer; and at years 4 and 5 following final reclamation for performance monitoring purposes. The second of these inspections will be made at the same time the quantitative vegetation monitoring is conducted (see Vegetation Monitoring below). The monitoring results will be used to aid in determining the cause of any failures which are encountered and to locate problem areas before erosion becomes widespread enough to affect reclamation success.

Table 3-14. Descriptors of Soil Surface Status

Characteristic	Class 1	Class 2	Class 3	Class 4	Class 5
Soil movement	Subsoil exposed over much of area; may have embryonic dunes and wind-scoured depressions	Soil and debris deposited against minor obstructions	Moderate movement of soil is visible and recent; slight terracing	Some movement of soil particles	No visual evidence of movement
Surface rock and/or litter	Very little remaining (use care on low-productivity sites); if present, surface rock or fragments exhibit some movement and accumulation of smaller fragments behind obstacles	Extreme movement is apparent; large and numerous deposits against obstacles; if present, surface rock or fragments exhibit some movement and accumulation of smaller fragments behind obstacles	Moderate movement is apparent, and fragments are deposited against obstacles; if present, fragments have a poorly developed distribution pattern	May show slight movement; if present, coarse fragments have a truncated appearance or spotty distribution caused by wind or water	Accumulation in place; if present, the distribution of fragments shows no movement caused by wind or water
Pedestaling	Most rocks and plants are pedestaled, and roots are exposed	Rocks and plants on pedestals are generally evident; plant roots are exposed	Small rock and plant pedestals occurring in flow patterns	Slight pedestaling in flow patterns	No visual evidence of pedestaling
Flow patterns	Flow patterns are numerous and readily noticeable; may have large barren fan deposits	Flow patterns contain silt, sand deposits, and alluvial fans	Well defined small, and few with intermittent deposits	Evidence of deposition of particles	No visual evidence of flow patterns
Rills and gullies	Rills may be present at depths of 8 to 15 cm (3 to 6 inches) and at intervals of less than 13 cm (5 inches); sharply incised gullies cover most of the area, and 50 percent are actively eroding	Rills at depths of 1 to 15 cm (0.4 to 6 inches) occur in exposed areas at intervals of 150 cm (60 inches); gullies are numerous and well developed, with active erosion along 10 to 50 percent of their lengths or a few well-developed gullies with active erosion along more than 50 percent of their length	Rills at depths less than 15 cm (6 inches) occur in exposed places at intervals of less than 300 cm (120 inches); gullies present, with active erosion along less than 10 percent of their length; some vegetation may be present	Evidence of some rills at infrequent intervals of over 300 cm (120 inches); evidence of gullies that show little bed or slope erosion; some vegetation is present on slopes	No visual evidence of rills; may be present in stable condition; vegetation on channel bed and side slopes

Source: Adapted from U.S. Department of the Interior, Bureau of Land Management 1973

Any reclaimed area larger than 100 feet by 100 feet receiving a soil surface status evaluation score of Class 3 which persists more than 1 year will be investigated. Areas receiving a score of Class 1 or 2 will receive treatment to correct the erosion at the earliest opportunity. Obvious reasons for the failure will be noted and rectified. The climatic data for the time-period involved will also be considered while evaluating the cause(s) of the soil instability.

Sediment Monitoring

In addition to monitoring of suspended solids in surface waters that will be included in the EMMP, stormwater basins, run-on diversion and surface drainage channels and sediment control structures such as silt fences and check dams, will be inspected by a water resources, civil or other qualified person. Inspectors will assess the adequacy of Project drainage systems to safely pass or retain the flow and sediments generated by spring runoff and major storm events. Project drainage systems will be inspected in accordance with weather records and snow pack conditions. Stormwater basins and major diversion and drainage channels will also be inspected following large precipitation events.

Drainage structure maintenance and sediment removal will be performed as necessary. If sediments are suitable GM, as determined through testing, they will be added to the GMSs. If sediments are unsuitable GM, then they will be disposed or treated according to test results.

Vegetation Monitoring

A vegetation reference area (or areas) will be identified that will serve as the standard of comparison to determine whether the reclaimed areas at the Project have been successfully revegetated. The vegetation reference area(s) will be adjacent to the planned surface disturbance but will not themselves be disturbed by mining activities. The reference area(s) will be representative of the undisturbed areas adjacent to the Project so that a statistically valid comparison between reclaimed and undisturbed vegetation communities can be made. The reference area(s) will generally reflect the following:

- Vegetation communities that are characteristic of the Project and its vicinity;
- Pre-disturbance conditions of the planned disturbance, excluding historical disturbance; and
- Desired post-mining land use conditions.

Revegetation performance standards for the Project are presented in the next section.

Quantitative monitoring of revegetation success will begin the year following reclamation on any one area of the Project and will continue until the vegetation success standards in any one area are met. When vegetation success standards are met in any one area, Midas Gold will submit a request to the appropriate agency requesting release of the bond covering establishment and persistence of desirable perennial vegetation on that area of reclaimed and restored Project-related disturbance.

The schedule of vegetation monitoring and bond release request will depend on the success of revegetation activities, and therefore, may vary. At the time full bond release is approved by the appropriate agency, active revegetation monitoring and maintenance of the Project, or portions thereof, will cease.

The vegetation canopy cover of revegetated area(s) and the reference area(s) will be monitored annually. All vegetation monitoring will be conducted during the period of peak vegetative production which will vary slightly from year to year depending upon climatic conditions. It is expected that most vegetation monitoring will be conducted in the month of July.

A grid will be established on each area (i.e. revegetated and reference areas). Grid spaces will be numbered. Random numbers will be generated and the starting point of transects will be located within the grid spaces corresponding to the random numbers generated. Within the selected grid space, a line transect will be established by randomly selecting a starting point and compass heading. Transect orientation on reclamation units that represent more linear disturbances (e.g., haul road, powerline corridor), will be manipulated so that the entire line transect lies within the revegetated area. The line transect will be located using hand-held GPS and clearly delineated on the revegetation monitoring maps. A photograph will be taken at the start of each line transect to document vegetation dynamics.

Vegetation canopy cover will be estimated using the line-intercept method (Canfield 1941 or an equivalent method) along 50 to 100-meter (164 to 328 feet) line transects. In smaller areas (five acres or less), or in sites with highly varied topography, shorter transects (15 to 30 m or 49 to 98 ft length) may be used. Percent canopy cover will be measured by summing the relative lengths of the transect that intercepts live foliar canopy by species, litter, rock, or bare ground. The line intercept method is described in *Sampling Vegetation Attributes, Interagency Technical Reference* (BLM, 1999).

The minimum number of samples required to meet sample adequacy within both the revegetated area(s) and reference area(s) will be calculated based on a confidence interval of 80 percent. The perennial foliar canopy cover of the reclaimed vegetation must equal or exceed the reference area(s) cover presented in the next section. The statistical test for sample adequacy that will be used for vegetation monitoring at the Project is as follows:

$$\text{Sample Adequacy } (n) = \frac{t^2 s^2}{(0.20x)^2}$$

where: n = Minimum number of samples required to meet sample adequacy;

s^2 = Sample variance;

t^2 = degrees of freedom at 80 percent confidence level; and,

x = Sample mean.

Sample sizes will be enlarged, if necessary, to ensure the minimum sample size is met.

Vegetation canopy cover data collected from the reference area and the revegetated areas will be statistically compared using the one-tailed, two-sample, t-test at a confidence interval of 80 percent. This test will be employed to determine if the perennial vegetation canopy cover of the reclaimed vegetation is equal to or exceeds the percent of the reference area(s) standards presented in the section below.

Woody shrub and tree density estimates will be based on woody species encountered within a 2-meter X 50-meter (6.6 ft X 164 feet) belt transect (Mueller-Dombois and Ellenberg [1974] or an equivalent methods) located adjacent to the line-transect described above and within revegetated areas only. Species richness and shrub and tree density data will be recorded for each belt transect. Additional pertinent information will be recorded to qualitatively assess the health of the seedlings including height, and presence of stem damage due to herbivory or frost. The minimum number of samples required to meet sample adequacy within the revegetated area(s) will be evaluated by species-area curve method (Brower and Zar 1984). Species-area curves are derived by plotting the cumulative number of species against cumulative size of the area sampled. The number of samples is considered statistically sufficient when the curve levels off. Sample sizes will be enlarged, if necessary, to ensure the minimum sample size is met.

The mean of the woody shrub and tree density data collected from the revegetated areas will be compared to the static woody shrub and tree density performance standard presented in the next section.

3.3.6.3 Reclamation Performance Standards

The proposed reclamation performance standards for the Project are presented below.

Slope Stability Performance Standard

Tailings dams and other types of impoundments will be decommissioned so that upon their abandonment they will not constitute a hazard to human or animal life. Decommissioning techniques for Project dams and impoundments shall comply with the Idaho Dam Safety Act, Sections 42-1710 through 42-1721, Idaho Code, if applicable. Emergency spillways and sediment basins shall be designed to withstand, and release storm flows as required by these same Idaho Dam Safety Act sections, where applicable.

For slope stability, the performance standard for all reclaimed areas, with the exclusion of dams and other types of impoundments governed under the Idaho Dam Safety Act, will be that no deep-set slope failures are observed for five consecutive years of monitoring or failures that are observed or stabilized by Midas Gold are predicted, through slope stability modeling to meet or exceed applicable factors of safety.

Soil Stability Performance Standard

For soil stability, the performance standard will be that no areas larger than 150 feet by 150 feet receive a soil stability descriptor of 3 or more (**Table 3-14**). A reclaimed area will be considered stabilized successfully and excluded from further soil stability monitoring when two consecutive full years of monitoring have met this performance standard.

Sediment Performance Standard

Standards for the content of suspended solids in surface water affected by the Project will be included in the EMMP. These standards will constitute the Project sediment performance standard.

Vegetation Performance Standards

The revegetation performance standards for the Project will be to achieve:

- 70 percent of the perennial plant canopy cover of the recommended reference area(s) for two consecutive growing seasons in areas planted to herbaceous species only; and
- 50 percent the perennial plant canopy cover of the recommended reference area(s) for two consecutive growing seasons and an average of six hundred (600) woody plants per acre in areas planted to a mixture of herbaceous and woody species.

3.3.6.4 Reclamation Maintenance Activities

Following completion of reclamation activities in any one area, maintenance activities will occur if necessary to satisfy the qualitative performance guidelines or quantitative reclamation performance standards discussed above. Examples of maintenance activities are as follows:

- 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 or tailings;
- Noxious weed and invasive plant species control; and
- Re-seeding or re-applying reclamation treatments will occur in areas where it is determined through monitoring and agency consultation that reclamation will unequivocally not meet reclamation standards without reapplication/reseeding.

Midas Gold anticipates that bond release criteria would be applied to the quantitative data collected in the fourth and fifth years following reclamation; however, this may vary based the site conditions being monitored (e.g. slope stability) and on the specific agreements made between IDL, USFS, and Midas Gold and the reclamation data collected during reclamation monitoring.

3.3.6.5 Annual Reclamation Report

Starting the first year of concurrent or final reclamation, Midas Gold will submit an annual reclamation report to USFS and IDL for the preceding calendar year. The annual reclamation report will contain descriptions of the reclamation activities completed during the previous year. The annual report will also include a summary of areas reclaimed and a discussion of the general vegetation performance, slope and soil stability status, dam safety inspection reports (if they occur during the monitoring year), reference to or reporting of suspended sediment content of surface waters affected by the Project contained in water quality monitoring reports and corrective actions completed and/or proposed.

3.4 Stormwater Management

Stormwater and other environmental management measures will be important and essential components of construction, concurrent and final reclamation activities. A primary objective of stormwater management at the Project site during closure will be to segregate clean stormwater runoff from stormwater that has encountered development rock, tailings, and disturbed areas undergoing reclamation. Reclamation designs are focused on diverting clean “non-contact” stormwater around the mine features and releasing it into the stream system, while collecting runoff from disturbed areas and routing it through ponds or other BMPs to control sediment. Stormwater that has encountered mine facilities such as the TSF, DRSFs, and pits is considered contact water and will be captured and used in mining and ore processing activities as makeup water for the ore processing circuit or dust control. Contact water that cannot be used may be treated, if necessary, to meet NPDES permit limits and discharged, or disposed of through forced evaporation. Section 4 describes final closure designs for the TSF, Hangar Flats DRSF, Fiddle DRSF, Yellow Pine pit DRSF, and West End DRSF facilities, which include diversion channel and sediment pond designs to manage post-closure stormwater. As this RCP is not intended to be a water management plan, Midas Gold is developing and will provide a sitewide water management plan under separate cover, which will provide additional details for the overall Project area beyond that presented here. A storm water pollution prevention plan will also be developed for the SGP prior to initiation of construction activities.

3.5 Invasive Plant and Noxious Weed Control

Previous studies conducted at the Project area have identified the primary noxious weeds present on the site to be Canada thistle (*Cirsium arvense*), rush skeletonweed (*Chondrilla juncea*), spotted knapweed (*Centaurea maculosa*) and yellow toadflax (*Linaria vulgaris*). To minimize the presence of invasive plants and noxious weeds at the Project area, Midas Gold implemented a Weed Management Plan (Plan) in 2015 (Midas Gold 2015) that focuses on prevention and control of the spread of noxious weeds and invasive plants during and following construction, operation and reclamation activities. The Plan will be updated prior to construction to address the construction activities, new disturbances, vehicles entering the Project area, reclamation activities, and other operations. Midas Gold and its contractors will be responsible for carrying out the methods described in the Plan. The Plan will implement preventative measures to keep the Project area free of species that are not yet established onsite, but which are known to be present in adjacent counties. It includes a listing of state-designated noxious weeds and the 42 noxious weeds that can be found in and around Valley County. The Plan sets priorities for the control or elimination of weeds that have already become established on the Project site, according to their actual and potential impacts on native species and communities. The focus of the Plan is to prevent the spread of new populations resulting from project activities and to reduce and eliminate existing identified populations in the project area.

The updated Plan will include measures that will be implemented to prevent the spread of noxious/invasive plants during construction, operation, and closure activities. These include the following general measures (additional details can be found in the current Plan):

- Prior to construction, Midas Gold and its contractors will be trained on methods for cleaning equipment, identifying problem plant species in the Project area, and procedures to follow when an invasive or noxious weed is located.
- Prior to the mobilization of equipment onto the Project site, all equipment will be cleaned and inspected.
- Prior to construction disturbance, all known weed populations in the specific disturbance area will be flagged so that they may be avoided.
- Equipment, materials, and vehicles will be stored at specified work areas or construction yards.
- Disturbed areas that are identified in this report for either concurrent or final reclamation will be seeded following completion of activities to reduce the potential for the spread and establishment of noxious weeds and invasive plants. Pit highwalls, roads, and other features that will not ultimately be reclaimed will not be seeded. Seeding will occur as specified in Section 3.3.5 and only seed mixtures described in **Tables 3-12** and **3-13** will be used.
- Certified weed-free seed will be used. All other introduced vegetative construction materials used for the Project, such as straw, mulch, etc., shall also be certified weed-free.

When the Plan has been applied to the Project area, it will be updated to include all the mine development activities, the Landmark facilities, and the transmission line right-of-way from the Johnson Creek Substation to the mine site. IPCo will continue to have weed management responsibilities during and after construction of the upgrade of the transmission line from Lake Fork Substation to Johnson Creek Substation. Midas Gold will coordinate and consult with Valley County and USFS personnel regarding all noxious weed control activities to ensure compatibility with existing weed control protocol.

When herbicides are used in the Project area, their use will be in accordance with the South Fork Salmon River Sub-Basin Noxious and Invasive Weed Management Program (USFS 2010). Specific measures for mixing, loading, and disposal of herbicides as well as response to any spills are described in the Plan.

Midas Gold will survey all known noxious weeds/invasive plants (for avoidance and treatment) prior to any new construction and on an annual basis to prevent the spread of existing populations found in the designated weed control areas. Following the identification of existing populations of noxious weeds/invasive plants, annual spraying will continue, likely during the months of June and July; however, the potential for fall treatment does exist for some species. Annual spraying will continue as necessary to control identified noxious weeds/invasive plants in the Project area for the life of the Project.

During the winter of each year, Midas Gold will prepare and submit a status report to the USFS, IDL, and Valley County Weed Department regarding that year’s weed control activities. The report will detail the occurrence, distribution, and abundance of listed species observed during the previous year in the Project area, weed control activities accomplished during the previous year, and expected activities for the following year. The report will include timing of surveys, herbicide treatments, amount and types of chemical applied, and a list of participants and their activities. These reports will continue annually for the life of the Project.

3.6 Post-Mining Land Use and Public Access

PMLU for the SGP will be for wildlife and fisheries habitat and dispersed recreation, the latter of which is significantly influenced by where public access routes are created post-closure on USFS property. Midas Gold does not anticipate facilitating public access on its private property.

The RCP and WHMP describe the wildlife habitat components and the Stream Design Report describes the fisheries and aquatic life habitat component. In an effort to minimize potential future impacts to fish and wildlife no public access roads or trails have been planned to access specific mine related features such as pit lakes. The recreation component of the PMLU is multi-faceted and includes the following:

- Hiking and camping: No restrictions will be placed on the public lands to restrict hiking and backpack camping/walk-in camping. However, no access roads/trails will be constructed for OHV or standard vehicle access to site features such as Hangar Flats pit Lake. Similarly, no restrictions will be placed on the site to prevent horseback access for camping.
- Hunting/Fishing: No restrictions will be placed on the public lands to restrict hunting or fishing activities. However, no access roads/trails will be constructed for hunting/fishing access. Walk-in or horseback in hunting and fishing will not be restricted. The main connector road does parallel the EFSFSR in many areas which would provide access for anglers.
- Wildlife/Bird Viewing: No restrictions will be placed on the public lands to restrict wildlife or bird viewing. However, no access roads/trails will be constructed for wildlife or bird viewing access. Walk-in or horseback wildlife or bird viewing will not be restricted.
- OHV/OSV Use: The main connection road mentioned above will allow public passage through the site for OHV in summer months and OSV in winter months. No spur roads or trails for OHV or OSV will be constructed off the main connection road. The intent is to provide OHV and OSV recreation access to the existing Thunder Mountain road/trail system.

Public Access

Midas Gold plans to reconnect the Stibnite Road to the Thunder Mountain Road through the project site post mining (**Figure 3-9**). This will allow public access through the site to connect to other existing roads for recreational use. This road may cross private land but is not explicitly designed to access private or public lands. Rather the intent is to connect existing travel ways through the project site. Midas Gold does not plan to create any spur roads or trails off this connector road to the Hangar Flats pit lake or other mine features. Midas Gold does not plan to plow snow from this connector road during winter months following bond release. Midas Gold will use this connector road to access mine site features for required monitoring and water treatment (if required). A semblance of this connector road is shown in Section 4 where it crosses the backfilled Yellow Pine pit.

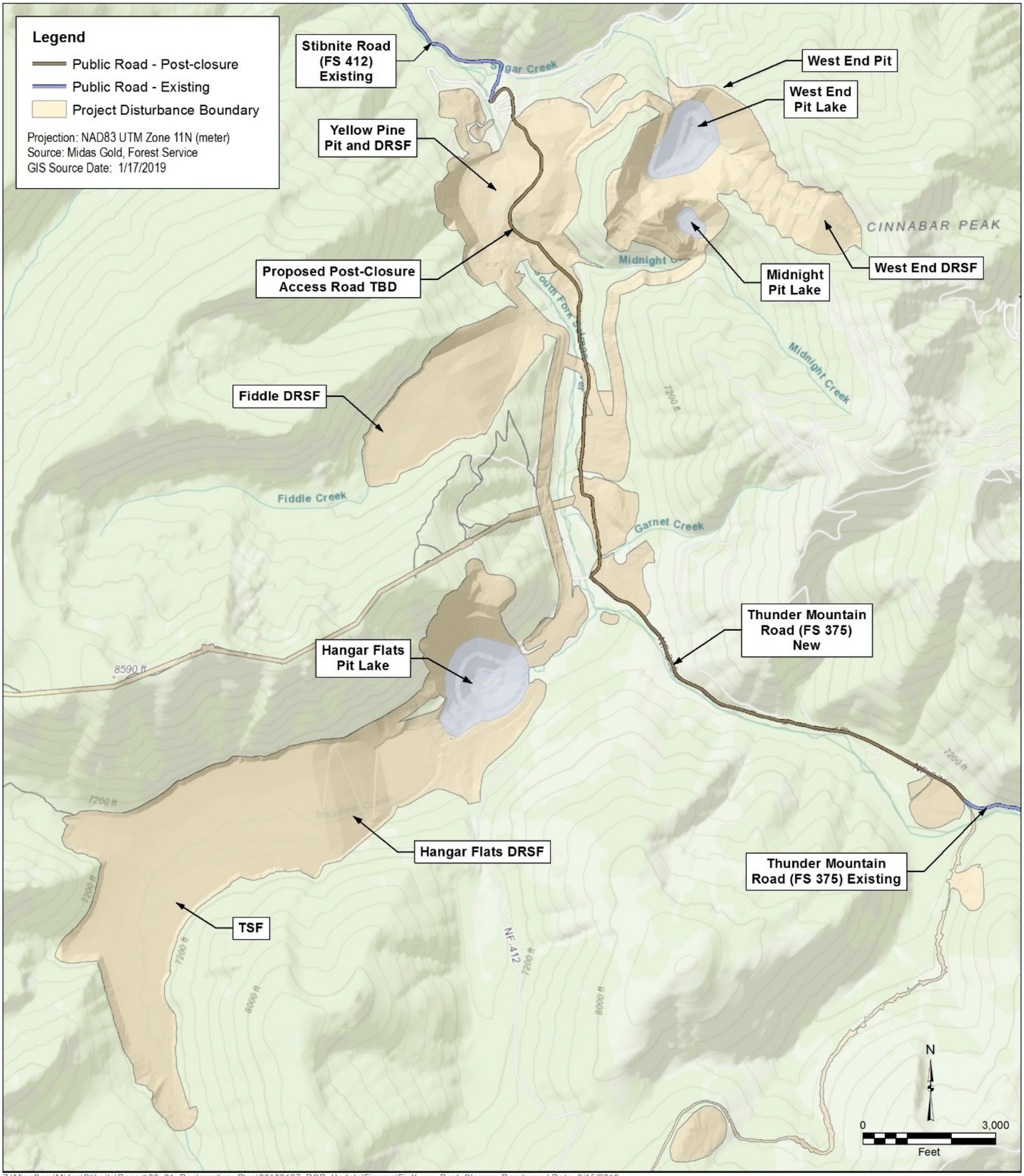

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Figure 3-9. Post closure public access road

Section 4

Specific Closure and Reclamation Practices

Specific closure and reclamation practices are discussed in this section for the site activities and facilities listed below:

- Surface exploration;
- Underground exploration, including adits and raises;
- TSF;
- Hangar Flats DRSF;
- Hangar Flats Pit;
- Yellow Pine Pit;
- Partially Backfilled Yellow Pine Pit (i.e. Yellow Pine DRSF);
- Fiddle DRSF;
- West End Pit;
- West End DRSF;
- Burntlog Route (primary mine access road);
- Plant Site (which includes Primary Crusher Area, Mill Area, Admin Area, Truck shop and other related facilities;
- Worker Housing Facility;
- Communication Facilities;
- Haul roads, internal site access roads, and ancillary facilities;
- Substation, switchgear, and electric transmission line; and
- Water and sediment retention structures.

4.1 Exploration-Related Sites

Midas Gold will implement the steps described in the following sections for reclamation and closure of exploration drill holes, drill pad sites, and exploration roads accessing drill pad sites. The scope of proposed exploration activities is outlined in Chapter 13 of the PRO. The approach conforms with past exploration at the site and standard industry practice.

4.1.1 Exploration Drill Hole Plugging

As part of the abandonment routine for exploration drilling operations, Midas Gold will continue to follow IDAPA 20.03.02.060.06 (c) rules relative to plugging drill holes per past exploration projects at the Site. This will entail, at the time of drill hole completion, using drill cuttings, concrete, cement grout, or bentonite grout from the bottom of the hole to within 3 feet of the ground surface. The concrete or grout will be pumped into the drill hole “bottom upward” via a tremie pipe to ensure the entire boring is filled with grout.

Native materials and/or a bentonite plug will be placed from the top of the aforementioned plugging to within a few feet of the ground surface. A concrete cap will be set at approximately 3 inches below the ground surface, and a steel chain, cap, or other monument, will be set in the concrete for future location and surveying purposes and to eliminate a post-exploration danger to people and wildlife that might be traversing the area. Plugging and capping will eliminate the potential for water transmission along the length of drill holes and eliminate potential transfer between aquifers, if any.

4.1.2 Removal of Structures and Exploration Gear

At the completion of drilling at a site, Midas Gold will remove any wood platforms (in the case of helicopter drill pads) and any tankage, drill steel, and exploration gear from the site. Most of these items will be reused on another drill site.

4.1.3 Recontouring and Regrading of Drill Pad Sites and Access Roads

As necessary, and unless the site will be consumed by planned future mining, Midas Gold will follow reclamation practices conducted on previous exploration drill pads and access roads, which are summarized in the Golden Meadows Exploration Environmental Assessment (USFS, 2015). Reclamation methods will be selected based on site-specific conditions (e.g., slopes, soil type, aspect, etc.), but will generally include the following:

- Contouring and grading to blend disturbance into the surrounding topography;
- Scarifying compacted surfaces to reduce compaction;
- Roughening ground surface prior to fertilizer application; and
- Applying fertilizer, seed, and mulch.

Contouring and grading work will involve the retention of water-bars and/or re-establishment of ephemeral surface water channels through the area. If sumps are present, they will be filled with original material or drill cuttings and reclaimed as described immediately above. The seed mixture will be per **Tables 3-12** and **3-13**. Following seeding, straw or wood straw will be applied to the ground surface and lodgepole pine or other conifer seedlings will be planted if the areas disturbed by exploration activities were previously forested. Available slash and logs will be randomly distributed on the reclaimed drill pad after seeding and mulching. Whenever practical, the timing will follow the schedule presented in Section 6.

On drill pads that are only accessible by helicopter, the reclamation activities described immediately above will be completed by hand or the smallest effective piece of equipment available.

Following establishment of seeded species and reduction in the amount of sediment transported from drill pads and access roads, the silt fence and construction fence will be removed.

4.2 Underground Exploration and Tunnel

Midas Gold will decommission and close underground exploration facilities and underground support facilities, including the portals of the EFSFSR Tunnel and Scout decline with the objective of abating public safety hazards, protecting wildlife, and avoiding groundwater contamination. Details regarding underground exploration activities and the construction and operational aspects of the EFSFSR Tunnel are discussed in Chapter 13 of the PRO (Midas Gold 2016). The locations of these features are shown on **Figures 3-1** and **3-2**.

For closure of underground facilities, work generally will start at the lowest active point underground and proceed up to the surface. Removal of underground facilities and equipment will consist of the following steps:

- Underground piping, pumps, tanks, and pumping equipment will be removed and salvaged, or disposed of in an approved waste disposal facility;
- Piping that cannot be salvaged for reuse will be dismantled as required for backfill placement and left underground;
- Fans, motors, pumps, compressors, power supply, electrical distribution equipment, ventilation curtains and ducts, and other equipment will be removed, as practicable, and salvaged for use at another facility or disposed of in an approved waste disposal facility; and
- Remaining fuel, lubricants, and explosives will be removed from the underground workings and transported to other sites for use or disposed of according to federal and state standards and regulations.

To prevent future access to underground workings, the underground portals (i.e., EFSFSR Tunnel and Scout decline) will be closed and sealed upon permanent cessation of mining operations through construction of a steel and concrete bulkhead inside each of the portals per IDAPA 20.03.02. The bulkheads will not be watertight. Concrete blocks will be used to construct the bulkheads to prevent access to tunnels. The bulkheads will be installed at a minimum where the distance to the ground surface is three times the height of the tunnel (**Figure 4-1**). No backfill will be placed inside the tunnels, except to fill the portals.

During closure, the only source of water to the EFSFSR tunnel will be groundwater, since surface water will be redirected back into the reclaimed EFSFSR channel. Any groundwater that enters the tunnel will flow downhill and exit the lower end of the tunnel and report to the EFSFSR.

Groundwater evaluations of the EFSFSR Tunnel area in the Stibnite Gold Project Water Resources Summary Report (Brown and Caldwell, 2017) suggest that groundwater flow is generally perpendicular to the tunnel toward the EFSFSR and the tunnel is upgradient from the main mineralized zones in the Yellow Pine deposit (Brown and Caldwell, 2018). Therefore, the mineralized ore body will not affect groundwater intercepted by the tunnel, although the tunnel may intercept some mineralized zones. It should also be noted that groundwater flow through the unconsolidated sediments above the bedrock is the primary groundwater pathway in the area rather than groundwater in the lower specific yield bedrock in which the tunnel will be completed. Estimates of potential water inflows into the EFSFSR Tunnel are as high as 350 gallons per minute during construction (conservative estimate used for estimating tunnel construction costs), however, flows during operation and post-closure are anticipated to be much lower and grouting efforts at fractures and shear zones will also reduce the quantity of groundwater that flows into the tunnel. Mineralized and disturbed areas that might be sources of metals and other contaminants in groundwater are more limited upgradient of the EFSFSR Tunnel (Brown and Caldwell, 2017), hence, high contaminant concentrations are not anticipated in the tunnel. Grouting will also limit the amount of groundwater flow entering the (and exiting) the EFSFSR Tunnel, which will limit the potential for impacts to surface water downgradient of the tunnel. The predicted quantity and quality of water flowing out of the EFSFSR tunnel during operation and post-closure will be refined as part of the Site Wide Water Management Plan. The EMMP will identify the location and frequency of water quantity and quality monitoring to be conducted in the tunnel both during operations and after closure. Trigger points and contingencies will also be identified to address water quality issues.

The portal areas will be backfilled with development rock material. The actual length of backfill will be determined based on conditions observed at each portal, however, it is expected to extend from the portal bulkhead to outside the actual portal (**Figure 4-1**). A permanent informational plaque will be erected at the portal to identify the site, where appropriate.

