OCEANAGOLD
HAILE OPERATION

Monitoring and Management Plan

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Department:	Environmental
Location/Site:	Haile Operation

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Document Issuance and Revision History

Revision No.	Revision Date	Description of Revision	Effective Date

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1 PURPOSE

The purpose of this Monitoring and Management Plan (MMP) is to summarize the monitoring and management activities that Haile has committed to perform as part of the Haile Gold Mine Project (Project).

2 OBJECTIVES

The objectives of this MMP are to:

- Identify the environmental sites that Haile will monitor during the Project and provide a summary of this monitoring;
- Provide an overview of major operations and environmental media at the Project site;
- Provide an overview of the major Project facilities to enhance understanding of how Haile's environmental monitoring and management activities will address any potential environmental impacts of those facilities; and
- Summarize information relative to monitoring and management at the Project site.

3 MONITORING PLANS AND PERMITS

Monitoring programs play a key role in release prevention and identification, as well as providing a basis for effective worker training. Monitoring is used to assure compliance with permit terms and regulatory requirements. As explained more fully within this MMP, Haile has committed to monitoring at intervals adequate to characterize the medium being monitored, as well as to provide information in a timely manner to notify authorities and take any necessary corrective actions.

3.1 Existing Operations Plans

To minimize duplication of information and rationale for specific monitoring and sampling requirements, this MMP relies upon and incorporates information from the following documents:

Reclamation Plan
Wetland and Stream Monitoring Plan
Avoidance and Minimization Plan
Surface and Groundwater Monitoring Plan
Wetlands and Streams Mitigation Plans
Cultural Resources Management Plan
Unanticipated Discovery Plan
Fugitive Dust Control Plan
Solid and Hazardous Waste Management Plan
Storm Water Pollution Prevention Plan
Spill Prevention, Control and Countermeasure Plan
Duckwood Tailing Storage Facility Operations, Inspection and Maintenance Plan
Duckwood Tailing Storage Facility Emergency Action Plan
Wildlife Monitoring Plan
International Cyanide Code (2012)
Pre-Blast Survey Plans
PAG Overburden Storage Area Operation, Maintenance, and Inspection Plan

3.2 Permits

Final provisions regarding monitoring are included in State permits. In some cases, these permit terms are available for reference in this MMP. The following permits are referenced in this MMP:

Mine Permit No. I-000601

NPDES Individual Discharge Permit No. SC0040479, Outfalls 002 and 003

NPDES General Stormwater Permit for Industrial Activity Permit No. SCR000000

NPDES General Permit for Stormwater Discharges Associated with Construction Activities Permit No. SCR100000

Air Construction Permit No. 1460-0070-CA

Dam Safety Permit No. 29-0007

3.3 Permit Categories and Monitoring Requirements

The following table contains a list of the State permits that apply to Haile Gold Mine.

Table 1. State Permits & Monitoring Requirements

Permit	Monitoring Requirements
Air Permit (Construction)	See Permit No. 1460-0070-CA (October 6, 2013)
Dam Safety Permit	See Permit No. 29-0007 (October 7, 2013)
Mining Permit (includes Reclamation Plan)	See Permit No. I-000601 (November 6, 2014)
NPDES Individual Permit	See Permit No. SC0040479 (October 7, 2013)
NPDES Industrial General Permit	See Permit No. SCR000000
NPDES Construction General Permit	See Permit No. SCR100000
CWTP Construction Permit	See Permit No. 19830-IW (October 30, 2014)
Surface Water Withdrawal Permit	See Permit No. R.61-119 (June 22, 2012)

4 MANAGEMENT PLANNING

This MMP focuses largely on Haile's commitments for monitoring. Management for environmental protection goes beyond monitoring and includes both operational steps to remain in compliance and procedures for addressing emergencies or other significant events. Haile has developed procedures to remain in compliance with permit terms; those procedures are part of the operational plans that implement the permits and provides for training for employees.

In general, management of emergencies or significant events are addressed in permits and requires notification to the appropriate authorities. Upon notification, the authorities can evaluate the situation, determine what information is needed, and work with Haile to develop and assure implementation of the appropriate response. Because there may be many different circumstances that are treated as "emergencies or significant events" under the permits, it is not feasible to describe the reporting requirements or management planning for response in much detail in this MMP.

Where appropriate, this MMP describes some of the measures that are intended to protect against adverse impact to environmental media. These include, but are not limited to, double High-Density Polyethylene (HDPE) lined ponds, double contained pipelines, lined storage facilities, closed-loop system for process water, concurrent reclamation, cyanide destruct, and buffers for otherwise non-impacted wetlands and streams.

5 GROUNDWATER MONITORING

5.1 Monitoring Plans and Permits

Haile's Operational Water Quality Monitoring Plan includes up-gradient and down-gradient monitoring of the primary facilities at site. Groundwater monitoring associated with reclamation, closure and post-closure is addressed in Section 11.

5.1.1 Monitoring Program

Haile monitors groundwater to comply with the requirements of its Mining Permit. The groundwater monitoring is also planned to assemble data pertinent to evaluating potential indirect impacts of Project activities. Haile's groundwater monitoring program enables verification that the extent of predicted drawdown is occurring, and adequate data is available to update future impact predictions. The groundwater monitoring program rational is outlined in Table 2

Table 2. Groundwater Rationale

Purpose	Monitor ground water quality and water levels.			
Location Criteria	Close to the pits with spatial coverage along prominent flow path and in each aquifer type.			
Type of Monitoring	Reporting	Monitor	Sample Collection	Rationale
Depressurization Wells	Quarterly	Water Levels and Chemistry	Quarterly	Monitoring locations are established around the pits to evaluate decrease in the hydraulic pressure at the dig faces and minimization of water in flux to the active mine pits or openings.
Drawdown Extent	Quarterly	Water Levels	Quarterly	Monitoring locations are established in a phased approach along predicted groundwater elevation contours and provide validation data to the groundwater model. These are predominately located in shallow CPS aquafers and monitor changes in wetlands and stream flows.
TSF, Pit Areas, and Overburden	Quarterly	Water Levels and Chemistry	Quarterly	Monitoring locations are established around mine components to ensure constituent migration is not occurring.
Compliance Wells	Annual	Water Levels and Chemistry	Annual	Monitoring locations are established around mine facilities to ensure constituent migration is not occurring.

5.1.2 Sampling Locations

Monitoring wells are placed, based on modelled predictions of groundwater flow, direction and timing, to provide adequate data to evaluate potential impacts of mine activities on groundwater.

Haile's monitoring site location map is presented in Figure 1, below. The actual number of sampling locations and monitoring specifics are specified in Haile's Mining Permit.

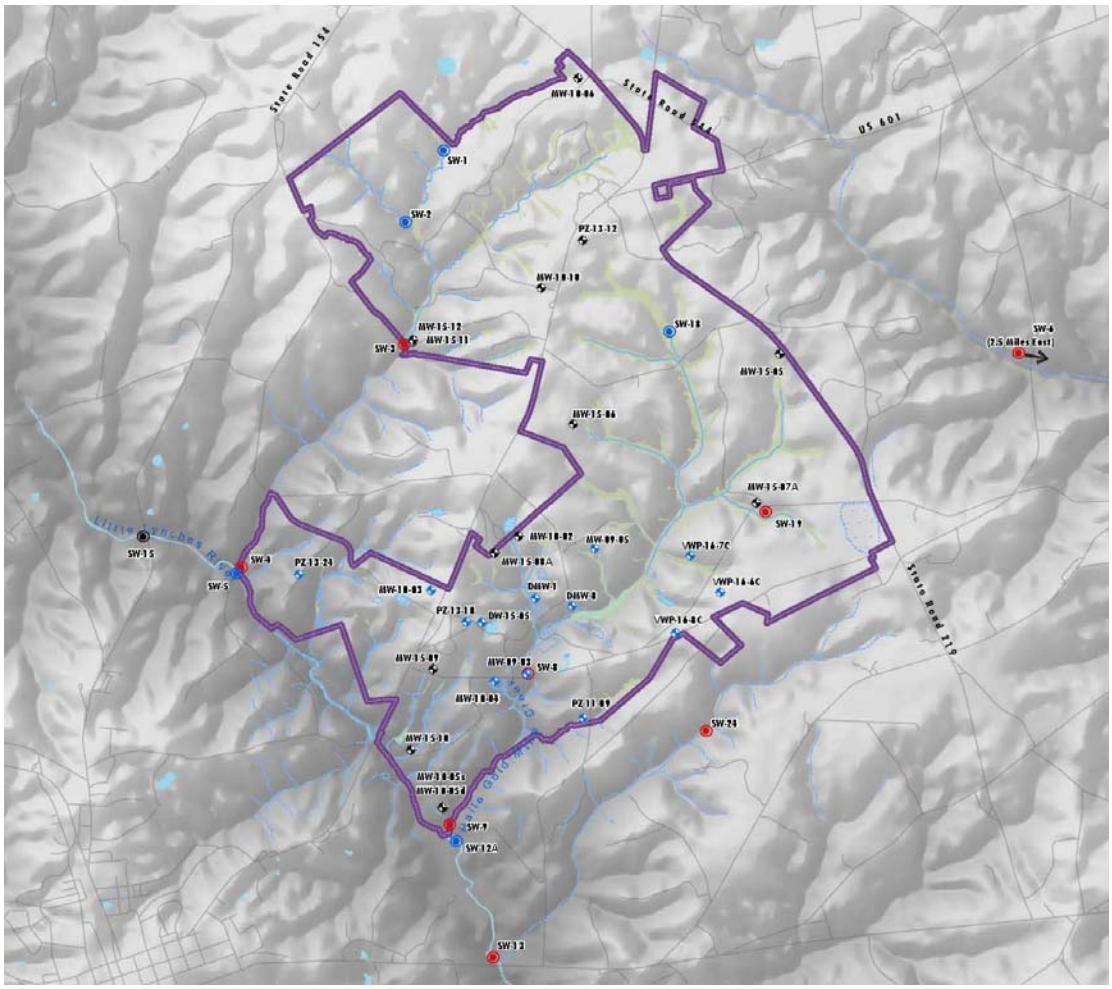


Figure 1. Groundwater Quality Sampling Locations (PZ and MW)

5.2 Water Quality Chemical Analyte Monitoring List During Operations

The analytes identified in the following Tables were provided by Haile to the USACE. These analytes, for which Haile will sample unless DHEC modifies the list, were developed based on geochemical studies performed at the site.

Table 3 identifies analytes for groundwater sampling near the TSF. Table 4 identifies analytes for sampling in other wells. Haile developed different analyte lists in compliance with standards required by DHEC. Haile monitors for indicator analytes near potential sources, and for a fuller suite of analytes at the compliance points (See Table 5).

Table 3. Groundwater Wells Near TSF

(Water Quality Chemical Analyte Monitoring List During Operations)

Analyte Group	List A
Field Parameters	pH EC Temperature
Indicator Parameters	Alkalinity Acidity Sulfate
Cation/ Anion Balance	Calcium Chloride Magnesium Sodium Potassium Bicarbonate/ Carbonate
Other Parameters	Cyanide (WAD) TDS

Table 4. All Other Groundwater Monitoring Wells

Analyte Group	List B
Field Parameters	pH EC Temperature
Indicator Parameters	Alkalinity Acidity Sulfate
Cation/ Anion Balance	Calcium Chloride Magnesium Sodium Potassium Bicarbonate/ Carbonate
Other Parameters	TDS TSS
Total & Dissolved Metals	Aluminum Arsenic Copper Iron Manganese Mercury Nickel Silica Zinc

Table 5. Groundwater DHEC Compliance Wells

Analyte Group	List C
Field Parameters	pH
	EC
	Temperature
Indicator Parameters	Alkalinity
	Acidity
	Sulfate
Cation/ Anion Balance	Calcium
	Chloride
	Magnesium
	Sodium
	Potassium
	Bicarbonate/ Carbonate
Nutrients	Phosphorus (ortho)
	Ammonia
	Total N
	Nitrate
Other Parameters	WAD Cyanide
	Oil & Grease
	Fecal Coliform
Other Parameters	TDS
	TSS
Total & Dissolved Metals	Aluminum
	Antimony
	Arsenic
	Boron
	Chromium III, VI, total
	Copper
	Iron
	Lead
	Manganese
	Mercury
	Nickel
	Selenium
	Silica
	Thallium
	Zinc

5.2.1 Frequency of Sampling

Groundwater wells are sampled for water quality parameters quarterly. Groundwater compliance points are sampled for water quality parameters annually.

