Environmental Information Document (EID) Manh Choh Project

December 31, 2021

Prepared for:

Peak Gold, LLC

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Executive Summary

The purpose of this Environmental Information Document (EID) is to support compliance with the National Environmental Policy Act (NEPA) for the development of the Manh Choh Project (e.g., construction, operation, reclamation and closure phases). This EID assists agencies by providing sufficient evidence and analysis for determining whether to prepare a categorical exclusion, environmental assessment, environmental impact statement, or other environmental document.

The Manh Choh Project is located on property owned and controlled by the Native Village of Tetlin (Tetlin), an indigenous Alaska Native community. Tetlin opted to not participate in the 1971 Alaska Native Claims Settlement Act (ANCSA) as a regional corporation, and so has not received revenue sharing from resource development completed by other Alaska Native regional corporations. Tetlin is an Environmental Justice population, with both high rates of poverty and a minority population. Tetlin leased the mineral rights to their lands to Peak Gold, LLC so that mineral development can bring revenue to the Tetlin tribal members.

Peak Gold, LLC proposes to operate an open pit gold mine in the Tetlin Hills, near Tok, Alaska. In conjunction with Tetlin, it has been named the Manh Choh Project (Project). The proposed Project consists of three components:

- Mine development (Manh Choh Mine),
- Ore transport to Fort Knox Mine (Fort Knox), and
- Ore processing at Fort Knox.

This EID presents a summary of the Proposed Action. Extensive technical reports have been prepared to support the analysis. This EID directly quotes and summarizes the technical reports, provides supplemental analysis for some categories (i.e. land use), and presents a single distilled narrative of baseline resources and potential impacts.

The EID defines the potential impacts as:

- Negligible Impacts: Resource would not be affected, or impacts would not result in a loss of individuals or habitat.
- Minor Impacts: Impacts on resource would be measurable or perceptible and local; however, the overall viability of the resource (i.e. population or subpopulation) would not be affected and without further adverse impacts the population would recover.

The EID finds that potential impacts range from negligible to minor (Table ES-1).

Table ES-1 Impact Summary

Resource	Proposed Action	No Action
Physical and Chemical Environment		
Air Quality	Minor, Long-Term, Localized	No Impact
Climate Change	Negligible, Short-Term, Localized	No Impact
Noise	Negligible, Short-Term, and Localized	No Impact
Visual	Minor, Permanent, and Localized	No Impact
Hazardous Materials	Negligible to Minor, Short-Term, and Localized	No Impact
Geology and Geochemistry	Minor, Permanent, and Localized	No Impact
Permafrost	Negligible, Permanent, Localized	No Impact
Water Resources	Negligible, Long-Term, Localized	No Impact
Soils	Minor, Permanent, Localized	No Impact
Biological Environment		
Wetlands	Negligible, Long-Term, Localized	No Impact
Vegetation	Negligible, Long-Term, Localized	No Impact
Fish	No Impact	No Impact
Birds	Negligible, Long-Term, Localized	No Impact
Wildlife	Negligible, Long-Term, Localized	No Impact
Social and Economic Environment		
Subsistence	Negligible, Long-Term, Localized	No Impact
Cultural Resources	Minor, Permanent, Localized	No Impact
Land Use	Negligible, Temporary, Localized	No Impact
Recreation	Negligible, Temporary, Localized	No Impact
Socioeconomics	Minor, Long-Term, Localized*	Minor, Long-Term, Localized
Environmental Justice	Minor, Long-Term, Localized*	Minor, Long-Term, Localized
Traffic	Minor, Long-Term, Regional	No Impact

Notes: Green – Positive Impact; Red – Negative Impact, White – Negligible or No Impact

* The No Action would negatively impact the socioeconomics and environmental justice populations at Tetlin and Tok. In contract, the Proposed Action will positively impact these resource categories. These positive impacts are currently the only proposal to address the poverty rates at Tetlin, an Alaska Native community.

Abbreviations

AAC .... Alaska Administrative Code
AADT .... Average Annual Daily Trips
AAQS .... Alaska Ambient Air Quality Standards
ABA .... acid-base accounting
ADEC .... Alaska Department of Environmental Conservation
ADEED .... Alaska Department of Education and Early Development
ADF&G .... Alaska Department of Fish and Game
ADNR .... Alaska Department of Natural Resources
Al .... Aluminum
ANCSA .... Alaska Native Claims Settlement Act
APDES .... Alaska Pollutant Discharge Elimination System
ARD .... Acid Rock Drainage
As .... Arsenic
AWC .... Anadromous Waters Catalog
BCR .... Bird Conservation Region
bgs .... Below Ground Surface
BLM .... Bureau of Land Management
BMPs .... Gest Management Practices
Cd .... Cadmium
CDP .... Census-Designated Places
CERCLA .... Comprehensive Environmental Response, Compensation, and Liability Act
CFR .... Code of Federal Regulations
CH4 .... Methane
CO .... Carbon Monoxide
CO2 .... Carbon Dioxide
Cu .... Copper
Cy .... Cyanide
dB .... Decibels
DOT&PF .... Department of Transportation & Public Facilities
DSSR .... Deciduous Shrub and Sapling Regeneration
EFH .... Essential Fish Habitat
EID .... Environmental Information Document
EPA .... Environmental Protection Agency
F .... Fahrenheit
Fe .... Iron
FEMA .... Federal Emergency Management Agency
FHWA .... Federal Highways Administration
FNSB .... Fairbanks North Star Borough
GHG .... Greenhouse Gasses

GMU	Game Management Unit
gpm	Gallons per Minute
Hg	Mercury
HRC	Higgs Research and Consulting LLC
HUC	Hydrologic Unit Code
KOP	Key Observation Points
Lbs	Pounds
LEDPA	Least Environmentally Damaging Practicable Alternative
m/s	Meters per Second
MBTA	Migratory Bird Treaty Act
mg/L	Milligram/Liter
mi	Miles
ML	Metal Leaching
ML/ARD	Metal Leaching/Acid Rock Drainage
MLRA	Major Land Resource Area
Mn	Manganese
MSGP	Multi-Sector General Permit
MSHA	Mine Safety and Health Administration
MW	Megawatts
N	North
N2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NAG	Not Acid Generating
NAG ML	Non-Acid Generating Metal Leaching
NEPA	National Environmental Policy Act
NH3	Ammonia
NHD	National Hydrography Dataset
NO2	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NOX	Nitrogen Oxides
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
O3	Ozone
PAG	Potentially Acid Generating
Pb	Lead
PEM	Emergent
PFO	Forested
PM10	Particulate matter with an aerodynamic diameter less than 10 microns
PM2.5	Particulate matter with an aerodynamic diameter less than 2.5 microns
Proponent	Peak Gold, LLC
PSS	Scrub-Shrub
PUBH	Ponds

QMS	Quartz Muscovite ± Biotite Schist
R3	Upper Perennial
R4	Intermittent
RCRA	Resource Conservation and Recovery Act
RFFAs	Reasonably Foreseeable Future Actions
RO	Reverse Osmosis
SARA	Superfund Amendments and Reauthorization Act
SEFCA	Southeast Fairbanks Census Area
SHPO	State Historic Preservation Officer
SO2	Sulfur Dioxide
SPAR	Spill Prevention and Response
SPCC	Spill Prevention, Control and Contingency Plan
SSURGO	Soil Survey Geographic Database
Stantec	Stantec Consulting Services LLC
STATSGO	Digital General Soil Map of the United States
SWPPP	Storm Water Pollution Prevention Plan
TCC	Tanana Chiefs Conference
Tetlin	Native Village of Tetlin
TNW	Traditional Navigable Water
TPQ	Threshold Planning Quantity
tpy	Tons per Year
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VRM	Visual Resource Management
W	West
WAMCATS	Washington-Alaska Military Cable and Telegraph System
WMP	Water Management Plan
WOTUS	waters of the U.S.
WRDA	Waste Rock Disposal Area
WRSA	Waste Rock Storage Area

1.0 PURPOSE AND NEED

The Manh Choh Project is located on property owned and controlled by the Native Village of Tetlin (Tetlin), an indigenous Alaska Native community. Tetlin opted to not participate in the 1971 Alaska Native Claims Settlement Act (ANCSA) as a regional corporation, and so has not received revenue sharing from resource development completed by other Alaska Native regional corporations. Tetlin is an Environmental Justice population, with both high rates of poverty and a minority population. Tetlin leased the mineral rights to their lands to Peak Gold, LLC so that mineral development can bring revenue to the Tetlin tribal members.

Peak Gold, LLC is the entity that owns the Manh Choh Project. KG Mining (Alaska) is the manager of Peak Gold, LLC.

The purpose of this Environmental Information Document (EID) is to support compliance with the National Environmental Policy Act (NEPA) for the development of the Manh Choh Project. This EID assists agencies in having sufficient evidence and analysis for determining whether to prepare a categorical exclusion, environmental assessment, environmental impact statement, or other environmental document.

The EID will also assist the US Army Corps of Engineers (USACE) in completing a 404(b)(1) evaluation, per 40 CFR 230, and guide other agency officials with jurisdiction in taking actions that are based on understanding of environmental consequences, and take actions to protect, restore, and enhance the environment.

1.1 PURPOSE AND NEED

1.1.1 Purpose

To develop and operate a mine utilizing the Manh Choh deposit to meet current and future demand for commodities.

1.1.2 Need

To meet the global demand for commodities.

1.2 PROJECT LOCATION

Peak Gold, LLC (Proponent) proposes development of the proposed Manh Choh Mine, transportation of ore along the highway system, and ore processing at the Fort Knox Mine (Fort Knox). These three project components are located as follows (Figures 1, 2, 3, 4):

- Development of the proposed mine would take place within the Tetlin Hills, located in eastern Alaska 80 miles west of the Canadian border, approximately 10 miles (mi) southeast of Tok.

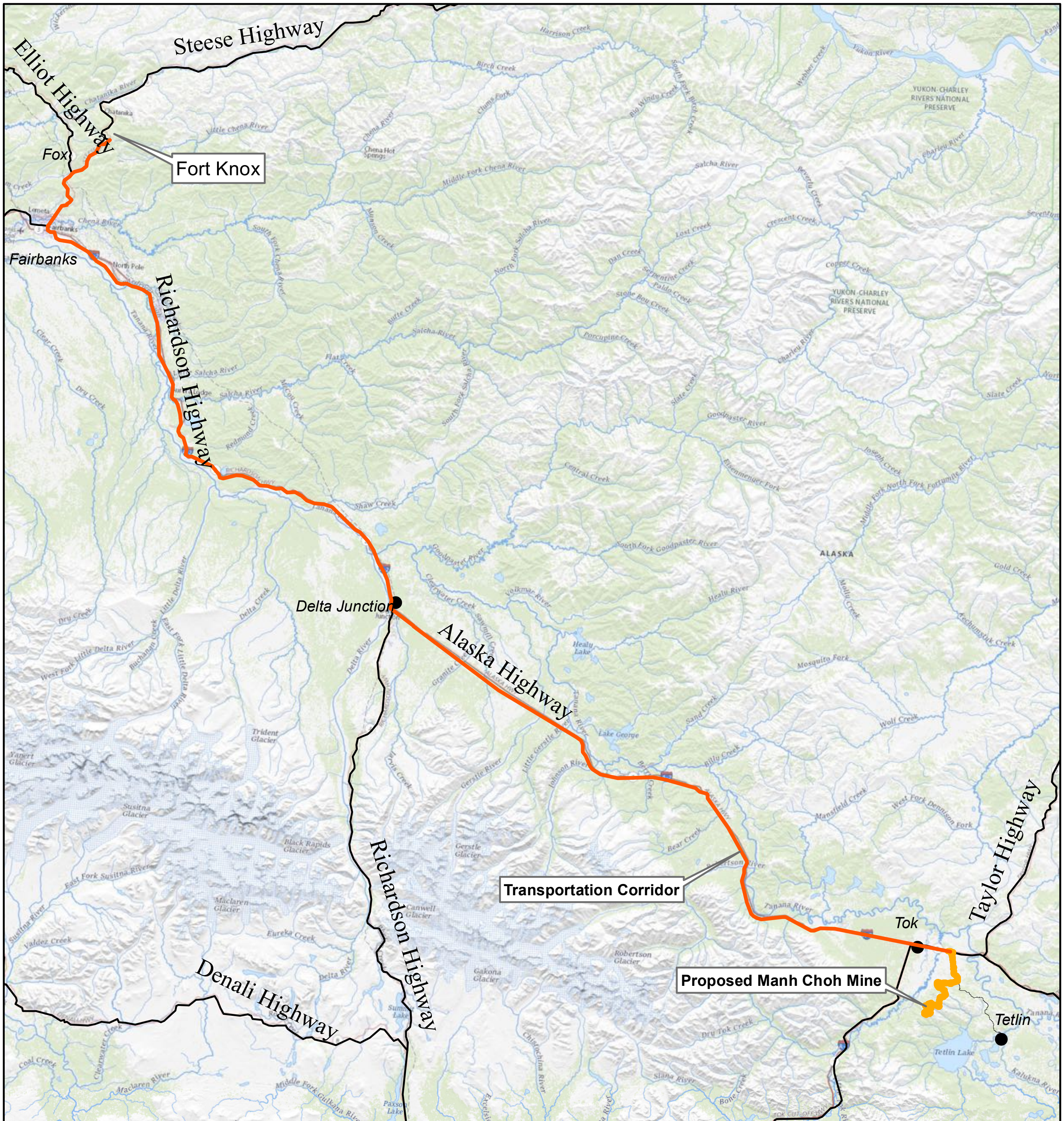
- Transportation of ore would occur along the roads and highways between Manh Choh and Fort Knox, a distance of 250 miles, travelling through the communities of Tok, Delta Junction, North Pole, Fairbanks, and Fox.
- Ore processing would occur within existing, permitted facilities at Fort Knox, located 25 road-miles northeast of Fairbanks.

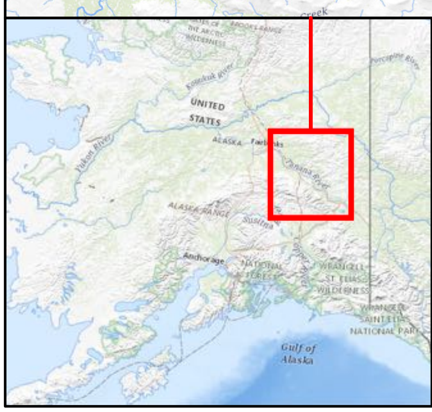
The Manh Choh project area is located at Latitude 63.186581 N; Longitude -142.889417 W (decimal degrees).

The project is located within US Geological Survey (USGS) Quad Maps listed on the table below (Table 1).

Table 1 USGS Quad Maps

Project Component	Map Name	Map Quad
Manh Choh	Tanacross	A4, B4
Highway	Tanacross	B4, B5, B6, C6
	Mt Hayes	C1, C2, D2, D3, D4
	Big Delta	A4, A5, B5, B6, C6
	Fairbanks	C1, D1, D2
	Livengood	A1, A2
Fort Knox	Livengood	A1
	Fairbanks	D1





Manh Choh Project

Transportation Corridor

Manh Choh Footprint

0 10 20 30 Miles

N S E W

(At original document size of 8.5x11)
1:1,400,000 1 inch = 22.1 miles

Client Peak Gold LLC

Project Manh Choh Project

Figure **Project Location**

Figure Number

1

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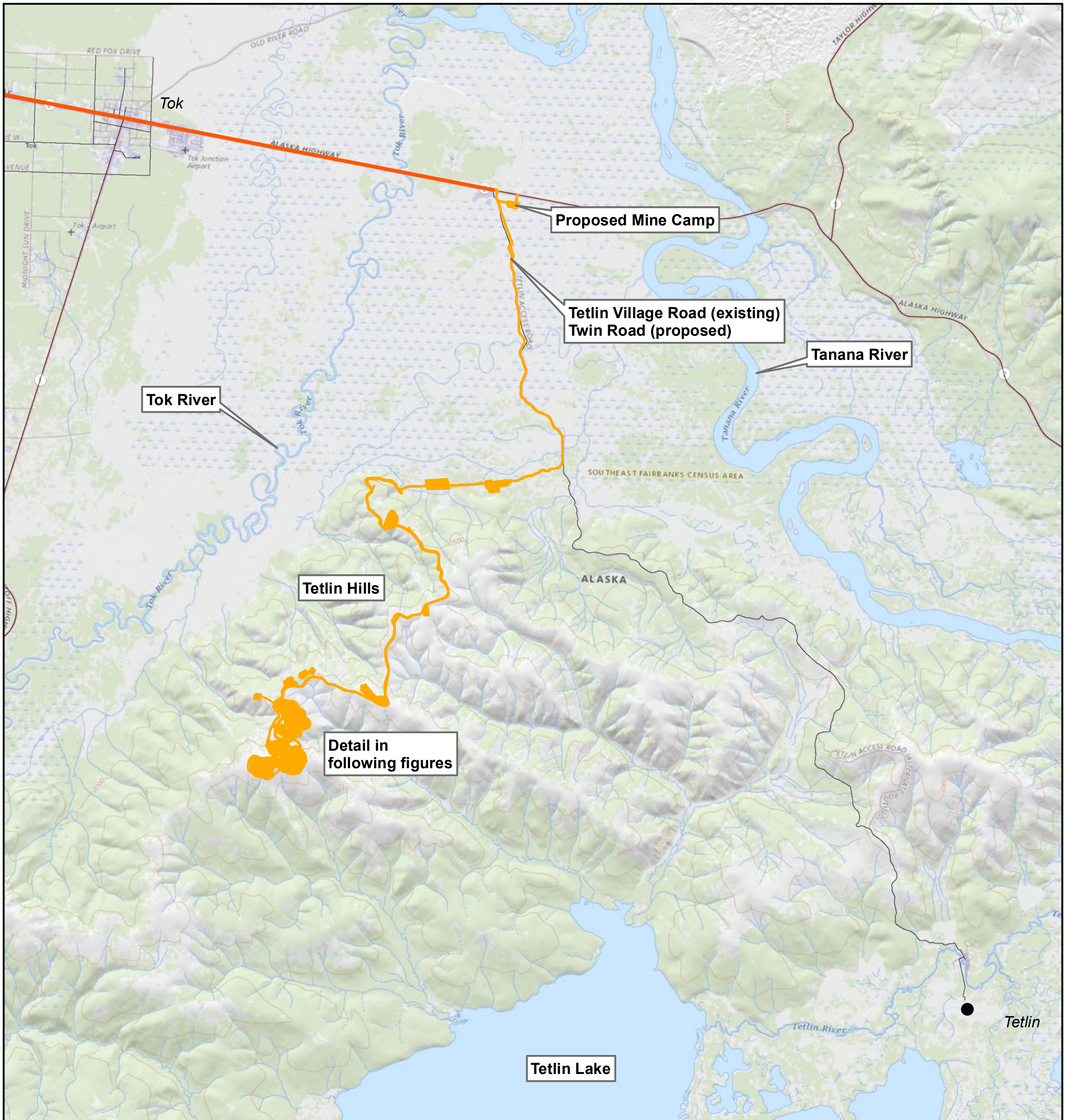
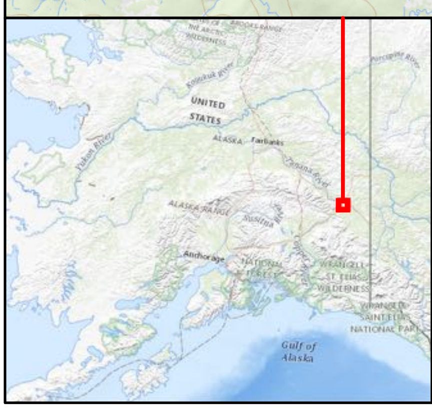




Manh Choh Project

Transportation Corridor

Manh Choh Footprint

0 1 2 3 Miles

N E S W

(At original document size of 8.5x11)
1:150,000 1 inch = 2.37 miles

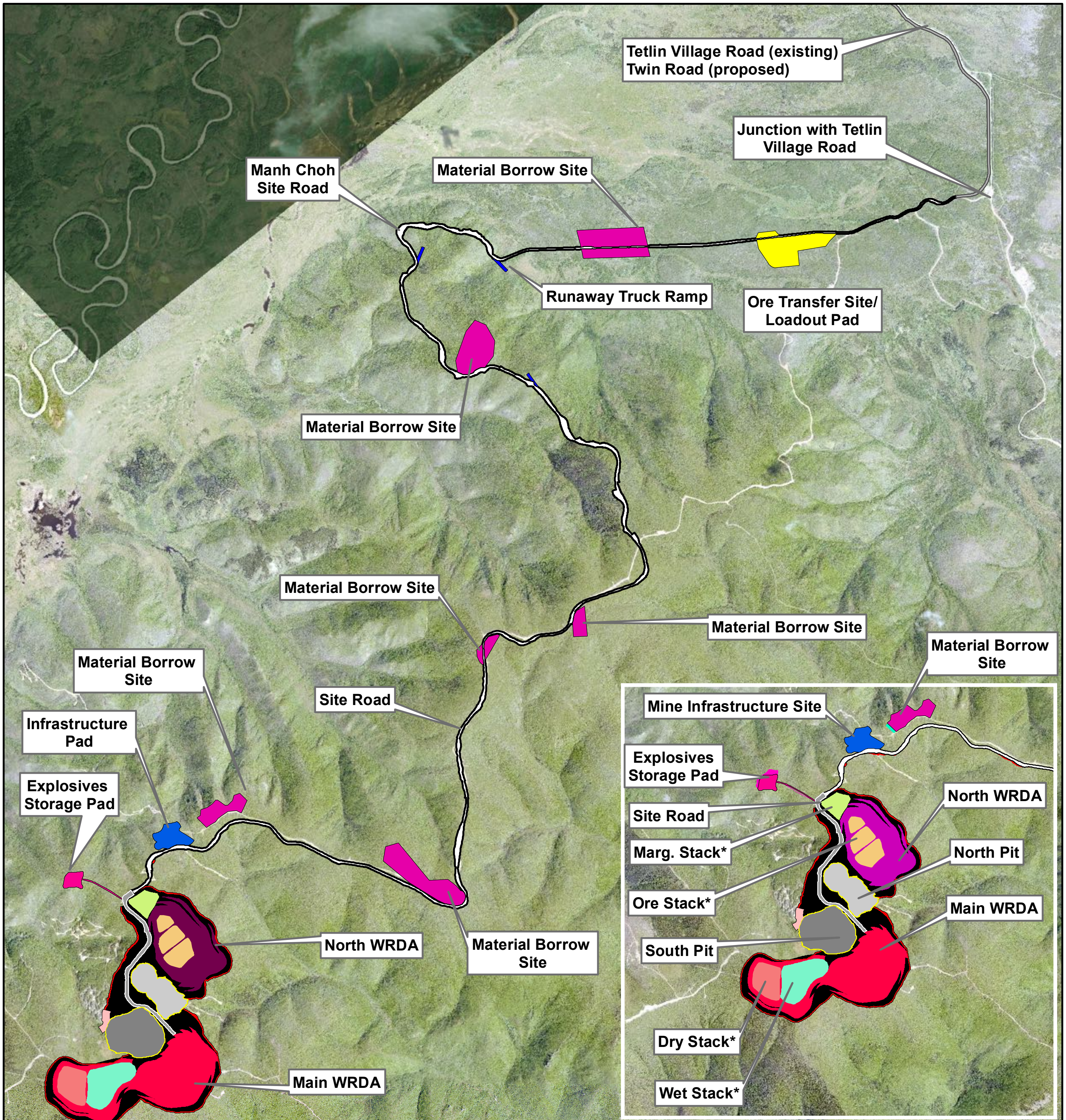
Client Peak Gold LLC

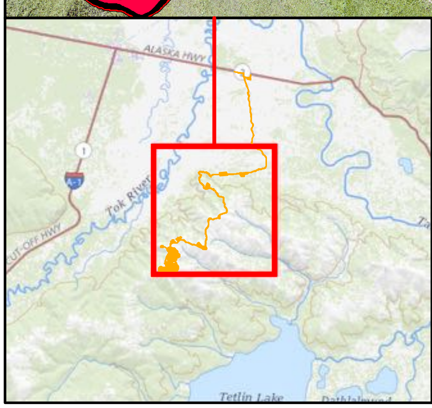
Project Manh Choh Project

Figure **Tetlin Hills Project Area**

Figure Number

2





Manh Choh Project

- Manh Choh Twin Road
- Manh Choh Site Road
- Pioneer Mine Road
- South Pit
- North Pit
- Explosives Storage Pad
- Ore Transfer Site
- Mine Infrastructure Pad
- Main WRDA
- North WRDA
- Dry Stack
- Ore Stack
- Margingal Stack
- Wet Stack
- Material Site
- Runaway Truck Ramp
- Ditch
- Retention Ditch
- Project Footprint

0 0.5 1 1.5 Miles

1:50,000
1 inch = 0.79 miles
(At original document size of 8.5x11)

N W E S

*** = Overlapping**

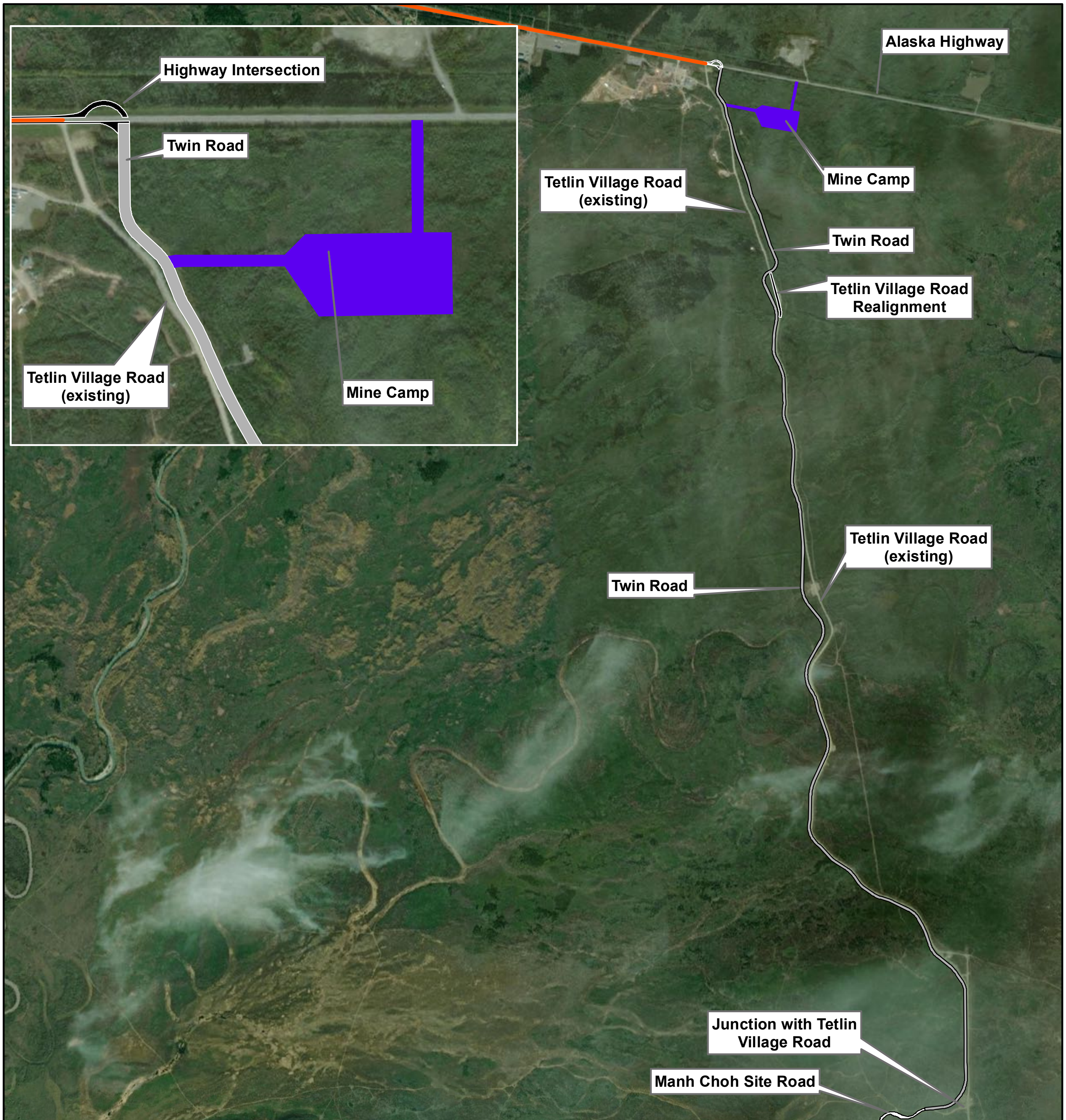
Client Peak Gold LLC

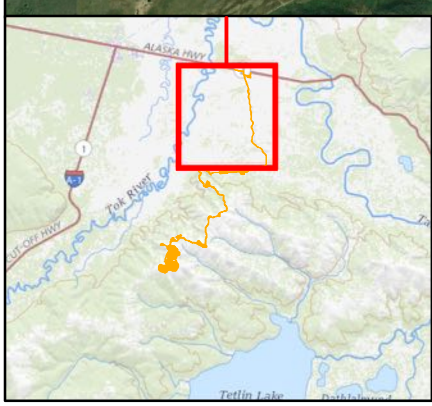
Project Manh Choh Project

Figure **Manh Choh Project Area (South)**

Figure Number

3





Manh Choh Project

- Transportation Corridor
- Camp Pad
- Highway Intersection
- Manh Choh Twin Road
- Manh Choh Site Road
- Tetlin Village Road Realignment

0 0.25 0.5 0.75 Miles

N W E S

(At original document size of 8.5x11)
1:40,000 1 inch = 0.63 miles

Client Peak Gold LLC

Project Manh Choh Project

Figure **Manh Choh Project Area (North)**

Figure Number
4

The project is located within all or portions of the following Townships and Ranges (Table 2).

Table 2 Legal Description

Project Component	Township	Range	Meridian
Manh Choh	16N	13, 14E	Copper River
	17N	13, 14E	Copper River
	18N	14E	Copper River
Highway	18N	10, 11, 12, 13, 14E	Copper River
	19N	8, 9, 10E	Copper River
	20N	8E	Copper River
	21N	7, 8E	Copper River
	22N	5, 6, 7E	Copper River
	14S	16E	Fairbanks
	13S	14, 15, 16E	Fairbanks
	12S	13, 14E	Fairbanks
	11S	11, 12, 13E	Fairbanks
	10S	10, 11E	Fairbanks
	9S	10E	Fairbanks
	8S	8, 9E	Fairbanks
	7S	4, 5, 6, 7, 8E	Fairbanks
	6S	4E	Fairbanks
	5S	4E	Fairbanks
	4S	3, 4E	Fairbanks
	3S	3E	Fairbanks
	2S	1, 2, 3E	Fairbanks
	1S	1E	Fairbanks
	1S	1W	Fairbanks
	1N	1W	Fairbanks
	1N	1E	Fairbanks
	2N	1, 2E	Fairbanks
	3N	1, 2E	Fairbanks
Fort Knox	2N	2E	Fairbanks

1.3 AUTHORITY

Construction of the proposed facilities would require terrain modification and discharge of clean fills. Due to the abundance of wetlands within the project area, avoiding all discharges into waters of the U.S. (WOTUS) is not practicable. The impacted WOTUS within the project area are hydrologically connected to the Tanana River, a Traditional Navigable Water (TNW). Therefore, the USACE has authority over this action and must determine the Least Environmentally Damaging Practicable Alternative (LEDPA) to authorize under Section 404 of the Clean Water Act. A Section 404 permit is required for the placement of fill within jurisdictional WOTUS.

2.0 ALTERNATIVES

2.1 HISTORY

The surface and subsurface lands within the Manh Choh deposit are owned by the Native Village of Tetlin. The Proposed Action is a step in their development of the mineral potential of their lands.

- The Tetlin Indian Reservation was established by US Presidential Executive Order 5365 on June 10, 1930.
- On December 18, 1971 Alaska Native aboriginal claims were 'settled' and extinguished by an Act of Congress and signed by President Nixon through the Alaska Native Claims Settlement Act (ANCSA), the largest land claims settlement in U.S. history. Thirteen regional native corporations were created under ANSCA. However, the Native Village of Tetlin opted not to participate as a regional native corporation under ANSCA.
- In September 1981, the United States of America issued a Patent (land) to the Native Village of Tetlin pursuant to ANSCA of 1971 for 743,147 acres. This gave the Native Village of Tetlin total land rights of surface and subsurface resources. Therefore, Native Village of Tetlin is not a Regional Native Corporation as defined by ANSCA, and the Native Village of Tetlin has sole control of the land and economic benefit from its resources.
- In 2008, the Native Village of Tetlin started to reach out to partners to explore the mineral potential of their surface and subsurface lands.
- In 2009, Contango ORE began early exploration work.
- In 2015, Royal Gold became a joint owner of the project, and a community relations program was started with a community support agreement.
- In 2016, an education support program began, including University of Alaska Fairbanks courses, GED prep courses, and providing presentations to students at the schools.
- In 2018, a Preliminary Economic Assessment was completed.
- In 2020, Kinross became a 70% majority owner with Contango ORE holding 30% of the project. Peak Gold, LLC is the entity that owns the Manh Choh Project. KG Mining (Alaska) is the manager of Peak Gold, LLC.

2.2 PROPOSED ACTION

Peak Gold, LLC proposes to operate an open pit gold mine in the Tetlin Hills, near Tok, Alaska. In conjunction with the Native Village of Tetlin, it has been named the Manh Choh Project (Project). The proposed project consists of three components: mine development (Manh Choh Mine), ore transport, and ore processing.

- Mine development will occur in the Tetlin Hills, located on land owned by the Native Village of Tetlin. The project site is reached by driving south on the Richardson Highway from Fairbanks through Delta Junction, and on the Alaska Highway to Tok. Approximately 6 miles south of Tok on the Alaska

Highway is a private access road to Tetlin Village. Access to the proposed mine will occur along a constructed Twin Road parallel to this route.

The proposed Manh Choh Mine components include the North and South Pits, roads, waste rock storage, overburden storage, ore transfer site, explosives storage, a personnel camp, and associated infrastructure (Table 3). The proposed mine development will begin in 2022 with construction activities on the Project's access roads.

Prior to mining ore, the pit locations and other facilities will have the overburden (organic and developed soil horizons) stripped and stockpiled for later reclamation.

Ore will be segregated from waste rock (non-ore bearing) at the Manh Choh site. Ore will be hauled from the two pits by off road haul trucks to the ore transfer site where the ore will be loaded onto highway capable vehicles for transport to Fort Knox, near Fairbanks.

- Ore will be hauled from the proposed Manh Choh Mine to Fort Knox, approximately 250 miles one way. The current haulage plan is 3,900 tons of material per day to Fort Knox. This would be accomplished by 4 trips to Fort Knox and 4 return trips every hour, 24 hours a day for the life of the mine (4.5 years). Truck haulage will start in 2024 and continue throughout the 4.5-year operational life of the mine. Haul trucks will only carry Alaska Department of Transportation & Public Facilities (DOT&PF) approved load limits. Peak Gold, LLC has had and continues to have numerous on-going discussions with DOT&PF about specifics of this Project to ensure compliance with their requirements.

- Ore processing and gold recovery will use existing, permitted facilities at Fort Knox. No ore processing will be completed at the Manh Choh site. Therefore, no tailings disposal will take place at Manh Choh. The milled-ore tailings disposal will take place at the permitted Fort Knox tailings storage facilities. The Manh Choh Project does not impact any additional federal permitting requirements at Fort Knox; therefore, no new federal permitting actions are required at Fort Knox.

Table 3 presents a summary of the Proposed Action components and acres of ground disturbance anticipated. Only proposed additional facilities or proposed changes to existing facilities are described below, all other project components (e.g., transportation corridors, ore processing and disposal facilities) would continue as currently authorized.

Beyond the specific project components, Table 3 includes two other types of impacts.

- A project fill footprint has been defined to encompass all of the Manh Choh components, and an additional polygon surrounding the facilities in the vicinity of the Manh Choh pits. This realistically accounts for the disturbance that will take place in this region of high levels of activity.

- A 25-foot vegetation clearing limit footprint has been buffered around the project fill footprint.

Table 3 Proposed Action

Component	Facilities	Acres
Proposed Manh Choh Mine		
Mining Area	Open Pits (South Pit and North Pit)	76.5
	Waste Rock Disposal Area (WRDA) Main	163.3
	WRDA North	89.6
	Mine Roads: Site Road, Pioneer Road, Runaway Truck Ramps	142.6
	Material Borrow Sites	122.5
	Water Diversion Ditches, Retention Ditch	18.8
	Dry Stack, Wet Stack, Marginal Stack	58.5
	Ore Stockpile	23.8
	Explosives Storage Pad (Powder Magazine)	6.0
	Infrastructure Pad	13.1
	Subtotal	**714.9**
Ore Transfer Site	Ore Transfer and Temporary Storage, Vehicle Maintenance, Warehousing	31.9
Camp Pad	Camp Pad	13.7
Twin Road	Industrial road near the Tetlin Village Access Road, Highway Intersection, Tetlin Village Access Road Realignment	47.7
Fill Footprint	Disturbed area between facilities (e.g. movement areas)	120.8
	Subtotal	**928.9**
25’ Vegetation Clearing outside of Fill Footprint (Non-Soil Disturbing, Temporary)		136.0
	Total	**1,064.9**
Ore Transportation	Haul: Manh Choh to Ft Knox: 4 trips north and 4 trips south, every hour for 24 hours a day	None
Fort Knox	Process ore and dispose of tailings at existing, permitted facilities	None

2.3 PROPOSED ACTION DETAILS

2.3.1 Manh Choh Mine

2.3.1.1 Open Pits

Under the Proposed Action, surface mining would occur at two locations at the proposed mine site, the South Pit and North Pit. The proposed pits would be accessed from the proposed and current mine access roads.

The proposed pits will require low rates of groundwater dewatering, which will be accomplished by localized sumps. A pit lake is not anticipated to form in either pit.

Closure plans include filling both pits with waste rock. Pits will naturally partially fill with water (1.5 years North Pit, 7 years South Pit) which will submerge some of the backfilled waste rock. The pits will discharge to groundwater.

2.3.1.2 Rock Crushing

The Proposed Action would include the use of a rock crusher during both construction of the site access road and operation of the mine. Rock crushers with a rated capacity of at least 5 tons per hour are one of the listed source categories that require a minor air quality permit per 18 AAC 50.502(b)(3).

2.3.1.3 Ore Transfer Site

The Ore Transfer Site will be constructed to provide ore unloading from the mine and loading to highway haul trucks, temporary ore storage for transportation, vehicle maintenance, fuel, highway truck scale, and warehousing. This facility will be located on the proposed mine access road (Site Road) at the base of the Tetlin Hills.

Temporary ore storage will be managed in accordance with the requirements specified in the Alaska Pollutant Discharge Elimination System (APDES) Multi-Sector General Permit for Storm Water Discharges Associated with Industrial Activity (MSGP) Sector G – Metal Mining.

2.3.1.4 Waste Rock Disposal Areas (WRDA)

Mining of the proposed pits would generate waste rock, which would be placed in the proposed WRDAs. As the pits are closed, some waste rock from the WRDAs will be placed back into the pits, but there will still be two permanent WRDAs.

Storm water management at the WRDAs consists of best management practices (BMPs) including straw wattles, sediment traps, or sediment basins located downhill of the WRDAs.

2.3.1.5 Waste Rock and Ore Management

The geochemical characterization and acid-base accounting (ABA) completed for the Proposed Action indicate that waste rock consists of Non-Acid Generating (NAG) material, Potentially Acid Generating (PAG) material and metals leaching Non-Acid Generating (ML NAG) material.

During reclamation, all PAG material and ML NAG material will be placed into the pits for closure, with the remaining “clean” waste rock remaining in the WRDA’s. Specific goals include:

- Contain contact surface water during operations and into early closure
- Retain water within its natural catchments wherever possible

- Return the site to conditions consistent with its natural state after closure
- Minimizing the long-term exposure of waste rock to the local environment

2.3.1.6 Water Management

The mine site runoff water will be treated using microfiltration followed by reverse osmosis. A head water tank will be used to inject chemicals for pretreatment to aid in removing iron, manganese, arsenic and heavy metals. Upon initial review of water quality, reverse osmosis may not be needed. However, it is being provided so that it is available should the need arise. The treatment system will be sized to handle peak flows at 350 gallons per minute (gpm). Treated water will be used to supply the wash bay, dust control, or discharged to surface. Brine and filter wash water will be stored in a pond and may be used for dust suppression.

During wet periods when dust suppression demand is low, excess water will either be infiltrated to ground in a Hillside Creek catchment or treated with reverse osmosis with discharge of clean water and brine stored for later use as dust suppression. Any dust suppression will meet environmental permit requirements.

2.3.1.7 Access and Other Roads

Roads must be constructed or upgraded from the Alaska Highway to the proposed mine facilities.

The Tetlin Village Road starts at the Alaska Highway and runs for the first five miles to the current project access road. It was installed in 2010, the first road connections from Tetlin to the highway system. New Twin Road infrastructure will be constructed parallel to the Tetlin Village Road to separate mine traffic from Tetlin traffic. This will provide a safe separation of commercial and local traffic. There are no stream crossings along this portion of the road, however, minor wetland impacts may occur to provide a safe road corridor.

At mile 5 of the Tetlin Village Road, the Twin Road will branch off from the Tetlin Village Road. This Site Road and existing Project Pioneer Road will be constructed and/or upgraded for the route (Site Road) to the proposed mine facilities.

2.3.1.8 Hazardous Materials Storage

Under the Proposed Action, fuel island(s) will be constructed inside of secondary containment.

Other smaller quantities of hazardous materials located at the truck shop, warehouse, and process area will be stored in secondary containment.

Explosive agents will be purchased, transported, stored, and used in accordance with the Mine Safety and Health Administration (MSHA), Bureau of Alcohol, Tobacco and Firearms, and Department of Homeland Security rules and regulations, as well as any and all other applicable federal, state, or local statutes and regulations regarding the transportation, storage, and handling of explosives. Explosive agents, boosters, and blasting caps will be stored within a secured explosives storage area.

2.3.1.9 Ancillary Facilities

Primary power supply to the camp will be provided by Alaska Power and Telephone. The camp will have a backup generator in case of power outages.

Primary power to the Mine and ore loadout facility will be supplies by onsite generators.

A septic system will be located at the personnel camp.

Security gates will be installed at the authorized access road junction sites.

Additional facilities will include a mine maintenance shop, drill maintenance shop, offices, warehousing, explosive storage (powder magazine), and fuel islands.

2.3.1.10 Schedule and Workforce

The project is anticipated to occur over a 4.5-year mine life, with a proceeding 1 year of construction. The mine will operate on multiple shifts per day, 24 hours a day, 365 days per year.

The initial estimate for people required during construction is 280. During operations, the initial estimate for people required at Manh Choh is 200. An additional 150-200 people would be required for trucking and as well as additional positions for other contractors. Project personnel working at the Project site will be housed at the camp or an offsite location.

2.3.1.11 Equipment

Open pit mining is carried out by conventional, diesel-powered equipment. An initial list of equipment is available on request.

2.3.1.12 Proposed Reclamation

A proposed reclamation and closing plan is being submitted for Alaska Department of Natural Resources (ADNR) approval and is available for review. It is incorporated here by reference, and to reduce report length.

2.3.2 Ore Transportation

The Proposed Action anticipates hauling (road legal loads) material 250 miles, one way, from the proposed mine to the Fort Knox Mine for processing. The volume of traffic for truck hauling is 4 trips north, and 4 trips south, every hour for 24 hours a day for the life of the mine. Transportation will include the use of the public highway system between the proposed mine and Fort Knox, through communities such as: Tok, Delta Junction, North Pole, Fairbanks, and Fox.

Highway transportation will use vehicles specifically designed to prevent fugitive dust impacts from the transported material. Fugitive dust anticipated during highway transport will be negligible.

2.3.3 Ore Processing and Disposal

Ore processing and gold recovery will use existing, permitted facilities at Fort Knox. No new (or changes to existing) federal, state, or local permits are required.

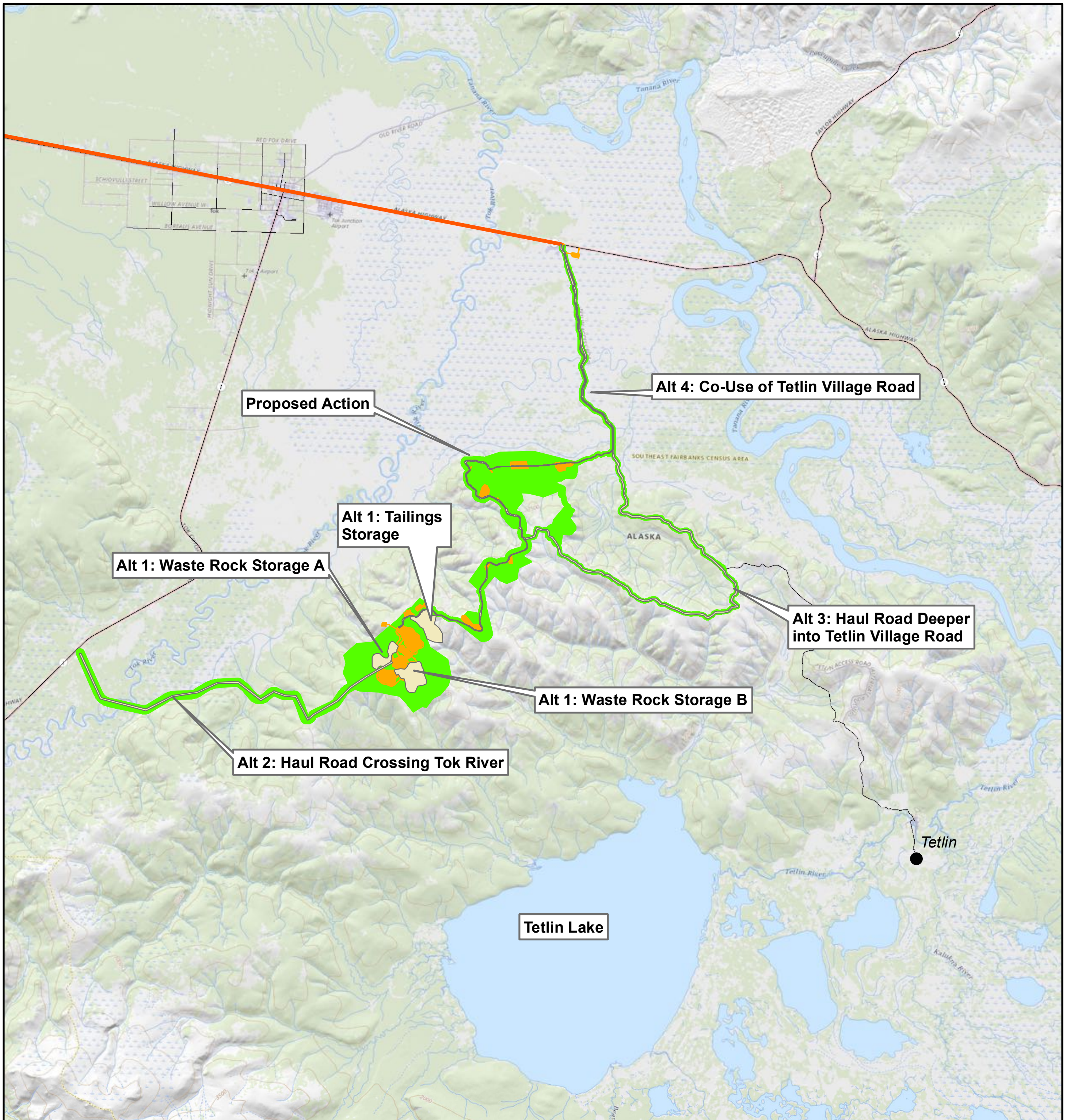
2.4 NO ACTION

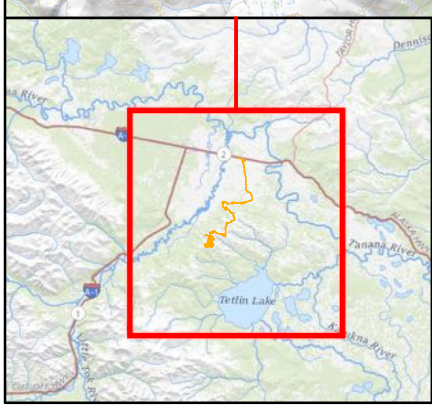
Under the No-Action Alternative, the Proposed Action would not be developed.

Under the No Action Alternative, mineral exploration may continue to take place in the Tetlin Hills in accordance with current authorizations.

2.5 ALTERNATIVES SUMMARY

To facilitate alternative analysis, a planning level screening of each resource category was conducted for each alternative. This analysis was used to inform the more detailed assessment described in the Affected Environment and Environmental Consequences section, which focuses on the Proposed Action and No Action alternatives. As a result, the planning level screening is more qualitative and has a greater reliance on desktop resources. Table 4 and Figure 5 provides summaries of the relative impact for each alternative. This detailed analysis is provided in Appendix A.





Manh Choh Project

- Proposed Action
- Alternative Study Area
- Transportation Corridor

0 1 2 3 Miles

N W E S

(At original document size of 8.5x11)
1:200,000 1 inch = 3.16 miles

Client Peak Gold LLC

Project Manh Choh Project

Figure **Manh Choh Alternatives**

Figure Number

5

2.5.1 Alternative 1: Ore Processing and Tailing Disposal at Manh Choh Mine

Under this alternative, ore processing and tailings disposal would be conducted at the proposed Manh Choh Mine site. The project was originally viewed as a conventional mine development with onsite milling. It was envisioned the ore would be mined from open pits and hauled to an onsite mill where the ore would be crushed and run through a cyanide mill circuit to recover gold. Onsite milling requires the construction of both a mill and a tailings disposal facility. The conventional mine design with a crusher and mill generates tailings (waste) that would have to be permanently stored in a tailing's storage site on Tetlin Lands.

This alternative would eliminate the need for transportation of ore to Fort Knox, and the use of existing facilities at Fort Knox for ore processing, gold recovery, and tailings disposal.

This alternative would have the negative impacts of requiring on site ore processing and long-term tailing storage. A mill would consume more power than is available locally and would require development of additional power generation. Additional water resource development would be required for the mill operations. Onsite cyanide use would pose the potential for hazardous releases to the environment. Construction of a permanent tailings storage facility would increase the potential impact to land and water resources.

This alternative would increase impacts related to ground disturbance to most resources due to the requirement for greater construction footprint needed for facilities and water management.

2.5.2 Alternative 2: Ore Transportation Haul Road Crossing Tok River

Under this alternative, a haul road would be constructed across the Tok River. This alternative was assessed to determine if it was feasible to construct a road that allowed greater access to the Tetlin Hills area, and a safer slope gradient. This alternative was found to increase impacts in almost all categories, including fill material being placed in wetlands and a bridge across the Tok River. This would increase the potential impacts to most resources, with no decrease in impacts in any resource category.

2.5.3 Alternative 3: Haul Road Deeper into Tetlin Village Road

Under this alternative, the project considered a different mine access road alignment from the Tetlin Village Road. This access would start approximately 9 miles down the Tetlin Village Road, and then branch off and follow the topography towards the proposed mine area. This alternative was originally thought to have the potential for lower grade sections, allowing for safer traffic. Further engineering determined that the Proposed Action had better grade for the roads and was shorter. Alternative 3 was also found to increase disturbed area from fill material, and would increase the potential impacts to most resources, with no decrease of impacts in any resource category. Alternative 3 would also have increased safety issues due to the longer length of co-mingled mine and Tetlin village traffic.

2.5.4 Alternative 4: Co-Use of Existing Tetlin Village Road

Under this alternative, the project considered co-locating mine traffic and village traffic both on the same Tetlin Village Road. The Proposed Action, in contrast, proposes to build a parallel twin road to separate the traffic. Co-use of the same road would have resulted in less impacts to some resources (e.g. wetlands) but would have negative potential life and safety impacts to Tetlin residents. Even one vehicle accident between Tetlin residents and an industrial vehicle would have negative ramifications.

Table 4 Alternatives Impact Summary

	Proposed Action	Alt 1: Ore Processing and Tailing Storage at Manh Choh	Alt 2: Haul Road Crossing Tok River	Alt 3: Haul Road Deeper into Tetlin Village Road	Alt 4: Co-Use of Tetlin Village Road
Physical and Chemical Environment					
Air Quality	Less Impact	More Impact	More Impact	More Impact	Less Impact
Climate Change	Middle Impact	Less Impact	More Impact	More Impact	Less Impact
Noise	More Impact	Less Impact	-	-	-
Visual	Middle Impact	Most Impact	Most Impact	Most Impact	Less Impact
Hazardous Materials	Less Impact	More Impact	-	-	-
Geology and Geochemistry	Less Impact	More Impact	-	-	-
Permafrost	Less Impact	More Impact	More Impact	More Impact	Less Impact
Water Resources	Middle Impact	More Impact	More Impact	More Impact	Less Impact
Soils	-	-	-	-	-
Biological Environment					
Wetlands	Middle Impact	More Impact	More Impact	More Impact	Less Impact
Vegetation	Middle Impact	More Impact	More Impact	More Impact	Less Impact
Fish	Less Impact	-	More Impact	-	-
Birds	Middle Impact	More Impact	More Impact	More Impact	Less Impact
Wildlife	Middle Impact	More Impact	More Impact	More Impact	Less Impact
Social and Economic Environment					
Subsistence	Middle Impact	More Impact	More Impact	More Impact	Less Impact
Cultural Resources	Middle Impact	More Impact	More Impact	More Impact	Less Impact
Land Use	Middle Impact	More Impact	More Impact	More Impact	Less Impact
Recreation	Middle Impact	-	More Impact	-	Less Impact
Socioeconomics	-	-	-	-	-
Environmental Justice	-	-	-	-	-
Traffic	Less Impact	Less Impact	-	More Impact	More Impact

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The Affected Environment and Environmental Consequences section analyzes each resource category. The affected environment sections provide a concise summary of the best available information on the current resource status. The environmental consequences sections provide an assessment of effects related to the No Action and Proposed Action to the resource.

The environmental consequences sections include analysis of both direct and indirect effects. Indirect effects are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. Indirect effects are analyzed alongside direct effects in this document.

Cumulative impacts are analyzed separately, in Section 5.0.

3.1 NON-ISSUE RESOURCE CATEGORIES

Environmental consequences described are issues-based. This means only the resource categories anticipated to be affected by the Proposed Action are included. Remaining resources categories that are not anticipated to be affected or that are not applicable are considered non-issue resources and are summarized below. These resource categories are not included in detailed analysis (Table 5).

Table 5 Non-Issue Resource Categories

Resource	Evaluation
Coastal Resources	The project is not located in or adjacent to any coastal resources.
Wild and Scenic Rivers	There are no designated wild or scenic rivers in the vicinity of the Proposed Action (National Park Service, 2021).
Navigable Waters	No impacts to navigable waters subject to Section 10 of the Rivers and Harbors Act of 1899 are anticipated.
Farmlands	According to the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) (USDA, 2021), there are no designated soils of local importance, nor prime or unique farmland within the project area.
Endangered Species Act	The IPaC (Information, Planning, and Consultation System) website was consulted for the project area on May 7, 2021 and it indicated no threatened, endangered, or candidate species or critical habitats for the Proposed Action.

3.2 EFFECT ASSESSMENT METHODOLOGY

Potential effects may include the temporary, short-term, long-term, and permanent impacts to the resource. Short-term effects are changes, such as habitat removal, that end after the completion of construction activities, mine closure, and successful reclamation. Long-term effects consist of changes irrespective of reclamation success. Permanent effects are associated with facilities that permanently alter the resource category.

3.2.1 Effects Level Definitions

The Proposed Action may cause changes in the resource categories. This document assesses and analyzes these potential changes and discloses the effects to the public. There are many concepts and terms used when discussing impacts assessment that may not be familiar to the average reader. The following sections attempt to clarify some of these concepts.

The terms “effect” and “impact” are synonymous in NEPA documents. Effects may refer to adverse or beneficial ecological, aesthetic, historical, cultural, economic, social, or health effects caused by the Proposed Action.

Intensity refers to the severity or level of magnitude of impact. Public health and safety, proximity to sensitive areas, level of controversy, unique risks, or potentially precedent-setting effects are all factors to be considered in determining intensity of effect. This document primarily uses the terms major, moderate, minor, or negligible in describing the intensity of effects.

Context means that the effect(s) of an action must be analyzed within a framework, or within physical or conceptual limits. Resource categories; location, type, or size of area affected (e.g., local, regional, national); and affected interests are all elements of context that ultimately determine significance. Duration of effects typically refers to the time-frame, or length of time, that a project’s effects would occur relative to specific resources.

The impacts definitions for intensity, duration, and context are provided in the following table (Table 6).

Table 6 Impact Definitions

Attribute	Term	Description
Intensity (severity or levels of magnitude of an impact)	Negligible	Resource would not be affected, or impacts would not result in a loss of individuals or habitat.
	Minor	Impacts on resource would be measurable or perceptible and local; however, the overall viability of the resource (i.e. population or subpopulation) would not be affected and without further adverse impacts the population would recover.
	Moderate	Impacts would be sufficient to cause a change in the resource (e.g., abundance, distribution, quantity, or viability); however, the effect would remain local. The change would be measurable and perceptible, but the negative effects may be reversed.
	Major	Impacts would be substantial, highly noticeable, and may be permanent in their effect on resource without active management.
Duration (the length of time an effect would occur)	Temporary	Impacts would occur during construction activities (i.e., six months to one year), or during maintenance activities.
	Short-Term	Impacts would occur for one year or less for a part of the resource (e.g., individual or habitat); five years or less for the resource as a whole.

Attribute	Term	Description
	Long-Term	Impacts would occur for greater than one year for a part of the resource (e.g., individual or habitat); greater than five years for the resource as a whole.
	Permanent	Impacts on resource would be permanent.
Context (effect[s] of an action must be analyzed within a framework, or within physical or conceptual limits)	Localized	Impacts are confined to a small part of the resource (e.g., population, habitat, or range).
	Regional	Impacts would affect a widespread area of the resource (e.g. suitable habitat or the range of the population or species).

The following sections detail the technical analysis completed for this report. To summarize this analysis in one page, the following table (Table 7) acts as a quick reference for the impacts of the Proposed Action and No Action.

Table 7 Impact Summary

Resource	Proposed Action	No Action
Physical and Chemical Environment		
Air Quality	Minor, Long-Term, Localized	No Impact
Climate Change	Negligible, Short-Term, Localized	No Impact
Noise	Negligible, Short-Term, and Localized	No Impact
Visual	Minor, Permanent, and Localized	No Impact
Hazardous Materials	Negligible to Minor, Short-Term, and Localized	No Impact
Geology and Geochemistry	Minor, Permanent, and Localized	No Impact
Permafrost	Negligible, Permanent, Localized	No Impact
Water Resources	Negligible, Long-Term, Localized	No Impact
Soils	Minor, Permanent, Localized	No Impact
Biological Environment		
Wetlands	Negligible, Long-Term, Localized	No Impact
Vegetation	Negligible, Long-Term, Localized	No Impact
Fish	No Impact	No Impact
Birds	Negligible, Long-Term, Localized	No Impact
Wildlife	Negligible, Long-Term, Localized	No Impact
Social and Economic Environment		
Subsistence	Negligible, Long-Term, Localized	No Impact
Cultural Resources	Minor, Permanent, Localized	No Impact
Land Use	Negligible, Temporary, Localized	No Impact
Recreation	Negligible, Temporary, Localized	No Impact
Socioeconomics	Minor, Long-Term, Localized	Minor, Long-Term, Localized
Environmental Justice	Minor, Long-Term, Localized	Minor, Long-Term, Localized
Traffic	Minor, Long-Term, Regional	No Impact

Notes: Green – Positive Impact; Red – Negative Impact, White – Negligible or No Impact

3.3 PHYSICAL AND CHEMICAL ENVIRONMENT

3.3.1 Air Quality

3.3.1.1 Area of Analysis

The area of analysis includes the Manh Choh Mine and the highway transportation route to the Fort Knox Mine. This area of analysis was chosen because it represents the area where the Proposed Action is most likely to affect air quality.

All activities at the Fort Knox Mine are currently authorized under existing air quality permits. The Project would not require additional equipment or activities at the Fort Knox Mine that is not already authorized under the existing Fort Knox Mine air quality permits. Therefore, no additional air quality permitting impacts are anticipated to occur at Fort Knox Mine.

3.3.1.2 Affected Environment

The following was developed by Boreal Environmental Services. Full discussion, along with data tables, is presented in Appendix B.

Climate and Meteorology

The Project is located in the eastern region of the Southeast Interior climate zone, based on the climate boundary zones identified by the National Oceanic and Atmospheric Administration (NOAA). This continental/subarctic climate zone is characterized by short, warm summers and long, extremely cold winters. The regional climate is highly variable. During the winter ambient temperatures can be low as -65°F and low-level temperature inversions are common in the winter. Precipitation in the area generally increases with elevation.

Air Temperature

The lowest temperatures typically occur during January and February and the highest temperatures typically occur in June and July. This temperature pattern is consistent with the continental and subarctic climate conditions in Interior Alaska.

Wind

A wind rose for the Northway Airport based on wind data collected during the period from January 1, 1991, through December 31, 2020, is provided in Appendix B. The Northway Airport wind rose shows a bimodal wind pattern with prevailing winds typically from the northeast and east-southeast directions, which generally runs parallel to the Alaska Range. The annual average wind speed observed at the Northway Airport is 2.32 meters per second (m/s).