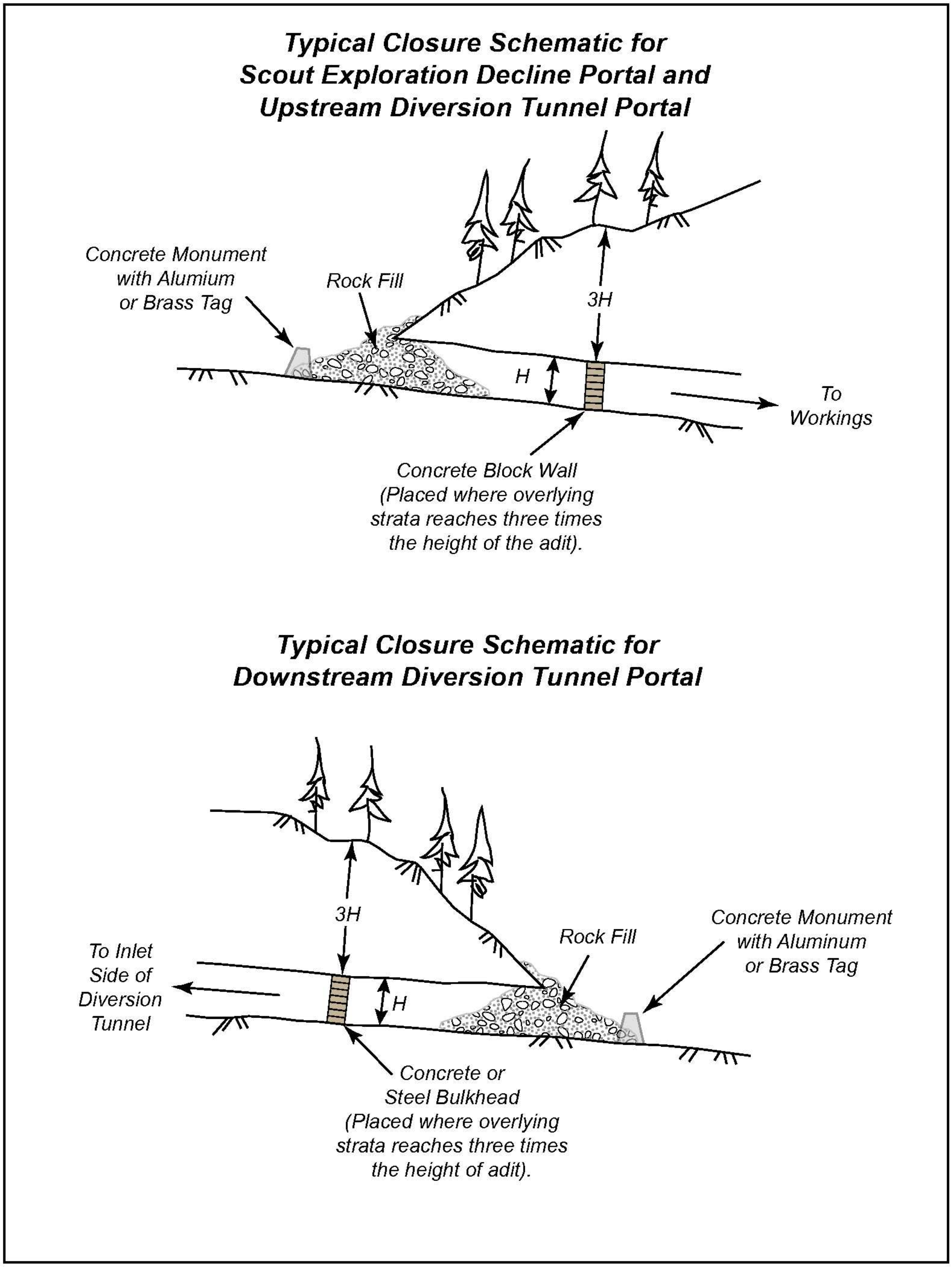


Figure 4-1. Portal and tunnel closure plan

The Scout decline will be advanced mainly through unmineralized rock along a fault trace. Post-closure flooding of the decline will be rapid, which will minimize the potential for oxidation and constituent mobilization. Furthermore, groundwater levels will stabilize below the outlet of the decline, meaning there will be no groundwater discharge from the portal (Brown and Caldwell, 2018). The Scout escape-ventilation raise will be closed and sealed with an engineered concrete plug, consisting of a reinforced concrete slab placed on firm ground over the opening and anchored into solid bedrock (see **Figure 4-2**). This concrete plug structure will be constructed as follows:

- A structure of I-beams will be placed over the opening,
- Steel plating will be welded to the framework,
- A concrete plug will be poured on top of the steel plate and reinforced with rebar, and
- Several feet of rock fill will be placed on top of the concrete. An additional 10 to 15 percent volume of material will be placed to allow for probable future settlement. This rock material will then be graded to provide for drainage away from the covered opening.

The site will then be reclaimed using methods similar to those described above for drill pads. It should be noted that most of the support facilities will be located within the Admin area disturbances.

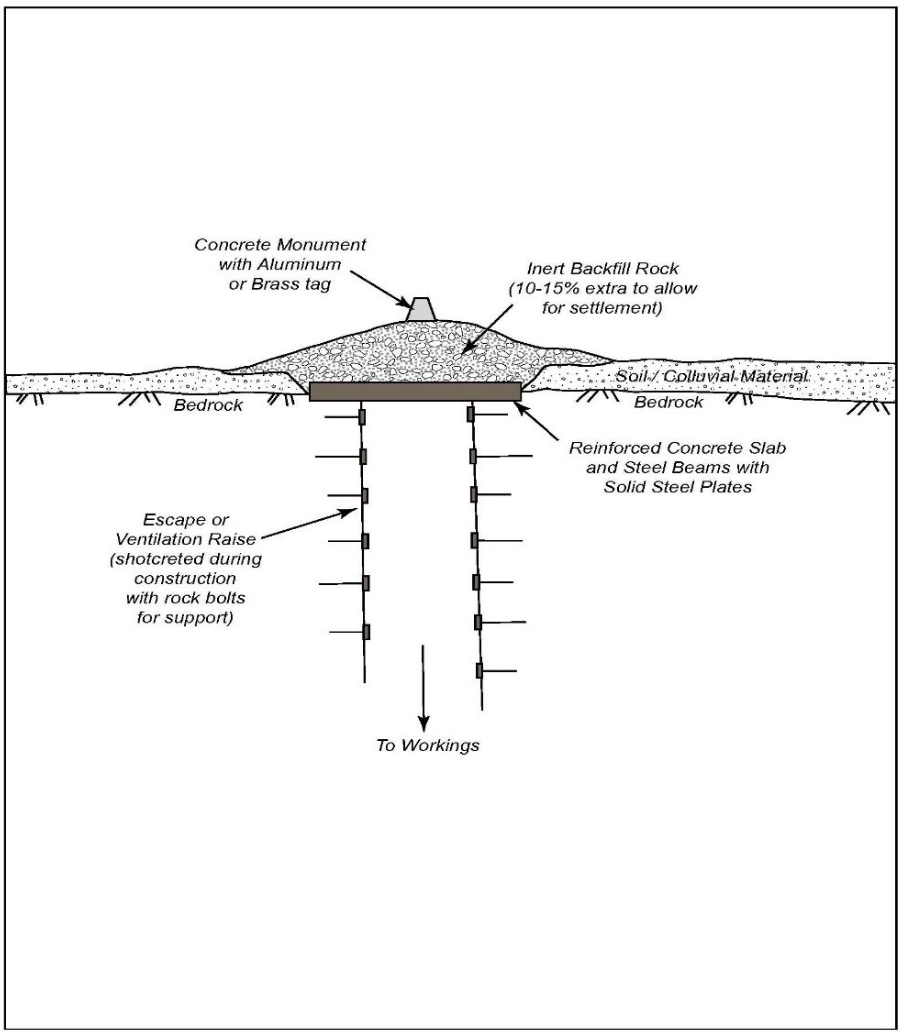


Figure 4-2. Raise closure plan

4.3 Tailing Storage Facility

Following cessation of ore processing operations, Midas Gold will initiate dewatering, closure, and reclamation of the TSF. The primary TSF closure objectives are as follows:

- Ensure short- and long-term geotechnical stability,
- Prevent impacts to the surface and groundwater hydrology of the site,
- Establish a no/low-maintenance post-closure condition,
- Restore wetland and fish habitat along wetland/stream corridors on the surface of the TSF, and
- Reclaim the surface of the TSF outside of the stream corridors and associated floodplain.

The proposed plan for reclamation and closure of the TSF will consist of several steps:

- During the later period of operations, deposit tailings on the TSF to generally create positive drainage towards the center of the TSF and down-valley when ore processing is complete.
- Eliminate the TSF supernatant pool (see Section 4.3.1).
- Control tailings erosion by placing at least 2 feet of non-potentially acid generating and metals leaching (non-PAG/ML) development rock from the Hangar Flats DRSF on the tailings surface when sufficient dewatering and consolidation of the tailings has occurred (at least 5 years following cessation of ore processing) to permit equipment access. Characteristics of development rock that will be placed in the Hangar Flats DRSF is provided in the SGP Proposed Action Site Wide Water Chemistry Report Modeling Report (SRK, 2018). Ongoing geochemical testing will occur during mine operations and adaptive management strategies will be used to identify differences in development rock characteristics that may warrant modification of how development rock is handled.
- Place additional non-PAG/ML development rock from the Hangar Flats DRSF on the TSF where consolidation is greatest to bring the surface up to the elevation and grades necessary to achieve positive down-valley drainage and restore Meadow Creek across the top of TSF (i.e., MC1 wetland and channel reach).
- Place liner and engineered fill materials to create stream/floodplain corridors to convey Meadow Creek and its tributaries and reestablish fish habitat and wetland characteristics. Details of these designs are presented in the CMP, Appendix D, Sheets 16, 21, 26, 32, 37, 128, 137 & 138 (Midas Gold, 2019).
- Place 6 inches of GM and SBM within the reestablished floodplains of Meadow Creek and its tributaries.
- Place 12 inches of GM in “upland” areas of the TSF outside of Meadow Creek floodplain.
- Seed and plant “upland” areas of the TSF with the seeding and planting mixtures presented in **Tables 3-12** and **3-13**.
- Construct valley margin wetlands in some “upland” areas of the TSF as described in the CMP Appendix D, Sheets 3 & 138 (Midas Gold 2018).

The general location of the restored Meadow Creek floodplain is shown on **Figure 4-3,** and a grading plan and cross-section of the final TSF surface is shown on **Figure 4-4**.

As shown on the sitewide planting prescription map (**Figures 3-5, 3-6,** and **3-7**), seeding of TSF upland areas will entail the “Cool Aspect” and “General” seed mixtures as well as the wetlands mitigation seeding, and plantings identified in the CMP (Midas Gold, 2019, Section 9.4.2). These revegetation plans are designed to establish self-sustaining perennial plant communities on the surface of the TSF that limit erosion by limiting surface runoff and velocities and create a variety of fisheries and wildlife habitats.

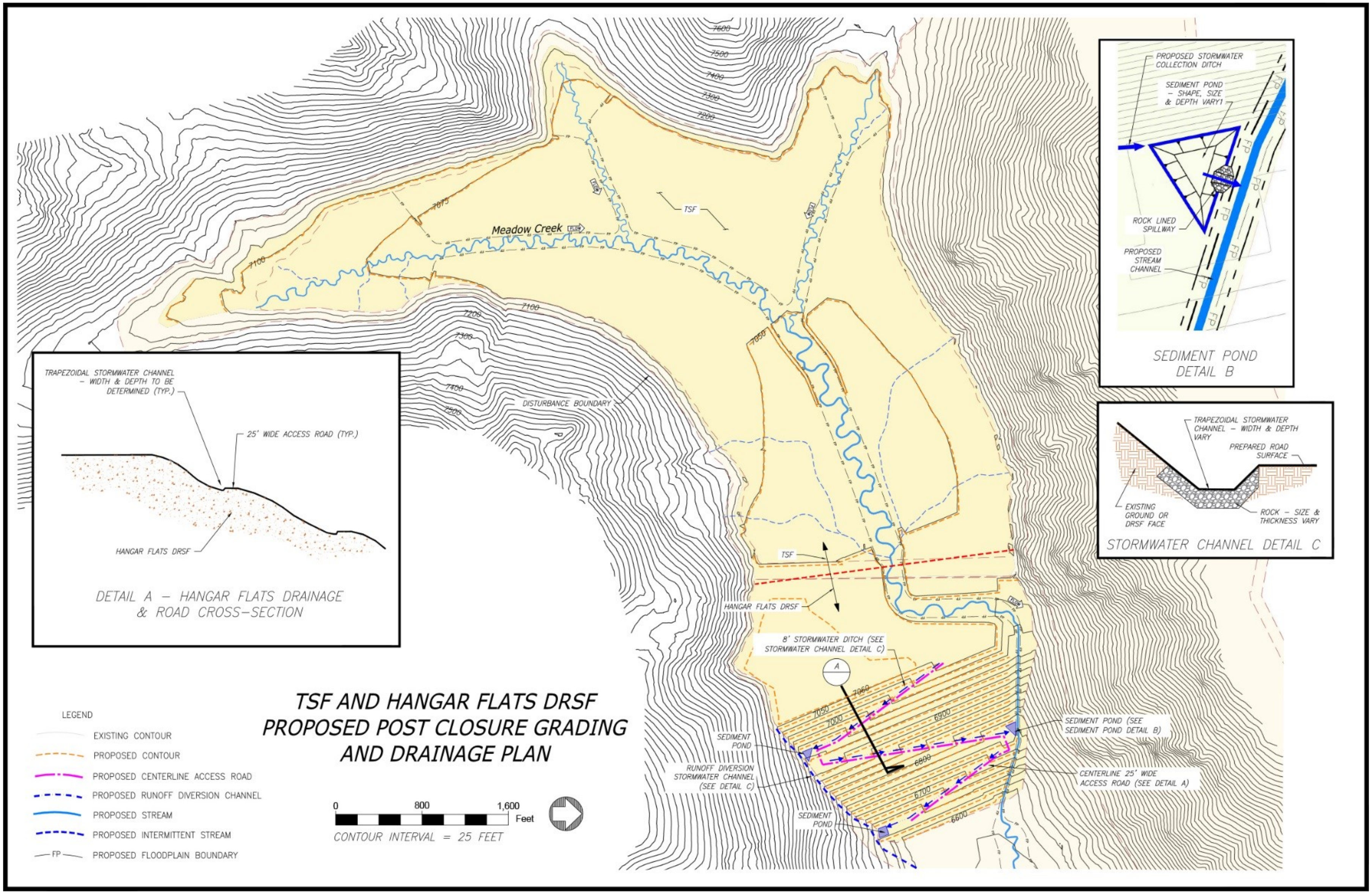


Figure 4-3. TSF and Hangar Flats DRSF grading plan

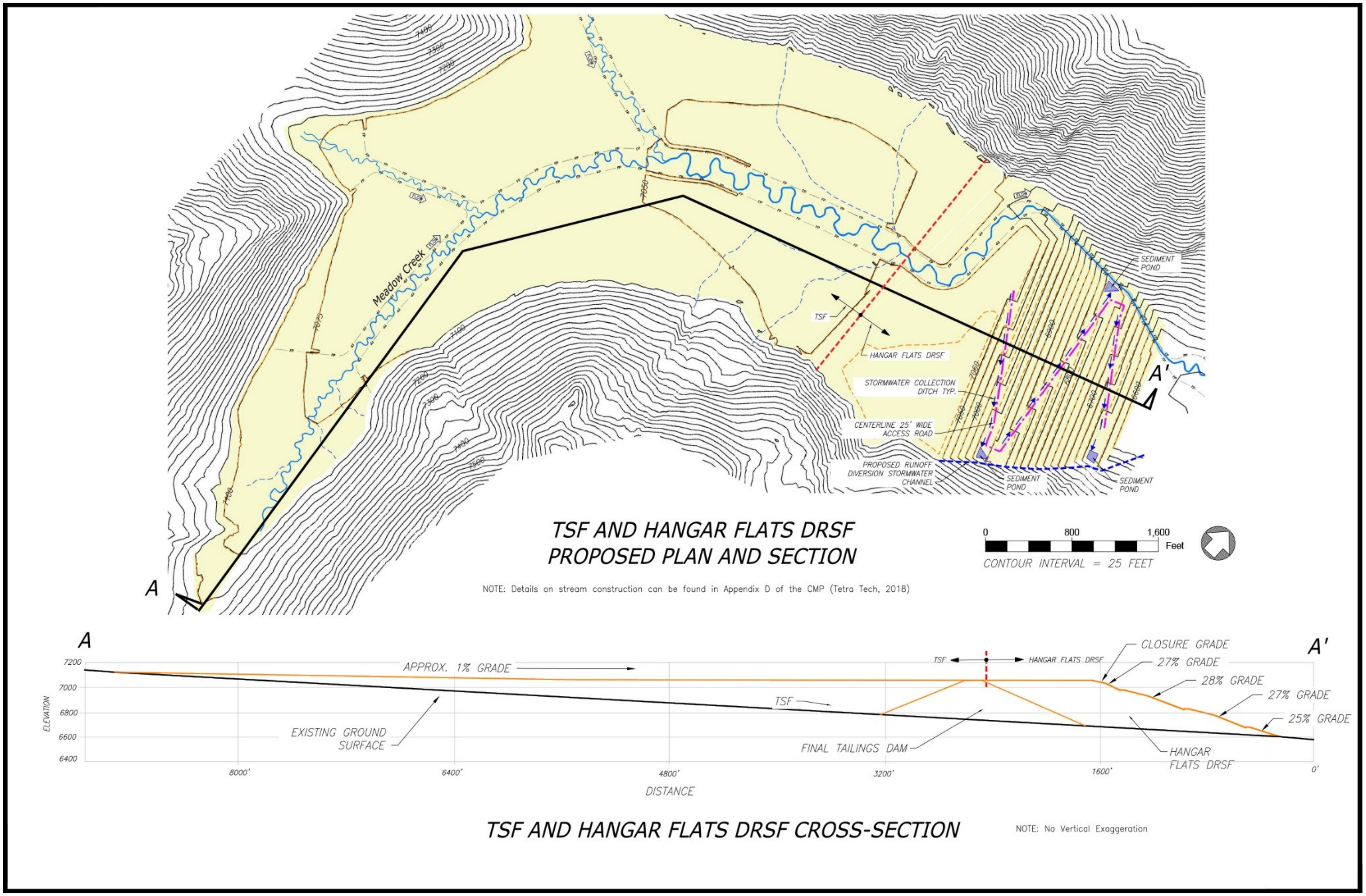


Figure 4-4. TSF and Hangar Flats DRSF plan and section

4.3.1 Elimination of Water from TSF Supernatant Pool

Midas Gold will begin to minimize the amount of excess water within the TSF supernatant pool during the last year of operations so that minimal water remains when the final tailings are pumped into the TSF. At or near the end of the operational phase of active tailings placement, Midas Gold will conduct a tailing consolidation analysis to better understand the rate and magnitude of tailings dewatering and consolidation and predict final tailings densities. Midas Gold can then adjust the grading plan for the top of the tailings and the material placed as the first lift to account for expected or observed settlement as the facility is dewatered and the tailings consolidate. Current estimates indicate it will take 5 years for the tailings to dewater and consolidate sufficiently to allow access of equipment to the tailings surface for placement of the rock cover material, reconstruction of MC1 wetland and channel reach, and placement of GM and SBM on upland and wetland areas of the TSF.

Following the cessation of ore processing, Midas Gold will implement an enhanced evaporation program to eliminate the supernatant pool. This program will include spray evaporators (snowmaking misters but operating in warmer temperatures) or other similar evaporation systems to eliminate the remaining supernatant. During operations, evaporators will be located on the dam crest and perimeter benches. At closure, evaporators may be moved to interior locations (i.e., on top of tailings) as the ability to drive on the tailings allows. Specific locations will not be defined until later in the design process. Midas Gold may treat and discharge water from the supernatant pool to prepare for final TSF closure and reclamation in compliance with discharge limits under the Project's NPDES permit. Removal of supernatant from the TSF will allow the surficial layers of the tailings to dry and gain strength, which will, in turn, allow equipment to operate on the tailings surface for the placement of the rock and GM cover discussed in Section 4.3.

4.3.2 Post-Closure Tailings Cover System

As designed, the rock and GM/SBM cover system placed on the tailings surface (described previously) should achieve the goals and objectives as follows:

- Reduce infiltration of precipitation and runoff into a portion of the tailings underlying the constructed Meadow Creek floodplain and stream;
- Limit wind and water erosion and transport of tailing material through armoring the TSF surface with 2 feet of development rock;
- Promote upland and wetland vegetation establishment and growth by placing adequate thickness of suitable GM and SBM on the TSF surface following rock and cover system placement; and
- Provide for stream habitat restoration through appropriate design and construction of stream channels and adjacent floodplains, stream meanders, and pools and riffle features with appropriately sized and thick armoring and stream bed materials.

Details of the location and dimensions of the cover system and its interaction with the reconstructed stream, floodplain, and wetlands are described in the CMP. The SGP Proposed Action Site Wide Water Chemistry Modeling Report (SRK, 2018) provides the current analysis of the TSF water balance, including that the proposed cover material does not indicate the potential to create water quality problems. Piezometers will be installed in the upland portions of the TSF to the contact between the development rock cover and the underlying tailings to monitor water levels within the TSF cover system and the potential for saturated conditions to impact revegetation success

Midas Gold will obtain the rock material for the TSF cover from the adjacent Hangar Flats DRSF and the GM from the Hangar Flats area GMSs. Reclamation of the TSF and restoration of Meadow Creek across the TSF is anticipated to occur following cessation of mining activities in Project Year 18 with reclamation of the TSF and Hangar Flats DRSF run-on diversion in Project Year 18. The thickness and volume of GM to be applied to upland portions of the TSF are 12 inches and approximately 552,000 BCY, respectively. This volume of GM assumes that the run-on diversion around the TSF and Hangar Flats DRSF will be covered with 6 inches of GM. The thickness and volume of GM and SBM applied to MC1 and MC3 wetland and channel reach (**Figure 3-3**) is 6 and 6 inches and approximately 64,000 and 64,000 BCY, respectively.

4.3.3 Post-Closure Surface Water Management Plan for TSF & Hangar Flats DRSF

Midas Gold will implement the post-closure surface water management system for the TSF and adjoining, down-gradient Hangar Flats DRSF once these facilities are graded, cover systems are installed, stream channels are constructed and GM/SBM is placed. This management system will include reconnection of the up-drainage stream segments in the Meadow Creek watershed (those that were diverted during operations to direct water from these up-gradient streams around the TSF and the Hangar Flats DRSF) to the down-gradient segment of Meadow Creek. Details of this design and channel capacities are presented in the Stream Design Report (Rio ASE, 2018). General locations of these restored stream channels are shown on **Figures 4-3** and **4-4**.

By constructing defined channels across the surface of the closed TSF and Hangar Flats DRSF, stream restoration can be completed allowing Midas Gold to eliminate and reclaim most of the diversion channels used to divert non-contact runoff around the TSF and the Hangar Flats DRSF during operations. A portion of the diversion channel shown on Figure 4-4 will remain post-closure along the southeast edge of the Hangar Flats DRSF to intercept overland flow from the adjacent hillside and to carry discharge from the sediment ponds that receive runoff from the DRSF access road.

The upland areas outside of the newly created floodplain will provide overland flow that is generally toward the reconstructed Meadow Creek channel, as discussed previously. It may be necessary to import fill in some portions of the TSF since dewatering and differential consolidation of tailings is expected to create low areas that will need to be brought up to grade with the rest of the TSF. The CMP calls for creation of swales and/or stream channels across the surface of the TSF, to re-establish previously existing ephemeral streams (**Figure 4-3**). Some overland flow across the top of the TSF uplands will likely enter the ephemeral stream channels, while the majority of the flow will go to the berm segregating the Meadow Creek floodplain from the TSF uplands. This water may pond periodically or seasonally along the outer edge of the berm. This ponded water will either infiltrate into the TSF, overflow the berms into Meadow Creek, evaporate or move down valley toward the TSF embankment/Hangar Flats DRSF. The berms isolate the floodplain from the uplands across most of the TSF; however, the berms will be terminated before they reach the Hangar Flats DRSF, thereby allowing overland flow from the uplands to enter Meadow Creek. The top of the DRSF will always be above the tailings, particularly after consolidation; thus the DRSF will funnel any overland flow on the TSF toward the Meadow Creek channel. The updated PA SWWC report provides the current analysis of the TSF water balance.

While the TSF cover system will reduce infiltration of precipitation into the tailings through evapotranspiration to a limited degree, the function of the TSF cover systems is primarily to:

- Limit wind and water erosion and transport of tailings material; and
- To bring the surface of the TSF up to the elevation and grades necessary to achieve positive down-valley drainage and restore Meadow Creek across the top of TSF.

As a result of the low permeability of the tailings relative to the overlying cover system, net-positive annual meteoric water balance, and run-on from upgradient areas adjacent to the TSF, the cover system is expected to saturate to the GM/SBM surface during the first spring runoff period following cover system construction. In subsequent years water levels in the cover materials will decline to a level within the cover materials.

4.4 Hangar Flats Development Rock Storage Facility

Development rock removal and storage are an integral and necessary part of the mining operation, and development rock will be moved throughout the life of the Project. A substantial amount of development rock removed from Project mining operations will be placed in the Hangar Flats DRSF, which will also serve as a buttress to the TSF, greatly increasing its factor of safety. Development rock placed in the Hangar Flats DRSF will be tested periodically and according to lithology as it is removed from the Hangar Flats pit to allow adaptive management procedures to identify if any changes are needed in placement of development rock. Non-PAG/ML development rock will be placed within 3 ft of the surface of the DRSFs, to provide suitable root zone material.

Midas Gold will construct the Hangar Flats DRSF in a series of lifts where the haul trucks will "end-dump" the material horizontally across the disposal area. The out-slopes of these individual lifts will be maintained at the angle of repose, which is defined as the steepest slope that development rock will conform to naturally. For the development rock encountered during the Project, Midas Gold is estimating the angle of repose to average approximately 35 degrees (Midas Gold 2016).

As part of concurrent and permanent reclamation work, Midas Gold will take steps to limit excessive migration of fines from GM into underlying development rock (if necessary) by placing finer grained development rock on the top surface of the DRSF. Midas Gold will reshape the DRSF out-slopes by grading with bulldozers. The goal for final overall out-slopes of the Hangar Flats DRSF will be 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. This will be accomplished by reducing the width of the haul road on the outslopes to about 25 feet (from approximately 120 feet) and providing a drainage channel along the inside of the reduced road. This will allow slopes between road switchbacks to be recontoured by pushing material downward and flattening slopes. Midas Gold envisions creating a complex slope between road switchbacks wherein the upper slope is convex and somewhat steeper, and the lower slope is concave and less steep with overall slopes of 3.7H:1V and interslopes between road benches ranging from some short slopes as steep as 3.5H:1V along the central ridge but typically 3.7H:1V or flatter, particularly along the outer edges. Drainage will be maintained through a series of excavated channels on the uphill side of each road segment. These channels will collect runoff from slopes between roads and direct them either to the north toward the restored Meadow Creek channel or to the south toward the diversion channel created during operations. Before discharging to either channel, the roadside channels will flow through small sediment ponds. **Figure 4-3** shows the proposed final closure surface for the Hangar Flats DRSF, and **Figure 4-4** shows the final grading plan and cross-section. Midas Gold will re-establish a lined channel and floodplain corridor for Meadow Creek across the top of the reshaped DRSF, similar to that discussed for the TSF, but at a gradient of approximately 0.63 percent. The steeper reconstructed stream channel on the north abutment of the Hangar Flats DRSF will consist of a rock-lined chute with a steep gradient (approximately 24 percent). High-velocity flows at the toe of the Hangar Flats DRSF will flow through an energy-dissipating basin before being discharged to the downstream Meadow Creek channel.

Using the same techniques as for the TSF (see Section 4.3), Midas Gold will plant a succession of plantings along the channel, including a variety of grasses and shrubs, particularly willows, to provide cover to the channel.

The slope gradient on the downstream slope of the Hangar Flats DRSF will vary following reclamation grading, however the interslopes will be 3.5H:1V or flatter. Additional erosion controls will therefore be necessary to limit erosion. These controls will include construction of microtopographic features, which may include pitting and gouging of soil surfaces, deep ripping or excavation of dozer basins or discontinuous contour furrows. The soil surface will also receive additional erosion protection, which may include application of erosion control fabrics, bonded wood fiber matrix, wood straw and straw mulch followed by crimping on the contour.

Reclamation of the Hangar Flats DRSF and restoration of the MC2 wetland and channel reach is anticipated to occur in Project Year 18. The thickness and volume of GM applied to upland portions of this DRSF are 12 inches and approximately 186,000 BCY, respectively. The thickness and volume of GM and SBM applied to MC2 wetland and channel reach are 2 and 4 inches (which will be comingled during application) and 1,200 and 2,500 BCY, respectively. The source of GM and SBM for this reclamation and restoration is anticipated to one of the three GMSs near the Hangar Flats pit.

4.4.1 Hangar Flats Pit

After completion of mining from the Hangar Flats Pit, it will not be backfilled but will remain open to function as a permanent sedimentation basin downstream of the TSF, Hangar Flats DRSF, and Blowout Creek, much like the current Yellow Pine pit does (to a reasonable extent) today. The Hangar Flats pit will have a highwall approximately 1,000 feet above the pit lake and the pit lake will be approximately 500 feet deep (**Figures 4-5** and **4-6**). The pit lake is projected by the SGP Hydrologic Model Proposed Action Report (Brown and Caldwell 2018) to take over seven years to reach a point where it will create a surface water discharge. After the pit lake fills, surface water runoff from the TSF, the Hangar Flats DRSF, and East Fork of Meadow Creek will be routed into the Hangar Flats pit lake, which will serve as both habitat and a sediment trap prior to water flowing from the pit downstream into lower Meadow Creek (**Figure 3-2**). Continual freshwater flow into and out of the open pit (from surface water and alluvial groundwater) will prevent evaporative concentration of waters that might be seen in a static lake. Midas Gold will also implement riparian reclamation activities immediately upgradient and around the fringes of the southern portion of the Hangar Flats pit at MC4 and MC5 wetlands and channel reaches, respectively, as described in the CMP.