5.3 Groundwater Level Monitoring

5.3.1 Monitoring of Groundwater Levels Surrounding Pit Activity

The drawdown of groundwater will evolve as mining operations proceed. Due to the changing nature of the groundwater drawdown over time, a phased groundwater monitoring program are implemented, whereby monitoring wells are determined at optimum locations corresponding to expected groundwater conditions between years 1 and 5. As operations continue beyond this timeframe, new monitoring wells may be placed corresponding to the next five or more years of groundwater monitoring; to determine optimum locations for years >5, the groundwater monitoring data are used to verify or update the groundwater contour conditions that were predicted originally. Determination of additional groundwater wells is based on data analysis and conditions at the time.

Groundwater quality monitoring at the Project site is identified in Haile's Mining Permit and operational aspects more fully described in Haile's Operational Water Quality Monitoring Plan.

5.4 Water Supply Monitoring

The objective of the MMP regarding private wells and water supply is to identify potential impacts to the availability of water in private wells near the mine site because of depressurization activities at the Haile Gold Mine. The

goal of monitoring potential impacts to water supply is to provide timely response to impacts for which Haile is responsible.

5.4.1 Monitoring Private Wells Water Supply

Haile has installed a series of groundwater monitoring wells within the Project Boundary for purposes, among others, of tracking the lateral and longitudinal movement of the groundwater as it responds to Haile's pumping of groundwater for pit depressurization purposes.

The monitoring system is intended to provide information on the impact of depressurization activities on groundwater and surface water levels in wells, ponds, springs and streams. This monitoring system is used to anticipate adverse impacts on water sources and to direct the remedial actions that are taken because of data obtained.

5.4.2 Management of Private Wells Water Supply

Management of private wells water supply impacted by mine-related activities is a condition of Haile's Mining Permit. The Mining Permit includes requirements to:

- Provide for independent, third party evaluation of potential impacts to private wells and water supply, using the Water Resources Inventory (2013) of all participating landowners;
- Establish a third-party independent investigation and review of complaints to determine if a private party is adversely impacted by Haile's pumping; and
- Provide for appropriate remedial action and/or payment if adverse impacts are discovered to have resulted from Haile's pumping.

Haile investigates all complaints and works cooperatively with DHEC and the private party to resolve any such complaints.

5.5 Reporting and Management Planning

5.5.1 State and Federal Permit Reporting Requirements

Groundwater Monitoring Report issued quarterly to DHEC, Army Corp of Engineers (ACOE) and US EPA. In the event of non-conformances or deviations, notifications will be reviewed with the recipients and corrective actions coordinated through DHEC and ACOE regarding further actions.

6 SURFACE WATER MONITORING

The objective of surface water monitoring is to ensure that the Project is in compliance with permit requirements, including the Mining Permit. Secondarily, the monitoring will provide early warning of water impacts and a means of identifying contaminant sources to assist in identifying contingency actions to be employed. Surface water monitoring associated with reclamation, closure and post closure is addressed in Section 8. In addition to other surface waters, this MMP addresses monitoring of the existing pit lakes at Champion; these pit lakes are currently governed by the on-going reclamation at the Project site. The location and other details of surface water monitoring remain under development pending results of hydrology analysis as well as the State permitting process.

Monitoring and other provisions of NPDES permits, including Haile's NPDES Individual Permit, the NPDES Industrial General Permit, and the NPDES Construction General Permit, are not addressed in this section. Haile's NPDES Individual Permit is addressed in Section 10.3.4, Contact Water Treatment Plant. The NPDES Industrial General Permit and NPDES Construction General Permit are addressed in Section 10.3.5, Stormwater Facilities.

6.1 Monitoring Plans and Permits

Surface water monitoring is identified in Haile's Mining Permit and operational aspects in Haile's Operational Water Quality Monitoring Plan, which will include both surface and groundwater.

6.1.1 Monitoring Program

Haile monitors surface water to comply with the requirements of its DHEC Mining Permit. The surface water monitoring data is used to evaluate potential indirect impacts. The rationale is presented in Table 6.

Table 6. Surface Water Rationale

Purpose	Monitor surface water and stream channel changes to verify extent and magnitude of predicted impacts, including stream flow water quality and physical characteristics. Monitor existing pit lake at Champion and receiving streams at Camp Branch, Lower Haile Gold Mine Creek and Little Lynches Creek.			
Location Criteria	Close to the mine workings with spatial coverage along prominent flow paths; all existing stream locations; and existing mine pit lake (Champion).			
Type of Monitoring	Reporting	Monitor	Sample Collection	Rationale
Geomorphology	Annual	Channel Cross-sections	Annual	Changes in channel width can be a sign of stream aggradation, degradation, vegetation encroachment and / or bed or bank stability alteration.
	Annual	Channel Profile	Annual	Change in channel profile can provide evidence of channel evolution that could occur in response to flow alteration or land use changes.
	Annual	Substrate Sediment Distribution	Annual	Changes in sediment size may indicate stream response to flow alteration or land-use changes.
Surface Water Flow and Water Levels	Quarterly	Stream Channels	Hourly	Mine operations may result in changes to flow.
	Quarterly	Champion Pit Lake	Quarterly	Mine operations will eventually result in pit lake dewatering.
Surface Water Quality	Quarterly	Streams	Quarterly	Chemical Analyte List D
	Annual	Compliance Points	Annual	Chemical Analyte List F
	Annual	Champion Pit Lake	Quarterly	Chemical Analyte List E

6.1.2 Sampling Locations

Monitoring locations are located within drainages on the Project site and surrounding areas and have been selected based upon location, physical stream characteristics, site access, as well as those areas potentially influenced by the Project.

Monitoring locations are presented in Figure 2, below.

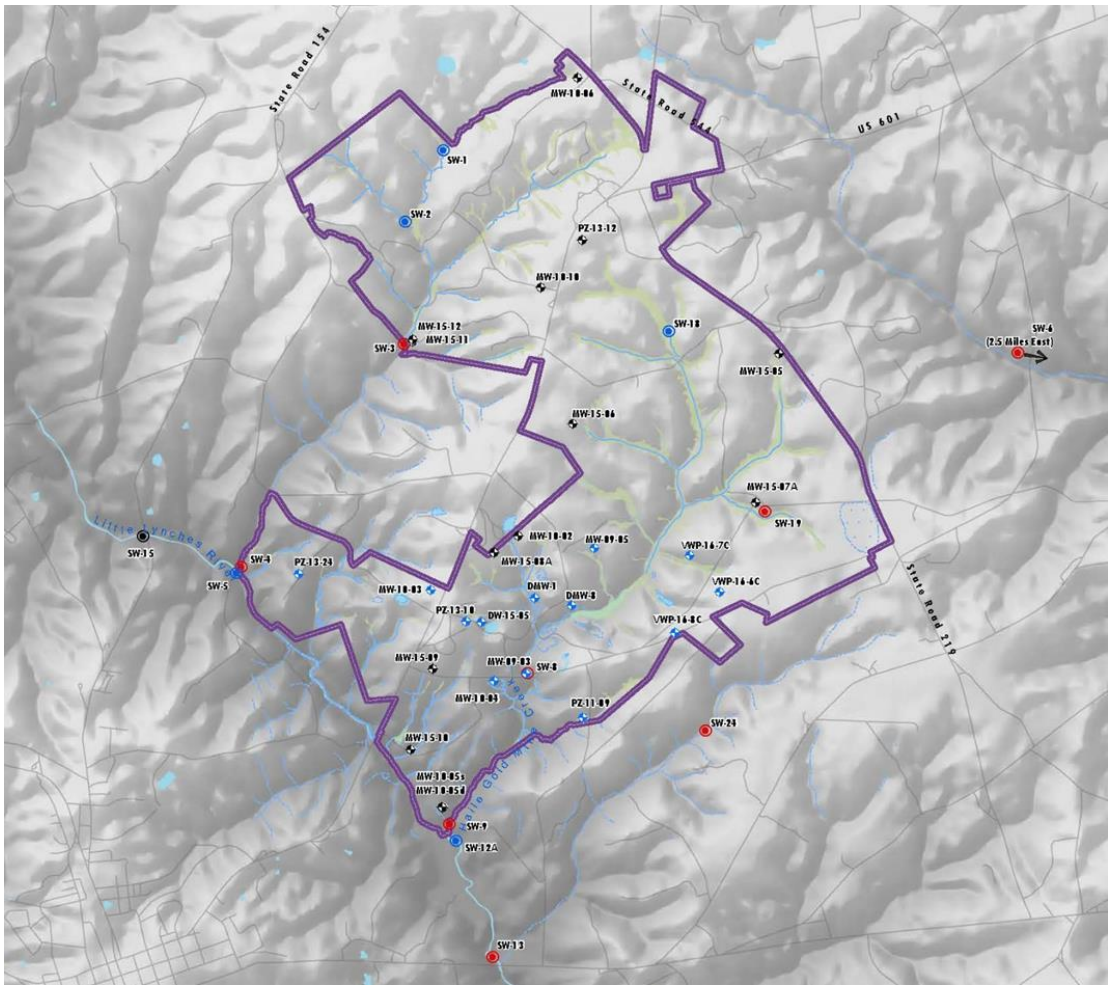


Figure 2. Surface Water Quality Sampling Locations During Operations (SW Locations)

6.1.3 Water Quality Chemical Analyte Monitoring List During Operations

The analytes identified in the following Tables were provided by Haile to the USACE in Haile's Draft MMP (October 30, 2012). These analytes were developed based on geochemical studies performed at the site and professional knowledge of water quality monitoring.

Table 7 identifies analytes for surface water. Table 8 identifies analytes for sampling in existing pit lakes. Table 9 identifies analytes for sampling at "compliance points".

Table 7. Surface Water Quality Chemical Analyte Monitoring List During Operations

Analyte Group	List D
Field Parameters	pH
	EC
	Temperature
	Dissolved Oxygen
Indicator Parameters	Alkalinity
	Acidity
	Sulfate
Cation/ Anion Balance	Calcium
	Chloride
	Magnesium
	Sodium
	Potassium
	Bicarbonate/ Carbonate
Nutrients	Phosphorus (ortho)
	Ammonia
	Total N
	Nitrate
Other Parameters	WAD Cyanide
	Oil & Grease
	Fecal Coliform
Other Parameters	TDS
	TSS
Total & Dissolved Metals	Aluminum
	Antimony
	Arsenic
	Boron
	Chromium III, VI, total
	Copper
	Iron
	Lead
	Manganese
	Mercury
	Nickel
	Selenium
	Silica
	Thallium
	Zinc

Table 8. Pit Lake Water Quality Chemical Analyte

Analyte Group	List E
Field Parameters	pH
	EC
	Temperature
	Dissolved Oxygen
Indicator Parameters	Alkalinity
	Acidity
	Sulfate
Cation/ Anion Balance	Calcium
	Chloride
	Magnesium
	Sodium
	Potassium
	Bicarbonate/ Carbonate
Nutrients	Phosphorus (Ortho)
	Ammonia
	Total N
	Nitrate
Other Parameters	Turbidity
	TDS

Table 9. Surface Water Chemical Analyte at Compliance Points

Analyte Group	List F		
Field Parameters	pH	Total & Dissolved Metals	Aluminum
	EC		Antimony
	Temperature		Arsenic
	Dissolved Oxygen		Boron
Indicator Parameters	Alkalinity		Chromium III, VI, Total
	Acidity		Copper
	Sulfate		Iron
Cation/ Anion Balance	Calcium		Lead
	Chloride		Manganese
	Magnesium		Mercury
	Sodium		Nickel
	Potassium		Selenium
	Bicarbonate/ Carbonate		Silica
Nutrients	Phosphorus (ortho)		Thallium
	Ammonia		Zinc
	Total N		
	Nitrate		
Other Parameters	WAD Cyanide		
	Turbidity		
	Oil & Grease		
	Fecal Coliform		
	TDS		
	TSS		

6.1.4 Frequency of Sampling

Streams are sampled for water quality parameters quarterly. Streams are sampled for water flow hourly or quarterly, depending on the stream/sampling location and methodology.

Champion Pit Lake is sampled for water quality parameters quarterly. Surface Water Compliance Points are sampled for water quality parameters annually.

6.2 Reporting and Management Planning

6.2.1 Federal and State Permit Reporting Requirements

Surface Water Monitoring Report is issued quarterly to DHEC, Army Corp of Engineers (ACOE) and US EPA. In the event of non-conformances or deviations, notifications will be reviewed with the recipients and corrective actions coordinated through DHEC and ACOE regarding further actions.