Winds at the Project are typically from the northeast direction and south-southeast and east-southeast directions, with a west-southwest wind component. The annual average windspeed observed at the project meteorological monitoring station during the period from November 1, 2020, through October 31, 2021, was 5.2 m/s.

Precipitation

Precipitation usually accumulates during the late-spring, summer, and early-fall months. Snowfall typically occurs in the months of September through May. On average, Northway and Tok experience approximately 37.4 inches and 40.8 inches of total snowfall per year, respectively. The annual average precipitation observed at the Northway Airport, Tok No. 1 station, and Tok No. 2 station was 10.64 inches, 11.25 inches, and 12.27 inches, respectively.

The mean annual precipitation at the Project was 10.97 inches based on measurements collected during the Manh Choh Project Meteorological monitoring year (Boreal 2021).

Air Quality

Under the Clean Air Act, the U.S. Environmental Protection Agency (EPA) established National Ambient Air Quality Standards (NAAQS) for six criteria air pollutants that are considered harmful to public health and the environment. The six criteria pollutants are: nitrogen dioxide (NO_2), carbon monoxide (CO), particulate matter (particulate matter with an aerodynamic diameter less than 10 microns (PM_{10}) and particulate matter with an aerodynamic diameter less than 2.5 microns ($PM_{2.5}$)), sulfur dioxide (SO_2), ozone (O_3), and lead (Pb). Under Title 18 Alaska Administrative Code (18 AAC) 50.010, the State of Alaska adopted the federal NAAQS as Alaska Ambient Air Quality Standards (AAAQS) and established state ambient standards for two other air pollutants, reduced sulfur compounds and ammonia (NH_3).

EPA has identified primary and secondary NAAQS. Primary standards have been established to protect public health of sensitive populations such as the elderly, children, or asthmatics. Secondary standards have been established for public welfare protection, including protection against decreased visibility, impairment and preventing damage to crops, livestock, and vegetation.

The Project is located in the Northern Alaska Intrastate Air Quality Control Region. EPA has designated the Project area as in attainment or unclassifiable for all criteria air pollutants. The closest nonattainment area to the Project is the Fairbanks North Star Borough (FNSB) $PM_{2.5}$ Nonattainment Area located approximately 155 miles (250 km) to the northwest.

3.3.1.3 No Action

Under the No Action alternative, impacts to air quality would not occur, mineral exploration may continue to take place in the Tetlin Hills in accordance with current or future authorizations.

3.3.1.4 Proposed Action

The following was developed by Boreal Environmental Services. Full discussion, along with data tables, is presented in Appendix B.

Air quality impacts associated with construction and operation of the Proposed Action would include emissions from point emission sources, fugitive emission sources, and mobile equipment. Anticipated point emission sources include diesel-fired generator engines, diesel-fired boilers, diesel-fired water pumps, rock crushers, and fuel storage tanks. Fugitive emissions sources would include ore and overburden mining activities in the mine pit, material stockpiles, material transfer activities, blasting, drilling, and vehicular traffic on unpaved and paved roads. Anticipated mobile equipment emission sources include the engines on mining equipment (e.g., haul trucks, shovels, graders, front-end loaders), pick-up trucks, crew buses, and other tracked and wheeled equipment.

Table 8 provides the total stationary source emissions during operation of both the mine site and camp. Other sources of emissions that are excluded from air quality permit applicability include emissions from fugitive sources, nonroad engines, and mobile equipment. For air quality permitting purposes, the mine site and camp are considered separate stationary sources. Under the Alaska Department of Environmental Conservation (ADEC) Air Quality Permits program, ADEC specifies source categories, size thresholds, and emissions thresholds that require a permit. Pursuant to 18 AAC 50.502(c)(1), a minor permit is required for construction of a new stationary source with a potential to emit an air pollutant at a rate greater than 15 tons per year (tpy) PM_{10}, 40 tpy nitrogen oxides (NO_X), 40 tpy SO_2, or 10 tpy $PM_{2.5}$. The respective potential emissions from the Project Mine site and camp would not exceed the minor air quality permitting thresholds in 18 AAC 50.502(c)(1), and therefore a minor permit is not required pursuant to 18 AAC 50.502(c)(1).

Table 8 Potential Stationary Source Operations Emissions

Stationary Source	Potential Emissions (tpy)						
	NO_X	CO	PM	PM_{10}	$PM_{2.5}$	VOC	SO_2
Mine Site	18.8	89.1	2.9	1.9	1.6	5.8	24.9

The Proposed Action would include the use of a rock crusher during both construction of the road and operation of the mine. Rock crushers with a rated capacity of at least 5 tons per hour are one of the listed source categories that require a minor air quality permit per 18 AAC 50.502(b)(3). The project would obtain the required minor air quality permits (minor source specific or general minor air quality permit) as required. As a prerequisite to issuing the required air permits, ADEC would ensure that project components comply with applicable air quality requirements.

The Proposed Action would include hauling ore from Manh Choh Mine to Fort Knox Mine for processing using the public highway system. Approximately 20 miles of the transportation route would transect the FNSB $PM_{2.5}$ nonattainment area. Because the transportation activity would be intermittent and transient in nature, this activity would not affect the EPA-approved State Implementation Plan and ADEC's plans to address pollution and bring the FNSB $PM_{2.5}$ nonattainment area into compliance.

Based on the emissions from the Proposed Action occurring over the duration of the project, air quality impacts would be minor, long-term, and localized.

3.3.2 Climate Change

3.3.2.1 Area of Analysis

The area of analysis includes the Manh Choh Mine and the highway transportation route to the Fort Knox Mine. This area of analysis was chosen because it represents the area where the Proposed Action is most likely to affect climate change.

All activities at the Fort Knox Mine are currently authorized under existing permits. The Project would not require additional equipment or activities at the Fort Knox Mine that is not already authorized under the existing Fort Knox Mine permits. Therefore, no additional impacts are anticipated to occur at Fort Knox Mine.

3.3.2.2 Affected Environment

The following permafrost analysis and language was completed by SRK Consulting (2021b).

Climate conditions to support the understanding of baseline permafrost conditions were evaluated using meteorological data collected at Tok and Northway (SRK Consulting 2021b). Long-term increase in mean annual air temperature measured at Tok from 1956 to 2020 is estimated to be +0.77°F per decade (+0.43°C per decade) (SRK Consulting 2021b). This represents a linear increase of +5°F (+2.8°C) from 21.3°F (-5.9°C) to 26.3°F (-3.2°C) over 65 years (SRK Consulting 2021b).

The monthly change in average air temperature for Tok is a positive increase for each month, with a range from +0.13°F to +1.73°F (+0.07°C to +0.96°C per decade) (SRK Consulting 2021b). The greatest monthly increase has been for December and January which would be expected to mainly impact winter heat extraction from the ground (SRK Consulting 2021b). Thermal inversions common in the Tok River valley during the winter may result in winter air temperatures that are warmer than those reported (SRK Consulting 2021b).

3.3.2.3 No Action

Under the No Action alternative, impacts to climate change would not occur, mining exploration would continue to take place in the Tetlin Hills in accordance with current authorizations.

3.3.2.4 Proposed Action

The following analysis and language was completed by Boreal Environmental Services in 2021.

The Proposed Action would include the use of stationary and mobile fuel burning equipment. The exhaust gases from these emissions units will contain certain greenhouse gasses (GHG), principally carbon dioxide (CO_2). Trace amounts of nitrous oxide (N_2O) and methane (CH_4) would also be released to the atmosphere in the exhaust gas of fuel burning equipment.

The amount of GHG emissions that will be released to the atmosphere due to the Proposed Action has not yet been quantified beyond a conceptual model. Given the scale of Manh Choh Mine versus other gold mining operations around the world, GHG emissions will be essentially negligible with short-term duration.

Peak Gold's lead joint venture participant, Kinross, has a strong corporate philosophy on sustainability and climate change. Kinross has publicly stated its commitment to working towards the goals of the United Nations Framework Convention on Climate Change Paris Agreement with the ultimate objective of achieving net-zero emissions by 2050. "Net-zero emissions" means that CO_2 emissions into the atmosphere will be balanced by CO_2 removal. To support this objective, Kinross is advancing a strategy that will include tangible GHG reduction targets for 2030 and the steps the company plans to take to achieve those targets. This approach will leverage Kinross' current position as one of the lowest GHG emitters among its peers and continue to incorporate energy efficiencies into projects and operations.

To reduce GHG emissions, Kinross has several advanced initiatives in its portfolio. For instance, in 2018, Kinross acquired 155 megawatts (MW) of capacity in hydropower assets in Brazil to help power its mining operations there. In Chile, Kinross contracted for 100 percent renewable power from the grid, and now Kinross is studying how to supply its African operations with solar power. Ongoing energy efficiency projects across the portfolio have resulted in 1-2 percent savings per year in energy used and GHG emitted.

Peak Gold is assessing the climate change impacts of its proposed Project within this broader framework of Kinross' corporate climate change strategy including:

- Incorporating energy efficiency measures that are economic over the life of mine;
- Implementing a corporate fuel management policy to improve energy efficiency;
- Seeking opportunities with electric power provider, Alaska Power & Telephone, to reduce GHG emissions; and
- Working with Tetlin Village to implement community projects with GHG reduction benefits.

While Manh Choh Mine has a short time horizon of only about 4.5 years of mining operations, climate change adaptation and resiliency are still important considerations in mine design. Climate change impacts that could affect mines include water stress – whether more frequent droughts or severe rainstorms and flooding. Manh Choh Mine would be a low water-usage mine so droughts would not have a significant impact on operations. If more frequent or intense rainstorms occur, the mine is well-situated on a hilltop high above the flood plain.

Managing stormwater runoff is an important long-term issue. Manh Choh Mine is designed to safely manage a 1 in 100-year storm event, an important aspect of post-closure resiliency. This type of low probability, high impact storm event is predicted to become more frequent with climate change. By designing to low probability events, infrastructure would be inherently resilient to changes in precipitation patterns over the relatively short mine life.

All WRSAs and in-pit waste rock storage areas are designed to minimize recharge and to isolate PAG and metal leaching material, and therefore minimize any potential for external discharge from the waste rock over the long term. Any future changes to mean annual rates and seasonal patterns of precipitation and temperature are therefore not expected to change net infiltration or otherwise affect the environmental design intent of the waste rock facilities.

Peak Gold would monitor climate change impacts and adapt mine design as necessary to ensure a resilient operation.

3.3.3 Noise

3.3.3.1 Area of Analysis

The area of analysis includes the proposed Manh Choh Mine and the highway transportation route to Fort Knox (Figure 6). This area of analysis was chosen because it represents the area where the Proposed Action is most likely to affect potential receivers.

3.3.3.2 Affected Environment

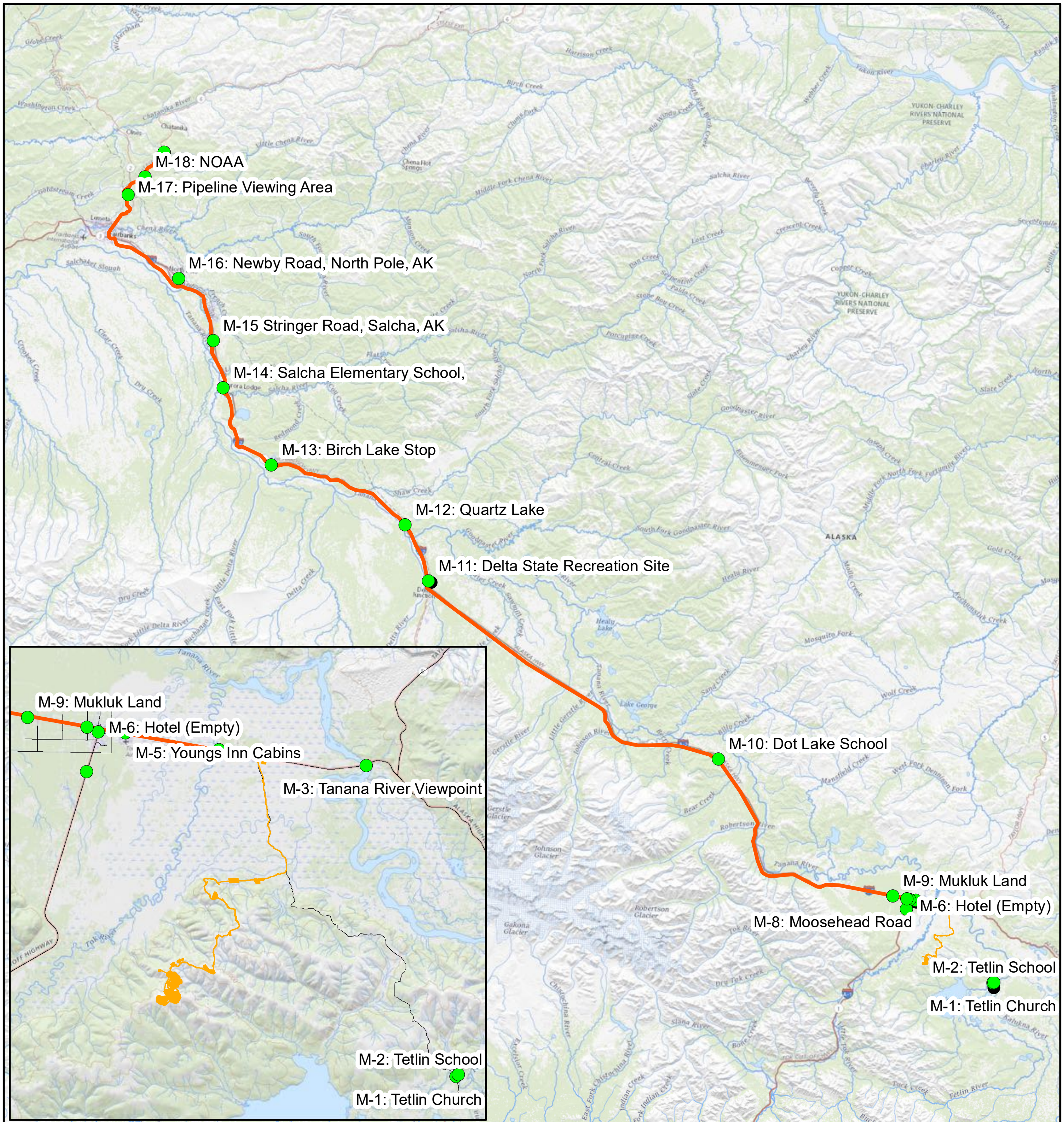
The following analysis and language was completed by Michael Minor & Associates (2021).

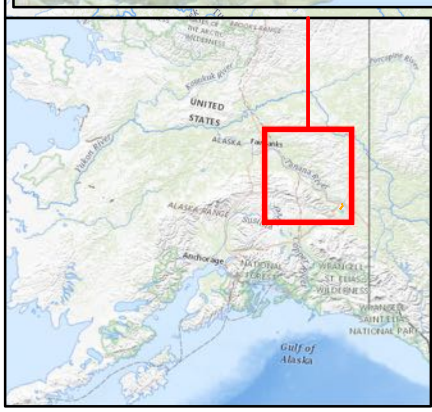
Noise is measured in units of decibels (dB). A 3 dB change is about the smallest change in noise the human ear can detect. A 5 dB change in noise can be perceived by most people.

Common ranges for noise, and their decibels, include:

- 30 – 35 dB: Very quiet rural area
- 40 – 50 dB: Urban nighttime
- 44 – 65 dB: Conversation between people 3 – 6 feet apart
- 70 – 80 dB: Urban daytime
- 110 dB: Intolerable noise

Michael Minor & Associates (2021) monitored ambient noise at the 19 locations depicted in Figure 6. This monitoring data formed the basis of the modeling for potential noise impacts.





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Manh Choh Project

Noise Monitoring Location

Proposed Action

Transportation Corridor

0 10 20 30 Miles

N W E S

(At original document size of 8.5x11)
1:1,508,117 1 inch = 23.8 miles

Client Peak Gold LLC

Project Manh Choh Project

Figure **Noise**

Figure Number

6

3.3.3.3 No Action

Under the No Action alternative, impacts to noise would not occur. Mineral exploration may continue to take place in the Tetlin Hills in accordance with current and future authorizations.

3.3.3.4 Proposed Action

Michael Minor & Associates (2021) evaluated four potential sources of noise from the Proposed Action:

- General mining noise from operations
- Haul trucks traveling between Manh Choh and Fort Knox
- Blasting noise
- Helicopter noise

Sound is regulated by a variety of laws and regulations, reviewed in Michael Minor & Associates (2021). The project selected the most applicable stringent noise criteria to evaluate potential impacts.

General Mining Noise

General mining noise was analyzed for five receivers, due to their potential proximity to the Manh Choh mine (Table 9). These included: Butch Kuth Ave Area, Tetlin Village, Tok River Recreation Area, the Tok High School, and cabins adjacent to the Tetlin Village Road.

With the exception of Butch Kuth Ave, noise increases are not anticipated to increase an amount that is audible. For Butch Kuth Ave, noise may be noticed during certain environmental periods (e.g. low pressure, temperature inversions) (Michael Minor & Associates 2021).

Table 9 General Mine Noise Impacts

Location	Most Conservative Regulatory Criteria (dB)	Soft Site without Dense Foliage		Soft Site with Dense Foliage	
		Total Noise (dB)	Change (dB)	Total Noise (dB)	Change (dB)
Butch Kuth Ave Area	50	28.5	+5.5	24.1	+1.1
Tetlin Village	50	24.0	+2.0	22.2	+0.2
Tok River Recreation Area	50	28.1	+1.2	27.0	+0.1
Tok High School	50	35.8	+0.2	35.6	+0.0
Cabins: Tetlin Village Rd	50	26.3	+2.3	24.3	+0.3

Note: Levels are the most conservative, for a 'soft' site

Haul Truck Noise

Haul truck noise was modeled for the locations between Manh Choh Mine and Fort Knox listed in Table 10. The cabins have the largest increase in noise, at 19 dB. Outside of the cabins, the largest increase in noise was 8 dB, which is still relatively quiet for most receivers (Michael Minor & Associates 2021).

Table 10 Haul Truck Noise Impacts (dB)

Site	Description	2 AM			2 PM			10 PM		
		Exist	Proposed	Δ	Exist	Proposed	Δ	Exist	Proposed	Δ
T1	Cabin (3900 ft)	24	43	19	32	43	11	26	43	17
T2	Cabin (1900 ft)	25	35	10	25	35	10	25	35	10
T3	Cabin (1500 ft)	26	38	12	27	38	11	26	38	12
T4	Cabin (1500 ft)	26	42	16	32	43	11	26	43	17
T5	Cabin (1000 ft)	28	43	15	34	44	10	28	43	15
T6	Tok River Site 26	46	53	7	57	58	1	48	53	5
T7	Tok River Near River	40	47	7	50	52	2	41	47	6
T8	Youngs Motel	36	43	7	50	51	1	42	45	3
T9	Tok RV Village Office	41	48	7	55	55	0	47	50	3
T10	Tok RV Village RV	34	41	7	47	48	1	40	43	3
T11	E Slana Ave; E 3rd St.	31	38	7	44	45	1	37	40	3
T12	E Slana Ave; W 2nd St.	34	42	8	44	46	2	38	43	5
T13	Moosehead 80 ft. to Rd	44	52	8	54	56	2	48	53	5
T14	Dot Lake Playground	38	46	8	47	49	2	41	47	6
T15	Dot Lake School	41	49	8	50	52	2	44	50	6
C1	House of Prayer Church	38	45	7	50	51	1	44	47	3
C2	Diamond Willow Inn	45	52	7	57	58	1	50	54	4
C3	Pioneer Park	36	42	6	48	49	1	42	45	3
C4	Delta Presbyterian	42	47	5	55	56	1	49	51	2
C5	Delta Library	32	39	7	46	47	1	39	42	3
C6	First Baptist Church	41	47	6	54	55	1	48	50	2
C7	Birch Lake North	51	58	7	63	64	1	57	60	3
C8	Birch Lake South	46	53	7	58	59	1	52	55	3
C9	Salcha Playground	39	46	7	51	52	1	45	48	3
C10	Salcha School	36	43	7	47	48	1	41	45	4
N1	Ridge Run (West)	31	37	6	37	39	2	32	37	5
N2	Pedro Dome (West)	36	42	6	42	44	2	38	42	4
N3	Pedro Dome (Center)	28	34	6	34	36	2	30	34	4
N4	Pedro Dome (East)	32	36	4	36	38	2	33	36	3
N5	Ridge Run (East)	35	37	2	38	39	1	35	37	2
N6	Cleary Summit View	45	45	0	52	52	0	47	48	1
N7	Ski Land Rd (West)	26	28	2	35	36	1	29	30	1
N8	Fish Creek Rd Resident	28	36	8	40	41	1	31	36	5
N9	Ski Land Resort	24	31	7	32	34	2	26	31	5
Maximum		**51**	**58**	**19**	**63**	**64**	**2**	**57**	**60**	**6**

Δ = change

Blasting Noise

Blasting noise was modeled for the same locations as general mining noise. Noise levels for most receivers are not anticipated to increase an amount that is audible. For Butch Kuth Ave, the low level of the noise (32 db) is not likely to be audible to people in a structure (Michael Minor & Associates 2021).

Table 11 Blasting Noise Impacts

Location	Most Conservative Regulatory Criteria (dB)	Total Noise (dB)	Change (dB)
Butch Kuth Ave Area	50	32.1	+9.1
Tetlin Village	50	22.9	+0.9
Tok River Recreation Area	50	27.9	+1.0
Tok High School	50	35.7	+0.1
Cabins: Tetlin Village Road	50	26.2	+2.2

Helicopter Noise

Michael Minor & Associates (2021) concluded that given the low number of flights, helicopter operations are not expected to be a notable source of community noise.

Noise Summary

The Proposed Action would temporarily increase the noise in the environment. These increases are within regulatory criteria.

The noise impacts are negligible, short-term, and localized.

3.3.4 Visual

3.3.4.1 Area of Analysis

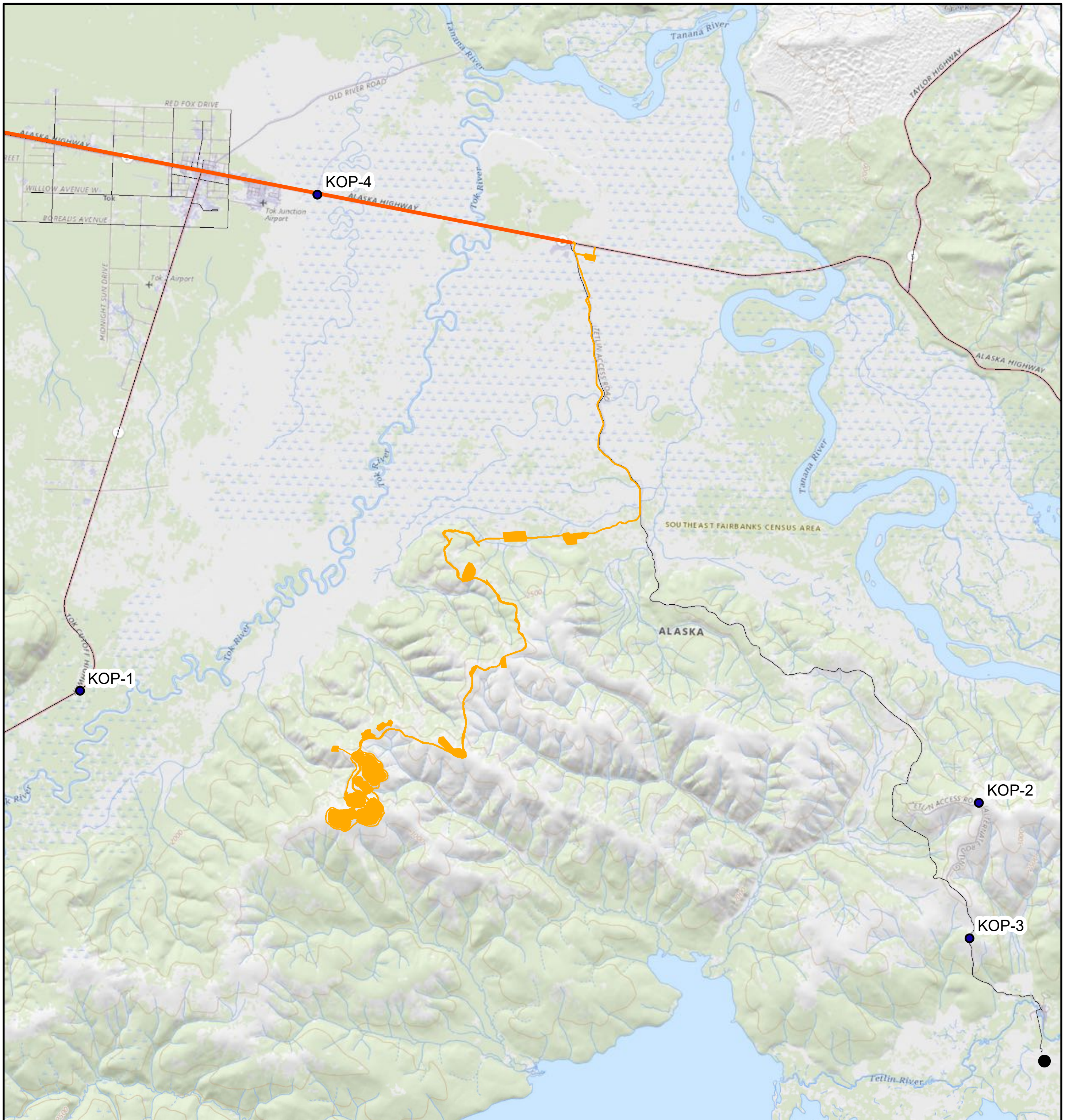
The area of analysis includes the proposed Manh Choh Mine (Figure 7). This area of analysis was chosen because it represents the area where the Proposed Action is most likely to affect visual resources.

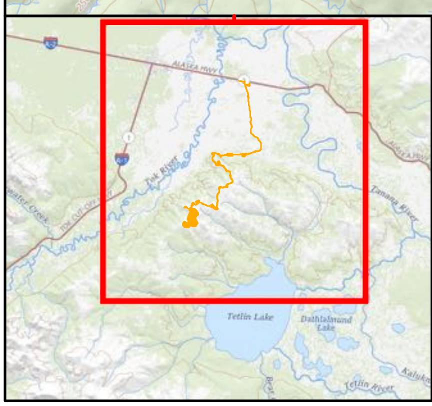
No impacts are anticipated along the highway or at Fort Knox.

3.3.4.2 Affected Environment

The following analysis and language was completed by SRK Consulting (2021c).

The mine is located on Tetlin owned lands, which has no visual resource management categories or regulations. SRK (2021c) followed BLM Visual Resource Management (VRM) system guidelines to evaluate the affected environment and potential impacts.





Manh Choh Project

- Key Observation Point
- Transportation Corridor
- Proposed Action

0 1 2 3 Miles

N W E S

(At original document size of 8.5x11)
1:150,000 1 inch = 2.37 miles

Client Peak Gold LLC

Project Manh Choh Project

Figure **Visual**

Figure Number

7

Four Key Observation Points (KOPs, Figure 7) were selected to highlight changes to visual resources anticipated to be perceptible by local populations and/or viewers along travel routes (SRK 2021c).

- KOP-1 was selected due to its location along the Tok Cut-Off Highway.
- KOP-2 is located at a topographically high point along the Tetlin Village Road.
- KOP-3 is also located near the Tetlin Village Road, at a topographically high point before the road drops into the village.
- KOP-4 is located along the Alaska Highway, just south of Tok. The Alaska Highway is a major transportation route in Alaska between Fairbanks and the Canadian border.

3.3.4.3 No Action

Under the No Action alternative, impacts to visual resources would not occur, mineral exploration would continue to take place in the Tetlin Hills in accordance with current and future authorizations.

3.3.4.4 Proposed Action

SRK (2021c) evaluated three scenarios for each KOP:

- Existing Viewshed – The current viewshed.
- Full-Buildout Scenario – The simulated proposed project components at the point of full-buildout.
- Post-Reclamation Scenario – The simulated project components after reclamation and approximately 10 to 15 years of vegetation establishment.

SRK (2021c) found that impacts to visual resources would be:

- KOP 1: Moderate to None
    - The moderate impact is due to changes in the form of land features. Changes to line, color, and texture would be weak.
- KOP 2: Weak to None
- KOP 3: None
- KOP 4: Weak to None

Visual simulation photographs for the Existing Viewshed, Post-Mining Scenario, and Post-Reclamation Scenario are available in SRK 2021c.

The major differences between the Existing Viewshed and the Full-Buildout Scenario would result from the construction of larger mine components, such as the WRDs (SRK 2021c). These components generally add trapezoidal forms to a landscape dominated by gentle, rolling, and subangular forms (SRK 2021c). The lines created by these new forms would be horizontal and diagonal, usually seen in silhouette, as opposed to the smooth to undulating lines seen in the Existing Viewshed (SRK 2021c). Mine component colors would generally be warmer (soil colors) and would generally have a higher range of values (lightness to darkness) as compared to the vegetated surroundings (SRK 2021c).

The Post-Reclamation Scenarios show the mine component forms and lines returned to qualities closer to those found in the existing landscape, with post-reclamation vegetation effectively reducing contrasts on each feature (SRK 2021c).

The Proposed Action would permanently alter the visual resources at the Manh Choh Mine. The Proposed Action would remain as a post-reclamation feature on the landscape and would be constructed, regraded, and reclaimed to be consistent with the surrounding topography. Impacts resulting in alteration of the landscape would be minor, permanent, and localized.

3.3.5 Hazardous Materials

3.3.5.1 Area of Analysis

The area of analysis includes the proposed Manh Choh Mine and the highway transportation route to Fort Knox. This area of analysis was chosen because it represents the area where the Proposed Action is most likely to affect hazardous materials.

All activities at Fort Knox are under existing permits, and no new federal permitting actions are required at Fort Knox.

3.3.5.2 Affected Environment

Existing Contaminated Sites

The Alaska Department of Environmental Conservation's (ADEC) Contaminated Sites Program database lists known contaminated sites in, and surrounding, Tok and Tetlin (ADEC 2021a). No listed sites are anticipated to interact, impact, or be impacted by the Proposed Action.

No other known hazardous waste sites, generators, or contaminated sites have been identified in the area of analysis.

3.3.5.3 No Action

Under the No Action alternative, impacts to hazardous materials would not occur, mineral exploration would continue to take place in the Tetlin Hills in accordance with current and future authorizations.

3.3.5.4 Proposed Action

No direct or indirect impact is anticipated to any known existing contaminated sites.

The Proposed Action would result in the use of hazardous materials throughout the life of the proposed mine. These would consist of the tanks and facilities to support the mine operations. Other smaller quantities of hazardous materials will be located throughout the facility and stored in compliance with regulations (e.g., maintenance areas, warehouses).

Explosive agents will be purchased, transported, stored, and used in accordance with MSHA, Bureau of Alcohol, Tobacco and Firearms, and Department of Homeland Security rules and regulations, as well as any and all other applicable federal, state, or local statutes and regulations regarding the transportation, storage, and handling of explosives. Explosive agents, boosters, and blasting caps are stored within a secured explosives storage area.

Analysis of mining waste is discussed in the Geology and Water chapters.

Ore Transportation

The trucks hauling along the highway route from Manh Choh Mine to Fort Knox will also contain hazardous materials. Transporters of ore will maintain a spill response plan and appropriate resources required under that plan.

Probability of a Release

Under the Proposed Action, accidental releases may occur within the Manh Choh Project area or when transporting materials to the Manh Choh site for use at the mine, and to Fort Knox. A release would be immediately reported to ADEC Spill Prevention and Response (SPAR) as specified by Agency requirements. The Proposed Action would implement the site's Spill Prevention, Control, and Countermeasure Plan's (SPCC) mitigation measures to minimize the risk and effects of a potential spill. The transporter's Spill Contingency Plan would be implemented for spill mitigation measures to minimize the risk and effects of a potential spill during transportation activities. A spill of hazardous materials or fuels would be limited to the area adjacent to the spill. The spill would likely be contained and remediated shortly after the release, making the spill or release short-term and localized.

Public Safety

Any release of hazardous materials can have implications for public health and safety. The location of the release would be a primary factor in determining its importance. The probability of a release is low and the effect of a release (e.g. truck over fueling, fuel tank leak, spill of hazardous materials in transit) is anticipated to remain contained to a limited area.

Based on the small quantities of hazardous materials, the Proposed Action does not anticipate a release having a severe effect to human health or safety. Impacts would be anticipated to be negligible to minor, short-term, and localized.

3.3.6 Geology and Geochemistry

3.3.6.1 Area of Analysis

The area of analysis includes the proposed Manh Choh Mine. This area of analysis was chosen because it represents the area where the Proposed Action is most likely to affect the resource.

No impacts are anticipated on the highway transportation route to Fort Knox.

All activities at Fort Knox are under existing permits, and no new permitting actions are required at Fort Knox.

3.3.6.2 Affected Environment

The following geology and geochemical analysis and language was completed by SRK Consulting (2021a).

Host Rock

Host rock is a description of the natural geology of the area.

The majority of the Project is hosted within the Yukon-Tanana Terrane, a regionally extensive package of greenschist to amphibolite facies metamorphic rocks of Mississippian or older age (SRK Consulting 2021a). Most of the project area escaped Pleistocene continental glaciation and is covered by a variable thickness of aeolian silt ranging up to 10 m thick with extensive oxidation occurring some 60 to 90 m below surface (SRK Consulting 2021a).

The majority of the bedrock in the area is a quartz muscovite ± biotite schist unit (QMS) containing conformable layers of amphibolite schist / greenstone (SRK Consulting 2021a). The QMS unit is primarily comprised of quartz, muscovite, biotite and local garnet with minor actinolite and epidote (SRK Consulting 2021a).

Waste Rock

Waste rock is a description of the leftover mining waste which is developed during the mining process.

Mining of the South and North Pits will generate waste rock and ore.

Waste rock includes portions of material that is potentially acid generating (PAG) and metal leaching (ML). PAG rock, when oxidized by weathering, may form acid which can be harmful to aquatic life. ML rock can leach metal ions which can be harmful to aquatic life. Waste rock can be inert, PAG, ML, or PAG/ML. Each rock type must be managed to inhibit potential impact. The Waste Rock Disposal Areas (WRDA) are designed to ensure these rocks are managed appropriately.

Some of the PAG and/or ML waste rock shows a difference in timing of potential leaching (e.g. rapid vs steady). Rapid leaching may release PAG and/or ML during the active operations of the mine, while steady leaching may be able to be managed so that PAG and/or ML are not released during the active operations of the mine.

All types of waste rock show some degree of elevated arsenic relative to a reference value of 10 times average global abundance for shale; highest concentrations occur in the skarn oxides and sulfides (SRK Consulting 2021a). Other parameters which were elevated in at least some of the waste rock samples were: Ag, Cd, Co, Cu, Pb, Se (SRK Consulting 2021a). Highest concentrations were typically reported in the skarns (SRK Consulting 2021a).

Open Pit Walls

Mining will not leave rock permanently exposed within the pit walls. Rock walls are ML (SRK Consulting 2021a). Any waters contacting pit walls have the potential to influence the overall water chemistry, and will be treated.

Ore

The ore is potentially PAG and NAG. The ore will be temporarily stored onsite and loaded into trucks for transport to Fort Knox for processing. At Fort Knox, the ore will be blended to form a NAG composite (SRK Consulting 2021a). The blended composite may have elevated copper and other metals (e.g. cobalt, copper, molybdenum and selenium) (SRK Consulting 2021a). Leachable arsenic was reported in all ore samples during (SRK Consulting 2021a).

Construction Materials

Analysis of the geochemistry of the potential construction material is being conducted, and results are not yet available. Using the information collected to date, it is not possible to determine if near surface rock could be used for construction purposes outside of water capture systems (SRK Consulting 2021a). Conceptually, oxidized material could be more suitable for construction if weathering and leaching processes have fully depleted reactive minerals, though the residual material may contain readily leachable oxidation products resulting in poor quality contact water (SRK Consulting 2021a). Initial results show that some of the near surface rock may have acidic components due to the oxidation of sulfides; further investigation is in progress (SRK Consulting 2021a).

3.3.6.3 No Action

Under the No Action alternative, impacts would not occur, mining exploration would continue to take place in the Tetlin Hills in accordance with current authorizations.

3.3.6.4 Proposed Action

Impacts of the Proposed Action on geology and geochemistry include: 1) the mining of ore; 2) the generation and permanent disposal waste rock. The Proposed Action will expose geology with the potential for metal leaching (ML) and acid rock drainage (ARD). Indirect effects were incorporated into the analysis by including impact modeling into perpetuity.

The Proposed Action would permanently alter the natural topographic and geomorphic features of the mine area. The Proposed Action would remain as a post-reclamation feature on the landscape and would be constructed, regraded, and reclaimed to be consistent with the surrounding topography. Therefore, impacts resulting in alteration of the landscape would be minor, permanent, and localized.

The Proposed Action would only temporarily alter some of the natural topographic and geomorphic features of the mine. These facilities (i.e., yards) would be reclaimed and would not permanently alter the natural topography or geomorphic features in the area of analysis. Impacts associated with the facilities that would be reclaimed would be minor, short-term, and localized.

Waste Rock

Waste rock has the potential to be NAG, PAG, and ML (SRK Consulting 2021a). Segregation will be important in managing PAG waste (SRK Consulting 2021a). Waste rock will be moved in the local area, and ultimately either stored in the pits or WRDA. This will have minor, permanent, localized impacts to geology.

Potential impacts to waters are discussed in the Water Resources section.

Open Pit

South Pit and North Pit walls that are temporarily exposed will have geochemistry that has the potential to influence the overall water chemistry of the pit water (SRK Consulting 2021a).

In the North Pit, pit walls will be exposed for a maximum of five years after which time the pit will be completely backfilled and all pit walls will be covered.

South Pit walls will be exposed for a similar length of time (5 years) until backfilling occurs. Backfilling at the South Pit will cover all of the pit walls, including the top benches.

Construction of the open pits will have a minor, permanent, localized impacts to geology.

Potential impacts to waters are discussed in the Water Resources section.

3.3.7 Permafrost

3.3.7.1 Area of Analysis

The area of analysis includes the proposed Manh Choh Mine. This area of analysis was chosen because it represents the area where the Proposed Action is most likely to affect the resource.

No impacts are anticipated on the highway transportation route to Fort Knox.

All activities at Fort Knox are under existing permits, and no new permitting actions are required at Fort Knox.

3.3.7.2 Affected Environment

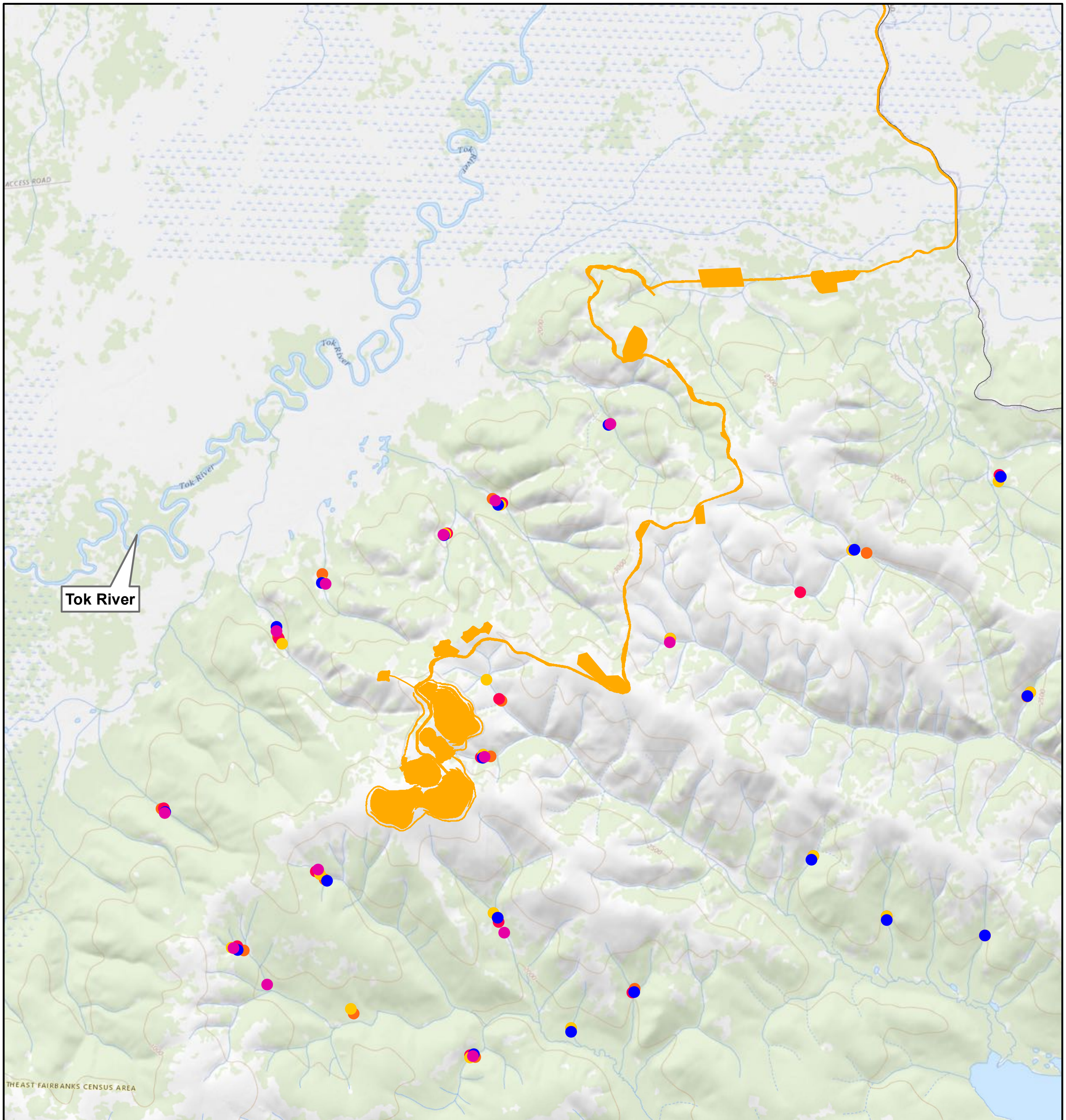
The following permafrost analysis and language was completed by SRK Consulting (2021b).

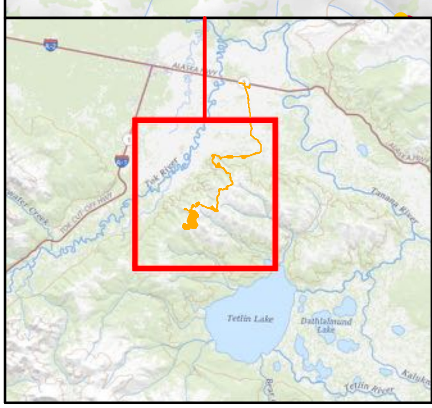
Permafrost is thermally defined as soil, organics, and rock that remains at or below 32°F (0°C) for at least two consecutive years including the intervening thaw season (SRK Consulting 2021b). Permafrost forms where the net loss of heat (energy) from the ground exceeds the input of heat during the thaw period (SRK Consulting 2021b). Under these conditions, the ground cools sufficiently during the freezing season (fall and winter) for below 32°F (0°C) ground temperatures to persist throughout the following thawing season (SRK Consulting 2021b).

Discussion of climate change is provided in the climate change chapter.

Aufeis

Aufeis (Icing) may form where groundwater is discharged to the surface at locations where prolonged subfreezing temperatures exist for a significant part of the year (SRK Consulting 2021b). Aufeis often indicates permafrost is locally absent and water flow is conveyed by hydraulically conductive fractures that intercept the surface (SRK Consulting 2021b). Aufeis locations are shown on Figure 8. The aufeis in this area is likely sourced from shallow groundwater flow through the suprapermafrost talik (perennial unfrozen zone above the top of permafrost) or deeper groundwater conveyed through bedrock fractures (SRK Consulting 2021b). Several of the aufeis areas observed may align with structural features that allow for groundwater flow conveyance and further suggest permafrost is locally discontinuous permafrost (SRK Consulting 2021b). Aufeis was not observed to occur within the mine infrastructure footprints (SRK Consulting 2021b).





Manh Choh Project

Aufeis

- 2016
- 2017
- 2019
- 2020
- 2021

Transportation Corridor

Proposed Action

0 0.5 1 1.5 Miles

N W E S

(At original document size of 8.5x11)
1:80,000 1 inch = 1.26 miles

Client	Peak Gold LLC
Project	Manh Choh Project
Figure	**Aufeis**
Figure Number	**8**

Permafrost

Permafrost is relatively warm (>31.3°F [>-0.5°C]) and naturally degrading at the project (SRK Consulting 2021b). The base of permafrost is approximately 200 ft below ground surface (bgs) to greater than 400 ft bgs (average for representative sites of 260 ft bgs) (SRK Consulting 2021b). Permafrost degradation is likely attributed to past climate warming and historic forest fires which have resulted in a change to the surface energy balance and input of heat in and out of the ground (SRK Consulting 2021b).

Surficial materials generally consist of colluvium, residual soil, aeolian silt, and alluvium along the creeks (SRK Consulting 2021b). Exploration road cuts and pads are seemingly well-drained and with few indications of thaw-settlement or ground mass movement caused by melting of ground ice (SRK Consulting 2021b). These observations do not rule-out the presence of ground ice, but instead provide context for the general nature of the soil properties which are expected to be largely ice-poor and thaw stable (SRK Consulting 2021b).

Long-term changes in climate are expected to continue into the near future (SRK Consulting 2021b). Natural permafrost degradation observed would be expected to continue irrespective of mine development (SRK Consulting 2021b). The low amount of ground ice observed at the site and already unfrozen, suprapermafrost talik, suggests thaw stable material in many areas and with less profound changes in the ground surface with continued thaw of the permafrost (SRK Consulting 2021b).

3.3.7.3 No Action

Under the No Action alternative, impacts to permafrost would not occur, mineral exploration may continue to take place in the Tetlin Hills in accordance with current and future authorizations.

3.3.7.4 Proposed Action

The Proposed Action will have the direct and indirect impact of excavating permafrost to develop proposed infrastructure. These will remove local materials currently experiencing permafrost. No regional changes are anticipated from the Proposed Action.

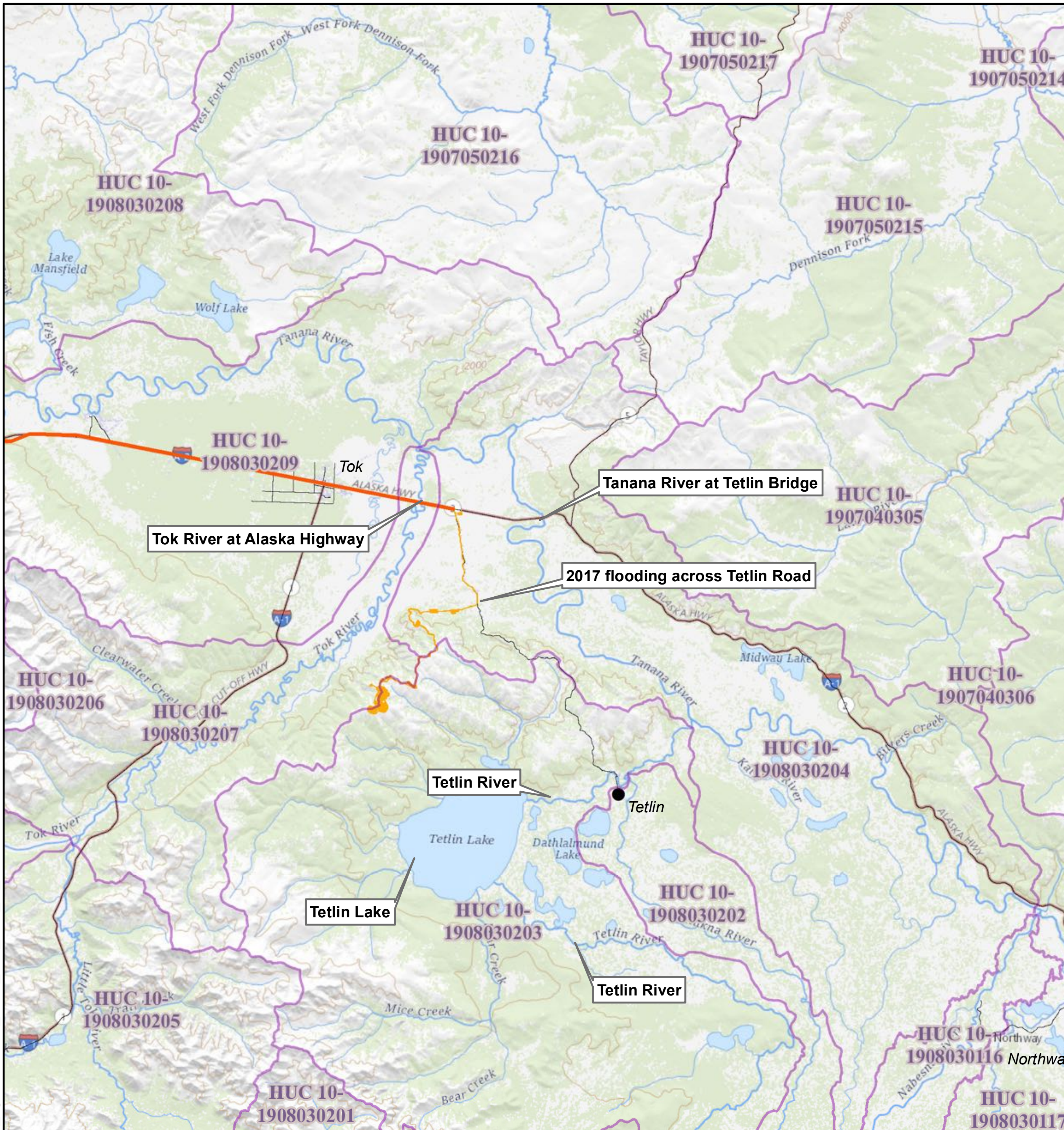
Any impacts from the Proposed Action to permafrost are anticipated to be negligible, permanent, and localized.

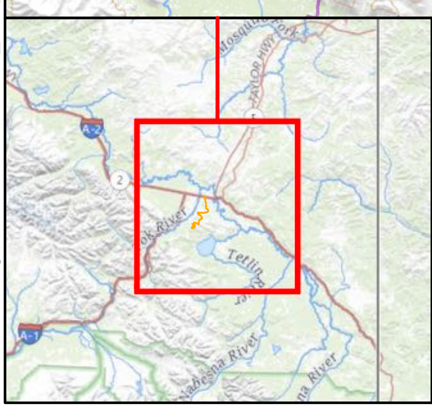
3.3.8 Water Resources

3.3.8.1 Area of Analysis

The area of analysis includes the proposed Manh Choh Mine. This area of analysis was chosen because it represents the area where the Proposed Action is most likely to affect the resource.

No impacts are anticipated on the highway transportation route to Fort Knox.





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Manh Choh Project

10-digit HU (Watershed)

Transportation Corridor

Proposed Action

0 3 6 9 Miles

N E S W

(At original document size of 8.5x11)

1:3,912,303 1 inch = 61.75 miles

Client Peak Gold LLC

Project Manh Choh Project

Figure **Water Resources Vicinity**

Figure Number

9

All activities at Fort Knox are under existing permits, and no new permitting actions are required at Fort Knox.

3.3.8.2 Affected Environment

Regional Hydrologic Setting

The area of analysis is centered on the Tetlin Hills, where the Tok and Tanana River drainage system drain to the north. The area is located in Hydrologic Unit Code (HUC) 10 watersheds of Tetlin Lake (HUC 1908030203), Kalutna River-Tanana River (HUC 1908030204), and Outlet Tok River (HUC 1908030207). The Tetlin National Wildlife Refuge drains into Tok-Tanana River HUC8 subbasin and is outside and upstream of the area of analysis. The Wrangel St. Elias National Park and Preserve is not in the Tok-Tanana River HUC8 subbasin and is also outside of the area of analysis (Figure 9).

The Tetlin Lake watershed is centered around Tetlin Lake. Tetlin Lake is bound on the north, south, and west by the Tetlin Hills. To the east of Tetlin Lake is a large wetland and pond complex, which stretches upstream for at least 25 miles to the community of Northway. The Tetlin River flows into and out of Tetlin Lake, and runs northeast, past the community of Tetlin, and enters the Tanana River. The Tanana River flows into the Yukon River, which flows into the Pacific Ocean.

The Kalutna River-Tanana River watershed is the primary drainage of the Tetlin National Wildlife Refuge to the east. The watershed is bound to the north by hills above the Alaska Highway, to the south by the Tetlin Lake watershed, and contains the east/west Tanana River watershed. This watershed is dominated by lowland wetlands, ponds, and river/stream habitat.

The Outlet Tok River watershed is directly adjacent to the west side of the Tetlin Lake watershed. It is bound on the west by the mountains surrounding Mt Neuberger, and to the east by the Tetlin Hills. The watershed receives water from the Tetlin Hills, which flows to the Tok River and ends with the Tok River's confluence with the Tanana River. The Tok Cutoff Highway runs directly through the watershed.

Surface Water

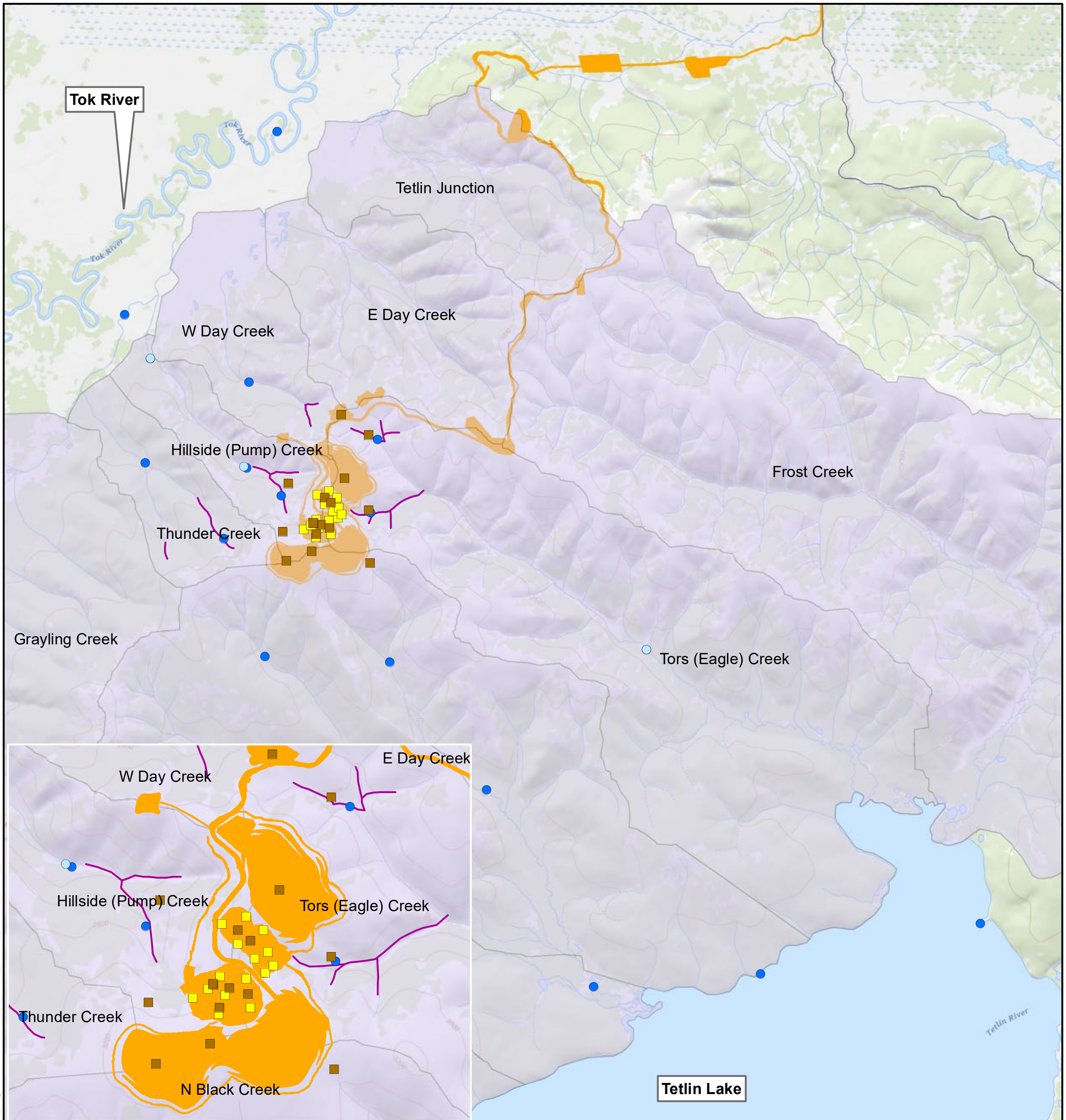
The following surface water analysis and language was completed by Piteau Associates (2021).

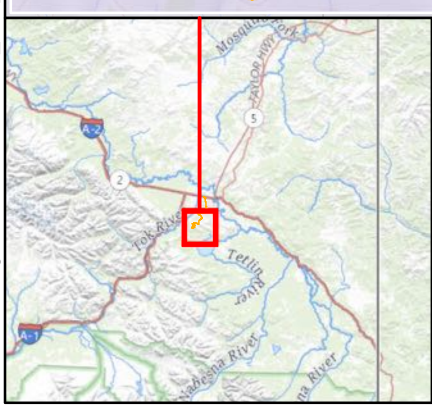
Surface water monitoring data is available from 19 sites around Manh Choh since 2012 (Piteau Associates 2021). Stream discharge is perennial in all catchments (Piteau Associates 2021). Most stream flows during the low-flow late fall and winter months are assumed to represent baseflows due to the limited precipitation at Manh Choh during this period (Piteau Associates 2021). Baseflows range between approximately 10 gallons per minute (gpm) and 100 gpm, depending on location within the catchment (Piteau Associates 2021).

Several natural constituents are of potential concern for water quality, include sulfate, antimony, arsenic and selenium (Table 12, Piteau Associates 2021):

- Natural arsenic concentrations exceed the ADEC guideline of 0.01 mg/L in Day Creek, Hillside Creek, Tors Creek, Tok River and Tetlin Lake.
- The highest measured natural antimony concentration of 0.0017 mg/L was observed in Day Creek and the highest selenium concentration of 0.00033 mg/L was observed in Tok River.
- Natural manganese concentrations (maximum and average) exceeded the guidelines in all surface water except Day Creek.
- Natural pH measurements are lowest (e.g. 4.1) in catchments west of Manh Choh and have been measured as low as 4.1. During wetter periods of the year, pH rises to more neutral values, but can be as high as 8.6. pH is rarely out of the guideline ranges in eastern catchments, except at one sampling location south of Manh Choh.
- Natural average sulfate concentrations are higher in Hillside Creek and Day Creek catchments and are spatially correlated with lower average pH.

The presence of naturally elevated constituents of concern, low pH and high sulfate is consistent with oxidation of sulfide bearing rocks associated with the Manh Choh deposits below the headwaters of these catchments (Piteau Associates 2021).





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Manh Choh Project

- Groundwater Monitoring
- Groundwater Monitoring (GeoTech)
- Stream Gauge (Surface)
- Surface Water Monitoring
- Intermittent Streams
- Watersheds
- Proposed Action
- Transportation Corridor

0 0.5 1 Miles

N E S W

(At original document size of 8.5x11)
1:84,903 1 inch = 1.34 miles

Client Peak Gold LLC

Project Manh Choh Project

Figure **Water Resources**

Figure Number

10

Table 12 Surface Water Monitoring: Count of ADEC Guideline Exceedance for Select Parameters

Basin	Catchment	Station	Number of Samples	pH	Alkalinity	Al	As	Cd	Cu	Fe	Pb	Mn	Hg	Ni	WAD-Cy
Tetlin	Tors (Eagle) Creek	EAT1-01	13	1		7				7		11			1
		EAT2-01	10	1	2	9	7	3	2	3	8	3			1
		EA02	17	4		1						1			
	Black Creek	BLT01-01	12	2		1						1			
		BL01 (BLT02-01)	17	6	1	7		1	1	3	2	3			
		BL02	15	4		3				1		13			
		BL03	17	1		7				2		6			
	Tetlin Lake	TL01	19	5		2		1	1	7	1	12			
		TL02	19	4		4	2	2	3	6	3	14	2	2	
Tok	Thunder Creek	THT1-01	9	3	2	9		1	9	4	4	2			2
		TH-01	16	4	4	10			4	1	1	3			1
	Hillside Creek	HIT2-01	10	4	8	1		1	1	1		2			1
		HI01	21	6	5	2	1		2	2	2	3	1		1
		HI02	18	6		2	3			11		18			1
	Day Creek	DA01	14	4	1		13								
	Grayling Creek	GR01	20	6						6		14	1		
	Tok River	TK01	16	1		6	1	1	1	9	1	6			

Source: Piteau Associates (2021)

Notes:

Al- aluminum; As- Arsenic; Cu Copper; Cd-Cadmium; Hg- Mercury; Fe-Iron; Pb- Lead; Mn- Manganese; WAD- Cy- Cyanide.

The parameters are total metals. Alkalinity is a minimum requirement. pH is a range between 6.5 and 8.5 and is measured in the field.

Ground Water

The following ground water analysis and language was completed by Piteau Associates (2021).