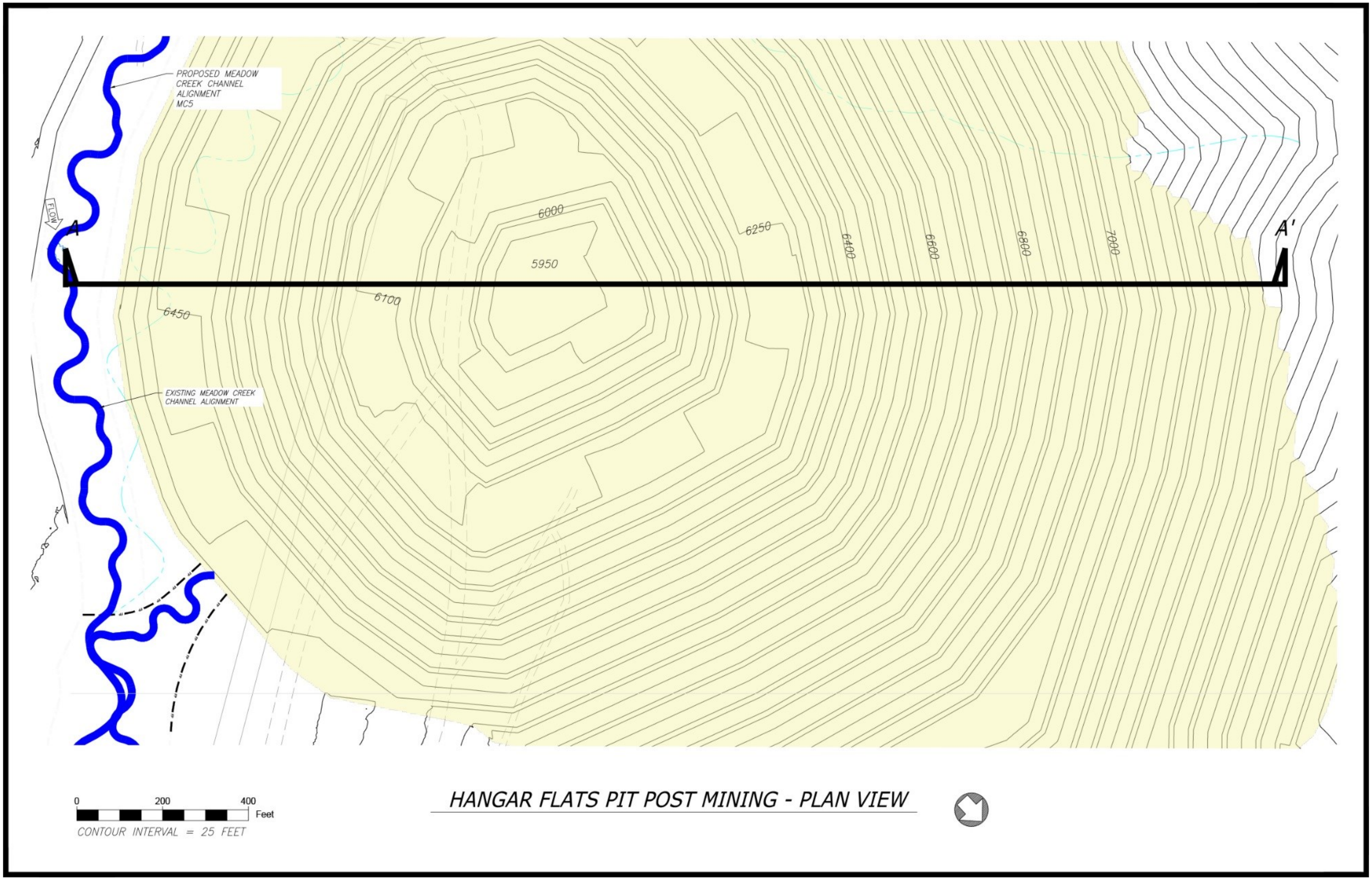


Figure 4-5. Hangar Flats pit post mining Plan View

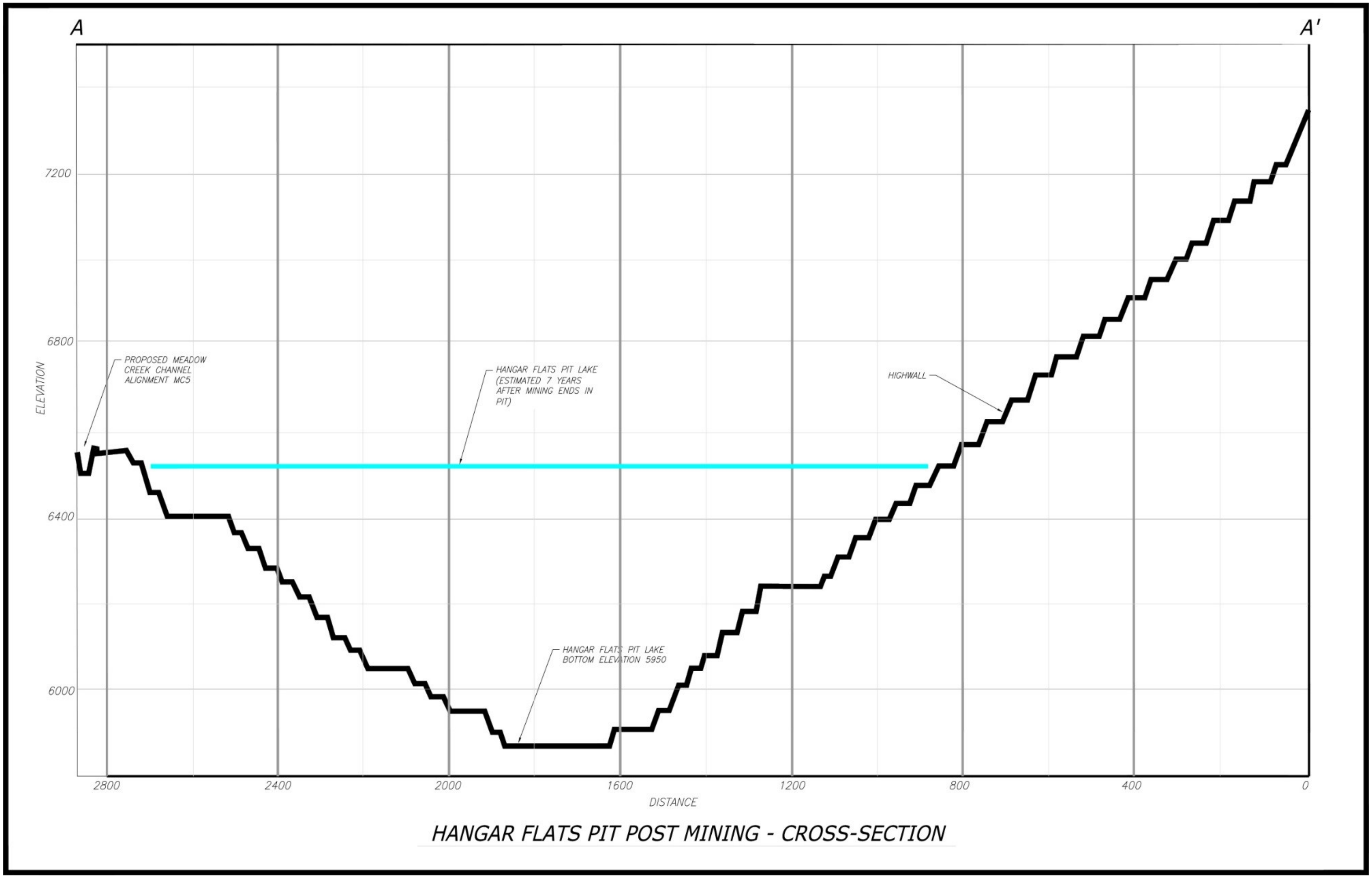


Figure 4-6. Hangar Flats pit post mining – Cross-Section

Midas Gold will block the haul road from the pit with large boulders and/or earthen berms to deter motorized vehicle passage into the pit and will not create direct vehicle access to the pit. These physical barriers will be installed far enough from the crest of the final pit highwall to prevent failure due to normal pit wall sloughing. Midas Gold will also post warning signs at this location as an added safety measure.

Two GMSs are proposed near the rim of the Hangar Flats pit. They are within the blasting buffer zone around the pit, which is not of concern since the GM will be placed prior to development of the pit and access to the GM will not be necessary until after mining operations cease in the pit.

Restoration of MC4 and MC5 wetlands and channel reaches (**Figure 3-3**) are anticipated to occur in Project Year 15. The thickness and combined volume of GM and SBM applied to these wetlands and channel reaches are 2 and 4 inches (which will be comingled during application) and 7,500 and 15,000 BCY, respectively. The source of GM and SBM for this reclamation and restoration is anticipated to be hauled from one of the three GMSs located near the Hangar Flats pit.

4.5 Yellow Pine Pit

As part of early construction and development work, Midas Gold will construct the EFSFSR Tunnel around the proposed Yellow Pine Pit to route flows of the EFSFSR, as described in the CMP (Midas Gold 2018). This will facilitate efficient and safe mining operations, protect water quality, and foster fish passage during operations to the upper reaches of the EFSFSR and Meadow Creek, where fish passage was blocked and eliminated in 1938 with Bradley Mining Company's development of the (now legacy) Yellow Pine pit. Containing the EFSFSR in the Tunnel will also prevent contact of EFSFSR waters with the mining operations in the Yellow Pine Pit, which could be a source of dust, metals, and nitrates from blasting agents.

Upon permanent cessation of mining activities at the Yellow Pine Pit, Midas Gold plans to partially backfill the pit with West End Pit development rock to re-establish the ground surface and thereby create the Yellow Pine DRSF. 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. The backfill will be placed to achieve the final reclamation surface as closely as possible with the large equipment. This will include placement of the top lifts of the backfill by direct dumping and compaction to better control the type of rock that it is placed near the surface (i.e., lower or non-PAG/ML rock and finer grained rock for rooting zone material). This will also limit the amount of regrading necessary prior to placement of GM. Backfilling of the pit will be followed by reconstructing the EFSFSR to the approximate original river gradient. West End development rock is deemed to be the best quality material to backfill the Yellow Pine Pit due to its geologic characteristics, NAG nature, and low sulfide content. Steps will be taken to limit excessive migration of fines from GM into underlying development rock (if necessary).

Through the backfilled Yellow Pine Pit, Midas Gold will construct a sinuous channel for the reconstructed EFSFSR as described in the Stream Design Report (Rio ASE, 2019) (**Figure 4-7**). The reconstructed EFSFSR will allow for salmon and trout passage to upstream spawning and rearing habitat. Re-establishing anadromous fish passage to the headwaters of the EFSFSR and its tributaries is one of the guiding conservation principles for Midas Gold.

The area along the reconstructed channel will be seeded and planted to restore wetland and riparian habitat (see the CMP). The riparian plantings of grasses and shrubs, particularly willows, will provide cover to the reconstructed channel, which is favored by fish.

As part of the reclamation program, Midas Gold will establish a permanent service road through the backfilled Yellow Pine Pit. This will allow recreational traffic to have long-term access from the community of Yellow Pine to the historical Thunder Mountain Mining District, much as the current access road does. Once the EFSFSR is re-established through the backfilled Yellow Pine Pit, including stable bank and bed conditions, Midas Gold will permanently close and seal the tunnel.

Outside of the floodplain, the backfilled Yellow Pine Pit will be recontoured with the goal of blending with the surrounding terrain to the extent practicable, producing a permanent and stable landform, providing access for future maintenance, and providing a stable drainageway. The Yellow Pine Pit or DRSF final closure surface is shown on **Figure 4-7** and **Figure 4-8** shows a final grading plan and cross-section. The uplands portion of the facility will be graded toward the EFSFSR floodplain. After the Yellow Pine pit is backfilled, it will have highwalls approximately 300 and 600 feet high on the east and west sides of the pit, respectively. One access road will remain across the highwall of the east side of the pit (along the operational haul route). This access road is intended to provide limited (not public) access for future maintenance in the Midnight and West End drainages. A second road will be constructed across the middle of the pit backfill (Figure 4-7) that connects into existing public access roads to provide access to the Thunder Mountain area.

Restoration of the EF3 wetland and channel reach which, for ease of reference includes EF3, MNC2 and HC2 wetlands and channel reaches (**Figure 3-3**) is anticipated to occur concurrent with mining activities in Project Year 12 and reclamation of the upland portion of the backfilled Yellow Pine Pit or DRSF is anticipated to be complete following cessation of mining activities in Project Year 14. The thickness and volume of GM applied to upland portions of the Yellow Pine pit backfill is 12 inches and approximately 209,000 BCY, respectively. The thickness and volume of GM and SBM applied to the EF3 (which includes EF3, MNC2 and HC2 wetlands and channel reaches) wetland and channel reach is 2 and 4 inches (which will be comingled during application) and approximately 6,800 and 14,000 BCY, respectively. GM and SBM for this reclamation and restoration is anticipated to be hauled from the Yellow Pine and North Homestake GMSs.

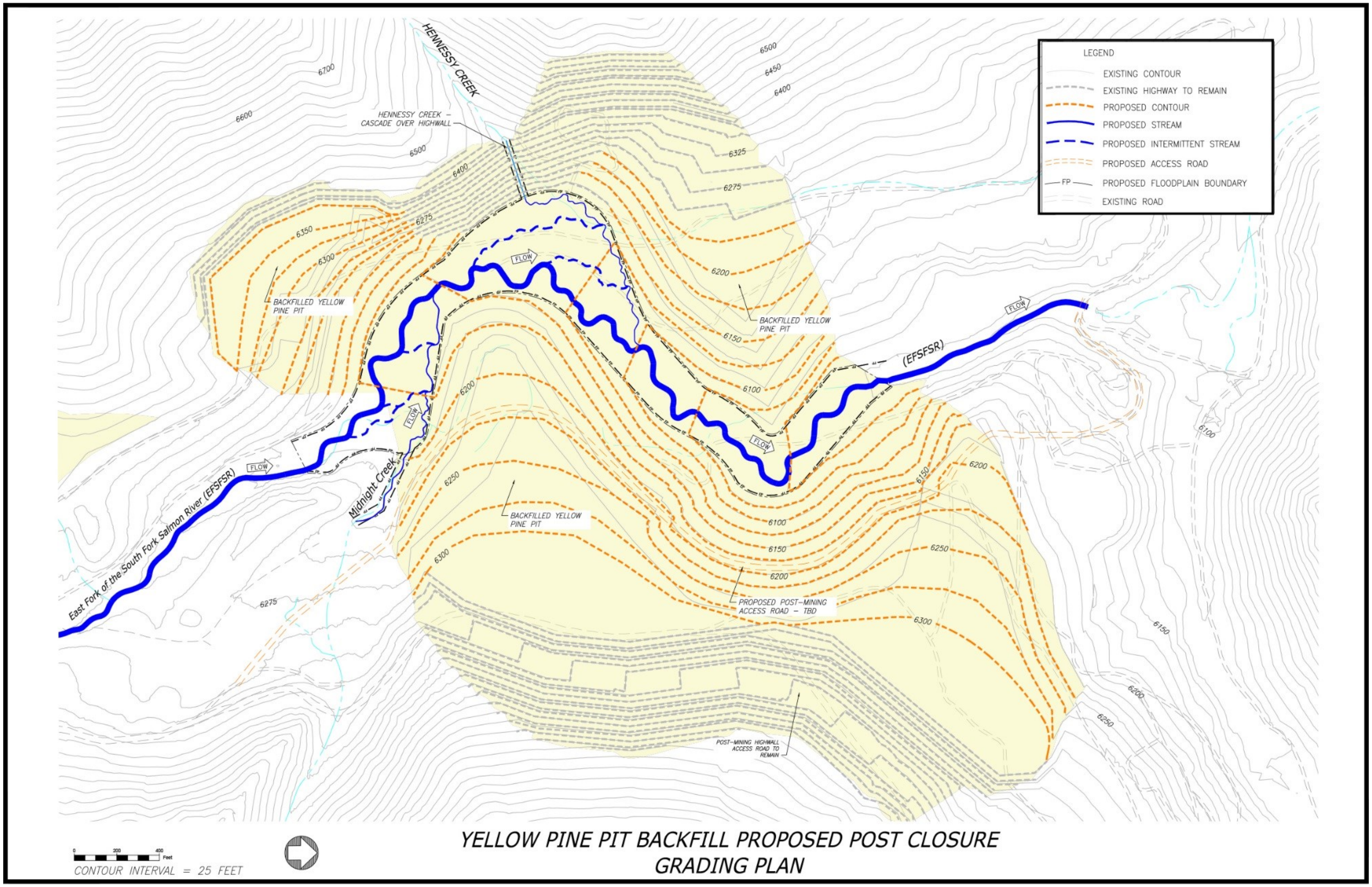


Figure 4-7. Yellow Pine pit backfill (or DRFS) post closure grading plan

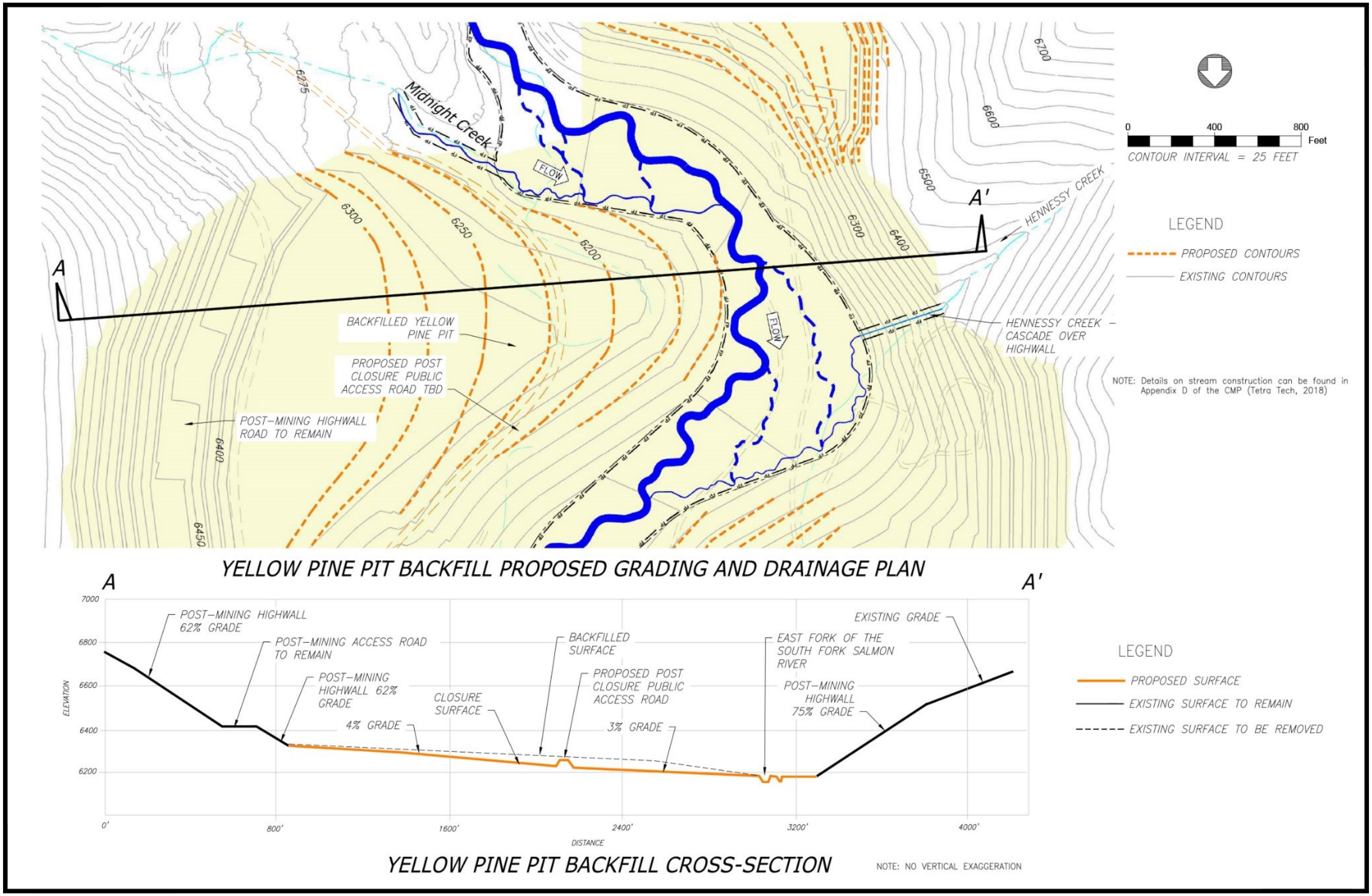


Figure 4-8. Yellow Pine Pit Plan and Cross-Section

4.6 Fiddle Development Rock Storage Facility

The Fiddle DRSF will receive development rock from all three of the pits, as needed. In anticipation of closure and final reclamation, Midas Gold will modify its development rock blasting methods to produce material with fewer boulders and generally finer grained material for the final lift of development rock on the top and inter-bench slopes of the Fiddle DRSF. This will limit excessive migration of fines from GM into underlying development rock and promote positive drainage and prevent pooling of water on top of the development rock. This will also reduce or eliminate the need for grading during placement of GM. The outslope of the DRSF will be graded and seeded to promote facility stabilization and to mitigate sediment generation and migration. Groundwater in underdrains and emanating from the toe of the DRSF will be collected in seepage collection sumps, wellpoints or by other means. Water treatment (if necessary) details, estimated amounts of seepage, and the duration of predicted seepage collection are discussed in the Site Wide Water Management Plan.

As part of permanent reclamation work, Midas Gold will reshape the DRSF top surface and out-slopes by grading with a bulldozer. The goal for final overall out-slopes of the Fiddle DRSF will be to blend with the surrounding terrain to the extent practicable, produce a permanent and stable landform, provide access for future maintenance on the DRSF, and provide for drainage across the reclaimed face of the DRSF (**Figure 4-9**). For the Fiddle DRSF, the overall goals will be met by reducing the width of the haul road on the outslopes to about 25 feet (from approximately 120 feet) and providing a drainage channel along the inside of the reduced road. This will allow slopes between road switchbacks to be recontoured by pushing material downward and flattening slopes. In addition, the Fiddle DRSF will be constructed with a sharp ridge or nose along its southeast flank. This ridge, which is constructed of development rock, will be minimized during the latter stages of mining to produce a more rounded shape. Midas Gold envisions creating a complex slope between road switchbacks wherein the upper slope is convex and somewhat steeper, and the lower slope is concave and less steep. The Fiddle DRSF final grading plan and cross-section is shown on **Figure 4-10**.

Midas Gold will re-establish a lined channel and floodplain corridor across the top of the reshaped DRSF (**Figure 4-9**), as described in the CMP (Midas Gold, 2018, Appendix D). The steeper reconstructed stream channel on the abutment/groin of the Fiddle DRSF will be a rock-lined chute with intermittent energy dissipation structures and rock grade controls. Midas Gold will grade the top of the Fiddle DRSF toward the adjacent hillside to carry overland flow to surface water channels. On the steep face of the DRSF, drainage will be maintained through a series of excavated channels on the uphill side of each road segment. These channels will collect runoff from slopes between roads and direct them either to the northwest toward the restored Fiddle Creek channel or to the south toward the diversion channel created during operations. Before discharging to either channel, the roadside channels will flow through small sediment ponds (**Figure 4-9**).

Similar to the Hangar Flats DRSF, the slope gradient on the downstream slope of the Fiddle DRSF will vary following reclamation grading but will have an overall slope of 3.5:1 with the interslopes ranging from 3.1H:1V to 5H:1V along the central ridge with flatter slopes on the outer edges. Additional erosion controls will therefore be necessary to limit erosion. These controls will include those identified in Section 4.3.4.A landfill is proposed to be constructed within the footprint of the Fiddle DRSF (**Figures 3-1** and **4-9**). This location will be on private land and will only be used for "inert waste materials" as defined in IDAPA 58.01.06 and as described in Section 8.7.3 of the PRO. The landfill will be permitted and constructed per the requirements of Idaho's Non-Municipal Solid Waste Landfills per IDAPA 58.01.06, which is not expected to require a liner for the facility. As the Fiddle DRSF adds lifts, it will cover refuse placed in the landfill earlier in the project. The waste may be covered by development rock as the DRSF is built up, however, the footprint of the landfill will be maintained to allow refuse to be placed later on during the project. A berm will be constructed on the top of the DRSF around the perimeter of the landfill to keep surface water out of the landfill area. After Project demolition activities are completed, the landfill will no longer be needed and will be closed per Idaho requirements for Non-Municipal Waste Landfills, covered with development rock at least 12 inches thick and the area graded to match the surrounding surface of the Fiddle DRSF. Following grading 12 inches of GM will be place on the covered landfill and the areas will be revegetated.

Reclamation of the Fiddle DRSF and restoration of FC1 and FC2 wetlands and channel reaches (**Figure 3-3**) is anticipated to occur concurrently with mining activities in Project Year 8 with reclamation of the Fiddle DRSF run-on diversion in Project Year 10. The thickness and volume of GM applied to upland portions of the this DRSF is 12 inches and approximately 259,000 BCY, respectively. This volume of GM assumes that the run-on diversion around the Fiddle DRSF will be covered with 6 inches of GM. The estimate quantity of GM applied to the Fiddle DRSF also include placement of 12 inches of GM will be applied to the Fiddle Landfill following placement of 12-inch-thick cover of development rock over “inert waste materials” that is disposed in the landfill (see below). The thickness and volume of GM and SBM applied to FC1 and FC2 wetlands and channel reaches are 2 and 4 inches (which will be comingled during application) and approximately 4,000 and 8,000 BCY, respectively. GM and SBM for this reclamation and restoration is anticipated to be hauled from the Fiddle DRSF GMS.

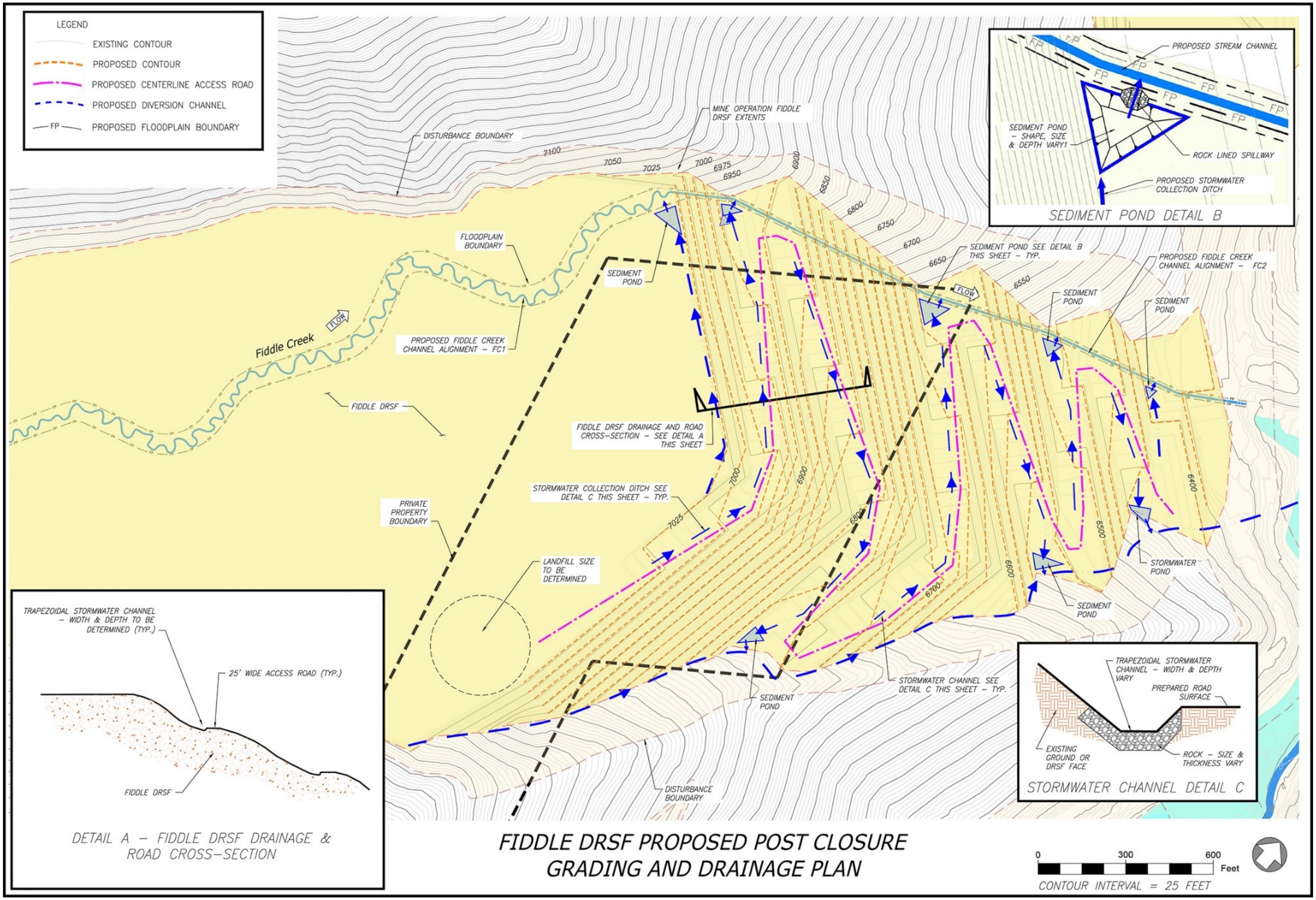


Figure 4-9. Fiddle DRSF grading plan

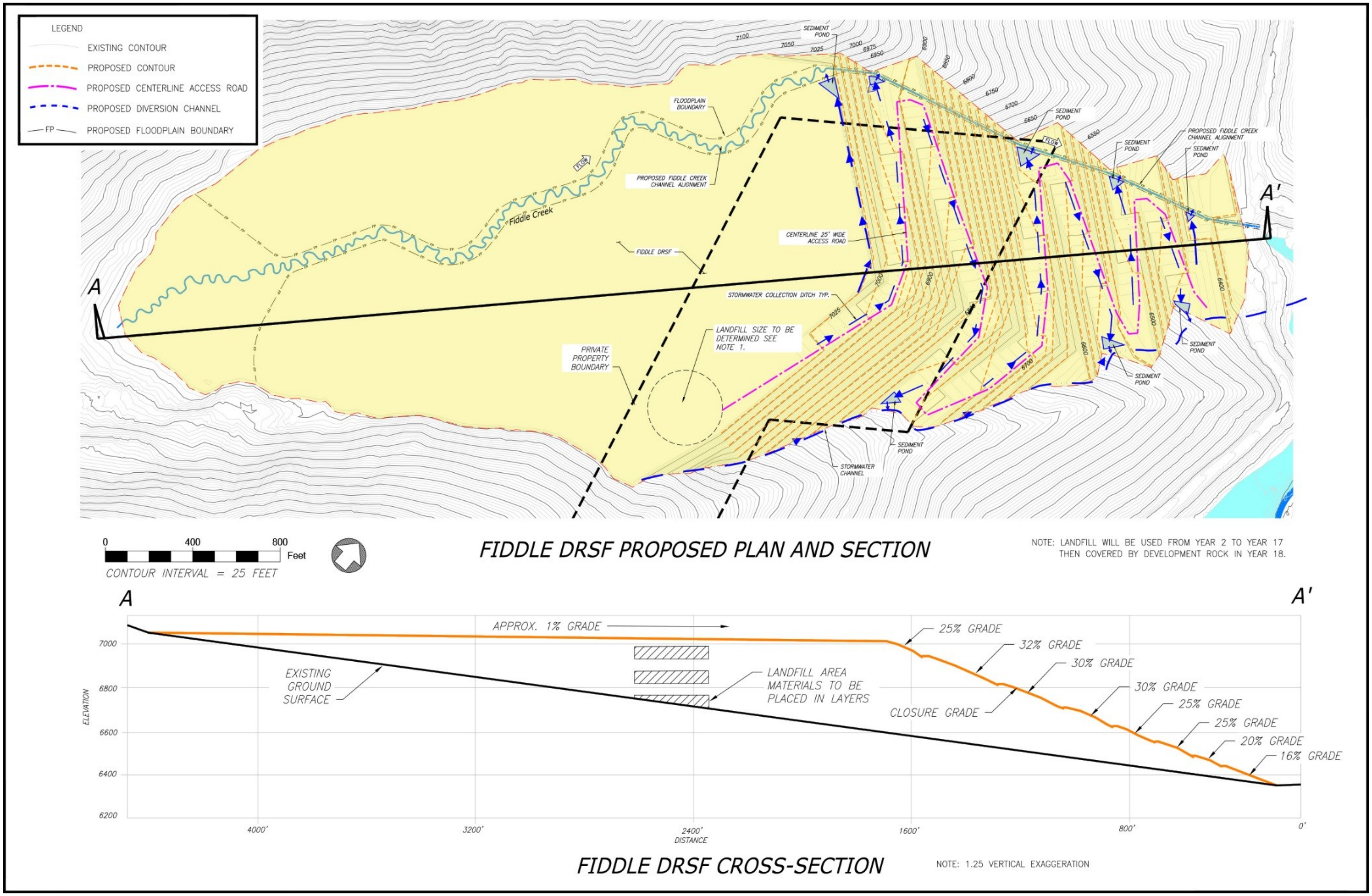


Figure 4-10. Fiddle DRSF plan and section

4.7 West End Pit

Development rock from the West End pit will go to the West End DRSF until such time that mining is completed in the Yellow Pine pit and any development rock will go to backfilling the Yellow Pine pit. After completion of mining from the West End pit, Midas Gold will remove any ancillary equipment and facilities from the pit and place barriers on the access road and surrounding the pit to prevent unintentional access to the fall hazards associated with the steep pit walls. No development rock backfilling of the West End Pit is planned; however, two pit lakes are anticipated to form in the north and south portions of the West End Pit with fresh water contributions from surface runoff from the surrounding catchment, runoff from a portion of the West End DRSF, groundwater, and direct precipitation. The northern and southern pit lakes are designated as the West End pit Lake and Midnight pit Lake, respectively. The West End pit will have a highwall approximately 1,000 feet above the northern pit lake, which will be approximately 400 feet deep, and the southern and smaller pit lake will be approximately 100 feet deep (**Figure 4-11** and **Figure 4-12**). Due to the limited nature of these inflows, the West End Pit lake is anticipated to take over 40 years to reach a point where it will create a surface water discharge (Brown and Caldwell 2018). The West End Pit lake will provide permanent storage for sediment generated from the West End DRSF above the West End Pit, as well as from a portion of the West End Pit highwalls. Midas Gold will include an overflow spillway for the West End Pit to channel water from the lake into lower West End Creek. The spillway will be founded in rock; however, if portions of the upstream or downstream channel are founded in development rock, it will be lined to limit the potential for infiltration through the existing lower West End DRSF. The spillway will be capable of safely passing a Probable Maximum Flood.