7 AQUATICS MONITORING

Haile has a surface water quality monitoring plan as part of its Monitoring Management Plan. The monitoring includes surface water quality, geomorphology, and surface water flow and water level monitoring. These parameters will provide early warning of water impacts and a means of identifying contaminant sources to assist in identifying contingency actions that are employed. These measures should provide adequate monitoring and assessment of any potential impacts to the aquatic community.

Haile also performs a late spring survey of fish populations, using gill nets and fyke nets (both with 3.25-inch stretch mesh), at two locations below the confluence of Haile Gold Mine Creek and the Little Lynches River: LL4 and LL6, as reflected on Figure 3 below. Frequency of monitoring is a step-down approach, with annual monitoring during the 2017 through 2019, then every two years until the monitoring frequency can be reduced or eliminated based upon review of the data and discussion with SCDHEC and SCDNR.

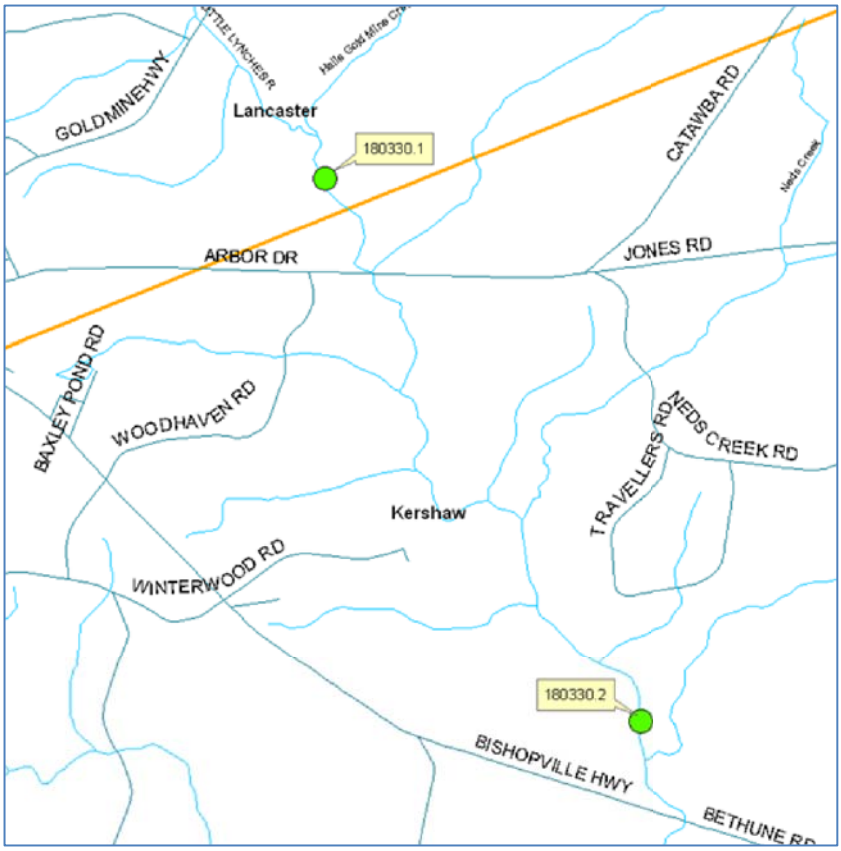


Figure 3. Fish Survey Locations

8 WETLANDS MONITORING

Information regarding the wetlands monitoring to be done at the Haile site can be found in the *Haile Gold Mine Wetland and Stream Monitoring Plan.*

9 WILDLIFE MONITORING

The objective of Haile's Wildlife Monitoring Program is to ensure compliance with federal laws protecting avian species, and to keep records of mortalities to help pinpoint the locations of mortalities and the extent to which they are occurring.

9.1 Monitoring Plans and Permits

Wildlife monitoring is described in Haile's standard operating procedures for the site.

9.2 Reporting and Management Planning

9.2.1 State and Federal Permit Reporting Requirements

In the event of non-conformances or deviations, notifications will be reviewed, and corrective actions coordinated through State Department of Natural Resources and US Fish and Wildlife.

9.2.2 Management Planning

The following management measures are planned for avian and terrestrial wildlife during all phases of the mine life:

9.2.2.1 General Management Practices for Birds

Following Migratory Bird Treaty Act (MBTA) terms described in 16 U.S.C. 703 (a), Haile cannot pursue, hunt, capture, collect, kill or sell/barter any bird or bird part, or any nest, egg or any product of bird covered under the MBTA. Haile will adhere to these terms.

If injured or trapped bird protected under MBTA is observed, Haile will notify the U.S. Fish and Wildlife Service (USFWS) and the South Carolina Department of Natural Resources (SCDNR). Contact information is:

US Fish and Wildlife Office: (843) 727-4707
SCDNR, Nuisance Wildlife Division, Region 2
295 S. Evander Drive, Florence, SC 29506
Wildlife 843-661-4766
Fisheries 843-661-4767
Law Enforcement 843-661-4766

If bird mortalities occur at the site, Haile will keep records of the mortalities to help pinpoint the locations of mortalities and the extent to which they are occurring.

9.2.2.2 General Management Practices for Raptors

The Bald and Golden Eagle Protection Act is a federal law that protects bald and golden eagles from harmful impacts and actions. In 2007, the USFWS developed The National Bald Eagle Management Guidelines to advise landowners and land managers who share land with bald eagles when and under what circumstances the protective provisions of the Eagle Act may apply to their activities (USFWS 2007). These management guidelines are followed by the SCDNR for bald and golden eagles year round. Permits can be obtained under this law, but Haile will adhere to The National Bald Eagle Management Guidelines provided by the USFWS in May of 2007 (USFWS 2007) which obviates the need for a permit. No bald or golden eagles or their nests were identified during wildlife surveys at and near the Haile Project location. If such species or their nests are identified, Haile

will work with the SCDNR and USFWS to determine the appropriate actions. Depending upon the circumstances (e.g., whether bald or golden eagles commence nesting activities at or near the Project during mining activities rather than in advance of Project activities), the response may differ.

If other active raptor nests are identified during the breeding season (generally April through August), Haile will work with the SCDNR and USFWS to determine the appropriate actions. Depending upon the circumstances (e.g., whether the raptors commence nesting activities at or near the Project during mining activities rather than in advance of Project activities), the response may differ.

Haile will not intentionally feed any raptors.

If other active raptor nests are identified during the breeding season (generally April through August), Haile will keep a distance between the activity and active nest (i.e., establish a 'buffer'). An active nest is defined as any nest that is frequented or occupied by a raptor (nestling, fledgling or adult) during the breeding season. The buffer areas serve to minimize visual and auditory impacts associated with human activities near nest sites. Buffers and activities for other raptors are established in consultation with the USFWS and SCDNR.

9.2.2.3 General Management Practices for Terrestrial Mammals

Haile has fenced all HDPE-lined ponds and TSF perimeter with an eight-foot tall fence and the Project boundary are fenced where practicable, which will help deter terrestrial mammal entry.

All fencing around HDPE-lined ponds and TSF perimeter are inspected regularly by Haile personnel performing their job functions.

Transportation corridors on site are periodically visually surveyed for signs of wildlife.

Haile will use skirting to enclose open spaces as necessary beneath raised structures, such as buildings, to deter wildlife from denning, resting or hiding.

Wildlife will not intentionally be fed, harassed or approached.

Vehicle traffic will follow posted speed limits to prevent accidents with wildlife.

9.2.2.4 Management Practices for Open Solution Ponds, including the TSF

As noted above, fencing has been installed around HDPE-lined ponds and the TSF to restrict entry and the property is fenced, where practicable, for security, which will deter some wildlife entry. Note also that TSF management are consistent with the principles and safe practices as described in the International Cyanide Management Code (ICMC 2012) for protection of birds and other wildlife from adverse effects of cyanide process solution. This includes the following measures:

- Where birds or other wildlife have access to water impounded in the TSF, operations will implement measures to limit the concentration of WAD cyanide in the TSF to a maximum of 50 ppm.
- For managed pond systems, as often as possible, uneven water margins and dam floors that may form islands, are avoided because these can attract birds.
- Contact and process water ponds are designed and operated in such a way as to restrict access where necessary and to provide a means of escape for trapped animals (textured exit ramps, etc.). It may be possible in some cases to safely rescue wildlife if discovered quickly enough.

- Vegetation surrounding the perimeter of ponds are cleared, and infrastructure around open solution ponds and the TSF are minimized where practicable.

As part of the closure of all operations, the steps necessary to decommission mine facilities are determined so that the facility can be closed in a manner that prevents adverse impacts to people, wildlife or the environment. The perimeter fence around HDPE-lined ponds and the TSF will remain in place for safety (and wildlife deterrence) during reclamation. Reclamation management is addressed further in Section 11.

Wildlife monitoring are implemented at all open retention structures that are HDPE-lined. For these structures, Haile staff will visually inspect each structure and, if wildlife is observed, they will try to deter the wildlife away from the structures. Measures to deter wildlife will include, but not be limited to the following: clapping, honking vehicle horn, air horn, more aggressive mechanical noises or pyrotechnics (bangers/screamers/lighting), or other types of non-threatening noise making devices.

9.2.2.5 Management Practices for Transmission Lines

The design of substations and distribution and transmission lines for Haile Gold Mine will follow the guidelines established in the Rural Utilities Service (RUS) Substation Design and Transmission Line Design Handbooks. Haile will design and construct its transmission lines to meet these requirements and will follow the guidelines in the Suggested Practices for Avian Protection on Power Lines - The State of the Art in 2006 (APLIC 2006) for the protection of federally and state protected avian species from electrocution and line strikes. Below are the best management practices and avian protection plan that Haile will implement specific to transmission lines on the property owned or managed by Haile.

9.2.3 Best Management Practices

Isolation is provided when possible. Isolation refers to a minimum separation of 150 cm (60 in) between phase conductors or a phase conductor and grounded hardware/conductor.

Insulation, which refers to cover phases or grounds where adequate separation is not feasible, is considered when attempting to make a structure safe for avian habitat. Examples of coverings are: phase covers, bushing covers, arrester covers, cutout covers, jumper wire hoses, and covered conductors.

Perch discouragers are used to deter birds from landing on hazardous (to birds) pole locations where isolation, covers, or other insulating techniques cannot be used.

Priority is given to poles preferred by raptors or other birds that have a high electrocution risk.

9.3 Avian Protection Plan for Transmission Lines

The following Avian Protection Plans (APP) are implemented at the Haile Mine site for transmission lines.

9.3.1 Training

Haile provides avian issues training to all appropriate personnel. The training will encompass: the reasons, needs, and methods for reporting avian mortalities; following nest management protocols; disposing of carcasses; complying with applicable regulations; and, understanding the potential consequences of non-compliance.

Supplemental training is provided when there are changes in regulations, permit conditions, or internal policies.

9.3.2 Construction Design Standards

Haile includes, at a minimum, the accepted standards for both new construction and retrofitting techniques as recommended in APLIC (2006) to limit avian interactions when designing and siting new facilities and operating and maintaining existing facilities.

9.3.3 Nest Management

Haile developed, in consultation with the SCDNR and USFWS, specific procedures for managing nests of protected species on utility structures, including a process for problem nests that need to be relocated or removed. These procedures are discussed during training to ensure consistent treatment of avian nest issues and compliance with regulations or permits related to nest management.

9.3.4 Mortality Reduction Measures

Haile has implemented the general management practices for birds described above. Haile has implemented the avian mortality reporting system as described in above.

9.3.5 Quality Control

Haile will review existing APP practices and ensure their efficiency and effectiveness, and update procedures and standards as needed for Facilities Monitoring

9.4 Major Facilities Monitored During Operations

This part of the MMP has been included so that the reviewer can understand how the monitoring described above relates to the major site facilities during operations, including the following:

Tailing Storage Facility.

TSF Impoundment.

TSF Underdrain Collection Pond.

Green OSAs (Ramona, South, Hayworth, Hilltop, James and 601).

JPAG / West PAG, including the 465 and 470 Collection Ponds.

East PAG, including 500 Pond

Other Facilities

Contact Water Treatment Plant, including the 19 Pond.

Mill Site, including the Process Event Pond.

Pipelines

Stormwater management facilities, including roadside ditches.

9.5 Tailing Storage Facility (TSF)

Initial, normal, and emergency operating procedures for the TSF are described in the TSF Operation, Maintenance and Inspection Manual. A contingency plan for emergency conditions and a discussion of safety measures and techniques for periodic monitoring are also provided therein.