Groundwater levels were monitored using 14 wells between 2019 and 2021 (Piteau Associates 2021). Groundwater has a wide range of differences due to surface recharge sources, connection to fracture porosity, permafrost conditions and other factors (Piteau Associates 2021). The regional water table varies by up to 30 ft seasonally, and recharge response is delayed by months (Piteau Associates 2021). Elevation gradually rises after snowmelt, and hits seasonal lows during the winter (Piteau Associates 2021).

Groundwater quality sampling has occurred since 2016, for a total of 15 wells and one groundwater seep (Table 13) (Piteau Associates 2021). Water quality of the groundwater seep sampled during the monitoring program is indicative of a natural magnesium-calcium-bicarbonate type water, similar to surface water (Piteau Associates 2021). Average natural concentrations of antimony and arsenic, two constituents of concern above, exceed ADEC guidelines for wells at Manh Choh (Piteau Associates 2021). In addition to the identified constituents of concern, natural metals typically associated with hydrothermal deposits have maximum measured concentrations which exceed guidelines, including cadmium, copper, lead, manganese, molybdenum, nickel selenium and zinc (Piteau Associates 2021).

Arsenic and sulfate are two key naturally occurring constituents of concern identified which have contrasting behavior in water (Piteau Associates 2021). Sulfate is conservative, i.e., is non-reactive and will tend to remain in solution, while arsenic is reactive and can naturally be pulled from solution by sorption and precipitation processes (Piteau Associates 2021). Comparing these can highlight the different processes in surface water and groundwater (Piteau Associates 2021). Elevated arsenic is consistently associated with elevated sulfate concentrations across the range of wells. In contrast, arsenic is relatively depleted versus sulfate in most surface waters compared to groundwater (Piteau Associates 2021). The contrast between surface and groundwater is interpreted to reflect natural attenuation processes which deplete arsenic from groundwater as it moves downgradient of Manh Choh, prior to discharging as stream baseflows (Piteau Associates 2021).

Infiltration testing indicates the upper weathered bedrock is relatively permeable and available piezometric data indicate a thick (>200 ft) unsaturated zone underlies the upper reaches of catchments downslope of Manh Choh (Piteau Associates 2021). A rapid infiltration basin or trench approximately 300 ft x 10 ft within the weathered bedrock and unsaturated vadose zone would have sufficient capacity to infiltrate several hundred gallons per minute within the Hillside Catchment (Piteau Associates 2021).

Infiltrated water is expected to flow through the vadose zone at low rates such that metals will likely attenuate in contact with organic rich shallow soils or weathered bedrock by sorption or reaction processes (Piteau Associates 2021).

Table 13 Groundwater Monitoring: Count of ADEC Guideline Exceedance for Select Parameters

Sample Location ID	Infrastructure/ Pit/CESA Area	Number of Samples	pH	TDS	Al	Sb	As	Cd	Cu	Fe	Pb	Mn	Ni	Ag
GW Seep	Main Manh Choh Pit	6	4		6		1	3	5	4	5	1	1	1
PKG19-002	North Waste Rock Storage Area	8	3		2		2	2	1	3	2	3		
PKG19-003	North Manh Choh Pit	8	4			2	9					1		
PKG19-005	North Manh Choh Pit	9	2				4							
Well 02	Tors Creek	9	1											
GW21-01	Tors Creek	7	1		1					1	1			
GW21-02	Tors Creek	6									1	6		
GW21-04	East of Main WRDA	7	6								2			
GW21-06	Main Manh Choh Peak	4	4				4					1		
GW21-07	Main Manh Choh Peak	7	1											
GW21-08	Hillside Creek	7		1							1	5		

Source: Piteau Associates (2021)
Notes:
Al- aluminum; As- Arsenic; Sb- Antimony; Cu Copper; Cd-Cadmium; Fe-Iron; Pb- Lead; Mn- Manganese; WAD- Cy- Cyanide.
ADEC guidelines for Cd, Cu, Pd, Ni, Ag and Zn are hardness dependent and vary between locations, based on average hardness values
pH is a range between 6.5 and 8.5 and is measured in the field.
Dissolved constituents in groundwater
GW seep is total metals

Floodplains

The Tok Hazard Mitigation Plan (Community of Tok 2018) reports that flooding has not damaged the community and is not a hazard. The report does state that flooding does occur in the greater area, and floodwaters have risen in the vicinity of Tok, but no damage has been sustained.

Tetlin reports that the Tetlin Village Road has been flooded and impassible in the past (Native Village of Tetlin 2020). The plan reports that the flooding is due to overflow from the Tanana River, and that the NOAA told Tetlin to prepare for future flooding events due to the migration of the Tanana River channels (Native Village of Tetlin 2020).

NOAA prepared a PowerPoint slide deck on a 2017 flood event (NOAA 2018). NOAA reports that between late July and Late August in 2017 the Tetlin Village Road was impassible for approximately 0.75 miles (Figure 11). NOAA's analysis found that the flooding was from a bank breach in the Tanana River. NOAA identified this section of road as being liable to future flooding and predicts that it will occur again 'frequently' since the bank erosion has already occurred.

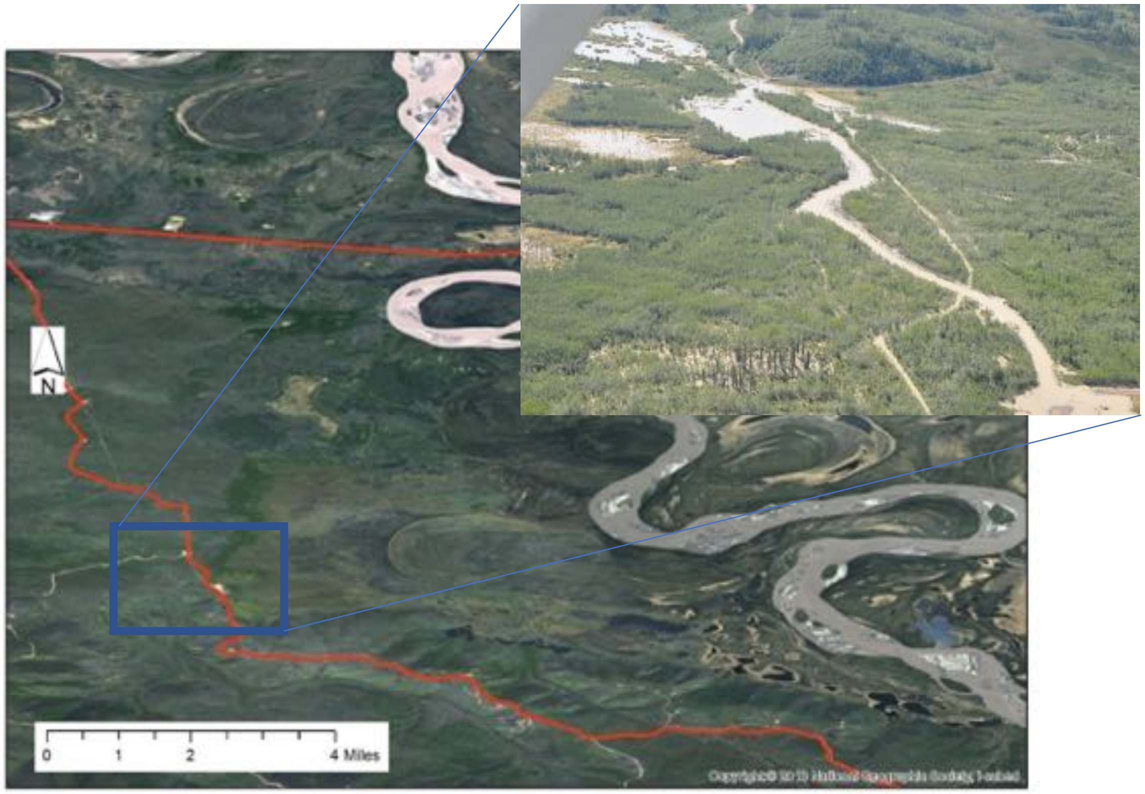


Figure 11 Civil Air Patrol Flight, August 5th 2017 looking south at the flooded portion of the road (NOAA 2018)

NOAA has a stream gauge on the Tanana River at the Tetlin Bridge, and the Tok River, both on the Alaska Highway (NOAA 2021b). Flood stages are not defined for either site.

- The Tanana River gauge operated between 2010-2012 and in 2017. The average observation was 36 feet, and high observations occurred in October 2010 at 50 feet, May 2011 at 45 feet, and July - September 2012 at 50 feet.
- The Tok River gauge operated 2016-2018 and in 2021. The average observation was 4 feet, and observations above 8 feet occurred in February 2016 at 15 feet, October 2017 at 15 feet, and June 2018 at 10 feet.

The FEMA has not published flood maps for Tetlin, Tok, or the surrounding area (FEMA 2021).

The USACE did not include Tetlin, Tok, or the surrounding area in the Alaska baseline erosion assessment program (USACE 2021).

The USGS does not have current or historic stream gauge data in the area (USGS 2021).

3.3.8.3 No Action

Under the No Action alternative, impacts to water resources would not occur, mineral exploration may continue to take place in the Tetlin Hills in accordance with current and future authorizations.

3.3.8.4 Proposed Action

Water Management

Precipitation, snowmelt, runoff, and groundwater discharge that interacts with exposed waste rock or pit slopes could come into contact with several constituents of concern which could affect water quality, including sulfate, arsenic, antimony, cadmium, copper, manganese, and selenium (Piteau Associates 2021).

All of these surface waters will be collected through diversion ditches to be contained and treated as appropriate (either utilized in accordance with permit guidelines, treated, and/or infiltrated to ground through a specifically created catchment (i.e., Hillside Creek Catchment)).

Sources of water that will need to be managed include:

- WRDA runoff during operations, closure and post-closure
- Water infiltrating the waste rock piles
- Runoff from the pit slopes
- Pit dewatering drains and sumps
- Water used to backfill the pits following construction, and
- Pore water flowing through the backfilled pits following closure

Surface Water

The Proposed Action will be constructed to minimize the direct and indirect impact to surface water, and the infiltration of surface water to potentially PAG or ML materials, including using perimeter ditch controls and implementing a stormwater management plan.

During mine construction and operation, runoff from the WRDA, pit slope water and pit dewatering water will be collected at North Pit for handling by way of the Hillside Creek Catchment. The relatively dry conditions at site require that any suitable and available water will be utilized for dust-suppression. During wet periods when dust suppression demand is low, excess water will either be infiltrated to ground in the Hillside Creek catchment or treated with reverse osmosis (RO) for later use as dust suppression. The Hillside Creek Catchment is expected to infiltrate water, which will flow through the vadose zone at low rates such that metals will likely attenuate in contact with organic rich shallow soils or weathered bedrock by sorption or reaction processes (Piteau Associates 2021).

Culverts will be used along the roadways to maintain hydrologic connectivity at any wetland crossings, and to provide water management along ditches for downhill drainage.

The Proposed Action is anticipated to have negligible, short-term, localized impacts to surface water.

Groundwater

During mine construction and operation, the Hillside Creek Catchment will be constructed to handle and infiltrate any surface water into groundwater, as discussed above. This catchment will quickly attenuate any metals.

During mine construction and operation, drawdown from pit dewatering is limited to local areas of the pit walls (Piteau Associates 2021). Groundwater seepage rates are not expected to exceed 3 gallons per minute (gpm) in North Pit and 6 gpm in South Pit (Piteau Associates 2021). Drawdown waters will be infiltrated into the Hillside Creek Catchment, as required.

After mine closure, runoff or discharge from waste rock will not be allowed to entered surface water environments. The WRDAs will be closed and recontoured to minimize infiltration of surface water either with an impermeable cover, or topsoil/overburden cap. This will minimize interaction of recharge with waste rock and reduce the potential for discharge to ground below the facility.

The goal for mine closure is to keep metal leaching waste rock in North Pit dry and to keep potentially acid generating waste rock in South Pit submerged (Piteau Associates 2021).

The highest potential for discharge to groundwater is from migration of pore water in the pit backfill into the saturated portion of bedrock below the reclaimed pits (Piteau Associates 2021). It is anticipated that low recharge rates over the waste backfill and low conductivity of the bedrock will result in low infiltration rates to groundwater below the pits, and subsequently low fluxes through bedrock (Piteau Associates 2021). Movement of metals and other identified constituents of concern will be delayed by the low flowrates and in many cases (e.g. arsenic) will be attenuated by sorption or precipitation reactions during flow through bedrock and organic-rich soils near surface (Piteau Associates 2021). The timescales of these processes therefore will be on the order of decades to centuries (Piteau Associates 2021).

Ground water will transport constituents beyond the mine pits (Piteau Associates 2021). Sulfate is expected to reflect the worst-case scenario for transport of constituents of concern because it is conservative (doesn’t attenuate), and is present in the highest concentrations, both naturally and in the predicted source terms (Piteau Associates 2021). Arsenic and other metals will travel shorter distances and at lower concentrations due to attenuation processes described in Piteau Associates (2021).

The primary direction of sulfate transport from the South and North Pits is to the west into the Hillside Creek catchment and east into the upper Tors Creek catchment (Piteau Associates 2021). At 100 years post-closure, concentrations in groundwater remain below 250 mg/L at 1,500 ft distance both west and east of the South and North Pits, for the no-recharge case (Piteau Associates 2021). For the maximum recharge case, the 250 mg/L contour moves out to approximately 2,500 ft east of North pit after 100 years

(Piteau Associates 2021). It is currently unclear where the 250 mg/L contour will stabilize at, over longer timeframes (Piteau Associates 2021). Under these conditions, cumulative peak discharge concentrations which meet ADEC guidelines for sulfate are expected a short distance downstream of the 250 mg/L groundwater concentration contour in groundwater in the Tors Creek headwaters (Piteau Associates 2021).

The model indicates that virtually all parameters in the downgradient headwaters will be below the ADEC guideline values (Piteau Associates 2021). Manganese could exceed its guideline value in the Hillside Creek headwaters after 180 years during dry months when creek flows are fed primarily by groundwater discharge (Piteau Associates 2021). Since groundwater flows at the headwaters make up a very small proportion (2%) of annual stream flows, significant changes in water quality are unlikely to be detectable in streams, except possibly in late summer when less runoff is available for mixing (Piteau Associates 2021). The Proposed Action is anticipated to have negligible, long-term, localized impacts to ground water (Piteau Associates 2021).

Floodplains

The Proposed Action is outside of any mapped floodplain.

All of the proposed action infrastructure in the Tetlin Hills will be constructed to accommodate the level of historical flooding. This will have a positive benefit to local floodplain management, helping to avoid the Tetlin community from being cut off by future floods.

The Proposed Action is anticipated to have a positive negligible, long-term, localized impact.

3.3.9 Soils

3.3.9.1 Area of Analysis

The area of analysis includes the proposed Manh Choh Mine. This area of analysis was chosen because it represents the area where the Proposed Action is most likely to affect the resource.

No impacts are anticipated on the highway transportation route to Fort Knox.

All activities at Fort Knox are under existing permits, and no new federal permitting actions are required at Fort Knox.

3.3.9.2 Affected Environment

The existing conditions within the area of analysis are not cataloged by Natural Resources Conservation Service (NRCS) SSURGO (Soil Survey Geographic Database) soil mapping (NRCS 2021). SSURGO information is collected at scales ranging from 1:12,000 to 1:63,360 (Figure 12).

The area is cataloged by NRCS STATSGO (Digital General Soil Map of the United States) (NRCS 2021). STATSGO information is collected at scales of 1:1,000,000. This level of mapping is designed for broad planning and management uses covering state, regional, and multi-state areas. The area of analysis includes these soil map units:

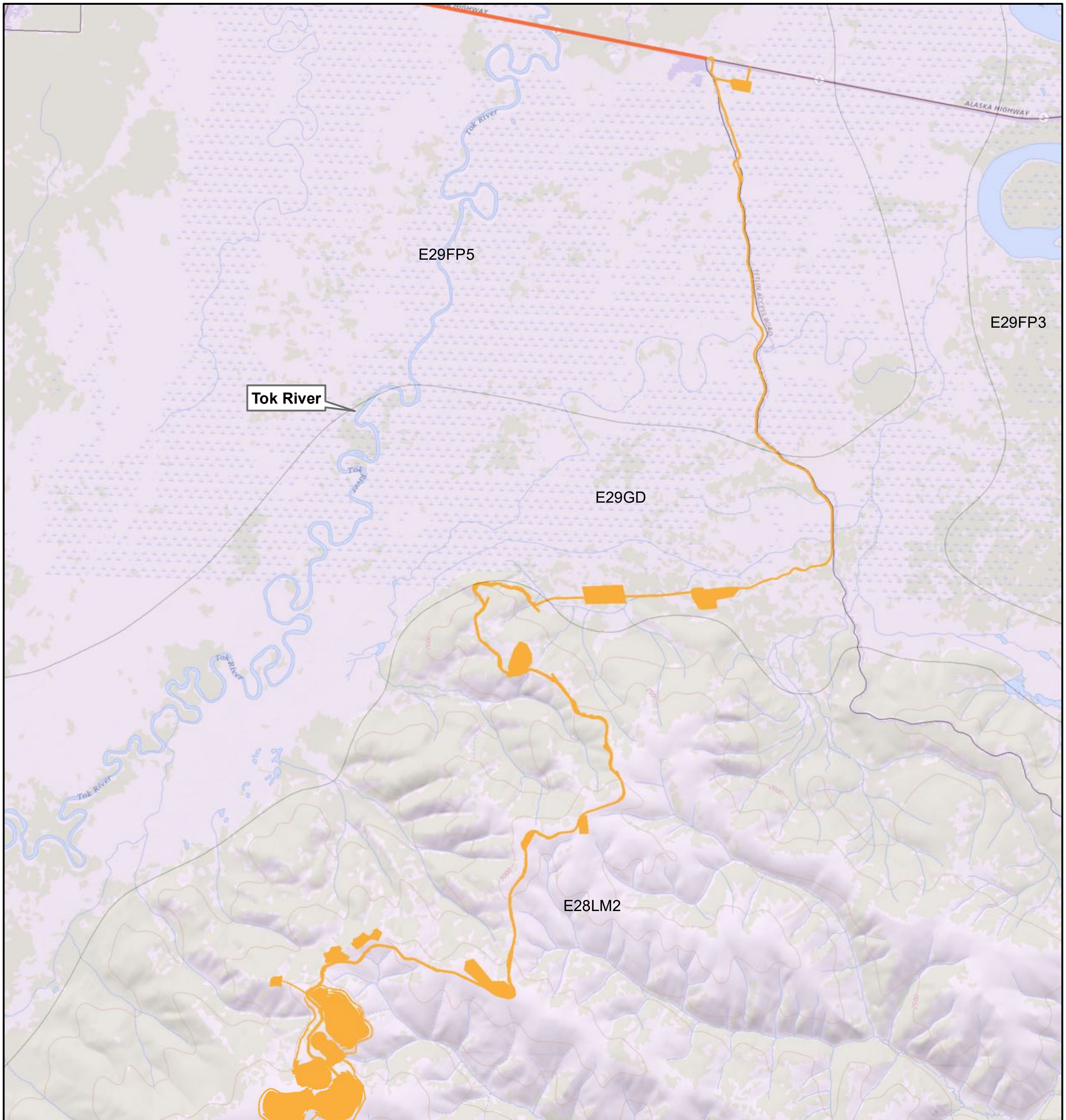
- E28LM2: Interior Alaska Mountains-Boreal Upland-Rounded Mountains, Acid
- E29FP3: Interior Alaska Lowlands-Boreal Lowland-Flood Plains and Terraces, Wet
- E29FP5: Interior Alaska Lowlands-Boreal Lowland-Fan Terraces and Stream Terraces
- E29GD: Interior Alaska Lowlands-Boreal Lowland-Alluvial Plains, Wet

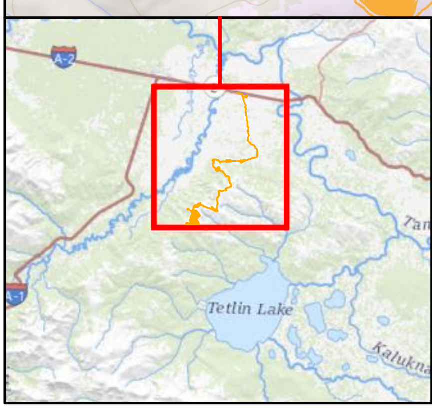
Erosion Potential

Wind erodibility groups were used to determine susceptibility of soils to wind erosion (Table 14). Wind erodibility groups are based on compositional properties of the surface horizon that are considered to affect susceptibility to wind erosion such as texture, presence of carbonates, and the degree of decomposition of organic soils. Group ratings range from one to eight, with one being the most susceptible and eight being the least susceptible to erosion. Soil map units within the area of analysis range between wind erodibility groups of five and eight (NRCS 2021).

Hydric Soils

Hydric soils are soils that formed under conditions of saturation, flooding, or ponding during the growing seasons which causes the development of anaerobic conditions. Hydric soils are one of three criteria in determining wetland status. All of the soils considered hydric by NRCS were either ‘poorly drained’ or ‘very poorly drained’.





Manh Choh Project

- Soil Map Units
- Transportation Corridor
- Proposed Action

0 0.5 1 1.5 Miles

N W E S

(At original document size of 8.5x11)
1:900,000 1 inch = 14.2 miles

Client Peak Gold LLC

Project Manh Choh Project

Figure **Soil**

Figure Number

12

Table 14 Soils Information

Map Symbol	Map Unit	Component	Landform	Hydric Rating	Depth to Restrictive Layer (in)	Drainage Class	Wind Erodibility Group
E28LM2	Interior Alaska Mountains-Boreal Upland-Rounded Mountains, Acid	E28-Boreal taiga-gravelly frozen colluvial slopes, acid	Mountains	Yes	10 - 19	Poorly	8
		E28-Boreal taiga-silty frozen slopes, acid	Mountains	Yes	8 - 24	Poorly	8
		E28-Boreal tussock-scrub-silty frozen slopes, acid	Mountains	Yes	-	-	-
E29FP3	Interior Alaska Lowlands-Boreal Lowland-Flood Plains and Terraces, Wet	E29-Boreal wet meadow-organic depressions	Flood plains	Yes	20 - 60	Very Poorly	8
		E29-Boreal taiga-loamy frozen terraces	Stream terraces	Yes	18 - 32	Poorly	8
		E29-Boreal scrub-silty frozen drainageways	Stream terraces	Yes	33 - 47	Very Poorly	5
		E29-Boreal forest-loamy frozen flood plains	Flood plains	Yes	9 - 33	Poorly	5
		E29-Boreal scrub-silty low flood plains	Flood plains	Yes	-	-	-
		E29-Boreal meadow-loamy flood plain depressions	Flood plains	Yes	-	-	-
		E29-Boreal taiga/tussock-silty frozen terraces	Stream terraces	Yes	-	-	-
E29FP5	Interior Alaska Lowlands-Boreal Lowland-Fan	E29-Boreal taiga-loamy frozen terraces	Stream terraces	Yes	18 – 32	Poorly	8
		E29-Boreal forest-loamy frozen flood plains	Flood plains	Yes	9 - 33	Poorly	5
		E29-Boreal taiga-loamy frozen channels	---	Yes	18 - 32	Very Poorly	8

Map Symbol	Map Unit	Component	Landform	Hydric Rating	Depth to Restrictive Layer (in)	Drainage Class	Wind Erodibility Group
	Terraces and Stream Terraces	E29-Boreal taiga/tussock-silty frozen terraces	Stream terraces	Yes	-	-	-
		E29-Boreal wet meadow-organic depressions	Flood plains	Yes	20 - 60	Very Poorly	8
		E29-Boreal scrub/sphagnum-organic depressions	Stream terraces	Yes	-	-	-
E29GD	Interior Alaska Lowlands-Boreal Lowland-Alluvial Plains, Wet	E29-Boreal taiga-loamy frozen channels	Plains	Yes	18 - 32	Very Poorly	8
		E29-Boreal fen-organic depressions	Plains	Yes	-	-	-
		E29-Boreal taiga-loamy frozen terraces	Stream terraces	Yes	18 – 32	Poorly	8
		E29-Boreal scrub-silty low flood plains	Flood plains	Yes	-	-	-
		E29-Boreal taiga/tussock-silty frozen terraces	Plains	Yes	-	-	-
		E29-Boreal scrub/sphagnum-organic depressions	Plains	Yes	-	-	-

Sources: NRCS 2021
'-' = No Data Available
Wind Erodibility Group:

5: Non calcareous loam and silt loam with <20 percent clay content, or sandy clay loam, sandy clay, and hemic (1) organic soil materials.
8: Soils not susceptible to wind erosion due to coarse fragments or wetness

3.3.9.3 No Action

Under the No Action alternative, impacts to soils would not occur, mineral exploration may continue to take place in the Tetlin Hills in accordance with current and future authorizations.

3.3.9.4 Proposed Action

The Proposed Action would include soil disturbance within the area of analysis. Direct and indirect impacts to soil would include changes to physical and chemical properties, which potentially lead to a decrease in quality of disturbed areas. The effect of removing native soil would cause the mixing of soil horizons that could result in the degradation or loss of soil function. This disturbance can alter soil productivity by affecting its permeability, structure, and microbial activity. These impacts would be minor, permanent, and localized.

Reclamation would be completed on the proposed surface disturbance area in accordance with the reclamation plan. To minimize effects to soils, reclamation would be conducted as soon as practical, with concurrent reclamation implemented to the maximum extent possible. Proposed reclamation activities would include, but are not limited to, grading of final slopes; ripping of compacted soil; application of growth media (stockpiled soils and organic material); and revegetation. Therefore, the impacts to soil resources from surface disturbance would be minor, long-term, and localized.

3.4 BIOLOGICAL ENVIRONMENT

3.4.1 Wetlands

3.4.1.1 Area of Analysis

The area of analysis includes the proposed Manh Choh Mine, including the Tetlin Village Road. This area of analysis was chosen because it represents the area where the Proposed Action is most likely to affect the resource.

No impacts are anticipated on the highway transportation route to Fort Knox.

All activities at Fort Knox are under existing permits, and no new federal permitting actions are required at Fort Knox.

3.4.1.2 Affected Environment

Stantec (2021) delineated the wetlands in the study area in 2020 and 2021 (Table 15). The Proposed Action study area is slightly larger, primarily due to upland shoulder impacts for improvements at the Tetlin Road/Alaska Highway Intersection. Additional field work by ABR Inc. in 2013 and 2016 were evaluated for the final mapping and report (Stantec 2021).

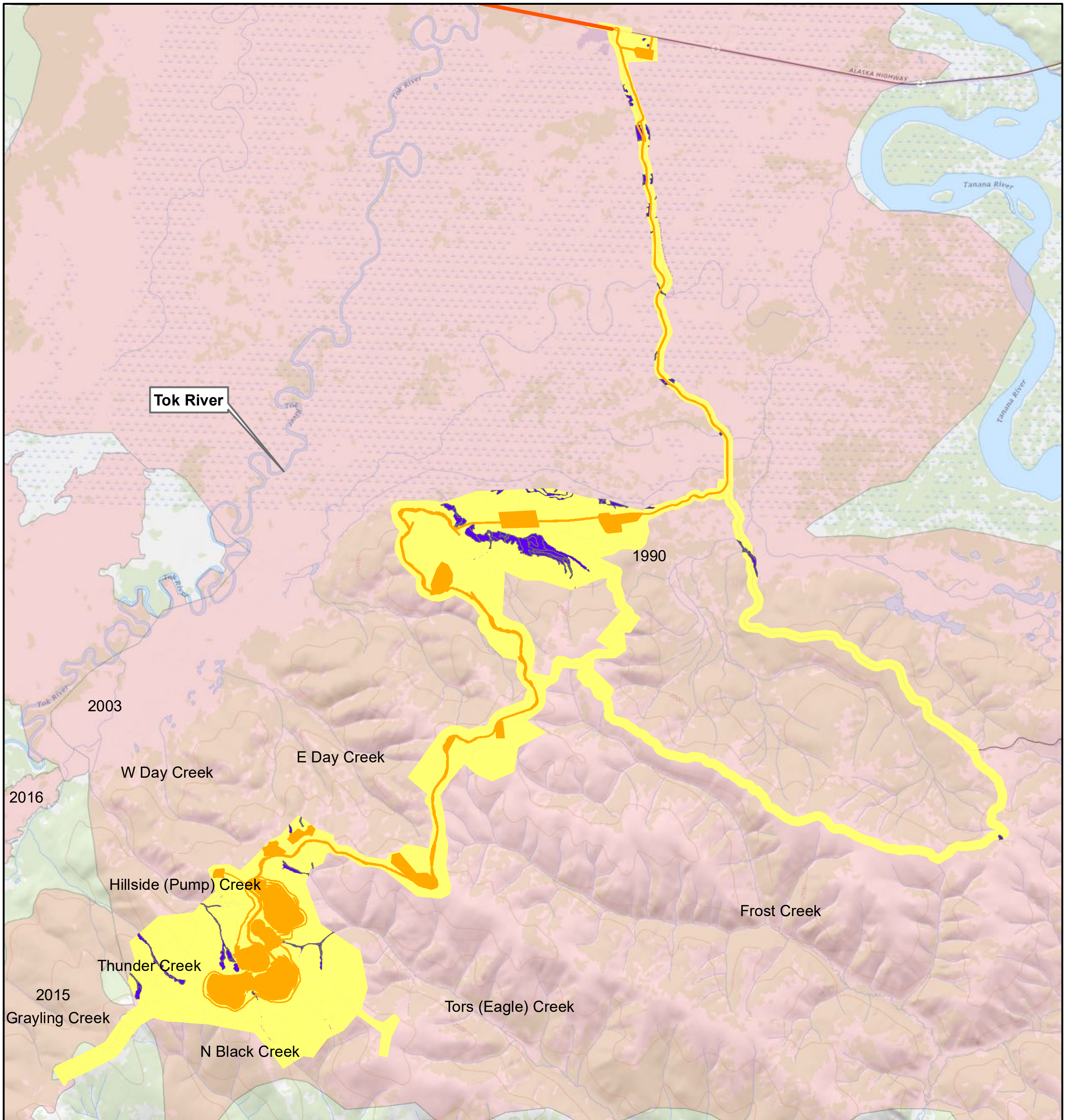
Table 15 Wetlands and Waters in the Study Area

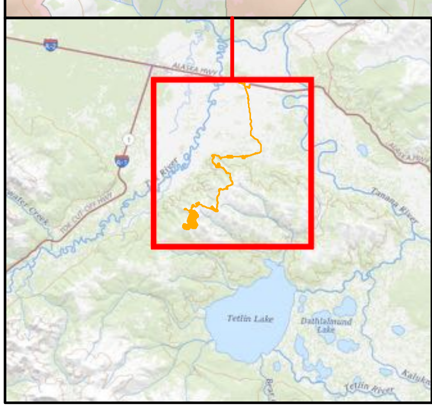
Wetland Status	Acres	Percent of Study Area
Wetlands and Waters	194.3	3.2%
Waters	3.5	0.1%
Total Wetlands and Waters	**197.8**	**3.3%**
Upland (Non-wetlands)	5,828.0	96.7%
Total Study Area*	**6,025.9**	**100.0%**

*Apparent inconsistencies in sums are the result of rounding.

The area is located within the 23-million-acre Interior Alaska Lowlands Major Land Resource Area (MLRA; USDA 2006). This MLRA includes broad floodplains, terraces, and outwash plains, with scattered hills and low to moderate relief mountains. The area is considered a zone of discontinuous permafrost. Permafrost is commonly close to the surface on gently sloping footslopes and hills.

The area is hydrologically divided by the Tetlin Hills. The waters and wetlands on the northwest side of the area flow downhill via Thunder and Hillside Creeks and eventually connect to the Tok River, which flows to the Tanana River. Wetlands and waters reach the Tanana River by flowing through the Tok River, Tetlin Lake, Tetlin River, and other small drainages.





Manh Choh Project

Transportation Corridor

Proposed Action

Wildfire

Cowardin

Wetland

Waterbody (PUBH)

Stream (R3)

Stream (R4)

Upland

0 0.5 1 Miles

N W E S

(At original document size of 8.5x11)

1:90,000 1 inch = 1.42 miles

Client Peak Gold LLC

Project Manh Choh Project

Figure **Wetlands**

Figure Number

13

Wetlands are classified by the Cowardin Classification System (Cowardin 1979). Wetlands are broken into Emergent (PEM), Forested (PFO), and Scrub-Shrub (PSS). Waterbodies are classified as PUBH (e.g. excavated ponds). Streams are classified as either Upper Perennial (R3) or Intermittent (R4).

Wetlands are found in the lowlands near the Tetlin Village Road (Stantec 2021). This area is relatively flat, and likely underlain by permafrost deeper than 24 inches. Prior to the 1990 Tok River fire, much of the area was covered in black spruce forests. Wetlands were found in black spruce forests that did not burn, or where regrowth is predominantly black spruce saplings. Hydrology is found based on secondary indicators; without saturation or water tables found at any location.

Along the base of the Tetlin Hills, near the proposed mine site road, groundwater-driven wetlands are maintained from water flowing off the hills. Surface waters disappear as the frozen soils recede and the hydrology enters a gravel substrate alluvial fan.

Wetlands are also found in the Tetlin Hills area (Stantec 2021). This area has steep hillsides and valleys, where small streams form from groundwater input, creating intermittent and perennial systems. Wetlands are found along many of these streams, either as alder/willow lined floodplains, or as hillside groundwater driven wetlands (black spruce and ericaceous tussock tundra) that flow to the streams below. Shallow permafrost was only found on north facing slopes, as was the case in two of the larger wetlands.

Fire History

Numerous natural wildfires have historically burned the area, which have changed the wetlands by lowing the level of permafrost. Lightning-caused fires are common, with willow and other deciduous shrubs and sapling establishing post fire (USDA 2006). Because fire is a natural event and a normal occurrence in interior forests, wetland conditions in the field in areas burned in previous years were considered to be the normal condition.

There are unburned mosaics within the study area, but most of the area has burned, with standing and downed dead wood throughout the area and vegetative regrowth occurring. The 1990 Tok River fire boundaries cover the entire area, and the 2015 Tetlin Hills fire burned a smaller area on the west. Fires most likely created a mosaic of burned and unburned areas within the fire boundaries. In many burned areas, trees were killed while understory shrub communities were not as severely impacted.

Figure 14 Fire Scarred Forest

3.4.1.3 No Action

Under the No Action alternative, impacts to wetlands and streams would not occur, mineral exploration may continue to take place in the Tetlin Hills in accordance with current and future authorizations.

3.4.1.4 Proposed Action

The Proposed Action would remove wetland habitat by filling existing wetlands for infrastructure (Table 16). The Proposed Action is surrounded by few undisturbed wetland habitats. Through the design process, effort was taken to avoid and minimize impacts to wetlands and waters by using updated wetland mapping that targeted potential design components (Stantec 2021).

Table 16 Impacts to Wetlands

Wetland Status	Impacts (Acres)	Study Area (Acres)	Impacts to Study Area (Percent)	Impacts Stream (Linear Ft)	Study Area Stream (Linear Ft)
Wetland (PEM, PFO, PSS)	5.11	194.27	2.6%	-	-
Waterbody (PUBH, excavated pond)	0.05	0.05	100.0%	-	-
Upper Perennial Streams (R3)	0.0	2.36	0.0%	-	15,481
Intermittent Streams (R4)	0.01	1.14	0.9%	80	9,490
Total Wetlands	5.17	197.82	2.6%	80	24,970
Total Uplands	923.70	5,899.76	15.7%	-	-
Total Study Area	928.87	6,097.58	15.2%	80	24,970

*Apparent inconsistencies in sums are the result of rounding.

Indirect impacts to wetlands and waters would include areas within 100 ft (30 m) of gravel infrastructure that causes airborne dust, interruption of sheet flow, snow removal, and snow drifting. Dust can land on wetland vegetation and alter photosynthesis and reduce wetland functions. Snow management and interruption of natural flow regimes can change the distribution of seasonal hydrology throughout the watershed and cause local changes in wetland functions. Project related activities that increase sedimentation could also impact wetland functions.

Mitigation measures, including maintaining updated stormwater pollution prevention systems will mitigate the potential indirect impact to wetlands. Best Management Practices will be employed to minimize airborne dust, sedimentation, and changes in local hydrology.

The Proposed Action would result in a negligible, permanent, localized impacts to wetlands.

3.4.2 Vegetation

3.4.2.1 Area of Analysis

The area of analysis includes the proposed Manh Choh Mine, including the Tetlin Village Road. This area of analysis was chosen because it represents the area where the Proposed Action is most likely to affect the resource.

No impacts are anticipated on the highway transportation route to Fort Knox.

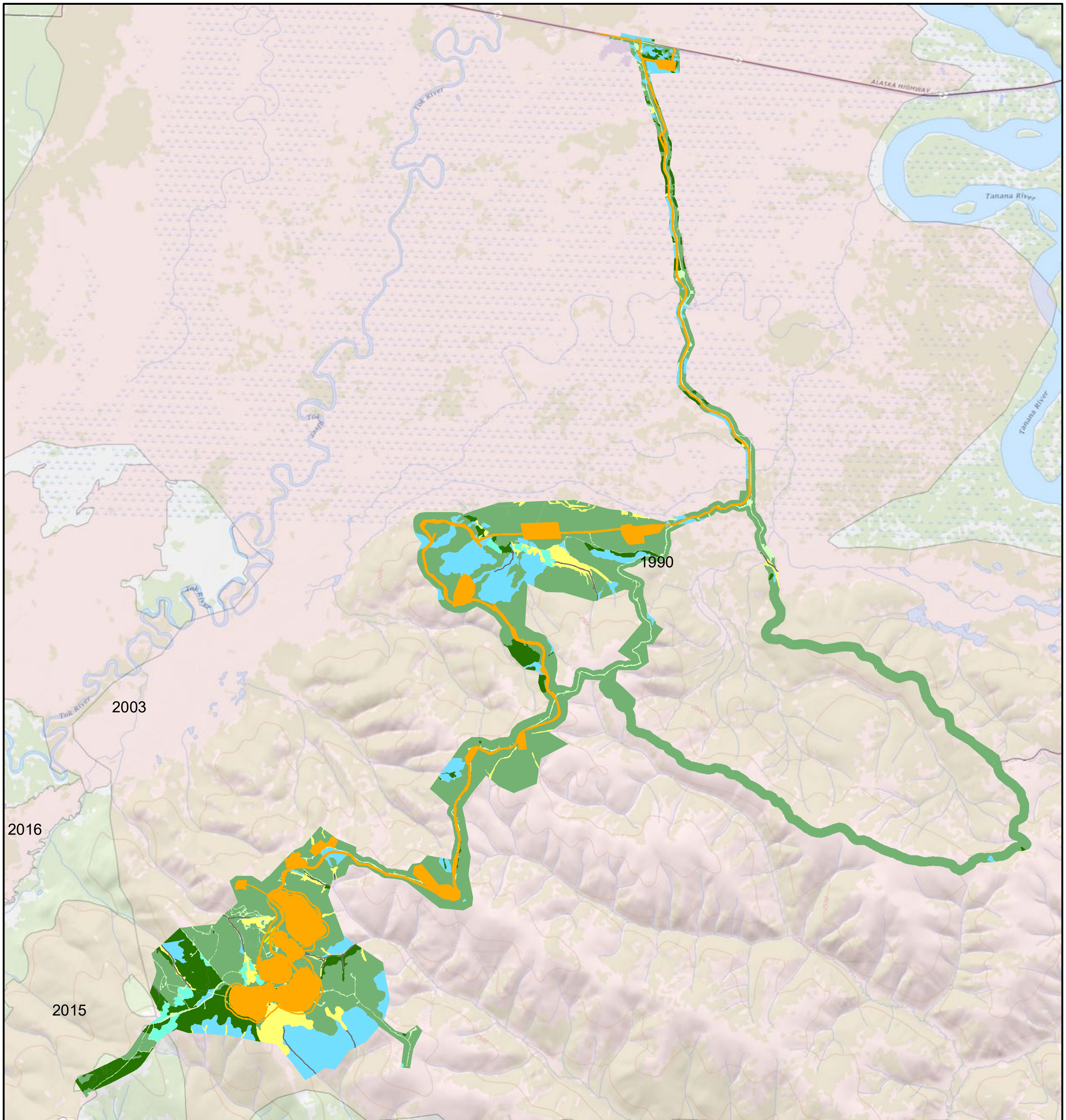
3.4.2.2 Affected Environment

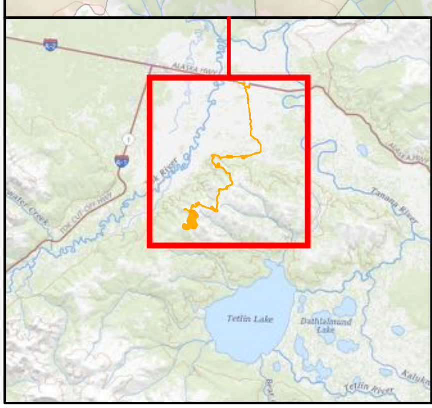
The vegetation mapping was conducted by Stantec (2021) in concert with the wetlands mapping (Table 17). Vegetation impacts are greater than wetland impacts, since vegetation clearing without soil disturbance is proposed in some areas. The plant community descriptions provided in the Alaska Vegetation Classification System (Viereck et al. 1992) formed the basis for the vegetation mapping.

The vegetation composition of the area has been greatly influenced by the 1990 Tok River fire. Much of the forest cover was burned/killed, and regrowth has occurred across the area. The Deciduous Shrub and Sapling Regeneration (DSSR) vegetation type is a combination of shrubs and saplings that typically recolonize areas of disturbance. It consists of regrowth of aspen and birch saplings and/or willow, alder, and glandular birch shrubs. Although there may be patches of unburned shrubs in the area, most shrub communities outside of drainages are incorporated into the DSSR type.

Black spruce forests (Open, Closed and Woodland) are found throughout the area on the unburned hillsides, and patches along the roadways. Black spruce saplings are recolonizing previously burned areas, some of which are in wetlands. White spruce forests and woodlands are found in small patches.

Deciduous and mixed forests include unburned hillsides in the exploration area, and areas of regrowth along the roads where tree size has been achieved (diameter breast height equals 3 inches or more). Mixed forests may contain regrowth of both aspen/birch and spruce that have not grown to tree size.





Manh Choh Project

Proposed Action

Wildfire

Vegetation

Deciduous Shrub and Sapling Regrowth

Spruce

Deciduous and Mixed

Willow and Alder

Tundra

Herbaceous

Barren

Open Water

0 0.5 1 1.5 Miles

N W E S

(At original document size of 8.5x11)

1:90,000 1 inch = 1.42 miles

Client Peak Gold LLC

Project Manh Choh Project

Figure **Vegetation**

Figure Number

15

Table 17 Vegetation Classification

Vegetation Structure	Project Vegetation Type	Study Area (Acres)
Barren	Partially Vegetated	6.79
	Disturbance Barren (Roads, Clearings)	185.29
Deciduous and Mixed	Closed Deciduous Forest	301.34
	Closed Mixed Forest	16.80
	Open Deciduous Forest	113.29
	Open Mixed Forest	333.13
	Woodland Mixed Forest	9.67
DSSR	Deciduous Shrub and Sapling Regrowth	4,218.47
Herbaceous	Mesic Herb	9.22
	Wet Herbaceous	0.72
Open Water	Open Water	3.55
Spruce	Closed Black Spruce Forest	1.79
	Open Black Spruce Forest	198.27
	Open White Spruce Forest	82.07
	Black Spruce Woodlands	53.32
	White Spruce Woodland	195.60
Tundra	Low Shrub Tundra	77.91
	Open Mixed Sedge Shrub Tundra	20.72
Willow and Alder	Closed Tall Alder Shrub	97.55
	Closed Tall Alder Willow Shrub	31.40
	Closed Tall Willow Shrub	18.96
	Open Alder Willow Shrub	22.07
	Open Tall Alder Willow Shrub	28.26
	Open Low Willow Shrub	13.05
	Open Tall Willow Shrub	58.35
	Total	**6,097.58**

*Apparent inconsistencies in sums are the result of rounding.

Alders and willows (Open and Closed Willow, Open and Closed Alder, and Open and Closed Alder-Willow Shrub) cover were identified in the area when they formed clear and distinct stands, to include the steep drainages in the exploration area.

Small patches of Low Shrub Tundra vegetation type occur at shoulder slopes in the area.

Disturbance Barrens occur as roads, material sites, drainage ditches, and pads. In the exploration area, it includes concentrated areas of soil disturbance activity; reclaimed areas are revegetating as saplings, shrubs, and herbs.

Plant Species

None of the plant species found during the vegetation mapping effort are threatened or endangered (Stantec 2021).

The Alaska Natural Heritage Program part of the NatureServe program established by the Nature Conservancy at the University of Alaska Anchorage, tracks population information on over 300 uncommon plant species in Alaska (AKNHP 2021). None of the plants recorded in the field are considered rare or uncommon (Stantec 2021).

Non-Native Plants

The Alaska Exotic Plants Information Clearinghouse (AKEPIC, 2021) was reviewed, and the database mapper does not have documentation of non-native plants being present within the Tetlin Hills portion of the project. Non-native species are likely found along the Tetlin Village Road and the current access road to the project area.

3.4.2.3 No Action

Under the No Action alternative, impacts to vegetation would not occur, mineral exploration may continue to take place in the Tetlin Hills in accordance with current and future authorizations.

3.4.2.4 Proposed Action

The Proposed Action would remove vegetation by converting existing habitat into infrastructure (Table 18). The Proposed Action is surrounded by suitable undisturbed vegetation habitat.

Indirect impacts to vegetation would be similar to those described above for wetlands. An indirect impact layer has been included for vegetation within 100 ft (30 m) of gravel infrastructure. These impacts may include airborne dust, interruption of sheet flow, snow removal, and snow drifting. Mitigation measures, including maintaining updated storm water pollution prevention systems will reduce the potential indirect impact to vegetation.

Table 18 Impacts to Vegetation

Vegetation Structure	Project Vegetation Type	Impacts (Acres)	Clearing Buffer (Acres)	Study Area (Acres)	Impact % of Study Area
Barren	Partially Vegetated	1.26	1.53	6.79	40.9%
	Disturbance Barren (Roads, Clearings)	49.76	14.08	185.29	34.5%
Deciduous and Mixed	Closed Deciduous Forest	14.61	3.97	301.34	6.2%
	Closed Mixed Forest	0.87	0.94	16.80	10.8%
	Open Deciduous Forest	1.93	1.52	113.29	3.0%
	Open Mixed Forest	12.11	5.72	333.13	5.4%
	Woodland Mixed Forest			9.67	0.0%
DSSR	Deciduous Shrub and Sapling Regrowth	740.24	96.56	4,218.47	19.8%
Herbaceous	Mesic Herb	6.87	0.17	9.22	76.3%
	Wet Herbaceous	0.01	0.01	0.72	1.9%
Open Water	Open Water	0.07	0.00	3.55	2.0%
Spruce	Closed Black Spruce Forest	0.28	0.18	1.79	25.7%
	Open Black Spruce Forest	11.95	5.69	198.27	8.9%
	Open White Spruce Forest	6.66	0.91	82.07	9.2%
	Black Spruce Woodlands	2.10	0.91	53.32	5.6%
	White Spruce Woodland	41.86	1.22	195.60	22.0%
Tundra	Low Shrub Tundra	16.26	0.53	77.91	21.5%
	Open Mixed Sedge Shrub Tundra			20.72	0.0%
Willow and Alder	Closed Tall Alder Shrub	20.93	1.59	97.55	23.1%
	Closed Tall Alder Willow Shrub	0.01	0.02	31.40	0.1%
	Closed Tall Willow Shrub	0.29	0.20	18.96	2.6%
	Open Alder Willow Shrub	0.01	0.03	22.07	0.2%
	Open Tall Alder Willow Shrub		0.01	28.26	0.0%
	Open Low Willow Shrub	0.56	0.09	13.05	5.0%
	Open Tall Willow Shrub	0.23	0.13	58.35	0.6%
	Total	**928.87**	**136.01**	**6,097.58**	**17.5%**

*Apparent inconsistencies in sums are the result of rounding.

No impacts are anticipated to threatened, endangered, or uncommon plant species.

The Proposed Action would result in a negligible, long-term, localized impacts to vegetation.

Non-Native Plants

The Proposed Action could result in the introduction of non-native plants into the area. The project would develop an invasive species management plan. Reclamation will occur with Alaska Native seed species, which will be specifically selected to exclude invasive plants.

The Proposed Action would result in a negligible, long-term, localized impacts to non-native plants.

3.4.3 Fish

3.4.3.1 Area of Analysis

The area of analysis includes the proposed Manh Choh Mine, including the Tetlin Village Road. This area of analysis was chosen because it represents the area where the Proposed Action is most likely to affect the resource.

No impacts are anticipated on the highway transportation route to Fort Knox.

All activities at Fort Knox are under existing permits, and no new federal permitting actions are required at Fort Knox.

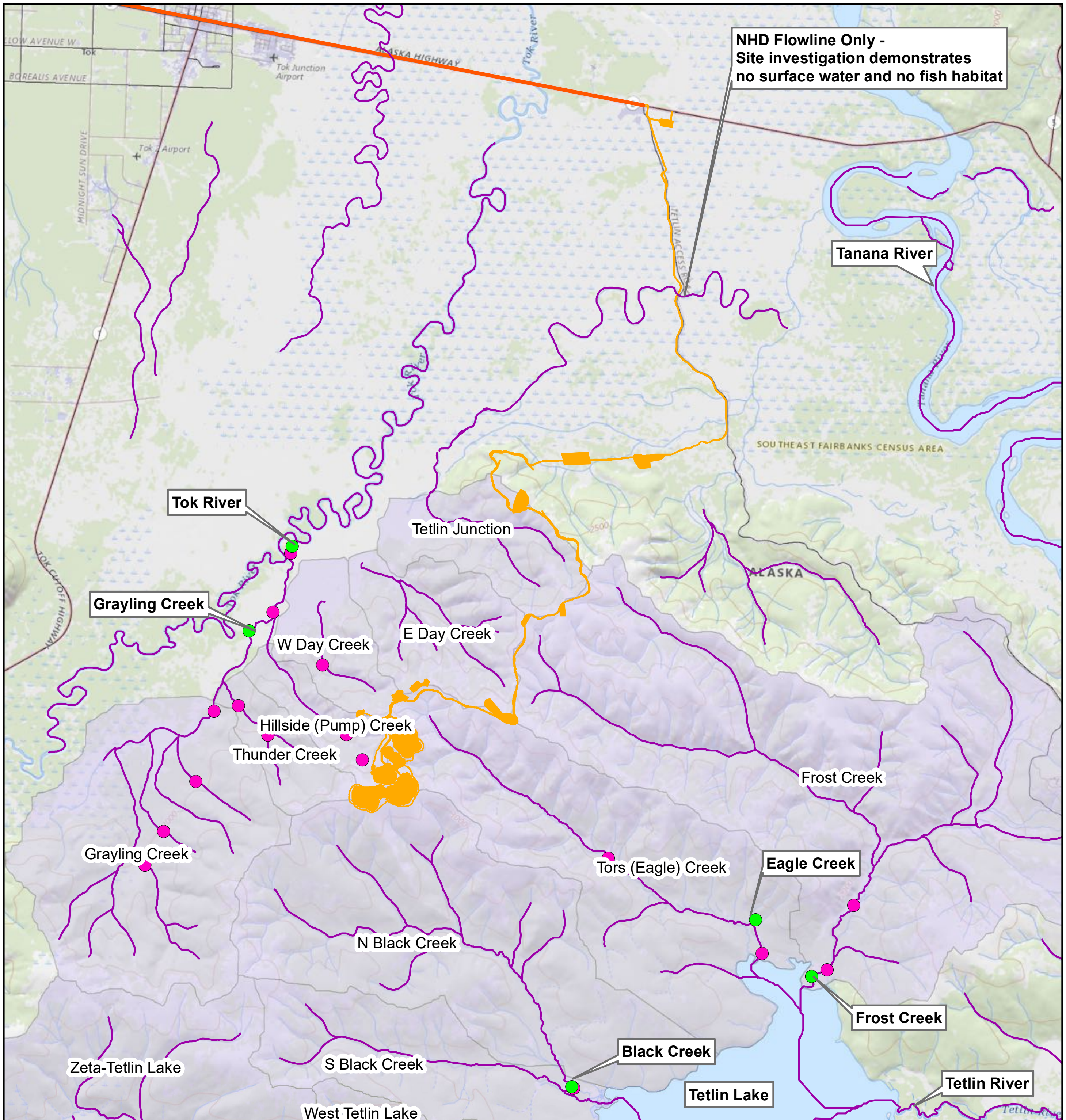
3.4.3.2 Affected Environment

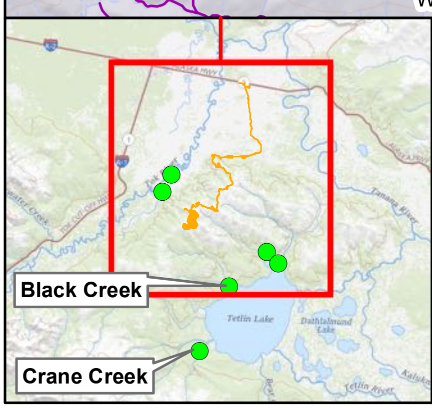
Fish Habitat

ABR conducted studies for the project in 2012-2013, 2015-2016, and 2018-2019 (ABR 2021b). During the summer of 2021, ABR (2021b) also completed minnow trapping, Hoop trapping, Fyke netting, and eDNA surveys at sample sites in the region.

The National Hydrography Dataset (NHD) does indicate a flowline crossing the Tetlin Village Road (Figure 16). Field inspections with ADF&G revealed there is no surface water, and the team reached the concurrence this habitat did not support fish.

ABR (2021b) found that the Proposed Action does not include disturbance of fish habitat. Waters flowing from the Tetlin Hills are first-order streams with high gradients, and only their lower portions (outside of the Proposed Action) are capable of providing fish habitat (ABR 2021b). Fish habitat does exist in the downstream watersheds, below the Proposed Action, and so baseline and impact analysis was conducted for these areas.





Manh Choh Project

- Fishing Locations
- eDNA Locations
- NHD Flowlines
- Transportation Corridor
- Proposed Action
- NHD Watersheds

0 1 2 3 Miles

N S E W

(At original document size of 8.5x11)
1:125,000 1 inch = 1.97 miles

Client	Peak Gold LLC
Project	Manh Choh Project
Figure	**Fish**
Figure Number	16

Sampling Results

Fish are present outside the Proposed Action but are not abundant at 2021 sampled locations (ABR 2021b). In the 2021 sampling effort, ABR completed 1,138.2 hours of fishing effort, a total of 21 individuals were captured for five species (i.e., Northern Pike, Longnose Sucker, Slimy Sculpin, Lake Chub, and Arctic Grayling). All 21 individual fish were captured at Grayling Creek, a tributary of the Tok River. 2021 eDNA studies showed evidence of Northern Pike at lower Black Creek. 2013 trapping also found fish at Lower Forest Creek.

Anadromous Waters

A review of the Alaska Department of Fish and Game (ADF&G) *Alaska Fish Resource Monitor* (ADF&G, 2021b; Parker 2009) and the NOAA Essential Fish Habitat (EFH) mapper (NOAA, 2021a) found the following information:

- The Tok River (Anadromous Waters Catalog [AWC] Code: 334-40-11000-2490-3660) is an anadromous fish stream. Coho salmon are documented as being present in the Tok River.
- The Tanana River (AWC Code: 334-40-11000-2490) is also an anadromous fish stream. Arctic lamprey, chum, coho, chinook, and sockeye salmon are documented to be present in the Tanana River.

Salmon run strength or other population characteristics are not available for the area of analysis. USFWS (2021c) and Parker (2009) qualitatively report that salmon returns are small.

Humpback whitefish

Humpback whitefish are one of the most important regional subsistence fish resources. Recent research has focused on documenting their movements (Brown, Lunderstadt, Schulz 2002, USFWS 2006, 2020b). Adult whitefish spend spring and early summer in regional lakes (e.g. Tetlin Lake), and then migrate to the Tanana River by late summer. In the fall, whitefish have congregated at one of two known spawning areas at the Nabesna and Chisana River. After spawning, whitefish overwinter in the Tanana River or Tetlin Lake.

Arctic Grayling

Arctic grayling are widespread throughout the waters of the region (Parker 2009), including Tetlin Lake (ADF&G undated). The Tok River system has a grayling population with well-documented seasonal movements and spawning grounds (Ridder 1995). This population appears to remain in the local Tok River drainage. Sport fishing opportunities are advertised for other area waters (ADF&G 2008), but little information exists for these populations.

Burbot

Burbot are distributed throughout the Tanana River, including in Tok and Tetlin area waters (Evenson 1988). Burbot migrate seasonally throughout the system. Two burbot spawning locations are reported in the Tetlin and Chisana Rivers (Evenson 1988). Burbot have also been captured for research in the Tanana River at the mouth of the Kalutna River, and where the Tanana River crosses the Alaska Highway (Mueller and Matz 2000).

Additional Species

Northern pike, rainbow trout, lake trout, and nongame species (e.g. Longnose Sucker, Slimy Sculpin, Lake Chub) are also present in the region. Northern pike are distributed throughout lakes managed as ‘Tok Area Lakes,’ and are also present in Tetlin Lake (Parker 2009, ADF&G undated). Distribution data for other species are not available, but sport fishing opportunities are advertised for some in waters throughout the system (i.e. rainbow trout in ADF&G 2008).

Arctic lamprey are also listed in the Tanana River by ADF&G (2021b), but no additional data is available on the species for the area of analysis.

3.4.3.3 No Action

Under the No Action alternative, impacts to fish would not occur, mineral exploration may continue to take place in the Tetlin Hills in accordance with current and future authorizations.

3.4.3.4 Proposed Action

No direct or indirect impacts are anticipated to fish habitat, anadromous waters, or fish species. Sampling of waters in the Proposed Action area has shown that they do not support fish. The only sampling which found fish was at Grayling Creek, a lower elevation waterbody.

The project was designed to avoid impacts to streams, and thus salmon, humpback whitefish, arctic grayling, burbot, Northern pike, rainbow trout, lake trout, and nongame species (e.g. Longnose Sucker, Slimy Sculpin, Lake Chub) and each species’ habitat.

The Proposed Action would result in no impacts to fish.

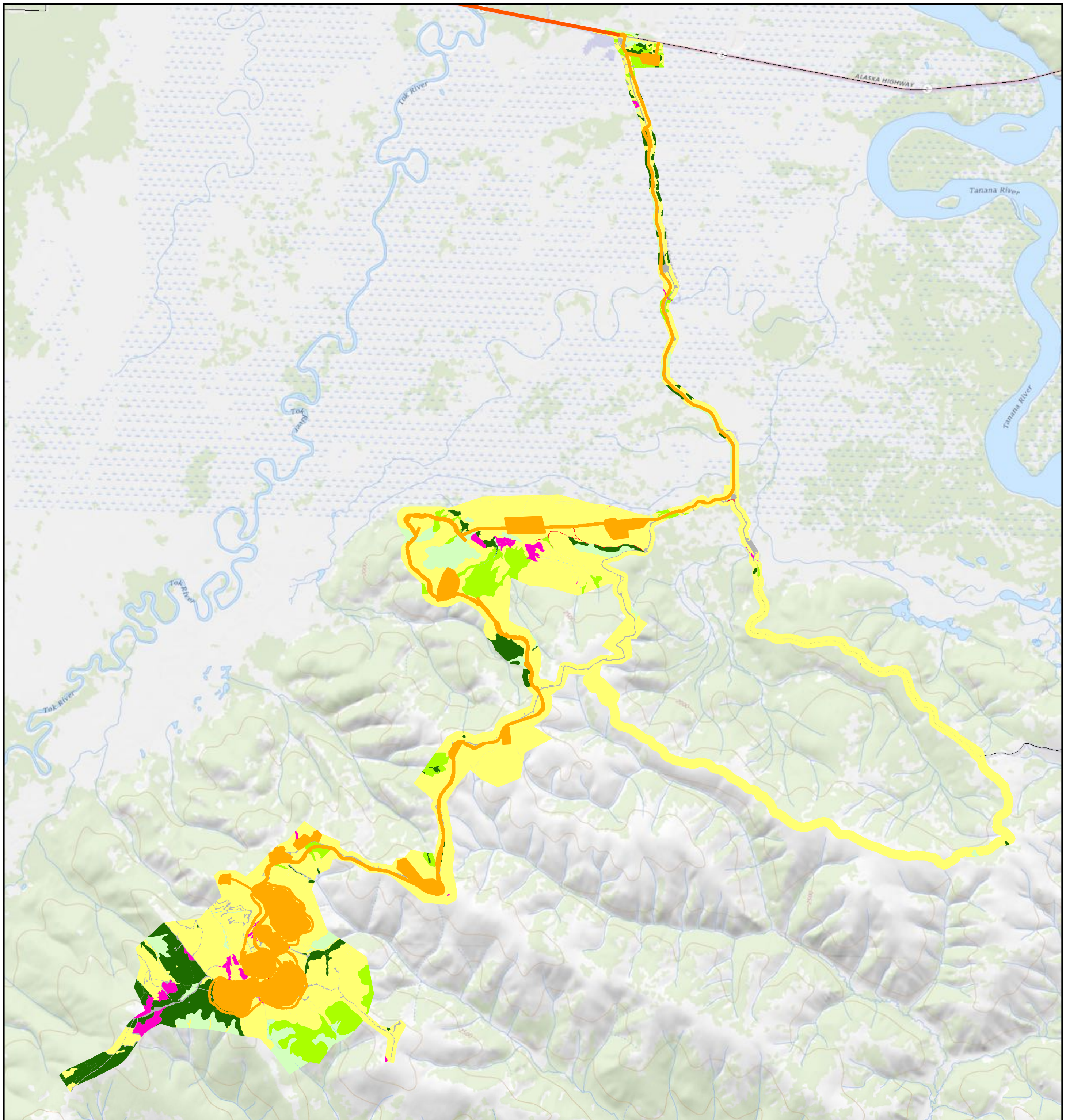
3.4.4 Birds

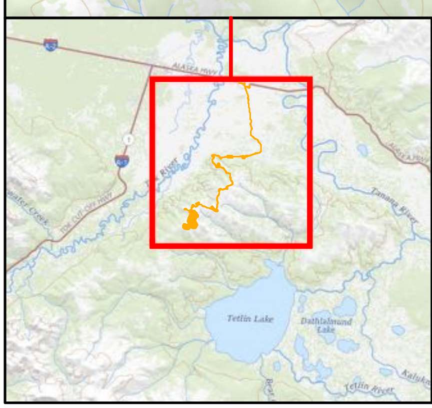
3.4.4.1 Area of Analysis

The area of analysis includes the proposed Manh Choh Mine, including the Tetlin Village Road. This area of analysis was chosen because it represents the area where the Proposed Action is most likely to affect the resource.