The PA SWWC report (SRK, 2018) predicts that the West End pit lake will be moderately alkaline (pH 8.4), however arsenic and mercury are predicted to be elevated above the strictest potentially applicable surface water quality standards for all post-closure years, and antimony is predicted to be elevated for the first 20 years post-closure. The chemistry of the West End pit lake is predicted to be relatively stable from year 30 onwards. Volumes of periodic spill-over are expected to be minor and are not predicted to impact water quality in West End Creek.

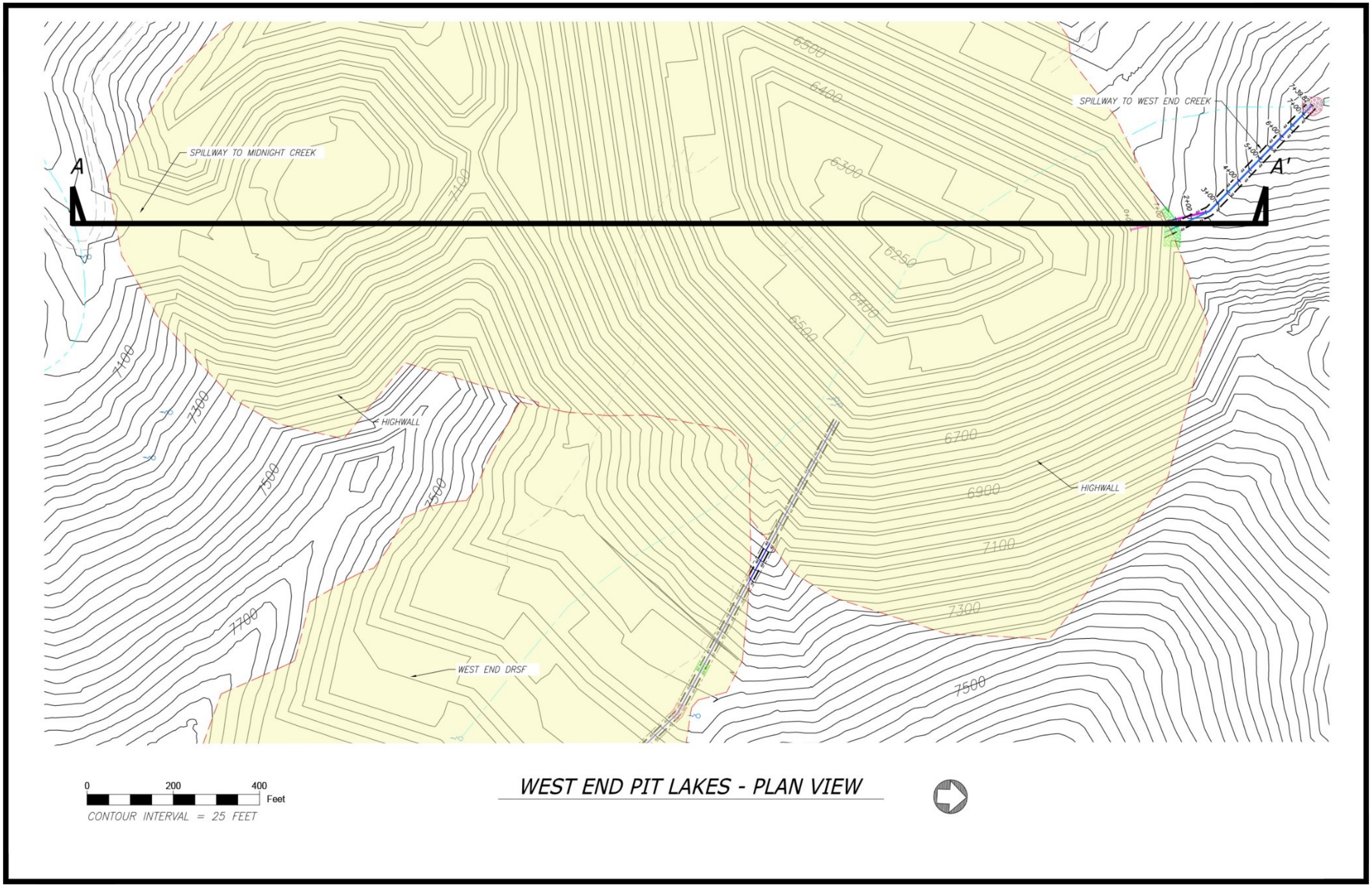


Figure 4-11. West End pit post mining cross-section

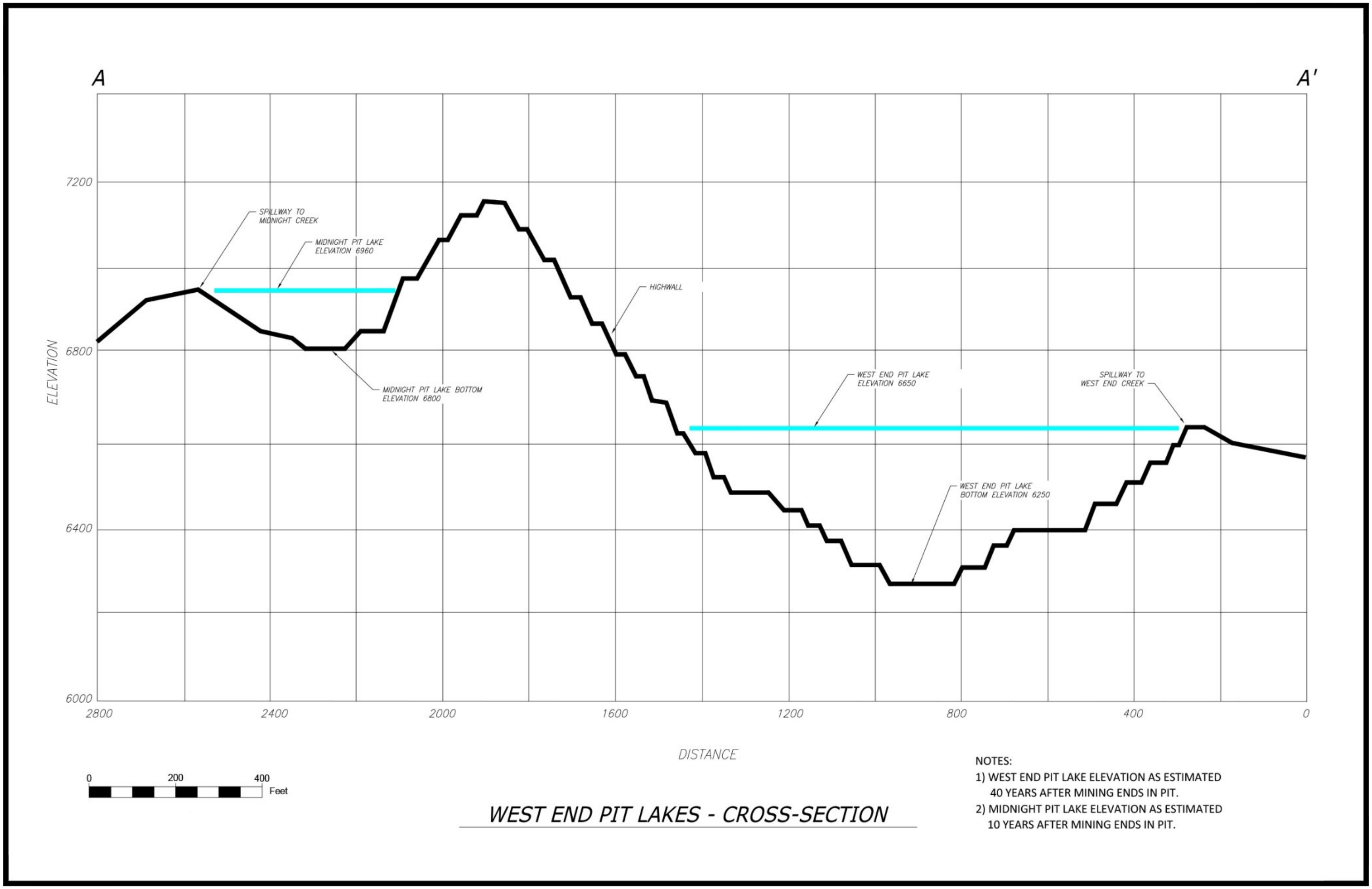


Figure 4-12. West End pit lakes – Cross-Section

The Midnight pit Lake is anticipated to take over 10 years to reach a point where it will create a surface water discharge (Brown and Caldwell 2018). The Midnight pit lake will provide permanent storage for sediment generated from the southern portion of the West End Pit highwalls. Midas Gold will include an overflow spillway for the Midnight Pit lake to channel water from the lake into Midnight Creek. The spillway will be founded in rock, will be capable of safely passing a Probable Maximum Flood and will discharge to Midnight Creek.

The PA SWWC (SRK, 2018) predicts the lake will be moderately alkaline (pH 8.4 – 8.5). Inflows to the pit lake will be dominated by pit wall runoff and direct precipitation, with only minor groundwater contribution and no surface water contribution. As such, the PA SWWC predicts solute concentrations in the Midnight Area pit lake will be typically higher compared to the Hangar Flats and West End pit lakes, where inflowing groundwater and surface water will have a greater diluting effect. Arsenic, cadmium, mercury and antimony are predicted to be elevated above the strictest potentially applicable surface water quality standards. The chemistry of the Midnight Area pit lake is predicted to be relatively stable from year 30 onwards. Volumes of periodic spill-over are expected to be minor and are not predicted to impact water quality in the EFSFSR.

4.7.1 West End Development Rock Storage Facility

Legacy development rock dumps exist in the West End area; one dump is located up-gradient of the existing West End pit and another is located downgradient of the existing pit. The water flowing beneath the dumps was routed through a French drain system constructed by Superior during construction of the dump. This French drain system clogged up several years after construction and a surface diversion was constructed to handle the flow. A small flex pipe was added between the waterfalls below the upper dump and the lower dump but was undersized and high flow is currently across the top of the lower dump. These previous systems will remain after closure of the SGP; however, they will be circumvented by the diversions and new channels constructed for the West End DRSF.

Although much of the development rock from the operation of the West End pit will be used to backfill the Yellow Pine pit, Midas Gold will also build the West End DRSF upstream of the upper existing legacy dump to facilitate the early stages of the West End pit development while mining in the Yellow Pine pit is still occurring.

In anticipation of closure and final reclamation, Midas Gold will modify its development rock blasting methods to produce material with fewer boulders and generally finer grained material for the final lift of development rock on the top and inter-bench slopes of the West End DRSF. This will limit excessive migration of fines from GM into underlying development rock and promote positive drainage and prevent pooling of water on top of the development rock. This will also limit the amount of grading that will be necessary during placement of GM. As part of GM placement, Midas Gold will grade the slopes of this DRSF to promote positive drainage (**Figure 4-13**). Runoff water from West End Creek will first be routed into a channel on top of the DRSF, as described in the CMP (Midas Gold 2018), then it will flow into a designed surface water channel on the northeast side of the DRSF. There will also be a stormwater water diversion channel on the southwest side of the DRSF to intercept surface flow from the adjacent hillside and to carry flow from the sediment ponds that receive runoff from the DRSF access road (**Figure 4-13**). The lower portion, or “toe.” of the West End DRSF will be graded and seeded to promote facility stabilization and to mitigate sediment generation.

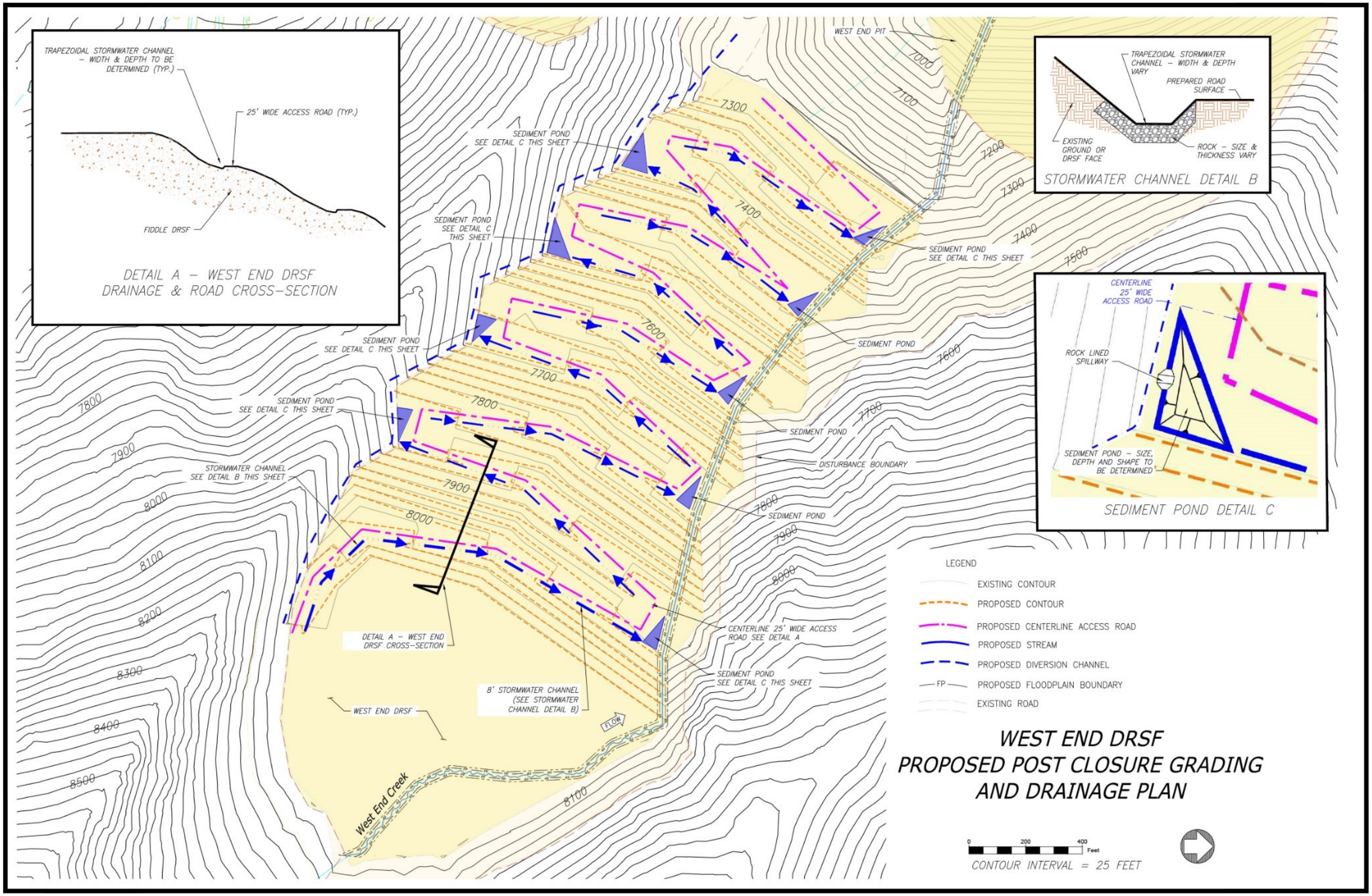


Figure 4-13. West End DRSF grading plan

As part of concurrent and permanent reclamation work, Midas Gold will reshape DRSF outslopes by grading with bulldozers. The goal for final overall out-lopes of the West End DRSF will be to blend with the surrounding terrain to the extent practicable, produce a permanent and stable landform, provide access for future maintenance on the DRSF, and provide for drainage across the reclaimed face of the DRSF. **Figure 4-14** shows the final grading plan and section for the West End DRSF. The overall goals for the facility will be met by reducing the width of the haul road on the out-slopes to about 25 feet (from approximately 120 feet) and providing a drainage channel along the inside of the reduced road (**Figure 4-14**). This will allow slopes between road switchbacks to be recontoured by pushing material downward and flattening slopes. Midas Gold envisions creating a complex slope between road switchbacks wherein the upper slope is convex and somewhat steeper, and the lower slope is concave and less steep. Drainage will be maintained through a series of excavated channels on the uphill side of each road segment. These channels will collect runoff from slopes between roads and direct them either to the northeast toward the reclaimed West End Creek channel or to the southwest toward the diversion channel created during operations. Before discharging to either channel, the roadside channels will flow through small sediment ponds.

Similar to the Hangar Flats and Fiddle DRSFs, the slope gradient on the downstream slope of the West End will vary following reclamation grading, however, the overall slope will be 3.2H:1V and the interslopes range from 2.9H:1V to 3.8H:1V along the central ridge with flatter slopes along the outer edges. Additional erosion controls will therefore be necessary to limit erosion. These controls will include those identified in Section 4.3.4.

Reclamation of the West End DRSF and restoration of WE1 wetland and channel reach (**Figure 3-3**) is anticipated to occur concurrently with mining activities in Project Year 7 with reclamation of the West End DRSF run-on diversion in Project Year 9. The thickness and volume of GM applied to upland portions of the DRSF is 12 inches and approximately 136,000 BCY, respectively. This volume of GM assumes that the run-on diversion around the West End DRSF will be covered with 6 inches of GM, since the underlying materials will be regolith instead of development rock. The thickness and volume of GM and SBM applied to WE1 wetland and channel reach is 2 and 4 inches (which will be comingled during application) and approximately 160 and 320 BCY, respectively. Of this volume, approximately 72,000 BCY of GM and 300 CY of SBM are anticipated to be live-handled. GM for this reclamation and restoration is anticipated to be directly hauled from the expansion of the TSF in Project Year 7. The remaining GM and SBM needed for the reclamation and restoration of this facility will be hauled from the North Homestake or Yellow Pine GMS.

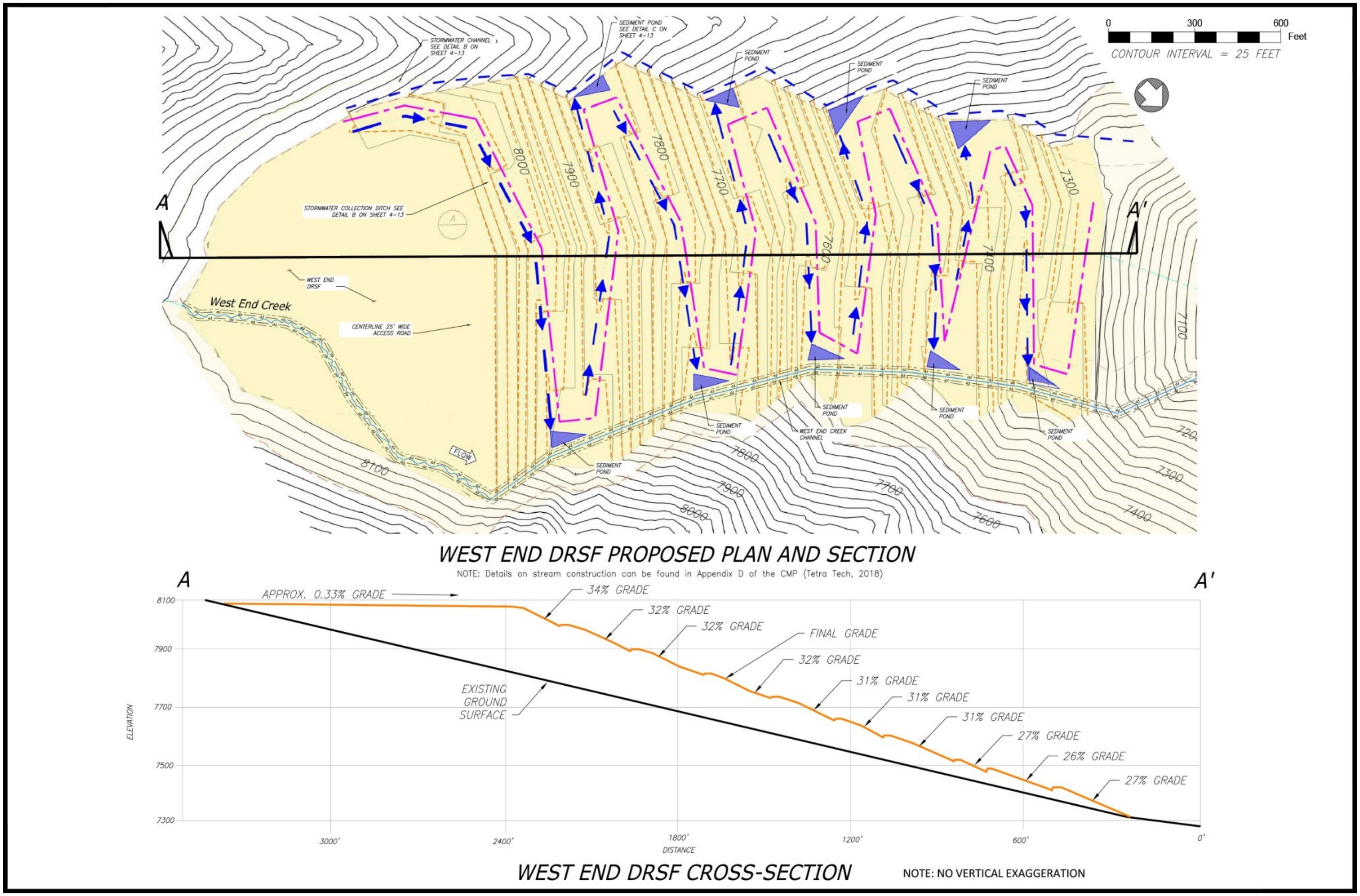


Figure 4-14. West End DRSF plan and section

4.8 Burntlog and Thunder Mountain Roads

The new Burntlog Route connector and upgrades to the existing Burntlog and Thunder Mountain Roads (**Figure 1-3**) will be constructed during Project Years -3 and -2. Figures 4-15 through 4-18 show the proposed route including those sections of existing roads that will be upgraded and those sections that will be constructed. Also shown on these figures are the locations and sizes of borrow areas and staging areas that will be constructed as a part of road development. Examples of likely cut-and-fill scenarios for reclamation of the road where it is widened or upgraded and where new road segments are constructed are presented on **Figure 4-19**. Extensive analysis and design of the Burntlog Route is described in RFAI 83 (Brown and Caldwell, 2018). Salvaging and stockpiling of logs, shrubs and herbaceous vegetation during construction for windrowing and chipping and incorporation into reclamation activities will be completed as described in Sections 3.1 and 3.3.3.3.

The thickness and volume of GM/SBM that can be salvaged from the new road construction activity varies according to SMU (**Table 3-11**) and is estimated to range from 0 (on slopes over 45 percent and where soil is not practically salvageable with conventional heavy equipment within SMU *mTC*) to 3 feet in SMU *fTH.* The average combined GM/SBM salvage thickness in areas where salvageable GM and SBM exists (approximately 120 acres) is 1.7 feet. The estimated volume of GM and SBM available for salvage along the Burntlog Road and Landmark Maintenance Facility is perhaps as much as 321,000 BCY. The salvaged GM will be stockpiled in borrow source areas used for the construction and widening of the road (**Figures 4-15** through **4-18**). The borrow source areas and construction staging areas will disturb approximately 67 acres. Restoration of wetlands on or along the Burntlog Route is not proposed since mitigation for their disturbance will be included in the mitigation work done on the Project site; therefore, GM and SBM are not needed for wetland restoration purposes along the Burntlog Route. Interim reclamation within the Burntlog Route corridor will be conducted on road cut and fill slopes, GM stockpiles and windrows, and borrow source areas where permanent reclamation cannot be conducted until the cessation of mining activities.

Once all final closure/reclamation and related environmental closure monitoring work has been completed at the Project site in Project Year 23, Midas Gold will initiate modifying the Burntlog and Thunder Mountain road segments that existed pre-mining to return them to their approximate pre-mining width and condition, and Midas Gold will no longer maintain the road. The roads will be reduced to their width and condition that existed prior to the Project such that the historical routes are returned to similar conditions for future use. This will entail grading and/or scarification along the outside edges of the road (**Figure 4-19**) followed by seeding with either the Cool or General seed mix per **Table 3-12**. Application of surface mulch be in accordance with the criteria presented in Section 3.3.5. Approximately 30 acres of ground adjacent to the existing road will be reclaimed during Project Year 18.

Long-term road maintenance for the portions of the Burntlog and Thunder Mountain Roads used during mining will revert to the responsibility of the entity that currently maintains those segments on completion of this reclamation work.

Midas Gold will close and reclaim the access road segment that was built during Project startup to connect Burntlog Road and Thunder Mountain Road. This road segment will be obliterated (where practicable) to reclaim the area to conditions similar to those that existed prior to the Project and to provide adequate surface water drainage. Reclamation will include pulling back and re-contouring road cuts made by Midas Gold to slopes that are similar to, but not necessarily matching pre-project conditions, and that are consistent with the surrounding terrain as practicable. **Figure 4-20** presents examples of how the typical cut-and-fill scenarios for the new road segment will be regraded during reclamation. The intent is to create conditions that will limit or prohibit vehicle traffic. After grading has occurred, Midas Gold will rip or disk the reclaimed surfaces or otherwise leave the former road area in a roughened condition prior to placement of 6 inches of GM followed by seeding with species listed in **Tables 3-11** and **3-12**. The estimated volume of GM needed to reclaim the obliterated segment of Burntlog Road is 180,000 CY, which will be spread across approximately 226 acres of disturbance. Approximately 15 miles of the road will be removed and reclaimed and approximately 23 miles of road will be narrowed and reclaimed to pre-mining conditions. Reclamation practices will be the same for roads located either within our outside of lands designated by the Idaho Roadless Rule.

Midas Gold will remove diversions, cross drains, culverts, safety berms, mile markers, guardrails, and signs upon permanent closure of the obliterated section. As appropriate, Midas Gold will leave water bars or other erosion or sediment control structures and will armor stream crossings and stormwater crossings. , Long-term road maintenance for the remaining portions of the Burntlog and Thunder Mountain Roads that are not decommissioned will revert to the responsibility of the USFS or Valley County depending which entity has jurisdiction over a particular road segment.