As part of the requirements for Haile's Dam Safety Permit No. 29-0007, a comprehensive Emergency Action Plan has also been developed. The goal of an emergency preparedness plan is a written procedure for reacting to emergency situations caused by a threat of the TSF embankment failure.

The TSF is designed to receive and store tailing from the Mill processing plant, arriving in a slurry. The TSF is operated to separate the liquid and the solids so that the liquid can be recycled for use in the Mill, and the solids can settle and eventually dewater, starting during operations and completing the process after closure. Tailing will retain residual Sodium Cyanide solutions at projected concentrations of less than 50 ppm Weak Acid Dissociable (WAD) Cyanide. The ultimate TSF would be constructed in five stages with storage to contain the current life-of-mine total tons of tailing. All five stages allow for the storage of an operating Reclaim Pond and the Probable Maximum Precipitation (PMP) event while retaining four (4) feet of freeboard above the maximum water elevation.

The TSF is monitored for structural integrity and for possible releases of pollutants into the environment, in accordance with its Dam Safety Permit No. 29-0007 and/or Mining Permit, as summarized herein. Final permit terms and conditions of Haile's Mining Permit have been established by DHEC.

9.5.1 TSF Structural Monitoring

9.5.1.1 TSF Geotechnical Measurements and Structural Integrity

Structural Integrity of the TSF is monitored in accordance with the terms of Haile's Dam Safety Permit No. 29-0007. Monitoring for TSF stability will include visual monitoring as well as geotechnical instrumentation that are installed in and around the TSF. Monitoring instruments include vibrating wire piezometers (VWPs), monuments to measure embankment settlement and movement, and monitoring of groundwater for possible leaks from the TSF. Groundwater quality monitoring is addressed more fully in Section 2, Groundwater.

9.5.1.2 TSF Monitoring

The TSF and the Mill processing facilities provide for a "closed loop" system in which there is no discharge of TSF fluids or materials into surface waters. In accordance with Haile's Mining Permit, surface water and groundwater near the TSF are monitored to detect and respond to a release from the tailing and solution stored within the TSF.

Shallow groundwater is routed under the TSF in collection pipes installed below the HDPE and low-permeability soil liner to route groundwater from beneath the facility (to avoid contact with the tailing material). Initially, per DHEC's request, this shallow groundwater is sampled at a manhole access point and may be pumped to the TSF Underdrain Collection Pond where it would be pumped back into the TSF Reclaim Pond for return to the Mill for reuse as process water.

The earth fill material used for the TSF embankment is site material classified as "Green" (see Section 9.6.5, Overburden Monitoring and Management Plan) or other clean material. The TSF will have a stormwater management and collection system for non-process water, meaning runoff that does not come into contact with the tailing or tailing pond. Stormwater at the Haile Gold Mine is managed in accordance with the Industrial General Stormwater Permit No. SCR000000. Consequently, water is released to receiving waters without chemical treatment after suspended solids have been removed in sediment ponds. Stormwater management and monitoring is described in Section 10.3.4.

9.5.1.3 Surface Water Monitoring

In accordance with Haile's Mining Permit, surface water above and below the TSF are monitored. See Section 3 for more details on Surface Water Monitoring at the Haile site. This monitoring will serve to detect releases from

the tailing and solution stored within the facility. In the event of sampling data indicative (based on protocols and procedures to be established in consultation with DHEC) of a release from the tailing or solution material, the Management Procedures identified in Section 6 (surface water) and any applicable Reporting Procedures in Haile's State permit(s) are followed.

9.5.1.4 Groundwater Quality Monitoring

In accordance with Haile's Mining Permit, Haile will conduct monitoring of groundwater. Groundwater monitoring is described in Section 5. This monitoring will serve to detect releases from the tailing and solution stored within the facility. In the event of sampling data indicative (based on protocols and procedures to be established in consultation with DHEC) of a release from the tailing or solution material, the Management Procedures identified in Section 5 (groundwater) and any applicable Reporting Procedures in Haile's State permit(s) are followed.

At the TSF, groundwater wells are installed at the locations identified in Section 5.1.1, including "upstream" of the TSF and "downstream" of the TSF. Sampling and characterization of samples from groundwater quality monitoring wells and groundwater manhole sumps are conducted in accordance with DHEC permit requirements.

9.5.1.5 Tailing Materials and Process Water

Cyanide is present only in the "closed-loop" process water used at the Mill and circulated through the TSF. Under normal operating conditions, flow from the Mill is pumped to the TSF. The pipelines from the Mill to the TSF are double-contained (a pipe in a lined ditch). See Section 10.3.7.1, for further details on pipeline management. If the cyanide level is greater than or equal to 50 ppm WAD cyanide, the flow would be directed to the cyanide destruction tanks, where cyanide levels would be reduced using a sulfur dioxide and air process. In the TSF, UV sunlight and air would naturally decompose cyanide and cyanide complexes to further decrease cyanide levels.

Haile will operate the gold extraction process at the Mill consistent with the International Cyanide Management Code so that the cyanide level (measured as weak acid dissociable cyanide, $CN_{(wad)}$ in the TSF is less than 50 ppm $CN_{(wad)}$. In accordance with its Mining Permit, $CN_{(wad)}$ levels are tested at the Reclaim Pond in the TSF.

9.5.1.6 TSF Underdrain Collection Pond

The TSF is designed with an underdrain collection system placed below the tailing (but above the HDPE liner) that collects seepage of fluids and places them in the double HDPE-lined Underdrain Collection Pond. Fluids from this Underdrain Collection Pond are pumped back into the TSF Reclaim Pond and used during operations as process water in the closed-loop recycling system between the Mill and the TSF.

In accordance with the TSF Operation, Maintenance and Inspection Manual, Haile will undertake periodic visual monitoring and management actions related to the Underdrain Collection Pond, including the Leakage Collection and Recovery Systems (LCRS) and underdrain collection sump pumps, for purposes of prevention, identification, and appropriate response in the event leakage should develop through the primary HDPE liner in the Underdrain Collection Pond.

9.5.1.7 Leak Collection and Recovery System

Double-HDPE lined ponds at the Project site will have a similar Leak Collection and Recovery System (LCRS). It is described more fully here but see also Sections 10.2.3 (465, 470, and 500 Collection Ponds) and 10.3.3 (19 / 29 Pond).

The LCRS are constructed as part of the Underdrain Collection Pond. The purpose of the LCRS is to provide a method to collect fluids in the event of a leak in the primary HDPE liner. Leakage are collected and removed from a low point located above the secondary HDPE liner.

9.5.1.8 LCRS – Monitoring and Response

Leakage through the primary HDPE liner of the Underdrain Collection Pond are indicated by the presence of process water in an LCRS sump. Level probes in the sump will start and stop the LCRS sump pump automatically. A totalizing flow meter on the discharge of the pump provides local indication of total flow.

Upon detection of leakage, pond levels are reduced, and an investigation conducted to determine the cause and location of the leakage.

9.5.2 Emergency Operating Procedures

Potential consequences of emergency situations and unforeseen natural disasters are addressed in Section 9.5. of the TSF Operation, Maintenance and Inspection Manual (August 31, 2013) and the Duckwood Tailing Storage Facility Emergency Action Plan (June 2013). Contingency procedures are described to reduce the effects of possible loss of tailing material and process water from the containment facilities.

9.5.3 Reporting and Management Planning

9.5.3.1 Federal and State Permit Reporting Requirements

Haile will comply with the reporting requirements in its Mining Permit. For further information on Haile's reporting with respect to surface and groundwater sampling data, see Section 6 and 5, respectively.

The Mining Permit requires regular reporting of the results of monitoring at the TSF. It also requires notification and reporting to DHEC if monitoring indicates a serious matter of structural integrity of the TSF or an actual or potential release of tailing or solution into the environment.

9.6 Overburden Monitoring and Management Plan

The purpose of the Overburden Management Plan is to describe the methods that are used to classify, characterize, segregate and manage overburden at Haile. The plan identifies materials that pose acid drainage (AD) or metal leaching (ML) risk so that they can be segregated and managed in a way that decreases environmental risks during and after mining.

The Overburden Management Plan is based on the Haile geochemical characterization program. The purpose of geochemical characterization is to identify, manage, and mitigate geochemical risks from the Project.

The purpose of the Overburden Management Plan is to assure that overburden presenting greater risk of release of pollutants or contaminants into the environment is managed commensurate with the risk and to provide for safe and stable management and storage of overburden material.

9.6.1 Overburden Classification

Haile has identified significant differences in the AD and ML risk of different overburden and rock units at the Project site, based on extensive analysis of cores from drilling done at the mine. Overburden is tested and classified during ore control sampling (with a sample of the drill cuttings from each blast hole assayed for sulfur and gold) into the following categories based on its potential to generate acid (PAG) characteristics:

- PAG (Red Class) – Net Neutralization Potential (NNP) < -31.25 kg/t as $CaCO_3$
- Moderate PAG (Yellow Class) – Total S greater than 0.2 % or NNP < 0 and NNP $\geq$ -31.25 kg/t as $CaCO_3$

- Non-PAG (Green Class) – Total S less than 0.2 % and NNP > 0 kg/t as $CaCO_3$

9.6.2 Growth Media

During mining, runoff from the Growth Media Storage Areas are monitored in accordance with the NPDES Industrial General Permit No. SCR000000. Water meeting growth media is released to receiving water without chemical treatment after suspended solids have been removed in sediment ponds.

9.6.3 Green Overburden

During mining, runoff from Green overburden are monitored in accordance with the NPDES Industrial General Permit No. SCR000000 for waste rock and overburden piles. Runoff from Green overburden is released to receiving water without chemical treatment after suspended solids have been removed in sediment ponds.

9.6.4 Yellow Overburden

Yellow PAG material placed in backfilled mine pits are restricted to elevations well below the ultimate water table that is expected to develop (based on historic groundwater levels and model predictions) in the backfilled pits after closure. Pit backfill is placed in lifts not more than 50 feet thick and material is amended with process lime or an equivalent amount of other alternative suitable alkaline material (which could include limestone or various by-products such as lime kiln dust or carbide from acetylene production). (The current anticipated rate of lime amendment is 2 pounds of lime per ton of yellow PAG, subject to DHEC review and final determination.) To add the lime, haul trucks loaded with yellow PAG material will drive beneath a bin containing lime. Lime is dropped onto the yellow PAG material as the truck passes beneath the bin. The truck would end-dump the material into the pit; this end-dumping over a 50-foot height causes the PAG material to mix with the lime. Yellow PAG material not used as pit backfill is permanently stored at PAG Facilities. See Section 11.4.1 below.

9.6.5 Red Overburden

Red overburden is permanently stored at PAG Facilities. See Section 11.4.3 below, for details regarding PAG Facilities.

10 REPORTING AND MANAGEMENT PLANNING

10.1 Federal and State Permit Reporting Requirements

Haile will comply with the reporting requirements in the Industrial General Stormwater Permit No. SCR000000 and its Mining Permit.

10.1.1 Management Planning

Haile has developed operational and management plans to ensure compliance with permit terms, including any emergency reporting and responses.

10.2 Potentially Acid Generating OSA's

PAG facilities – (JPAG / West PAG and East PAG), will contain Red (and some Yellow) PAG, as well as a temporary low-grade ore stockpile, are constructed with an 80-mil thick, HDPE geomembrane liner underlain with low permeability soils to contain and route seepage and runoff waters to the 465, 470 and 500 Collection Ponds for water treatment or use in the Mill. Red PAG are placed in lifts not more than 50-feet in height. The top of each

bench will be compacted, and the outside perimeter of each bench will be constructed with a minimum 20-foot wedge of saprolite. These measures will help minimize oxygen and meteoric water entry/infiltration into the PAG during operations. A minimum of 5 feet of saprolite will be placed on top of each PAG facility at closure.

10.2.1 Site Monitoring

Surface water and groundwater near the PAG facilities are monitored for purposes of leak detection in accordance with Haile's Mining Permit, as described in Sections 5 and 6 of this MMP. This monitoring will serve to detect any release of the PAG material stored within the facility through the HDPE liner and low permeability soils. In the event of sampling data indicative (based on protocols and procedures to be established in consultation with DHEC) of a release from PAG Facility, the Management Procedures identified in Sections 5 (groundwater) and 6 (surface water) and any applicable Reporting Procedures in Haile's Mining Permit are followed.