No impacts are anticipated on the highway transportation route to Fort Knox.

All activities at Fort Knox are under existing permits, and no new federal permitting actions are required at Fort Knox.





Manh Choh Project

Transportation Corridor

Proposed Action

Bird Habitat

- Spruce Forest
- Mixed Forest
- Broadleaf Forest
- Tall Shrub
- Low Shrub
- Partially Vegetated
- Barren
- Open Water

0 0.5 1 Miles

N W E S

(At original document size of 8.5x11)
1:90,000 1 inch = 1.42 miles

Client Peak Gold LLC

Project Manh Choh Project

Figure **Breeding Birds**

Figure Number

17

3.4.4.2 Affected Environment

The bird information and language below was provided by ABR (2021a, c).

Breeding Bird Surveys

In June 2021, a point count survey of breeding landbird and shorebird species was completed (ABR 2021a). Although the footprint has been altered over the summer of 2021 to avoid wetlands and cultural sites, the point count survey methodology was specifically constructed to allow for these types of changes. The point count survey results were correlated to project-specific bird habitat information (Partially Vegetated, Low Shrub, Tall Shrub, Broadleaf Forest, Mixed Forest, Spruce Forest; Table 19). This allows the impact section to describe the updated footprint.

The survey observed 38 bird species, including 3 species that were only detected incidentally while moving between survey points (ABR 2021a). All but 2 of the observed species were landbirds (i.e., songbirds, raptors, and other tree-dwelling or ground-feeding birds). Observations of shorebirds were limited to one Wilson’s Snipe and observations of waterbirds to one Trumpeter Swan (in flight over the study area). Of the 38 observed species, 18 occurred in both the proposed mine and project access road corridor areas, 19 occurred only in the mine area, and 1 occurred only in the mine access road corridor. The survey also observed dead remains of one additional species in the proposed mine area (Ruffed Grouse).

All species are well established breeders in Alaska except one—Yellow-bellied Flycatcher—which is considered rare in the state (Alaska Checklist Committee 2021). One Yellow-bellied Flycatcher was observed singing in dense, early successional Broadleaf Forest habitat in the western part of the mine area. The presence of this species in the Tetlin Hills and its affinity for Broadleaf Forest habitat is consistent with historical and recent observations of Yellow-bellied Flycatchers elsewhere in eastern Interior Alaska (ABR 2021a).

Breeding Bird Habitat Use

The average occurrence values for each sampled habitat provide a relative measure of the productivity of habitats for breeding birds (Table 19, ABR 2021a). For all species combined, average occurrence was lowest in Partially Vegetated habitats and highest in Spruce Forest (ABR 2021a).

Table 19 Average occurrence of birds by habitat type during point-count surveys [a]

Partially Vegetated	Low Shrub	Tall Shrub	Broadleaf Forest	Mixed Forest	Spruce Forest
0.250	4.667	5.176	4.970	5.636	6.333

[a] Average occurrence is the total number of birds detected in a focal habitat type divided by the number of points-counts conducted in each focal habitat type
*Apparent inconsistencies in sums are the result of rounding.

The habitat-specific average occurrence values also indicate the habitat affinities of the common species in the project area (for which there are larger sample sizes, ABR 2021a). For example, average occurrence of the most frequently detected species in the project area—Swainson's Thrush—was much higher in the three forest habitats than in Tall Shrub, and there were no observed Swainson's Thrushes in Low Shrub or Partially Vegetated habitats (ABR 2021a).

It is important to caution that some average occurrence values are based on a very limited number of observations made during a small number of point counts; average occurrence values are most reliable for common species in frequently sampled habitats (ABR 2021a).

Species of Conservation Concern

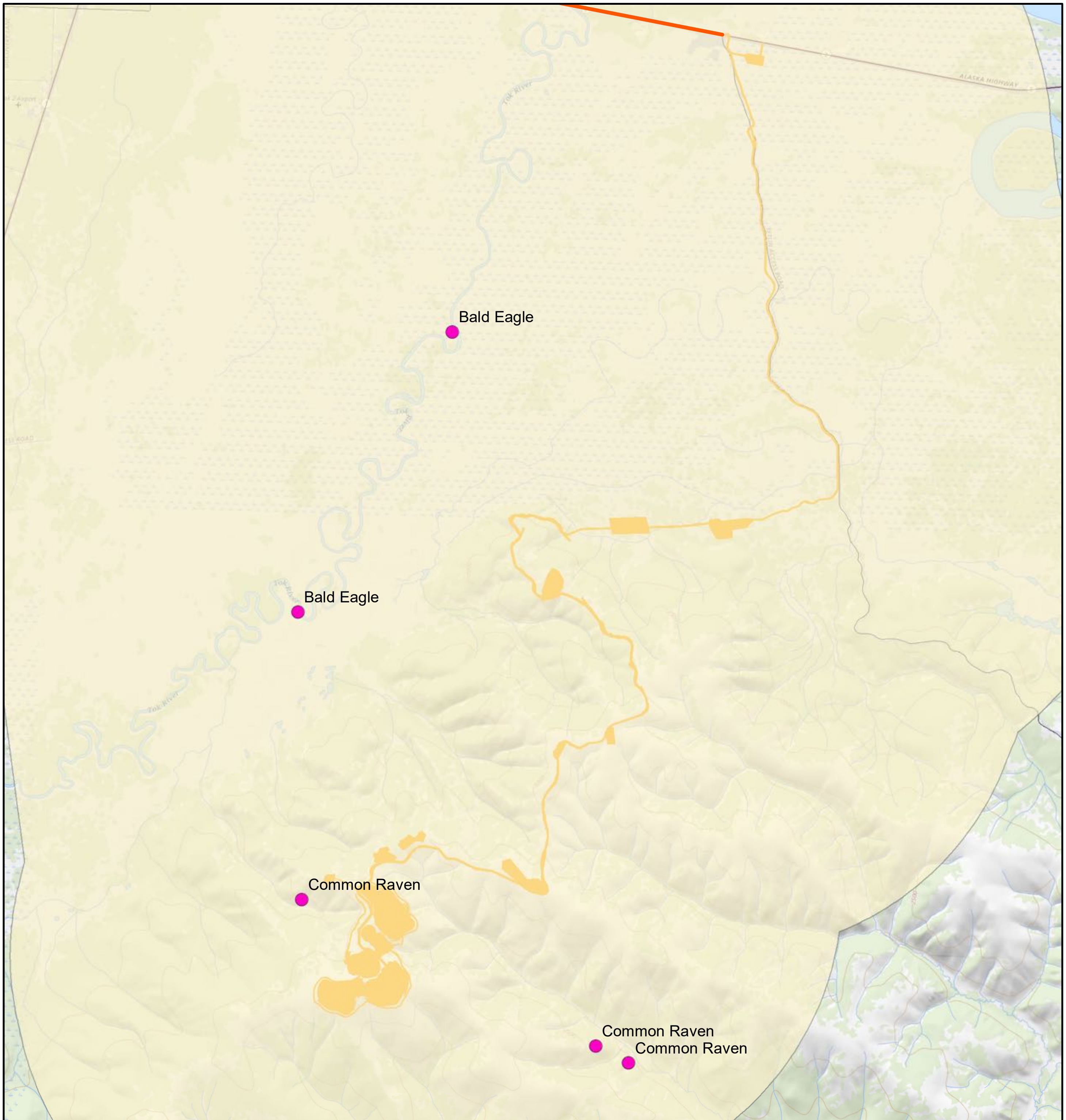
The study did not observe any federally or state-listed threatened or endangered species (ABR 2021a).

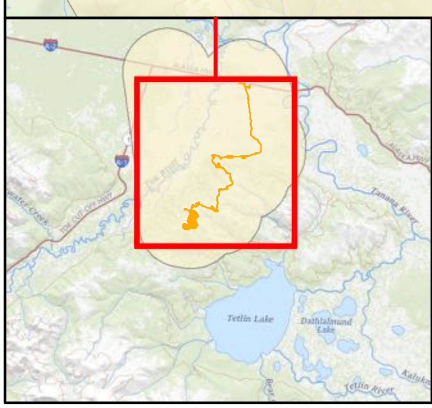
The Olive-sided Flycatcher is designated by the USFWS as a species of conservation concern in Bird Conservation Region 4 (BCR 4; Northwestern Interior Forest), which encompasses most of Interior Alaska (ABR 2021a). The Olive-sided Flycatcher was singing from a small patch of unburned Mixed Forest within the 2015 Tetlin Hills burn area, near the southwestern boundary of the mine area (ABR 2021a). The Tetlin Hills are within the breeding range of this species and appropriate breeding habitats are widely available, so it is likely that Olive-sided Flycatchers regularly occurs in small numbers in the Manh Choh project area (ABR 2021a).

The Short-eared Owl was not observed but is also a species of conservation concern and could occur in the area (ABR 2021a).

Raptor Nests

ABR (2021c) conducted a May 2021 raptor nest survey for a broad area surrounding, and including, the Proposed Action. The survey found 2 Bald Eagle Nests, and both were greater than 2 miles from the Proposed Action. The USFWS recommends that activities within 2 miles of Bald Eagle or Golden Eagle nests may require an incidental take permit (USFWS 2020a).





Manh Choh Project

Transportation Corridor

Raptor & Raven Nests

Raptor Survey Area

Proposed Action

0 0.5 1 Miles

N W E S

(At original document size of 8.5x11)
1:90,000 1 inch = 1.42 miles

Client Peak Gold LLC

Project Manh Choh Project

Figure **Raptor Nest**

Figure Number

18

During the raptor nest survey, ABR (2021c) also noted the presence of 3 common raven nests. These species are protected under the Migratory Bird Treaty Act (MBTA).

Waterfowl

No waterfowl nesting habitat was observed in the area of analysis during the wetland, vegetation, or bird surveys (ABR 2021a, c, Stantec 2021). Waterfowl nesting habitat is prevalent in the broader region outside of the area of interest, such as the Tetlin National Wildlife Refuge, which was established primarily due to its high waterfowl values. The Proposed Action specifically avoided impacts to potential waterfowl habitat.

3.4.4.3 No Action

Under the No Action alternative, impacts to birds would not occur, mineral exploration may continue to take place in the Tetlin Hills in accordance with current and future authorizations.

3.4.4.4 Proposed Action

The Proposed Action would remove breeding bird habitat by converting existing vegetation into infrastructure (Table 20). Some of this infrastructure would be reclaimed to provide bird habitat in the long term. The Proposed Action is surrounded by suitable undisturbed habitat for birds to use.

Table 20 Impacts to Bird Habitat

Bird Habitat	Impacts (Acres)	Clearing Buffer (Acres)	Study Area (Acres)	Impacts to Study Area (Percent)	Average Breeding Bird Occurrence
Spruce Forest	62.86	8.91	531.05	13.5%	6.333
Mixed Forest	12.98	6.67	359.60	5.5%	5.636
Broadleaf Forest	16.54	5.49	414.62	5.3%	4.970
Tall Shrub	761.72	98.55	4,475.04	19.2%	5.176
Low Shrub	23.70	0.79	121.62	20.1%	4.667
Partially Vegetated	1.26	1.53	6.79	40.9%	0.250
Open Water	0.07	0.00	3.55	2.0%	-
Barren	49.76	14.08	185.29	34.5%	-
Total	**928.87**	**136.01**	**6,097.58**	**17.5%**	**-**

Note: Bird Habitat to Vegetation Type Classification:
Spruce Forest: Open Black Spruce Forest, White Spruce Woodland, Open White Spruce Forest, Black Spruce Woodland, Closed Black Spruce Forest
Mixed Forest: Open Mixed Forest, Closed Mixed Forest, Woodland Mixed Forest
Broadleaf Forest: Closed Deciduous Forest, Open Deciduous Forest
Tall Shrub: Deciduous Shrub and Sapling Regrowth, Closed Tall Alder Shrub, Open Tall Willow Shrub, Closed Tall Alder Willow Shrub, Open Tall Alder Willow Shrub, Closed Tall Willow Shrub, Open Alder Willow Shrub

Low Shrub: Open Low Willow Shrub, Low Shrub Tundra, Open Mixed Shrub Sedge Tundra, Mesic Herbaceous, Wet Herbaceous

*Apparent inconsistencies in sums are the result of rounding.

Indirect impacts include behavioral, injury, and increased human hunting and subsistence pressure. Behavioral impacts can be generated from noise, barriers to movement, and attractants (e.g. waste). Injury can take place from vehicle collisions. Noise and migration impacts are anticipated to be negligible, given the small area of potential impacts and wide area of landscape available for birds to move to. The project will implement best management practices to limit and manage potential attractants. Only negligible increases in impacts from vehicle collisions are anticipated with the speed limits and traffic controls planned for the project.

Vegetation clearing for the project would follow the USFWS recommended time periods to avoid impacts to nesting birds for the region (USFWS 2021b).

The Proposed Action would result in a negligible, long-term, localized impacts to bird habitat.

Species of Conservation Concern

Two species of conservation concern may occur in the area, the Olive-sided fly catcher, and the Short-eared Owl. The Yellow-bellied Flycatcher is also considered a rare breeder and was also observed. All three species may occur in the region and are expected to utilize the surrounding undisturbed habitat surrounding the Proposed Action.

The Proposed Action would result in a negligible, long-term, localized impacts to species of conservation concern.

Raptor Nests

ABR (2021c) found that Bald Eagle and Golden Eagle nests were sufficiently distant from the Proposed Action to have no potential incidental take.

ABR (2021c) found that two of the three raven nests are sufficiently distant from the Proposed Action to not experience incidental take. One raven nest is close enough to the Proposed Action to consider implementing avoidance, minimization, and mitigation measures, which will be developed in compliance with USFWS guidance.

The Proposed Action would result in a negligible, temporary, localized impacts to raptor and raven nests.

Waterfowl

No waterfowl habitat has been observed in the Proposed Action. No impacts are anticipated to waterfowl habitat.

No pit lakes or similar open water habitat that may attract waterfowl will be developed under the Proposed Action. A small brine storage pool, and a sump at the North Pit, are anticipated to be created. These will be constructed to prevent entry from waterfowl, bird, and any other wildlife.

The Proposed Action would result in a negligible, temporary, localized impacts to waterfowl.

3.4.5 Wildlife

3.4.5.1 Area of Analysis

The area of analysis includes the proposed Manh Choh Mine, including the Tetlin Village Road. This area of analysis was chosen because it represents the area where the Proposed Action is most likely to affect the resource.

No impacts are anticipated on the highway transportation route to Fort Knox.

All activities at Fort Knox are under existing permits, and no new federal permitting actions are required at Fort Knox.

3.4.5.2 Affected Environment

Wildlife Habitat

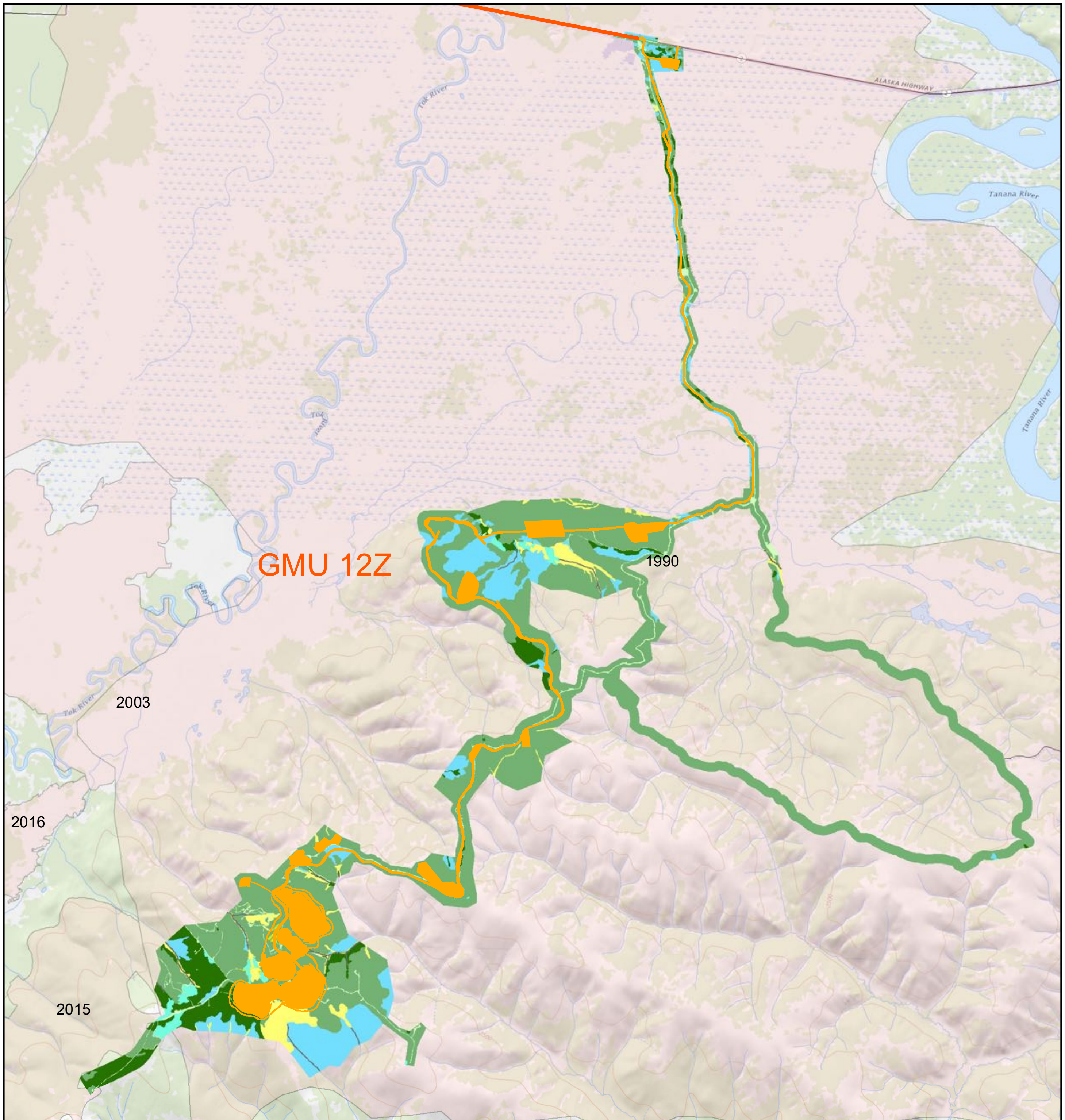
The area of analysis is potential wildlife habitat within the boundary of proposed surface disturbance of the Proposed Action, and includes previous human disturbance, including the Tetlin Village Road and existing mineral exploration infrastructure. This landscape includes the Tetlin Hills, and the drainages of the Tok and Tanana Rivers. Elevations range from 1,500 to 3,500 feet.

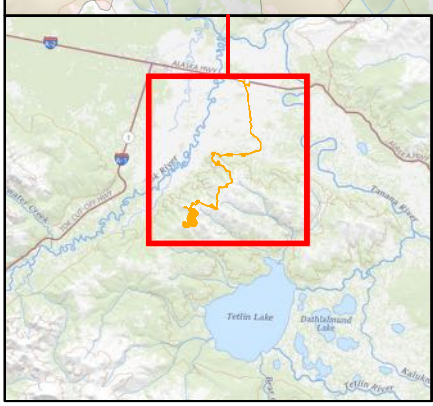
Approximately 41 species of mammals may occur in eastern Interior Alaska (ABR 2021d). Of these, moose and caribou are the most important subsistence species. Black bear, brown bear, wolves, and Dall sheep are also discussed below, due to general public interest. Many of the remaining animals are furbearers or small mammals. Furbearers support trapping, which has further analysis in the Recreation chapter. Impacts to furbearers and small mammals are expected to be similar to impacts for the larger keystone species (e.g. moose, caribou).

ADF&G manages wildlife habitat in the area of analysis under Game Management Unit 12 (GMU 12).

Moose

Moose are present throughout the area of analysis, and the best population estimates developed by ADF&G are considered part of the “northwestern survey area” of GMU 12 (ABR 2021d, Wells 2018a). Estimated moose densities in the area of analysis were consistently higher than the larger “northwestern survey area” (ABR 2021d). The estimate for moose density in the area of analysis ranged from 1.27–2.02 moose per square mile (ABR 2021d). Moose populations also vary throughout time. ABR (2021d) reports that it was high during the 1950s through the mid-1960s, declined rapidly during the mid-1960s through mid-1970s, and increased during the 1980s and 1990s. There has been a significant increase in moose estimated population between 2003 and 2017 (ABR 2021d). Annual average harvest estimates were 133 moose per year between 2010 and 2014 (Wells 2018a).





Manh Choh Project

Proposed Action

GMU Subunits

Vegetation

- Deciduous Shrub and Sapling Regrowth
- Spruce
- Deciduous and Mixed
- Willow and Alder
- Tundra
- Herbaceous
- Barren
- Open Water
- Wildfire

0 0.5 1 Miles

N W E S

(At original document size of 8.5x11)
1:90,000 1 inch = 1.42 miles

Client Peak Gold LLC

Project Manh Choh Project

Figure **Wildlife**

Figure Number

19

Moose are likely to exhibit seasonal movement inside the area of analysis (ABR 2021d). The Tok River corridor, outside of the area of analysis, is recognized by ADF&G as important moose habitat (Wells 2018a). Moose winter in the lower Tok River valley and use the upper Tok River valley for spring calving and fall rutting (Wells 2018a). Moose are anticipated to winter in the lower Tok River valley, and lower portions of the area of analysis, and they may summer at higher elevations (ABR 2021d).

In 1990, the Tok River wildfire burned habitat in the Tetlin Hills, and lower Tok River valley. This improved moose habitat quality and moose density (Wells 2018a). Studies have found that burned habitat in Interior Alaska support some of the highest densities of moose (ABR 2021d, Maier et al. 2005). This high-quality habitat is expected to last through 2028, until stand maturity will reduce the quality of moose browse (Wells 2018a). The State has begun to conduct habitat enhancement to promote moose habitat, on previously burned areas on State owned land southeast of Tok, between Tok and Tetlin owned lands (Wells 2018a). Subsequent 2003 and 2015 wildfires in the Tetlin Hills have likely further improved moose habitat in those areas.

ADF&G reports that potlatch harvesting of moose along the road system tends to be underreported. These harvests take a higher proportion of females than sport hunting and may lead to localized population depressions near the road system, where potlatch harvesting tends to be the most prevalent (Wells 2018a).

Caribou

Multiple caribou herds occur in the area around Tok (ABR 2021d), but the area of analysis is anticipated to be most likely used by the Nelchina caribou herd or the Mentasta caribou herd (ABR 2021d). The other two nearby caribou herds are the Chisana and Macomb.

The Nelchina herd is the largest herd which seasonally occupies the area. This herd had a 2012 fall herd estimate of 50,646, and 2013 fall herd estimate of 37,257 (the difference between the two is attributed to poor survey conditions and not actual reductions in population [Harper and McCarthy 2015b]). In 2016 the herd was estimated at 47,000 animals (ABR 2021d). In August 2020, the fall herd was estimated at 44,500 caribou (ADF&G 2020b). Calf recruitment is the primary determinant of herd size, with snow, range conditions, and predator densities the primary determinants for calf survival. The herd is actively managed, with predator control and liberalized hunting during periods of high population.

ABR (2021d) estimates that caribou are most likely to occur in the area of analysis during spring or fall migration or during winter. ABR (2021d) also notes that caribou avoid areas of recent wildfires (<50 years old), which may further limit the use of the area of analysis.

The Nelchina herd is an important sport and subsistence hunting resource, with a range that crosses major regional highways (e.g., Richardson, Tok Cutoff, Alaska Highway). Spring calving, summer feeding, and fall rutting occur west of the area of analysis. The Nelchina herd wintering range spans a large area including the Richardson Highway, Taylor Highway, and Fortymile River; and includes the area of analysis. Caribou occupation of specific locations inside the wintering range varies from year to year, in response to habitat quality and herd size (Harper and McCarthy 2015b).

The Mentasta herd's range includes the area of analysis (Hatcher 2020). The herd traditionally spends the spring and summer south of the area of analysis, in Wrangell St. Elias National Park and Preserve (ABR 2021d). Wintering strategies differ but include dispersal in and through the area of analysis (Hatcher 2020). Population estimates have been at a maximum of 3,160 in 1987 to a low of 261 in 2005. The herd has grown recently with 2013 and 2017 fall abundance estimates of 512 and 429, respectively (Hatcher 2020). Studies to identify if herd decline was due to range condition have had flaws in methodology, but some authors found no evidence of caribou impacting vegetation growth (Hatcher 2020). Jenkins and Barten (2005) conclude population growth was limited due to predation on calves (ABR 2021d).

Other caribou herds reside near, but outside of the area of analysis. The Chisana herd is a woodland caribou herd, and typically maintains a range between Alaska and Canada, outside of the area of analysis (Harper and McCarthy 2015b). Presence in the area is considered to be negligible. The herd experienced a 60% population decline between 1988 – 2005, primarily from adverse weather and predation (Harper and McCarthy 2015b). The 2011 – 2013 population estimate is currently 701 individuals.

The Macomb caribou herd resides west of the project, with the southern border being the Tok Cutoff (Schmidt 2021). The Fortymile herd resides north of the project, above the Alaska Highway (Harper and McCarthy 2015b). Neither population is anticipated to occur in the area of analysis.

Black Bear

Black bear can be found throughout the entire area of analysis. Population estimates and density have not been developed but ADF&G applies estimates from other Game Management Units for this area. Those estimates are 12 – 19 black bears per square mile (Harper and McCarthy 2014). ADF&G states that black bears prefer forested habitats (ABR 2021d), and that black bear use declined in the forests burned in the 1990 Tok River fire, with bears beginning to return by 1994, and bears throughout the area by 1997 (Harper and McCarthy 2014). Home ranges for black bears in the area are estimated to be 16 square miles for an adult female, 3 square miles for a subadult male, and 63 square miles for an adult male. ADF&G estimates half of GMU 12 has habitat suitable for black bears (Harper and McCarthy 2014).

Grizzly/Brown Bear

Grizzly/brown bears can be found throughout the entire area of analysis. ADF&G does not provide estimates for the area, but brown bear densities in the area are expected to be approximately 47 bears per thousand square miles (ABR 2021d, Harper and McCarthy 2015a). Brown bears in the area of analysis do not benefit from the reliable seasonal salmon runs that are present in other parts of Alaska. Similar to black bears, brown bears avoid freshly burned areas, but benefit in the long run from increased regrowth and habitat diversity (Harper and McCarthy 2015a).

Wolves

Wolves occur throughout the area of analysis. ADF&G has designated a predator control area outside of the area of analysis; north of the Alaska Highway, extending into neighboring Game Management Units.

Wolf surveys are limited to this predator control area (ABR 2021d, Gross 2021). The predator control area comprises 194 of the 9,978 square miles of GMU 12. Predator control on wolves is used to manipulate wolf populations to enhance other resources, such as caribou and moose (Gross 2021). ADF&G estimates that in spring 2008 GMU 12 had 179 – 192 wolves in 31 packs (18.1-19.4 wolves per thousand square miles, ABR 2021d, Gross 2021). ADF&G does not believe the population has changed significantly since then, except for inside the predator control area.

Dall sheep

Dall sheep occupy the mountains west of the Tok Cutoff and the mountains surrounding Nabesna, 30 miles south of the Tetlin Hills (Wells 2018b, 2019). The ADF&G and ABR (2021d) does not report Dall sheep occurring in the area of analysis. For this reason, no impacts are anticipated to Dall sheep, and they are excluded from further analysis.

3.4.5.3 No Action

Under the No Action alternative, impacts to wildlife would not occur, mineral exploration may continue to take place in the Tetlin Hills in accordance with current and future authorizations.

3.4.5.4 Proposed Action

Wildlife Habitat

The Proposed Action would remove wildlife habitat by converting existing vegetation into infrastructure. The impacts to wildlife habitat are the same as the impacts to vegetation. The Proposed Action is surrounded by suitable undisturbed habitat for wildlife to use, and the impacts would be negligible.

The Proposed Action would result in a negligible, long-term, localized impacts to wildlife habitat.

Wildlife

No direct impact will occur to moose, caribou, black bear, brown bear, wolves, or other wildlife species. Potential habitat will be reduced, but the Proposed Action is surrounded by suitable undisturbed habitat for wildlife to use.

The project avoided important lowland moose habitat surrounding the Tok River. Moose may avoid the immediate Manh Choh area during construction and/or operations, but moose quickly become habituated to human presence. Any impacts to moose due to the Proposed Action will be negligible.

Individuals from two caribou herds may be present seasonally. Caribou avoid areas of recent wildfire, which indicates they may naturally avoid the Proposed Action (ABR 2021d). The project also avoids seasonal migration routes for caribou. Any avoidance of the area by caribou due to the Proposed Action will be negligible.

No impacts will occur to Dall sheep because they are not known to occur in the Area of Analysis.

Indirect impacts to wildlife are similar to birds, described above. Potential impacts include changes to behavior, injury/mortality, and increased human hunting and subsistence. Behavioral impacts can be generated from noise, barriers to movement, and attractants (e.g. waste). No migratory routes have been identified in the area. The project was designed to follow the existing Tetlin Village Road corridor and much of the current access roads to minimize potential impacts to wildlife. Noise will cause wildlife to avoid the immediate area but will be negligible given the abundant habitat available surrounding the project. The project will also implement best management practices to limit and manage potential attractants. Negligible increases in impacts from vehicle collisions are anticipated with the speed limits and traffic controls planned for the project.

A wildlife interaction plan will be developed and implemented to avoid, minimize, and mitigate potential impacts to wildlife. This will include management of food waste, which historically has proven to be an attractant to wildlife in Alaska.

The Proposed Action would result in a negligible, long-term, localized impacts to wildlife habitat.

3.5 SOCIAL AND ECONOMIC ENVIRONMENT

3.5.1 Subsistence

3.5.1.1 Area of Analysis

The area of analysis includes the Tetlin, Northway, Tok, and Tanacross subsistence use areas (Figure 20). The area of analysis also borders Mentasta Lake subsistence use areas. This area of analysis was chosen because it represents the area where the Proposed Action is most likely to affect the resource.

No impacts are anticipated on the highway transportation route to Fort Knox.

All activities at Fort Knox are under existing permits, and no new federal permitting actions are required at Fort Knox.

3.5.1.2 Affected Environment

This analysis is based on historic data. Current data of subsistence practices involves personal interviews of subsistence users. This has been severely hampered by successive waves of Covid-19 moving through these communities over the past 2 years.

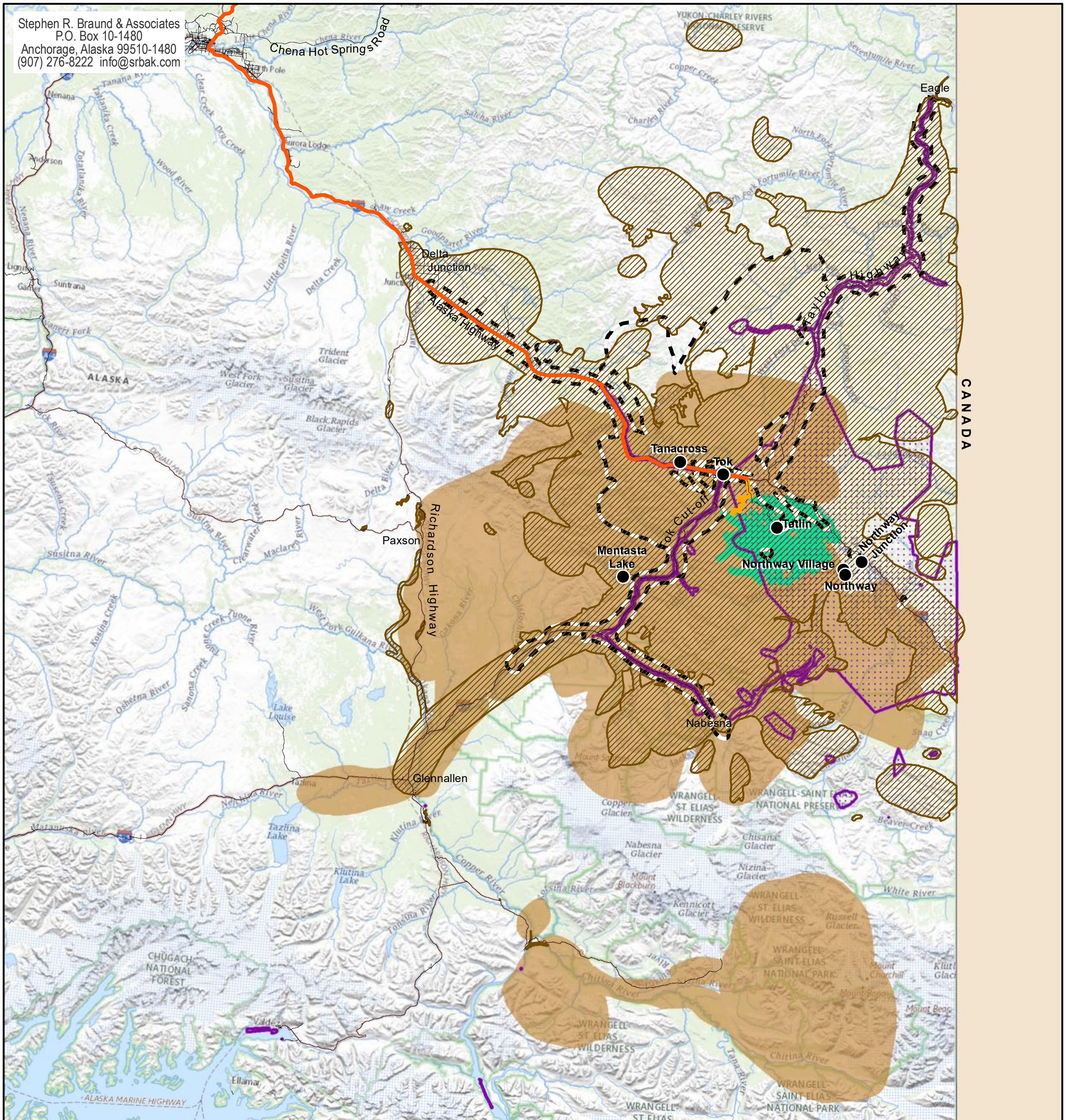
The following language was developed by Braund (2021).

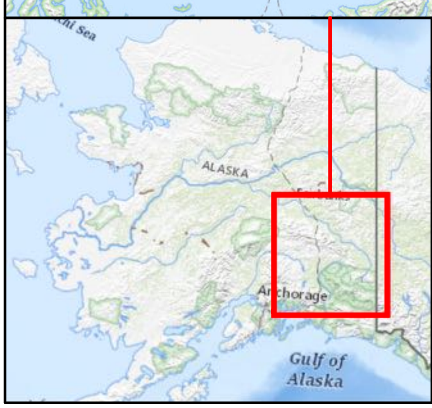
Braund (2021) found that the area hosts traditional Athabascan communities, which traditionally relied on a high degree of movement to engage in subsistence activities though the year. The communities today rely on caribou, moose, fish, small land mammals, birds, and berries and plants for their subsistence harvests (Braund 2021).

Tetlin

Braund (2021) reports the bulk of the community's subsistence harvest is comprised of non-salmon fish and large land mammals, which on average, have comprised more than 90 percent of the community's harvest. Whitefish are by far the most common non-salmon fish harvested by local residents, and whitefish harvests over all study years have averaged nearly half of the subsistence harvest (Braund 2021). Moose is the most common large land mammal harvested, providing nearly a third of the community's harvest on average (Braund 2021). Other resources that contribute to the overall harvest include small land mammals (notably muskrat), migratory birds, and vegetation (primarily berries) (Braund 2021).

Braund (2021) reports that the Proposed Action does not overlap with the Tetlin subsistence use areas.





Manh Choh Project

- Mentasta Lake and Mentasta Pass
- Northway
- Tanacross
- Tetlin
- Tok
- Study Communities
- Transportation Corridor
- Proposed Action

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1:2,350,000 1 inch = 37.09 miles

N W E S

Client Peak Gold, LLC

Project Manh Choh Project

Figure **Subsistence**

Figure Number

20

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Northway

Braund (2021) reports the majority of Northway's subsistence harvest (nearly 75 percent) is comprised of non-salmon fish and large land mammals. Salmon and small land mammals also contribute just over 17 percent of the harvest (Braund 2021). Whitefish and moose contribute approximately one-third and one-quarter of all subsistence harvest in Northway, with sockeye salmon the next most harvested at just over five percent of the harvest (Braund 2021). Other important resources that contribute to the overall harvest include hare, caribou, blueberries, coho salmon, muskrat, and a variety of other small land mammals, migratory birds, and berries (Braund 2021).

Braund (2021) reports that the Proposed Action does overlap with the reported Northway subsistence use areas. The report also notes that Northway drew their subsistence use areas in less than explicit ways due to residents' reluctance to identify prime hunting areas due to competition with nonlocal hunters and complex land ownership boundaries (Braund 2021).

Tok

Braund (2021) reports Tok's harvests are more widely distributed across resource categories than that of Tetlin or Northway, with the majority of harvests coming from large land mammals (59.7 percent), followed by salmon (24.5 percent), and non-salmon fish (17.3 percent). Moose contributes over one-third of the harvest followed by caribou and sockeye salmon at approximately 12 percent each (Braund 2021). Other important resources that contribute to the overall harvest include whitefish, other salmon species, berries, several species of non-salmon fish, hare, grouse, and black bear (Braund 2021).

Braund (2021) reports that the Proposed Action does overlap with the reported Tok subsistence use areas. The report also notes that Tok's subsistence use areas are far larger than other communities in the area (Braund 2021).

Tanacross

Braund (2021) reports that Tanacross' subsistence harvest is comprised of nearly equal portions of large land mammal and non-salmon fish and make up three quarters of the entire harvest. Moose and whitefish are the primary species harvested within these resource categories (Braund 2021). Other important resources that contribute to the overall harvest include coho salmon, northern pike, caribou, hare, berries, and several other species of salmon and non-salmon fish (Braund 2021).

Braund (2021) reports that the Proposed Action does overlap with the reported Tanacross subsistence use area, right at the junction of the Tetlin Village Road with the Alaska Highway.

Mentasta Lake

Braund (2021) reports that on average, large land mammals contribute just over half of the community's total harvest followed by salmon (21.2 percent) and non-salmon fish (11.9 percent). Moose followed by caribou are the top two large land mammals harvested with sockeye salmon and whitefish representing the most common fish species (Braund 2021). Moose alone provides over one-third of the total harvest

(Braund 2021). Other resources that contribute to the overall harvest include small land mammals (notably hare) and vegetation (primarily berries) (Braund 2021).

Braund (2021) reports that the Proposed Action does overlap with the reported 'lifetime' Mentasta Lake subsistence use areas. Braund (2021) notes that the Mentasta Pass use areas are so large because respondents in 2010 were uncomfortable with only showing a single year of use areas and decided to provide their "lifetime" use areas. Furthermore, several households reported large use areas due to the reliance on privately owned or charter airplanes (Braund 2021).

3.5.1.3 No Action

Under the No Action alternative, impacts to would not occur, mineral exploration may continue to take place in the Tetlin Hills in accordance with current and future authorizations.

3.5.1.4 Proposed Action

The analysis of impacts to the subsistence species themselves are discussed in their respective Biological Environment sections. Negligible impacts are anticipated to wetlands, vegetation, fish, birds, or wildlife.

The Proposed Action would directly and indirectly remove potential subsistence habitat by converting existing habitat into infrastructure. These impacts to habitat are summarized in the Biological Environment sections.

The Proposed Action's impacts to subsistence use areas are summarized by community below.

- Tetlin has not identified the Proposed Action as significantly impacting subsistence use areas.
- Tanacross has identified the only potential impact at the intersection of the Tetlin Village Road and the Alaska Highway. This area already hosts a road corridor, and no significant changes to subsistence are anticipated from the Proposed Action.
- The Proposed Action does overlap with the regions of use identified by Northway, Tok, and Mentasta Lake. These communities did not provide explicit subsistence use areas, instead providing regional areas of use due to privacy concerns. In each case, the Proposed Action is on the periphery of these identified subsistence use regions in Braund (2021).

No subsistence impacts are anticipated to users from Tetlin or Tanacross.

The subsistence impacts to Northway, Tok, and Mentasta Lake are anticipated to be negligible. The land of the Proposed Action is owned by Tetlin. Access to use Tetlin's land would require obtaining a permit. The identified areas are also generalized regions, focusing on the adjacent highway and river corridors. The Proposed Action is located on the periphery of these regions and does not host any known concentrations of subsistence resources. No significant impact is anticipated to these community's users.

Subsistence activities are anticipated to continue to take place surrounding the Proposed Action. The Proposed Action is surrounded by suitable undisturbed habitat, which will continue to support subsistence activities.

A Subsistence Advisory Committee is being established to review all of the Proposed Action throughout the life of the project, and provide active management to avoid, minimize, and mitigate potential impacts to subsistence.

The Proposed Action has also hired local residents to act as public liaisons between the Proposed Action and the local community.

The Proposed Action would result in a negligible, long-term, localized impacts to subsistence species.

3.5.2 Cultural Resources

3.5.2.1 Area of Analysis

The area of analysis for cultural resources includes the proposed project boundary of surface disturbance in the vicinity of the Tetlin Hills. This area of analysis was chosen because it represents the area where the Proposed Action is most likely to affect cultural resources.

No impacts are anticipated on the highway transportation route to Fort Knox.

All activities at Fort Knox are under existing permits, and no new federal permitting actions are required at Fort Knox.

3.5.2.2 Affected Environment

Cultural resources analysis was conducted by Higgs Research and Consulting LLC (HRC 2021). Cultural resource information is not public, and so baseline and impact analysis are summaries. Interested parties can contact the State Historic Preservation Officer (SHPO) for more detailed information.

HRC (2021) surveyed the proposed mine development area in the Tetlin Hills, and the corridors of new and existing infrastructure in the Tetlin Hills (e.g. project access roads, proposed mine camp area). A Phase I pedestrian ground survey was conducted in May and June 2021 to identify high to moderate potential landforms for an intensified Phase II survey and archaeological testing in June and July 2021.

No historic-age buildings or historic sites were found. Seven prehistoric archaeological sites were identified and further evaluated during Phase II testing (HRC 2021) (Table 21). Based on the Phase II testing and subsequent data analysis, HRC is recommending that five of the seven sites meet federal archaeological site significance criteria making them eligible for listing on the National Register of Historic Places (NRHP). The five eligible sites retain integrity and important archaeological information relevant to understanding the past land use patterns by prehistoric peoples and the development of Native Alaskan culture in the Upper Tanana River region. For two of the seven sites, HRC is recommending that they lack significance or integrity to meet NRHP eligibility criteria.

The location of the Twin Road, adjacent to the Tetlin Village Road has not been surveyed by a pedestrian survey, due to the recent addition (Winter 2021) of this project element at the request of Tetlin. This survey will be conducted in 2022 and permitted in accordance with SHPO requests.

3.5.2.3 No Action

Under the No Action alternative, impacts to cultural resources would not occur, mineral exploration may continue to take place in the Tetlin Hills in accordance with current and future authorizations.

3.5.2.4 Proposed Action

The Proposed Action is likely to have an unavoidable adverse impact on one archaeological site (TNX-00270) that is recommended for NRHP eligibility (HRC 2021).

TNX-00270 is located at the highest outcrop in the western Tetlin Hills. The outcrop has a view of the surrounding terrain, is the location of a US Geodetic Survey monument, and is associated with an Upper Tanana Athabascan place name. Shovel testing at this multicomponent site found both surface and subsurface prehistoric stone tool making material in at least three distinct activity areas. The prehistoric artifacts suggest short-term habitation events, and the refurbishing of stone tools while waiting for game to hunt, seen from this lookout. Historic-age surface features and 1940s artifacts are likely associated with USGS use of the site, but there are also recent features and scattered surface artifacts associated with late-20th and 21st century hunting.

HRC (2021) recommends that within a consultation framework involving Tetlin (landowner and stakeholder), Phase III mitigation plans will need to be developed for the NRHP eligible archaeological site (TNX-270) that will be adversely affected by the Manh Choh Project. This archaeological resource is important because of what can be learned by data recovery and has minimal value for preservation in place; therefore, mitigation may include data recovery and additional documentation.

The four other NRHP eligible archaeological sites can either be avoided (with no effect) or have no potential project effect (HRC 2021). Monitoring construction activities is recommended to avoid potential project construction-related damage to the four NRHP eligible archaeological sites. There are no historic buildings or historic districts that would directly or indirectly be impacted by the project.

Any potential impacts would be minor, permanent, and localized.

Table 21 Impacts to Cultural Resources

AHRS No.	Site Description	NRHP Eligibility Recommendation	Potential Project Effect
TNX-00270	Prehistoric/historic site with surface and subsurface material	Eligible	Destruction; Adverse effect
TNX-00271	Prehistoric site with two surface artifacts, no features or subsurface cultural deposits	Not eligible; lacks significance and integrity	None
TNX-00272	Heavily disturbed small prehistoric site with minimal surface and subsurface artifacts	Not eligible; lacks significance and integrity	None
TNX-00273	Prehistoric site with stratified subsurface material	Eligible	Avoidance; No effect
TNX-00274	Prehistoric site with stratified subsurface material	Eligible	Avoidance; No effect
TNX-00275	Prehistoric site with stratified subsurface material	Eligible	Avoidance; No effect
TNX-00276	Prehistoric site with surface features having stratified and dated subsurface deposits	Eligible	Avoidance; No effect

3.5.3 Land Use

3.5.3.1 Area of Analysis

The area of analysis includes the Manh Choh Mine (Figure 21). This area of analysis was chosen because it represents the area where the Proposed Action is most likely to affect the resource.

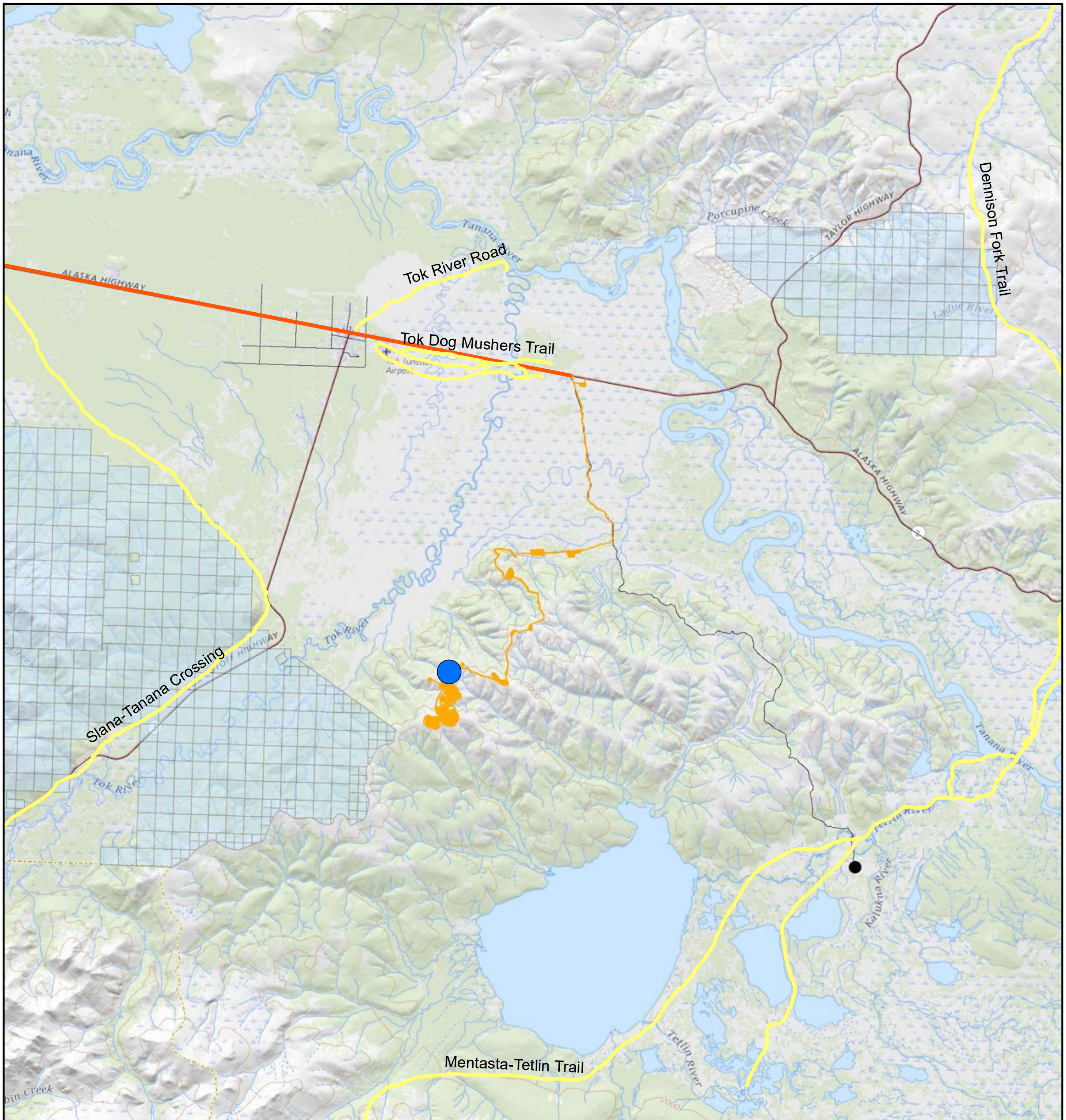
No impacts are anticipated on the highway transportation route to Fort Knox.

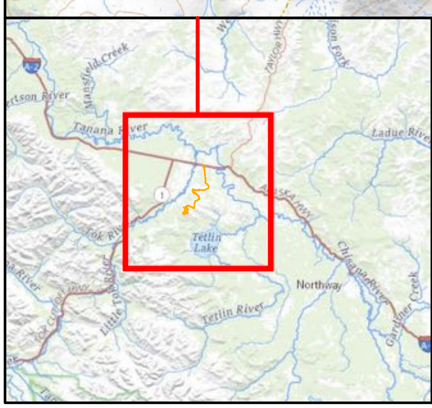
All activities at Fort Knox are under existing permits, and no new federal permitting actions are required at Fort Knox.

3.5.3.2 Affected Environment

The Tetlin Hills portion of the project is located on land owned by Tetlin. Tetlin is a federally recognized tribe.

Tetlin is not associated with any regional Alaska Native Corporation. In general, subsurface rights went to regional Alaska Native Corporations. Due to Tetlin's special status, they have retained ownership of the subsurface mineral rights. Tetlin has had a mineral exploration program in place in the Tetlin Hills since 2008.





Manh Choh Project

- Temporary Water Use Authorization
- RS2477
- State Mining Claims
- Transportation Corridor
- Proposed Action

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1:250,000 1 inch = 3.95 miles

Client Peak Gold LLC

Project Manh Choh Project

Figure **Land Use**

Figure Number

21

The Tetlin community land use plan; Tetlin Community Plan 2020 (Native Village of Tetlin 2020) states, in part:

- *Environment/Land Use Goal: To protect, respect and utilize the land.*
  - *Priority:*
    - *Create Natural Resource Department within the Native Village of Tetlin Administration to address the concerns of Tetlin Tribal Members and promote the protection of the Tetlin Tribal Lands.*
  - *Action Plan*
    - *Create Land-Use Management Plan for Tetlin Tribal Lands.*
    - *Begin Baseline testing for water, Soil and Air on Tetlin Tribal Lands; there is a need for a baseline study and findings.*
    - *Upgrade Tribal Regulations and monitoring for hunting, fishing, trapping, and natural resources on Tetlin Tribal Lands.*

The 2020 Tetlin Community Plan (Native Village of Tetlin 2020) also states:

> *In 2008, Tetlin started working with Juneau Exploration, based out of Texas, to do mining exploration on Tetlin Tribal Lands. Contango Ore has over the past several years, provided season employment for 10-30 tribal members. In 2015, the Contango Ore announced that they have partnered up with Royal Gold now called Peak Gold, LLC.*

The Bureau of Land Management (BLM) database states that all of the land surface and subsurface rights in the Tetlin Hills portion of the proposed action was transferred to the Tetlin Village Corporation circa 1981 (BLM 2021). The latest planning documents state that there was a land transfer in 1998 from the Tetlin Village Corporation to the Native Village of Tetlin, and the surface and subsurface is currently owned by the Native Village of Tetlin (Native Village of Tetlin 2020).

There are no 17(b) easements in the Tetlin Hills portion of the Proposed Action (BLM 2021).

No land use authorizations are on file with the BLM.

Two existing land use authorizations are on file with the State of Alaska and are summarized below (Table 22).

Table 22 Land Use Authorizations

Serial Number	Grantee	Case Number	Description	Location within Area of Analysis		
				Township	Range	Section
Water Right	Tetlin Village Council	ADL 76060	Drilled well 56 feet deep.	16N	15E	26
Temporary Water Use Authorization	Peak Gold, LLC	TWUA F2020-093	Drilled well 800 feet deep. Use of 12,000 gallons per day for mineral exploration activities.	16N	13E	2

Sources: ADNR 2021a, ADNR 2021c

RS2477 right of ways protect public access to lands. The Tetlin Hills portion of the project is in the vicinity, but does not impact, three RS2477 right of ways (Table 23).

Table 23 RS2477 Rights of Way

Name	Number
Tok River Road	233
Tok Dog Mushers Trail	1759
Slana-Tanana Crossing	188

Sources: ADNR 2021b

3.5.3.3 No Action

Under the No Action alternative, impacts to land use would not occur, mineral exploration may continue to take place in the Tetlin Hills in accordance with current and future authorizations.

3.5.3.4 Proposed Action

The surface lands and subsurface rights are owned by the Native Village of Tetlin. These organizations are the mine proponent, and desire to develop their surface and subsurface mineral resources. The Proposed Action would be in alignment with the land use objectives of the landowners and land managers.

The Tetlin Community Plan states priorities to protect, respect, and utilize the lands. The Proposed Action is completing baseline science to understand the existing resources, and is designing the Proposed Action to avoid, minimize, and compensate for potential impact to resources. These are detailed in each respective chapter of this document. The Proposed Action is consistent with the Tetlin Community Plan.

No direct or indirect impact is anticipated to the Tetlin Village Council water right.

The Proposed Action would be consistent with the Peak Gold Temporary Water Use Authorization.

No direct or indirect impact is anticipated to RS2477 right of ways.

In summary, direct and indirect impacts to land use from the Proposed Action are anticipated to be avoided. Any potential impacts would be negligible, temporary, and localized.

3.5.4 Recreation

3.5.4.1 Area of Analysis

The area of analysis includes the proposed Manh Choh Mine (Figure 22). This area of analysis was chosen because it represents the area where the Proposed Action is most likely to affect the resource.

No impacts are anticipated on the highway transportation route to Fort Knox.

All activities at Fort Knox are under existing permits, and no new federal permitting actions are required at Fort Knox.

3.5.4.2 Affected Environment

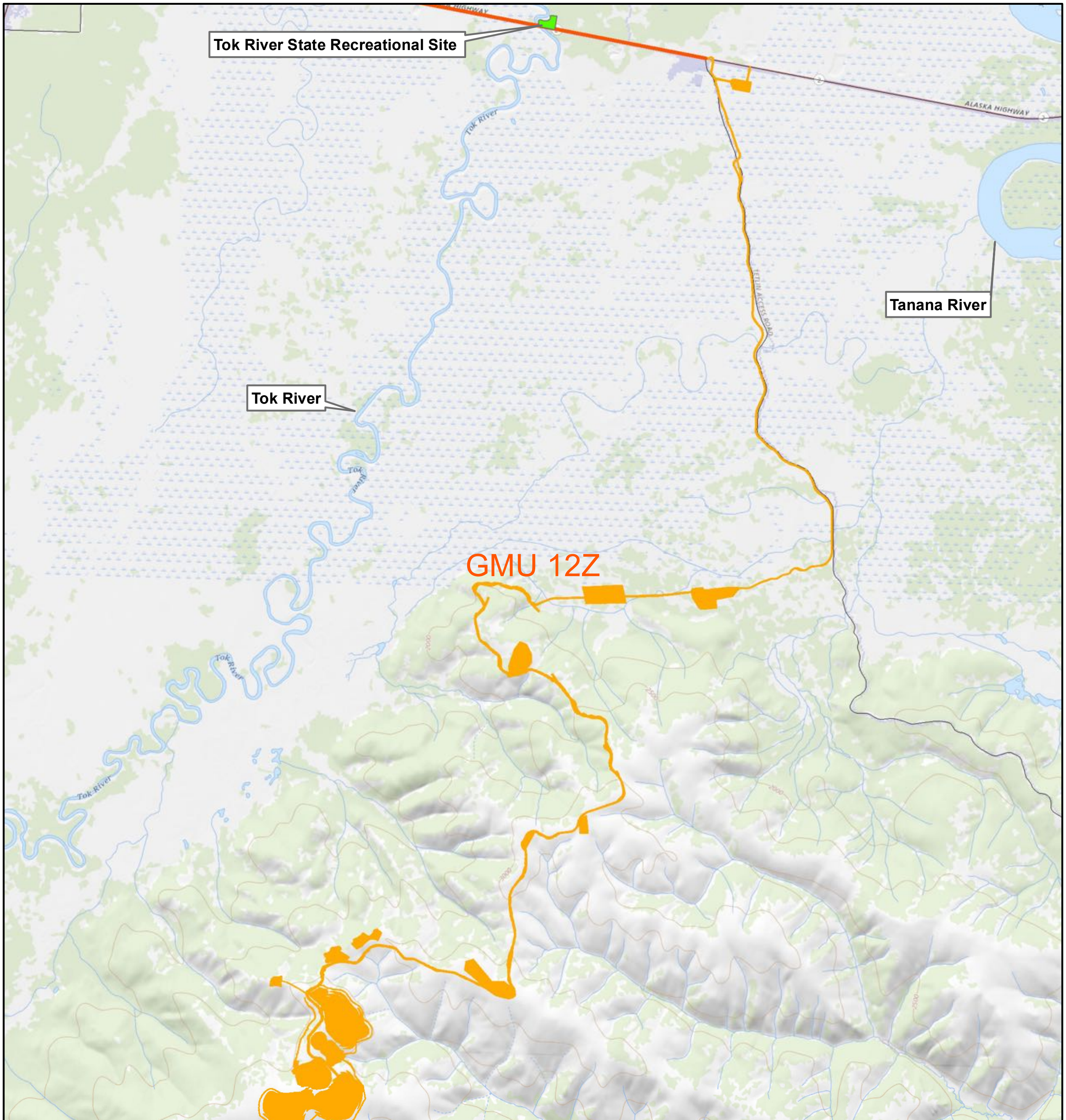
Recreation within the analysis area is primarily dispersed, including hunting, fishing, off-highway vehicle use, photography, camping, sightseeing and wildlife viewing, hiking, water sports (e.g. canoe, raft, kayak), and winter sports (e.g. skiing, snowshoeing, snow machining, dog sledding). The dispersed nature of recreation prevents specific user data for individual recreation activities.

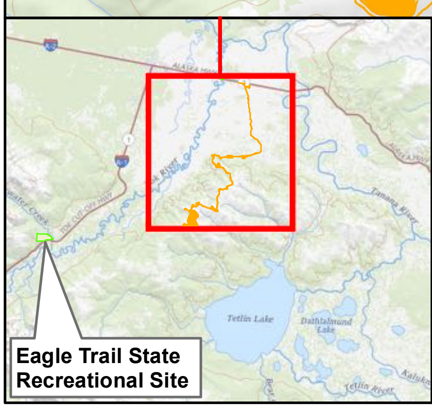
The State of Alaska Department of Natural Resources Park Division has two local sites located outside of the area analysis. These sites are mentioned below due to the potential for use in the region:

- The Tok River State Recreational Site is located along the Alaska Highway, between Tok and the Tetlin Village Road. It consists of 24 campsites, picnic area, toilets, water, trails, and a carry in boat launch.
- The Eagle Trail State Recreation Site is located along the Tok Cutoff, about 2 miles south of where the Alternative #2 Access Road joins the Tok Cutoff. It has 25 campsites, picnic area, toilets, water, and trails. The site features the historical Valdez-Eagle Trail, the Old Slana Highway, and the Washington-Alaska Military Cable and Telegraph System (WAMCATS). It also has a 1-mile nature trail and a 2.5-mile hiking trail to view the Tok River valley.

There are also two sites at the Tanana River crossing of the Alaska Highway, an interpretive site and a parking/boat launch site.