Figure 4-15. Burntlog Route Disturbance Borrow and Staging Areas, Segment One

Figure 4-16. Burntlog Route Disturbance Borrow and Staging Areas, Segment Two

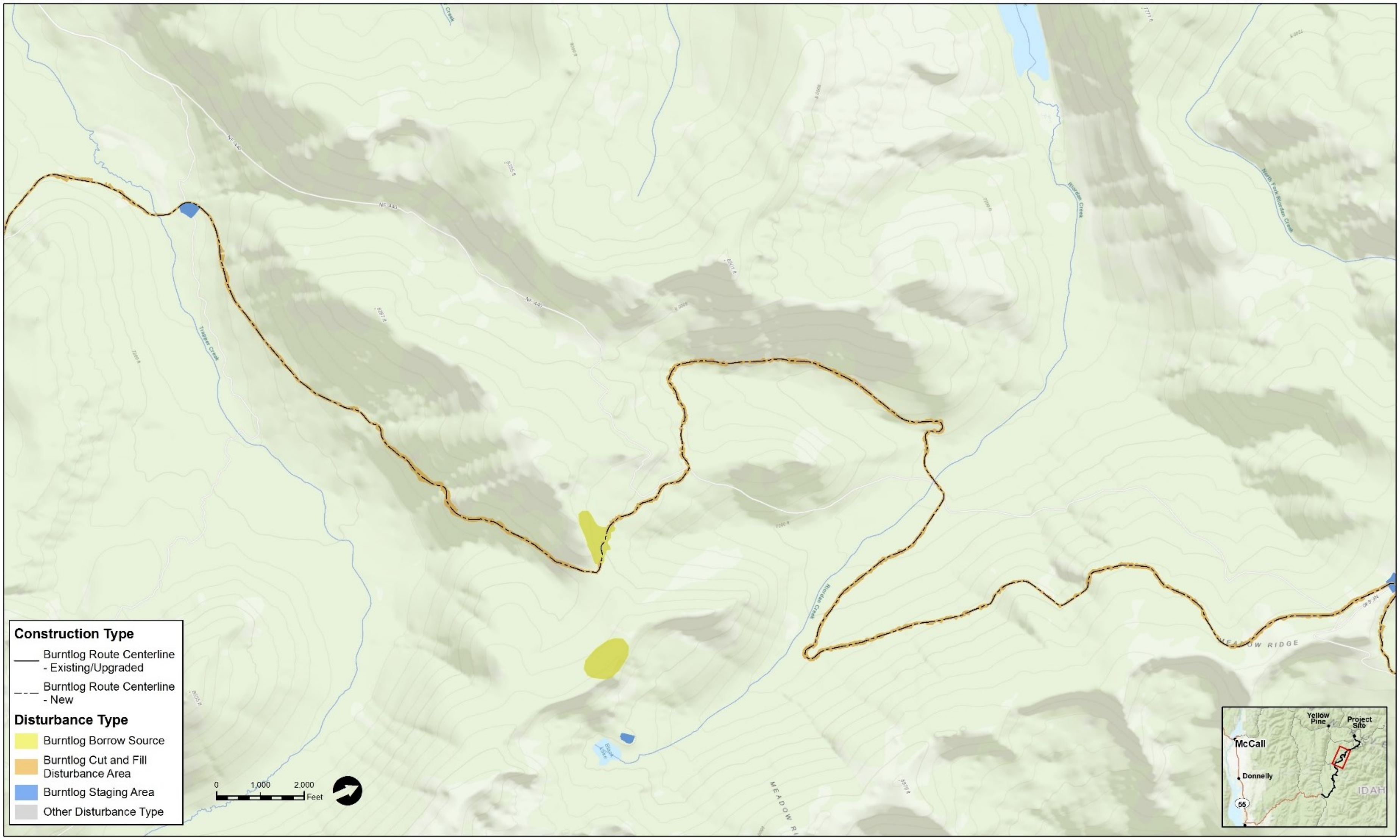


Figure 4-17. Burntlog Route Disturbance Borrow and Staging Areas, Segment Three

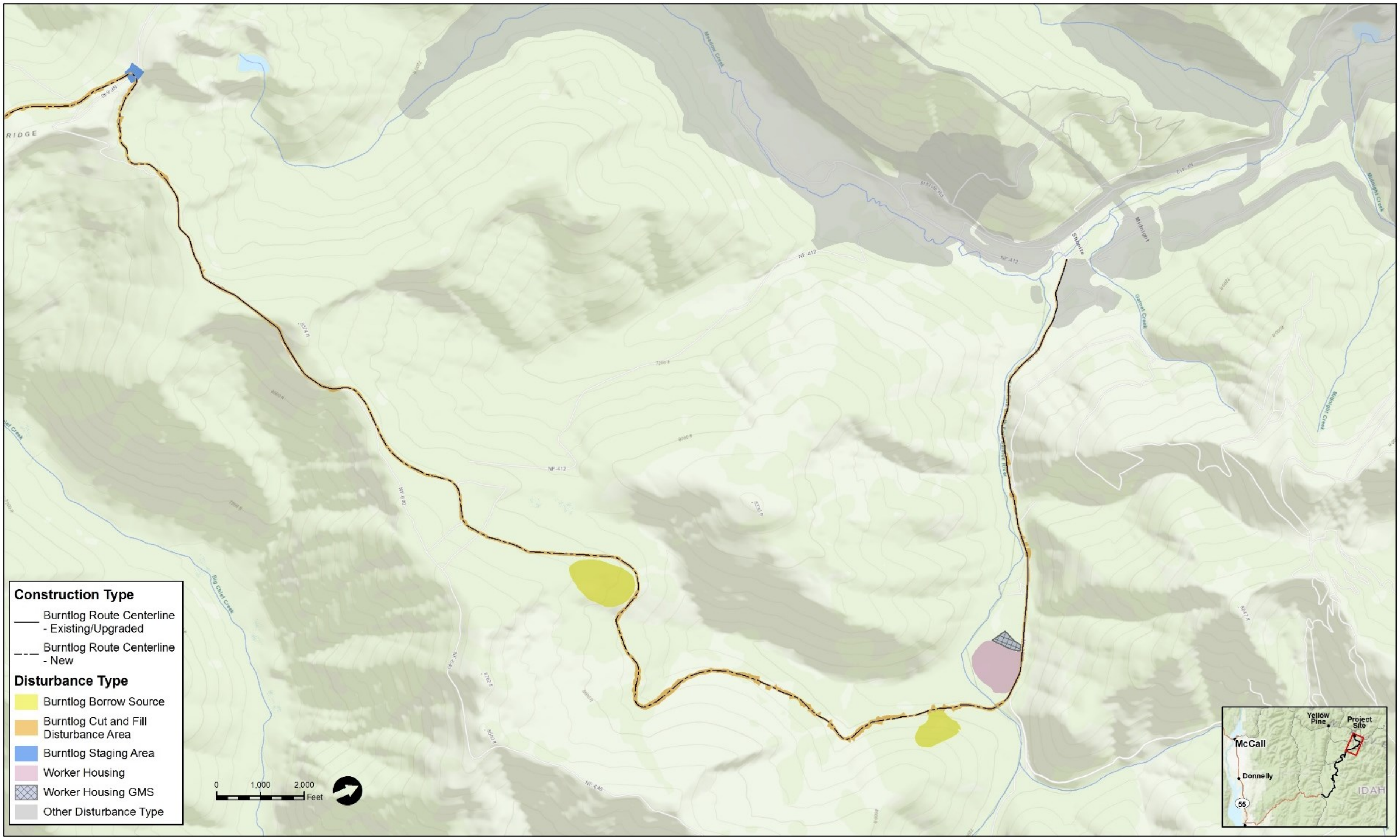
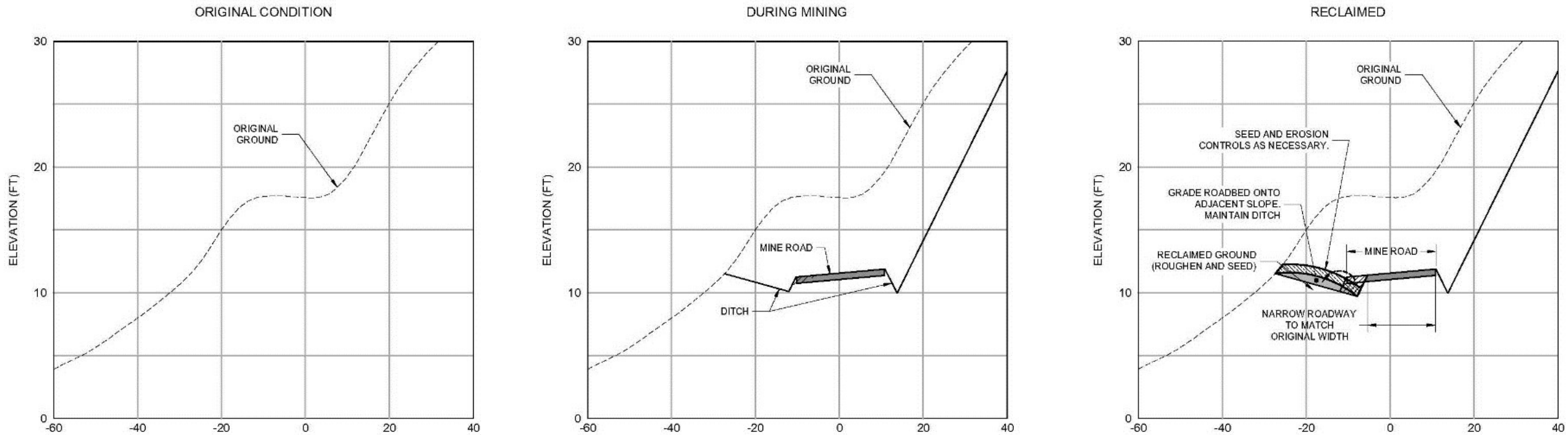


Figure 4-18. Burntlog Route Disturbance Borrow and Staging Areas, Segment Four

TYPICAL CUT SECTION



TYPICAL FILL SECTION

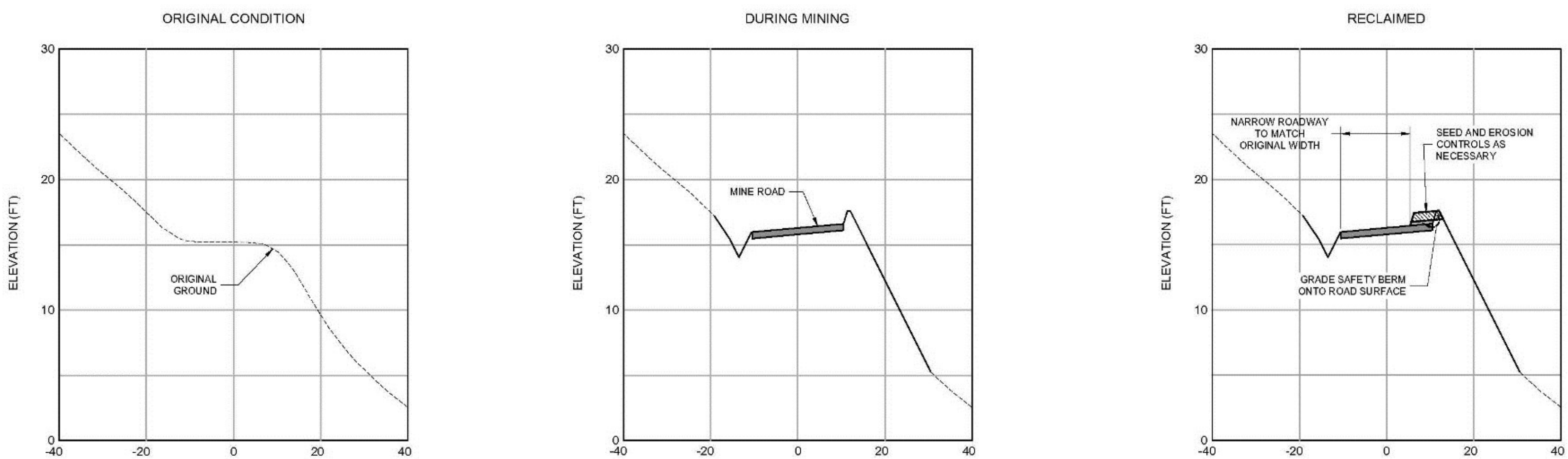


Figure 4-19. Typical Burntlog Route reclamation in sections to remain

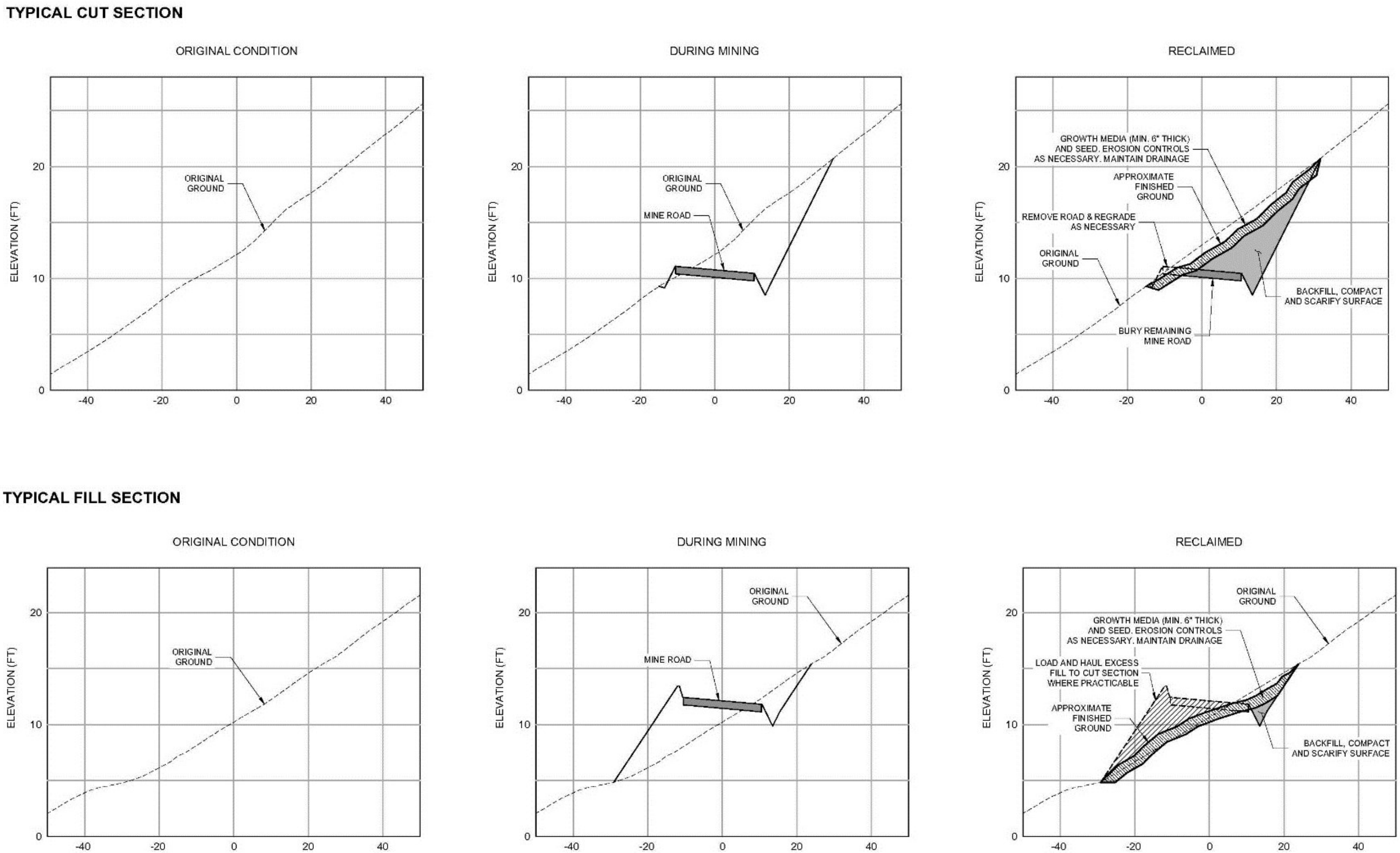


Figure 4-20. Typical Burntlog route reclamation in sections to be obliterated

4.9 Plant Site and Worker Housing Facility

Midas Gold will continue to use a portion of the Worker Housing Facility during some of the post-mining years to provide housing for crews conducting the final closure and reclamation activities at the Project; however, that portion of the on-site housing not needed for final closure work will be dismantled and salvaged, or demolished. Upon conclusion of the major closure and reclamation work, Midas Gold will complete the job of dismantling and salvaging or demolishing the remaining portion of the housing facility, including breaking up foundations and burying them in place.

After the Plant Site is dismantled, salvaged, and demolished and any foundations are broken up, the concrete foundations will be buried in place as discussed in Section 3.3.1. Much of the Plant Site is on private property, however, those portions that are on USFS lands would also be buried in place. Those buildings located on USFS lands with foundation materials acceptable for disposal on USFS lands will be disposed of in place, while other material will go to the Fiddle DRSF landfill on private property or off site. Midas Gold will regrade the area and rip or disc compacted areas or otherwise leave the site in a roughened condition prior to GM placement, seeding and tree and shrub planting with species listed in **Tables 3-12** and **3-13**. Reclamation of the crusher and mill areas of the Plant Site is anticipated to occur in Project Year 13 following cessation of mining and processing activities. Reclamation of the administrative and truck shop areas of the Plant Site is anticipated to occur in Project Year 18 following completion of most reclamation and closure activities. The thickness and volume of GM applied to the entire Plant Site area (i.e. crusher, mill, administrative and truck shop areas) is 6 inches and approximately 85,000 BCY, respectively. GM for the reclamation of this facility will be hauled from the Plant Site GMS.

Midas Gold will regrade the Worker Housing Facility and rip or disk the parking and building area or otherwise leave the site in a roughened condition prior to GM placement, seeding and tree and shrub planting with species listed in **Tables 3-12** and **3-13**. Reclamation of the Worker Housing is anticipated to occur in Project Year 18 following cessation of mining and processing activities and completion of most reclamation and closure activities. The thickness and volume of GM applied to this area is 6 inches and approximately 18,000 BCY, respectively. GM for the reclamation of this facility will be hauled from the Worker Housing GMS. The remaining excess GM in this stockpile (approximately 37,000 CY) will be used for the reclamation of the TSF or Hangar Flats DRSF.

4.10 Haul Roads, Internal Site Access Roads, Communication Towers and Other Compacted Sites

As part of final closure/reclamation work, Midas Gold will close and reclaim haul roads external to the pits and any internal site access roads not needed for long-term access and monitoring. Road reclamation will include pulling back and re-contouring road cuts and fills and ripping or disking the road surface or otherwise leave the surfaces in a roughened condition prior to seeding. Seed mixes and planting prescriptions will follow those outlined in **Tables 3-12** and **3-11**.

Midas Gold will remove diversions, cross drains, culverts, safety berms, mile markers, guardrails, and signs upon permanent closure. As appropriate, Midas Gold will leave water bars or other erosion or sediment control structures, but roads will be closed from any long-term use.

Areas disturbed by the haul and site access roads will be contoured and graded to blend into surrounding terrain. Compacted areas, such as the road surface or any associated parking or storage areas, will be loosened as necessary by ripping or disking, and left in a “roughened” condition prior placement of 6 inches of GM, fertilization, and seeding. Contouring and grading work will involve establishment of the ephemeral surface water channels through the reclaimed areas.

The communications system will entail existing towers near the Project Area plus new VHF towers located at the US Forest Service Meadow Creek Lookout and the Thunderbolt Lookout, which means they will be located adjacent to existing fire towers; hence, no new roads are anticipated. As part of final closure Midas Gold will remove these towers and sell them for reuse or dispose of them in an off-site landfill. The ground will be contoured to blend into surrounding terrain. Compacted areas will be loosened as necessary by ripping or disking and left in a “roughened” condition prior to seeding.

4.11 Substation, Switchgear, and Electric Transmission Line

There will be several phases of construction and post construction reclamation and post closure reclamation associated with the electrical transmission lines that will service the project. Prior to operation of the mine, the existing USFS permitted transmission line from the Lake Fork Substation to the Johnson Creek Substation (**Figure 1-3**) will be upgraded by IPCo to meet the larger power demands of the Project. There will also be a new electrical transmission line owned, operated and maintained by Midas Gold, constructed from the Johnson Creek Substation to the Project site (**Figure 1-3**). The new electrical transmission line will be removed and reclaimed as part of post-closure activities.

Design of the transmission line upgrade and the new construction are very preliminary at this stage of the project; however, they are expected to follow typical industry standard designs for transmission lines of this size in steep terrain. Based upon preliminary plans provided by IPCo, the estimated disturbance and reclamation acreages are presented below.

The transmission line right-of-way will be cleared of tall vegetation and vegetation will be maintained at a low height during operation of the transmission line. This will not entail clearing and grubbing to bare dirt like other construction activities for the project; hence, upwards of 500 acres may have vegetation cut with only limited surface disturbance. This is a rough estimate because many areas only have low shrubs and grasses, which will not require any clearing of vegetation. Reclamation of the transmission line right-of-way will entail simply letting the vegetation grow back and managing weeds and invasive plant species. However, access road and construction work areas will be cleared and grubbed and are included in the disturbance and reclamation acreages described below.

Roads for construction and maintenance of both transmission line segments will utilize both bladed constructed roads similar to those on the Project site and “primitive” or “two-track” roads that are created by the operator’s direct vehicle use with little or no grading. This may include overland routes within a defined travel corridor that leave no defined roadway beyond crushed vegetation. Clearing of woody vegetation, deadfall, and other obstructions will commonly occur along the travel way to allow safe vehicular travel. Drainage must be maintained, where appropriate, to avoid erosion or the creation of a muddy, braided road. Primitive roads or routes necessitate low vehicle speeds and are typically limited to four-wheel-drive or high-clearance vehicles. Primitive roads are not intended for use as all-weather roads.

Some bladed roads will be constructed using heavy equipment and designed to support vehicular traffic similar to those proposed for the Burntlog route, although they will typically be narrower in width. Bladed roads are used where the side slope is over 8 percent or when crossing rough and uneven terrain. Typical construction disturbance is 16 feet wide; however, it can be up to 35 feet wide as dictated by terrain and soil conditions. The target operational width is 14 feet with typical features as shown on **Figure 4-21**. For primitive roads, the road section is typically 10 feet wide or less and is defined as the travel surface and extent of clearing necessary for horizontal clearance or the extent of modification from the natural condition, whichever is greater (**Figure 4-22**). Bladed and primitive roads will be used to access different segments of the transmission line as needed for construction and maintenance, with the different types constructed as needed to support heavy equipment and material access. An example of how these different road types may be located relative to the transmission line is shown on **Figure 4-23**.

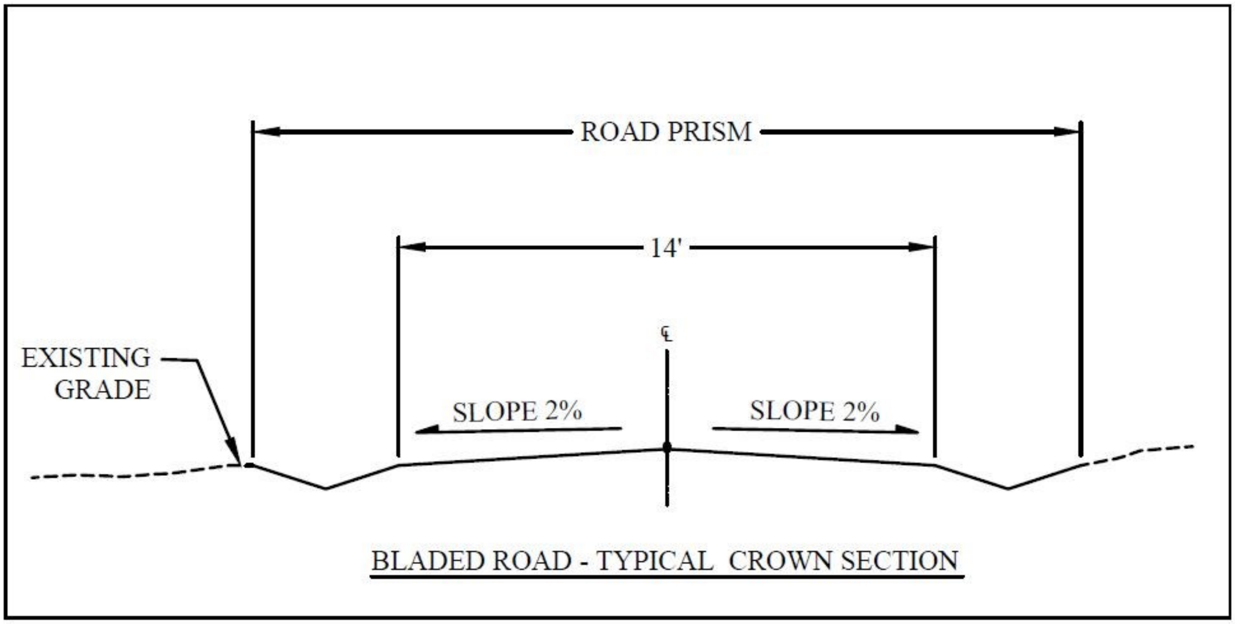


Figure 4-21. Typical transmission line bladed road section

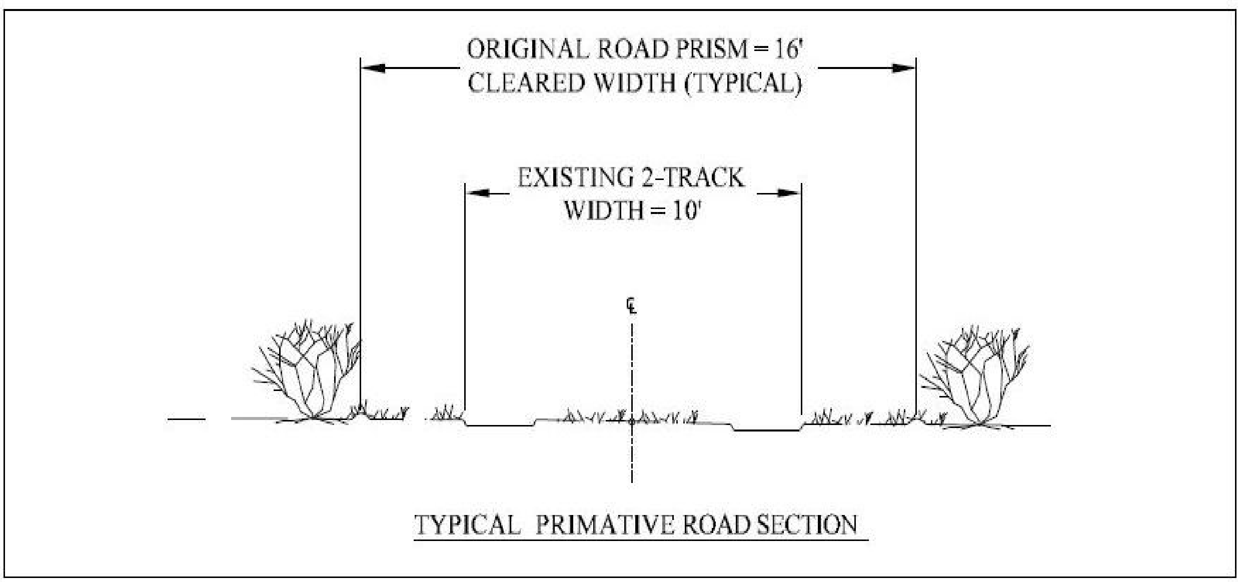


Figure 4-22. Typical transmission line primitive road section

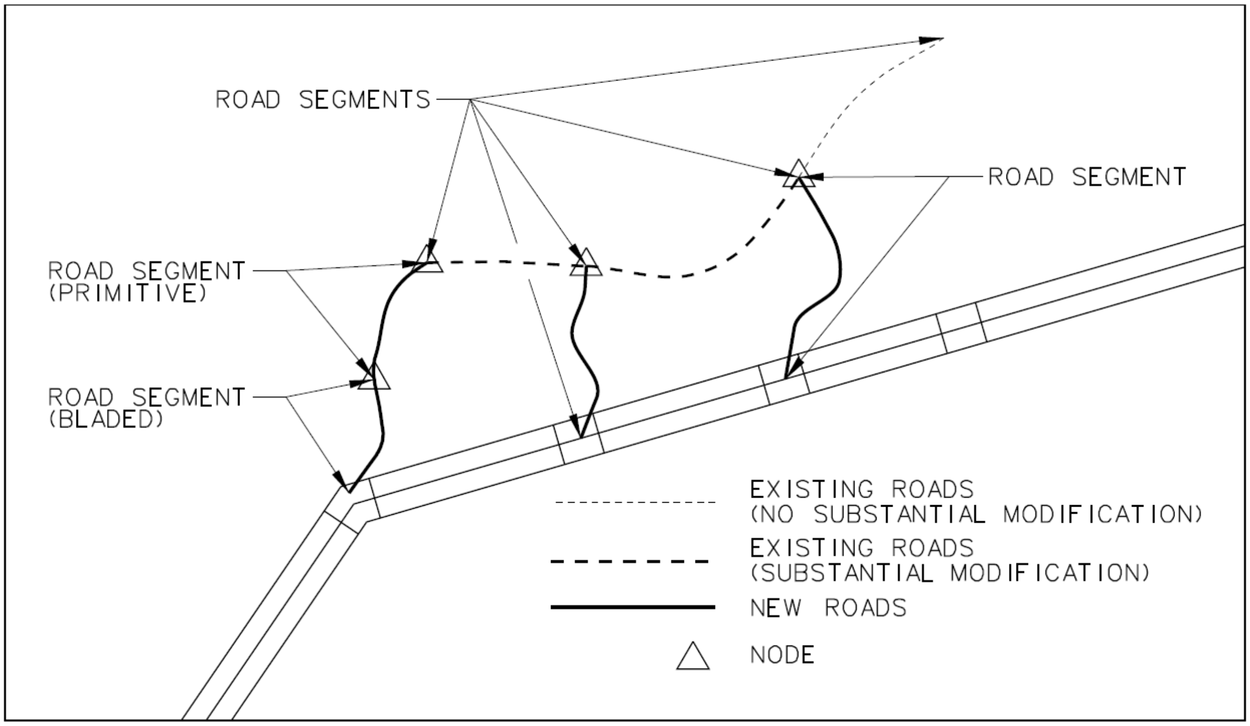


Figure 4-23. Example of transmission line road segment configuration

4.11.1 Upgrade of Existing Substations, Switchgear, and Transmission Line

Upgrading of the existing transmission line will require construction of additional roads to provide access for construction crews as well as laydown yards to store equipment and materials and tensioning areas that need to be cleared of vegetation and generally levelled out. This will require amendment of the USFS special use permit for the existing transmission line and related operations and maintenance plan. Laydown yards will typically be located on flatter areas since they only need to be near the construction activities, while tensioning areas may be constructed on steeper slopes since they must be adjacent to corners in the transmission line. Soil will not be salvaged from the roads, laydown yards, and tensioning areas. Some access roads already exist; however, additional roads will be necessary.

Upon completion of the upgrade, the laydown yards, tensioning areas, and some of the new roads will be reclaimed. Since these are primarily surface disturbances outside of any mineralized areas at the mine and areas with minimal potential for spills to occur, reclamation will typically entail scarifying the surface to reduce compaction, seeding and mulching. Seeding mixes will follow those outlined in **Table 3-12**. The Johnson Creek Substation to Lake Fork Substation segment of the transmission line crosses multiple landownerships in addition to USFS-managed lands; hence, IPCo has multiple easement agreements, some of which may specify access points and surface reclamation measures to be followed that do not match typical USFS requirements.

After final closure of the mine, the Johnson Creek to Lake Fork Substation segment of the transmission line is expected to be retained by IPCo to provide greater reliability of service than the current situation, thereby providing a long-term benefit to local communities. Hence, there will be no post-closure reclamation or monitoring requirements for Midas Gold; those will be retained by IPCo.