10.2.2 Water Quality Monitoring

10.2.2.1 Surface Water

Any water in contact with the material on PAG Facilities (including the low-grade ore stockpile) are managed as contact water. Collection channels are built within the HDPE-lined facility and surround PAG Facilities to divert untreated surface runoff to HDPE-lined collection ponds that are sized to capture the 100-year, 24-hour storm (a model storm of a 24-hour duration with an intensity that is only likely to occur once every 100 years). This "contact" stormwater runoff is used in the closed-loop process at the Mill or treated at the on-site Contact Water Treatment Plant and released to Outfall 004 or returned to the Mill as a make-up water source.

10.2.2.2 Shallow Groundwater

Shallow groundwater is routed under PAG Facilities (to avoid contact with the PAG materials) via collection pipes that are installed below the low-permeability soil liner to route shallow groundwater from beneath the facility. Shallow groundwater is routed and discharged to a tributary of Haile Gold Mine Creek (HGMC) in accordance with Haile's Mining Permit.

10.2.3 465, 470 and 500 Collection Ponds

A summary of the Collection Pond is shown in Table 8. The Collection Ponds are double HDPE-lined with a leak collection and recovery system (LCRS). See Section 9.5.1.7 for details regarding LCRS. Fluids in these ponds are pumped to the 19 Pond / 29 Pond as the ponds are designed to be maintained empty, rather than as holding ponds.

Table 10. Contact Water Collection Ponds

Contact Water Collection Pond	Source of Water	Volume of Water
465 Pond	JPAG / West PAG	19 Million Gallons
470 Pond	West PAG	70 Million Gallons
500 Pond	East PAG	50 Million Gallons

Collection Ponds are sized such that each can contain the entire 100-year, 24-hr storm volume plus 10 percent excess storage capacity. Each is also designed so that the 100-year runoff volume can be emptied in 72 hours, with water pumped to the 19 Pond for treatment at the CWTP and discharge or use as make-up water at the Mill.

10.2.3.1 Monitoring Plans & Permits

Since the Contact Water Collection Ponds are a source of water that will need to be treated and are managed in accordance with both the CWTP Construction Permit and the Mining Permit.

10.2.4 Reporting and Management Planning

Reporting requirements for PAG Facilities and the Collection Ponds are in Haile's CWTP Construction Permit and Mining Permit. Haile has developed operational and management plans to ensure compliance with permit terms, including any emergency reporting and responses.

10.3 Other Facilities

10.3.1 Contact Water Treatment Plant

Haile's Contact Water Treatment Plant (CWTP) will treat contact water in accordance with Haile's Individual NPDES Permit No. SC0040479. The CWTP is designed to treat 1,200 gpm and to handle variable low flows efficiently. The treatment approach is a two-stage clarification system to address the estimated influent metals loading from contact water generated on site during operational activities. The water treatment process approach was selected to provide flexibility and reliability in meeting discharge permit standards for the variable flow rates and water quality from the contact water generated on site (the inflow to the CWTP will vary, over time, in both quantity and quality). Redundancy has been provided for critical process areas and unit process equipment to ensure NPDES compliance and to better handle the variable water quality and loading.

The CWTP is a self-contained facility within the Mill Site. Contact water is collected in the double HDPE-lined 19 Pond, which can be a makeup source for the Mill or can be sent to the CWTP, where it is treated and released or returned to the Mill as a make-up water source. The treatment process is two reaction tanks, two clarifiers, and a multi-media filtration process that is designed to precipitate the metal hydroxides into flocculated solids. The solids that settle in the containment compartments ultimately are disposed in the TSF.

The Contact Water Treatment Plant (CWTP) will be expanded to 2,200 gpm in approximately 2025.

10.3.2 Sources of Contact Water

Contact water is water that meets PAG material. Contact water originates from the following sources:

- Dewatering of the surface water within active and inactive pits (not reclaimed) that have intercepted PAG material, including seepage, stormwater runoff, and pit wall runoff;
- Runoff from PAG Facilities;
- Seepage from PAG Facilities; and
- Runoff and seepage from ore stockpile(s) – including the low-grade ore stockpile at PAG Facilities, the primary crusher, and the ore stockpile at the Mill.

10.3.3 19 Pond / 29 Pond

The 19 Pond is designed to store approximately 19 million gallons of water (2.54 million cubic feet) with an additional 2 feet of freeboard. The 19 Pond is designed to be used as a buffer between the various sources of

contact water and the CWTP. The 19 Pond is sized to ensure the a Contact Water Collection Ponds can be evacuated of runoff from the 100-year event within 72 hours in coordination with running the CWTP. The water reporting to the 19 Pond will either be treated in the CWTP or be sent to the Mill for make-up water.

The 19 Pond is double HDPE-lined with a leak collection and recovery system (LCRS). See Section 9.5.1.7 for details on the LCRS.

A third cell will be added to 19 Pond which will increase its capacity from 19 million to 29 million gallons (3.88 million cubic feet) in approximately 2024.

10.3.4 Monitoring Plans & Permits

The CWTP is monitored in accordance with Haile's NPDES Individual Permit No. SC0040479 and is operated in accordance with Haile's Operations and Maintenance Manual for the CWTP. Water quality at the CWTP is monitored in accordance with Haile's NPDES Individual Permit No. SC0040479.

10.3.5 Reporting and Management Planning

10.3.5.1 Federal and State Permit Reporting Requirements

Specific reporting procedures are in NPDES Individual Permit No. SC0040479, Part II, Section L, Reporting Requirements.

10.3.5.2 Management Planning

In the event of any non-compliance, including that which may endanger health or the environment (as these terms are defined in Haile's NPDES Individual Permit No. SC0040479), Haile will follow the reporting procedures in Part II, Section L, Reporting Requirements. This includes notification of the DHEC local office within 24 hours, and a written submission within 5 days of the time Haile becomes aware of the circumstances. "The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance."

10.3.6 Mill Site

10.3.6.1 Process Flow

Gold bearing ore is sent to the Mill where it will go through a process of physical size reduction and chemical separation to extract the precious metals. TSF reclaim water is re-used in the Mill process. The reclaim water will cycle between the Mill and the HDPE-lined TSF in a closed loop, which will prevent the Mill process water from being discharged into the environment.

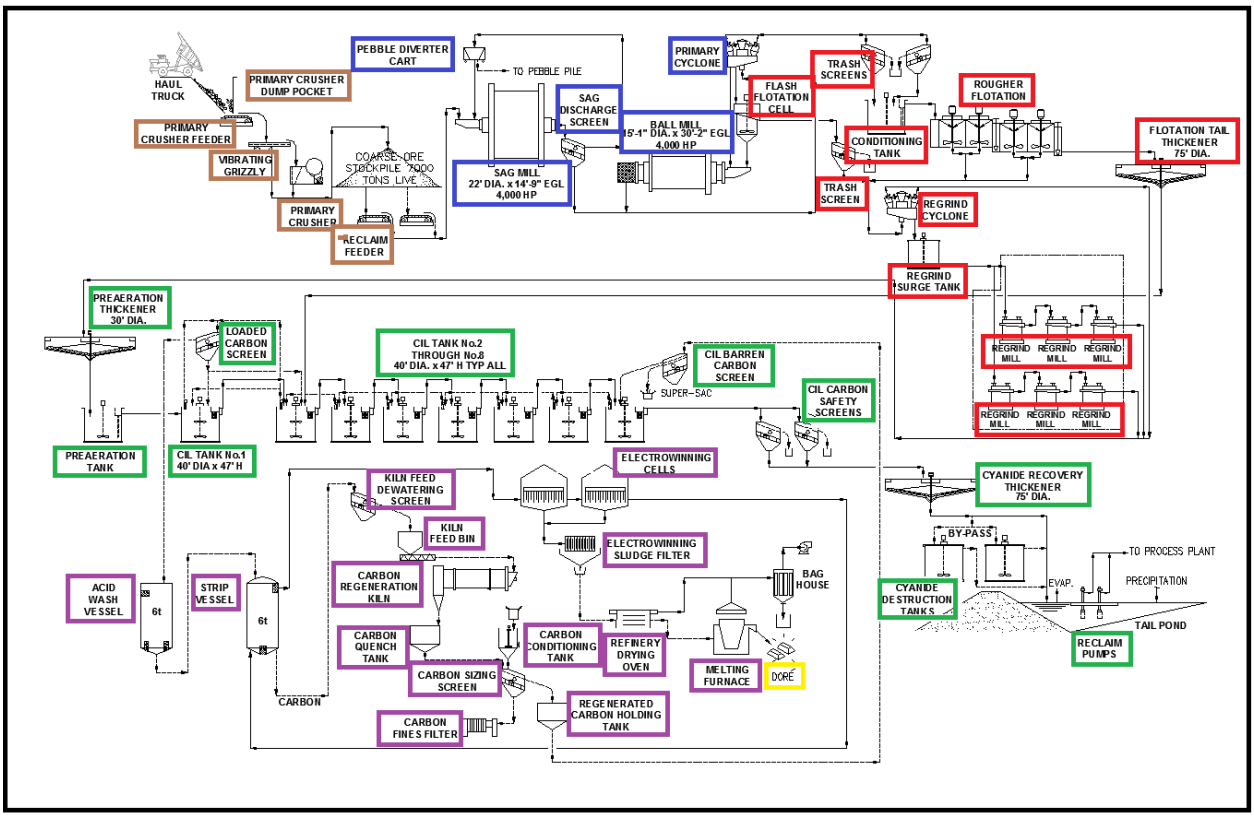
Sodium cyanide is used only in tanks and in the following manner within the closed-loop system for the Mill process water. Sodium cyanide is added with activated carbon to the concentrate and flotation tailing treatment stages. (Prior to those stages, the slurry is aerated to oxidize the ore, which reduces the amount of sodium cyanide required to extract the gold.) In addition to sodium cyanide and activated carbon, lead nitrate and lime are added in the concentrate and flotation tailing treatment stages in various amounts to enhance gold recovery and maintain the pH to ensure protective alkalinity. The Carbon-in-Leach (CIL) process will then take place in eight tanks. Slurry will advance from tank to tank by gravity and the discharge from the last tank would report to a carbon screen. Because the particles of activated carbon with the adsorbed gold are larger than the slurry

mixture, they would be retained in the tanks by screens while the “waste slurry” will pass through from tank-to-tank and finally out of the circuit.

Tailing slurry is pumped through the Cyanide Destruct Process to the TSF. In the cyanide destruction tanks, WAD cyanide is oxidized to form cyanate (OCN-). The process utilizes sulfur dioxide and air at a slightly alkaline pH in the presence of soluble copper to oxidize the cyanide. Through this process, the cyanate quickly decomposes in water to ammonium (NH4) and bicarbonate (HCO3) ions that are stable. This process was developed in the 1980’s by INCO and is currently in use in over 30 mine sites worldwide. Ammonium bisulfite is the source of sulfur dioxide, and air is the source of oxygen. Copper sulfate is added as a catalyst, as needed, and lime is added to control pH.

Figure 13 presents the general Mill process flow sheet, showing Primary crushing (Brown), Grinding (SAG and Ball Mill) (Blue), Flotation (Red), Regrind (Red), Carbon-in-Leach (CIL) (Green), Carbon stripping and Gold processing (Purple).

Figure 13. General Mill Process Flow Sheet



Source: Project Description (December 2018).

10.3.6.2 Spill Containment & Response

The ore processing facilities and chemical storage areas are designed with the capacity to contain spills or leaks, with the volume to hold a 100-year, 24-hour storm event, assuming it would occur in conjunction with a spill or leak. Each area is built on a concrete floor with cast-in-place concrete walls. The floor area and wall heights are designed to capture any spills, and the floors slope toward a collection sump for clean-up and return of the spill to the process stream for which it is best suited. The floor area and walls are designed to capture 110 percent of the largest vessel (or container) in that process area plus stormwater (for the 100-year, 24-hour storm event) if it is open to the sky.

In the event of a spill that exceeds a facility's containment capacity, the overflow will drain to the adjacent Process Event Pond, which is designed to act as a failsafe in case individual containment systems have insufficient capacity. The Process Event Pond is designed to capture quantities of spilled solution or slurry that may exceed the main process containment facilities, tailing slurry pipeline contents, or reclaim water line contents. It is constructed on the north end of the processing facilities. Table 9 summarizes the containment systems and volumes for each component of the Mill.