Sport fisheries in the Tetlin Hills area are regulated by the ADF&G Upper Tanana River Drainage regulations. Sport fishing in the area is focused on the Tok and Tanana Rivers, and their tributaries, and is generally open year-round (ADF&G 2021a). The Tok River is closed to all salmon fishing, and retention of all Arctic Char/Dolly Varden. Arctic grayling fishing is open between May 15 – October 31. Land access to fishing areas on Tetlin lands requires prior approval.





Manh Choh Project

- GMU Subunits
- State Park
- Transportation Corridor
- Proposed Action

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Client Peak Gold LLC
Project Manh Choh Project
Figure **Recreation**
Figure Number
22

Sport hunting in the Tetlin Hills area (GMU 12) is also regulated by the ADF&G (ADF&G 2020a). Sport hunters must obtain land access approval from Tetlin. Current sport hunting limits include:

- Black bear: 3 bears/year
- Brown/Grizzle bear: 1 bear/year
- Caribou: No open season in Tetlin Hills area
- Moose: 1 bull
- Dall sheep: 1 ram
- Wolf: 10 wolves
- Wolverine: 1 wolverine

Hunters may also pursue a variety of small game and waterfowl/migratory birds.

The ADF&G provides hunting report information for moose and sheep in the region via reports on GMU 12 (Table 24, ADF&G 2021c). The information states that between 22 – 42% of hunters are successful in harvesting moose and sheep. There were 651 hunters pursuing moose in 2019, and 396 hunters pursuing sheep. These data are for the Game Management Unit as a whole, which is larger than the area of analysis, but provides an indication at the amount of activity in the region.

Table 24 Game Management Unit 12 Harvest Information

	Moose		Sheep	
Year	**Hunting Reports**	**Successful Hunts**	**Hunting Reports**	**Successful Hunts**
2019	651	140 (22%)	396	150 (38%)
2009	545	145 (27%)	348	125 (36%)
1999	569	138 (24%)	404	168 (42%)

Sources: ADF&G 2021c

*Apparent inconsistencies in sums are the result of rounding.

Trappers may also pursue a number of furbearers in the area, including beaver, coyote, red fox, lynx, martin, mink, river otter, squirrel, marmot, wolf, and wolverine (Table 25, ADF&G 2020d). Trappers must obtain access permission from Tetlin. Trapping information from 2018 and 2008 is provided below (2018 is the most recent data available). These data are for the GMU 12 as a whole, which is larger than the area of analysis.

Table 25 Game Management Unit 12 Trapping Survey Respondents and Number of Animals Harvested

Year	Number of Respondents	Arctic Fox	Beaver	Coyote	Ermine	Fisher	Lynx	Marten	Mink	Muskrat	Red Fox	Red Squirrel	River Otter	Wolf	Wolverine
2018	6	0	20	2	6	0	25	33	6	14	12	4	1	14	0
2013	1	0	30	2	23	-	31	129	1	30	14	7	0	15	6
2008	-	0	11	22	0	-	139	90	9	66	52	0	0	25	9

Sources: Parr 2018, Spivey 2020, ADF&G 2010
'-' = Not Provided
*Apparent inconsistencies in sums are the result of rounding.

The Tok and Tanana Rivers host water sport activities, including canoeing, rafting, kayaking, and riverboating. Documentation on dispersed activities is not available, but both the Alaska Highway and Tok Cutoff have small boat launch/take out in both formal (e.g. Tok River State Recreation Site, Tanana River) and informal locations (e.g. Tok River Bridge at milepost 104 of the Tok Cutoff).

There are no wilderness areas, wilderness study areas, parks, or other conservation or recreation units in the area of analysis.

Two conservation units exist adjacent to tribal lands, but outside of the area of analysis. The USFWS Tetlin National Wildlife Refuge is located 15 miles east of the proposed action. The Wrangell St. Elias National Park and Preserve is 35 miles to the south of the proposed action. Both conservation units are upstream of the proposed action.

3.5.4.3 No Action

Under the No Action alternative, impacts to recreation would not occur, mineral exploration may continue to take place in the Tetlin Hills in accordance with current and future authorizations.

3.5.4.4 Proposed Action

The Proposed Action will have no direct or indirect impact to the sport fisheries. No impacts are proposed for the Tanana River, Tok River, Tetlin River, Tetlin Lake, or other waters containing fish. No impacts are proposed for waters that support water sports or water recreation (e.g., canoe, raft, kayak, riverboating).

The Proposed Action will have negligible direct or indirect impact to sport hunting or trapping. Lands proposed for development are owned by the Native Village of Tetlin, and sport hunting and trapping is only allowed if Tetlin approves that use.

The Proposed Action will have negligible direct or indirect impact to recreation. No change or impact is proposed for off highway vehicle recreation, photography, camping, sightseeing and wildlife viewing, and/or hiking. The Proposed Action does include the disturbance of land. These lands will not be available for recreational activities but are owned by Tetlin. Use of the lands for recreation is only allowed after approval by the corporation, and the lands proposed for disturbance are not used regularly (if ever) for recreation.

The Proposed Action will have no direct or indirect impact to wilderness areas, wilderness study areas, parks, refuges, or other conservation or recreation units. The Proposed Action will have no impact to the two State of Alaska park sites: Tok River State Recreational Site and Eagle Trail State Recreation Site.

In summary, impacts to recreation from the Proposed Action are anticipated to be avoided. Any potential impacts would be negligible, temporary, and localized.

3.5.5 Socioeconomics

3.5.5.1 Area of Analysis

The area of analysis for socioeconomic analysis is Tetlin Village and Tok. The area of analysis was chosen based on the location of the Proposed Action, and where potential socioeconomic impacts would occur.

3.5.5.2 Affected Environment

The following socioeconomic analysis and language was completed by McKinley Research (2021a, b). McKinley Research (2021a) also includes analysis on the Fairbanks North Star Borough which has not been incorporated into this report due to length; but is available for reference.

The analysis below represents the best available information for the existing social and economic condition of the area of analysis using publicly available data. Socioeconomic data for Tetlin Village and Tok is reported as Census-Designated Places (CDPs). There is no organized borough for the area, and data is reported for the Southeast Fairbanks Census Area (SEFCA).

Due to the uncertainties related to the ongoing COVID-19-related economic impacts and changes in regional economic and social conditions, the data below may be inexact as it is based on prior economic conditions data and trends.

Population and Demography

Tetlin had a 2020 population of 106 individuals and has seen fluctuation in population, with an overall decrease between 2010 – 2020 of 16.5%. Tok has a 2020 population of 1,187; and has lost 5.4% of its population since 2010. The SEFCA has had smaller loses in population (1.3%). These communities' trends are different than the State of Alaska as a whole (Table 26), which has experienced steady population growth since 2010.

Table 26 Population: 2010 - 2020

Years	Tetlin Village	Tok	SEFCA	Alaska
2010	127	1,255	7,026	710,231
2011	114	1,272	7,104	722,473
2012	117	1,272	7,200	731,005
2013	111	1,262	7,093	736,552
2014	131	1,251	6,978	737,053
2015	121	1,252	6,899	737,786
2016	113	1,236	6,927	740,637
2017	110	1,227	6,993	738,920
2018	121	1,231	6,967	735,367
2019	123	1,216	6,900	732,734
2020	106	1,187	6,937	728,903
% Change 2010-2020	**-16.5%**	**-5.4%**	**-1.3%**	**+2.6%**

Source: McKinley Research (2021a)

*Apparent inconsistencies in sums are the result of rounding.

Tetlin Village and Tok differ by racial composition (Table 27). Tetlin Village is a majority Alaska Native community, with 89% of residents being Alaska Native, 10% being White, and 1% being multi-racial. In contrast, Tok is a majority white community; with 75% of residents being white, 22% being Alaska Native, 1% being Asian, and 3% being multi-racial.

These communities differ in regard to the State of Alaska as a whole. Tetlin Village has proportionally more Alaska Native residents than Alaska as a whole, and Tok has a larger proportion of white residents than the State.

These differences are likely related to the different community histories of Tetlin Village and Tok. Tetlin Village is a historic Alaska Native community, with a history of Athabascans living in the area for thousands of years (Native Village of Tetlin 2020, McKinley Research 2021a). Tok was established in 1942 as a construction camp and continues to primarily support a service economy focused on travelers along the Alaska Highway (Community of Tok 2018).

Table 27 2015 - 2019 Racial and Ethnicity in the Area of Analysis

Race/Ethnicity	Tetlin Village CDP	Tok CDP	SEFCA	Alaska
Alaska Native/American Indian Alone	89%	22%	14%	15%
White Alone	10%	75%	76%	65%
Asian Alone	0%	1%	3%	6%
Other Race Alone	0%	0%	3%	6%
Two or more races	1%	3%	4%	8%

Race/Ethnicity	Tetlin Village CDP	Tok CDP	SEFCA	Alaska
Total	**100%**	**100%**	**100%**	**100%**
Alaska Native/American Indian Alone or in Combination with One or More Other Races	90%	24%	17%	21%

Source: McKinley Research (2021a)

*Apparent inconsistencies in sums are the result of rounding.

Economy, Income, and Employment

Government employment represented approximately one-third (32%) of wage and salary employment in SEFCA in 2019 (McKinley Research 2021a). The largest private employer in SEFCA is the Northern Star Pogo Mine, an underground gold mine about 38 miles northeast of Delta Junction on land owned by the State of Alaska (McKinley Research 2021a).

Income data is available for Tetlin and Tok and shown in Table 28. Tetlin earns significantly less money than Tok, SEFCA, or the State of Alaska.

Table 28 2015 - 2019 Annual Household Income

Income	Tetlin Village CDP	Tok CDP	SEFCA	Alaska
Median	$22,500	$64,398	$70,056	$77,640
Mean	$37,186	$85,124	$80,810	$98,606

Source: McKinley Research 2021a.

Employment data is not available specifically for Tetlin Village and Tok. The State of Alaska does publish statistics for the SEFCA. 2020 unemployment in the SEFCA was 7.9% (Table 29). Unemployment in this region has ranged from 7.4% to 10.3% between 2015 – 2020 (ADLWD 2020).

Table 29 2019 Labor Force and Unemployment

Sector	SEFCA	Alaska
Employment	2,652	334,754
Unemployment	227	19,134
Unemployment Rate	7.9%	5.4%

Source: McKinley Research 2021a.

Poverty data is available for the individual communities of Tetlin Village and Tok (McKinley Research 2021a). 42% of Tetlin Village residents live below the poverty level, a higher number than Tok (15%), SEFCA (10.9%), or Alaska (11%) residents (Table 30).

The community of Tetlin Village reports that local employment opportunities are limited (Native Village of Tetlin 2020). Jobs in Tetlin Village are focused on the Tetlin Village Council, school, Tanana Chiefs Council, and seasonal industry (e.g. firefighting, construction, mining exploration). The primary sources of economic activity reported by the community are government transfers and subsistence activities (Native Village of Tetlin 2020).

Table 30 2015 - 2019 Poverty Rate of Individuals in the Area of Analysis

	Tetlin Village CDP	Tok CDP	SEFCA	Alaska
Families below the poverty level	42%	15%	11%	11%

Source: McKinley Research 2021a

Housing

Housing in Tetlin Village and Tok is largely owner occupied, with little vacancy (0% in Tetlin Village, 1.5% in Tok). Rental unit vacancy is higher for Tetlin Village (27%) and Tok (13%).

There are limited opportunities for short-term housing. Tok hosts numerous hotels, motels, bed and breakfasts, and recreational vehicle parks that might provide short term housing (Tok Home Page 2021). Tetlin has no commercially available short-term housing. No information is available on capacity for these facilities. Demand for temporary housing during the summer would be increased by tourists.

Table 31 Housing Ownership and Vacancy Rates 2015 - 2019

	Tetlin Village CDP	Tok CDP	SEFCA	Alaska
Owner-occupied housing units	75.0% [a]	70.8% [a]	73.5%	64.3%
Renter-occupied housing units	25.0% [a]	29.2% [a]	26.5%	35.7%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Homeowner vacancy rate	0.0% [a]	1.5%	3.9%	1.9%
Rental vacancy rate	26.7% [a]	13.1% [a]	20.8% [a]	7.2% [a]

Source: McKinley Research 2021a

[a] Data have a high margin of error and should be interpreted with caution

*Apparent inconsistencies in sums are the result of rounding.

Households in Tetlin are disproportionately heated by wood (93%) and lack plumbing (96%). In both measures, the disparity in housing infrastructure for Tetlin Village is significant when compared to Tok, SEFCA, and the State of Alaska.

Table 32 Household Heating Type 2015 - 2019

Heating Type	Tetlin Village CDP	Tok CDP	SEFCA	Alaska
Wood	93.2%	45.5%	33.3%	5.5%
Fuel oil, kerosene, etc.	6.8%	42.6%	58.5%	29.5%
Coal or coke	0.0%	5.6%	1.6%	0.4%
Utility gas	0.0%	2.9%	1.9%	48.2%
All others	0.0%	3.4%	4.8%	16.3%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: McKinley Research 2021a

*Apparent inconsistencies in sums are the result of rounding.

Table 33 Occupied Houses with Plumbing 2015 - 2019

Housing Infrastructure	Tetlin Village CDP	Tok CDP	SEFCA	Alaska
Lacking complete plumbing facilities	95.5%	3.5%	8.0%	4.0%
Lacking complete kitchen facilities	47.7%	2.3%	5.7%	3.0%
No telephone service available	15.9%	0.0%	2.5%	1.8%

Source: McKinley Research 2021a

*Apparent inconsistencies in sums are the result of rounding.

Community Facilities and Services

Community facilities and services are limited in Tetlin Village and Tok. Neither are part of an organized borough; there is no regional government providing services.

Tetlin has no stores and relies on Tok, Delta Junction and Fairbanks for commercial services. Tetlin Village does have a local landfill, sized for their local community to last for 20 years. Bulk fuel is transported to Tetlin Village from Tok. Telephone, internet, and power are provided by the local utility (Alaska Power and Telephone). Tetlin has a health clinic staffed by 2 health aides. Tetlin Village also has a volunteer fire department. Tetlin Village has a Village Public Safety Officer position budgeted.

Tok has limited public facilities and has no local government. There is no public water or sewer, but there is a local landfill. Alaska Power and Telephone provides telephone, internet, and power. Tok also has a medical clinic, and volunteer fire station. In October of 2020, Tanana Chiefs Conference opened the new Upper Tanana Health Center, located in Tok. This facility provides basic medical care for the entire region.

Alaska State Troopers, based in Tok, provide law enforcement for the entire region, including Tok and Tetlin Village.

Utilities

Tetlin Village has limited water and wastewater utilities (Native Village of Tetlin 2020). The washateria is a key public facility, providing showers, washing machines, and dryers. Water for houses is hauled from a community drinking well, and wastewater is dumped in outhouses or transported to the sewage lagoon by a sewage truck. Wastewater disposal continues to be an urgent public issue in Tetlin Village (Native Village of Tetlin 2020). The community reports that the majority of residents' heat with wood, and bulk fuel is obtained through individual trips to Tok, or inconsistent deliveries from a commercial service (Native Village of Tetlin 2020).

Tok buildings are on individual water and wastewater systems, with individual wells, and septic systems.

The Tok and Tetlin Village area has three active solid waste facilities (Table 34, ADEC 2021b). Tetlin Village and Tok have Class III landfills, which are rural landfills. Tetlin Village also has a sewage solid monofil.

Table 34 Tok and Tetlin Solid Waste Facilities

Name	Classification	Status	Region	ADEC Site ID
Tetlin.5 mile East Landfill	Class III Landfill	Active	Tetlin	632
Tetlin 1- Time Sewage Solid Monofill	1-Time Sewage Solids Monofill	Active	Tetlin	3774
Tok Landfill	Class III Landfill	Active	Tok	108

Source: ADEC 2021b

Education

Tetlin Village and Tok both host local K-12 schools, which are both a part of the Alaska Gateway School District. The Tetlin Village school has historically had between 23-38 students, and the Tok school has had between 185-204 students (ADEED 2020). Staff retention is reported as difficult at the schools. No information was available as to student capacity, although student:teacher ratios are listed in Table 35.

Table 35 Historic Student Enrollment and Number of Teaching Staff in the Area of Analysis

School	Year	Student Enrollment	Student:Teacher Ratio
Tetlin Village School	2019-2020	38	21:1
	2018-2019	33	9:1
	2017-2018	23	9:1
Tok School	2019-2020	198	15:1
	2018-2019	185	13:1
	2017-2018	204	14:1

Source: Alaska Department of Education and Early Development 2020

Local Government

Tetlin is governed by the Tetlin Village Council, with 7 members (Native Village of Tetlin 2020). Members are elected to 4-year terms. The Village Council operates the clinic, behavioral health aide program, water/sewer, tribal court, and a variety of other community services.

Tetlin works closely with the Tanana Chiefs Conference (TCC). TCC is a non-profit that helps small, native Alaskan communities provide efficient government services.

Tok has no local government.

3.5.5.3 No Action

The No Action would disproportionately affect socioeconomically vulnerable populations. The jobs and income associated with the Proposed Action will not improve the lives of Tetlin and Tok residents under the No Action. Tetlin Village will remain with poverty rates 10x the state average, and annual incomes almost ¼ of the state average. The No Action Alternative will have a minor, short-term, localized impact.

3.5.5.4 Proposed Action

Population and Demography

The Proposed Action would directly employ residents. Local hire will be preferred, with Tetlin Village residents and tribe members given priority, and additional focus on the residents of all of the communities in the region.

The Proposed Action would result in a minor, short-term, localized impact to population and demographics.

Economy, Income, and Employment

The Proposed Action would directly employ residents.

The Proposed Action would increase the income of the area. A summary is presented below, with full analysis in McKinley Research (2021b).

- Construction Phase
  - Development of the $150 million capex mine project is expected to directly generate $50 million in labor income and about 280 new jobs over the construction period.
  - Based on Alaska Department of Labor and Workforce Development average nonresident hire data for the construction and mining sectors, it is assumed about 70% of the Manh Choh construction labor force will be Alaska residents.
  - Including multiplier effects from in-state spending in support of mine construction (indirect impacts) and spending by construction workers (induced impacts) in the Alaska economy, employment will total about 485 direct, indirect, and induced jobs with a total labor income of about $75 million statewide.
- Mine Operations Phase
  - The mine operations labor force is expected to average approximately 500 workers annually over the estimated 4.5-year life of mine, with an estimated annual direct payroll of $75 million and an estimated total of $376 million over the estimated life of mine. The average annual wage will be about $128,230 (not including benefits), exceeding the average 2020 wage for residents of the Southeast Fairbanks Census Bureau ($75,085) by 70% and the Fairbanks North Star Borough ($56,916) by 125%.
  - While in production, Manh Choh will be the second largest private employer and source of income in the Southeast Fairbanks Census Areas after Northern Star Pogo mine located near Delta Junction.

The Alaska Mining Association’s 2021 economic study states the average annual wage is $115,320 (Alaska Mining Association 2021). A truck driver working for a company may drive 3,000 miles a week at a per mile rate of $0.706 for $2,118 per week, not including benefits (personal communication Ken Hall, November 2021). These wages are higher than Tetlin Village’s median annual household income of $21,250.

Tok’s median annual household is $62,583. The Proposed Action’s annual mean wages are similar to Tok’s household income for single wage earner households and would approximately double the average income for two wage earner households.

The higher income from the Proposed Action is anticipated to decrease the local poverty levels.

The Proposed Action would result in a minor, long-term, localized impact to the economy, income, and employment.

Housing

McKinley Research (2021b) found that while the economic impacts of Manh Choh will be significant, the population-related impacts will be short-term and likely will not result in significant population changes in the nearby communities. The employment and income opportunities offered by Manh Choh are not expected to attract new permanent residents to the area, but rather provide employment and income opportunities to existing residents.

Local mine workers already have housing, and non-locals will be housed at a Project site personnel camp. No impact on the housing market is anticipated. Some individuals may choose to invest in local housing, but these are anticipated to be limited. The Proposed Action is anticipated to have negligible, short-term, localized impacts to housing.

Community Facilities and Services

The Proposed Action is anticipated to be self-contained, so that negligible impacts occur on the local community infrastructure.

Utilities

The Proposed Action will provide their own water and wastewater utilities. No impacts are anticipated to the surrounding communities.

The Proposed Action will obtain power from onsite diesel generators. Telephone, and internet service may be provided from the Alaska Power & Telephone Company and by providing Peak Gold's own infrastructure. Any telephone and internet services have been discussed with Alaska Power & Telephone Company to ensure no impacts will occur to the local communities. No impacts are anticipated from the Proposed Action.

The Proposed Action is anticipated to have negligible, short-term, localized impacts to utilities.

Education

It is not anticipated that the Proposed Action would increase school enrollment. The life of the mine is estimated to be too short to entice non-local families to move to the area. Some individuals may choose to bring their families, but these are anticipated to be limited. The Proposed Action is anticipated to have negligible, short-term, localized impacts to education.

3.5.6 Environmental Justice

3.5.6.1 Area of Analysis

The area of analysis for environmental justice is Tetlin Village and Tok, Alaska. The area of analysis was chosen based on the location of the Proposed Action, and where potential environmental justice impacts would occur.

3.5.6.2 Affected Environment

Council on Environmental Quality guidelines for evaluating potential adverse environmental justice effects indicate minority populations should be identified when either:

- a minority population exceeds 50 percent of the population of the affected area, or
- a minority population is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

Executive Order 12898 states that population groups defined as minorities include American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic/Latino origin; or Hispanic/Latino.

Low-income populations are those communities or sets of individuals whose median income is below the current poverty level of the general population. In identifying low-income populations, federal agencies may consider as a community either a group of individuals living in geographic proximity to one another or a set of individuals (such as migrant workers or Native Americans) where either type of group experiences common conditions of environmental exposure or effect.

Tetlin Village is a minority population, with 90% of individuals identifying as a minority, in contrast to Alaska, where 35% of individuals identify as a minority (Table 27). This qualifies Tetlin Village as an environmental justice population.

Tetlin Village is also a low-income population, with 42% of individuals living below the poverty level. This is four times the poverty rate of the State of Alaska (11%) (Table 30).

Tok is not a minority population, with 26% of individuals identifying as a minority, a smaller proportion than the State of Alaska's 35% (Table 27).

Tok is a low-income population, with 15% individuals living below the poverty level. This is greater than the poverty rate of the State of Alaska (11%) (Table 30).

3.5.6.3 No Action

The No Action would disproportionately negatively affect the socioeconomics of environmental justice populations at Tetlin and Tok. The jobs and income associated with the Proposed Action would not take place. These positive impacts are currently the only proposal to address the poverty rates to Tetlin Village, an Alaska Native community. With the selection of the No Action, these communities will remain with poverty rates above the state average. The No Action Alternative will have a negative minor, long-term, localized impact.

3.5.6.4 Proposed Action

The Proposed Action would positively impact the environmental justice populations at Tetlin Village and Tok. The residents of both communities would have increased incomes, and the opportunity to reduce poverty. The communities will also benefit from increased economic activity. The land and mineral rights are owned by Tetlin, and if they choose that it is not in their best interest to operate the proposed mine, the mine will not be successful. The Proposed Action will have a positive minor, long-term, localized impact.

Any negative direct and indirect environmental impacts from the Proposed Action has the potential to impact Tetlin Village and/or Tok. These are discussed in detail for each resource category and are incorporated by reference.

3.5.7 Traffic

3.5.7.1 Area of Analysis

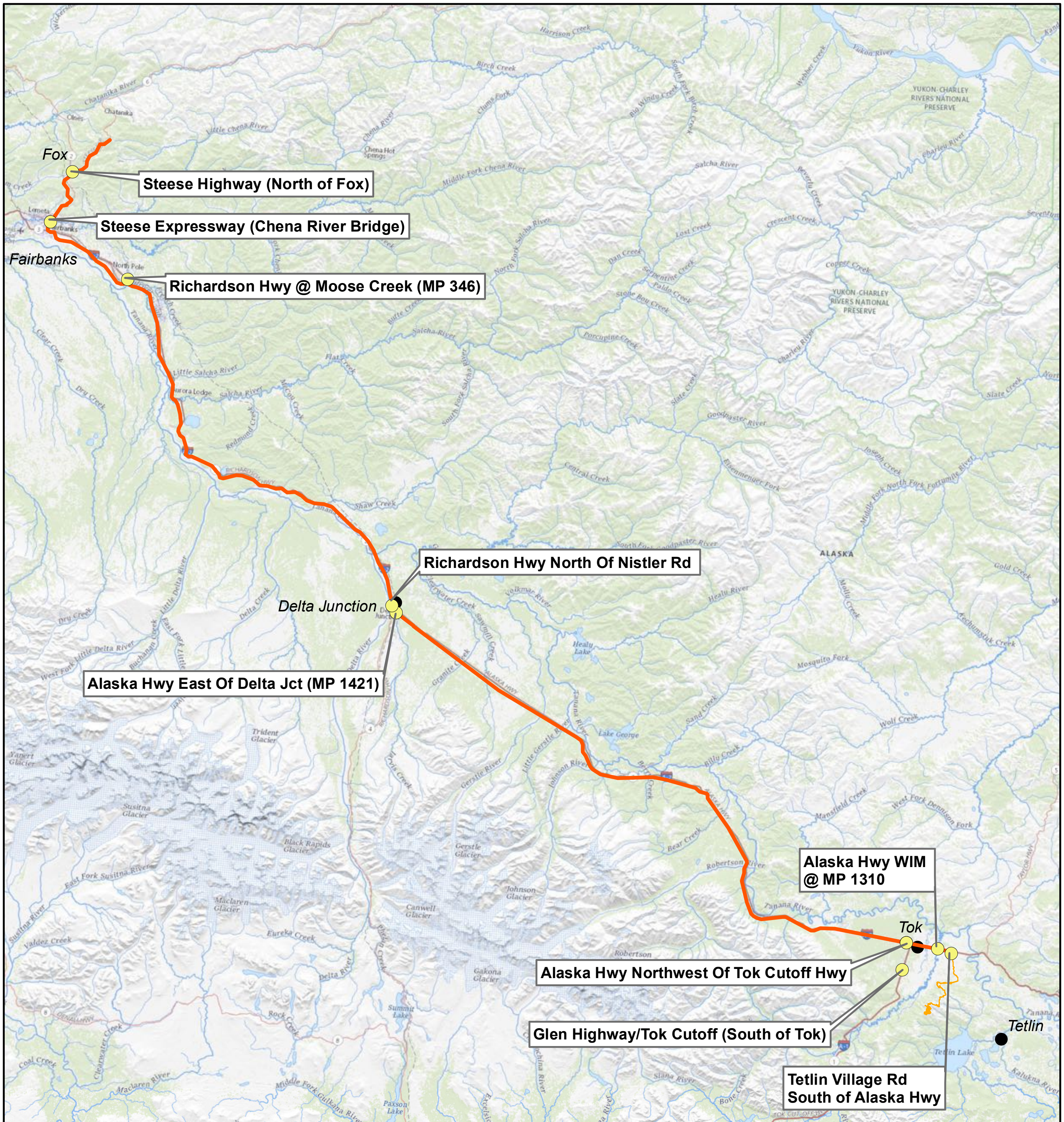
The area of analysis includes the proposed Manh Choh Mine and the highway transportation route to Fort Knox (Figure 23). This area of analysis was chosen because it represents the area where the Proposed Action is most likely to affect the resource.

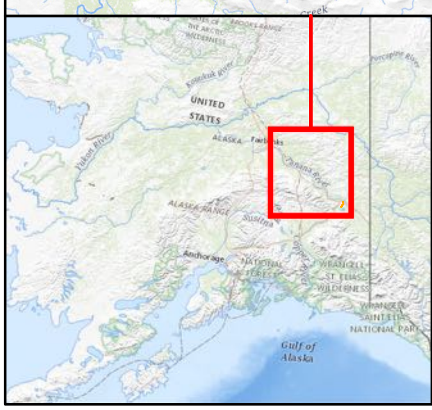
3.5.7.2 Affected Environment

Transportation routes for the Proposed Action include:

- Tetlin Village Road and Twin Road
- Alaska Highway from the Tetlin Village Road to Delta Junction, including passing through Tok
- Richardson Highway from Delta Junction to Fairbanks
- Steese Highway from Fairbanks to Fort Knox, including passing through Fox

The Alaska Department of Transportation and Public Facilities tracks the Average Annual Daily Trips (AADT) for each segment (Table 36, DOT&PF 2021). The AADT is the average volume of traffic for the average one day (24 hour period) during a year at a specific location. The value measures how busy a road is and is important for transportation planning.





Manh Choh Project

AADT Traffic Count Stations

Transportation Corridor

Proposed Action

AADT: Average Annual Daily Traffic

0 10 20 30 Miles

N S E W

(At original document size of 8.5x11)
1:1,400,000 1 inch = 22.1 miles

Client Peak Gold LLC

Project Manh Choh Project

Figure **Traffic**

Figure Number

23

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Each road is also assigned a functional classification. These classes are given to the roads according to the character of service they are intended to provide. In general, these classes are:

- Interstate: Major roads that provide access between different states or regions.
- Arterial: These roads provide mobility so traffic can move from one place to another quickly and safely.
- Major Collector: These roads link arterials and local roads and perform some duties of each.
- Local: These roads provide access to homes, businesses, and other property.

Table 36 2017 – 2020 Road and Traffic Characteristics

Station Name	Station ID	AADT				Truck %	Road Surface	Functional Classification
		2017	2018	2019	2020			
Tetlin Village Rd South of Alaska Hwy*	36011000	69	69	69	60	-	Unpaved	Major Collector
Alaska Hwy WIM @ MP 1310	13901310	592	593	619	400	22	Paved	Interstate
Alaska Hwy Northwest Of Tok Cutoff Hwy	33002315	1,399	1,380	712	620	-	Paved	Interstate
Alaska Hwy East Of Delta Jct (MP 1421)	13601421	1,440	1,487	1,502	1,280	11	Paved	Interstate
Richardson Hwy North Of Nistler Rd (i.e. Delta Junction)	33062251	3,373	3,972	3,038	2,660	-	Paved	Interstate
Richardson Hwy @ Moose Creek (MP 346)	13920528	7,977	8,640	9,107	7,980	-	Paved	Interstate
Steese Expressway (Chena River Bridge)	13920504	25,608	24,608	24,140	23,300	-	Paved	Arterial
Steese Highway (North of Fox)	13400011	1,854	1,760	1,798	1,710	11	Paved	Arterial

Source: DOT&PF (2021)

3.5.7.3 No Action

Under the No Action alternative, impacts to traffic would not occur, mineral exploration may continue to take place in the Tetlin Hills in accordance with current and future authorizations.

3.5.7.4 Proposed Action

Under the Proposed Action, traffic will increase for the life of the mine. The transportation of mined material will occur on highways and access roads from Manh Choh Mine to Fort Knox, approximately 250 miles one way. The additional AADT for the Proposed Action is 192 (i.e., 4 trips north, and 4 trips south, every hour).

The public roads proposed for use are under capacity. The Federal Highways Administration (FHWA) publishes service level guidance for traffic volume (i.e. AADT) on highways (FHWA 2017). Highway capacity for the project specifications are listed in Table 37. The Proposed Action's increase in traffic would remain below FHWA guidelines. The Tetlin Village Road would receive the largest increase in traffic, but the mine is proposing the Manh Choh Twin Road (Twin Road) to be built to separate industrial and community traffic. A minor impact is anticipated for traffic volumes from the Proposed Action (Table 37).

Table 37 Traffic Impacts

Road Name	Station ID	Number of Lanes	FHWA Minimum Capacity	2020 AADT	Proposed Action Increase	% Increase
Tetlin Village Rd South of Alaska Hwy	36011000	2	N/A	60	192	320%
Alaska Hwy WIM @ MP 1310	13901310	2	5,900	400	192	48%
Alaska Hwy Northwest Of Tok Cutoff Hwy	33002315	2	5,900	620	192	31%
Alaska Hwy East Of Delta Junction (MP 1421)	13601421	2	8,500	1,280	192	15%
Richardson Hwy North Of Nistler Rd (i.e. Delta Junction)	33062251	2	8,500	2,660	192	7%
Richardson Hwy @ Moose Creek (MP 346)	13920528	4	31,100	7,980	192	2%
Steese Expressway (Chena River Bridge)	13920504	4	31,100	23,300	192	1%
Steese Highway (North of Fox)	13400011	2	8,500	1,710	192	11%

Source: DOT&PF (2021)

The public may be concerned about the ability to pass industrial truck traffic along the route. Passing opportunities are generally available every few miles. The speed limits along the route are generally 55 miles per hour (mph) (with slower speeds in some posted locations). A vehicle moving, on average, 10 mph faster than haul trucks, would, on average, pass 3 haul trucks over the 250-mile route. A vehicle moving 20 mph faster would pass 5 haul trucks. Negligible impacts are anticipated to traffic.

The Proposed Action will have a minor, long-term, regional impact on the traffic resources.

Traffic noise impacts are analyzed in the noise section of the report.

4.0 MITIGATON

Under the Proposed Action, the project would implement mitigation measures described below, as practicable:

Air Quality

To the extent possible, the Proposed Action would employ the following measures to minimize air emissions:

- Implement good combustion practices for all fuel-fired equipment, including regular maintenance consistent with manufacturer's recommendations.
- Implement dust control management measures to minimize the presence of fugitive dust, including:
  - Applying water or chemical dust suppressant (such as Lignin sulfate or magnesium chloride) to haul roads and disturbed area where appropriate.
  - Minimizing vehicular traffic and limiting vehicle speeds on haul roads, as much as practicable.
  - Using a bag house and/or water sprays, where necessary, on crushers and conveyor drop points in accordance with the air quality permits.
  - Loaded highway trucks will be covered to minimize dust emissions.

Climate Change

Peak Gold is assessing the climate change impacts of its proposed Manh Choh Project within the broader framework of Kinross' corporate climate change strategy including:

- Incorporating energy efficiency measures that are economic over the life of mine;
- Implementing a corporate fuel management policy to improve energy efficiency;
- Seeking opportunities with electric power provider, Alaska Power & Telephone, to reduce GHG emissions; and
- Working with Tetlin Village to implement community projects with GHG reduction benefits.

Noise

- Using late model year haul trucks equipped with noise suppression systems
- Driver training for all haul truck personnel to maintain speeds at or below the speed limits
- Avoid the use of engine compression breaks (i.e., jake brakes), in communities, except in emergencies
- Use a slow to moderate acceleration from stops and signalized intersections
- Limit the use of personal vehicles to access the mine through the use of buses to transport the majority of workers to and from the mine

Visual

To protect visual resources, specific protection measures will apply throughout the life of the Project:

- Partially backfilling the South Pit with materials off the WRDs;
- Backfilling of the South Pit to the pit's crest on a 2H:1V slope;
- Backfilling the North Pit to above the pit crest (North Pit Backfill) with materials off the WRDs;
- Narrowing roads to two-lane access, pulling down berms, and scarifying and seeding the reclaimed edges;
- Removal of materials from the Marginal low grade ore stockpile and placement in a WRD, if not processed;
- Regrading WRDs to a 3H:1V slope, placing two feet of growth media cover, and reseeding with an approved native plant seed mix; and
- Removing constructed infrastructure

Hazardous Materials

- Hazardous materials will be transported to the Project by U.S. Department of Transportation (USDOT) regulated transporters and stored on site in USDOT authorized containers. Spill containment structures will be provided for storage containers. Hazardous materials will be managed in accordance with applicable regulations identified in 29 CFR § 1910 Occupational Safety and Health Standards (only regulations adopted by MSHA), 30 CFR § 56 Safety and Health Standards – Surface Metal and Nonmetal Mines; 40 CFR § 262 Standards Applicable to Generators of Hazardous Waste, and 49 CFR § 171 – 173 Hazardous Material Regulations, and Kinross Environmental Management System Standard 10.9 Chemical and Petroleum Management.
- Hazardous materials that may be transported, stored, and used in quantities less than the Threshold Planning Quantity (TPQ) designated by SARA Title III for emergency planning include blasting components, petroleum products, and small quantities of reagents for laboratory use. Small quantities of hazardous materials not included in the above list may also be managed; such materials are contained in commercially produced paints, office products, and vehicle maintenance products.
- All explosive materials will be stored in compliance with regulatory requirements.
- Management of hazardous materials at the Project will comply with all applicable federal, state, and local requirements, including the inventorying and reporting requirements of Title III of CERCLA, also known as the Emergency Planning and Community Right to Know Act.
- All petroleum products and reagents used in the process will be stored in above ground tanks within a secondary containment area capable of holding a minimum of 110 percent of the volume of the largest vessel in the area. A Spill Prevention, Control and Contingency Plan (SPCC) will be prepared and implemented in accordance with 40 § CFR 112 Oil Pollution Prevention. The SPCC is reviewed and updated regularly and whenever major changes are made in the management of these materials. Inspection and maintenance schedules and procedures are set forth in sections of the SPCC.
- Fuel and oil for diesel- and gas-powered equipment will be stored in above-ground tanks. The tanks will be installed in lined containments. The storage area will be designed to provide secondary

containment for the largest vessel in case of rupture. The refueling hoses will be equipped with overflow prevention devices and secondary containment.

- Hazardous wastes will be managed in the designated hazardous waste accumulation area prior to their shipment to an off-site permitted disposal facility (per state and federal RCRA regulations). These materials may include waste paints and thinners. Spent cleaning solutions will be returned to recycling facilities. Where appropriate, all recyclable materials will be shipped offsite to agency authorized or permitted recycling facilities.
- Petroleum Contaminated Soils
  - Petroleum contaminated soils resulting from spills or leaks of hydrocarbons will be removed from the spill site, managed, and disposed in accordance with ADEC guidelines.

Geology and Geochemistry

- To minimize the potential for oxidation and solute generation from waste rock, the project will adhere to classification, handling, management, sampling and reporting procedures for the various types of waste rock anticipated to be encountered during Project operations. Specifically, procedures will be followed for the management of waste rock that demonstrates a potential to generate acid or leach metals.

Water Resources

- Water Quality Protection measures include:
  - Components will be designed, constructed, and operated in accordance with ADEC regulations.
  - The project will sample groundwater on a regular basis from monitoring wells located within the the Project area. Groundwater sampling will be conducted using ADEC and U.S Environmental Protection Agency (EPA) approved sampling methodologies.
- A Storm Water Pollution Prevention Plan (SWPPP) is currently used for managing erosion and sediment control due to precipitation events from the mineral exploration area in the Project area. The SWPPP will be updated at the appropriate time to change from exploration to mining activities. A SWPPP will be developed and implemented for the construction activities associated with the proposed mine.
- BMPs will be used to limit erosion and reduce sediment in precipitation runoff from Project facilities and disturbed areas during construction, operations, and reclamation.
- Specific BMPs include, but will not be limited to:
  - Erosion and sediment control structures such as diversions (e.g., runoff interceptor trenches, check dams, or swales), siltation or filter berms, filter or silt fences, straw waddles, filter strips, sediment barriers, and/or sediment basins;
  - Collection and conveyance structures, such as rock lined ditches and/or swales;
  - Vegetative soil stabilization practices such as seeding, mulching, and/or brush layering and matting;
  - Non-vegetative soil stabilization practices such as rock and gravel mulches, jute and/or synthetic netting;

  - Slope stabilization practices such as slope shaping, and the use of retaining structures and riprap; and
  - Infiltration systems such as infiltration trenches and/or basins.
- Following construction activities, areas such as cut and fill slopes and embankments and growth media/cover stockpiles will be seeded as soon as practicable and safe. Concurrent reclamation will be maximized to the extent practicable to accelerate revegetation of disturbed areas. All sediment and erosion control measures will be routinely inspected, and maintenance/repairs performed, as needed.

Soils

- Available growth media and cover material disturbed during construction or operation will be salvaged and stockpiled.
- The surfaces of the growth media stockpiles will be shaped after construction with overall slopes of 3H:1V to reduce erosion. To further minimize wind and water erosion, the growth media stockpiles will be seeded after shaping with an interim Alaska seed mix developed in conjunction with ADNR. Diversion channels and/or berms will be constructed around the stockpiles, as needed, to prevent erosion from overland runoff. BMPs such as straw wattles or staked straw bales will be used as necessary to contain sediment liberated from direct precipitation.

Wetlands

During the preliminary and final planning and design process, engineers evaluated several mine designs, road layouts, and processing scenarios. During the process, the team made substantive efforts to avoid and minimize impacts to wetlands at the Project. These avoidance and minimization measures were incorporated in the preferred alternative.

Compensatory mitigation for the loss of wetlands and waters will be completed through Permittee Responsible Mitigation. Potential sites for restoration include drainages along the Tetlin Village Road with insufficient hydrologic connectivity, and management of sediment transport.

Material sites in uplands that intersect the water table will be reclaimed upon closure as ponds and contoured to maximize wetland establishment and wildlife use.

Vegetation

The Proposed Action would comply with regulations on invasive and non-native species, by:

- Ensuring that ground disturbing activities are minimized, and disturbed areas are re-vegetated with seed recommended for the region by Alaska Department of Natural Resources (ADNR)'s A Revegetation Manual for Alaska (ADNR 2008);
- Equipment would be cleaned prior to enter and exiting the Tetlin Hills portion of the project site to minimize spread of vegetative materials; and
- Erosion and sediment control materials would be from locally produced products to minimize potential importation of new propagules from outside Alaska.

- Ore hauling trucks will be limited to the Twin Road, and the Site Road to the loading facility at the base of the hill.

Fish

- The Proposed Action avoids all impacts to fisheries resources.

Birds

- In compliance with the Migratory Bird Treaty Act (MBTA), land clearing and surface disturbance will be avoided within 0.25 miles of any active raptor nests during the appropriate season and will be timed to prevent destruction of active bird nests or birds' young.
- In addition, disturbance activities will be avoided during the avian breeding season, as specified by the current USFWS Timing Recommendations to Avoid Land Disturbance & Vegetation Clearing when the activity is taking place. If surface disturbing activities are unavoidable during the avian breeding and nesting season, the project will commission a qualified biologist to survey areas proposed for disturbance for the presence of active nests immediately prior to the disturbance activities.

Wildlife

- Site-specific training will include internal contact numbers for reporting sick or injured animals in the Project area.
- All food, solid waste, and other trash will be placed in closed containers.
- The project will prohibit employees, contractors, and sub-contractors from feeding wildlife, or making food available for scavenging wildlife.
- Reclamation of infrastructure after mining is complete will include reseeding, and the area is expected to return in the near term with deciduous willows/alders/saplings that are beneficial to wildlife.

Subsistence

- A Subsistence Advisory Committee is being established to provide active management to avoid, minimize, and mitigate potential impacts to subsistence.

Cultural Resources

- In order to avoid inadvertent impacts to cultural resources that may result from unfamiliarity with protections for cultural resources, the project would provide *Cultural Resource Sensitivity Training* to employees and on-site contractors.
- Avoidance is the preferred management response for preventing impacts to historic properties or unevaluated cultural resources.
- Specific cultural resource protection measures include:
  - A treatment plan will be developed, and mitigation activities completed and approved by the SHPO prior to construction activities in the area of any eligible cultural sites.

- If previously unidentified cultural resources are discovered or an unanticipated impact situation occurs, all project-related activities within 328 ft (100 m) of the discovery/impact will cease immediately and the project will secure the location to prevent vandalism or other damage and will notify Tetlin and SHPO immediately.
- Cultural monitors from the Native Village of Tetlin will be notified of cultural mitigation activities and project construction activities with sufficient advanced notice to be on-site during these activities.

Land Use

- The Proposed Action is consistent with the applicable land use plans.
- The Subsistence Advisory Committee will provide continual input throughout the life of the project on how the Proposed Action is impacting land use, and provide recommendations on how to avoid, minimize, and mitigate potential impacts.

Recreation

- The Proposed Action has avoided impacts to sport fisheries, parks, and recreational facilities.
- The Proposed Action will have negligible impact to sport hunting or trapping. Lands proposed for development are owned by Tetlin, and sport hunting and trapping is only allowed if Tetlin approves that use.

Socioeconomics

- A community investment strategy has been developed, focusing on directing project spending to the local businesses. Donations have also already been made to the local community organizations (e.g., Tok Dog Mushers Association, Tok Youth Hockey, Tok Wolverine Trap Club, Tok Library, Deltana Fair).

Environmental Justice

- The project has been specifically designed to maximize the benefits and minimize the potential impacts, as practicable, to the local Environmental Justice populations.

Traffic

- Speed limits will be based on site- specific safety requirements and will be set based on factors such as ramp slopes, ramp widths, and curve radius.
- Prior to ground disturbance associated with the Twin Road, the project would coordinate with Tetlin to establish appropriate traffic controls to ensure continued public access on the road, promote public safety, and prevent conflicts with the public and hauling traffic.
- Public access control points will be established where pre-existing roads and trails enter the active mining areas to ensure public safety is maintained. These control points will be at the Project boundary and will consist of a combination of signs warning of the active mining and other physical barriers to restrict access.

5.0 CUMULATIVE IMPACTS

Cumulative effects analysis identifies any project impacts, that when combined with past, current, and Reasonably Foreseeable Future Actions (RFFAs), may cause a resource category to have a significant impact.

The analysis began by considering the past, current, and RFFAs applicable to the proposed project, detailed in the following table (Table 38). Only actions with ongoing or reasonably foreseeable impacts have been identified. Not all actions will have the potential for a cumulative effect to the Proposed Action. The cumulative effects are determined by combining the potential effects of these activities with the Proposed Action.

5.1 PHYSICAL AND CHEMICAL ENVIRONMENT

5.1.1 Air Quality and Climate Change

Past, present, and RFFAs that could contribute to cumulative effects with the proposed mine include transportation and mineral exploration. Both activities lead to an increase in air emissions. Air quality permits would be obtained when required, and there are no significant air quality concerns for the area. Any cumulative impacts to air quality would be negligible.

The cumulative activities would involve emissions of greenhouse gases from consumption of fuel. The increase in emissions from cumulative impacts would be negligible.

5.1.2 Noise and Visual

Past, present, and RFFAs that could contribute to cumulative effects include transportation and mineral exploration. RFFA transportation projects are limited to improvements of the existing road network. This limits noise and visual impacts along the existing transportation corridors. Any cumulative impacts will be negligible.

Mineral exploration may include the construction of new access trails and infrastructure in undeveloped habitat. This could cause noise disturbances in new areas. While human receivers are limited, animals could avoid the area. Any impacts are anticipated to be negligible given the abundance of surrounding habitat, and the temporary nature of mineral exploration.

Visual impacts from mineral exploration infrastructure could occur. Depending on the location, impacts may be visible from area roads. These disturbances would be linear features of vegetation removal, with road and pad networks potentially being visible. Changes in topography are not anticipated. Current mineral exploration is most likely to be adjacent to existing infrastructure, resulting in an incremental increase. Any cumulative impacts to visual resources will be negligible.

Table 38 Past, Current, and Reasonably Foreseeable Future Actions (RFFAs)

Category	Time Period	Activity	Description
Transportation	Past	Existing Infrastructure	Private Tetlin village Road
Transportation	Past	Existing Infrastructure	Tetlin Hills mineral exploration roads and infrastructure
Transportation	Past	Existing Infrastructure	Public roads between the Tetlin Hills and Fort Knox
Transportation	RFFA	New passing lanes	In 2023, DOT&PF Plans to construct: • 6 passing lanes on the Alaska Highway • 1 right turn lane into Tetlin Village Road • 9 passing lanes on the Richardson Highway (https://dot.alaska.gov/nreg/tetlintofortknox/)
Fort Knox	Past	Existing Infrastructure and Permitting	Mill and Tailings Storage Facility, with associated infrastructure and permitting
Subsistence	Past, Current, RFFA	Subsistence Activities	Past, present, and future subsistence activities in the Tetlin Hills
Recreation	Past, Current, RFFA	Recreation Activities	Past, present, and future recreation activities in the Tetlin Hills
Mineral Exploration	Past, Current, RFFA	Mineral Exploration	Past, present, and future mineral exploration activities in the Tetlin Hills

5.1.3 Geology, Geochemistry, Permafrost, Soils, Hazardous Materials

No significant impact to these resources are anticipated from past, present, and RFFAs. Transportation, recreation, subsistence, and mineral exploration activities have limited impacts, and are too small of disturbances to have a greater than negligible impact for these resources.

5.1.4 Water Resources

Past, present, and RFFAs that could contribute to cumulative effects include transportation and mineral exploration. Surface water could be impacted by placement of fill to build infrastructure, crossing of water bodies, and inadvertent spills of materials (e.g. fuel). With environmental permitting and spill control requirements, the scale of potential impacts is negligible in comparison with the region's water resources.

No cumulative impacts to ground water or floodplains are anticipated from past, present or RFFAs.

5.2 BIOLOGICAL ENVIRONMENT

5.2.1 Wetlands and Vegetation

Past, present, and RFFAs that could contribute to cumulative effects include transportation and mineral exploration. These activities could require fill to be placed in wetlands and vegetation. Given the large expanse of undeveloped wetlands and vegetation mapped by the National Wetland Inventory (NWI) (USFWS 2021a) throughout the region, any potential takes from these activities would be a very small fraction of existing wetlands. Due to this small potential impact, cumulative impacts are anticipated to be negligible.

5.2.2 Fish, Birds, Wildlife

Past, present, and RFFAs that could contribute to cumulative effects include transportation, subsistence, recreation, and mineral exploration. Transportation and mineral exploration can develop infrastructure in existing habitat, create noise which causes animals to avoid habitat, and cause direct impacts (e.g., collisions, inadvertent fuel spills). Given the large expanse of fish, bird, and wildlife habitat in the surrounding area, any potential impacts from these activities would be a very small fraction of existing resources. Cumulative impacts for transportation and mineral exploration would be negligible.

Unregulated subsistence and recreation activities have the potential to impact fish, bird, and wildlife resources. Subsistence and recreation activities are anticipated to continue into the future and are assumed to follow state and federal regulations. The state and federal agencies actively manage fish, bird, and wildlife populations in the region. Agencies are anticipated to be able to respond to any overharvest of resources by publishing new regulations. The cumulative impacts to these resources are anticipated to be negligible.

5.3 SOCIAL AND ECONOMIC ENVIRONMENT

5.3.1 Subsistence

Past, present, and RFFAs that could contribute to cumulative effects include transportation, recreation, and mineral exploration. Transportation and mineral exploration can develop infrastructure which can both increase and decrease the impact to subsistence. Infrastructure would fill natural habitat, decreasing the habitat available to subsistence resources. Infrastructure would also provide greater access for subsistence users to engage in traditional activities. One of the major hindrances to subsistence is movement over the landscape. The positive and negative impact of either of these activities to subsistence is anticipated to be offset by the large amount of subsistence habitat available in the surrounding area. Impacts to subsistence from transportation and mineral exploration is expected to be negligible.

Recreation can decrease access to subsistence resources by directly competing through sport hunting, sport fishing, and sport trapping. The lands including and surrounding the Tetlin Hills are owned by Tetlin. Recreational activities on these lands require a permit by Tetlin. This level of control allows Tetlin to directly regulate recreation on their lands, and any potential impact to subsistence. Any negative impacts to subsistence from recreation is expected to be negligible.

5.3.2 Cultural Resources

Past, present, and RFFAs that could contribute to cumulative effects include transportation, recreation, subsistence, and mineral exploration. The potential impact from all of the activities are the disturbance of existing cultural resources. Transportation and mineral exploration activities require survey and permitting of potential impacts to cultural resources and are unlikely to have a significant cumulative impact for the region.

Recreation or subsistence activities generally do not disturb intact cultural resources. Vandalism is a risk from activities near sites, but sites are kept confidential at the SHPO. Cumulative impacts from recreation or subsistence activities to cultural resources are anticipated to be negligible.

5.3.3 Land Use

Past, present, and RFFAs that could contribute to cumulative effects include transportation, recreation, and mineral exploration. The lands in the Tetlin Hills are owned by Tetlin, who also sets the land use plans for both surface and subsurface use. This provides direct control to Tetlin to use the land in conformance with their land use plans. Tetlin also has the ability to prevent non-compliant uses. Given this control, cumulative negative impacts to transportation, recreation, and mineral exploration are negligible.

5.3.4 Recreation

Past, present, and RFFAs that could contribute to cumulative effects include transportation and mineral exploration. Similar to subsistence, transportation and mineral exploration projects can both increase and decrease recreation. Development projects can negatively destroy recreation resources, or indirectly impact resources through noise, visual, or other impacts. Any of these negative impacts are anticipated to be prevented by the environmental permitting process. The infrastructure provided by the construction of roads can increase access to recreational resources throughout the region. The lands surrounding the Tetlin Hills are owned by the community of Tetlin. Recreational activities on these lands require a permit by Tetlin. Overall, any proposed projects are not anticipated to have beyond a negligible impact to recreation.

5.3.5 Socioeconomics

Past, present, and RFFAs that could contribute to cumulative effects include transportation, recreation, and mineral exploration. Both activities can provide increases in economic activity in the region, from direct sales to indirect activities such as food and lodging. The regional economy is largely based on the transportation network running through the Upper Tanana Valley, and increased spending would improve local incomes.

These activities could also have negative socioeconomic effects, including causing strains on social services such as police, fire, health care, housing, and utilities. None of the RFFAs are anticipated to be of a scale large enough to have a negative impact on socioeconomics. The current infrastructure is sized to accommodate these potential activities.

Overall, the potential impact to socioeconomics is either negligible or positive.

5.3.6 Environmental Justice

Past, present, and RFFAs that could contribute to cumulative effects include transportation, recreation, subsistence, and mineral exploration. Tetlin Village and Tok are both environmental justice populations. Positive impacts from the potential cumulative impacts include the addition of jobs, income, and infrastructure to these communities. Recreation and subsistence also improves the quality of life of residents in Tetlin Village and Tok, although in ways more difficult to quantitatively measure.

Negative impacts are anticipated to be negligible given the current permitting requirements for transportation and mineral exploration. Tetlin also owns the surface and subsurface rights, and so controls the activities on their land in the Tetlin Hills, further decreasing the potential for a negative impact.

Cumulative impacts to environmental justice communities are anticipated to be positive.

5.3.7 Traffic

Past, present, and RFFAs that could contribute to cumulative effects include transportation and mineral exploration. The transportation projects are anticipated to have a positive impact to cumulative traffic. The proposed improvements have long been desired by the area communities.

Mineral exploration is not expected to increase traffic in the region. Individual exploration programs would increase local traffic for seasonal periods of time. These increases from mineral exploration are considered negligible given the quantity of traffic on area roads.

6.0 COMMUNITY ENGAGEMENT

Appendix C provides a table of community engagement that has taken place since 2020, and examples of community engagement presentations and newsletters.

Since May 1, 2020 the project has held at least 71 engagement activities, with over 1,200 cumulative attendees.

This project has made a concerted effort to engage with the community and change the Proposed Action to respond to community comments. The project plans to continue community engagement throughout the life of the Proposed Action.

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APPENDIX A

Alternatives Analysis

Appendix A ALTERNATIVES ANALYSIS

Beyond the Proposed Action, the project evaluated a series of alternatives (Figure A.1). These are summarized briefly here, and with further detailed analysis for each resource category below.

A.1 ALTERNATIVE 1: ORE PROCESSING AND TAILING DISPOSAL AT MANH CHOH MINE

Under this alternative, ore processing and tailings disposal would be conducted at the proposed Manh Choh Mine site. The project was originally viewed as a conventional mine development with onsite milling. It was envisioned the ore would be mined from open pits and hauled to an onsite mill where the ore would be crushed and run through a cyanide mill circuit to recover gold. Onsite milling requires the construction of both a mill and a tailings disposal facility. The conventional mine design with a crusher and mill generates tailings (waste) that would have to be permanently stored in a tailing's storage site on Tetlin Lands.

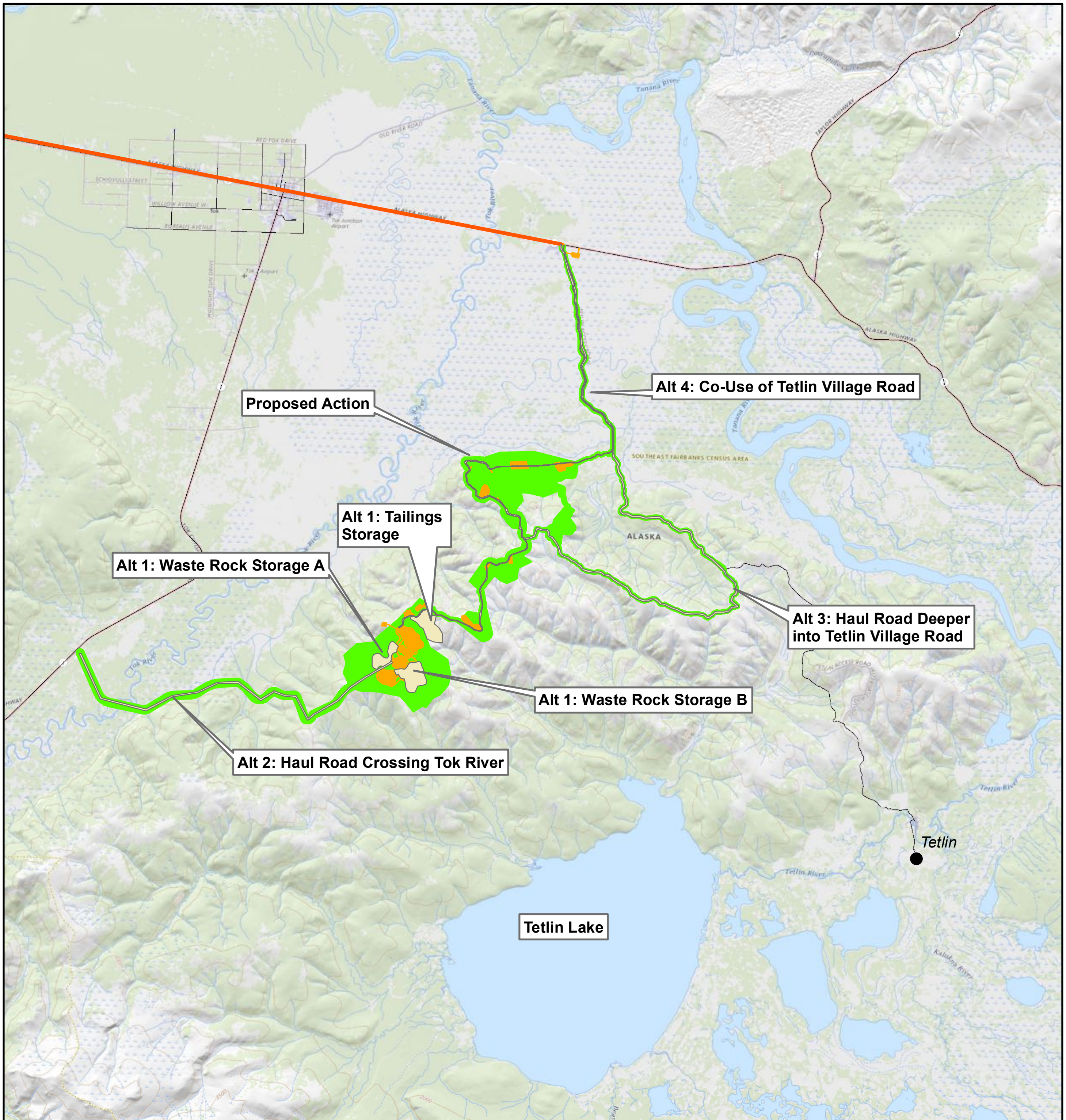
This alternative would eliminate the need for transportation of ore to Fort Knox, and the use of existing facilities at Fort Knox for ore processing, gold recovery, and tailings disposal.

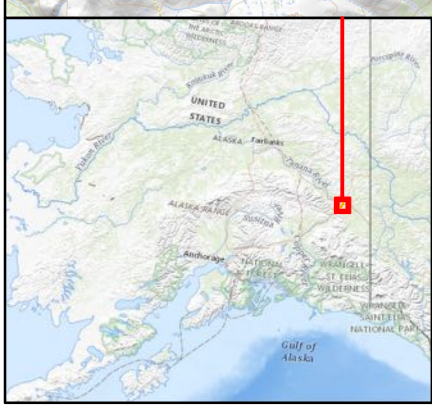
This alternative would have the negative impacts of requiring on site ore processing and long-term tailing storage. A mill would consume more power than is available locally and would require development of additional power generation. Additional water resource development would be required for the mill operations. Onsite cyanide use would pose the potential for hazardous releases to the environment. Construction of a permanent tailings storage facility would increase the potential impact to land and water resources.

This alternative would increase impacts related to ground disturbance to most resources due to the requirement for greater construction footprint needed for facilities and water management.

A.2 ALTERNATIVE 2: HAUL ROAD CROSSING TOK RIVER

Under this alternative, a haul road would be constructed across the Tok River. This alternative was assessed to determine if it was feasible to construct a road that allowed greater access to the Tetlin Hills area, and a safer slope gradient. This alternative was found to increase impacts in almost all categories, including fill material being placed in wetlands and a bridge across the Tok River. This would increase the potential impacts to most resources, with no decrease in impacts in any resource category.





Manh Choh Project

- Alternative Study Area
- Proposed Action
- Transportation Corridor

0 1 2 3 Miles

N W E S

(At original document size of 8.5x11)
1 inch = 3.16 miles
1:200,000

Client Peak Gold LLC

Project Manh Choh Project

Figure **Manh Choh Alternatives**

Figure Number

A.1

A.3 ALTERNATIVE 3: HAUL ROAD DEEPER INTO TETLIN VILLAGE ROAD

Under this alternative, the project considered a different mine access road alignment from the Tetlin Village Road. This access would start approximately 9 miles down the Tetlin Village Road, and then branch off and follow the topography towards the proposed mine area. This alternative was originally thought to have the potential for lower grade sections, allowing for safer traffic. Further engineering revealed that the Proposed Action had better grade for the roads and was shorter. Alternative 3 was also found to increase disturbed area from fill material, and would increase the potential impacts to most resources. Alternative 3 would also have increased safety issues due to the longer length of co-mingled mine and Tetlin village traffic.