4.11.2 New Substation, Switchgear, and Transmission Line

Construction of the new substation, switchgear, and transmission line from the Johnson Creek Substation to the Project site will require construction of roads to provide access for construction crews as well as laydown yards to store equipment and materials and tensioning areas that need to be cleared of vegetation and generally levelled out. This will follow similar disturbance patterns and road construction as discussed above for the transmission line upgrade; however, soil will be salvaged from disturbance areas and stockpiled along the route.

Upon completion of the construction of the new transmission line, the laydown yards, tensioning areas, and some of the new roads will be reclaimed. Since these are primarily surface disturbances outside of any mineralized areas at the mine and areas with minimal potential for spills to occur, reclamation will typically entail scarifying the surface to reduce compaction, placement of GM, seeding, and mulching. Seeding mixes will follow those outlined in **Tables 3-12** and **3-13**.

After site closure activities are completed in Project Year 18 and the need for substantial on-site electric power requirements has passed, Midas Gold will disassemble the electric transmission line from the Johnson Creek Substation to the Project site. In addition, Midas Gold will remove the on-site substation and the switchgear. The supporting overhead transmission and distribution lines will be disconnected, reeled onto spools, and removed from the site for recycling or reuse elsewhere. Power pole structures will be cut at the base (below ground surface), loaded onto trucks, and removed for salvage or disposal at an appropriate off-site location. The laydown yards, tensioning areas, and roads will be reclaimed. Since these are primarily surface disturbances outside of any mineralized areas at the mine and areas with minimal potential for spills to occur, reclamation typically entails blading to match surrounding topography, scarifying the surface to reduce compaction, placing 6 inches of GM, seeding, and/or mulching. For roads at closure, road base and other unsuitable root zone materials will be addressed as described in Section 3.3.1. Where perennial streams cross the road corridor, culverts will be removed, and stream channels will be excavated to original or near original grades. The road corridors will be graded to blend into the surrounding topography. Seeding mixes for all reclaimed areas will follow those outlined in **Tables 3-11** and **3-12**, based upon the type of vegetation conditions that previously existed in each area.

Total disturbance for the upgraded and new transmission line construction is estimated to be 325 acres, with 314 acres being reclaimed either after construction or in Project Year 18. The construction work areas will be reclaimed after the transmission lines are completed (117 acres across both segments) and 68 acres of the disturbance from upgrading the line between the Johnson Creek Substation and the Lake Fork Substation will be reclaimed post construction. The entire new transmission line will be reclaimed (128 acres) post closure.

4.12 Water and Sediment Retention Structures

Water and sediment retention structures will be constructed during the construction, operation, and reclamation phases of the Project. Many of the structures built for the operational phase of the Project will be removed during grading of disturbed areas for reclamation, while others will be created by reclamation activities to retain water and sediment from the newly disturbed reclamation areas. As appropriate, Midas Gold and the USFS may agree to leave some sediment control structures; however, most will be removed as part of final closure. Details concerning the location and sizing of water and sediment retention structures and the pathways of collected waters will be presented in the Site Wide Water Management Plan.

As part of final site closure, the remaining sediment retention structures will be cleaned of collected sediment and the material will be disposed of as appropriate for its nature. Sediment in the ponds is not anticipated to require special disposal; however, it will be analyzed for metals to determine its suitability as GM. Fine sediment will be incorporated into GM and coarse material will be mixed with surrounding material during site grading. The structures will be knocked down and contoured and graded to blend into surrounding terrain. Diversion channels will be daylighted so as not to pond any water. Compacted areas, such as pond embankments, will be loosened as necessary by ripping or disking and left in a “roughened” condition prior to fertilizing and seeding. Seeding will be consistent with seed mixes and methods in **Tables 3-12** and **3-13**.

Section 5

Temporary Closure

No periods of temporary or seasonal closure are planned; however, circumstances beyond Midas Gold's control could require temporary cessation of operations. Cyclical production trends or slow-downs at mining operations are unpredictable due to circumstances that include fluctuation in metals prices, extreme weather conditions, labor disputes, technical issues with operations or equipment, production costs, taxes, company profitability, and effects of political, regulatory, and economic events.

In the event of temporary cessation of mining activities, Midas Gold will notify the USFS, IDEQ, IDL, Idaho Department of Water Resources, and Valley County in writing within 30 days of the temporary curtailment of mining activities. This notification will include reasons for the shutdown and the estimated timeframe for resuming production per 35 CFR 228.10.

During any temporary shutdown, Midas Gold will continue to implement operational and environmental maintenance and monitoring activities to meet permit stipulations and requirements for environmental protection. This will include the reclamation success monitoring described in Section 3.3.6. Environmental monitoring will continue on defined schedules, as outlined in the appropriate permit approvals and the PRO (Midas Gold 2016).

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

Dewatering of the open pits will continue during temporary closure due to the negative effects that pit lake formation or highwall saturation would have on highwall stability and renewed mining operation. Since ore processing may not be occurring, excess water collected from the various facilities will need to be discharged to the TSF for storage or, in the case of a longer-term closure, water treatment may be necessary to allow discharge to the area streams and prevent filling of the TSF.

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

Section 6

Reclamation Schedule

Concurrent and final closure and reclamation activities will be timed to take advantage of optimal climate conditions. Generally decommissioning activities, such as building, structure and non-mine waste removal will be conducted over the late winter and early spring months. Final establishment of grades, drainages, and sediment controls will typically occur over the late spring and summer months. GM application and seedbed preparation will occur in late summer or early fall immediately prior to seeding. Seed will be applied in fall prior to the time of most reliable precipitation, which is typically November through April. If seeding is not completed prior to winter onset, surface erosion protection measures will be applied, and spring seeding will occur at the earliest practicable time.

The estimated sitewide schedule of concurrent and final reclamation and wetland restoration is shown on **Figure 3-2** and presented in **Table 3-1**. The schedule and figure outline the timing of major disturbance and reclamation activities anticipated throughout the Project. Concurrent and final closure reclamation activities will be completed as soon as practicable after an individual facility (or portions thereof) is no longer needed for production or reclamation activities onsite. Concurrent reclamation of Project-related disturbance and restoration of wetland will be conducted in Project Years 7 through 12. Concurrent reclamation and restoration of a wetland and channel reach in Project Year 7 is anticipated to include:

- Haul roads outside the Hangar Flats pit (28.5 acres) and Yellow Pine pit (28.9 acres), and
- West End DRSF and WE1 wetland and channel reach (72.7 acres).

Concurrent reclamation and restoration of wetlands and channel reaches in Project Year 8 is anticipated to include:

- Haul roads outside the West End pit (23.2 acres), and
- Fiddle DRSF and FC 1 and FC2 wetlands and channel reaches (156.1 acres).

Concurrent reclamation in Project Years 9 and 10 is anticipated to be conducted at the Midnight GMS (11.4 acres), Fiddle DRSF Diversion (30 acres) and West End DRSF Diversion (24.2 acres). In Project Year 11, concurrent reclamation is anticipated to include:

- Additional haul roads outside the West End pit and ancillary disturbances (54.1 acres), and
- Yellow Pine pit Ancillary Disturbance (2.4 acres).

During the final year of production (Project Year 12), concurrent restoration is anticipated at the EF3 wetland and channel reach, which includes EF3, MNC2 and HC2 wetlands and channel reaches (25.2 acres). Midas Gold therefore anticipates that 457 acres of Project-related disturbance will be concurrently reclaimed or restored. This equates to approximately 30 percent of the total planned acres of reclamation and restoration to be conducted for the Project site.

The BC1 wetland (9.8 acres) will be restored in Project Year 1. The restoration of this wetland is not included in accounting of Project site reclamation/restoration acreage. As it also does not require salvage or placement of GM/SBM, it has not been included in the Project GM/SBM mass balance estimates.

Reclamation of the remaining 1,083 acres of Project-related disturbance will be initiated in Project Year 13 following cessation of mining and processing activities. In the three years following cessation of mining and processing activities decommissioning, closure and reclamation of process and support facilities at the Plant Site, RIBs, Meadow Creek Cut/Potential GM Borrow Area, Plant Site Haul Road, EFSFSR Diversion Inlet/Outlet, Midnight Creek Diversion, Yellow Pine DRSF, Blowout Creek Rock Drain along with restoration of MC4 and MC5 wetlands & channel reaches will occur. As a result, approximate 339 acres of Project-related disturbance will be reclaimed or restored during this time.

An approximately 2-foot-thick layer of development rock from the Hangar Flats DRSF will be placed on the surface of the TSF after the tailings have dewatered and consolidated sufficiently to support heavy equipment, which is anticipated in Project Year 18. The Hangar Flats DRSF will therefore not be reclaimed starting in Project Year 13 because development rock from the DRSF will be needed in Project Year 18 to provide a rock cover over the TSF prior to construction of the restored Meadow Creek channel and application of GM to the uplands portion of the TSF. The TSF will be allowed to dry and settle for approximately 5 years prior to initiating of reclamation and wetland restoration grading, and filling. During this time, the supernatant pool will be eliminated through enhanced evaporation.

Reclamation of the TSF, Hangar Flats DRSF, and wetlands and channel reaches across these facilities (i.e. MC1, MC2 and MC3) is anticipated in Project Year 18. The TSF will be reclaimed first, since development rock from the Hangar Flats DRSF will be used to cover the tailings before GM is placed on the TSF. Then, the wetlands and channel reaches across the TSF and Hangar Flats DRSF can be restored and the upland areas of the TSF and Hangar Flats DRSF can be reclaimed. Once the Hangar Flats DRSF is regraded, the Meadow Creek channel across the top can be restored. During this time, the remaining portions of the Plant Site (i.e. administration and truck shop areas), Worker Housing, Central Haul Road, Fiddle DRSF Landfill will be reclaimed. Six hundred fifty-two (652) acres of Project site-related disturbance planned to be reclaimed, will be reclaimed in Project Year 18, as well as the majority of the remaining GMSs (i.e. Truck Shop, Worker Housing, North Homestake and Yellow Pine Pit) will be reclaimed as they are cleared of GM. Finally, reclamation of the TSF and Hangar Flats DRSF run-on diversion is planned in Project Year 20 with a small portion of the Truck Shop GMS reclaimed during the same project year. As defined in IDAPA 20.03.02.39 (and the RCP Glossary of Term) “Post Closure” is the period after completion of permanent closure when the operator is monitoring the effectiveness of the permanent closure activities. The post closure period is therefore anticipated to begin following Project Year 20 and is anticipated to end in 5 years in Project Year 25. Since equipment access for the reclamation of the TSF may be delayed due to longer than anticipated tailing consolidation, and the West End pit Lake may not fill for 40 years, the completion of permanent closure and reclamation of these two facilities may extend past Project Year 18. However, the majority of project closure activities will be completed by then.

As defined in IDAPA 20.03.02.39 (and the RCP Glossary of Term) “Post Closure” is the period after completion of permanent closure when the operator is monitoring the effectiveness of the permanent closure activities. Monitoring and maintenance of the site will continue during this period, or as required. Discussion of specific reclamation monitoring for the Project site is included in Section 3.3.6.

The release of the reclamation performance bond will be concluded when the performance standards identified in Section 3.3.6 are achieved and the mechanism of bond release and demonstration of reclamation is formally agreed to by USFS, IDL and Midas Gold. When the full bond is released, sediments in the stormwater ponds will be removed and reclaimed. Following this, site monitoring and maintenance will cease. The post-mining phase is anticipated to begin following Project Year 25.

Section 7

Glossary of Terms

Alluvial: Said of a sediment, formed by the action of running water, as in a stream channel or an alluvial fan.

Angle of Repose: The maximum angle of slope, measured from a horizontal plane, at which loose or broken material will come to rest on a pile of similar material.

Aquatic: Growing, living in, frequenting or taking place in water.

Bond and Bond Reduction: Environmental legal responsibilities associated with regulatory sureties. Lowering of environmental legal responsibilities and associated regulatory sureties through the reclamation of disturbed areas, remediation, minimization of environmental impacts, or improving the efficacy and lowering the cost of reclamation and closure.

Capillary Break (Barrier): Capillary barriers, consisting of fine-over-coarse soil layers used in closures, especially in dry climates. The differences in pore size distribution between two soil layers cause infiltrated water to be retained in the upper soil layer under unsaturated flow conditions, as long as the contrast in unsaturated properties (e.g., soil-moisture characteristics and unsaturated hydraulic conductivities) of the soils in the two soil layers is sufficiently large.

Cessation: The temporary or complete stopping.

Closure: Closure represents both an activity and an event. Closure as an activity includes facility decommissioning and decontamination, and the physical and chemical stabilization of mine waste and disturbed lands. Closure is discrete from reclamation. However, for convenience, "reclamation" is often used to indicate both reclamation and closure. Closure as events includes the cessation of mining and processing activities (in part, or all of the property), and the period of time immediately following, when site activities emphasize decommissioning, decontamination and demolition of processing and mining facilities and the stabilization of mine wastes and disturbed areas. These activities foster reclamation (defined below) activities and realization of PMLUs.

Compensatory Wetland and Stream Mitigation: The restoration of aquatic resources for the purposes of offsetting unavoidable adverse impacts that remain after all appropriate and practicable avoidance and minimization has been achieved. Under 33 CFR 332.2, the terms restoration is defined as follows:

> <u>Restoration</u> - The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historical functions to a former or degraded aquatic resource.

Contact Water: Water that has come into contact with ore, processing or mining waste material or water and as a result of this contact contains or may contain suspended and dissolved constituent in solutions that are in concentrations that may exceed applicable water quality standards.

Contouring (Re-contouring): Reshaping ground material into a final landform.

Cover System, Cover, or Cover Material: A cover over mine waste (i.e., tailings and waste rock) that is designed to meet post-mining land uses or reduce the generation and transport of water that exceeds applicable water quality standards by reducing air and water contact with waste or which may or may not be suitable for establishment of vegetation.

Development Rock: The rock that must be removed and disposed of to gain access to and excavate ore. Also referred to as "waste rock".

Embankment: A linear structure, usually constructed of earth or rock, as an extension above the natural ground surface so as to retain water or tailings.

Erosion: The wearing away of the land surface by running water, wind, ice or other geologic agents including gravitational creep.

Evaporation: The process by which a substance changes from a solid or liquid state into a vapor or gas.

Excavation: The process of removing soil and/or rock and materials from one location and transporting them to another.

Fill Material: Soil or loose rock used to raise the surface of low-lying land, such as an embankment to fill a hollow.

Floodplain: Any low-level flat land the borders a stream that may be covered by its waters during a flood stage.

Geotechnical: Concerned with the engineering design aspects of slope stability, settlement, Earth pressures, bearing capacity, seepage control and erosion.

Grading or Regrading: The act of manipulating and leveling the ground surface.

Highwall: The unexcavated face of exposed overburden

Haul Road: A road used by large (typically off-road vehicles) trucks to relocate material for deposition or construction purposes.

Infiltration: The movement of water or other fluid into the soil (or other medium) through pores or other openings.

Infrastructure: The underlying foundation or basic framework; substructure of a community (i.e. schools, police, fire department, roads, water, sewer systems, etc.)

Leachate: The solution obtained by leaching of waste through a porous medium.

Liners: Low permeability material (clay or synthetic) used to create a barrier, such as between tailings and the ground surface.

Mine: An opening or excavation in the ground for the purpose of extracting minerals.

Mine Life: The period in which through labor, capital and tangible resources the ore reserves will be extracted.

Mining: The science, technique, and business of mineral discovery and exploitation; the act of extracting ore out of the ground.

Mitigation (Mitigate): Includes: avoiding an impact altogether by not taking action or certain parts of an action; minimizing impacts by limiting the degree of magnitude of the action and its implementation; rectifying the impact by repairing, rehabilitating or restoring the environmental effects; reducing or elimination of the impact over time by preservation and maintenance of operations during the life of the action; and/or compensating for the impact by replacing or proving substitute resources or environments.

Operations: All functions, work, and activities in connection with prospecting, exploration, development, mining or processing of mineral resources and all uses reasonably incident thereto, including roads and other means of access on lands subject to the regulations in this part, regardless of whether said operations take place on or off mining claims.

Growth Media: Material capable of establishing and sustaining an effective and permanent vegetation cover. Generally, mineral soil material from the A and B horizons of non-hydric soil solum are suitable plant growth media. Growth media may include amended or un-amended and screened or unscreened C horizons of the soil solum, as well as regolith, geologic material, and mine waste with physical and chemical properties (e.g. texture, density, water holding capacity, pH, soluble salts and metal content, base status, organic matter, and cation exchange capacity) that are not limiting to plant growth. These materials may be used to supplement available GM or used exclusively as the primary GM for reclamation.

Live Handling, Live-handling or Live Handled: Refers to the removal of soil (growth media- GM) from an area prior to the initiation of mining and related activities (i.e. disturbed area) and the haulage and immediate placement of the GM onto another area of disturbance that is prepared for permanent reclamation.

Obliteration: The act of closing of road segments so that future access is prevented, erosion on the disturbed surface is minimized, stabilized drainage across the disturbed surface is provided, geotechnical stability is provided, and the closed road is returned to productivity through appropriate seeding.

Post-Mining Land Use: Management-related activities or specific uses of mined land following cessation of mining and completion of closure and reclamation activities (e.g. grazing, agriculture, industrial, residential, watershed protection, and wildlife).

Production: Mining and processing of ore.

Production Period: The years the mine and processing facilities are active.

Raise: Underground opening driven upward from one level to a higher level or to the surface; a raise may be either vertical or inclined.

Reclamation: The process of restoring an area affected by a surface mining operation to its original or another beneficial use, considering previous uses, possible future uses, and surrounding topography. The objective is to re-establish a diverse, self-perpetuating plant community, and to minimize erosion, remove hazards, and maintain water quality. Reclamation measures prevent or control onsite and off-site damage to the environment and forest surface resources including, for example:

(1) Control of erosion and landslides;

(2) Control of water runoff;

(3) Isolation, removal or control of toxic materials;

(4) Reshaping and revegetation of disturbed areas, where reasonably practicable; and

(5) Rehabilitation of fisheries and wildlife habitat.

> <u>Interim Reclamation</u>: Temporary reclamation of land disturbed by construction and mining that: **will** be re-disturbed by mining, concurrent or final reclamation (see definitions below); **cannot** be permanently reclaimed concurrent with mining; and where temporary stabilization of disturbed ground would limit soil erosion, sediment transport and noxious weed establishment and spread. Reclamation activities may include: creation of micro-topographic features; sowing of interim reclamation seed mixture(s); application of mulch or erosion control fabric on erosion-prone areas; and installation and maintenance of BMPs. Examples of areas where interim reclamation may occur include road cut and fill slopes, and GMSs.

Concurrent Reclamation: Final or permanent reclamation of land disturbed by construction and mining that **will not** be re-disturbed during mining or final reclamation (see definition below) and **can** be permanently reclaimed concurrent with mining.

Final or Permanent Reclamation: Final or permanent reclamation of land disturbed by construction and mining that cannot be reclaimed until mining is completed.

Regolith: Unconsolidated material below the soil profile and on top of bedrock.

Runoff: Precipitation or snowmelt that is not retained on the site where it falls, not absorbed by the soil; the natural drainage away from an area.

Run-on Diversion: Diversion of runoff from undisturbed catchment areas above disturbed areas, which conveys surface water or non-contact water runoff away from disturbed areas. Non-Contact water is water that originates from areas that have not been disturbed by current or proposed mining and processing activities.

Sediment: Earth material transported, suspended and deposited by air, water or ice; also, the same material once it has been deposited.

Sedimentation: The act or process of accumulating sediment in layers; including the deposition, transportation and actual diagenetic changes to form ultimate consolidation.

Sediment or Sedimentation Pond or Basin: A place to temporarily retain stormwater runoff and hold the water while the soil and debris in the water settles out to become sediment. For the purposes of this report sediment pond will also function to attenuate or detain stormwater flow to reduce the potential for flooding residences, roads and other structures.

Seed Bank Material: Soil dominated by or containing a high content of organic matter and an established wetland seed bank. Generally, organic soil material from the O and A horizons of hydric soil solum.

Seepage: The residual solution that drains from tailings, evaporation ponds, leached and waste rock materials and other mine wastes.

Soil: A collection of natural bodies in the earth's surface, in places modified or even made by man of earthly materials, containing living matter and supporting or capable of supporting plants out-of-doors.

Soil Horizon: A layer approximately parallel to the surface of the soil, which is distinguishable from adjacent layers by a distinctive set of properties produced by soil-forming processes.

Soil Productivity: The capacity of the soil, in-situ, to produce a specified plant or sequence of plants under a certain ecosystem. Productivity is generally dependent on availability of soil moisture and nutrients as well as length of growing seasons.

Soil Profile or Profile: An exposed vertical cut through a soil.

Steady-State: A condition in which some specified characteristic of a condition, such as a value, rate, periodicity, or amplitude, exhibits only negligible change over an arbitrarily long period.

Stockpile: Material piled for future use.

Stormwater: Stormwater is water that originates during or immediately following precipitation events. Stormwater does not soak into the ground, rather it becomes runoff on the surface. For the purposes of this report, stormwater is runoff that does not contact ore, processing or mining waste material or process water, but does contact mine yards, road surfaces, cut/fill slopes composed of regolith and rock that is not mined. Generally, treatment of stormwater prior to release to water bodies (i.e. rivers, streams, lakes, ponds, etc.) includes only removal/partial removal of sediment through settling in sediment ponds/basins and possible the addition of flocculants.

Supernatant or Supernatant Pool: In a tailings impoundment, the water than gathers above the settled tailings material.

Tailings: The non-economic, ground rock material that remains after the valuable minerals have been removed from the ore by milling and subsequent mineral recovery circuits.

Tailings Storage Facility (TSF): The TSF embankment and all associated infrastructure needed to safely, efficiently and successfully manage and store tailings.

"Toe", at the toe, along the toe: The intersection of two drastically different slopes such as at the base of a steep fill slope and flat or nearly flat valley bottom.

Transect (line and belt): A line or rectangle along which one counts and records occurrences, type and properties of plant species.

Vegetation: All the plants or plant life of a place, taken as a whole.

Water of the United States: A jurisdictional term from the Clean Water Act and implementing regulations referring to wetlands, streams, and other water bodies within the scope of fill permitting requirements under Section 404 of the Act.

Watershed: The entire land area that contributes water to a particular drainage system or stream.

Water Treatment: The reagents, process, mixing, storage, equipment, and facilities used to meet water quality standards by neutralizing and removing precipitates from water prior to discharge to receiving water bodies such as rivers, streams, lake, ponds, etc.

Wetland: A land area that is saturated with water, either permanently or seasonally, such that it takes on the characteristics of a distinct ecosystem.

Windrow: A ridge of soil, typically pushed-up by a grader or bulldozer, usually for the purposes of safety or delineation.

Section 8

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Appendix A: Development Rock and Tailing Root Zone Suitability Analysis

APPENDIX A: Development Rock and Tailings Root Zone Suitability Analysis

Prepared for

Midas Gold Idaho, Inc.

Boise, Idaho

July 26, 2019

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List of Abbreviations

AES	Atomic Emission Spectroscopy
Ag	silver
As	arsenic
Bgs	below ground surface
CCME	Canadian Council of Ministers of the Environment
CMP	Conceptual Mitigation Plan
D	diameter
DBH	diameter at breast height
dm^2	square decimeter
DOE	United States Department of Energy
DRSF	development rock storage facility
EPA	United States Environmental Protection Agency
ft	feet
ft^2	square feet
GARD	Global Acid Rock Drainage Guide
GM	growth medium
Hg	mercury
ICP	Inductively Coupled Plasma
m	meter
m^2	square meter
Midas Gold	Midas Gold Idaho, Inc.
mm	millimeter
MS	Mass Spectrometry
n	sample size
n.a.	not available
ORR	Oak Ridge Reservation
ppm	parts per million
%ile	percentile
POX	pressure oxidized
Q	quantile
RCP	Stibnite Gold Project Reclamation and Closure Plan
RIVM	National Institute of Public Health and Environmental Protection (NETHERLANDS)
Sb	antimony
SBM	seed bank material
SGP	Stibnite Gold Project
stats	statistics
SWWC	Stibnite Gold Project Proposed Action Site Wide Water Chemistry
™	Trademark
TSF	Tailings Storage Facility
USGS	United States Geologic Survey

Section 1

Introduction

Comments and questions have been received with respect to the plant Growth Media (GM) or Seed Bank Material (SBM) thicknesses proposed for the reclamation of the Stibnite Gold Project (SGP) and the suitability of underlying mine materials (i.e. development rock and tailings) as root zone materials. This study therefore includes an evaluation of the suitability of development rock and tailings generated by the SGP as root zone material. The results of this study are included in this appendix to the SGP Reclamation and Closure Plan (RCP).

The RCP includes cover and GM/SBM replacement recommendations, which are generally (from bottom to top) as follows:

- Tailings Storage Facility (TSF) Uplands: Tailings - 24 inches Hangar Flats Development Rock - 12 inches GM
- TSF Wetlands and Channel Reach Cut or Fill Sections (Bankfull to Floodplain Boundaries): Tailings or Tailings - Hangar Flats Development Rock - Transition Layer (optional) - Geosynthetic Clay Liner (GCL) - Transition Layer - Rock Armor Layer - Streambed Material - 6 inches GM - 6 inches SBM
- TSF Wetlands and Channel Reach Cut or Fill Sections (Floodplain to Top of Terrace Boundaries): Tailings or Tailings - Hangar Flats Development Rock - Transition Layer (optional) - GCL - Transition Layer - Rock Armor Layer or Hangar Flats Development Rock - 6 inches GM - 6 inches SBM
- Development Rock Storage Facilities (DRSFs) Uplands: Development Rock - 12 inches GM
- DRSF Wetlands and Channel Reaches: Development Rock - Transition Layer - GCL - Transition Layer - Rock Armor Layer - 2 inches GM - 4 inches SBM

Concern has been expressed that these covers and GM/SBM replacement recommendations are not adequate to support and sustain vegetation as described in the planting prescriptions presented in RCP Section 3.3.5 and the Conceptual Mitigation Plan for Streams and Wetlands (Tetra Tech 2019). The goal of these prescriptions and plans is to sow seeds and plant woody and herbaceous species to encourage the establishment wetlands and upland grassland, shrub, and treed communities, which vary with respect to substrate depth and quality, aspect, topographic position, soil moisture and nutrient regime. Thereby creating wetlands and a dry to wet shrub and grassland upland vegetation community structure with some areas that are composed of tree species.

The primary method used to evaluate the suitability of tailings and development rock as root zone material is to assess soil properties that support: natural plant communities typical of the region, aspect, and elevation (Vegetated Soil); and vegetation on previously reclaimed mined land in the vicinity of the SGP (Reclaimed Soil) and compare these to development rock and tailings properties. These comparisons are the basis for total arsenic and coarse fragment content guidelines presented in RCP Table 3-3. *Root Zone Material Suitability Guidelines* and as presented in Section 6 of this Appendix. These guidelines would be used, in part, to assess the suitability of materials located approximately 0 to 3 feet below the GM layer placed on the DRSFs and TSF for final reclamation. These guidelines will be revised over the life of the SGP as more data and information are collected regarding tailings, development rock, GM, SBM properties and plant species tolerance and sensitivity to the properties of these materials.

Materials underlying general disturbance (e.g., Meadow Creek Cut/Potential GM Borrow, haul roads, plant site, ancillary disturbances) will be composed of regolith (See RCP Table 3-4). Regolith currently functions as root zone material; therefore, by inference, these materials will be suitable root zone materials for the reclamation of SGP disturbance and were not considered further in this analysis.

Section 2

Tailings and Development Rock Properties

Geochemical test results presented in the SRK's report "*Stibnite Gold Project Proposed Action Site Wide Water Chemistry (SWWC) Modeling Report*" (SRK, 2018) show that development rock and tailings generated by mining and ore processing activities at the SGP presents a low potential for acid generation. The pH of porewater retained within tailings and development rock are therefore anticipated to be circum-neutral to alkaline and not limiting to plant growth.

Antimony (Sb), arsenic (As), mercury (Hg) and silver (Ag) were identified as constituents anticipated to be present in development rock and tailings generated by the SGP in concentrations that may adversely impact plant growth and development. The last lift and average total concentration of trace metals projected to be present in the DRSFs were estimated using the geological resource model (block model) for the SGP and are presented in **Table A-1** along with screening-level phytotoxicity criteria from a variety of sources.

The block model reports elemental concentrations in ore and development rock from the Hangar Flats, Yellow Pine and West End deposits using a database base on multi-elemental analysis of rock samples collected during the SGP exploratory and resource drilling programs. Rock samples were subjected to multi-elemental analysis by four-acid digestion followed by inductively coupled plasma atomic emission spectroscopy (ICP AES) for 33 elements, with every 20th sample digested in aqua regia followed by an inductively coupled plasma mass spectrometry (ICP MS) finish for 51 elements with a fluorine add-on. Element concentrations in tailings are based on multi-element analysis (i.e. four-acid digestion and ICP-MS/ICP-AES analysis - ALS Chemex Method MEMS61m) of a 10% Pressure Oxidation (POX) residue and 90% bulk flotation tailings mixture, which was generated during bench-scale metallurgical testing of a composite ore sample from the Yellow Pine Pit. The comingled waste stream is the best representation of the tailings deposited in the SGP TSF (SRK, 2017). Given the digestion and analysis performed on tailings and development rock sample, the trace metal concentrations reported in **Table A-1** are considered to represent total metal concentrations.

The overall particle size distributions of SGP development rock as identified in the SWWC modeling report (SRK, 2018) are described as follows:

> *"According to Schafer and Associates (1997), Price and Kwong (1997), Murray (1977), Munroe et al. (1999), Herasymuik (2006) and Schneider et al. (2010) the typical proportion of fines within a development rock facility is between 10% and 50%. For the purpose of the Project DRSF source term predictions, 20% of total mass in the DRSFs will consist of 'fines' and available for chemical weathering reactions (SRK, 2017a). This is a reasonable estimate for unsaturated crystalline (i.e. durable) development rock and is within the 10 to 50% range reported in the literature. Uncertainty analysis will be undertaken to assess the uncertainty associated with this parameter (Section 12)."*

This development rock particle size distribution is considered conservative as its gradations at the surface of DRSFs are anticipated to contain a lesser proportion of boulders due to the fracturing of rock during dumping and grading activities and exposure to atmospheric conditions, freeze/thaw and other weathering processes. In addition, Midas is considering decreasing the proportion of boulders in the development rock that will be present at the surface of the DRSFs (and TSF) through enhanced blasting techniques and implementation of other options as discussed in RCP Section 3.3.3.

One hundred percent of the commingled pressure oxidized (POX)/flotation tailings will be composed of “fines” or fine-earth fraction (< 2 mm) (USDA, 2019).