Table 9. Containment Systems for the Mill

Containment Area	Indoor / Outdoor	Containment System	Containment Volume	Sump Pumps to
Primary Crusher	Outdoor	Concrete Pad with stem walls	100 year/ 24-hour storm event	Stockpile Collection Pond
Grinding (SAG & Ball Mill) Building	Covered	Concrete Pad with stem walls	110% of largest vessel	Grinding Circuit
Flotation and Regrind	Outdoor	Concrete Pad with stem walls	110% of largest vessel + 100 Year/ 24-hour storm event (utilizing overflow to adjacent containment areas)	Flotation Circuit
Pre-aeration Thickener	Outdoor	Concrete Pad with stem walls	110% of largest vessel + 100 Year/ 24-hour storm event (utilizing overflow to adjacent containment areas)	Pre-aeration Thickener
Flotation Tail Thickener	Outdoor	Concrete Pad with stem walls	110% of largest vessel + 100 Year/ 24-hour storm event (utilizing overflow to adjacent containment areas)	Flotation Tail Thickener
Carbon in Leach (CIL) Area	Outdoor	Concrete Pad with stem walls	110% of largest vessel + 100 Year/ 24-hour storm event (utilizing overflow to adjacent containment areas)	CIL Circuit
Cyanide Recovery Thickener/Cyanide Destruction	Outdoor	Concrete Pad with stem walls	110% of largest vessel + 100 Year/ 24-hour storm event (utilizing overflow to adjacent containment areas)	Cyanide Destruction
Reagent Mixing Area	Covered	Concrete Pad with stem walls	110% of largest vessel in each containment area + 100 Year/ 24-hour storm event	Cyanide Destruction
Reagent Storage Area	Outdoor	Concrete Pad with stem walls	110% of largest vessel in each containment area + 100 Year/ 24-hour storm event	CIL Circuit
Reclaim Water Pad	Outdoor	Concrete Pad with stem walls	110% of largest vessel + 100 Year/ 24-hour storm event	Reclaim Water Tank
Tailing Line	Outdoor	Lined Trench and Pond	110% of the entire pipeline volume + 100-year/ 24- hour storm event	Process Event Pond
Truck Shop Tank Farm	Outdoor	Double Walled Tanks	Tanks are double-walled on concrete foundations.	No sump in this area. Any spills would be remediated at the point of spill
Carbon Acid Wash	Outdoor	Concrete Pad with stem walls	110% of largest vessel + 100 Year/ 24-hour storm event	Carbon Acid Wash
Carbon Strip	Outdoor	Concrete Pad with stem walls	110% of largest vessel + 100 Year/ 24-hour storm event	Carbon Strip
Carbon Regeneration	Outdoor	Concrete Pad with stem walls	110% of largest vessel + 100 Year/ 24-hour storm event	Carbon Regeneration
Refinery	Indoor	Concrete Pad with stem walls	110% of largest vessel	Refinery
Fuel Storage	Outdoor	Double Walled Tanks	Tanks are double-walled on concrete foundations.	No sump in this area. Any spills would be remediated at the point of spill

Source: Haile Draft Project Description (December 2018)

Systems and procedures at the Mill Site are in place to address potential recovery of released solutions, remediation of any contaminated soil, and possible failures of delivery tank trucks, as necessary to protect surface and ground water.

10.3.6.3 Process Event Pond

The Process Event Pond is a 1.5-million-gallon capacity HDPE-lined pond to handle overflow events should multiple spill events occur in the Mill processing area., Process solution or slurry exceeding secondary containment capacity would exit the containment area through a pipeline and would flow by gravity within a pipe to the HDPE-lined Process Event Pond. Should a failure of the tailing or process water pipelines occur, or in the event of a prolonged unplanned power outage, the material from the pipelines would drain to the Process Event Pond.

Once the failures have been repaired, or power restored, the material in the Process Event Pond would be returned to the cyanide recovery thickener or applicable area for processing. Water from a spill or incident that contacts processing reagents would be suitable for use in the closed-loop system, which includes use of process water from the TSF.

10.3.6.4 Monitoring Plans & Permits

The Mill and Process Event Pond are monitored in accordance with Haile's Mining Permit, and operated in accordance with Haile's Operating Plans and Procedures for the Mill, which will describe the standard practices necessary for the safe and environmentally sound operation of the facility, and specific measures needed for compliance with applicable regulatory requirements. Haile's Operating Plans and Procedures for the Mill are consistent with the International Cyanide Management Code.

10.3.6.5 Water Quality Monitoring

Sections 5, Groundwater, and Section 6, Surface Water, provide for up-gradient and down-gradient monitoring of the primary facilities at the mine, to determine whether constituent migration from the Mill is occurring, as well as appropriate reporting and response activities.

10.3.6.6 Cyanide Management

Unloading of liquid cyanide and other chemicals used at the Mill is done on a concrete surface to prevent any leakage from reaching the environment. Cyanide storage and mixing tanks are located on concrete surface to prevent seepage to the subsurface. Secondary containment is employed to contain any releases from the tanks, and for any precipitation that may contact cyanide. Should there be any releases from the tanks, the material/liquid are recovered and returned to the cyanide process and any contaminated materials are disposed of properly.

10.3.6.7 Air Quality Control and Monitoring

Haile's Air Quality State Construction Permit No. 1460-0070-CA and Operating Permit (not yet issued) from the South Carolina DHEC, Bureau of Air Quality, will contain emissions limitations, work practice standards, recordkeeping requirements, equipment monitoring requirements and reporting obligations. *See* Air Construction Permit No. 1460-0070-CA, Sections C-N.

10.3.6.8 Reporting and Management Planning

Haile will follow the reporting procedures in its Air Construction Permit No. 1460-0070-CA and Air Operating Permit and Mining Permit, as appropriate.

Haile will develop operational and management plans associated with optimization to ensure compliance with permit terms, including any emergency reporting and responses.

10.3.7 Pipelines

10.3.7.1 Spill Prevention, Containment & Response

The tailing slurry (from the Mill to the TSF) and process water pipelines (from the TSF to the Mill) are designed to have double containment – with one pipe placed inside another pipe (the containment pipe) and/or a pipe in an HDPE-lined ditch – to minimize the potential of an accidental spill. Haile will also install pressure-sensing alarms on these pipelines.

Should a failure of the tailing or process water pipelines occur, or in the event of a prolonged unplanned power outage, the material from the pipelines would drain to the Process Event Pond (See Section 10.3.6.3 for details on the Process Event Pond). Once the failures have been repaired, or power restored, the material in the Process Event Pond would be returned to the cyanide recovery thickener or applicable area for processing. Water from a spill or incident that contacts processing reagents would be suitable for use in the closed-loop system, which includes use of process water from the TSF.

The contact water pipelines will carry contact water from its source to the 29 Pond for treatment or use in the Mill. The contact water pipelines and pump systems have not yet been designed; however, Haile expects that these are single-wall pipes that will have differential pressure-sensing alarms and/or an automatic shut-off system to respond to a change in pressure in the pipe (which is a standard indicator of a potential leak).

10.3.7.2 Monitoring Plans & Permits

Tailing slurry and process water pipelines are monitored in accordance with Haile's Mining Permit. Haile's contact water pipelines from originating sources to the 29 Pond are expected to be addressed in Haile's CWTP Construction Permit for mine optimization.

10.3.7.3 Reporting and Management Planning

Haile will comply with the reporting requirements in its Mining Permit and NPDES Individual Permit, as appropriate.

Haile has developed operational and management plans to ensure compliance with permit terms, including any emergency reporting and responses.

10.3.8 Stormwater Facilities, Including Roadside Ditches

Management of non-contact stormwater involves routing runoff from undisturbed areas around mine facilities, collection of stormwater runoff from non-PAG mine facilities, sediment control and release of non-contact waters to the stream system.

10.3.8.1 Monitoring Plans & Permits

Stormwater management actions are more fully described in Haile's Stormwater Pollution Prevention Plans (SWPPP), which were completed in conjunction with the NPDES Industrial General Permit. Methods of managing sediment and erosion control during construction will follow guidelines presented in the South Carolina Stormwater Management Handbook (DHEC 2005) and be in accordance with the NPDES Industrial Permit.

For construction activities at the Mill area, Haile will comply with the NPDES Construction General Permit. Following construction, this area will comply with the NPDES Industrial General Permit.

10.3.8.2 Stormwater Management

Stormwater management at Haile is guided by the regulations and standards set by the DHEC and Haile's current coverage under the NPDES Industrial General Permit. Presently, all covered stormwater discharges are being managed in accordance with the requirements of the NPDES Industrial General Permit. Regulation R61-9.122.26(b)(14) defines "Stormwater discharge associated with industrial activity" to mean "the discharge from any conveyance that is used for collecting and conveying stormwater and that is directly related to manufacturing, processing or raw materials storage areas at an industrial plant. The term does not include discharges from facilities or activities excluded from the NPDES program under this regulation."

The NPDES Industrial General Permit includes Part 8 (Sector-Specific Requirements for Industrial Activity), Subpart G (Sector G-Metal Mining). The sector-specific requirements apply to those areas of the mine facility where those sector-specific activities occur. These sector-specific requirements are in addition to any requirements specified in the permit. Coverage is required for metal mining facilities that discharge stormwater contaminated by contact with, or that has come into contact with, any overburden, raw material, intermediate product, finished product, byproduct or waste product located on the site of the operation (see Part 8.G.1, Covered Stormwater Discharges). Part 8.G.2, Covered Discharges from Active and Temporarily Inactive Facilities, identifies the stormwater discharges covered under Part 8, Subpart G. In accordance with the NPDES Industrial General Permit, Part 5, Stormwater Pollution Prevention Plan (SWPPP), Haile will update its existing SWPPP to document the selection design, and installation of control measures, and implementation (including inspections, maintenance, monitoring, and corrective action) of the permit requirements.

DHEC has determined that construction of the Mill Site will require coverage under the NPDES Construction General Permit and associated SWPPP for stormwater discharges associated with construction. As a result, Haile submitted its Notice of Intent (NOI) for coverage under the NPDES Construction General Permit to DHEC on June 28, 2013. Upon completion of the construction activities for the Mill Site, stormwater discharges associated with industrial activities at the Mill Site will return to being regulated by the NPDES Industrial General Permit. Other earthmoving activities at the mine are covered by the NPDES Industrial General Permit.

Stormwater control design measures and implementation procedures are in process for several of the planned facilities at the mine site, and Haile is working with DHEC to ensure compliance with all stormwater permitting requirements. Haile will have complete stormwater plans, which will have been reviewed by DHEC, prior to conducting any construction and industrial activities not otherwise covered under the current NPDES Industrial General Permit.

10.3.8.3 Reporting and Management Planning

The reporting requirements are stated in Part 8, Sector G, 8.G.8 of the NPDES Industrial General Permit.

Under the NPDES Industrial General Permit, Haile must report any noncompliance which may endanger health or the environment. Any information must be provided orally to DHEC within 24 hours from the time Haile

becomes aware of the circumstances. A written submission to DHEC must also be provided within five days of the time Haile becomes aware of the circumstances.

Under the NPDES Industrial General Permit, if a follow-up monitoring test result (as defined in Section 6.3 of the permit) exceeds a numeric effluent limit, Haile must submit an Exceedance Report to DHEC no later than 30 days after it has received its lab results. Haile's report must include the following:

a. NPDES permit tracking number;
b. Facility name, physical address and location;
c. Name of receiving water;
d. Monitoring data from this and the preceding monitoring event(s);
e. An explanation of the situation; what Haile has done and intends to do (should the Company's corrective actions not yet be complete) to correct the violation; and
f. An appropriate contact name and phone number.

Under the NPDES Construction General Permit, Haile shall report to DHEC any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time Haile becomes aware of the circumstances. A written submission to DHEC shall also be provided within 5 days of the time Haile becomes aware of the circumstances. The written submission shall contain:

a. A description of the noncompliance and its cause;
b. The period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue;
c. And steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

Under the NPDES Construction General Permit, Haile shall report to DHEC all other instances of noncompliance at the time monitoring reports are submitted. The monitoring reports shall contain the above-listed information.

11 RECLAMATION PLAN, POST-MINING RECLAMATION AND CLOSURE MONITORING

The Haile Gold Mine Reclamation Plan has been developed to meet the requirements of Section 48-20-90 of the South Carolina Mining Act. The Reclamation Plan is designed to describe methods used to reclaim land disturbed by mining, ore processing operations, and associated activities to a stabilized condition that will provide for the long-term protection of land and water resources, minimize the adverse impacts of mining, and support the intended post-mining land use.

In addition, the Reclamation Plan serves as a basis for calculating reclamation costs, identifying long-term post-reclamation monitoring and maintenance requirements, and determining financial assurance. As mining activities at the Haile Gold Mine progress, the Reclamation Plan is continuously refined and expanded, while adhering to the concepts outlined therein. Appropriate financial assurance is provided for reclamation and closure activities to ensure that funds for reclamation and closure are available.