A.4 ALTERNATIVE 4: CO-USE OF TETLIN VILLAGE ROAD

Under this alternative, the project considered co-locating mine traffic and village traffic both on the same Tetlin Village Road. The Proposed Action, in contrast, proposes to build a Twin Road to separate the traffic. Co-use of the same road would have resulted in less impacts to some resources (e.g. wetlands) but would have negative potential life and safety impacts to Tetlin Village residents. Even one vehicle accident between Tetlin Village residents and an industrial vehicle would have negative ramifications.

A.5 RESOURCE CATEGORIES ALTERNATIVE ANALYSIS

To facilitate alternative analysis, a planning level screening of each resource category was conducted for each alternative. This analysis was used to inform the more detailed studies described in the Affected Environment and Environmental Consequences analysis focused on the Proposed Action and No Action alternatives. As a result, the planning level screening is more qualitative and has a greater reliance on desktop resources. Table A.1 provides a visual summary of the relative impact for each alternative.

Soil, socioeconomics, and environmental justice did not have a difference between alternatives. These resource categories are not discussed in detail.

Table A.1 Alternatives Impact Summary

	Proposed Action	Alt 1: Ore Processing and Tailing Storage at Manh Choh	Alt 2: Haul Road Crossing Tok River	Alt 3: Haul Road Deeper into Tetlin Village Road	Alt 4: Co-Use of Tetlin Village Road
Physical and Chemical Environment					
Air Quality	Less Impact	More Impact	More Impact	More Impact	Less Impact
Climate Change	Middle Impact	Less Impact	More Impact	More Impact	Less Impact
Noise	More Impact	Less Impact	-	-	-
Visual	Middle Impact	Most Impact	Most Impact	Most Impact	Less Impact
Hazardous Materials	Less Impact	More Impact	-	-	-
Geology and Geochemistry	Less Impact	More Impact	-	-	-
Permafrost	Less Impact	More Impact	More Impact	More Impact	Less Impact
Water Resources	Middle Impact	More Impact	More Impact	More Impact	Less Impact
Soils	-	-	-	-	-
Biological Environment					
Wetlands	Middle Impact	More Impact	More Impact	More Impact	Less Impact
Vegetation	Middle Impact	More Impact	More Impact	More Impact	Less Impact
Fish	Less Impact	-	More Impact	-	-
Birds	Middle Impact	More Impact	More Impact	More Impact	Less Impact
Wildlife	Middle Impact	More Impact	More Impact	More Impact	Less Impact
Social and Economic Environment					
Subsistence	Middle Impact	More Impact	More Impact	More Impact	Less Impact
Cultural Resources	Middle Impact	More Impact	More Impact	More Impact	Less Impact
Land Use	Middle Impact	More Impact	More Impact	More Impact	Less Impact
Recreation	Middle Impact	-	More Impact	-	Less Impact
Socioeconomics	-	-	-	-	-
Environmental Justice	-	-	-	-	-
Traffic	Less Impact	Less Impact	-	More Impact	More Impact

A.5.1 Air Quality

Alternative 1, 2, and 3 will have an increase in impacts to air quality, when compared to the Proposed Action. For Alternative 1, the emissions to construct and operate a new mill, new tailings storage facility, and new power plant in the Tetlin Hills could be similar or greater than the emissions to truck ore to Fort Knox and conduct these operations at existing infrastructure. This is particularly true given the short life (4.5 years) of the Proposed Action.

Alternative 2 and 3 would result in greater emissions from the larger infrastructure development. Larger infrastructure development requires more heavy equipment operations, which would result in more emissions.

Alternative 4 would have similar air quality impacts, as traffic would still occur on both roads.

A.5.2 Climate Change

Alternative 1 would avoid the emissions from trucking to Fort Knox from Manh Choh Mine. Alternative 1 would add emissions from the construction of a larger facility at Manh Choh to house all of the mine components. It would also add emissions from the construction/operation/deconstruction of the mill, and power plant, at the Manh Choh Mine. Overall, Alternative 1 would likely results in similar, or possibly reduced, greenhouse gas emissions.

Alternative 2, and 3 will have an increase in impacts to climate change. All of these alternatives require larger infrastructure. In order to construct more infrastructure, more heavy equipment would be operated. This would increase the amount of fossils fuels burned by heavy equipment, and so emissions of greenhouse gases would increase. This is particularly true for the construction and operations of a smaller, less efficient on-site mill and tailings storage facility.

Alternative 4 would have the least emissions, due to the lower acres of disturbance from not constructing a new access road to the Alaska highway. This is offset by the increased safety the new road provides.

A.5.3 Noise

Alternative 1 would have a decrease in noise impacts along the highway corridor. Noise impacts from the Proposed Action would occur along the highway for the truck haul from Manh Choh Mine to Fort Knox. It is important to note, that the noise analysis found the Proposed Action's increase in highway noise is small.

Alternative 1 would eliminate the noise from hauling to Fort Knox. Alternative 1 would still require some truck traffic that the Proposed Action would not, including trucking of processed product from Manh Choh, the trucking to install and deconstruct the new mill that would be required at the Manh Choh Mine, and trucking of materials for use at the Manh Choh Mine.

Alternative 1's decrease in noise impacts (compared to the negligible increase in the Proposed Action) must be compared to the increased impacts in almost all of the other resources categories. Given those comparisons, the increase in noise for the Proposed Action was determined to be the most practicable alternative due to the decrease in impacts for the other resources.

Alternative 2, 3, and 4 would not have a difference in noise from the Proposed Action.

A.5.4 Visual

Alternative 1, 2, and 3 would have increased visual impacts. Each of the alternatives would require additional infrastructure construction (e.g., roads, milling facility, tailings facility). Those alternatives would remove native vegetation, change the natural topography, build infrastructure, and increase visual disturbance in the area. Visual impacts are particularly important to minimize for the residents and subsistence users of Tetlin. These stakeholders wish to continue to practice traditional activities, while having an operating mine, with minimal impacts to the viewsheds.

Alternative 4 would have the least visual impacts. This alternative would not create the new Twin Road paralleling the Tetlin Village Road. This reduction in impact to visual resources must be compared to the increase in risk to human health by co-locating traffic on the Tetlin Village Road. The Proposed Action has higher impacts by constructing a new Twin Road; but lower risks to human health.

A.5.5 Hazardous Materials

Alternative 1 would increase the impact of hazardous materials by locating new ore processing and tailings storage in the Tetlin Hills. Those activities require hazardous materials and introducing them into the project would increase the risk of a release. The Proposed Action avoids these impacts by conducting these activities at Fort Knox, where hazardous materials are safely being used.

Alternative 2, 3, and 4 do not have a difference on hazardous materials. Alternative 2 exposes the Tok River to direct impacts.

A.5.6 Geology and Geochemistry

Alternative 1 would have greater impacts to geology and geochemistry due to the construction of the ore processing and tailings storage in the Tetlin Hills. Both would have significantly greater geochemistry impacts, and the tailings storage facility would require impact monitoring and mitigation for geochemistry into the long term. Under the Proposed Action, these impacts would be avoided by using the existing facilities at Fort Knox. The primary reason to select the Proposed Action was the avoidance of impacts to geochemistry from onsite ore processing and tailings storage.

Alternative 2, 3, and 4 would not have a significant difference in geology and geochemistry.

A.5.7 Permafrost

Alternative 1, 2, and 3 would have greater impacts to permafrost due to the increased footprint of construction in permafrost habitat. The Proposed Action will avoid impacts by minimizing the footprint of the project.

Alternative 4 and the Proposed Action are anticipated to have similar impacts to permafrost, as the access road is being constructed to avoid impacts to permafrost soils.

A.5.8 Water Resources

Alternative 1 would increase the risk to water resource by constructing an ore processing and tailings storage facility in the Tetlin Hills. The Proposed Action will avoid these risks to water resources by not constructing these facilities. These activities will take place in Fort Knox, which already has the constructed capacity to handle these activities. Avoidance of potential water and subsistence impacts is one of the most important issues to the local community in Tetlin Village.

Alternative 2 would involve crossing the Tok River, and Alternative 2, and 3 would both involve greater levels of construction of infrastructure in water resources. These alternatives would have more impacts to water resources than the Proposed Action.

Alternative 4 would have the least impact to waters, avoiding potential impacts to waters along the Tetlin Village Road. These impacts must be compared to the increase in risk to human health by co-locating traffic on the Tetlin Village Road.

A.5.9 Wetlands

For alternative analysis, wetlands were analyzed based on field verified wetland mapping, when available, and National Wetland Inventory (NWI) Mapping when field verified mapping is not available (Table A.2).

Alternative 1 would require larger impacts to wetlands due to the larger required tailings storage facility, mill pad, and additional infrastructure.

The other alternatives focus on access road routing. The primary factor guiding the access road design is the requirement to maintain a safe gradient along the hillsides, requiring some switchbacks and longer routes than simple, steep, hill climbs.

For Alternative 2, 3, and 4 an approximate 198 ft (60 m) wide road corridor was plotted along the alignments. This is similar to the new road width for the Proposed Action.

All alternatives have greater wetland impacts than the corresponding segments of the Proposed Action.

Table A.2 Access Road Alternatives Wetland Impact

Alternative	Wetlands	Waters	Upland	Total
Proposed Action	3.9	0.0	248.4	252.2
Alternative 1	43.5	0.2	658.9	702.6
Alternative 2	89.8	0.9	370.3	461.0
Alternative 3	3.1	0.1	489.6	492.8
Alternative 4	5.6	0.0	206.2	211.8

*Apparent inconsistencies in sums are the result of rounding.

A.5.10 Vegetation

For alternative analysis, the wetland acreage presented in Table A.1 provides the relative comparison of acreage of habitat impacts between each alternative.

Alternative 1, 2 and 3 have larger impacts to vegetation, due to the longer road corridors or mining infrastructure required to be developed.

Alternative 4 had a smaller overall vegetation impact, because the new twin road along the Tetlin Village Road would not be developed. This difference in vegetation impact would be offset by the increased safety risk by mixing industrial and community traffic.

A.5.11 Fish

Alternative 2 would cause potential increases of impacts to fish (Table A.3). The alternative would require crossing the Tok River. The bridge would be designed to minimize the potential impacts to fish, but the Proposed Action would avoid any potential impacts to the Tok River.

Alternative 1, 3, and 4 would not have a difference in impact.

Table A.3 Access Road Alternatives Fish Impacts

	Cross a Fish Bearing Water?
Proposed Action	No
Alternative 1	No
Alternative 2	Yes (Tok River)
Alternative 3	No
Alternative 4	No

A.5.12 Birds and Wildlife

The bird and wildlife habitat impacts would be the same as vegetation and wetlands. Alternative 1, 2, and 3 require larger acreages of impacts to potential habitat due to the larger required infrastructure. Alternative 4 would disturb less habitat but decrease safety by co-mingling industrial and community traffic.

A.5.13 Subsistence

Alternative 1, 2, and 3 may have an increase in impact to subsistence due to the larger acreages of vegetation disturbance. The larger infrastructure footprints have the potential to have increased impacts to subsistence due to the greater habitat losses.

Alternative 4 would have the least impacts to subsistence, by not constructing a twin road parallel to the Tetlin Village Road. These impacts must be compared to the increase in risk to human health by co-locating traffic on the Tetlin Village Road.

Beyond acreage calculations, the construction of the ore processing and mill facilities in the Tetlin Hills were a particular concern for the local subsistence users. Subsistence users would prefer for the chemicals associated with mill and processing activities to not be introduced into the Tetlin Hills area. Under the Proposed Action, these activities to be consolidated at Fort Knox where potential impacts to subsistence in the Tetlin Hills are avoided.

A.5.14 Cultural Resources

Alternative 1, 2, and 3 would require greater disturbances of habitat. These may host larger numbers of cultural resource sites. Detailed cultural surveys were not conducted on all of the alternatives. Consultation with desktop resources indicated that the likelihood for encountering cultural resources existed. This alternative analysis assumes that minimizing the footprint of the project will minimize the impact to undiscovered cultural resources.

Alternative 4 would have the least impact to cultural resources, by not constructing a twin road parallel to the Tetlin Village Road. These impacts must be compared to the increase in risk to human health by co-locating traffic on the Tetlin Village Road.

A.5.15 Land Use

Alternative 1, 2, and 3 would have increases in impacts to land use. They would have greater acreage impacts. Mining is consistent with current land use plans, but local planning documents also emphasize the importance of pairing mining with the least potential impact, to allow continued subsistence activities. Minimizing the impact and size of infrastructure in the Tetlin Hills minimizes the impact to Land Use.

Alternative 4 would have the least impact, by not constructing a twin road parallel to the Tetlin Village Road. These impacts must be compared to the increase in risk to human health by co-locating traffic on the Tetlin Village Road.

A.5.16 Recreation

Alternative 2 would increase impacts to recreation due to the bridge crossing of the Tok River. Installation of a bridge would potentially decrease the quality of water recreation along the river, at minimum visually. The Proposed Action would avoid these impacts by not constructing the bridge or road alternative.

Alternative 4 would have the least impact, by not constructing a twin road parallel to the Tetlin Village Road. These impacts must be compared to the increase in risk to human health by co-locating traffic on the Tetlin Village Road.

Alternative 1 and 3 would not have a difference in impact.

A.5.17 Traffic

Alternative 1 would cause less traffic impacts than the Proposed Action. Alternative 1 would avoid the ore hauling from Manh Choh to Fort Knox. Alternative 1 would cause different increases in highway traffic, including trucking to construct and deconstruct a new mill, and trucking materials to the site for process operations.

Overall, Alternative 1 would result in decreased traffic impacts. This decrease must be compared to the increased impacts in almost all of the other resources categories. Given those comparisons, the increase in traffic impacts for the Proposed Action was determined to be the most practicable alternative due to the decreases in impacts for the other resources.

Alternative 2 would have negligible impact on traffic. The truck traffic would be routed along on a different highway component, but the impacts would be similar. Alternative 2 would put haul traffic through the Tok School Zone, which the Proposed Alternative avoids.

Alternative 3 would cause mining traffic to travel a longer distance and cause increased safety issues on the Tetlin Village Road. This road is used by village members to commute to Tok and the rest of the highway system. The Proposed Action minimizes the length of this road by mining vehicles, which increases the safety to Tetlin residents.

Alternative 4 would have increased traffic danger. Co-locating the Manh Choh and Tetlin traffic would pose a risk for negative interactions between the two types of vehicles. Accidents between the community and mine traffic can best by avoided by designing different physical locations for traffic.

APPENDIX B

Air Quality

Appendix B AIR QUALITY

This appendix presents Air Quality analysis completed by Boreal Environmental Services (2021).

Existing meteorological and ambient air quality data sources available in proximity to the Project area are limited. Peak Gold collected site-specific meteorological data at the proposed Project Mine site (Mine), which is located approximately 11 m (18 kilometers (km)) southeast of Tok and 34 m (55 km) northeast of Northway. This site-specific meteorological data set was collected from November 1, 2020, through October 31, 2021.

Historical weather stations are also limited in the Project area. Available meteorological and climatic data collected at the Northway Airport (PAOR) National Oceanic and Atmospheric Administration (NOAA) Automated Surface Observation Station (ASOS) and at the Tok No. 1 and Tok No. 2 NOAA Cooperative Observer Network (COOP) stations were selected to represent the meteorological and climatological conditions of the Project area. The PAOR climate data are based on a 30-year period of record (1991 through 2020) per World Meteorological Organization (WMO) guidelines. The Tok No. 1 COOP station climate data are based on data collected during the period from 1981 through 2016, due to substantial data gaps after the 2016 observation period. The Tok No. 2 COOP station period of record begins during August 2011 and contains large data gaps during the 2013 through 2014 observation period.

The Linc Energy Umiat ambient air monitoring station is the closest representative ambient air quality station to the Project area located in the Northern Alaska Intrastate Air Quality Control Region. Ambient air quality data collected at the Linc Umiat monitoring program have been reviewed and determined by the Alaska Department of Environmental Conservation (ADEC) to meet U.S. Environmental Protection Agency (EPA) and ADEC Prevention of Significant Deterioration (PSD) data quality standards. Peak Gold anticipates using the Linc Umiat data set as a representative background ambient air quality data set that could be used to demonstrate meeting potential air quality permitting requirements.

The existing meteorology and climatic data sources used to characterize the meteorology and climate of the Project area are summarized in Table B.1.

Table B.1 Existing Meteorological, Climate, and Ambient Air Quality Data Sources

Data Type	Station Name	Station ID	Latitude and Longitude	Data Period	Distance from Project
Climate Data	Northway Airport NOAA ASOS	26412 (WBAN) 70291 (WMO)	62.96, -141.99	1991 through 2020	Southeast 34 miles (55 km)
	Tok AK NOAA COOP	509313 (COOP) USC00509313 (GHCN)	63.33, -143.04	1987 through 2016	Northwest 11 miles (18 km)
	Tok-2 AK NOAA COOP	TOKA2 (NWS)	63.32, -143.01	2011 through 2020	Northwest 10 miles (17 km)
Site-Specific Meteorological Data	Peak Gold Manh Choh Project Meteorological Station	N/A	63.18, -142.89	November 1, 2020 through October 31, 2021	Located at Project
Ambient Air Quality Data	ADEC-Approved Linc Energy Umiat Station	N/A	69.37, -152.14	2013 through 2014	Northwest 491 miles (790 km)

B.1 CLIMATE AND METEOROLOGY

The Project is located in the eastern region of the Southeast Interior climate zone, based on the climate boundary zones identified by NOAA. This continental/subarctic climate zone is characterized by short, warm summers and long, extremely cold winters. The regional climate is highly variable. During the winter ambient temperatures can be low as -65°F and low-level temperature inversions are common in the winter. Precipitation in the Project area generally increases with elevation.

B.2 AIR TEMPERATURE

Table B.2 provides a summary of the monthly mean, maximum, and minimum surface air temperatures and the maximum and minimum daily surface air temperatures observed per month at the proposed Project, Northway Airport NOAA ASOS, and Tok NOAA COOP stations. Note that the Project temperature statistics are based on twelve months of observations while the respective Northway Airport and Tok No. 1 temperature statistics are each based on 30 years of observations.

The lowest temperatures typically occur during January and February and the highest temperatures typically occur in June and July. This temperature pattern is consistent with the continental and subarctic climate conditions in Interior Alaska.

B.3 WIND

A wind rose for the Northway Airport based on wind data collected during the period from January 1, 1991, through December 31, 2020, is provided in Figure B.1. The Northway Airport wind rose shows a bimodal wind pattern with prevailing winds typically from the northeast and east-southeast directions, which generally runs parallel to the Alaska Range. The annual average wind speed observed at the Northway Airport is 2.32 meters per second (m/s).

Figure B.2 provides an annual wind rose based on wind data collected at the Manh Choh Project monitoring station during the period from November 1, 2020, through October 31, 2021. The wind rose shown in Figure B.2 indicates prevailing winds at the proposed Project location are typically from the northeast direction and south-southeast and east-southeast directions, with a west-southwest wind component. The annual average windspeed observed at the Project meteorological monitoring station during the period from November 1, 2020, through October 31, 2021, was 5.2 m/s.

Table B.2 Surface Air Temperatures at the Project, Northway Airport, and Tok Monitoring Locations

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Manh Choh Mine Site [1]													
Maximum Daily Mean Temperature (°F)	24.2	13.6	24.5	46.8	51.0	62.1	64.6	66.7	53.8	29.6	18.4	28.3	66.7
Minimum Daily Mean Temperature (°F)	-14.2	-27.9	-12.9	-14.8	29.1	39.7	48.2	30.5	17.0	11.9	-14.4	-15.1	-27.9
Mean Temperature (°F)	7.4	-6.5	6.1	23.8	41.2	52.6	55.9	49.3	35.9	22.4	4.0	4.6	24.9
Maximum Temperature (°F)	31.1	19.2	28.7	53.4	57.8	69.3	73.2	76.0	59.1	35.8	22.8	32.3	76.0
Minimum Temperature (°F)	-16.9	-31.1	-15.9	-17.3	19.5	37.0	43.6	28.4	15.7	8.1	-21.3	-17.6	-31.1
Northway Airport [2]													
Maximum Daily Mean Temperature (°F)	29.5	26.5	42.5	53.5	64.5	73.0	71.0	70.5	62.5	50.5	26.5	28.5	73.0
Minimum Daily Mean Temperature (°F)	-55.0	-51.0	-32.0	-4.0	22.0	38.0	45.5	37.5	10.5	-20	-42	-49.5	-55.0
Mean Temperature (°F)	-13.9	-4.6	7.6	30.5	46.5	56.5	59.3	54.3	42.6	22.5	-1.3	-11.4	24.2
Maximum Temperature (°F)	43	41	56	74	84	92	86	88	77	68	34	51	92
Minimum Temperature (°F)	-61	-60	-50	-27	10	25	35	26	-4	-36	-49	-55	-61
Tok No. 1 [3]													
Maximum Daily Mean Temperature (°F)	33.5	28.0	47.9	56.0	65.5	78.0	75.0	79.0	60.5	52.4	31.0	26.5	79.0
Minimum Daily Mean Temperature (°F)	-58.5	-51.0	-32.5	-4.0	24.5	37.0	46.5	34.5	18.1	-22.5	-48.0	-52.4	-58.5
Mean Temperature (°F)	-11.0	-1.4	10.1	31.9	46.4	56.6	59.7	53.9	42.2	22.7	0.4	-10.7	25.3
Maximum Temperature (°F)	39	40	58	74	85	96	95	93	73	65	39	34	96
Minimum Temperature (°F)	-63	-60	-52	-33	10	18	27	13	4	-41	-51	-57	-63

Sources: [1] Boreal Environmental Services, 2021, Manh Choh Project Meteorological Data - Period of Record (November 1, 2020, through October 31, 2021).
[2] National Centers for Environmental Information, NOAA NWS ASOS PAOR station meteorological data, calendar years 1991 through 2020.
[3] National Centers for Environmental Information, Tok GHCN (Station ID: USC00509313) data, calendar years 1987 through 2016

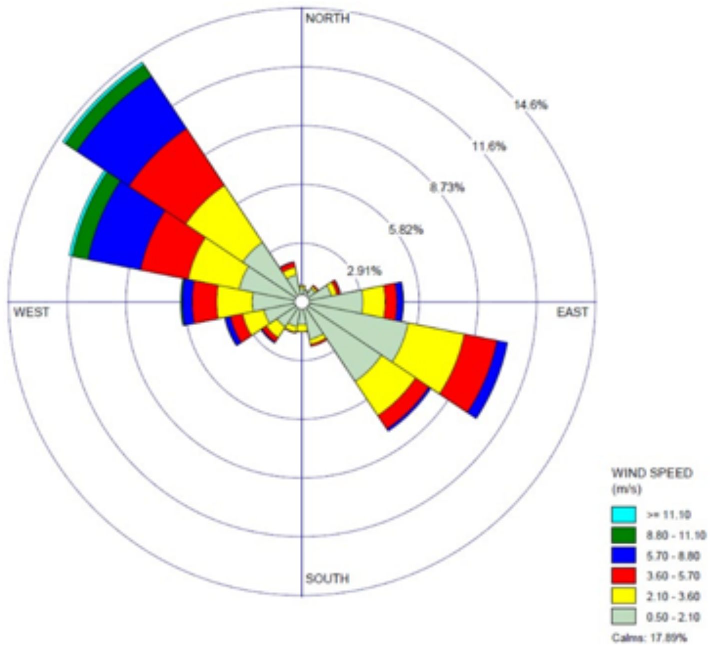


Figure B.1 Northway Airport Annual Wind Rose, January 1, 1991, through December 31, 2020

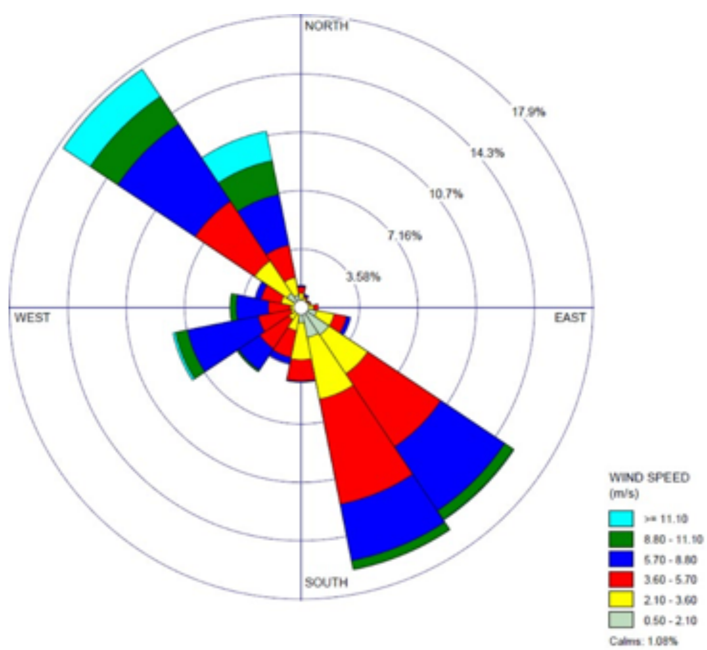


Figure B.2 Manh Choh Project Annual Wind Rose November 1, 2020, through October 31, 2021

B.4 RELATIVE HUMIDITY, BAROMETRIC PRESSURE, AND SOLAR RADIATION

Table B.3 summarizes of the relative humidity, barometric pressure, and solar radiation observed at the Manh Choh Project Meteorological Monitoring Station. The mean solar radiation measurements are consistent with the seasonal changes between summer and winter seasons. Higher solar radiation measurements are observed during the summer months, when the region experiences increased daily hours of sunlight.

Table B.3 Manh Choh Project Station Relative Humidity, Barometric Pressure, and Solar Radiation

Period	Mean Barometric Pressure (mb)	Minimum Barometric Pressure (mb)	Maximum Barometric Pressure (mb)	Mean Relative Humidity (%)	Minimum Relative Humidity (%)	Mean Solar Radiation (W/m^2)	Maximum Solar Radiation (W/m^2)
November 2020	884	862	901	83.6	57.5	13	228
December 2020	881	863	897	81.5	54.1	3	121
January 2021	881	860	901	83.1	52.0	9	191
February 2021	890	862	909	77.6	56.6	38	468
March 2021	887	867	906	75.0	44.1	103	581
April 2021	896	876	915	52.6	22.4	205	743
May 2021	894	854	906	60.6	14.2	211	875
June 2021	894	880	905	61.5	19.7	241	869
July 2021	898	889	906	59.5	22.5	228	840
August 2021	894	879	904	73.7	23.6	152	776
September 2021	887	872	898	77.9	40.7	105	643
October 2021	881	865	899	91.0	64.0	40	392
Monitoring Year	889	854	915	73.2	14.2	112	875

Source: Boreal Environmental Services, 2021, Manh Choh Project Meteorological Data - Period of Record (November 1, 2020, through October 31, 2021).

B.5 PRECIPITATION

Table B.4 provides a summary of precipitation statistics based on measurements collected at the Northway Airport NOAA ASOS station and Tok NOAA COOP stations, respectively. The Northway precipitation climate data is based on data collected during 1991 through 2020 period of record. The Tok No. 1 COOP station data period of record is from 1987 through 2016. The Tok No. 2 COOP station data period of record is from 2012 through 2020, which has substantial data gaps in 2013 and 2014.

Precipitation usually accumulates during the late-spring, summer, and early-fall months. Snowfall typically occurs in the months of September through May. On average, Northway and Tok experience approximately 37.4 inches and 40.8 inches of total snowfall per year, respectively. The annual average precipitation observed at the Northway Airport ASOS, Tok No. 1 station, and Tok No. 2 station was 10.64 inches, 11.25 inches, and 12.27 inches, respectively.

The mean annual precipitation at the Project location was 10.97 inches based on measurements collected during the Manh Choh Project Meteorological monitoring year (Boreal 2021).

Table B.4 Surface Air Temperatures at the Project, Northway Airport, and Tok Monitoring Locations

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Northway Airport [1]													
Average Total Precipitation (in)	0.24	0.14	0.14	0.19	0.94	2.26	2.91	1.80	1.06	0.4	0.35	0.23	10.64
Maximum Total Precipitation (in)	0.97	0.82	0.95	0.71	2.15	5.68	6.49	5.45	3.52	1.22	1.06	0.69	18.69
Average Total Snowfall (in)	6.2	5.2	3.4	1.2	1.7	0	0	0	1.9	6	10	6.9	37.4
Tok No. 1 [2]													
Average Total Precipitation (in)	0.43	0.20	0.19	0.19	0.79	2.31	2.18	1.30	0.98	0.69	0.61	0.61	11.25
Maximum Total Precipitation (in)	1.31	0.96	0.49	1.06	2.02	6.69	5.11	2.86	3.17	2.26	1.94	1.80	21.35
Average Total Snowfall (in)	4.9	3.4	3.2	2.4	0.9	0	0	0	1.9	6.6	8.0	7.5	40.8
Tok No. 2 [3]													
Average Total Precipitation (in)	0.50	0.25	0.31	0.43	1.13	2.46	2.52	1.74	0.74	0.94	0.74	0.52	12.27
Maximum Total Precipitation (in)	1.15	0.88	0.8	0.6	1.7	4.37	4.55	3.65	1.91	2.03	1.16	1.23	16.81

Notes:

[1] National Centers for Environmental Information, PAOR station meteorological data, calendar years 1991 through 2020.

[2] NOAA National Climate Data Center, Tok GHCN (Station ID: USC00509313) data, calendar years 1987 through 2016.

[3] Iowa State University, Iowa Environmental Mesonet, Tok No. 2 (Station ID TOKAA2) data, calendar years 2012, and 2015 through 2020

B.6 AIR QUALITY

Under the Clean Air Act, the U.S. Environmental Protection Agency (EPA) established National Ambient Air Quality Standards (NAAQS) for six criteria air pollutants that are considered harmful to public health and the environment. The six criteria pollutants are: nitrogen dioxide (NO_2), carbon monoxide (CO), particulate matter (particulate matter with an aerodynamic diameter less than 10 microns (PM_{10}) and particulate matter with an aerodynamic diameter less than 2.5 microns ($PM_{2.5}$)), sulfur dioxide (SO_2), ozone (O_3), and lead (Pb). Under Title 18 Alaska Administrative Code (18 AAC) 50.010, the State of Alaska adopted the federal NAAQS as Alaska Ambient Air Quality Standards (AAAQS) and established state ambient standards for two other air pollutants, reduced sulfur compounds and ammonia (NH_3).

EPA has identified primary and secondary NAAQS. Primary standards have been established to protect public health of sensitive populations such as the elderly, children, or asthmatics. Secondary standards have been established for public welfare protection, including protection against decreased visibility, impairment and preventing damage to crops, livestock, and vegetation.

The Project is located in the Northern Alaska Intrastate Air Quality Control Region. EPA has designated the Project area as in attainment or unclassifiable for all criteria air pollutants. The closest nonattainment area to the Project is the Fairbanks North Star Borough (FNSB) $PM_{2.5}$ Nonattainment Area located approximately 155 miles (250 km) to the northwest.

Table B.5 provides a summary of representative baseline ambient air data collected from July 1, 2013, through June 30, 2014, at the Linc Umiat PSD ambient air monitoring station compared with the NAAQS and AAAQS.

Ambient air quality in Alaska is managed by ADEC under Alaska Air Quality Control Regulations (18 AAC 50) and the EPA-approved state implementation plan (SIP). As part of the air permitting process for the Project, ADEC would review the potential effects due to emissions from the proposed Project. ADEC would issue an air quality construction permit for the proposed Project only after an adequate demonstration of compliance with all applicable ambient air quality standards is made and the protection of public health and welfare is assured.

Table B.5 Summary of Ambient Background Concentrations Compared with NAAQS/AAAQS

Air Pollutant	Primary/Secondary	Averaging Period	NAAQS [1]	AAAQS [2]	Ambient Background Data [3]
NO_2	Primary	1 hour [4]	100 ppb	100 ppb	32 ppb
	Primary and Secondary	Annual	53 ppb	53 ppb	1 ppb
CO	Primary	1 hour [5]	35 ppm	35 ppm	0 ppb
	Primary	8 hour [5]	9 ppm	9 ppm	0 ppb
PM_{10}	Primary and Secondary	24 hour [6]	150 µg/m³	150 µg/m³	20 µg/m³
$PM_{2.5}$	Primary	Annual [7]	12 µg/m³	12 µg/m³	2.3 µg/m³
	Secondary	Annual [7]	15 µg/m³	15 µg/m³	14.2
	Primary and Secondary	24 hour [8]	35 µg/m³	35 µg/m³	7 µg/m³
SO_2	Primary	1 hour [9]	75 ppb	75 ppb	2.0 ppb
	Secondary	3 hour [10]	0.5 ppm	0.5 ppm	0.002 ppm
	N/A[11]	24 hour [5]	None	365 µg/m³	5 µg/m³
	N/A[11]	Annual	None	80 µg/m³	0.3 µg/m³
O_3	Primary and Secondary	8 hour [12]	0.070 ppm	0.070 ppm	0.050 ppm
Pb	Primary and Secondary	3 month	0.15 µg/m³	0.15 µg/m³	NA [13]
NH_3	None	8 hour	None	2.1 mg/m³	NA [13]

Table Notes:

[1] National Primary and Secondary Ambient Air Quality Standards, 40 CFR 50, October 1, 2015. Alaska Ambient Air Quality Standards.

[2] State of Alaska Ambient Air Quality Standards, 18 AAC 50.010, December 25, 2020.

[3] Linc Energy Umiat ambient air data collected 2013-2014 accessed through ADEC Industrial Data Summary (https://dec.alaska.gov/air/air-permit/dispersion-modeling/industrial-data-summary052218).

[4] The standard is based on the 3-year average of the 98th-percentile of the annual distribution of 1-hour daily maximum NO_2 concentrations.

[5] Not to be exceeded more than once per year.

[6] Not to be exceeded more than once per year on average over 3 years.

[7] Annual mean averaged over 3 years.

[8] The form of this standard is the 3-year average of the 98th percentile of annual 24-hour average concentrations.

[9] The form of this standard is the 3-year average of the 99th percentile of the annual distribution of 1-hour daily maximum SO_2 concentrations.

[10] The form of this standard is the annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years.

[11] Not applicable. EPA revoked the annual and 24-hour SO_2 standards on June 22, 2010 (75 FR 35520, June 22, 2010).

[12] Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years.

[13] Not available.

APPENDIX C

Community Engagement

Appendix C Table of Contents

C.1 2020 – OCTOBER 2021 COMMUNITY ENGAGEMENT

Manh Choh Project-to-Date Community Engagements
as of 10/27/21

2020 - Oct 2021 Community Engagement			
Date	**Group**	**Topics Covered**	**# Attendees**
5/1/2020	**Tetlin Village Council**	Project update, safety, Q&A	7
5/15/2020	**Tetlin Village Council**	Project info, Q&A	6
5/28/2020	**Tetlin Village Council**	Project info, Q&A	8
6/2/2020	**Tetlin Village Council**	Project info, Q&A	7
6/11/2020	**Tetlin Village Council**	Project info, Q&A	6
6/29/2020	**Tetlin Village Council**	Project info, Q&A	7
7/13/2020	**Tetlin Village Council**	Project info, Q&A	7
8/17/2020	**Tetlin Village Council**	Project info, Q&A	6
9/18/2020	**Tetlin Village Council**	Project info, Q&A	8
9/23/2020	**Tetlin Village Council**	Project info, Q&A	7
9/29/2020	**Tetlin Village Council**	Project info, Q&A	7
9/30/2020	**Senator Murkowski**	project update - acquisition announcement	1
9/30/2020	**Tanana Chiefs Conference**	project update - acquisition announcement	3
9/30/2020	**Doyon Limited - CEO**	project update - acquisition announcement	2
9/30/2020	**Tetlin Native Corp**	Project update, acquisition announcement	1
9/30/2020	**Tok Native Association**	Project update, acquisition announcement	1
9/30/2020	**Office of the Governor**	Project update, acquisition announcement	1
10/5/2021	**Village of Tanacross**	Project update, acquisition announcement	1
10/6/2020	**City of Delta Junction**	project update - acquisition announcement, to mayor, city administrator	3
10/9/2020	**Tetlin Village Council**	Project info, timeline, dust, Q&A	5
10/12/2020	**Alaska Trucking Association**	project update - acquisition announcement	2
10/30/2020	**Tetlin Village Council**	Project info, Q&A	7
11/5/2020	**Native Village of Tetlin**	Virtual village meeting on project, jobs, timeline, trucking, reclamation	4
11/8/2020	**Native Village of Tetlin**	Virtual -- timeline, jobs, environment	14
11/17/2020	**Native Village of Tetlin**	Virtual -- village meeting on project, jobs, timeline, trucking, reclamation	10
11/19/2020	**UAF Tok Campus**	education and training	3
12/8/2020	**Tok Community Meeting**	project update, reclamation plans, trucking, employment, Q&A -- - Chamber of Commerce sponsored	29

Manh Choh Project-to-Date Community Engagements
as of 10/27/21

2020 - Oct 2021 Community Engagement			
Date	**Group**	**Topics Covered**	**# Attendees**
12/9/2020	**Tanana Chiefs Conference**	trucking, training, project update, jobs, infrastructure, Q&A	4
12/9/2020	**Dept of Transportation**	transportation plans, working together	3
12/17/2020	**Tetlin Village Council**	Project info, jobs, infrastructure, Q&A	4
12/18/2020	**Dept of Transportation**	project overview, Q&A	2
1/21/2021	**Alaska Resource Development Council**	project overview, Q&A	85
1/26/2021	**Alaska Trucking Association**	road infrastructure, project update, traffic concerns,	2
2/3/2021	**Alaska State Troopers - Tok Post**	project overview, Q&A	2
2/3/2021	**Upper Tanana Health Center**	project overview, Q&A	3
2/4/2021	**Alaska Gateway School District**	ARE, youth support, hiring policies, partnerships, housing,	1
2/4/2021	**DOT- Tok**	project plan	2
2/4/2021	**Tetlin Refuge**	Overall company update, project update, fishing, subsistence, jobs, local hire policy, TU partnership, migration routes, reclamation	3
2/4/2021	**UAF Tok Campus**	hiring, skillsets, facilities maintenance, funding,	1
2/9/2021	**Doyon**	education, life skills, partnerships learnings	3
2/22/2021	**Tetlin Village Council**	infrastructure, hiring process, trucking, training, camps/housing, road alternatives,	5
2/24/2021	**City of Delta Junction**	mayor, deputy: project update, traffic safety, Q&A,	2
2/24/2021	**Tanana Chiefs Conference**	workforce development learnings	2
4/6/2021	**City of Delta Junction/community; live on-air**	Project update and timeline, jobs, trucking concerns, Q&A (approx. # listeners)	100
4/8/2021	**Tanana Chiefs Conference**	Project overview, training plans, local hiring plans, Q&A	3
4/9/2021	**Alaska Miners Association**	project overview, trucking safety, Q&A	124
4/20/2021	**Greater Fairbanks Chamber of Commerce**	Project overview	168
4/21/2021	**Alaska Dept. of Fish and Game**	Project overview, introductions	2
4/26/2021	**Rep. Prax**	Project update	1
5/18/2021	**Northway Natives (Village of Northway)**	Met with leadership, job opportunities, project overview, trucking, training, subsistence advisory council, infrastructure, schedule,	19
5/18/2021	**Tetlin Village Council**	donations, infrastructure, cultural study, jobs, trucking	9
5/19/2021	**Mentasta Lake**	project update, Q&A	16

Manh Choh Project-to-Date Community Engagements
as of 10/27/21

2020 - Oct 2021 Community Engagement			
Date	**Group**	**Topics Covered**	**# Attendees**
5/19/2021	**Village of Tanacross**	Planned community meeting cancelled out of respect due to community tragedy; provided update to leadership	3
6/2/2021	**Tanana Chiefs Council**	tour of site for Chief Simon and TCC staff	5
6/14/2021	**Tok Community Meeting**	BBQ for community, answer questions, jobs, project information	180
6/15/2021	**Delta Community Meeting**	BBQ for community, answer questions, Project update, traffic, safety, community resources, Q&A	28
6/16/2021	**Fox Community Meeting**	BBQ for community, answer questions, traffic, road infrastructure, local/indigenous hiring	26
7/7/2021	**Interior Delelgation**	Legislative tour of site with interior delegates to inlcude Sen Bishop and Rep Cronk	7
7/8/2021	**Native Village of Tetlin**	open house, Q&A, job information, reclamation --- in Tetlin	86
7/22/2021	**Tetlin Village Council**	road design considerations, jobs/drilling update, wetlands mitigation, infrastructure, cultural/archaeologysurvey results, socioeconomic results	8
8/5/2021	**Tanana Chiefs Conference**	jobs, employment, training, transportation, housing	3
8/23/2021	**UAF Tok Campus**	Tetlin area education courses, job readiness,	2
9/15/2021	**FNSB Mayor**	update	1
9/20/2021	**Alaska Resource Education**	Outreach programs	3
9/25/2021	**Mendas Cha-ag (Healy Lake)**	Native corp and shareholders: project info, reclamation/closure, project impacts, native hire policy, wildlife management, history,	10
9/28/2021	**Tetlin Village Council**	Project status update, camp/housing, layout, access road, jobs, infrastructure	7
10/13/2021	**Village of Northway**	Project update, timeline, jobs, trucking/traffic safety, Q&A	8
10/13/2021	**Village of Tanacross**	Project update, timeline, jobs, trucking/traffic safety, Q&A	6
10/14/2021	**City of Delta Junction**	Project update, timeline, jobs, trucking/traffic safety, Q&A	32

Manh Choh Project-to-Date Community Engagements
as of 10/27/21

2020 - Oct 2021 Community Engagement			
Date	**Group**	**Topics Covered**	**# Attendees**
10/14/2021	**Salcha/Harding Lk/Birch Lk**	Project update, timeline, jobs, trucking/traffic safety, Q&A	53
10/21/2021	**Tok**	Project update, timeline, jobs, trucking/traffic safety, Q&A	25
10/25/2021	**Tetlin Village Council**	road design considerations and safety	6
Totals	**71**		**1228**

C.2 2020 10 14 TETLIN LARGE MINE PROJECT TEAM ORIENTATION

Tetlin Project LMPT Orientation

October 14, 2020

Bartly Kleven

KINROSS

AGENDA

1. Introductions – Bartly Kleven, Kinross
2. Orientation – Bartly Kleven, Kinross
3. Tetlin Project Introduction – Joy Huntington, Uqaqti Consulting
4. Cultural Survey – Andy Higgs, Higgs Research & Consulting
5. Fish & Wildlife and Water Quality – John Seigle, ABR
6. Groundwater Studies – Martin Stewart, Piteau
7. Geochemistry – Bill Jeffress, SRK
8. Wetlands – Steve Reidsma, Stantec
9. Meteorological Monitoring – Isaac Bertschi, SLR
10. Site Visit
    a. Site Visit Agenda
    b. Covid Protocols

KINROSS

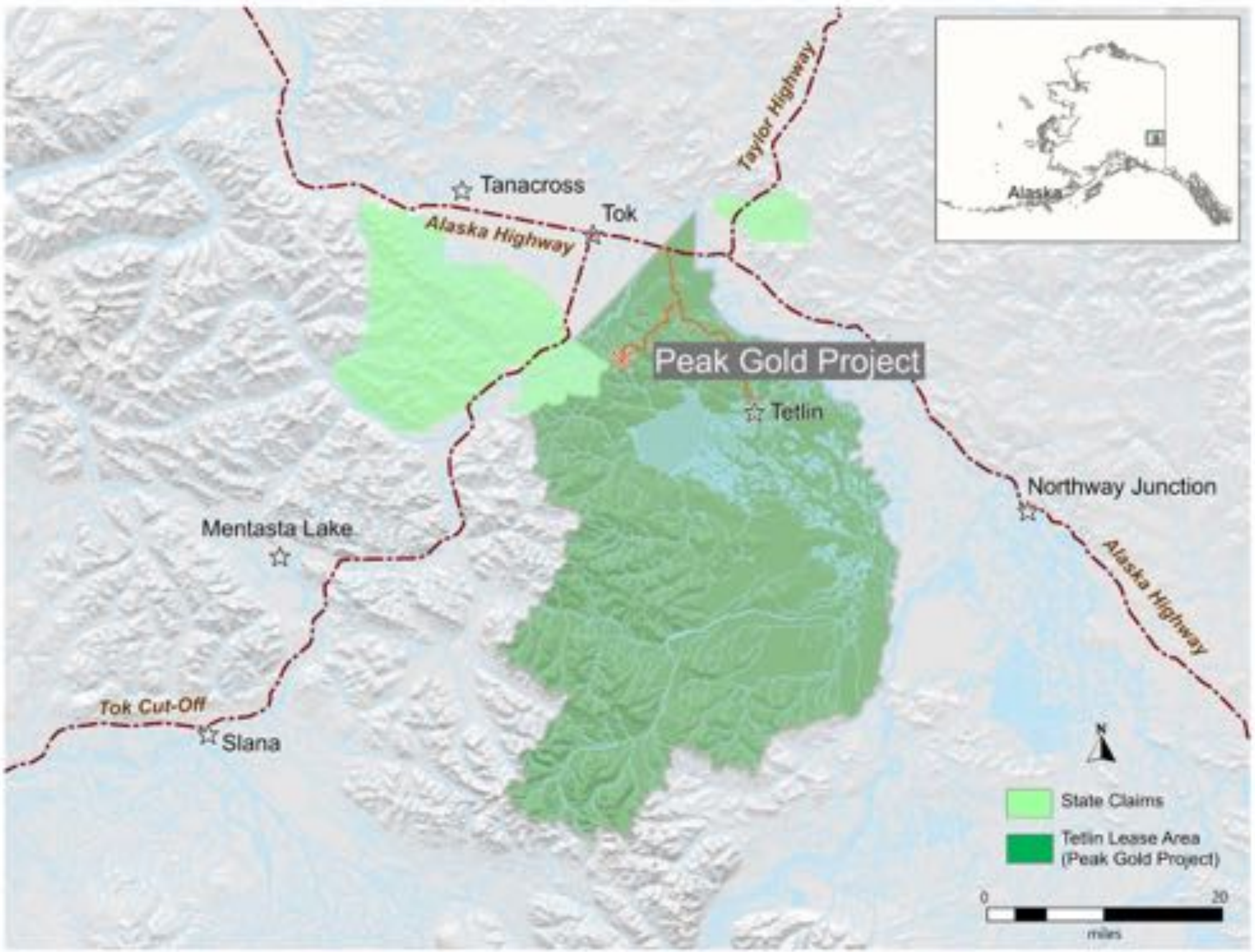
Kinross Acquires 70% of Peak Gold

Michael Sam, Chief of Tetlin and Jeremy Brans, GM of Kinross Fort Knox

Tetlin Gold Project Land Package

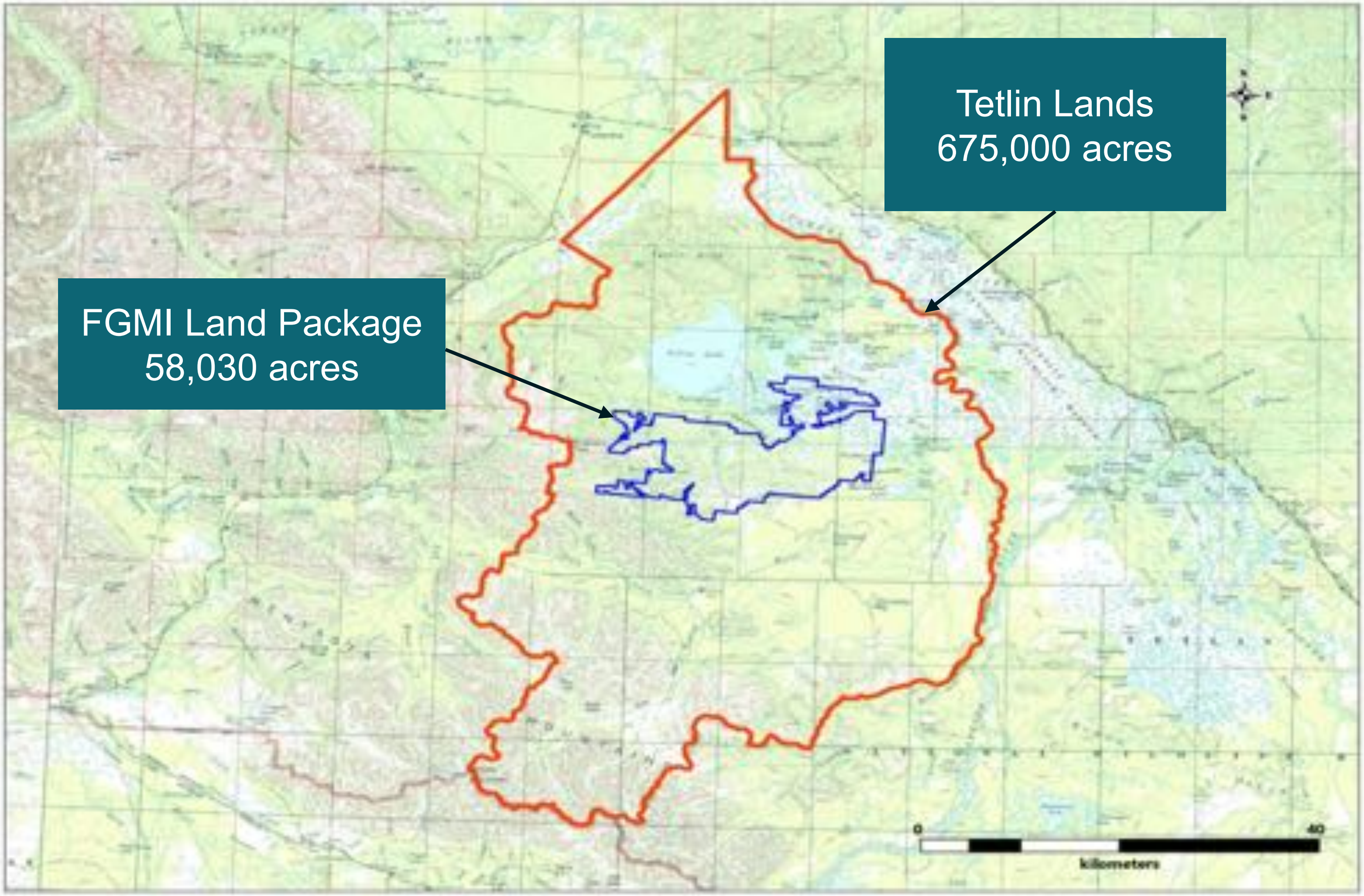
TETLIN NATIVE LAND

- Land package of 675,000 acres leased from Tetlin Village Council, a federally recognized tribe
- 227 road miles from Tok to Fort Knox
- Land package is largely unexplored. Potential for additional mineral deposits
- Deposit is accessible via road



KINROSS

Tetlin Tribal Land

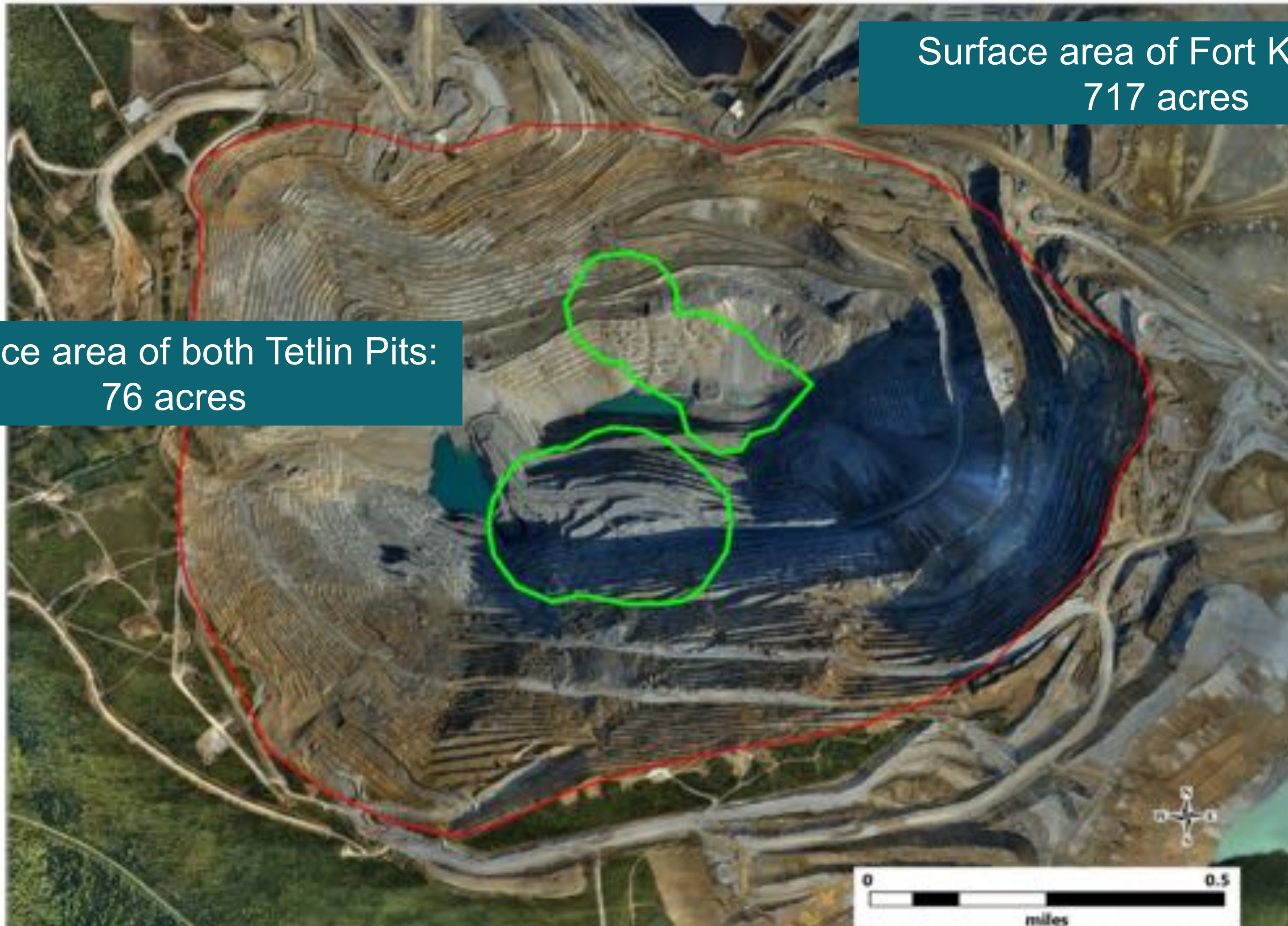


KINROSS

Fort Knox Pit Compared to Tetlin Pits

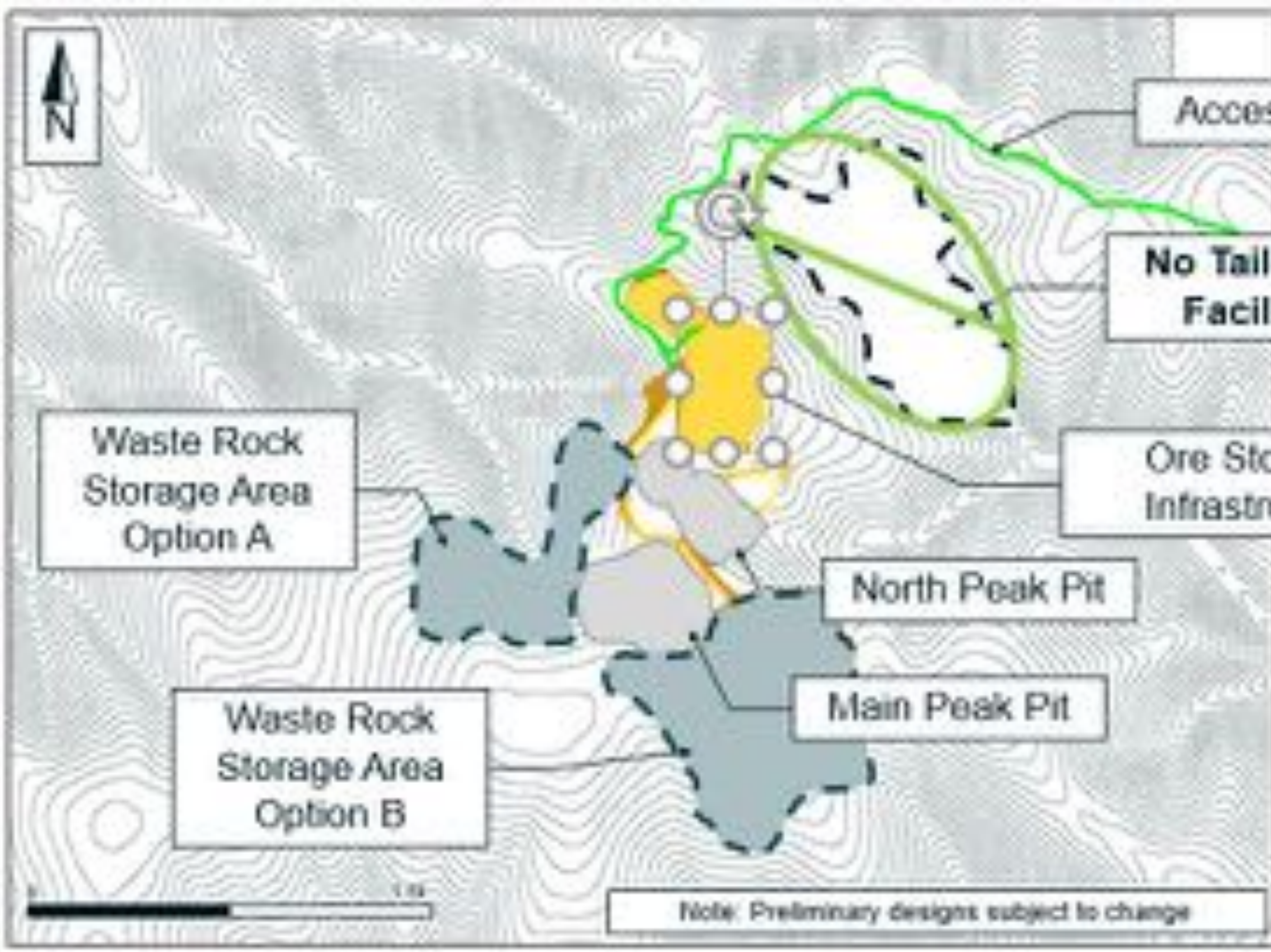
Surface area of Fort Knox pit:
717 acres

Surface area of both Tetlin Pits:
76 acres

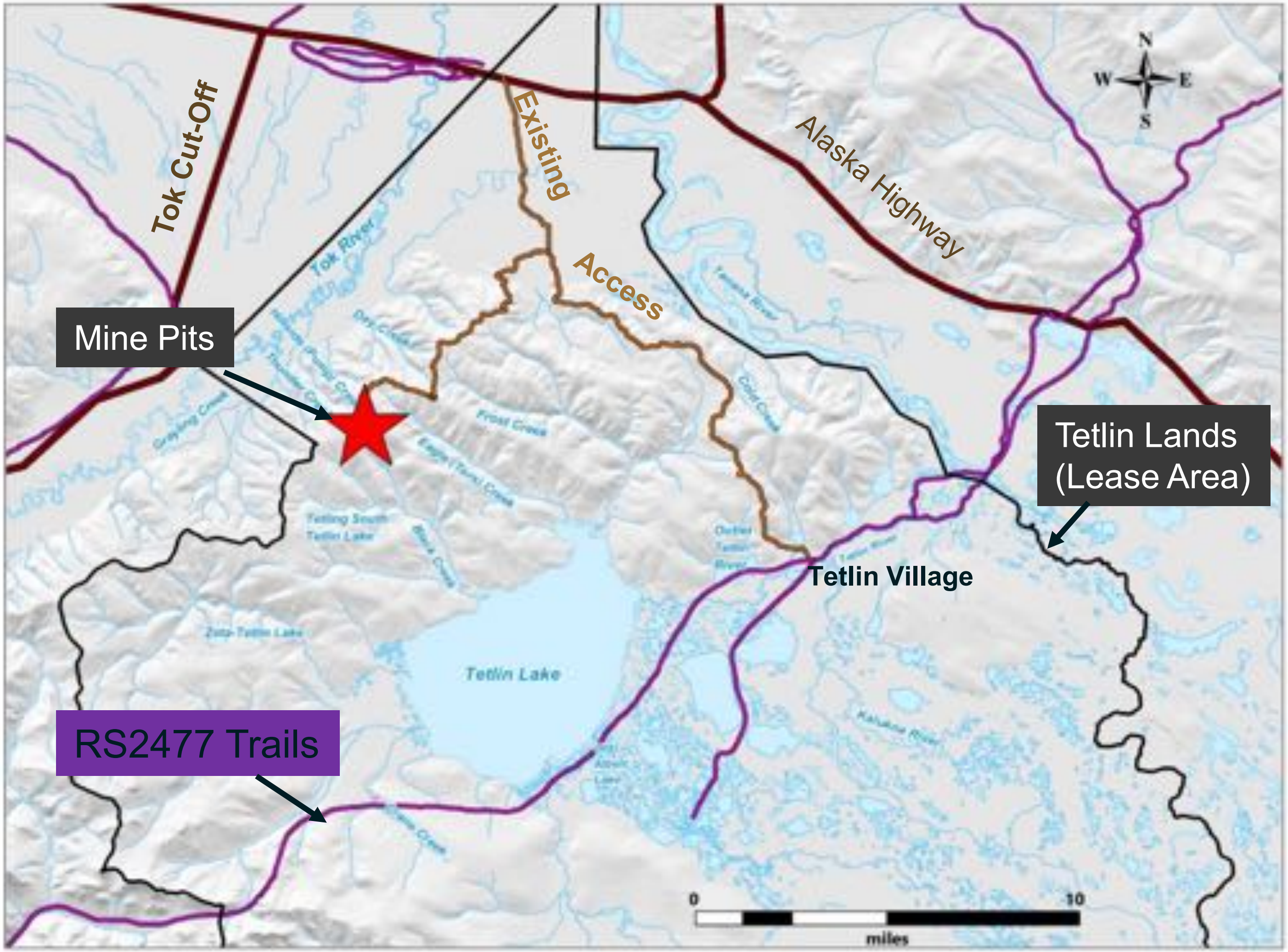


KINROSS

The Kinross plan eliminates the tailings storage facility reducing site disturbance and water use



Existing Roads



Tetlin Project Permits

Permit	Authorization Number	Issue Date	Expiration	Comments
Chief Danny Area				
Multi-year Misc. Land Use Permit for Exploration & Reclamation	APMA 2626	March 4, 2016	December 31, 2020	
Temporary Water Use Permit	TWUA F2016-023	April 5, 2016	December 31, 2020	
Temporary Water Use Permit	TWUA F2018-060	July 11, 2018	December 31, 2020	
Fish Habitat Permit	FH18-III-0094	May 9, 2018	December 31, 2022	
Multi-sector general permit for storm water discharge	AKR06GA93	May 1, 2020	May 31, 2025	
Temporary Water Use Permit*	TWUA F2020-011	March 20, 2020	June 16, 2020	*This is to complete a pump test, for which we are expecting to receive a formal extension on the termination date
Stormwater Pollution Prevention Plan	AKR060000	April 1, 2020	December 31, 2024	
Army Corp of Engineers Permit	POA-2013-286	January 5, 2018	December 31, 2022	
Conditional Approval of Met Site	n/a	Sept 23, 2020	n/a	
Tuck Creek Area				
Miscellaneous Land Use Permit for Hardrock Exploration & Reclamation	APMA F2018 2884	April 30, 2018	December 31, 2022	
Temporary Water Use Permit	TWUA F2018-068	April 30, 2018	December 31, 2022	

Introduction to Tetlin Project

Uqaqti Consulting, Joy Huntington

Community Relations Highlights

- Community meetings
- Community Support Funds
- Relationship Building
- Road Maintenance & Safety
- COVID-19 Relief Donations
- UAF Courses
- Newsletters
- Regular Communication
- GED Program
- Cultural Awareness Training during field crew training
- Stakeholder Issues Tracking

Cultural Survey

Higgs Research and Consulting, Andrew Higgs

Cultural Resources (Archaeological and Historical resources)

Potential cultural resource types

Archaeological [surface to deeply buried] (subsistence camps, subterrain cache pits, tool stone quarrying, pictographs, burials, seasonal village sites, etc.)