Table A-1. Tailings, Average of DRSF Last Lift and Pit Development Rock Total Trace Metal Concentrations, and Screening-Level Phytotoxicity Criteria

Element	Hangar Flats DRSF Last Lift Ave[a]	Fiddle DRSF Last Lift Ave[a]	West End DRSF Last Lift Ave[a]	Yellow Pine DRSF (Pit Backfill) Last Lift Ave[a]	Yellow Pine Pit Develop Rock Ave[b]	Hangar Flats Pit Develop Rock Ave[b]	West End Develop Pit Rock Ave[b]	POX/ Flotation Tailings[c] (*n*=1)	Screening Concentrations (Total) for the Phytotoxicity of Element in Soils[d]						
									EPA 2018	CCME 2015	DOE 1997	Kabata 1992	ORR 1993	RIVM 1993	USGS 1984
Antimony (ppm)	40	30	0	0	80	50	0	68	-	20	5	5-10	0.46	-	0.52
Silver (ppm)	0.56	0.33	0.36	1.33	0.48	0.32	0.51	2.1	560	20	2	-	1.22	-	-
Arsenic (ppm)	1,241	793	233	384	1,244	751	287	3,800	18	12	10	2-50	9.7	40	4.8
Iron (ppm)	18,000	13,000	18,000	17,000	19,000	15,000	19,000	15,000	-	-	-	-	-	-	-
Mercury (ppm)	1.49	1.18	0.59	0.78	0.44	1.32	0.72	0.18	-	6.6	0.3	0.3-5	0.2	10	0.08
Aluminum (ppm)	72,000	51,000	42,000	36,000	n.a.	59,000	43,000	75,000	-	-	50	-	15,700	-	33,000

[a] *Average concentration in last lift of development rock placed in DRSF (Midas Gold 2018).*

[b] *Average concentration in development rock mined from respective pit (Midas Gold 2018).*

[c] *Yellow Pine Pit composite and blend of Pressure Oxidation (POX) and flotation tailings (SRK, 2017)*

[d] *Citations for screening-level concentrations presented in Section 7 - References:*

n.a. - Not Available

Section 3

Screening-Level Evaluation of Development Rock and Tailings Properties

Screening-level phytotoxicity criteria concentrations of total trace elements in soils from various literature references and federal agencies in the U.S. and Canada are presented in **Table A-1**. The large variability in these screening-level values may be the result of differences in test design, laboratory protocol, species sensitivity and tolerance mechanisms, metal reactivity and the ability to measure the precise effects of metals on plant growth and function (DOE 1997 and EPA, 2003b). This variability underscores the importance of establishing site-specific criteria to assess the suitability of development rock and tailings materials as root zone material at SGP (as well as other mine sites).

The anticipated concentrations of total trace metals in development rock and tailings that exceed at least one of these screening-level criteria are as follows:

- Antimony and arsenic - all development rock and (POX)/flotation tailings;
- Mercury - POX/flotation tailings (USGS criteria), all development rock (DOE, ORR, USGS and Kabata minimum criteria); and
- Silver - Yellow Pine DRSF (pit backfill), Last Lift (ORR criteria), and POX/flotation tailings (DOE and ORR criteria).

Screening-level criteria for total iron is not included in the references presented in **Table A-1**. While the concentrations of total aluminum in all development rock and tailings exceed the criteria, presented by USGS, ORR and DOW, which were developed in 1984, 1993 and 1997, respectively, since the publications of these criteria, it has been shown that total aluminum in soil is not correlated to toxicity to plants (EPA 2003a). Iron and aluminum were, therefore, not considered further in this analysis.

As presented in Sections 4.0 and 5.0 below, the concentration of Sb, As, Hg and Ag in Vegetated and Reclaimed Soils adjacent to the SGP are considerably greater than screening-level criteria presented in **Table A-1**. The ratio of development rock and tailings metal concentrations to screening-level criteria presented in **Table A-2** were, however, assumed to be the best indicator of the metal in SGP development rock and tailings with the greatest potential to adversely impact plant growth and development. Based on this assumption arsenic in root zone materials is considered to have the greatest potential to cause phytotoxicity in plants growing on reclaimed DRSFs and the TSF at the SGP since the ratio of the maximum arsenic concentrations in development rock and tailings to the highest and lowest screening-level criteria are at minimum, 19 to 11 times higher, than the next metal of potential concern, respectively.

Table A-2. Ratio of Highest Average Development Rock or Tailings Total Metal Concentrations to Highest and Lowest Soil Screening-Level Phytotoxicity Criteria

Element	Max Develop Rock, Last Lift or Tailings Concentration (ppm)	Highest Screening - Level Criteria (ppm)	Lowest Screening - Level Criteria (ppm)	Ratio	
				Waste: Highest Criteria Ratio (X:1)	Waste: Lowest Criteria Ratio (X:1)
Antimony	80[a]	20	0.46	4.0	173.9
Arsenic	3800[b]	50	2	76	1900
Mercury	1.49[c]	6.6	0.2	0.2	7.5
Silver	2.1[b]	560	1.22	0.004	1.7

[a] *Average concentration in development rock mined from Yellow Pine Pit (Midas Gold Idaho, Inc. 2018).*

[b] *Concentration of all POX/Flotation Tailings.*

[c] *Average concentration in last lift of development rock placed in Hangar Flats DRSF*

The selection of arsenic as the metal that is most likely to cause phytotoxic responses in plants growing on reclaimed lands at SGP is consistent with Kabata (1992) where statements are made as follows:

- *"Arsenic toxicity has commonly been noted in plants growing in mine waste, on soils treated with arsenical pesticides and on soils with As (arsenic) added by sewage sludge treatment." (pg. 207); and*
- *"Arsenic is known as a metabolic inhibitor, therefore yield reduction of vegetation under a high level of arsenic should be expected." (pg. 209)*

Section 4

Evaluation of Vegetated Soil Adjacent to the SGP

Soil data from areas surrounding the SGP were evaluated to assess trace metal concentrations in Vegetated Soil. This evaluation is not a prediction of what metals concentrations will be in growth media salvaged during implementation of the SGP; it is an evaluation of the occurrence of healthy natural vegetation on natural soils that have metals concentrations in excess of typical screening criteria. It is intended to show that natural vegetation in the vicinity of the mineralization at SGP has adapted to naturally elevated metals concentrations in soils and that revegetation using propagants of these plants could thrive despite SGP development rock being within its rooting zone. Four thousand eight hundred twenty-eight (4,828) surface soil samples were collected by Midas Gold Idaho, Inc. (Midas Gold) from 2009 to 2015 for the purposes of mineral exploration (mineral exploration soil sampling program). Soil samples were collected from locations surrounding the SGP on grid patterns, the majority of which were distant from surface disturbance created by historical mining, and current SGP permitting and development activities. Based on discussions with the exploration manager for Midas Gold, these soil samples were collected from locations outside of the prevailing wind direction (of north) from the former Meadow Creek Mine smelter, which was located in the proposed location of the Hangar Flats Pit. While the potential exists for winds other than prevailing winds to contaminate soils via airborne emissions from the smelter, according to the Stibnite Area Site Characterization Report (URS Greiner Woodward Clyde, 2000) extensive sampling was conducted adjacent to the smelter to define lateral extent of soil contamination, and soil contamination was only observed immediately adjacent to the smelter stack in the highly disturbed areas. Areas of known contamination and historical mine-related disturbance (e.g., trenches, dumps, buildings, ground disturbance from historical mining operations) were intentionally avoided and not sampled as part of mineral exploration soil sampling program because the analytical result from the sampling of these areas would not represent *in situ* materials properties and would therefore serve no useful purpose for mineral exploration. Soil sample site locations and historical mining surface disturbance are shown on **Figure A-1**. Soil samples were collected from 0 to 16 inches below ground surface (bgs), with average and median collection depth bgs of 9 and 12 inches, respectively.

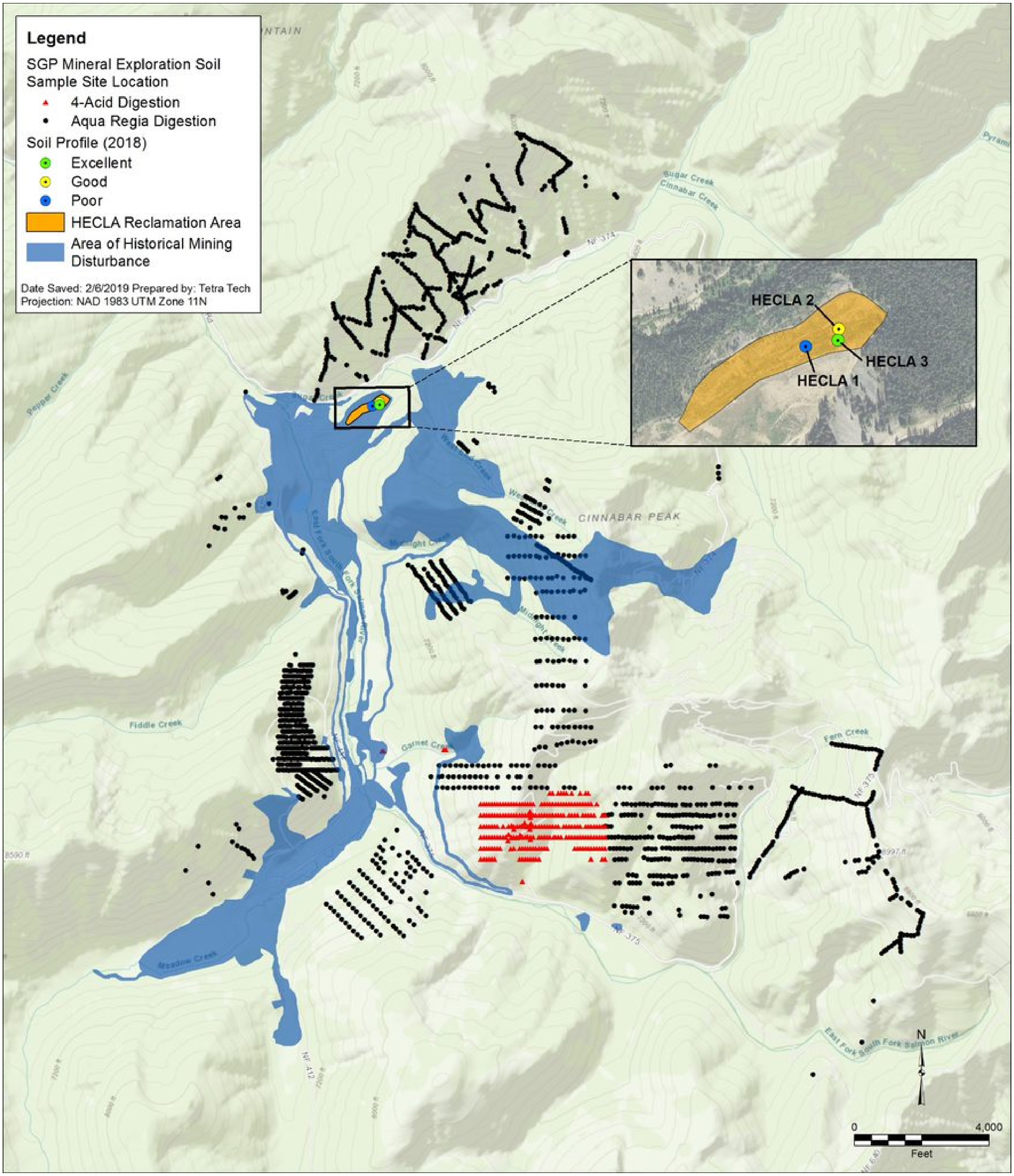


Figure A-1. SGP mineral exploration soil sample site locations collected from 2009 to 2015

4.1 Summary of Laboratory Analytical Methods

The soil samples collected from the vicinity of the SGP were analyzed using one of two laboratory procedures as follows:

- Four-acid digestion followed by elemental analysis with ICP-MS and ICP- AES (ALS Method ME-MS61m); or
- Aqua regia digestion followed by elemental analysis with ICP-MS and ICP-AES (ALS Method ME-MS41m).

The suite of elements analyzed are as follows: Au–Gold; Ag- Silver; As- Arsenic; B- Boron; Ba-Barium; Be-Beryllium; Bi-Bismuth; Cd- Cadmium; Ce – Cerium; Co- Cobalt; Cr- Chromium; Cs- Cesium; Cu-Copper; Ga- Gallium; Ge- Germanium; Hf- Hafnium; Hg- Mercury; In- Indium; La- Lanthanum; Li-Lithium; Mn- Manganese; Mo- Molybdenum; Nb – Neodymium; Ni- Nickel; P- Phosphorus; Pb- Lead; Pd- Palladium; Pt- Platinum; Rb- Rubidium; Re- Rhenium; Sb- Antimony; Sc- Scandium; Se- Selenium; Sn- Tin; Sr- Strontium; Ta- Tantalum; Te- Technicium; Th- Thorium; Tl- Thallium; U – Uranium; V-Vanadium; W- Tungsten; Y- Yttrium; Zn- Zinc; and Zr- Zirconium.

In general, the four-acid digestion results in a higher analytical result due to a more complete digestion of the sample material when compared to the aqua regia digestion. According to the GARD Guide™ - (INAP, 2009)

- Four-acid (hydrofluoric, perchloric, nitric, and hydrochloric acid) digestion is the most powerful wet acid dissolution procedure in common use and is considered a near total digestion. Although the lower digestion temperature makes it less able to digest silicates than fusion methods, the four-acid method is capable of dissolving most metal salts, carbonates, sulphides, silicates, and almost all sulphates and oxides.
- Aqua regia (3:1 mixture of hydrochloric and nitric acids) is an effective solvent for most base metal sulphates, sulphides, oxides and carbonates, but provides only a partial digestion for most rock forming elements and elements of a refractory nature. It is typically less expensive and does not provide as complete a digestion as the four-acid method. However, aqua regia provides a good measure of trace elements in most reactive minerals.

Given this, the aqua regia digestion method likely underestimates trace metal concentrations when compared to the four-acid digestion method, however both of these methods should adequately capture most plant-available metals/metalloids in soil. As approximately 93% of the soil samples were analyzed using the aqua regia digestion method (see Section 4.2 below), conservatism in the prediction of natural soil metal concentrations is provided since the total trace metal concentrations in soil adjacent to the SGP is likely higher than reported below, thus indicating a higher level of plant tolerance to trace metal concentrations in soils where vegetation is present (Vegetated Soil). Based on these factors, the trace metal data from the mineral exploration soil sampling program at the SGP were considered comparable to the screening-level phytotoxicity criteria and POX/Flotation tailings and development rock total trace metal concentrations presented in Section 2 and 3 of this appendix.

4.2 Summary of Soil Laboratory Data Prior to Statistical Analysis

The concentrations for antimony Sb, As, Hg and Ag in the 4,828 soil samples are summarized in **Table A-3**. In the complete or total dataset (i.e. dataset containing statistical outliers, non-vegetated soil data, etc.), 352 samples were analyzed using the four- acid digest method and 4,476 were analyzed using the aqua regia digestion method. Summary information indicates a wide range of results, up to: 2,580 ppm Sb; 7,380 ppm As; 283 ppm Hg; and 6.75 ppm Ag.

Table A-3. Summary Statistics for Total Sb, As, Hg and Ag Concentrations in Soils Adjacent to the SGP Uninfluenced by Historical Mining Activities[a]

Statistic	Antimony	Arsenic	Mercury	Silver
n observed[b]	4828	4828	4807	4828
Detection limits	5	5	0.005 - 0.1	0.01 - 0.5
Non-Detects (#)	8	7	4	40
Detection Frequency	99.83%	99.86%	99.90%	99.11%
Minimum Detect	0.04	0.22	0.005	0.002
Maximum Detect	2580	7380	283	6.8
Mean	14.88	115	0.972	0.106
10%ile	0.624	4.48	0.039	0.019
20%ile	0.923	5.97	0.053	0.025
25%ile(Q1)	1.115	6.92	0.061	0.028
50%ile(Q2)	2.835	25.1	0.117	0.045
75%ile(Q3)	7.483	95.4	0.315	0.083
80%ile	9.94	128.5	0.431	0.099
90%ile	21.35	270	1.138	0.183
95%ile	39.35	421.3	2.55	0.322
99%ile	125.1	922	13.3	0.626

[a]Notes: Statistics presented exclude analytical data below method detection limits. The frequency of detection for the all metals presented is greater than ~ 99% of the dataset. The exclusion of analytical data below the method detection limits is therefore immaterial to the statistical analysis and conclusion presented here.

All values in ppm unless otherwise indicated.

Q = quantile

%ile = percentile

[b] n observed = total sample size

4.3 Statistical Analysis: Procedures

To estimate a range of concentrations that supports vegetation, steps were taken to determine an appropriate dataset as follows:

1. Statistically evaluate acid digest samples versus aqua regia samples using Wilcoxon Mann Whitey U test (EPA 2013, EPA 2016)[1] and Sb, As, Hg, and Ag as indicator metals for all others.
2. Remove outliers from four-acid dataset with the higher concentrations based on As, Ag, Hg and Sb. If a result is identified as an outlier for any of these four metals, the sample is removed from the four-acid dataset.
3. Remove samples from the dataset that were collected from non-vegetated areas. This is based on identification of the samples that had the highest concentrations, as well as specific locations that appeared to be devoid of vegetation for any reason based on visual inspection of the sample's location on Google Earth Pro™. Areas that had fallen tree trunks due to forest fires were considered vegetated, as were areas where live trees, shrubs, or grasses were present.
4. Combine the datasets, and

[1] The Mann-Whitney (M-W) (or WMW) test (Bain and Engelhardt, 1992) is a nonparametric test used for determining whether a difference exists between the site and the background population distributions. This test is also known as the WRS test. The WMW test statistic tests whether or not measurements (location, central) from one population consistently tend to be larger (or smaller) than those from the other population based upon the assumption that the dispersion/shapes of the two distributions are roughly the same (comparable)."

5. Prepare summary statistics and quantile estimates and prepare a box and whisker graph for As, Sb, Ag, and Hg.

4.4 Statistical Analysis: Discussion

First, data were segregated by analytical method. Soil samples analyzed by four acid digestion (*n*=352) were compared to samples analyzed by aqua regia digestion method (*n*=4476) to determine if analytical method influenced soil concentration results for Sb, As, Hg and Ag. In all cases and as anticipated, the four-acid digestion method produced higher results than the aqua regia digestion method. This observed difference is attributed to the differences in the analytical methods, since the soil samples analyzed using both digestion methods were taken from areas away from the mining activities and are uninfluenced overall by historical mining and recent exploration activities.

Based on the results of the statistical test of methods, samples analyzed using the four-acid digestion methodology were tested for outliers using Rosner's test. This test identified 66 samples as outliers for Sb, As, Hg and Ag and were therefore, removed from further consideration to minimize the impact of analytical method on overall threshold concentration. The summary statistics for these outlier samples are presented in **Table A-4**.

Table A-4. Summary Statistics for Outlier Sample Set (Excluded from the Dataset)[a]

Statistic	Antimony	Arsenic	Mercury	Silver
n observed[b]	66	66	47	63
Minimum	6.48	21.6	0.06	0.12
Maximum	1015	4830	15.7	2.2
Mean	165.7	970.3	3.94	0.81
50%ile(Q2)	124	816.5	2.78	0.69
Standard Deviation	176	790.9	3.46	0.57

[a]*Notes: Statistics presented exclude analytical data below method detection limits.*

The frequency of detection for the all metals presented is greater than ~ 99% of the dataset. The exclusion of analytical data below the method detection limits is therefore immaterial to the statistical analysis and conclusion presented here.

All values in ppm unless otherwise indicated.

Q = quantile

%ile = percentile

[b] *n observed = total sample size*

To determine which samples could be representative of soil conditions that support vegetation, 20 samples that were collected from areas devoid of vegetation were removed from the aqua regia digestion method dataset. There were exceptions to this general rule, however, as samples were considered to be from vegetated areas if any vegetation was located around them (including shrubs, grasses, trees or fallen tree trunks on the ground). Samples that appeared to be located within road corridors were included if the road was within a vegetated area without mining-related features (e.g. mine spoil, waste rock, highwalls). In addition, the soil sample series were all taken on a grid, with the purpose of identifying mineralized zones; roads, therefore, would have been excluded from the sampling design if they were constructed from mine waste. These samples were identified based on visual inspection of the sample's location on Google Earth Pro ™. The samples removed include EX0450 and EX0451 (appear to have rock/waste rock from historical mining activities) and several samples from the 3700 series where vegetation was not present. The reason that the 3700-series area is devoid of vegetation is not known, but the samples were removed consistent with the pre-determined dataset refinement steps. The summary statistics for the samples located in areas that were devoid of vegetation are presented in **Table A-5**.

Table A-5. Summary Statistics for Non-Vegetated Sample Set (Excluded from the Dataset)[a]

Statistic	Antimony	Arsenic	Mercury	Silver
n observed[b]	20	20	20	20
Minimum	29.6	478	0.38	0.26
Maximum	2580	7380	4.7	6.05
Mean	288.1	2171	1.297	1.05
50%ile(Q2)	55.75	1775	1.01	0.45
Standard Deviation	718.6	1777	0.99	1.69

[a]Notes:

All values in ppm unless otherwise indicated.

Q = quantile

%ile = percentile

[b] n observed = total sample size

Following removal of these data from the datasets, the remainder of the data were retained and combined to develop reference values that could be used for the development of root zone material suitability guidelines.

It is important to note that the 10 highest results each for Sb, As, Hg and Ag in the combined dataset were reviewed visually to verify that they were from samples collected in areas containing vegetation. All of the highest samples were from vegetated areas, with concentrations ranging as follows:

- Antimony: 49.3 ppm [EX1968] to 462 ppm [EX3517]
- Arsenic: 1230 ppm [EX3422] to 5280 ppm [EX1539]
- Mercury: 0.07 ppm [EX2077] to 252 ppm [EX1102]
- Silver: 0.304 ppm [EX3609] and 1.085 ppm [EX3565]

It is also important to note that, as shown in **Table A-6**, the concentrations of total Sb, As, Hg and Ag in the combined Vegetated Soils dataset (i.e. following removal of statistical outliers and sample data from non-vegetated areas) are greater in some instances than the concentrations of these same total metal concentrations projected to be present in the SGP DRSFs and TSF (**Table A-1**).

Table A-6. Number and Percentage of Vegetated Soil Samples with Total Metal Concentrations Greater than Tailings and Highest Estimated Average Development Rock Total Metal Concentration

Comparison	Antimony *n* stats[a] = 4734			Arsenic *n* stats[a] = 4735			Mercury *n* stats[a] = 4736			Silver *n* stats[a] = 4702		
	Highest Average Mine Waste [M+] (ppm)	#	%	Highest Average Mine Waste [M+] (ppm)	#	%	Highest Average Mine Waste [M+] (ppm)	#	%	Highest Average Mine Waste [M+] (ppm)	#	%
Vegetated Soil[a] [M+] > POX/Flotation Tailings[b] [M+]	68	170	3.6	3800	1	0.02	0.18	175 0	37.0	2.1	7	0.15
Vegetated Soil[a] [M+] > Fiddle DRSF Last Lift Average [M+]	30	456	9.6	793	46	1.0	1.18	440	9.3	0.33	233	5.0
Vegetated Soil[a] [M+] > Hangar Flats Pit Development Rock Average or DRSF Last Lift Average[c] [M+]	50	251	5.3	1241	9	0.2	1.49	361	7.6	0.56	62	1.32
Vegetated Soil[a] [M+] > Yellow Pine Pit Development Rock Average or DRSF Last Lift Average[c] [M+]	80	134	2.8	1244	9	0.2	0.78	610	12.9	1.33	9	0.19
Vegetated Soil[a] [M+] > West End Pit Development Rock Average or DRSF Last Lift Average[c] [M+]	n.a.			287	428	9.0	0.72	647	13.7	0.36	194	4.1

[M+]: metal concentration

#: Number of vegetated soil samples (following removal of statistical outliers, non-vegetated areas and analytical data below method detection limits) with metal concentration greater than mine waste metal concentration.

%: Percentage of vegetated soil samples (following removal of statistical outliers, non-vegetated areas and analytical data below method detection limits) with metal concentration greater than mine waste metal concentration.

[a] Soil dataset following removal of statistical outliers, non-vegetated areas and analytical data below method detection limits.

[b] Yellow Pine Pit composite and blend of pressure oxidized and flotation tailings

[c] Highest of either the average [M+] in development rock mined from pit OR the average [M+] in last lift of development rock placed in DRSF (Midas Gold Inc. 2018).

n.a. = Not Available

The combined Vegetated Soils dataset for all analytes was summarized using ProUCL (EPA 2013, EPA 2016). All data were tested to determine their distribution. These data did not fit normal, log-normal or other common distributions. This is expected given that the samples collected were from a large and complex zone of mineralization, which may represent more than one distribution due to variations in the phase and degree of mineralization and truncation by erosion within the Stibnite-Yellow Pine Mining District (District). This necessitated that the combined dataset be assessed using nonparametric methods, statistical methods in which data are not required to fit a particular distribution. Therefore, all potential reference values presented in **Table A-7** including quartiles, percentiles, and the Chebyshev rule of inequality, are based on the nonparametric dataset presented in this section (i.e. Section 4.0). The Chebyshev rule of inequality states that 75% of all data will fall within 2 standard deviations of the mean (Remington and Schork 1985). It is important to note that regardless of the reference value selected it will always be less than the maximum concentrations observed.

Table A-7. Summary Statistics for Total Sb, As, Hg and Ag in Vegetated Soils Adjacent to the SGP Following Removal of Statistical Outliners, Non-Vegetated Areas and Non-Detects[a]

Statistic	Antimony	Arsenic	Mercury	Silver
n observed[b] (#)	4828	4828	4807	4828
Detection limits	5	5	0.005 - 0.1	0.01-0.5
Non-Detects (#)	8	7	4	40
Detection Frequency	99.83%	99.86%	99.92%	99.17%
Statistical Outliers (#)	66	66	47	66
Non-Vegetated (#)	20	20	20	20
n stats[c] (#)	4734	4735	4736	4702
Minimum Detect	0.04	0.22	0.005	0.002
Maximum Detect	500	5280	283	6.75
Mean	11.63	94.40	0.94	0.0928
10%ile	0.64	4.56	0.04	0.02
20%ile	0.96	6.11	0.05	0.03
25%ile(Q1)	1.18	7.19	0.06	0.03
50%ile(Q2)	3.15	29.3	0.12	0.05
75%ile(Q3)	8.90	103.5	0.31	0.09
80%ile	12	137.8	0.43	0.11
90%ile	28.3	269	1.06	0.20
95%ile	51.79	408	2.42	0.35
99%ile	129.8	783	12.93	0.60
Standard Deviation	28.35	177.8	8.064	0.204
Mean + 2 Std Dev	68.33	450	17.07	0.50
Chebyshev Rule of Inequality [75% of all data will be within 2 Std Dev] (ppm)	68.33	450	17.07	0.50

[a] *Notes:*

Statistical outliers, non-vegetated areas and analytical data below method detection limits removed from dataset.

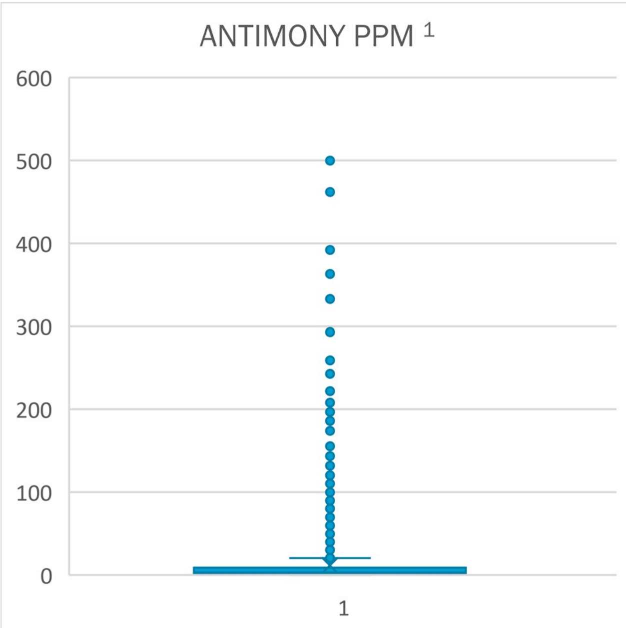
The frequency of detection for the all metals presented is greater than ~ 99% of the dataset. The exclusion of analytical data below the method detection limits is therefore immaterial to the statistical analysis and conclusion presented here.

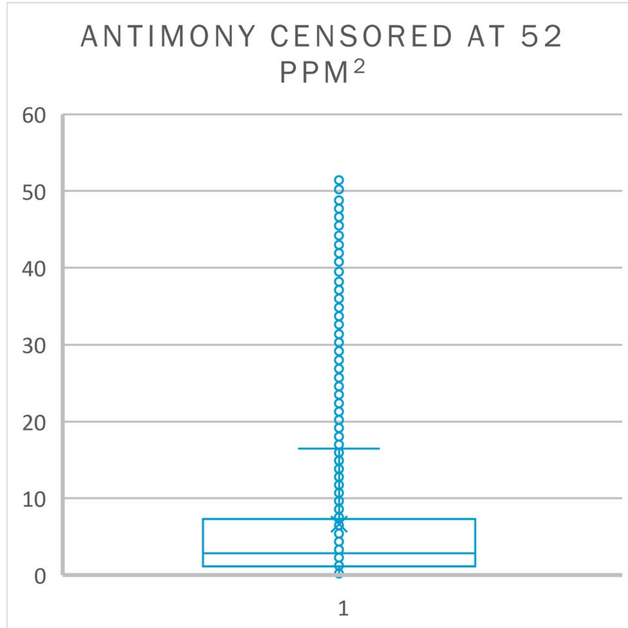
All values in ppm unless otherwise indicated.