Due to its past reclamation successes at the Haile Gold Mine site, Haile has experience and understanding of the reclamation process, including what vegetation can and will grow at the site. During mining operations, Haile will take every opportunity to perform reclamation concurrent with operations. Concurrent reclamation is performed

on disturbed areas once all planned mining activities in the area are completed and no future mining activity is expected. Final reclamation is completed as soon as practicable after mining activities cease at the facility. Haile will also conduct post-mining reclamation and closure maintenance and monitoring.

11.1 Site-Wide Reclamation Plan

The Haile Gold Mine Reclamation Plan describes the reclamation of disturbed land from mining and ore processing operations to a stabilized condition that will provide for the long-term protection of land and water resources for post-mining land uses. Additional goals include:

- Reducing the environmental impacts of mining.
- Utilizing concurrent reclamation where appropriate throughout the mining process.
- Minimizing the need for long-term active water management requirements through the conversion to and use of passive treatment technology at the TSF and PAG Facilities.
- Abating the generation of acid rock drainage from the sulfide materials exposed due to mining operations.
- Meeting state and federal regulatory requirements.

During operations, Haile will perform aspects of the final reclamation activities as part of operational activities. This concurrent reclamation is planned for stabilization and vegetation of the outboard slopes of the TSF and OSAs, backfill and reclamation of certain mine pits, and grading and reseeding areas where previously reclaimed facilities were removed. Final reclamation (which is anticipated to include reclamation of the TSF, PAG Facilities, the Mill Site, roads, pit lakes, and the associated revegetation efforts) begin immediately upon cessation of mining and milling operations. Reclamation are completed as expeditiously as practicable and in compliance with SC Mining Regulations 89-80.B: “Reclamation shall be conducted simultaneously with mining whenever feasible and in any event shall be initiated at the earliest practicable time, but no later than within 180 days following termination of mining on any segment of the mine and shall be completed within two years after completion or termination of mining on any segment of the mine.”

11.2 Vegetation Plan

Re-establishing vegetation on impacted lands are essential to preventing erosion, restoring surface stability, providing site productivity, and providing wildlife forage/cover opportunities as well as visual/aesthetic values at the Haile Gold Mine Project site during operations and reclamation. The vegetation procedures planned for the Haile site are based on industry standards, site specific experience in South Carolina, and past reclamation success.

Multiple seed mixes are to be used at Haile depending on soil condition, planting season, weather conditions and available water sources. All seed shall be certified noxious weed-free. Seed mixes are chosen based on species characteristics, varied soil conditions at site, and the planned land use and maintenance of the area. An annual grass is used in the mix and will change dependent on the time of year the planting is made. The primary goal of revegetation is soil stabilization while a secondary goal is to provide a habitat for wildlife and the natural succession of vegetation.

During the mine operating period, Haile will consult with SCDNR and DHEC, establish vegetation test plots and perform other studies to establish, confirm and refine appropriate vegetation species and seeding rates, determine the need for soil amendments, and determine overall vegetation procedures to ensure sustainable vegetation post-mining for the intended land use.

Based on previous experience at the mine site, majority of the disturbed surfaces are suitable to sustain vegetation without the need to supplement the soil. As a precaution, growth media is stockpiled during mine development to fully reclaim the site in accordance with SC Mining Regulation 89-140. Where Haile, in conjunction with the State, determines that growth media is needed to establish vegetation, material are recovered from the storage areas and used during reclamation activities.

11.3 Post-Mining Land Use

Consistent with the individual locations that are reclaimed as described in Sections 11 to 11.6, the goal of Haile's reclamation plan is to return the disturbed areas to a stable condition that can support a productive post-mining land use. After reclamation, assuming such uses are consistent with local zoning laws, most of the site are suitable for other uses (i.e., industrial, commercial, residential, and agriculture & forestry), restored to their natural condition (i.e., wetlands and streams), or reclaimed as pit lakes. Future activities at the TSF and PAG Facilities are limited, consistent with post-closure restrictions.

11.4 Facilities

The facilities at the Haile Gold Mine that are addressed in the Reclamation Plan include:

- Backfilled Mine Pits
- Pit Lakes
- Green OSAs
- PAG Facilities
- Site surface water management facilities
- TSF
- Mill Site and associated infrastructure
- Roads, on-site power lines, and other ancillary facilities

Following is an overview of the reclamation activities planned for the above facilities:

11.4.1 Backfilled Mine Pits

Mill Zone, Snake, Haile, and Red Hill are backfilled with overburden and reclaimed to facilitate post mining land uses. A reclamation approach for each pit has been designed to best suit the location, geometry, and timing of mining within the scope of the current mine plan and reclamation concepts. These pits are backfilled with Yellow and Green overburden as part of overburden placement during operations (i.e., concurrent backfilling).

As Yellow overburden material is placed in the pit backfill, the overburden is amended with lime at a rate of 2 lbs. per ton of overburden. Lime amendment will assist in neutralizing acid rock drainage that forms within the pit backfill material until depressurization activities cease, and the water level in the pit backfill has risen to fully inundate the yellow overburden. Yellow overburden is placed using lift heights no greater than 50 feet.

The final lift of Yellow overburden will be placed well below the anticipated inundation level (based on historic levels and groundwater modeling). Above the Yellow overburden, a minimum of 5 feet of saprolite will be placed

to reduce oxygen entry into the backfill. Once water levels in the pit backfill have recovered to the inundation level, the Yellow overburden is permanently Snake, Mill Zone submerged, limiting the oxygen available and thereby reducing the potential to generate acid rock drainage.

The top of pit backfill will be regraded to minimize impoundment of storm waters and flow concentration and seeded using an approved seed mix and appropriate seeding methods, described above in Section 11.2 until inundated with water at the end of active mining with the filling of Ledbetter Reservoir.

11.4.2 Pit Lakes

Ledbetter Reservoir (comprised of the partially backfilled Snake, Haile, Mill Zone and Red Hill Pits and Small Pit) and Champion Pit Lake will fill with water at the cessation of dewatering. A safety berm is constructed around any portions of the Champion Pit Lake and the Ledbetter Reservoir that did not have these during operations. Appropriate signage will be placed at regular intervals on the berm warning of the potential hazards of highwall remaining along the shore and other pit lake hazards.

Pit lake water quality studies have been performed based on pre-mining information. During operations, as additional information is acquired related to acid generating characteristics of the pit walls and refined groundwater modeling, additional pit lake studies will be performed to refine the predictions of the quantity and quality of the Ledbetter Reservoir and Champion Pit Lake.

During pit filling and until water quality stability has been achieved, water quality within the pit lakes will be monitored and managed to ensure water quality meets applicable requirements. Lime will be added, as necessary, to maintain the pit lakes with an appropriate pH levels throughout the post closure period.

11.4.3 PAG Facilities

PAG Facilities are designated to receive all Red overburden and any Yellow overburden not utilized for the pit backfills. Low grade ore will also be stored within the lined area of PAG Facilities; however, the plan is to remove and process the low-grade ore prior to final closure and reclamation of PAG Facilities. Any low-grade ore left within PAG Facilities would be closed and reclaimed with the Red/Yellow overburden. Additionally, spent ore from the existing Chase and South Heap Leach Pads and existing passive cell material are placed in PAG Facilities; Red or Yellow material from existing overburden facilities and backfill material from previously backfilled pits that are within the pit footprints are placed in PAG Facilities.

PAG Facilities are constructed with an 80-mil thick, HDPE geomembrane liner underlain with low permeability soils to contain and route seepage and runoff waters to three collection ponds (the 465, 470 and 500 Collection Ponds) for water treatment. The HDPE liner is overlaid with two (2) feet of sand, to protect the liner during operations and removal of the low-grade ore stockpile for processing at the Mill. Collection channels are built within the HDPE-lined facility and surround PAG Facilities to divert untreated surface runoff and seepage from the PAG to HDPE-lined collection ponds that have been sized to capture the 100-year 24-hour precipitation event. Groundwater is routed under PAG Facilities to avoid contact via collection pipes that would be installed below the low- permeability soil liner to route groundwater from beneath the facility.

Red PAG is placed in lifts not more than 50 feet in height. The outside perimeter of each bench will contain a minimum 20-foot wedge of saprolite. Also, the top of each bench is compacted. These measures will help minimize oxygen and meteoric water entry/infiltration into the pile. As sections are filled to capacity, thetop surface of the regraded PAG will be c capped with a minimum five (5) feet of saprolite cover.

Once the pile is constructed and capped to final configuration, the entire surface of PAG Facilities are covered with a double textured HDPE geomembrane to limit the infiltration of water and restrict oxygen movement. A

minimum of two feet of growth media material are placed on top of the liner. The growth media is vegetated. See Section 11.2. Once vegetated, a petition to re-classify stormwater as non-contact will be submitted to DHEC. After DHEC approves, runoff will be treated as stormwater.

After the geomembrane cover is installed and infiltration into the OSA is cut off, seepage from PAG Facilities is anticipated to report to the seepage collection pond at a low flow rate and be of poor quality for an extended duration. However, the quantity of seepage is expected to decrease quickly once the HDPE cover is installed and additional precipitation is prevented from infiltrating the PAG material. The long-term treatment of this flow will be performed using a passive treatment facility. Unless and until the flow is capable of being treated by passive technology, Haile will use the on-site CWTP to treat and discharge the seepage from PAG Facilities.

Passive systems use gravity to move the water. The system is planned to be constructed in the lined Collection Ponds. Due to the passive (no pumping) nature of the system, the maintenance is expected to be minimal. The media in the cells have been assumed to require replacement every 20 years for bonding purposes.

These passive treatment systems will treat the seepage using an anaerobic (no-oxygen) treatment cell filled with organic media containing beneficial bacteria followed by an aerobic (with oxygen) polishing treatment cell and discharge. The Contact Water Collection Ponds for PAG Facilities will contain passive treatment systems capable of addressing the effluent from their portion of PAG Facilities.

Construction and operation of the passive wastewater treatment facility will be regulated by the DHEC

11.4.4 Green OSAs

Five OSAs are designated to receive only Green overburden (601, Ramona, Hayworth / South, and James OSAs). All operational slopes of the OSAs are constructed with alternating benches and angle of repose slopes to have an overall slope no steeper than 3H:1V. Concurrent with placement of the overburden, the angle of repose slopes is pushed down to develop inter-bench slopes of 2.5H:1V slopes with surface water controls to limit erosion. Benches will remain to provide surface water control to limit erosion from the slope face. Any portion of the OSA that can be safely accessed without impacting overburden placement are regraded in this manner and vegetated concurrent with mining activities.

Once final reclamation of a facility has begun, any remaining regrading are performed to achieve the above configuration over the remainder of the OSA slopes. Additionally, access ramps are removed or reduced, the top surface are regraded to promote drainage and minimize erosion, and any additional surface water control features that are needed for reclamation are shaped into the overburden surface. During final grading, occasional large boulders that are uncovered during sloping may be left on the surface to provide topographic diversity, microhabitats for wildlife and vegetation, and to break the linear appearance of the final slope.

11.4.5 Site Surface Water Management

The development and active mining of the Mill Zone, Haile, Red Hill, Snake and Ledbetter Pits will impact stretches of Haile Gold Mine Creek and North Fork Creek. For temporary surface water control, diversion ditches are installed to enable flow around active open pit mining activities. In 2016, a HDPE-lined diversion channel was constructed to divert the Haile Gold Mine Creek flow below the historic Ledbetter Reservoir around the Mill Zone Pit. For permanent water control, a Fresh Water Storage Dam (FWSD), a retention structure, is expected to be constructed in 2019 within the footprints designated for the previously permitted detention structure and the previously permitted “Pit-Related Activities” area south of there. Initially, this will be a retention structure placed in the upper reaches of Haile Gold Mine Creek that can capture some of the stream flow (to a 470’ amsl operating level and then divert the remaining Haile Gold Mine Creek streamflow) once related permitting is completed. There will be a haul road over the top of the FWSD that will be a crossing

between West PAG and East PAG. The FWSD will have the capacity to detain up to 100-year precipitation event and will allow for controlled flow into the diversion pipes. Stormwater exceeding the design event would flow through the emergency spillway into Ledbetter Pit. Upon the filling of Ledbetter Reservoir to equilibrium (approximately 95%), the Fresh Water Detention and Diversion Structure / low head dam is expected to be removed and all stream flows in Haile Gold Mine Creek will flow into Ledbetter Reservoir with flows exiting the pit lake through an engineered outlet structure into the re-established downstream channel. An engineered outlet structure will be designed prior to this time in cooperation with DHEC. The plan is to allow the upper Haile Gold Mine Creek to flow through the Ledbetter Reservoir, then out of the reservoir through an engineered outlet structure, into re-established stream channels constructed over the backfilled pits, into the Lower Haile Gold Mine Creek, and into the Little Lynches River.