Historical [surface] (trails, camps, subsistence features, cache pits, burials, landmark gathering places, cabins, buildings, villages, etc.)

Past Cultural Resource Survey Results

- Known/documented cultural resources (both archaeological and historical) from over 60 years of archaeological survey efforts by State/Federal cultural resource compliance surveys and academic researchers.

Sites I have been personally involved with on past projects.

- Prehistoric/Native sites
- Non-Native 20th century sites

Scarcity of surveys within Tetlin lands

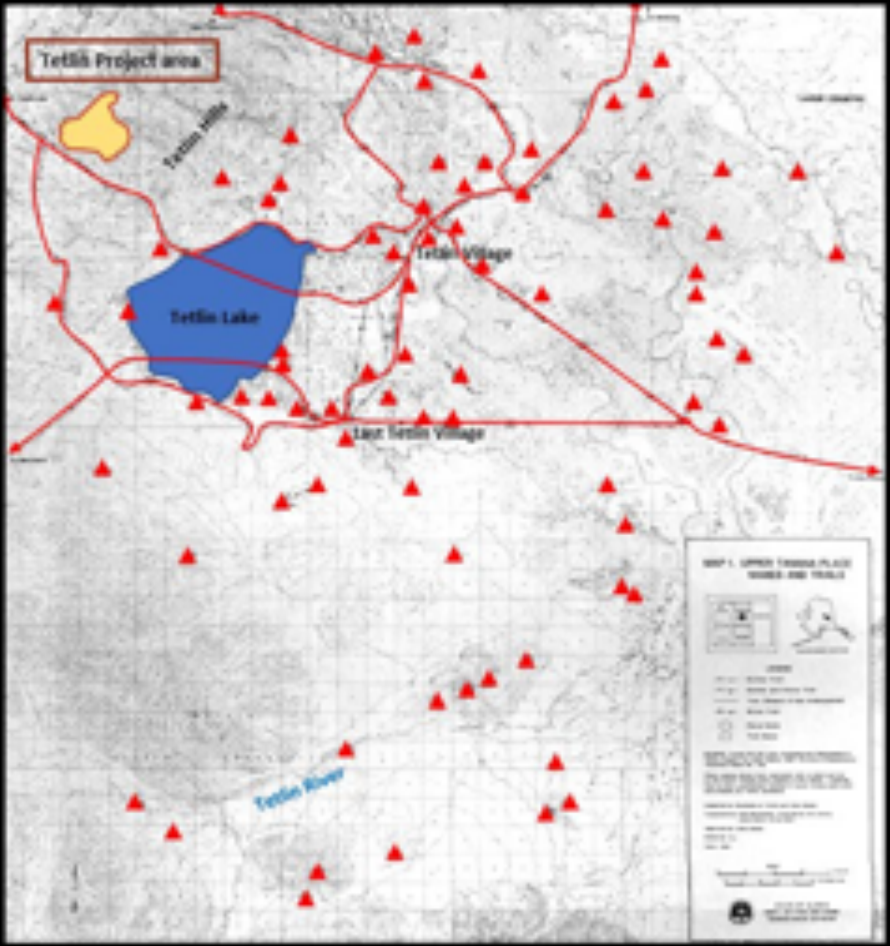
Place names & historic trails

Tetlin Village ethnography and history is well documented albeit scattered around in various resource reports and dissertations.

For example, this US Fish and Wildlife Service (Halpin 1987) map of historically-used Tetlin place names.

▲ place name
trail

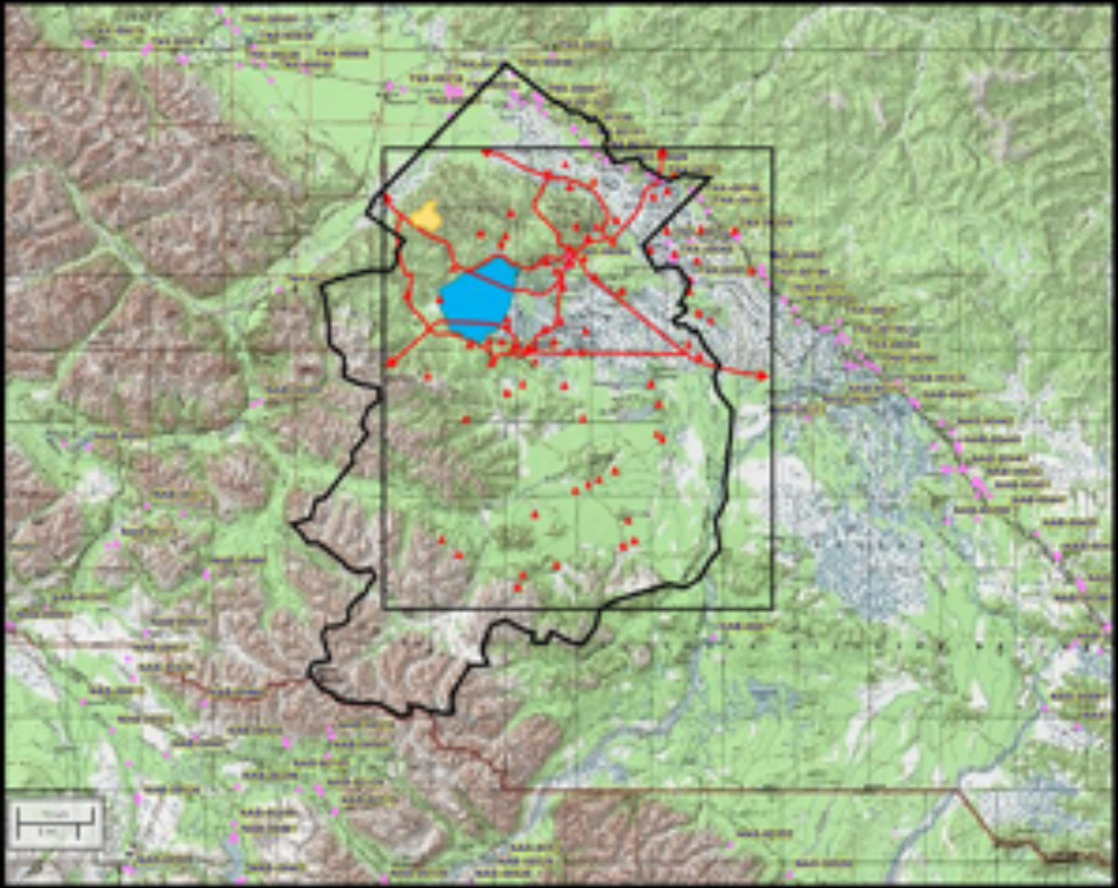
Illustrates the scale and range of Tetlin historic land use



Known vs. Unsurveyed Cultural Resources

Place names and trails overlay shows the potential for cultural resource sites that have <u>yet to be physically surveyed</u> where there may be physical manifestations of land use (e.g., cabins, trapping/hunting features, caches, transportation routes, etc.)

Based on what we know about prehistoric sites in the region, we can anticipate a similar potential for discovery of prehistoric sites as well.



July 22, 2018 Survey

Tetlin Hills

Reported historic cabin on Tors Creek (not found), but trapping trails noted.

Potential for historic resources (cabins, trapping and hunting features, and trails) throughout the Tetlin Hills creek basins and transportation routes along the ridgelines.

Prehistoric resource potential on ridges overlooking the Tok River floodplain and Tetlin Lake, as well as sites on the higher ground margins of waterways and lakes.

Summary

High potential for discovery of undocumented cultural resources in the Project Area

Mineral Exploration phase

Local knowledge to be tapped

Reconnaissance surveys of "Project Area" are needed

Sites found should be avoided during exploration

Significance of sites, and direct vs. indirect impacts to be determined

Mitigation options drafted and agreed upon prior to development

Mine Development/Extraction phase

Mitigation measures conducted during the course of development/extraction

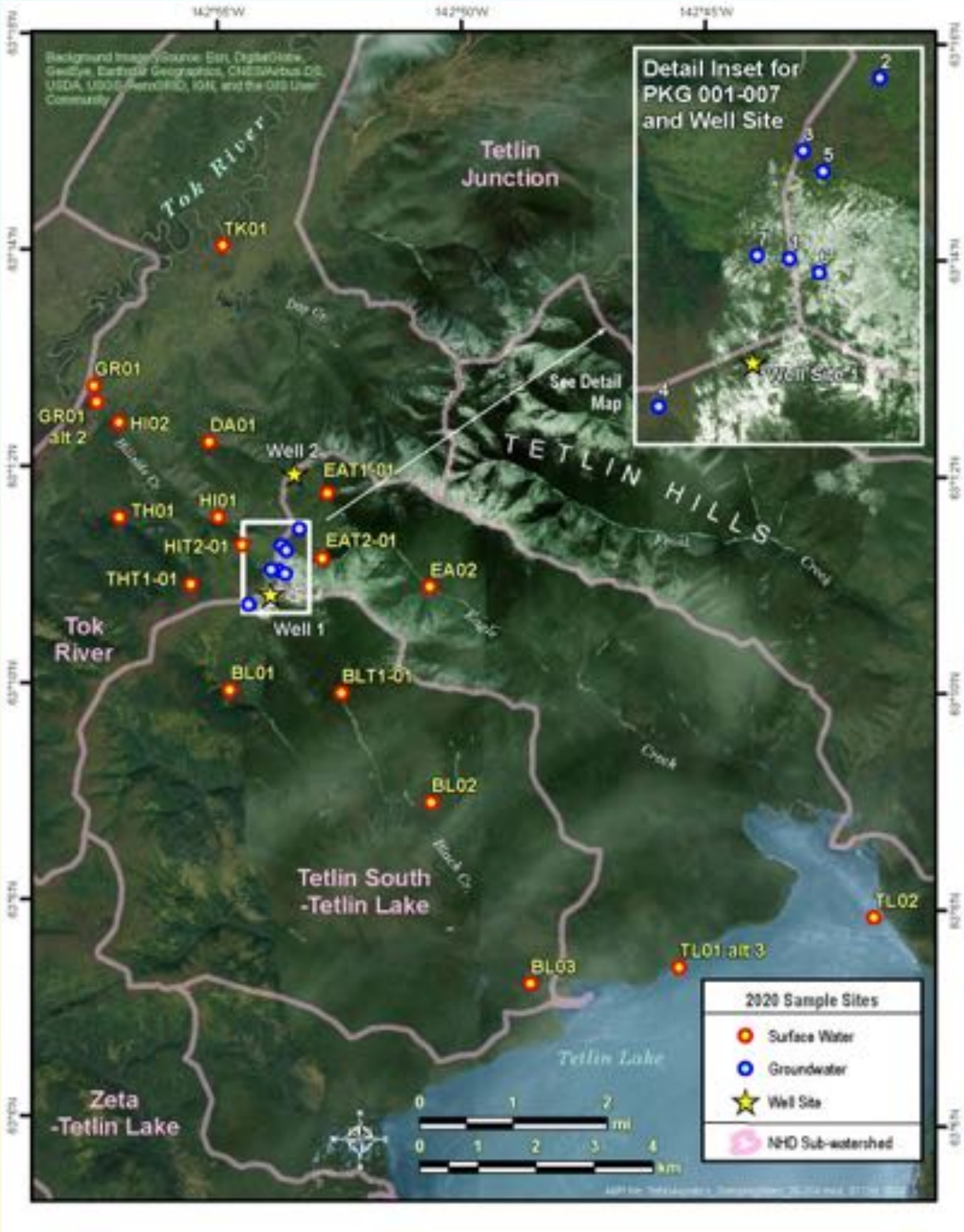
Aquatic Resource Monitoring

ABR, Inc., John Seigle

Aquatic Resource Monitoring for the Tetlin Project

2012–2020

Current Sample Locations



Background- Aquatic Sampling Overview

Semi-annual **Water Quality** Monitoring

- Surface Water
- Groundwater

Initial **Project Area Habitat Characterization**

- Stream Habitat Characterization
- Stream Productivity
  - Macrophytes
  - Macro-invertebrates
- Fish Surveys

Data Management Solutions

- App development
- Tablet data collection
- SQL Database repository

Background

2012

2013

2014

2015

2016

2017

2018

2019

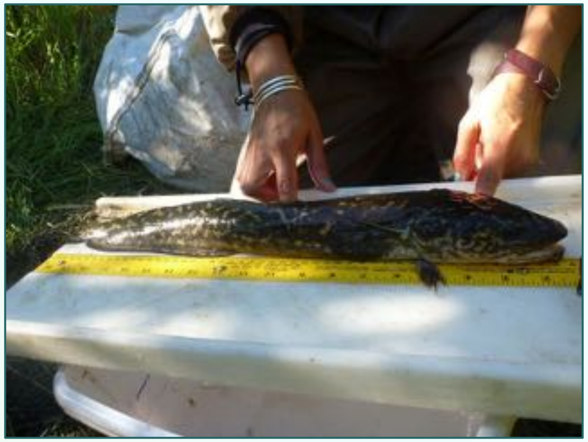
2020

- First Contracted by Avalon in 2012
- Objective was to describe baseline water conditions for permitted streams
- Sampled surface water at 10 sites on 5 streams

Background

- 2012
- 2013
- ~~2014~~
- 2015
- 2016
- 2017
- 2018
- 2019
- 2020

- Surface Water (16 Sites, 8 streams)
- Macroinvertebrates
- Periphyton
- Fish Surveys
- Fish Tissue Analysis
- Habitat Characterization



Background

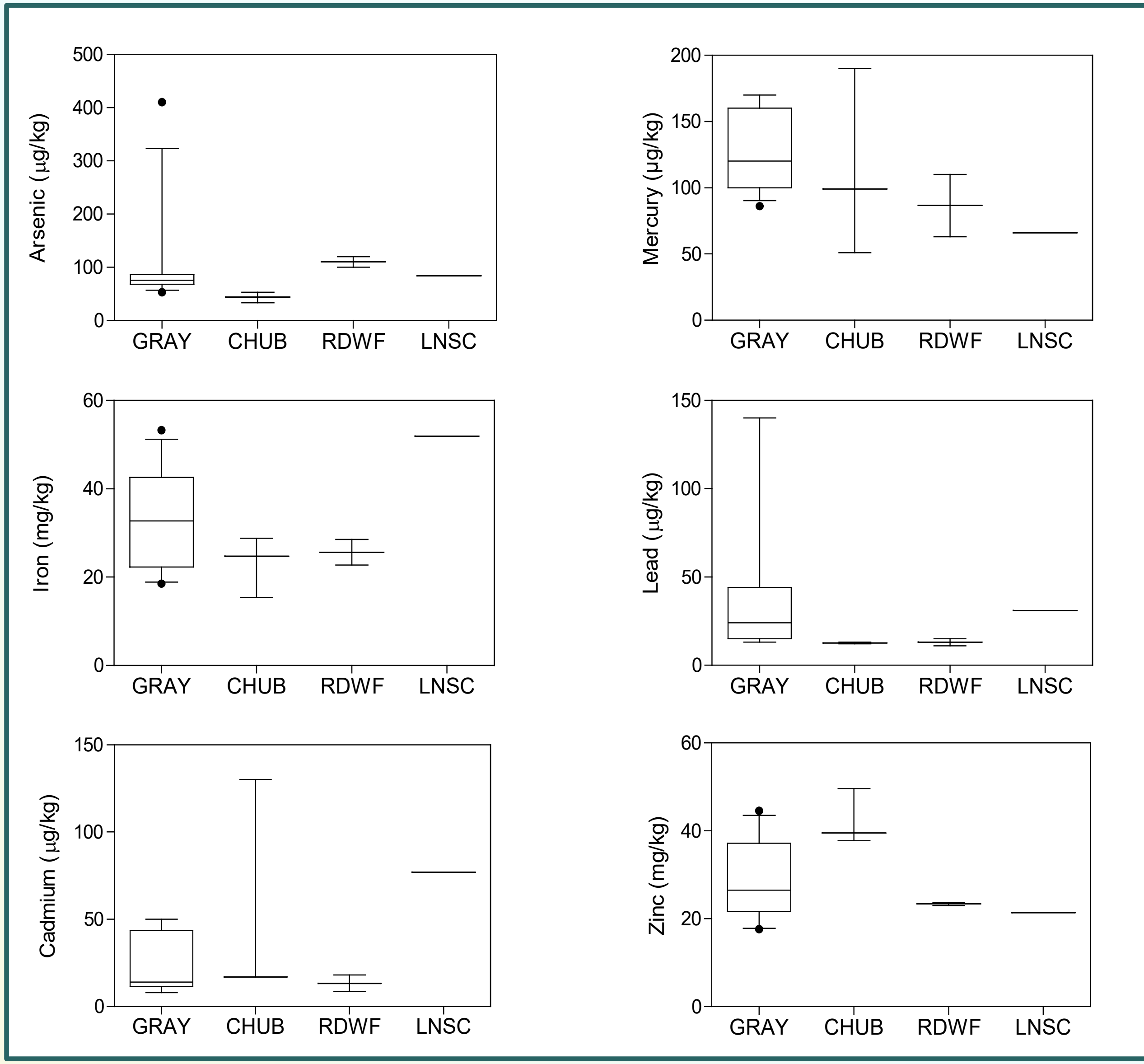
2012
2013
~~2014~~
2015
2016
2017
2018
2019
2020

Fyke net surveys in 4 waterbodies 9–18 July 2013.

Species	Total Catch (#)	Fork Length Range (mm)
Arctic Grayling	199	70-246
Coho Salmon	65	75-109
Lake Chub	59	66-142
Round Whitefish	46	65-169
Slimy Sculpin	43	68-129
Longnose Sucker	38	154-285
Burbot	2	520-559
Humpback Whitefish	1	270
Total Catch	**453**	

Background

2012
2013
~~2014~~
2015
2016
2017
2018
2019
2020

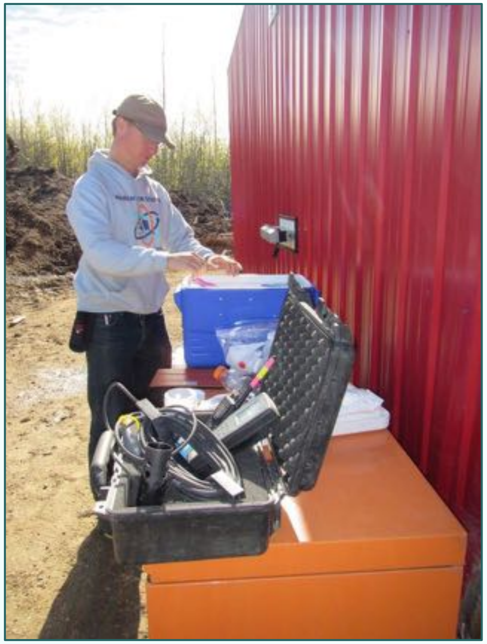


Fish tissue metal concentrations caught on Grayling Creek July 2013

Background

- 2012
- 2013
- ~~2014~~
- 2015
- 2016
- ~~2017~~
- 2018
- 2019
- 2020

- Joint Venture
- Surface Water
- (17 and 19 sites, resp. 10 streams)
- Stream habitat
- Discharge



Background

2012

2013

~~2014~~

2015

2016

~~2017~~

2018

2019

2020

- Surface Water (11 sites, 9 streams)
- Stream habitat and
- Stream Discharge

Background

2012

2013

~~2014~~

2015

2016

~~2017~~

2018

2019

2020

- Increased sampling effort
- Assisting Piteau with groundwater sampling (7 sites)
- Surface water (17 sites, 8 streams)
- Stream Discharge

Water Quality Monitoring-Analytes

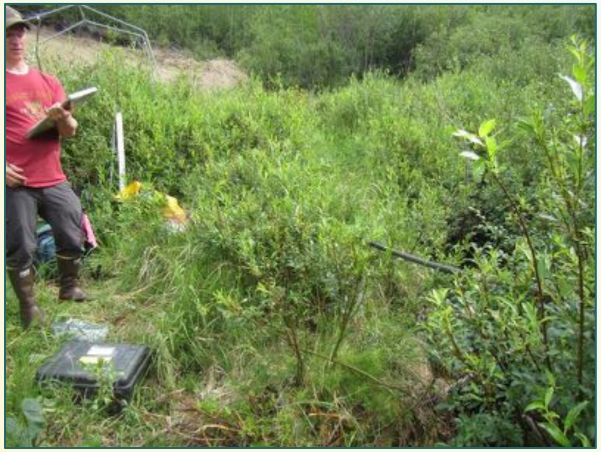
Analyte	Method
Mercury	EPA 1631 E
Aluminum	200.8 Low Level
Antimony	200.8 Low Level
Arsenic	200.8 Low Level
Barium	200.8 Low Level
Beryllium	200.8 Low Level
Bismuth	200.8 Low Level
Boron	200.8 Low Level
Cadmium	200.8 Low Level
Calcium	200.8 Low Level
Chromium	200.8 Low Level
Cobalt	200.8 Low Level
Copper	200.8 Low Level
Iron	200.8 Low Level
Lead	200.8 Low Level
Magnesium	200.8 Low Level
Manganese	200.8 Low Level
Molybdenum	200.8 Low Level
Nickel	200.8 Low Level
Potassium	200.8 Low Level

Analyte	Method
Selenium	200.8 Low Level
Silver	200.8 Low Level
Sodium	200.8 Low Level
Strontium	200.8 Low Level
Thallium	200.8 Low Level
Tin	200.8 Low Level
Vanadium	200.8 Low Level
Zinc	200.8 Low Level
Total Nitrate/Nitrite-N	SM21 4500NO3-F
Hardness as CaCO3	SM21 2340B
Total Dissolved Solids	SM21 2540C
Total Suspended Solids	SM21 2540D
Chloride	EPA 300.0
Sulfate	EPA 300.0
Nitrate	EPA 300.0
Nitrite	EPA 300.0
Total Phosphorus	SM21 4500P-B,E
Cyanide (historical)	SM21 4500-CN C,E
Cyanide (beg. Sept 2020)	SM21 4500-CN I
Alkalinity	SM21 2320B

Database Development

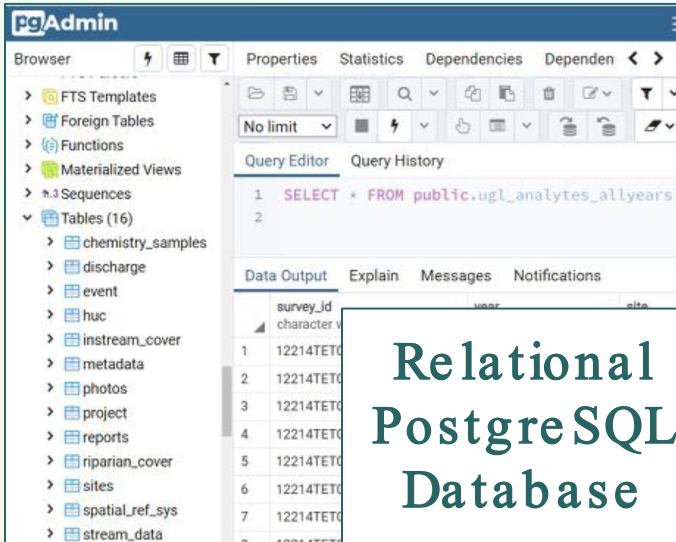
- PostgreSQL Database Repository (2018)
- Mobile App Development
- Field Collections Using Tablets

Tablet data collection

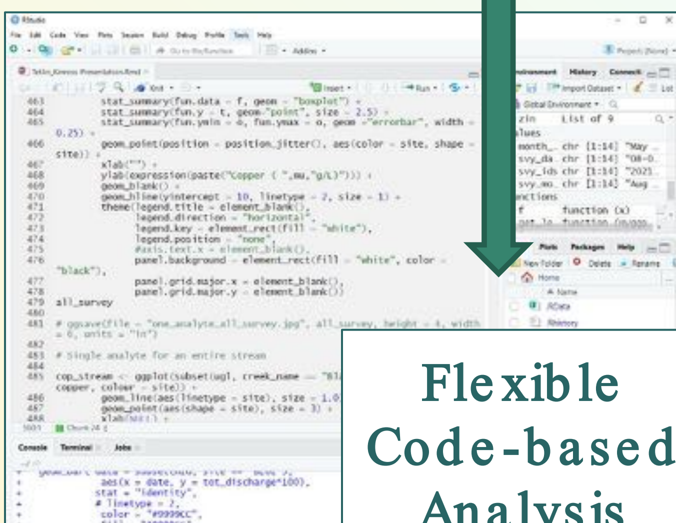


Paper data forms

Reporting

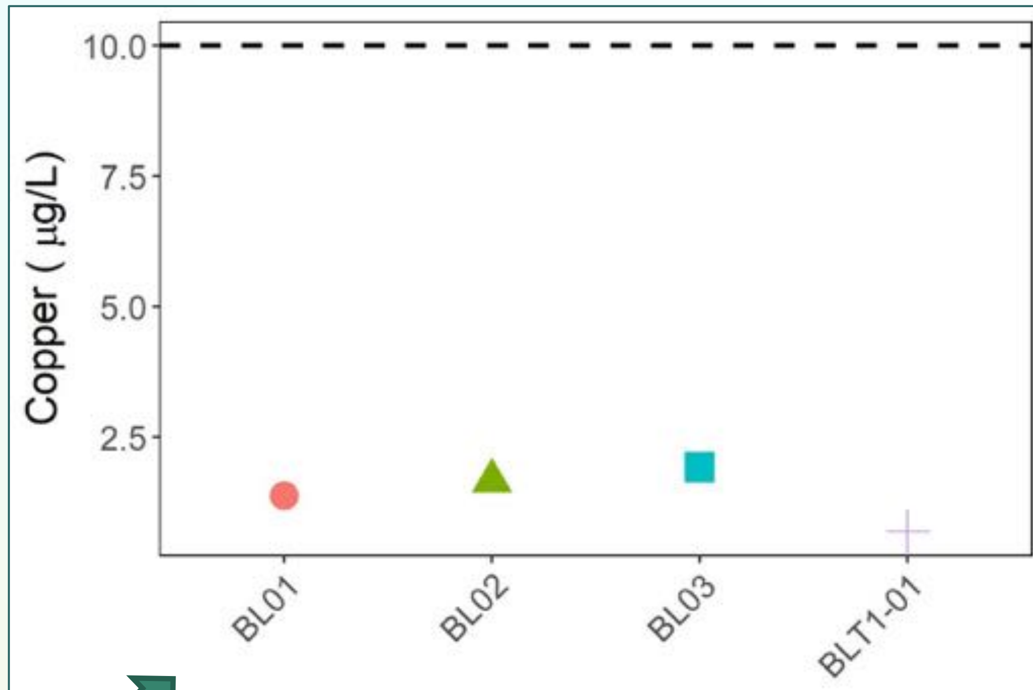


Relational PostgreSQL Database

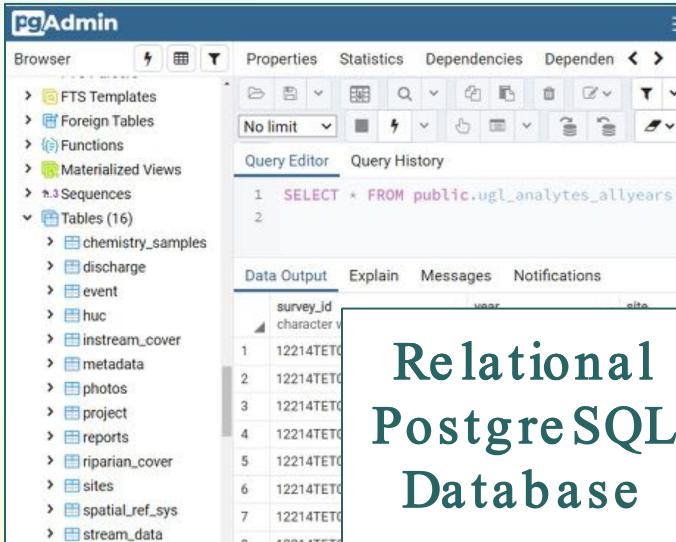


Flexible Code-based Analysis

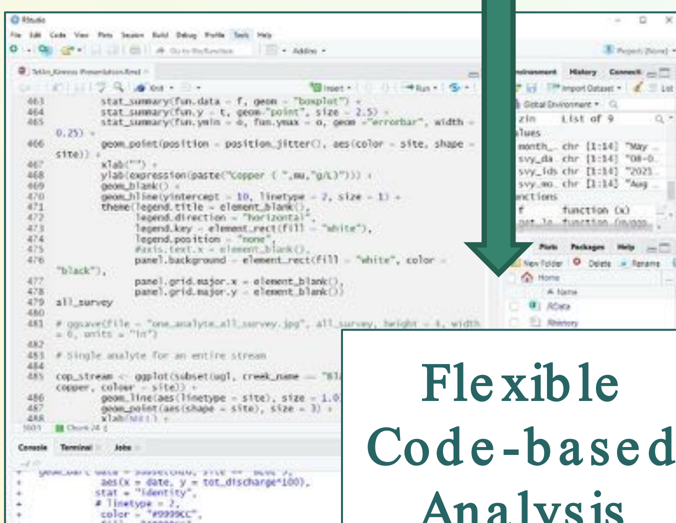
Black Creek (Oct 2019)



Reporting

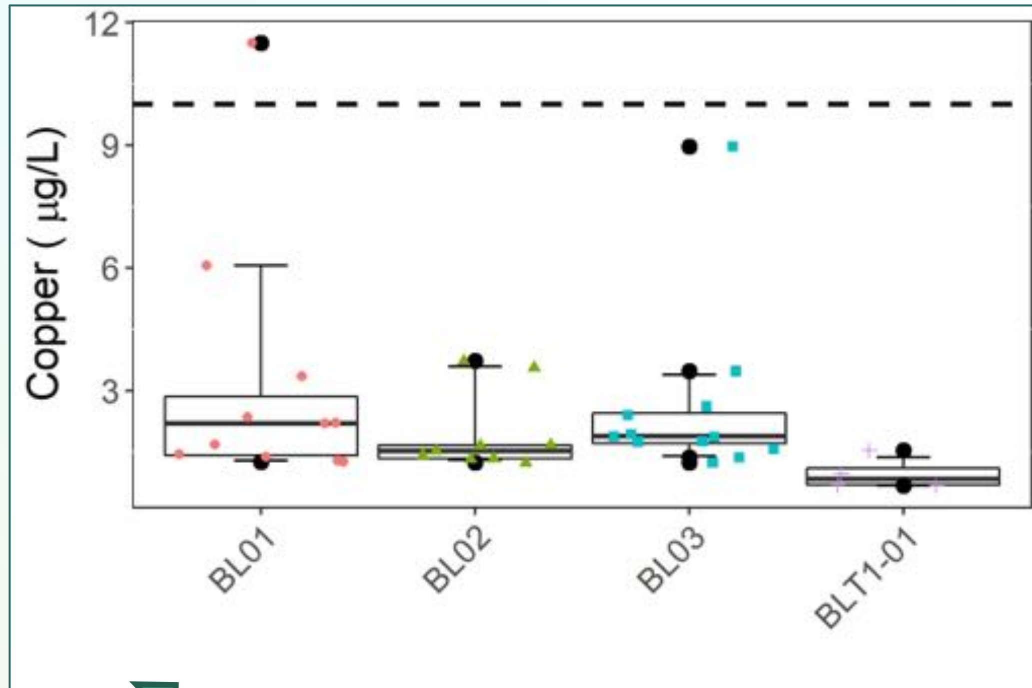


Relational PostgreSQL Database

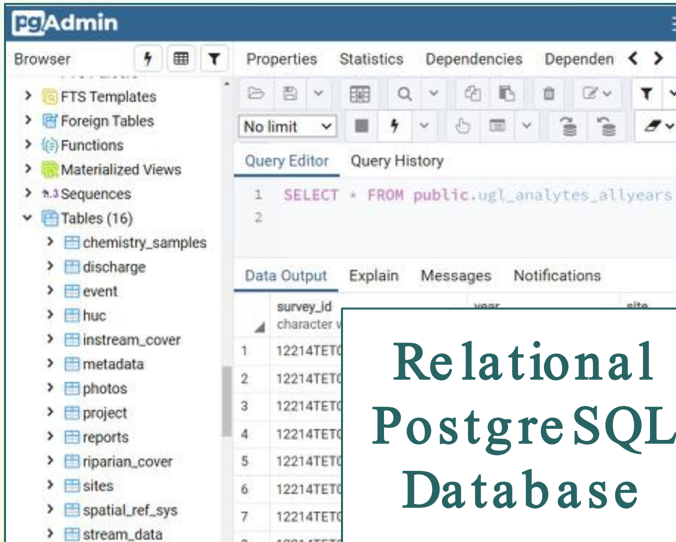


Flexible Code-based Analysis

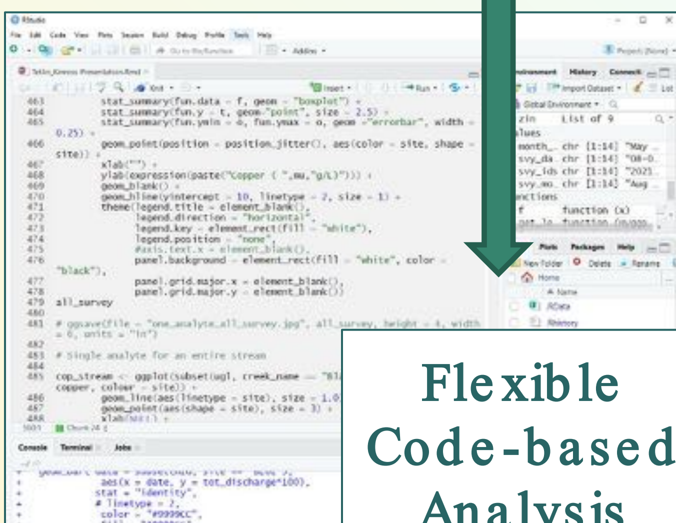
Black Creek (all site visits)



Reporting



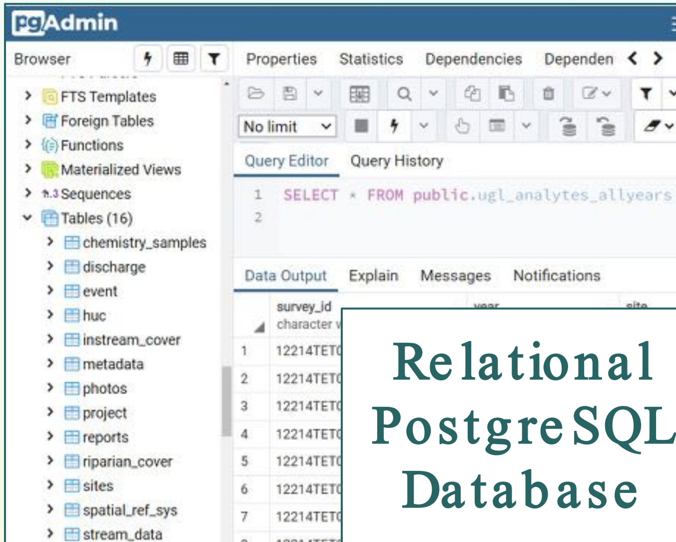
Relational PostgreSQL Database



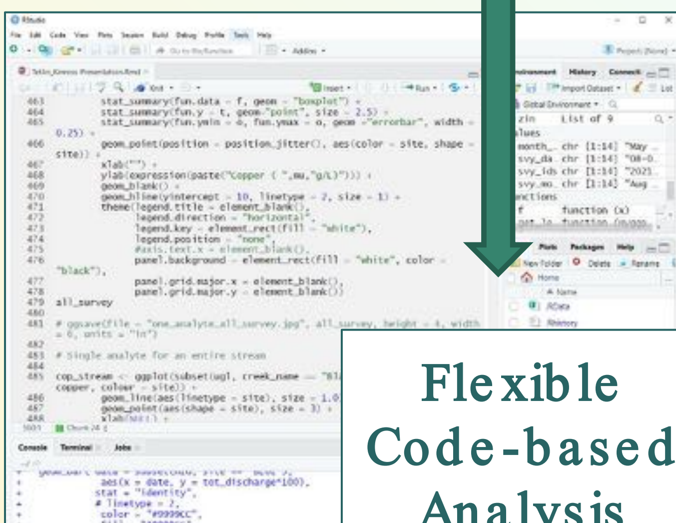
Flexible Code-based Analysis

Black Creek (across years)

Reporting

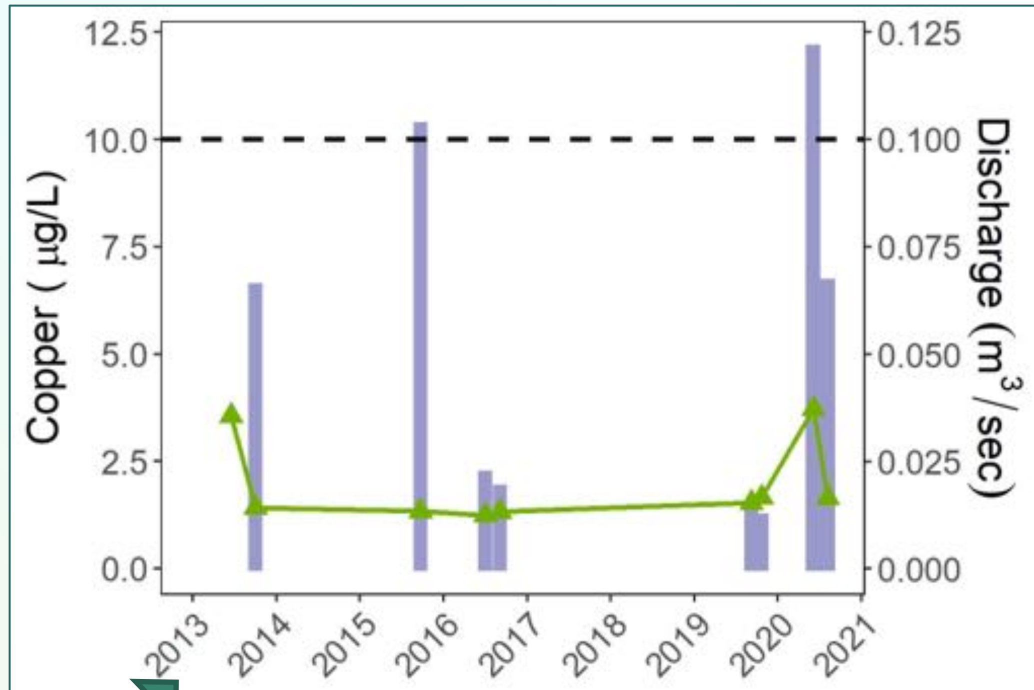


Relational PostgreSQL Database



Flexible Code-based Analysis

Site Specific Analyses: BL02



Overview of Baseline Groundwater Studies

Piteau, Martin Stewart

Summary

- Baseline study program
- Climate and hydrology
- Water levels and temperatures
- Surface water quality
- Groundwater flow regime
- Groundwater quality
- Implications for mine development

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Review of Baseline Groundwater Studies

- Baseline surface water quality sampling and biological/habitat assessments started in 2012
- 7 monitoring wells completed in 2019; water management studies initiated
- Water quality & quantity, permafrost assessments started in 2019
- Monitoring/supply well drilling proposed for Q1-2020 – *plan prepared*
- Water quality sampling continued through 2020
- Hydrometric monitoring stations established Q3-2020

Year	Surface Water Quality	Hydrometric Monitoring	Groundwater Quality	Groundwater Levels	Permafrost	Wetland Mapping	Stream Habitat	Biologic Assessments
2012	x						x	x
2013	x					x	x	x
2015	x						x	
2016	x						x	
2017						x		
2018	x						x	
2019	x		x	x	x		x	
2020	x	x	x	x	x		x	

Piteau directed all baseline studies 2019

Climate and Hydrology

- Cold continental/subarctic climate zone: extreme temperature range, local orographic effects (e.g. thermal inversion in winter)
- Station approximately 1,640 ft above base of Tok River valley
- Main Peak and North Peak at 3,215 ft-elevation
- Pits reside at surface water drainage divide; northwest to Tok River and southeast towards Tetlin Lake
- New robust weather station to be installed fall 2020

	Average Daily Temperature (°C)		Monthly Precipitation (inches)	
	Max	Min	Mean	St. Dev
January	-18.45	-26.83	0.61	1.14
February	-12.76	-24.89	0.22	0.62
March	-2.69	-19.17	0.26	0.85
April	7.67	-8.13	0.40	1.28
May	16.44	-0.19	0.93	2.56
June	43.37	3.39	1.71	3.39
July	22.74	8.41	2.11	4.32
August	19.32	5.06	1.57	4.01
September	13.20	-0.14	0.85	2.14
October	1.40	-8.10	0.85	2.50
November	-13.18	-21.32	0.89	2.65
December	-19.42	-27.22	0.58	1.38
Annual	-	-	10.95	-

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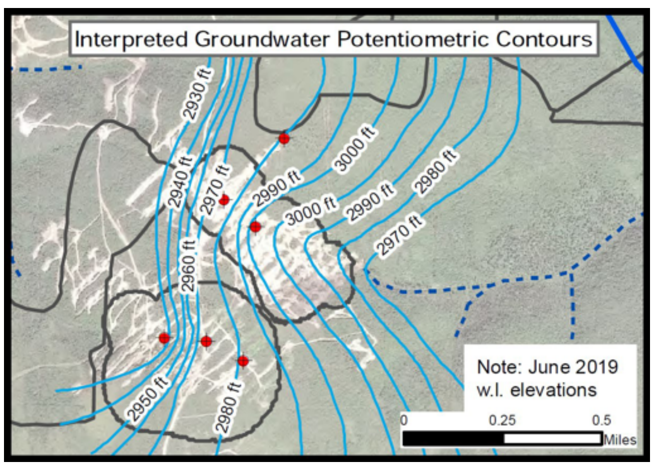
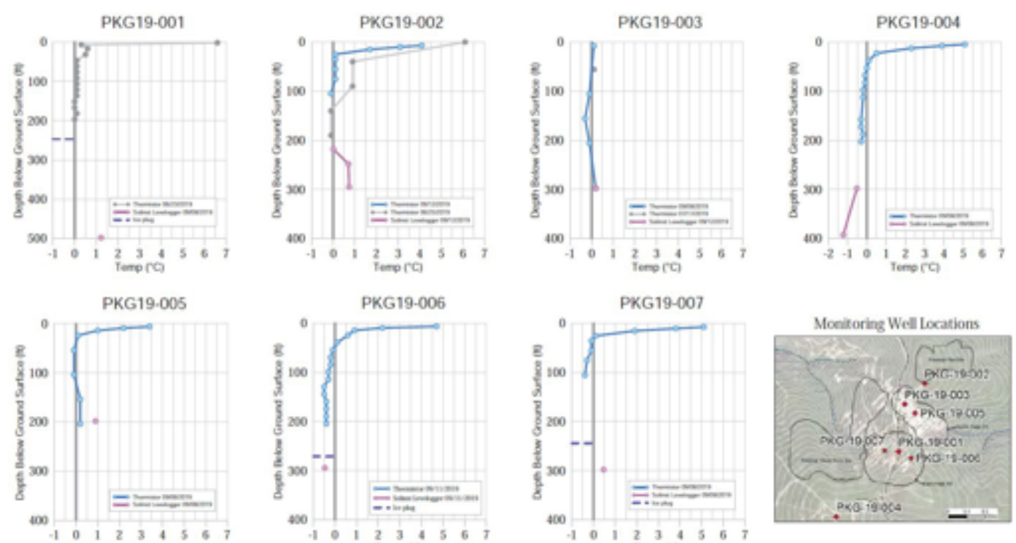
Borehole Water Levels and Bedrock Frozen Zones

- Bedrock water levels average >200 ft below ground level in upland areas
- Substantial ice formation in 3 groundwater wells
- Depth to top of sub-zero range 31 ft to 152 ft
- Depth of bottom of sub-zero range 120 ft to >300 ft
- ‘Residual’ or ‘warm’ permafrost, likely degrading naturally; presence depends on surface vegetation, aspect, snow cover, geology and past disturbances (i.e. forest fires)

Well ID	Collar Elevation (ft-elev)	Presence of frozen conditions (Yes/No)	Approximate thickness of sub-zero zone (ft)	Average temperature of sub-zero zone (°C)	Top of sub-zero zone (ft bgs)	Depth to base of sub-zero zone (ft bgs)
PKG19-001	3248	Yes	95	0.02	152	> 247
PKG19-002	3254	Yes	102	-0.10	98	~200
PKG19-003	3231	Yes	124	-0.16	82	~206
PKG19-004	3340	Yes	340	-0.22	53	>393
PKG19-005	3173	Yes	81	-0.10	39	~120
PKG19-006	3251	Yes	251	-0.35	47	>298
PKG19-007	3169	Yes	213	-0.22	31	>244
Well-1	3307	Yes	-	-	-	-
Well-2	2897	No	-	-	-	-

Note:
Thermal strings could not be installed in water supply Well 1 or Well 2.
Depth to base of frozen zone/permafrost is estimated based on thermal curve, groundwater temperature and ice plugs





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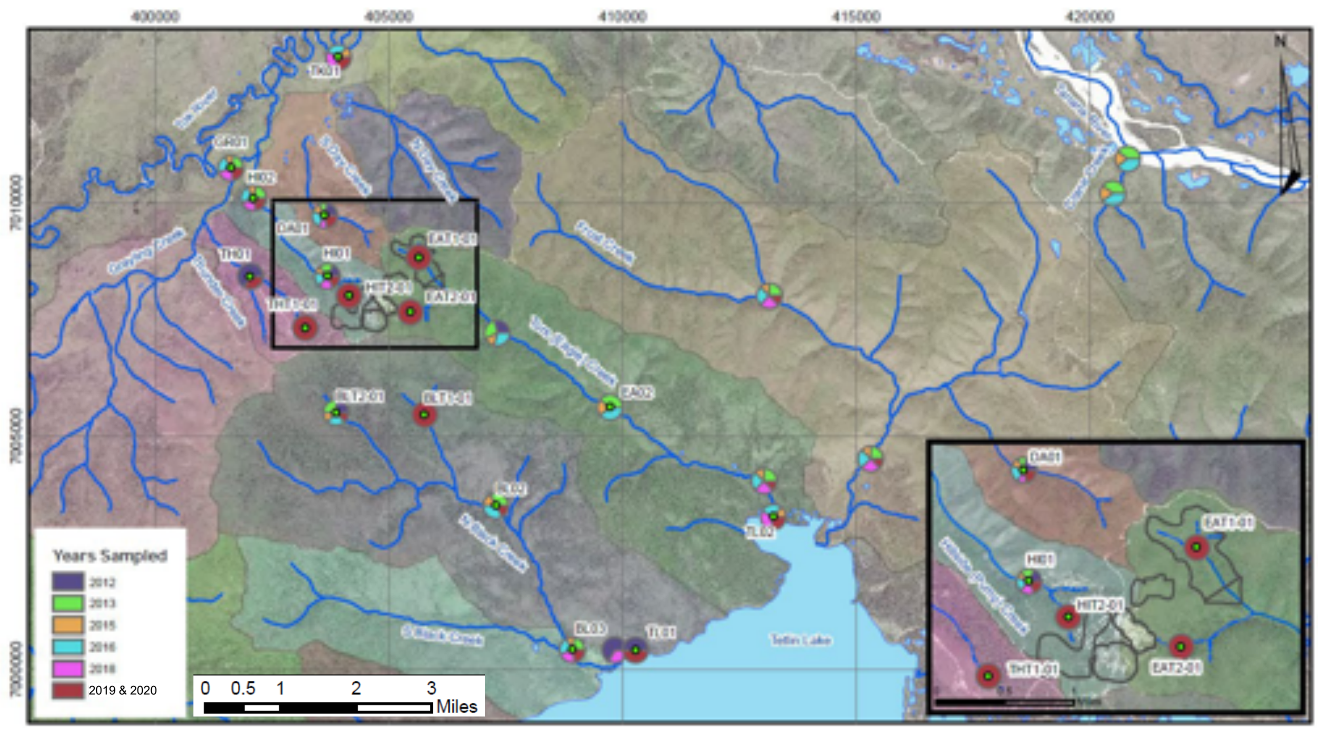
Surface Water Monitoring Program

- Baseline surface water collected since 2012
- Historical samples collected in up to 11 waterbodies
- Current monitoring plan includes 17 monitoring locations in 8 waterbodies



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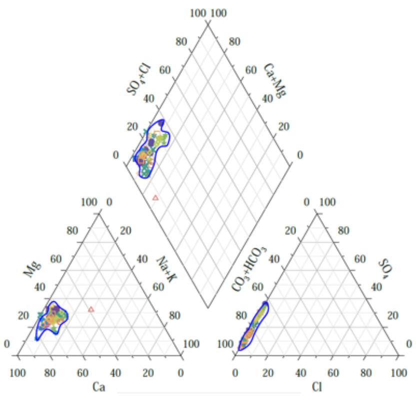
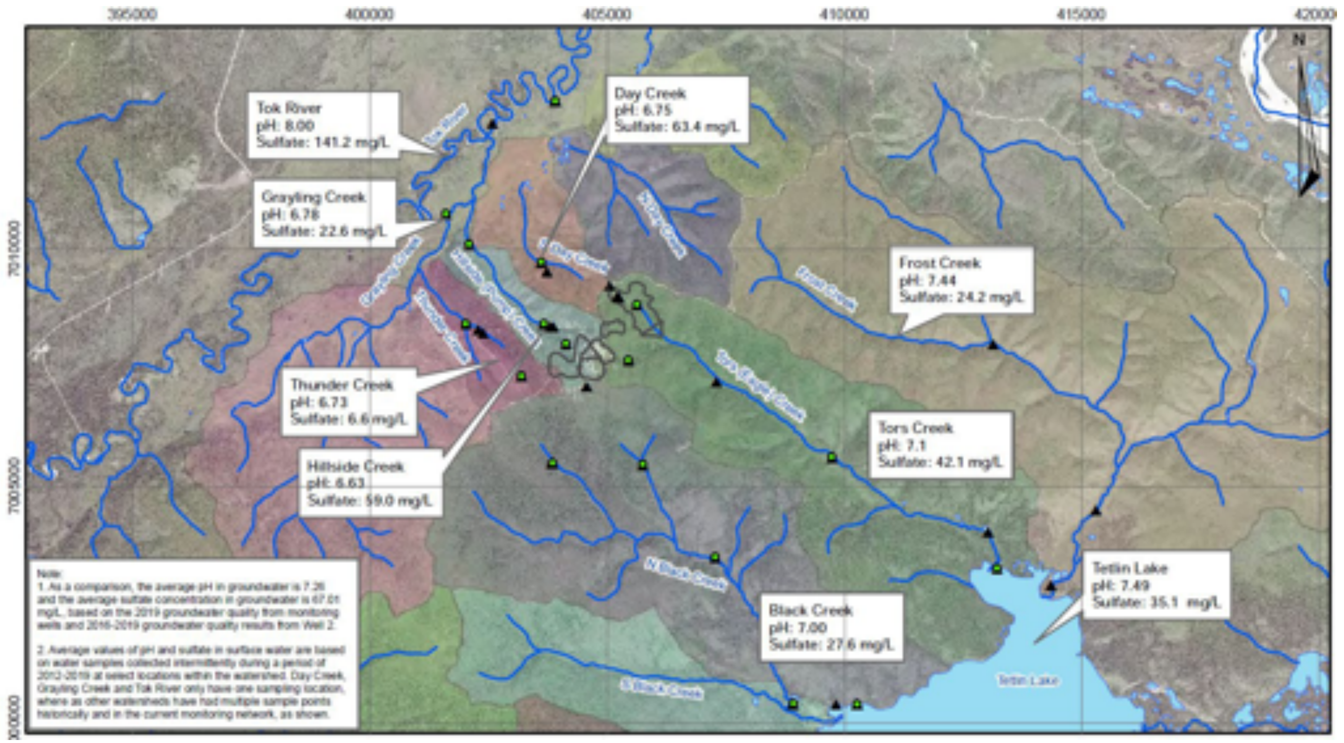
Surface Water Quality

- Geological control on surface water chemistry; no major ion variation between watersheds
- Major cation/anion ratio shows a ‘calcium-bicarbonate’ type
- Higher average sulfate concentrations, lower pH in northwestern drainages





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Water Balance & Groundwater Flow Regime

- Majority of precipitation falls as rain forming main source of runoff at higher elevations and infiltration.
- Groundwater flow in the Project Area is localized; discontinuous shallow interflow in shallow soils and local stream alluvium; deeper groundwater circulation is controlled by structure and permafrost and appears to be limited.
- Groundwater discharge into 1st or 2nd order surface water drainages; minimal recharge area since project area occurs at a drainage divide.
- Hydraulic gradients mimic topographic gradient; most geologic structures are perpendicular to topography which would tend to further limit the downslope movement of deep groundwater

$$Q_{in} = Q_{out}$$

$$P_W = (E_T + Q_{SW} + Q_{BF} + Q_{DF})^*$$

Q_{in} -*flow input*

Q_{out} -*flow output*

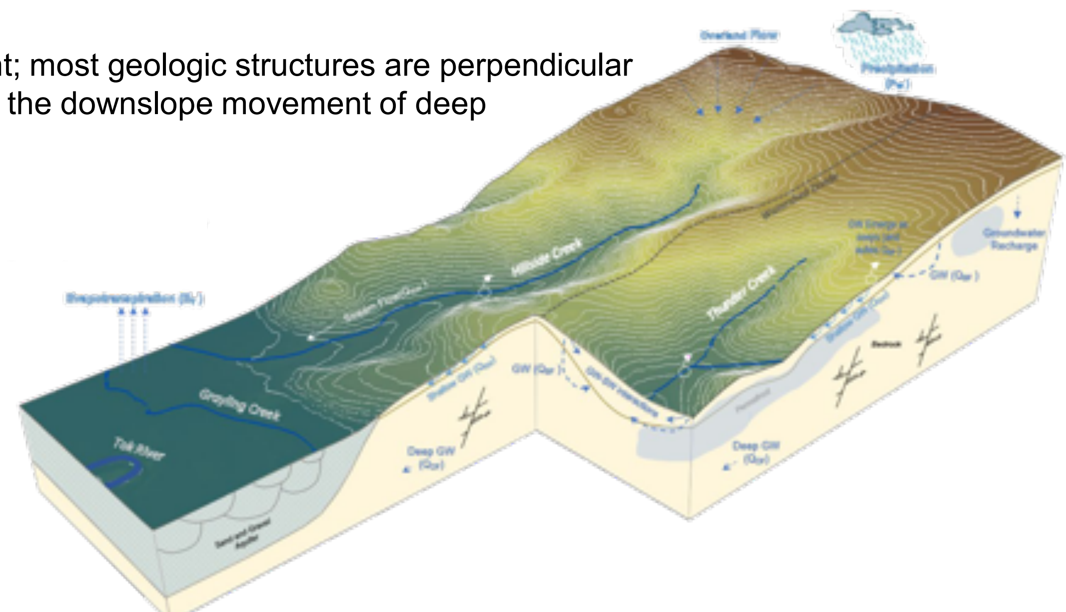
P_W -*measured precipitation as water equivalent*

E_T -*evapotranspiration*

Q_{SW} –*surface water flow and shallow groundwater*

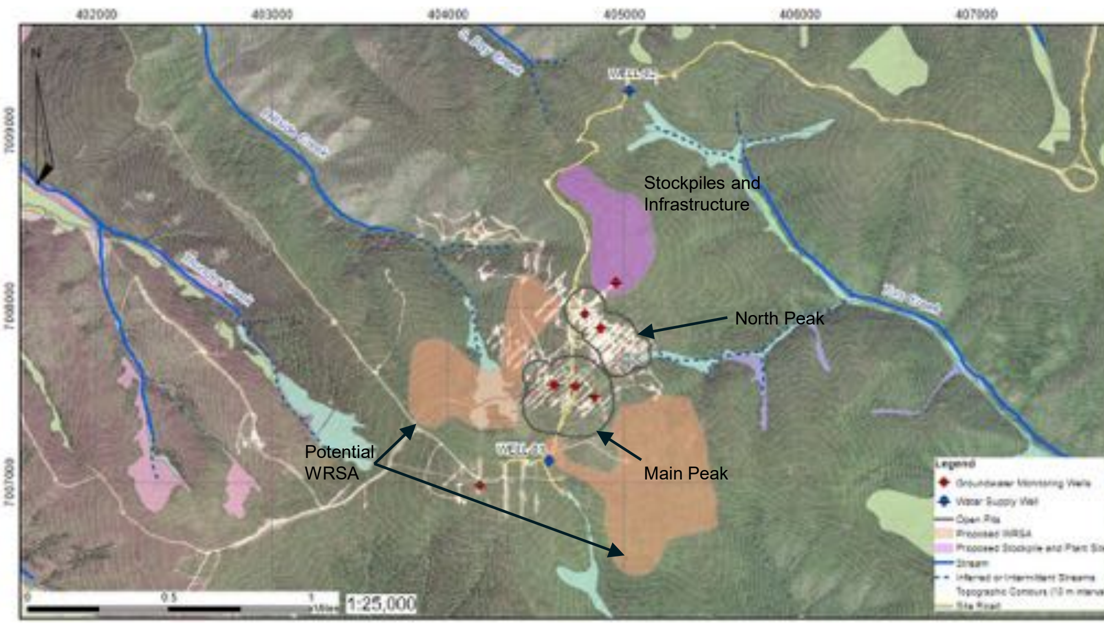
Q_{BF} -*groundwater that provides baseflow to surface streams*

Q_{DF} –*deep groundwater (insignificant)*



Groundwater Monitoring Program

- 7 groundwater monitoring wells installed in summer 2019; 2 pre-existing test water supply wells; ongoing monitoring for water level, temperature and chemistry
- Additional monitoring wells to fill gaps in lowlands around site (below waste rock facility, stock pile facility and other infrastructure)



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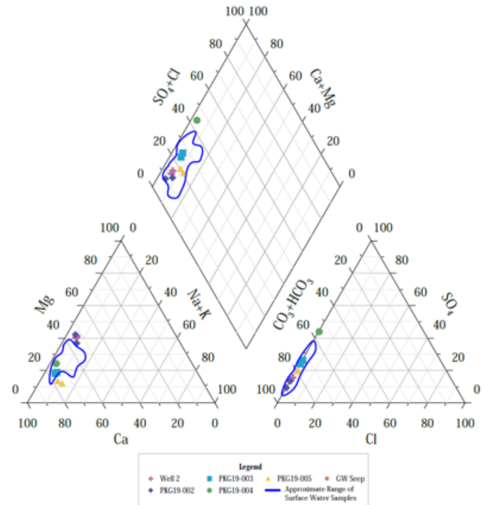
Groundwater Quality