[b] *n observed = total sample size*

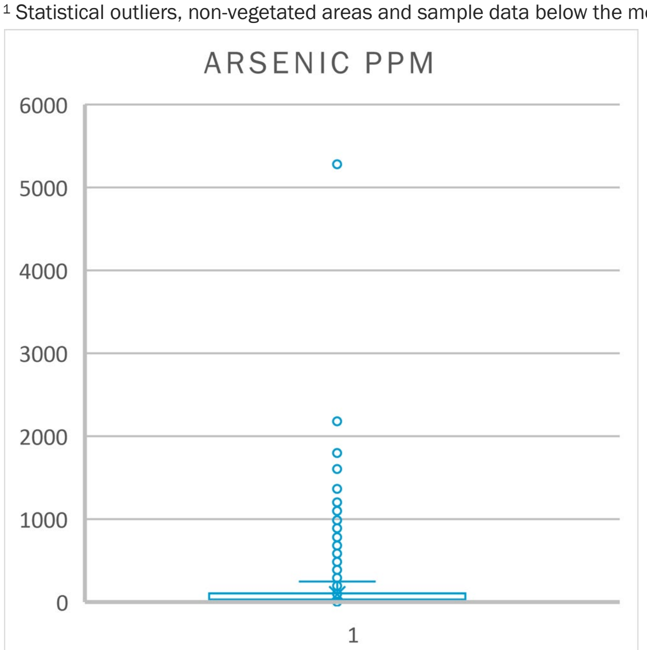
[c] *n stats = sample size used in statistical analyses.*

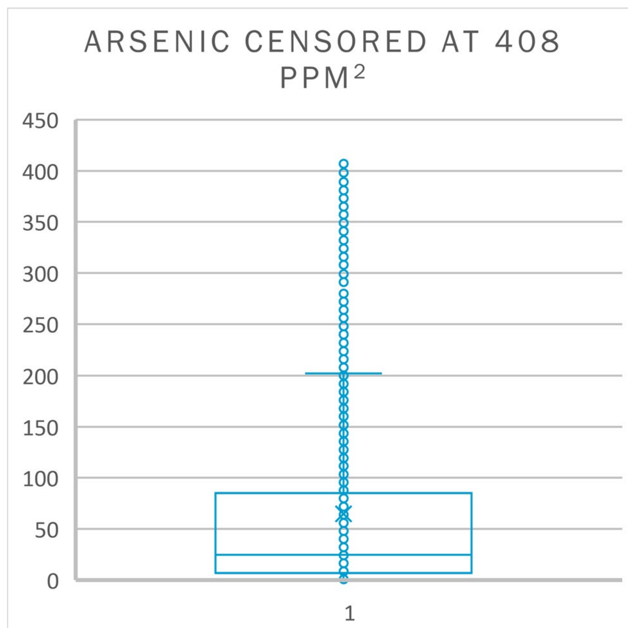
Box and whisker plots of the combined dataset were generated for Sb, As, Hg and Ag. The plots presented below are compressed due to the wide range of detected values.



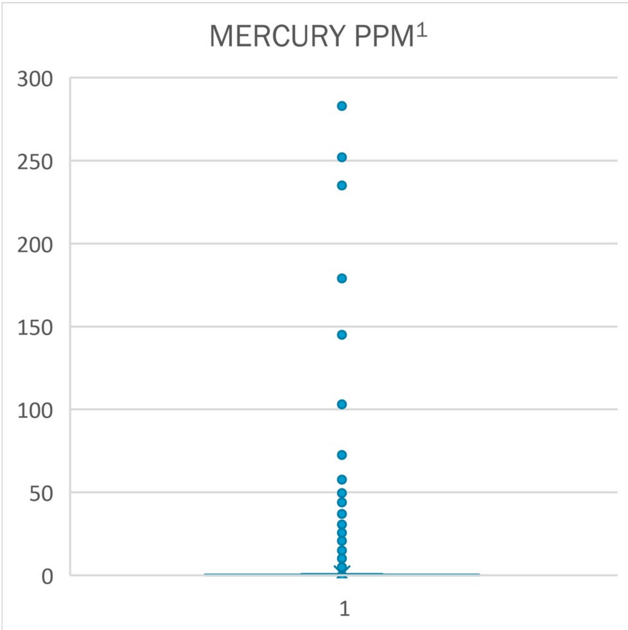


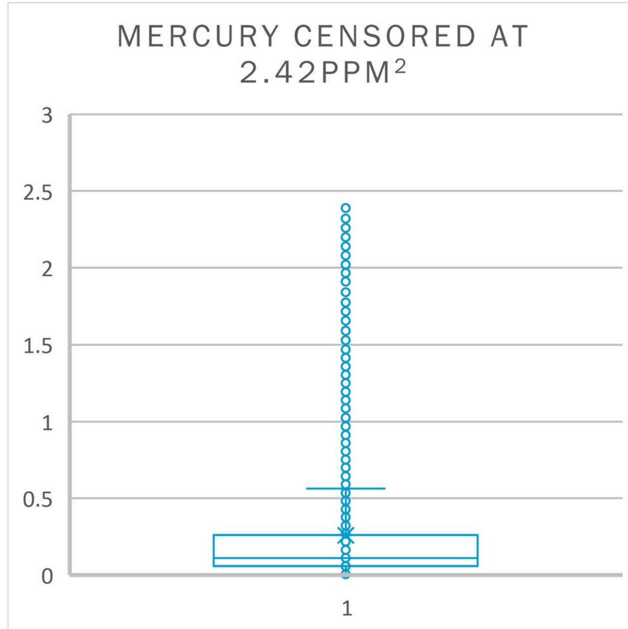
[1] Statistical outliers, non-vegetated areas and sample data below the method detection limits removed from dataset.

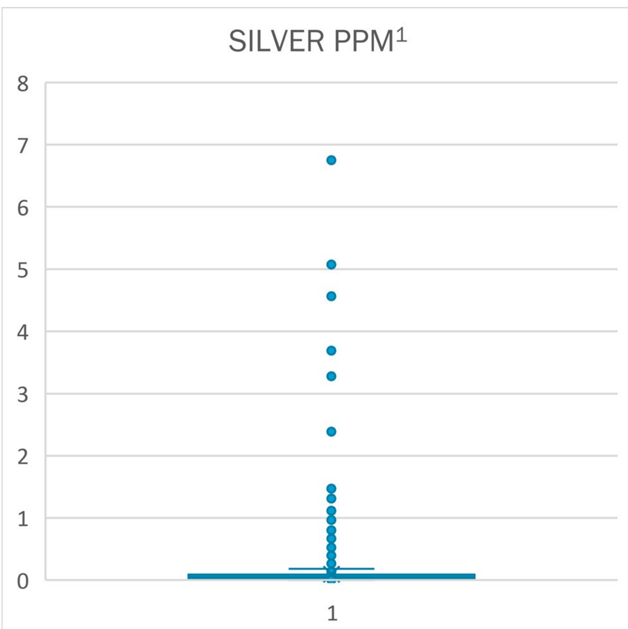


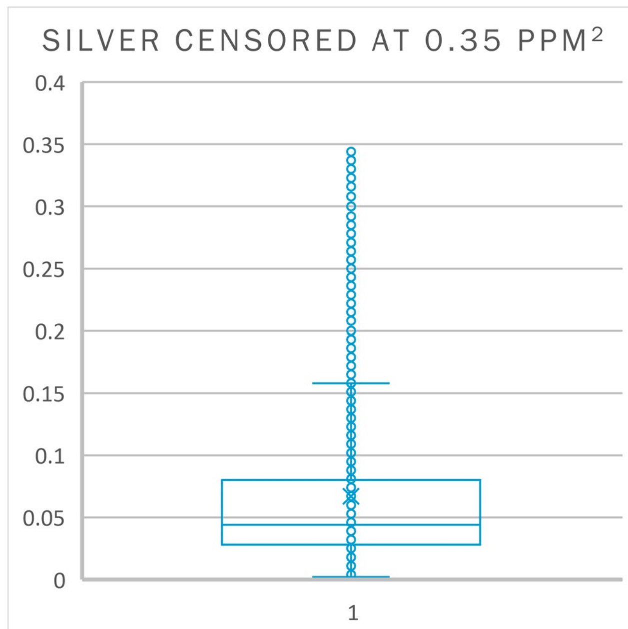


[2] Data in the censored box and whisker plot as footnoted immediately above and restricted to those samples at or below the 95th percentile.









[1] Statistical outliers, non-vegetated areas and sample data below the method detection limits removed from dataset.

[2] Data in the censored box and whisker plot as footnoted immediately above and restricted to those samples at or below the 95th percentile.

These plots more clearly show the upper quantile (the upper bar), lowest quantile (lowest bar), with a blue shaded or outlined region showing the span of the 2nd to 3rd quantile, with the median represented by a solid line and the mean represented by the X within the blue shaded region. Note that the data in the censored box and whisker plots were restricted to those samples at or below the 95th percentile as determined by the combined dataset presented in **Table A-7** for non-log transformed data.

For completeness, the combined dataset was evaluated to determine the log-transformed quartiles. These quartiles were often well above actual detected concentrations and indicate that log transformation does not provide a better characterization of the dataset. Again, this is likely due to the various phase and degrees of mineralization and truncation within the mining District.

4.5 Statistical Analysis: Recommendation

It is recommended that the upper-quantile values be used to assess whether on-site soils could support plant growth and development, therefore the Chebyshev's rule of inequality value for Arsenic of 450 ppm would likely provide an upper statistical bound for the concentration in soil that would be expected to support plant growth and development on site. Alternatively, 95th percentile value could be used to identify an upper statistical bound for an arsenic concentration of 408 ppm that would be expected to support plant growth and development on site.

Application of these upper bounding values to the root zone materials at the SGP **is not** supported by observations of vegetation growing on and concentration of metal in soil used to reclaim mined land adjacent to the SGP as presented in Section 5 below.

Section 5

Evaluation of Reclaimed Mine Land Adjacent to the SGP

Reclamation conducted by Hecla Mining Co. in 1992 (Hecla Reclamation) was evaluated to assess the influences of surface material properties on the type and characteristics of vegetation growing on reclaimed mine land adjacent to the SGP. The Hecla Reclamation area is shown on **Figure A-1**.

Records, descriptions or as-builts of the Hecla Reclamation are not available; however, based on communications with the exploration manager for Midas Gold, waste rock was covered with nominally 1 to 2 feet of “soil” of unknown origin and properties. Following this, seed was sown that included alfalfa (*Medicago sativa*) and 2- to 3-year old tree seedlings were planted. It is not known if amendments, fertilizers, or other cultural practices were applied to the site.

5.1 Hecla Reclamation Vegetation Assessment and Soil Profile Description, Sampling, and Laboratory Analysis - Methods

Tetra Tech qualitatively evaluated vegetation, described soil profile characteristics and collected soil samples for laboratory analysis at the Hecla Reclamation. The field work was conducted in September 2018. The methods used to complete this on-site evaluation are as follows:

Vegetation:

- Zones of vegetation were qualitatively ranked based on best professional judgment as “poor”, “good” and “excellent” condition and roughly delineated on a map and photo-documented. Condition assessments were based on the type, structure, diversity, canopy cover, height and vigor of vegetation present.
- The criteria and reasons for each ranking were described.
- A plot within each zone, approximately 10 m^2 (1075 ft^2), was identified that represented the central concept or theme of each zone.
- Vegetation within plots was briefly described to include: identification of dominant tree, shrub and herbaceous species; estimates of plant canopy cover; measurement of tree height and diameter; and other relevant observations.

Soil:

- A single pit was excavated at the approximate center of each 10 m^2 (1075 ft^2) plot located within each zone.
- Soil profile characteristics (e.g. profile and horizon (if present) depths; USDA texture; presence and type of roots) were described and photo-documented.
- The content of coarse rock fragments in the soil profile was visually estimated and confirmed by sieving a representative sample of the soil profile through a # 10 Mesh sieve (Openings = 2 mm).
- Two soil samples from each soil profile were collected, placed in Ziplock™ plastic bags with sample site identifiers written on each bag and sealed.

- Soil samples were shipped to ALS Laboratories in Reno, Nevada for laboratory analysis.
- The soil samples were subject to four-acid digestion followed by elemental analysis with ICP-MS and ICP-AES (ALS Method ME-MS61m). The suite of elements analyzed are as follows: Ag; Al-Aluminum; As; B; Ba; Be; Bi; Ca-Calcium; Cd; Ce; Co; Cr; Cs; Cu; Fe-Iron; Ga; Ge; Hf; Hg; In; K-Potassium; La; Li; Mg-Magnesium; Mn; Mo; Na-Sodium; Nb; Ni; P; Pb; Rb; Re; S-Sulfur; Sb; Sc; Se; Sn; Sr; Ta; Te; Th; Ti; Tl; U; V; W; Y; Zn; Zr; Dy-Dysprosium; Er-Erbium; Eu- Europium; Gd-Gadolinium; Ho- Holmium; Lu-Lutetium, Nd- Neodymium; Pr- Praseodymium; Sm- Samarium; Tb-Terbium; Tm-Thulium, and Yb-Ytterbium.

5.2 Hecla Reclamation Vegetation Assessment and Soil Profile Description, Sampling and Laboratory Analysis - Results

The vegetation and soil at the Hecla Reclamation were evaluated and sampled on September 29, 2018. Three zones were identified as “poor”, “good” and “excellent” and a 10 m^2 (1075 ft^2) plot was identified within each of these zones. A single pit was excavated near the center of each plot and soil profile characteristics were described. Soil pits were excavated approximately 30 inches bgs before shovel refusal because of high coarse rock fragment content. Waste rock was not observed in the soil profiles located in the “good or “excellent” sites, however, waste rock is likely the material at the surface of and sampled from the “poor” zone. Two soil samples were collected from each pit, therefore a total of six samples were sent to ALS Laboratories in Reno, Nevada for laboratory analysis.

5.2.1 Vegetation Assessments and Soil Profile Descriptions and Samples

“Poor” Zone

The “poor” zone (i.e. Hecla Reclamation 1) was chosen because of lack of plant canopy cover (estimated to be approximately 2%) and the surface material was composed of a red weathered material thought to be waste rock with no apparent soil cover. Few Douglas fir (Pseudotsuga menziesii) trees were present within the plot, each approximately 4 feet high. Few Douglas fir saplings were present, each less than 1 foot. Few fescue grasses (Festuca sp.) were present.

The slope gradient was 60%. Rock fragments at the surface consisted of 20% gravels (Diameter – D = 0.08 to 2.6 inches), 15% cobbles (D = 2.6 to 9.8 inches), 15% stones (D = 9.8 to 23.6 inches), 5% boulders (D ≥ 23.6 inches) and 45% fine earth fraction (D < 0.08) with a texture of sandy loam. Please note that all particle size classification presented in this section are based on USDA (2019). A single pit was excavated to a depth of 29 inches bgs. Two samples, composed likely of waste rock, were collected at 0 to 6 and 6 to 29 inches bgs. The soil texture throughout the profile was loamy sand with coarse rock fragment content in the top and bottom interval sampled of 60 and 70% by volume, respectively. No roots were observed in the soil profile.

“Good” Zone

The “good” zone (i.e. Hecla Reclamation 2) had an established grass and forb cover with trees less than 25 feet high. A total of 8 trees were present within the plot, two measured Lodgepole pine (*Pinus contorta*), 12 and 17 feet high, had diameter at breast height (DBH) of 3.6 and 4.3 inches, respectively. One measured Douglas fir, 24 feet high, had a DBH of 5.8 inches. The 5 remaining trees were Douglas fir and Lodgepole pine all below approximately 6 feet high. The dominant forb was alfalfa. Other forbs present were common yarrow (*Achillea millefolium*). Grasses include fescue, timothy (*Phleum pretense*) and wheatgrass (*Agropyron sp.*). Some leaves appeared to have a brown color, but otherwise the vigor of the plants observed was considered good. The plant canopy cover was estimated to be 80%.

A soil cover was present that was composed of colluvium and residuum materials, which was inferred to overlie waste rock. The source of these cover materials may be the road cut located upslope of the Hecla Reclamation as the cut slope appeared to have a similar composition as the "good" zone cover material. It did not appear that the cover was placed over waste rock at a prescribed depth.

The plot slope gradient was 67%. Rock fragments at the surface was 20%. Moss and vascular plants covered a total of approximately 40 % of the soil surface, however the type of coarse fragments or fine earth fraction at the surface below the mosses and vascular plants was not noted. A single pit was excavated to a depth of 29 inches bgs. Two samples composed of colluvium and residuum materials were collected at 0 to 6 and 6 to 29 inches bgs. The soil texture throughout the profile was coarse sandy loam with coarse rock fragment content in the top and bottom interval sampled of 50 and 60% by volume, respectively. From 0 to 6 inches bgs: very fine roots (D < 1 mm or < 0.04 inches) were common (1 to 5/cm^2); fine roots (D = 1 to 2 mm or 0.04 to 0.08 inches) were few (< 1/cm^2); and medium roots (D = 2 to 5 mm or 0.08 to 0.2 inches) were few (< 1/dm^2) from 0 to 2.5 inches bgs and absent from 2.5 to 6 inches bgs. From 6 to 29 inches bgs very fine roots were few.

"Excellent" Zone

The "excellent" zone (i.e. Hecla Reclamation 3) had an established grass and forb canopy cover slightly higher than the Hecla Reclamation 2 plot and trees 25 feet high. A total of 15 trees were present within the plot, three measured Lodgepole pine, 22, 25, and 25 feet high, had DBH of 5.7, 5.1 and 5.1 inches, respectively. The other 12 trees present included: 7 Douglas-fir approximately 6 to 25 feet high; and 5 lodgepole pine approximately 6 to 25 feet high. Five Douglas-fir saplings less than approximately 6 feet high were also present. Some stems of alfalfa were black, possibly necrotic, but otherwise the vigor of the plants observed was considered good. The plant canopy cover was estimated to be greater than 80%.

The plot slope gradient was 70%. The soil surface cover was composed of 10% gravels, 10% cobbles, 10% stones, 5% boulders and 30% cover with moss and lichen. The composition of the remaining soil surface cover was not noted. A single pit was excavated to a depth of 24 inches bgs. Two samples composed of colluvium and residuum materials were collected at 0 to 6 and 6 to 24 inches bgs. The soil texture and coarse rock fragment content throughout the profile was loamy sand and 55% by volume, respectively. From 0 to 6 inches bgs: very fine roots were common and fine roots were few. From 6 to 24 inches bgs: very fine roots were few.

Plot, profile, and coarse fragment photos of Hecla Reclamation 1 through 3 plots are presented in Attachment 1. Soil profile descriptions, tree counts and measurements, and other field notes for these plots are presented in Attachment 2.

5.2.2 Laboratory Results

The concentrations for antimony (Sb), arsenic (As), mercury (Hg) and silver (Ag) in the soil samples collected from the Hecla Reclamation are presented in **Table A-8**.

Table A-8. Total Sb, As, Hg and Ag Concentrations in Hecla Reclamation Near Surface Materials[a]

Sample ID or Stats	Antimony	Arsenic	Mercury	Silver
Hecla1 0-6 inches	157.5	>10,000	3.58	1.21
Hecla1 6-29 inches	251	>10,000	4.02	0.63
Hecla2 0-6 inches	141	3,010	2.01	0.63
Hecla2 6-29 inches	47.3	924	0.642	0.61

Table A-8. Total Sb, As, Hg and Ag Concentrations in Hecla Reclamation Near Surface Materials[a]				
Sample ID or Stats	Antimony	Arsenic	Mercury	Silver
Hecla3 0-6 inches	111.5	1,035	0.542	0.6
Hecla3 6-24 inches	68.3	674	0.523	0.78
n (#)	6	6	6	6
Detection limits	5	5	0.005 - 0.1	0.01-0.5
Non-Detects (#)	0	0	0	0
Detection Frequency	100%	100%	100%	100%
Minimum Detect	47.3	674	0.52	0.6
Maximum Detect	251	10,000	4.02	1.21
Total Sample Mean (Hecla 1, 2 & 3) (*n*=6)	129.4	4273.8	1.89	0.74
Waste Rock Sample Mean (Hecla 1) (*n*=2)	204	10,000	3.80	0.92
Cover Soil Sample Mean (Hecla 2 & 3) (*n*=4)	92	1,411	0.93	0.66

[a]Notes:

All value in ppm unless otherwise indicated.

Hecla1 samples composed of waste rock.

Hecla2 and Hecla3 samples composed of soil cover materials (colluvium/residuum).

Total arsenic concentrations for Hecla1 samples reported by ALS Laboratories as >10,000 ppm. Summary statistic assumes these values are 10,000 ppm.

n = sample size

5.3 Hecla Reclamation Vegetation and Soil Assessment – Discussion

The Hecla Reclamation plots with vegetation rated as “good” and “excellent” support an equivalent of 324 and 810 coniferous trees/acre, respectively. Measured tree heights within these plots (*n* = 5) range from 12 to 25 feet and average 20.8 feet. These plots also support at least two forbs and three grass species. The combined tree and herbaceous canopy cover is at least 80%, which does not include ground covered by semi-vascular plants (moss and lichen).

The trees, herbaceous and semi-vascular plant species within the “good” and “excellent” plots are rooted in soil with total arsenic concentrations that average 1,411 ppm and range from 674 to 3,010 ppm. These total arsenic concentrations exceed or are within the expected range of the last lift and average total arsenic concentrations in all DRSFs (**Table A-1**). They also exceed the recommended upper bounding total arsenic concentration of 450 ppm (as presented in Section 4.0 above) by a factor of 3.1, 1.5, and 6.7, respectively. The averages and ranges of total antimony, mercury and silver concentrations in soil within the “good” and “excellent” plots exceed, or are within, the expected range of the last lift and average total concentrations of these metals in all DRSFs.

The depth-weighted average soil profile concentration of total arsenic in the plot supporting “good” vegetation (i.e. Samples Hecla 2 0-6 & 6-29) is 1,356 ppm, which exceeds the expected last lift and average total arsenic concentrations in all DRSFs. The depth-weighted average soil profile concentration of total arsenic in the plot supporting “excellent” vegetation (i.e. Samples Hecla 3 0-6 & 6-24) is 764 ppm, which is only exceeded by the expected average total arsenic concentration in Hangar Flats DRSF last lift (i.e., 1,241 ppm) and average concentration in development rock mined from Yellow Pine Pit (i.e. 1,244 ppm).

The approximate total arsenic and silver concentrations in the POX/flotation tailings (i.e. 3,800 and 2.1 ppm, respectively) exceed all observed total arsenic and silver concentrations in soil within the “good” and “excellent” plots. All observed mercury concentrations in soil within the “good” and “excellent” plots exceed the approximate total mercury concentration in the POX/flotation tailings (i.e. 0.18 ppm). The average and range of total antimony concentrations in soil within the “good” and “excellent” plots exceed, or are within, the approximate range of total antimony concentrations in POX/flotation tailings (i.e. 68 ppm).

The Hecla Reclamation plot with vegetation rated as “poor” supports no vegetation. The average concentrations of total antimony, arsenic, mercury and silver in soil within this plot exceeded the average total concentration of these same metals in soil within the “good” and “excellent” plots by a factor of 2.2, >7.1, 4.1, and 1.4, respectively. This further suggests that of the four metals evaluated, total arsenic concentration in root zone materials has the greatest potential to cause phytotoxicity in plants growing on reclaimed DRSFs and the TSF at the SGP.

The coarse rock fragment content of the Hecla Reclamation plots with vegetation rated as “good” and “excellent” ranged from 50 to 60% by volume. For the plot with vegetation rated as “poor” the content of coarse rock fragments in the single soil profile ranged from 60 to 70% by volume. The depth-weighted average coarse rock fragment content in soils profiles within the plots with vegetation rated as “poor”, “good” and “excellent” was 68, 58, and 55%, respectively. Based on these observations and apparent trend, the unsuitable rating for root zone material coarse rock fragments of greater than 75% presented previously in RCP Table 3-3 may be too high to support vegetation and is revised as presented below and in the revised RCP Table 3-3. The influence of soil chemistry (i.e. total arsenic concentration) is however, more likely the cause of the lack of vegetation in the plot with vegetation rated as “poor” than the content of coarse rock fragments.

Section 6

Conclusion and Recommended Root Zone Material Suitability Guidelines for Arsenic and Coarse Rock Fragments

The primary conclusions from this analysis are as follows:

- The pH of porewater retained within tailings and development is anticipated to be circum-neutral to alkaline and not limiting to plant growth.
- The concentrations of antimony, arsenic, mercury and silver were identified as constituents anticipated to be present in development rock and tailings generated by the SGP that may adversely impact plant growth and development.
- The anticipated concentrations of total metals in development rock and tailings that exceed at least one of screening-level phytotoxicity criteria presented in this appendix are as follows:
  - Antimony and arsenic - all development rock and POX/flotation tailings;
  - Mercury - POX/flotation tailings (USGS criteria), all development rock (DOE, ORR, USGS and Kabata minimum criteria); and
  - Silver - Yellow Pine DRSF (Backfill) Last Lift (ORR criteria) and POX/flotation tailings (DOE and ORR criteria).
- Screening-level phytotoxicity criteria exclude total iron and total aluminum concentrations in soils is not correlated to phytotoxicity, therefore these elements were not evaluated further.
- Total arsenic was identified as having the greatest potential to cause phytotoxicity in plants growing on reclaimed (and historical) mine lands at the SGP.
- Sb, As, Hg, and Ag screening-level concentrations are not appropriate criteria to assess the risk of phytotoxicity in plants rooted in root zone materials anticipated to be present below GM used for the reclamation of the SGP. Analysis were therefore conducted to estimate naturally occurring metals concentration in soil adjacent to the SGP and to develop reference values that could be used for the development of root zone material suitability guidelines presented in RCP Table 3-3. *Root Zone Material Suitability Guidelines*.
- The concentration of Sb, As, Hg, and to a lesser degree, Ag are naturally-elevated in surface soils adjacent to the SGP that are overall uninfluenced by historical mining activities;
- Following removal of statistical outliers, data from non-vegetated sample locations and data below method detection limits, the conclusions pertaining to Vegetated Soil adjacent to the SGP that are overall uninfluenced by historical mining activities are as follows:
  - The concentrations of total Sb, As, Hg and Ag are greater in some instances than the total concentrations of these same metals expected to be present in the DRSFs and the TSF.

- The total elemental concentrations are not normally or log-normally distributed, therefore all potential reference values are based on the nonparametric dataset.
- The Chebyshev rule of inequality value in the arsenic dataset of 450 ppm total arsenic is recommended as the upper bounding concentration that would be expected support plant growth and development for the reclamation of the SGP. Alternatively, the 95th percentile value could be used to identify an upper bounding total arsenic concentration of 408 ppm.

- Application of these upper bounding values to root zone materials at the SGP **is not** supported however by observations of vegetation growing on, and the concentration of metals in, soil used to reclaim mined land adjacent to the SGP, which suggests that trees, herbaceous and semi-vascular plant species are sustained when the roots exploit soil with total arsenic concentrations that average 1,411 ppm and range from 674 to 3,010 ppm.
- Based on observations and apparent trends in previously reclaimed mined land adjacent to the SGP, the unsuitable rating for root zone material coarse rock fragments of greater than 75% presented previously in RCP Table 3-3 is likely too high to support vegetation and is therefore revised to 70% as shown in the table below and in the revise RCP Table 3-3.
- The influence of soil chemistry (i.e., total arsenic concentration) is likely the cause of the lack of vegetation in the Hecla plot with vegetation rated as "poor" rather than the content of coarse rock fragments.
- The proposed root zone material guidelines for the reclamation of the SGP are as follows:

Root Zone Material Suitability Guidelines (0 to 3 feet below Growth Media)				
Property	Good	Fair	Poor	Unsuitable
Coarse Fragment Volume %[b]	<15	15 to 45	45 to 70	>70
Total Arsenic	<450	450 to 1,000	1,000 to 3,000	> 3,000

These proposed guidelines are based on: the properties of soil that support natural plant communities typical of the region, aspect, and elevation (vegetated soil) that are uninfluenced overall by historical mining and recent mine permitting and development activities (Vegetated Soil); and the properties of soil that support vegetation on previously reclaimed mined lands in the vicinity of the SGP (Reclaimed Soil).

In summary, the Stibnite-Yellow Pine Mining District is a large and complex zone of mineralization, which has led to the enrichment of rock and soil in the District with trace elements. As a result, the concentrations of arsenic (in particular), antimony, mercury, and to a lesser degree, silver are naturally elevated in surface soils adjacent to the SGP that are uninfluenced by historical mining and recent mine exploration activities. Based on comparisons of these total metal concentrations in soil to screening-level phytotoxicity criteria from a variety of sources, one may logically conclude that vegetation establishment, growth and reproduction would be impossible or severely inhibited. Yet mature vegetation communities typical of the region are present throughout the District.

One may infer from the extent, variety and health of vegetation within the District that plant species have adapted to local conditions, including soils that are enriched with trace metals. An example of this type of adaptation is demonstrated by Douglas fir, which have a remarkable ability to take up arsenic far more than many associated plants, with dry-weight tissue concentration have been measured as high as 6,000 ppm (Kabata, 1992). Conversely, in some locations within the District where human impact is limited or absent, vegetation cover is either severely limited or absent. These and well-vegetated locations within the District may provide the information and data needed to define the limits of plant growth and the extremes of plant tolerances for the development of reclamation plans and approaches with a high probability of success. Some of these reclamation approaches may include isolation and propagation of District ecotypic plant varieties and mychorizal fungal complexes, as well as implementation and close monitoring of concurrent reclamation, revegetation test plots, on-site growing programs in greenhouses, temporary hoop houses, out-plantings or by other proven reclamation and restoration methods.

Previous efforts to reclaim historical mining disturbance within the District have been challenging. In some instance, however they have been quite successful by most measures. Based on statistical analysis of total metal concentrations in District soils, an upper bounding concentration for arsenic of nominally 450 ppm is suggested, above which plant growth and development would be restricted. The potential however to reestablish a forested and woodland vegetation structure on substrate with total arsenic concentrations up to approximately 7 times greater than the suggested upper bounding limit is apparent at the Hecla Reclamation site and has therefore been considered for the development of root zone suitability guidelines for the SGP. Finally, successful reclamation of the SGP is achievable using the proposed GM/SBM application thicknesses over development rock and tailings cover systems given the reclamation approaches and plans presented in the RCP and posited immediately above.

Section 7

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Attachment 1: Hecla Reclamation Vegetation and Soil Field Assessment Photographs

Hecla Reclamation 1 (Poor Zone): Plot	Hecla Reclamation 1 (Poor Zone): Profile
	
Hecla Reclamation 1 (Poor Zone): Coarse Fragments 0-6 inches = 60 % by vol.	Hecla Reclamation 1 (Poor Zone): Coarse Fragments 6-29 inches = 70 % by vol.
	

Hecla Reclamation 2 (Good Zone): Plot	Hecla Reclamation 2 (Good Zone): Profile
	
Hecla Reclamation 2 (Good Zone): Coarse Fragments 0-6 inches = 50 % by vol.	Hecla Reclamation 2 (Good Zone): Coarse Fragments 6-29 inches= 60 % by vol.
	

Hecla Reclamation 3 (Excellent Zone): Plot	Hecla Reclamation 3 (Excellent Zone): Profile
	
Hecla Reclamation 3 (Excellent Zone): Coarse Fragments 0-6 inches = 55 % by vol.	Hecla Reclamation 3 (Excellent Zone): Coarse Fragments 6-24 inches = 55 % by vol.
	

Attachment 2: Hecla Reclamation Vegetation and Soil Field Assessment Field Notes