11.4.6 Tailing Storage Facility

The TSF is constructed using conventional downstream construction methods to raise the embankment in four stages. The site topography is such that to achieve the total storage capacity the embankment is a four-sided ring dike configuration, approximately 5,500 feet by 3,500 feet along the embankment crest centerline for the longest embankment legs.

The facility is underlain by a composite liner consisting of a low permeable soil liner and a 60 mil HDPE liner. An underdrain system over the 60 mil HDPE liner system will collect seepage from the tailing and convey it by gravity to the Underdrain Collection Pond at the toe of the southwest embankment. Groundwater is routed under the TSF in collection pipes installed below the HDPE and low-permeability soil liner to route groundwater from beneath the facility (to avoid contact with the tailing material).

As the outboard slopes of the TSF achieve final configuration, they are vegetated using established procedures. See Section 11.2 for details.

At the cessation of milling, the TSF is reclaimed using a dry closure approach. In order to dewater the tailing facility, the CWTP will be reconfigured to treat the water within the tailing impoundment and Underdrain Collection Pond. Water collected from the Underdrain Collection Pond and any remaining free water in the impoundment will be treated in the reconfigured water treatment plant and discharged though the same outfall used during operations.

As consolidation in an area of the tailing nears completion, that portion of the tailing will be covered with a smooth HDPE geomembrane laid directly on the tailing surface or foundation layer. The geomembrane will limit infiltration and will reduce long term seepage to the TSF underdrains, allowing the eventual use of passive treatment technology. The geomembrane cover will extend over the entire tailing surface to the edge of the TSF impoundment and will be sealed directly to the exposed TSF geomembrane liner at the perimeter of the TSF.

Following placement of the geomembrane cover, a minimum 2-foot thick layer of growth media are placed over the geomembrane to protect it from damage, UV radiation, and freezing and to provide a soil layer for establishing vegetation. The growth media will be placed over any exposed geomembrane liner on the interior TSF embankment and the top of the TSF embankment, extending to the outboard slopes of the TSF embankment. The surface the embankment is graded to allow precipitation on this surface to drain to the outside of the TSF embankment. The final surface is vegetated with an approved seed mix and established seeding methods. See Section 11.2 for details.

Drain down would continue to be collected in the TSF Underdrain Collection Pond and treated as provided for under the NPDES permit until the seepage is determined to be at the point where a passive treatment cell can treat the volume of flow from the seepage collection system. As described for PAG Facilities, see Section 11.4.3, the passive treatment cell will improve the water chemistry of the seepage to acceptable levels for state permitting

requirements. As with all passive treatment systems, the nature of the organic strata must be specifically tailored to the effluent stream and permitted by DHEC.

11.4.7 Borrow Areas

Two borrow areas (Holly and Hock) may be used to provide material for construction and expansion of the TSF. Once material from the borrow areas have been exhausted the areas are reclaimed.

If required, slopes on the edges of the borrow areas are maintained at a 3H:1V or shallower. Since material is being removed to lower the elevation without creating pits, slope grading should be minimal during reclamation. Also, during operations, slopes retained within the borrow areas will allow precipitation to flow off the areas and not create pooling. Reclamation of the borrow areas will include scarifying to loosen compacted soils and revegetating with an approved seed mix using approved seeding techniques.

11.4.8 Ancillary Facilities

Other facilities at the mine, including the Mill Site, growth media storage areas, sediment and settling ponds, disturbed land, roads, power lines, pipelines and surface water controls, that are not required for post-mining monitoring or maintenance will be regraded, demolished, salvaged and/or removed as appropriate. Specific areas (such as portions of the Mill Site) will be covered with a layer of growth media. All disturbed areas will be vegetated using established procedures.

11.5 Post-Mining Reclamation and Closure Monitoring

Haile will conduct post-mining reclamation and closure monitoring for purposes of ensuring continued compliance with permit requirements. However, Haile expects that a Post-Closure Water Quality Monitoring and Management Plan will be adapted from the operational water quality plan. In addition, monitoring will be coordinated with requirements of permits in that are affected. Overall objectives are to demonstrate that receiving waters are meeting water quality criteria. Secondarily, the plan will provide early warning of water impacts and a means of identifying contaminant sources. Finally, the plan will identify contingency actions that are employed if monitoring objectives are not satisfied.

Haile will develop a detailed post mining monitoring plan prior to mine closure based on a continuation of the operational monitoring plan. As noted above in Sections 5 and 6, the operational monitoring plan will have sampling sites in surface and groundwater that provide up-gradient and down-gradient monitoring. These sites may also be suitable for post mining monitoring. It will also include required discharge monitoring.

The Post-Mining Reclamation and Closure Water Quality Monitoring and Management Plan will be designed to assure:

- Surface and ground waters are monitored up gradient and down gradient (as appropriate) of permanent post mining features.
- There is monitoring in place between any potential sources of contamination and receiving waters to provide for adequate response time.
- All discharges are monitored in accordance with applicable regulation.
- Any known sources of contamination are appropriately monitored.
- Post mining monitoring for a period specified by regulation or agency requirements.

Groundwater monitoring are used to determine the performance of reclaimed and closed facilities that may have subsurface discharges. Selected wells are used to assess the potential loads contributed to groundwater from various facilities. Actual monitoring locations are designated in plans submitted before final reclamation commences. These points are selected for their ability to provide pertinent information on up gradient and down gradient water quality.

Based on early post-mining monitoring, the parameter list and sampling frequency may be adjusted to reflect the observed conditions. The parameters analyzed are selected based on parameters observed during operations and having the potential to adversely impact water quality downstream.

11.5.1 Post-Mining Care and Maintenance

The reclamation designs for the facilities at the Haile Site were developed to reduce the need for long-term care and maintenance. Staged-level monitoring will occur over the life of the mine, based upon Haile demonstrating that its reclamation and closure designs meet physical and chemical performance standards on a facility-by-facility basis.

The use of passive treatment cells for ongoing treatment of the drainage effluent from the TSF and PAG Facilities are expected to function over the long term but will require periodic replacement of the organic media within the facility. Haile has assumed that the cells will require replacement approximately every 20 years, or as necessary (based on the functionality of the media).

Maintenance of vegetation will also be required on PAG Facilities and the TSF following closure. Maintenance activities would be conducted to prevent woody species from becoming established. Haile will accomplish this via chemical application (i.e., spot spraying) and/or mechanical (i.e., bush hogging) as required.

Additional maintenance activities include the addition of lime to the pit lakes to maintain a neutral pH until the water level inundates any potential acid generating material in the pit walls. Haile anticipates that lime would be added to Ledbetter Reservoir and Champion Pit Lake until both water bodies obtain their design pool.

Post-mining monitoring and maintenance will also consist of surface and groundwater monitoring on a Site-wide basis beginning in Year 15 of the Mine Schedule (surface and groundwater will also be monitored during Years 0-14 as part of operations) and continue for pit lake filling reaches design pool and water quality within the lakes equilibrate. However, it is expected that the intensity and frequency of the surface and groundwater monitoring would be decreased over time as performance standards are achieved, until eliminated.

Importantly, DHEC and Haile will actively work together to determine appropriate post-mining monitoring and management obligations, as well as the appropriate length of time for which these activities should occur, once reclamation activities are underway and more Site-specific information is available.

12 CULTURAL RESOURCE MONITORING

Information regarding the cultural resource management measures that Haile is committed to implementing can be found in the Section 106 Memorandum of Agreement (MOA), Cultural Resources Management Plan (CRMP) and Unanticipated Discovery Plan.

13 REFERENCES

Arcadis, Ecological Risk Assessment for the Future Ledbetter Pit Lake (April 2012).

NewFields, Tailing Storage Facility Operations, Inspection and Maintenance Manual

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Haile, Anticipated Mine Production and Operations (Supplemental Report December 2012) (submitted in response to RAI 2-GI-06 on January 10, 2013)

Haile, Draft SEIS Project Description (December 2018)

Haile, Reclamation Plan

Haile, Water Resources Inventory (2013)

International Cyanide Management Code (ICMC 2012)

National Bald Eagle Management Guidelines (USFWS 2007)

Revised Mitigation Plan (July 2013)

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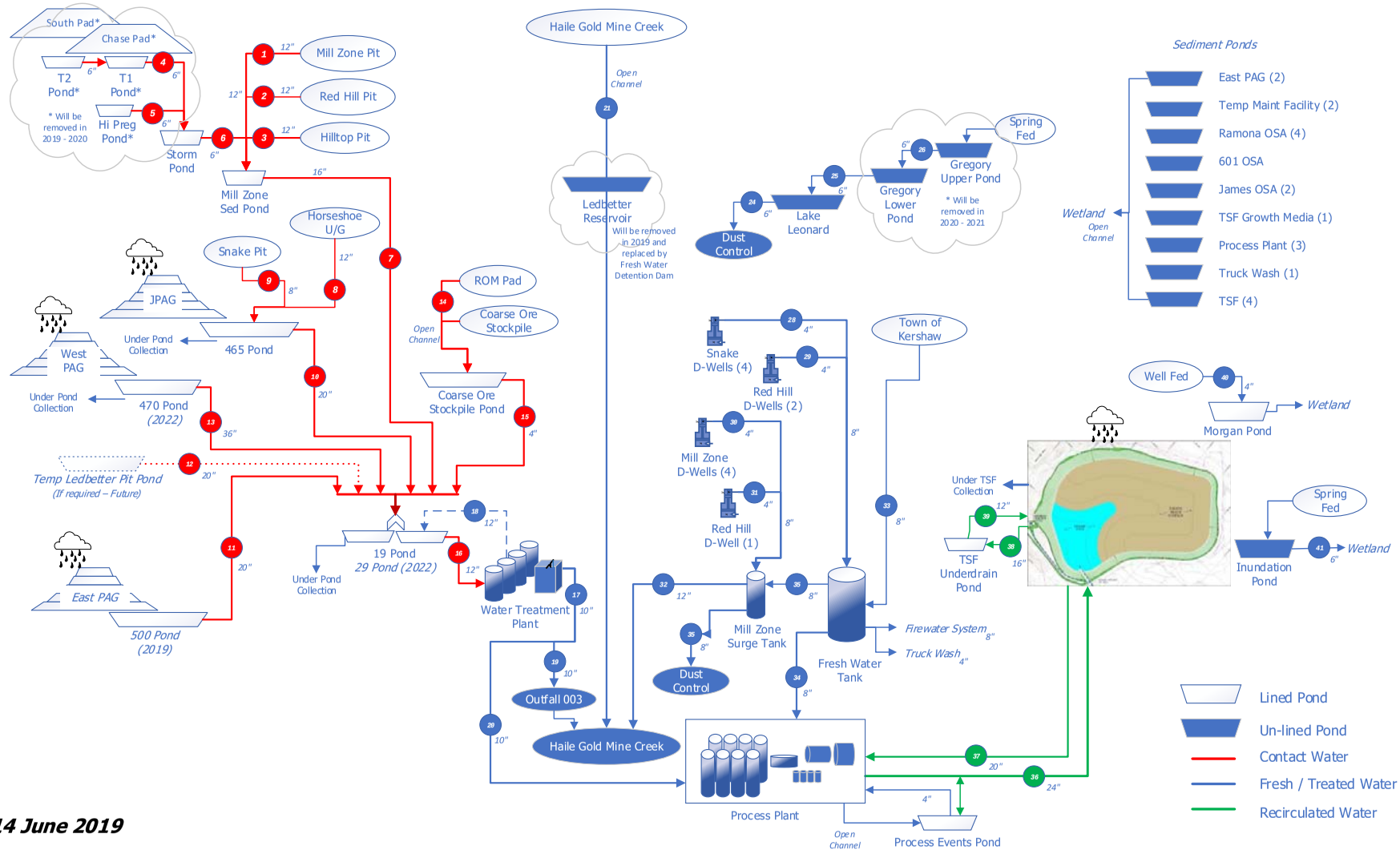
Suggested Practices for Avian Protection on Power Lines -The State of the Art in 2006 (APLIC 2006)

Haile Gold Mine Water Management Systems



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