- Surface water and groundwater analysis for major cations and major anions indicates a 'calcium-bicarbonate' type, with higher concentrations of these constituents in groundwater
- Seeps emerging at the soil-bedrock contact in lower reaches have chemistry similar to surface water, suggesting most active groundwater circulation is shallow
- High TDS and high hardness in deep groundwater; higher dissolved constituents→ low hydraulic conductivity, high residence time
- Some high baseline metal concentrations; no background mercury



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Preliminary Findings from Baseline Studies

- Groundwater recharge in the project area is generally low due to *fracture-dominated permeability*, *steep topography* and *permafrost* restricting deeper recharge
- *Water levels are relatively deep* (>200 ft-bgs) below upland areas, groundwater flow is topographically controlled, but focussed on fractures/faults
- *Limited groundwater inflow* to pits expected, but depressurization of pit slopes for geotechnical stability needs to be assessed
- Excavation will generate modest inflows to lower pit sump; preliminary estimate of groundwater *inflow* is *50-75 gpm*
- *Warm permafrost* from 30 to 150 ft-bgs, strongly controlled by surface cover and aspect
- Groundwater sustains *minimal baseflows* to streams surrounding the project site during dry/cold periods; flow rates peak during spring breakup and flash summer precipitation
- Higher mass loading in groundwater versus surface water; both calcium bicarbonate type
- *pH* ranges from *5.8 to 8.2* in surface water and groundwater across the site and appears controlled by catchment size and bedrock geology

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Key Issues for Project Development

1. Groundwater inflows expected to be low (within the range 50-75 gpm)

2. Localized management of groundwater will be important for optimizing the pit slope designs

3. Since all planned ore processing will be off site, the need to minimize contact water is important; a robust water balance will be important

4. A well designed site-wide and in-pit surface water management plan will be important to reduce off site water discharge requirements

5. Design of the waste rock facilities will need to consider accumulating snow, management of surface water, and preventing infiltration to the extent possible

6. Upon closure, groundwater outflow from final pits will need to be assessed; the prevailing structures are favorable for limiting the amount of downgradient percolation

Geochemical Characterization

SRK, Bill Jeffress

Tetlin Gold Project

Geochemical Characterization Study Update – Oct 14, 2020

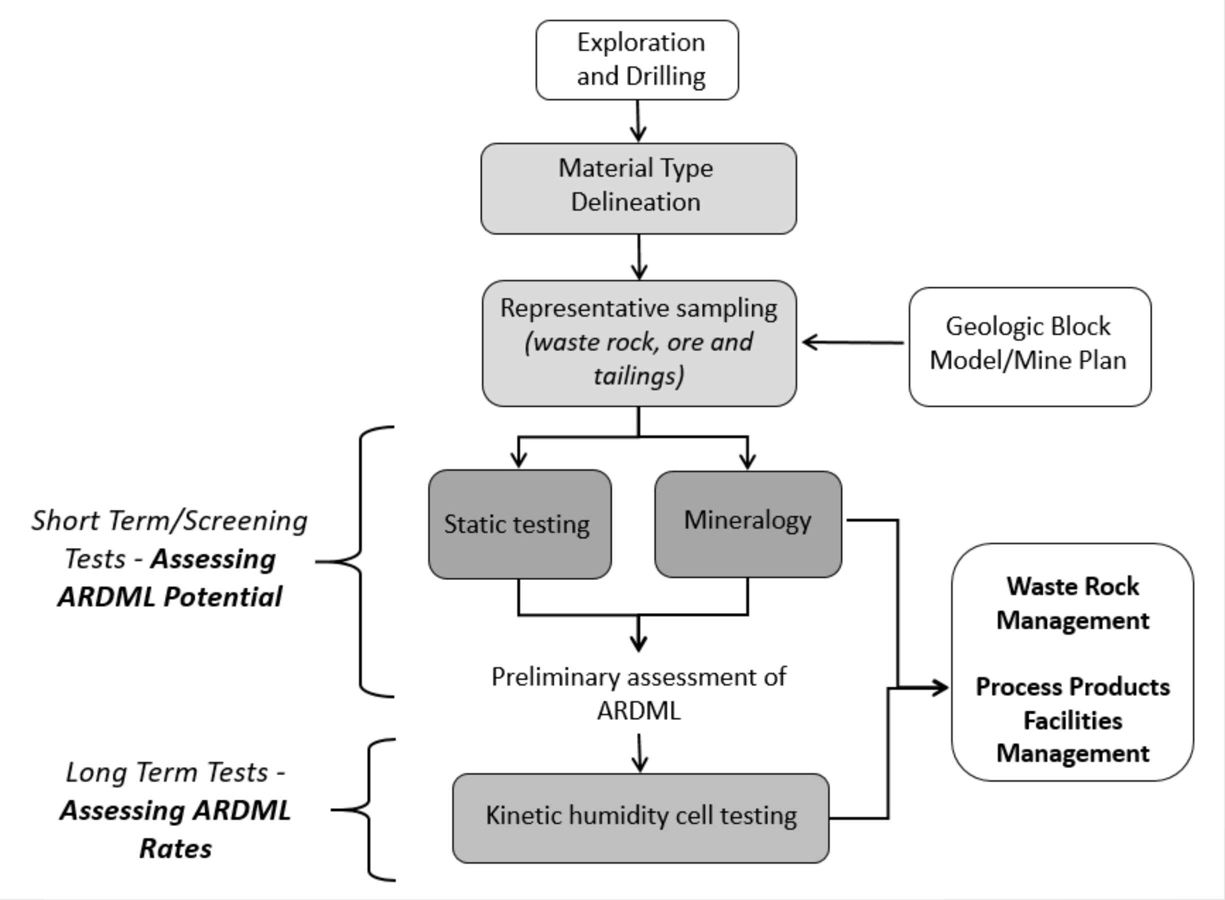
KINROSS

Presenter: Bill Jeffress

Location: Virtual Meeting

srk consulting

Geochemical Characterization – General Approach

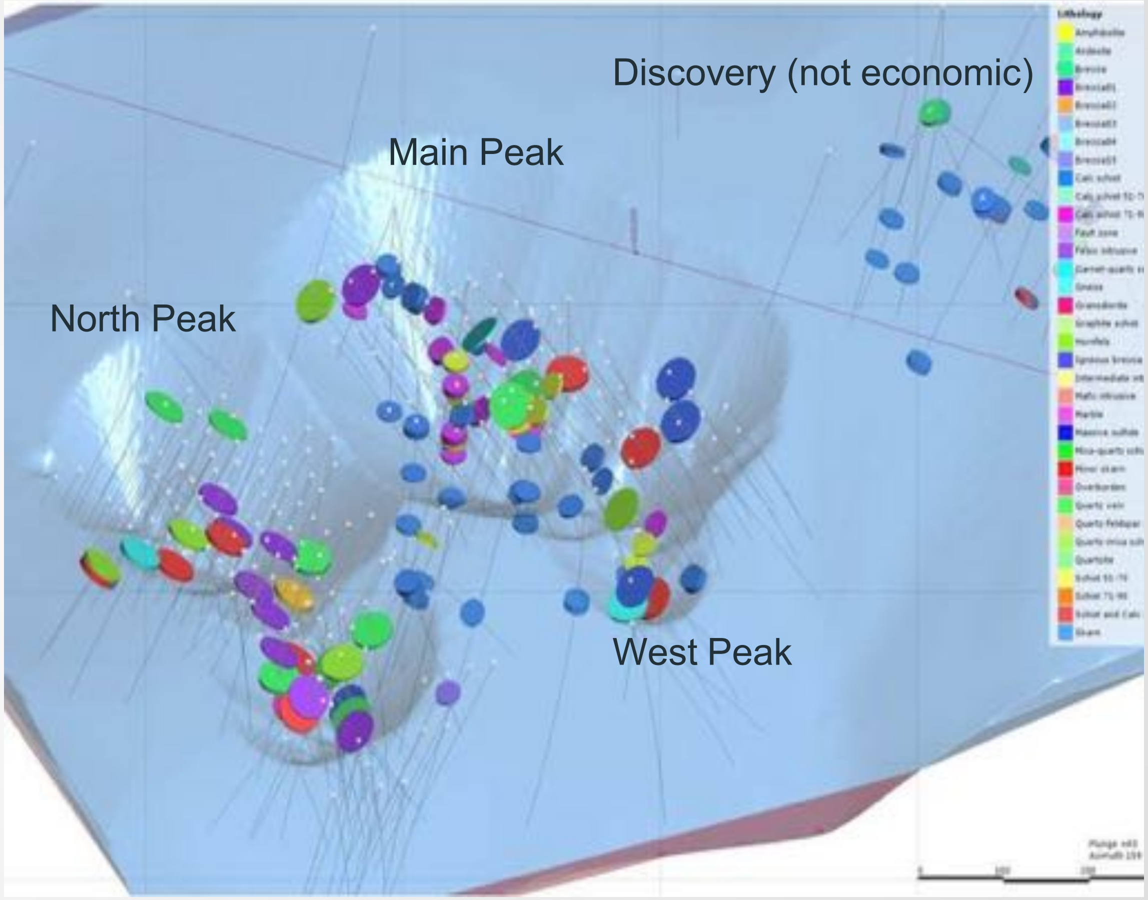


Testing has proceeded in four phases

1. Initial waste rock characterization – 2013
2. Additional spatial characterization – 2018
3. On-going kinetic testing – 2019 to present
4. Tailings characterization – 2019

Waste Rock Sampling – Objectives

- Represent main material types
  - Selected sample intervals consist of a single material type
  - Ore and waste grade samples, focus was on waste
  - Covers the range of lithology and oxidation conditions that will be encountered
- Spatially representative to the extent possible
  - Sample intervals visualized using Leapfrog
  - Representative of waste rock within proposed pit shells ($1400 pit shell from Dec 2017)



Note: Disk colors = lithology, size = program timing

Static Waste Rock Analysis

Samples were analyzed at Maxxam Analytics in Burnaby, BC, for:

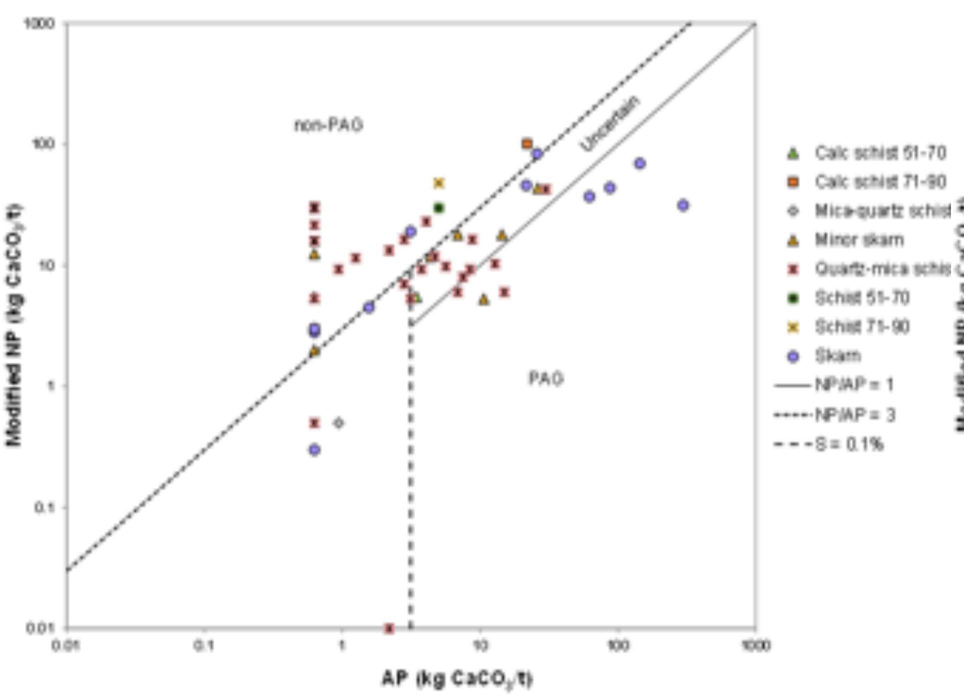
- Acid-base accounting (ABA)
- Total inorganic carbon
- Elemental analysis using aqua regia digestion and measurement by ICP-MS

Future potential for acid rock drainage evaluated using the NP/AP ratio:

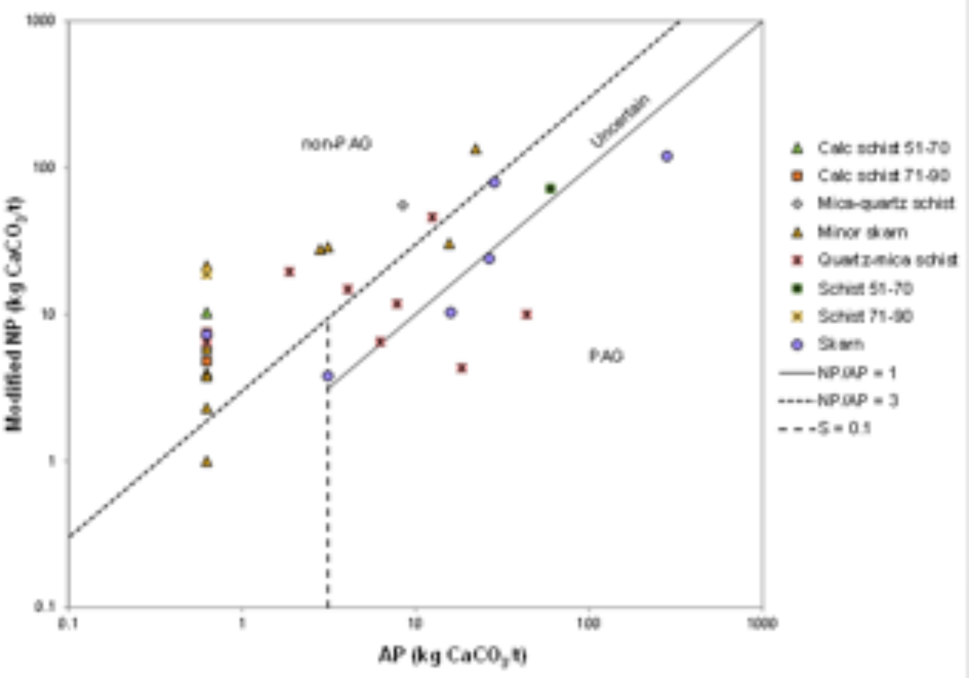
- $NP/AP>3$ not potentially acid generating (non-PAG)
- $NP/AP<1$ potentially acid generating (PAG)
- $1<NP/AP<3$ uncertain

Lithology	North Peak	Main Peak	West Peak
Quartz-mica schist	11	26	2
Skarn	6	12	1
Minor skarn	11	8	3
Schist 71-90	1	1	1
Mica-quartz schist	1	1	0
Schist 51-70	1	1	0
Calc schist 51-70	1	1	0
Calc schist 71-90	1	1	0
Total	**32**	**51**	**7**

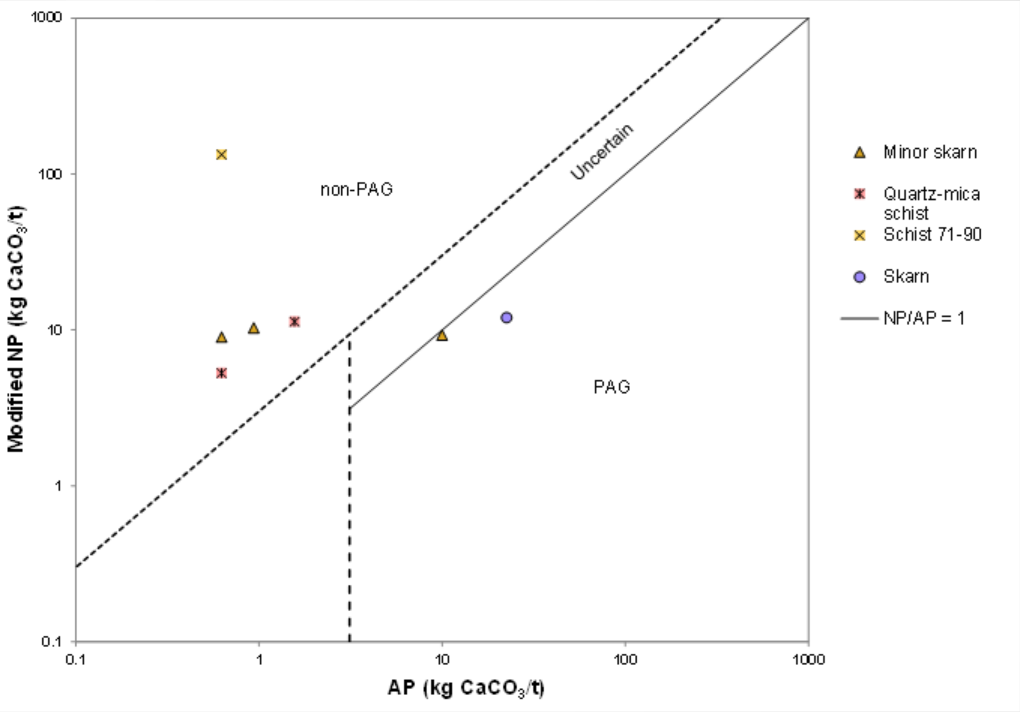
Main Peak



North Peak



West Peak


1000
100
10
1
0.1
0.1
1
10
100
1000
Modified NP (kg $CaCO_3$/t)
AP (kg $CaCO_3$/t)
non-PAG
Uncertain
PAG
Minor skarn
Quartz-mica schist
Schist 71-90
Skarn
NP/AP = 1

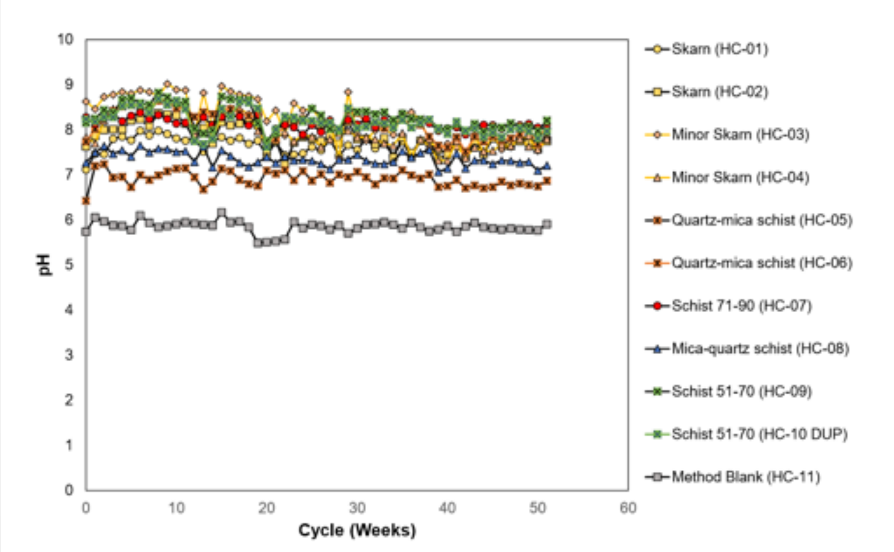
Ongoing Kinetic Testing

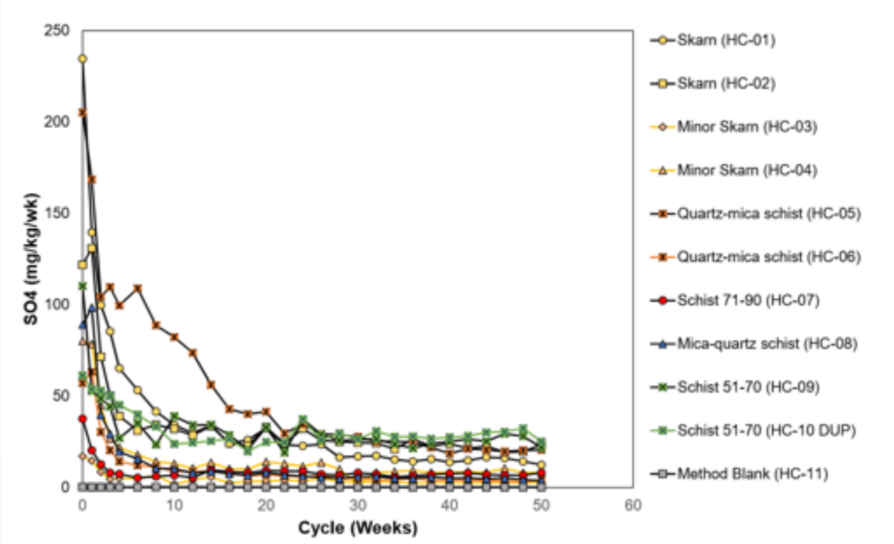
- Nine samples selected for kinetic testing using humidity cells (HCTs)
- Selected samples to represent the range of acid generation potential in the main lithologic units

HCT ID	Sample ID	Lithology	Area	NP/AP	ARD Classification	Current HCT pH	Current NP Remaining	Current Status
HC-01	TA7642	Skarn	North Peak	0.9	PAG	7.8	94.6%	Week 50
HC-02	PK19001	Skarn	Main Peak	1.1	Uncertain	7.8	97.2%	Week 50
HC-03	PK19002	Minor Skarn	North Peak	1.0	Uncertain	7.8	98.7%	Week 50
HC-04	TA7158	Minor Skarn	Main Peak	2.6	Uncertain	7.8	95.4%	Week 50
HC-05	PK19004	Quartz-mica schist	Main Peak	0.99	PAG	6.9	88.3%	Week 50
HC-06	PK19005	Quartz-mica schist	Main Peak	11	Non-PAG	8.2	98.6%	Week 50
HC-07	TA7638	Schist 71-90	Main Peak	9.6	Non-PAG	8.0	97.6%	Week 50
HC-08	TA7632	Mica-quartz schist	Main Peak	0.56	PAG	7.2	15%	Week 50
HC-09	TA7154	Schist 51-70	North Peak	1.2	Uncertain	8.2	97.6%	Week 50

Summary of Kinetic Test Results

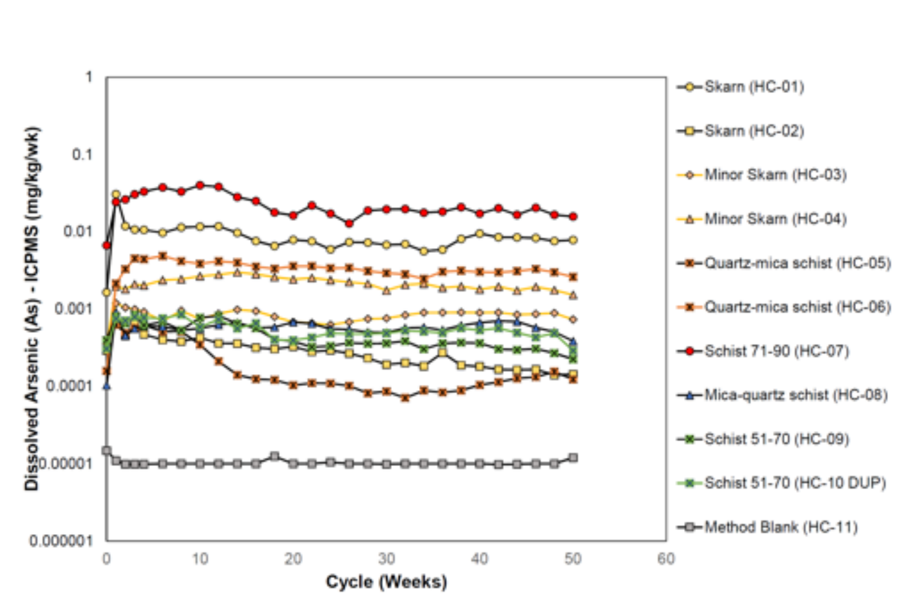
- All cells produced pH between pH 6.7 and 9.0 (neutral to slightly alkaline)
- Following initial flush – sulfate is leaching at stable rates
- Consumption of neutralization potential (NP) is low, indicating significant buffering is still available and/or that acid generation is limited or occurs at a slow rate despite sulfide sulfur contents up to 1.9 wt%
- Exception of HC-8 (quartz-mica schist) which has <15% NP remaining

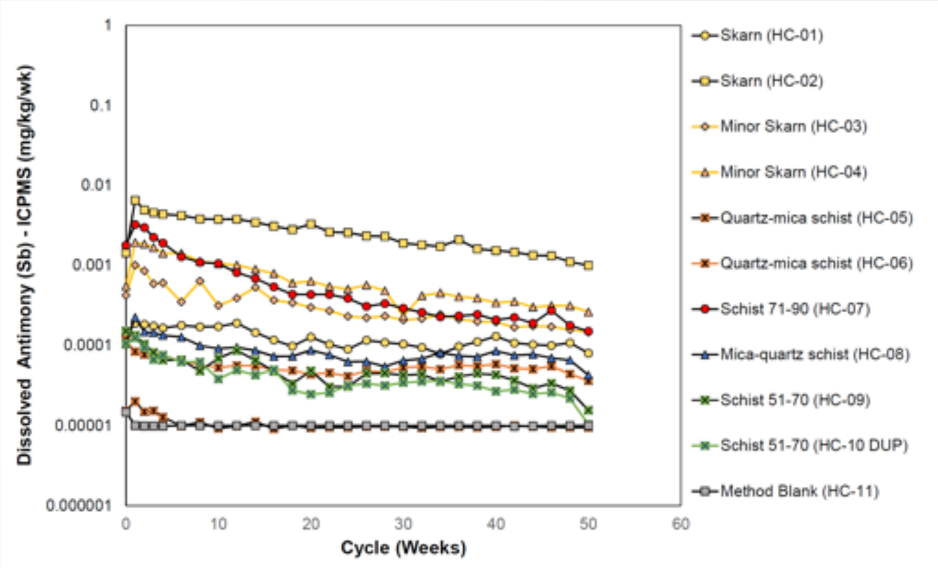




Summary of Kinetic Test Results

- Arsenic, antimony and aluminum are mobile under circum-neutral pH conditions





Tailings Ore Sampling

- Two representative composite tailings samples (North Peak and Main Peak) were analysed using the same static methods as waste rock and short term leach testing (MWMP)
- Results indicate different characteristics for the two deposits:
  - North Peak – 0.12% sulfide sulfur, non-PAG (NP/AP = 36)
  - Main Peak – 6.0% sulfide sulfur, PAG (NP/AP = 0.46)
- MWMP testing indicated potential mobility arsenic, cobalt and molybdenum in both samples and antimony and selenium in the Main Peak sample

Future Work

- Ongoing Humidity Cell Testing
  - All cells will be continued to at least100 weeks to evaluate the timing to acid generation and assess leaching rates
  - Cells will be discontinued when leaching rates are stable
- On- Site Barrel Testing
  - Field scale kinetic tests will be initiated to further evaluate leaching rates
- Tailings
  - Current results could drive different management approaches
  - Mine plan needs to be used to estimate how tailings characteristics might change with time and overall representivity
- Provide Input to Water Quality Modelling
  - Develop water chemistry predictions known as “source terms”
  - Current results indicate potential to generate acid is low but leaching of metals is likely a concern
  - Should be initiated at least 18 months prior to submission of the application that would initiate an EA or EIS

Wetlands

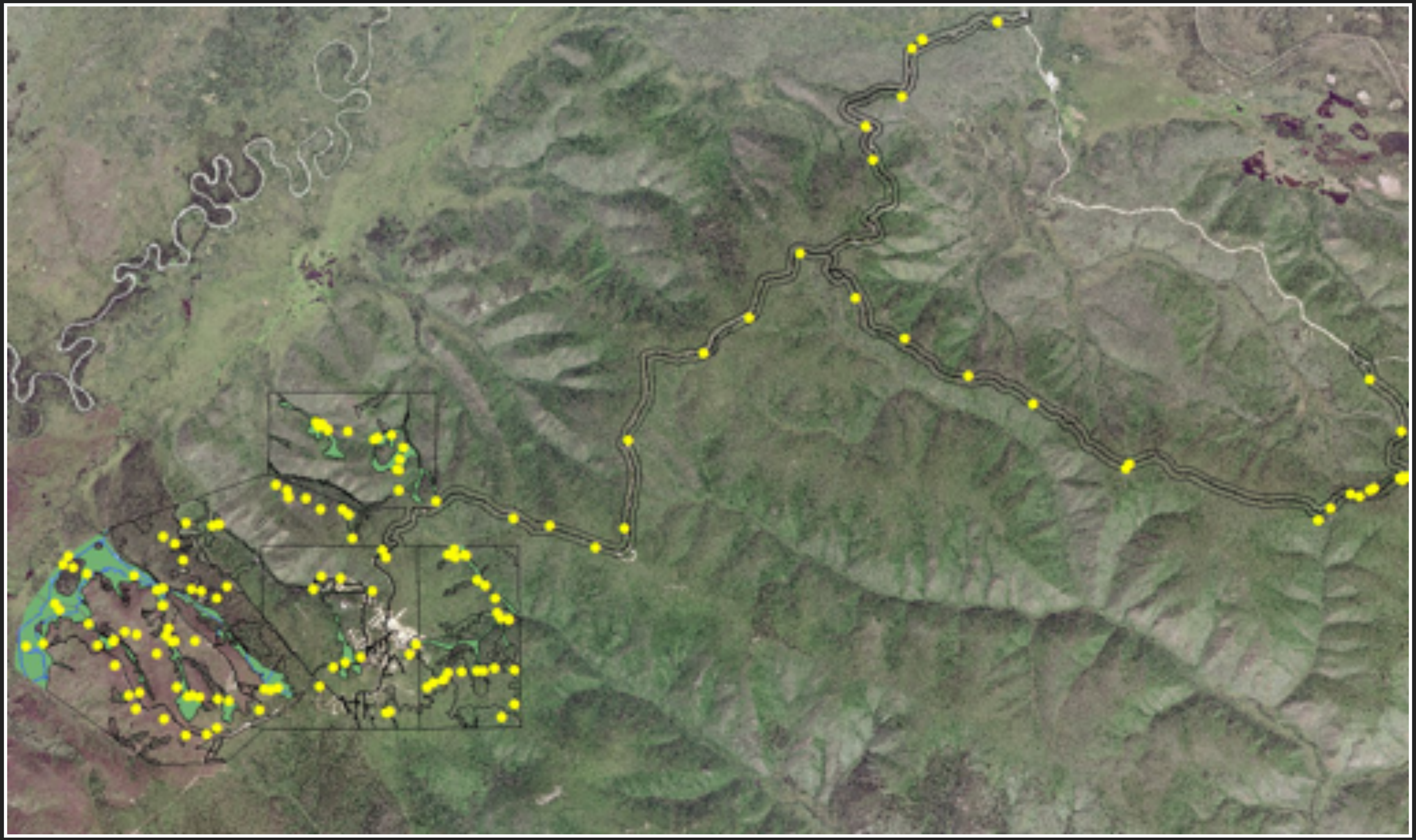
Stantec, Steve Reidsma

Tetlin Project

Wetlands and Waters Overview

2020 Field Objectives
Delineate New Study Area and Roads
Check NWI Mapping
Supplement ABR Data
Find the Water!

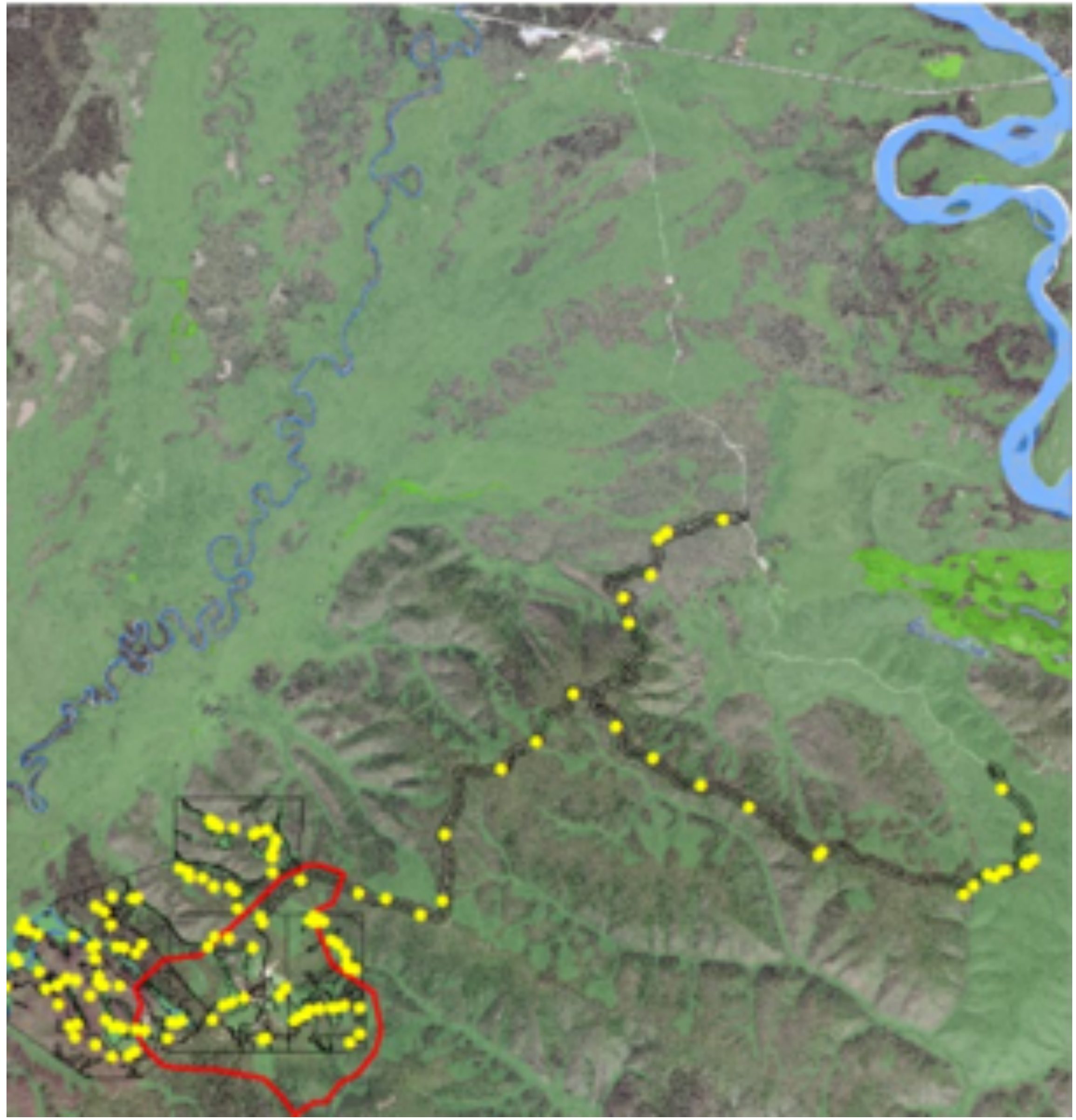
Stantec



2013, 2016 ABR Data

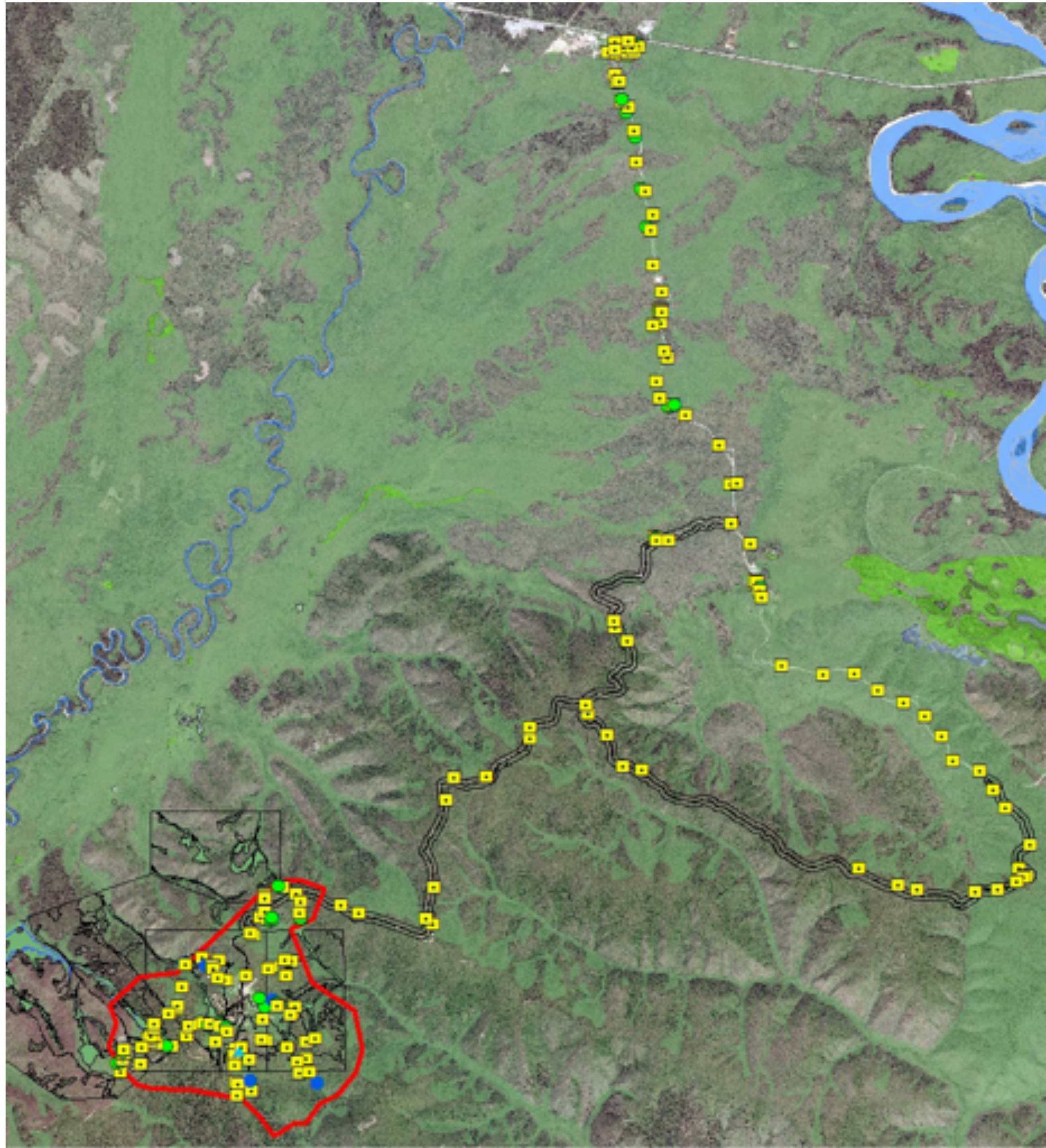
2020 Study Area

w/NWI layer (1978)



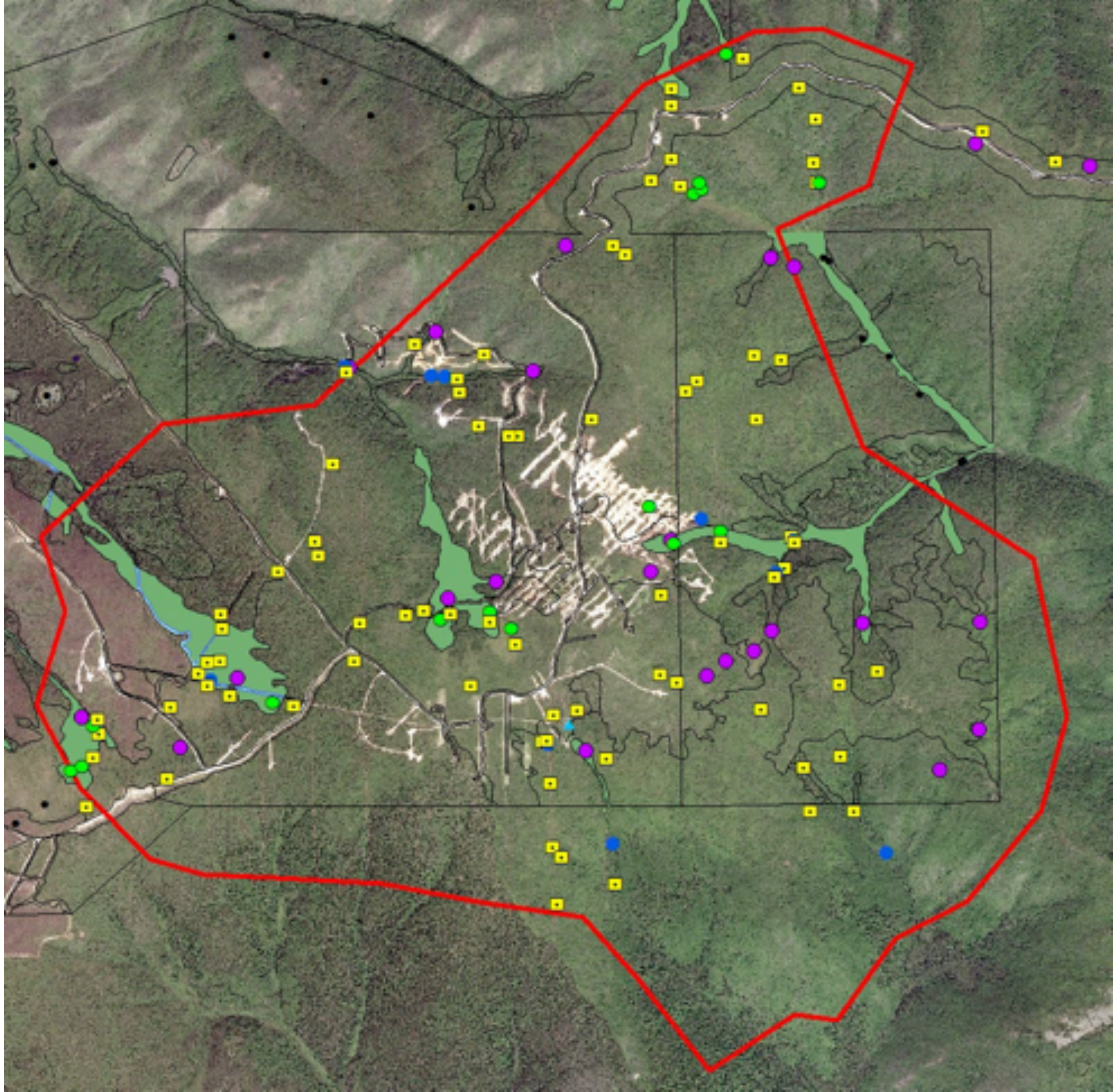
2020 Study Area

Field Results



2020 Study Area

Field Results
Mine Site



2020 Data
Wetlands Green
Streams Blue
Uplands Yellow

ABR Data Purple

Meteorological Monitoring

SLR, Isaac Bertschi

Meteorological Monitoring

October 2020
SLR International Corporation

KINROSS

Introduction

Tetlin Project Meteorological Monitoring Program

- Objectives – Collect Meteorological and Hydrologic Data to Support:
  - Air Quality Permit Application
  - Other Environmental Studies
  - Engineering Design (water balance, etc.)
- Regulatory Requirements
  - Data will be collected in accordance with all EPA Prevention of Significant Deterioration (PSD) requirements.
  - Requirements include ≥ 90% data completeness per quarter for four consecutive quarters.

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Meteorolgical Monitoring Parameters

- Horizontal Wind Speed and Direction (10-meters)
- Vertical Wind Speed (10-meters)
- Air Temperature (10-meters and 2-meters)
- 10-meter and 2-meter Temperature Difference
- Solar Radiation
- Barometric Pressure
- Relative Humidity
- Precipitation, and
- Evaporation

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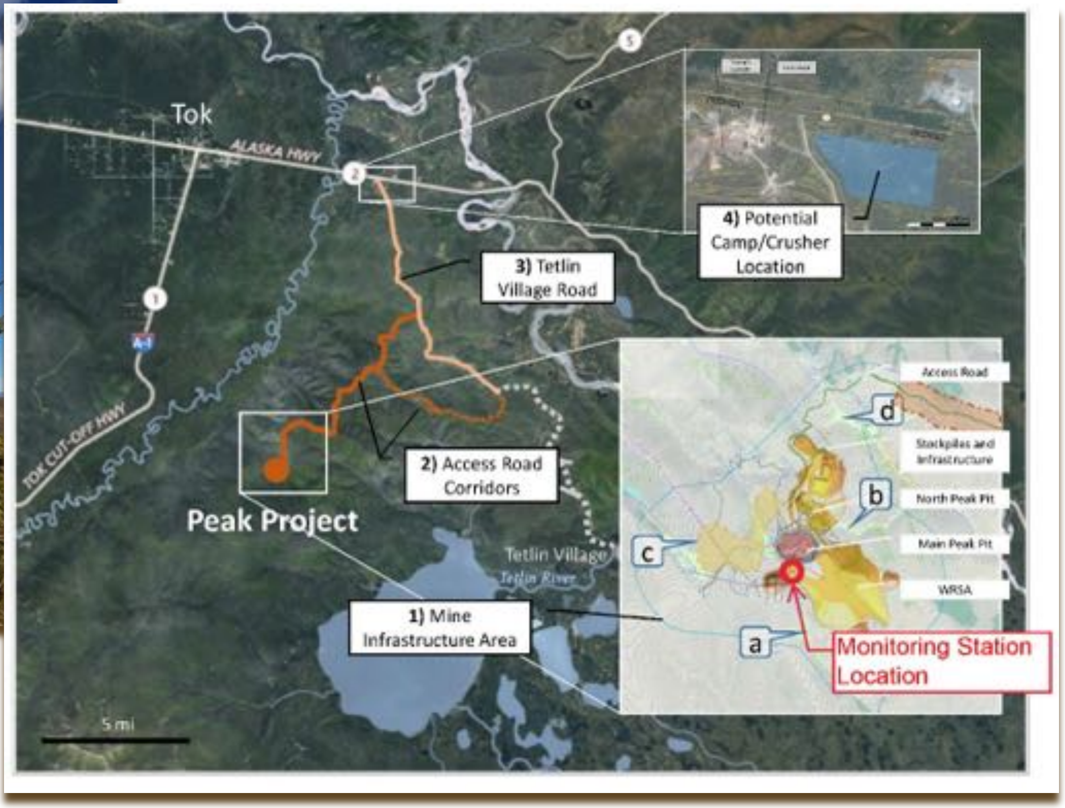
Meterological Station Location



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Meteorological Monitoring Timeline

- ADEC Site Approval – Received September 25, 2020
- Station Installation – October 2020
- Meteorological Monitoring Year – November 1, 2020 through October 31, 2021
- QAPP Submittal – November 2020
- Initial Station Audit and Calibrations – November 2020
- Semiannual Audit and Calibrations – May 2021
- Final Audit and Calibrations – October 31, 2021
- Annual Data Report (ADR) submittal to ADEC – December 31, 2021

✓ ADR approval anticipated by March 31, 2022

KINROSS

Site Visit

Bartly Kleven

Site Visit Agenda

Bartly cell (907) 460-4972

- Thursday – Arrive to Tok
  - 6:00 p.m. – Dinner at Fast Eddy's
- Friday
  - 8:00 a.m. – Breakfast at Fast Eddy's
  - 9:30 a.m. – Depart for site
    - Please bring winter outdoor gear
    - PPE and Mask Required – Bartly to bring extra
  - 10:00 - Minesite
    - Geology/Geography, Luke Raymond
    - Proposed Facilities, Bartly Kleven
    - Wetlands, Steve Reidsma
    - Groundwater, Surface Water, Bill Jeffress
    - Met Station, Dominic Shallies
  - 11:30 – Crusher Location
  - 12:00 p.m. – Site Visit Concludes

Covid Protocols

- Site Covid Questionnaire will be emailed
  - Please return to Bartly at Bartly.Kleven@Kinross.com prior to departure
- Social distancing will be required
- Two or more per vehicle must wear masks and keep the windows cracked
- Fast Eddy's will have a separate area for our meals where everyone can socially distance
- There will be a checkpoint at the entrance of the road to the site. Our names will be on the list for entry. This is to protect the village of Tetlin.
- At the site we all need to wear masks unless you are the speaker
- FGMI will have extra masks and hand sanitizer

KINROSS 25 YEARS

C.3 2020 10 30 PROJECT INTRODUCTION TO KINROSS TO VILLAGE COUNCIL

Project Update for Village Council

October, 2020

KINROSS

Agenda

- Who is Kinross Gold?
- The Kinross Alaska team
- Project timeline
- Peak design compared to Kinross design
- Environmental activities upcoming
- Community Relations update

October 12, 2020

Who is Kinross Gold?

- **Values based company with employees worldwide**
  - Responsibly producing gold in Interior Alaska for over 24 years
  - Putting People First; rigorous safety program
  - Outstanding Corporate Citizenship
    - Committed to maximizing local purchasing and employment
    - Committed to protecting biodiversity, air and water quality, and to meet or exceed environmental regulatory requirements wherever we operate
    - Widely recognized as a vital contributor to the well-being of

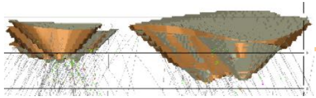
Alaskans, focused on the long-tem sustainability of the community.

Fort Knox employee providing hands-on CPR to community

Project team

- Jeremy Brans – General Manager
- Anna Atchison – Community and Government Relations
  - **Joy Huntington** will stay on to support the project for a while
- Shawn Colburn – Project Field Manager
  - Begun his exploration career in 2005
  - Extensive experience working in villages

The PEA plan included mining, ore processing, and tailings storage at Tetlin



Two open pit mines

Ore is mined

then crushed and processed producing…

Gold bars

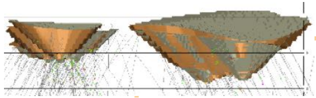
Waste is stored

Tailings

All infrastructure is built at the Tetlin site

Kinross plans to haul ore to an existing gold processing plant, rather than building a new one

Highway ore hauling is a new step



Two open pit mines

Ore is mined

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Waste is stored

Mining and crushing Tetlin site

and hauled to Fort Knox

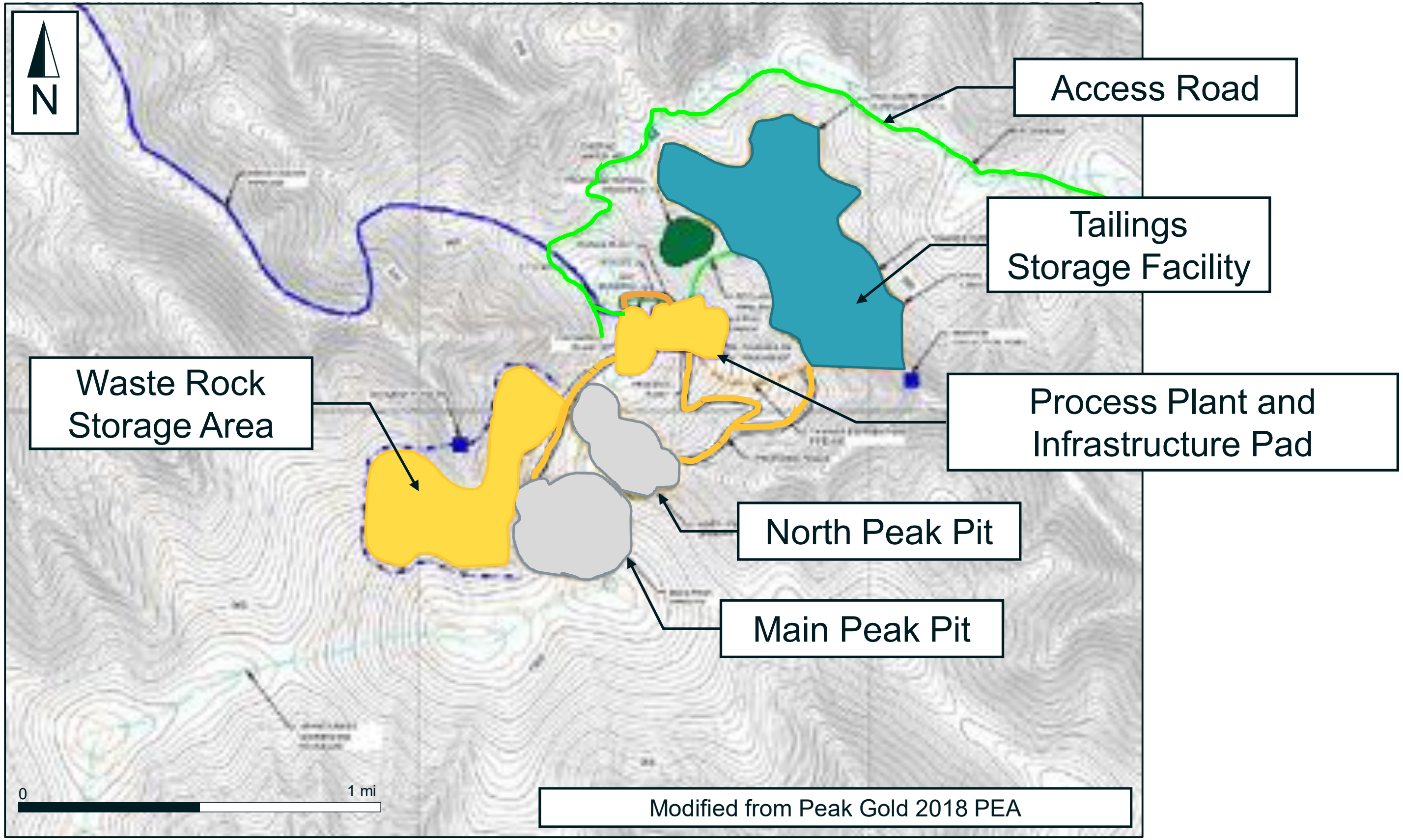
Processing and tailings at Fort Knox instead of Tetlin

Processing

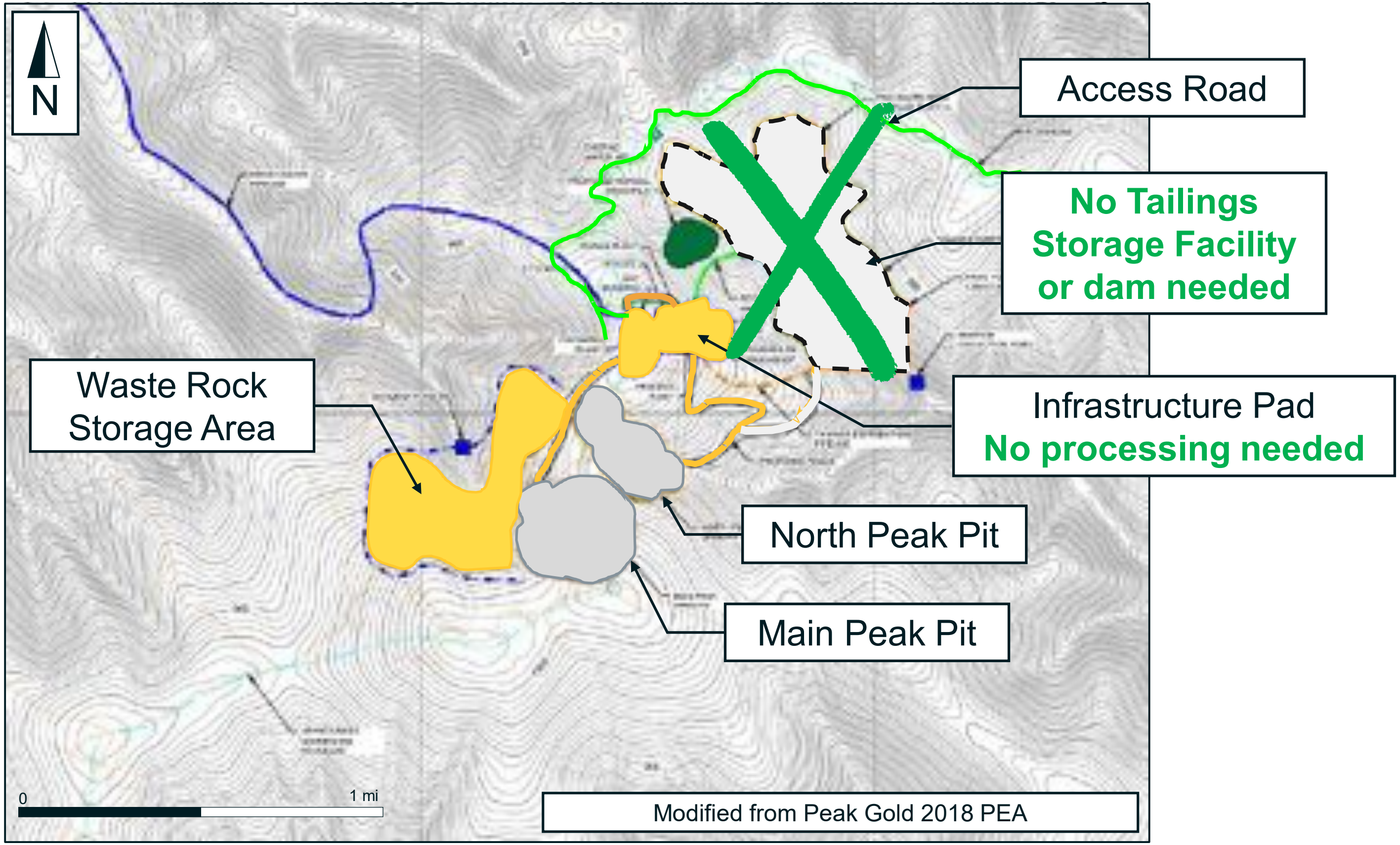
Gold bars

Tailings

The PEA plan required a process facility and tailings storage facility at the Tetlin site



The Kinross plan eliminated the tailings storage facility reducing site disturbance and water use



PROJECT TIMELINE

The Peak Gold Joint Venture Project
Community engagement, environmental baseline studies, and exploration field work like drilling are on-going and consistent through the project's timeline.

October 12, 2020

Gold is Discovered

Exploration for minerals began in 2009. From 2009 to 2014 Juneau Exploration and Contango ORE discovered and outlined a high-grade gold skarn deposit at the Main Peak zone.

Then in 2015 a partnership started between Royal Gold and Contango ORE operating under a land lease with the village of Tetlin. This operating agreement has allowed the Joint Venture to expand the definition of the Main Peak deposit and outline North Peak, a parallel deposit.

Economic Viability

The PEA[1] was published in 2018, by JDS Energy and Mining Inc.

The objective of the PEA is to determine the economic viability potential of a mining project.

We Are Here!

Scoping

This study will provide more information on the production plan, location of infrastructure, environmental mitigation required, capital cost as well as initial estimates of employment numbers.

Targeting to complete in 2021.

Further Studies

Once further results of the field work and tests are received, the team will finalize the production plan, project configuration, capital costs and have more information on potential employment. The team will continue the environmental monitoring and involving the public during this phase of the project.

Targeting to complete in 2022.

Detailed Design

Once the project team has received final approvals, the project will move into detailed engineering, equipment procurement, construction, and commissioning.

Targeting to complete in 2023.

Production

This project will benefit local residents and will contribute to the state economy by providing additional employment opportunities and benefits. Additionally, preliminary estimates for the Peak Gold project include 1) a mine life of 4.5 years, starting in 2024; 2) a total life of mine production of 1 million recovered gold equivalate ounces at an average mining grade of approximately six grams per ton; and 3) an initial project capital expenditure of $110 million.

Targeting to start in 2024.

Exploration → Prelim. Economic Assessment → Scoping Study → Feasibility Study and Permitting → Project Execution → Operations

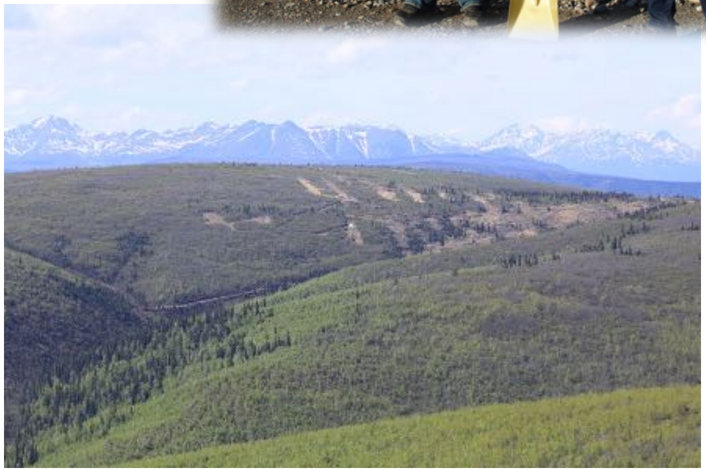
Environmental programs

- Continue the groundwater and surface water baseline studies with monthly monitoring on existing and new wells
- Set up a meteorological station and will monitor climatic conditions
- Continue wildlife and fish surveys
- Continue geochemistry studies
- Prepare wetlands maps and evaluate ways to mitigate impacts
- Ensure the regulatory stakeholders are familiar with the site and the baseline data collected to date
- Prepare permit applications

Kinross' reclaimed True North mine

Community Relations Update

- Stakeholder calls since announcement
  - Trout Unlimited
- Roads and maintenance
- Community Support Agreement
  - October support
- 2020-2021 work season and COVID precautions
  - Plan approved and sent to SOA
- Renaming the projects – next steps
  - Cultural significance
- Future presentation to village
  - Additional information to include?



KINROSS

C.4 2020 11 05 PROJECT INTRODUCTION TO KINROSS TETLIN VILLAGE

Project Update

November 5, 2020

KINROSS

Agenda

- Virtual meeting logistics
- Project history
- The Joint Venture (JV) explained
- Who is Kinross Gold?
- The Kinross Alaska team
- Project timeline
- Peak design compared to Kinross design
- Environmental protection programs and reclamation
- Community relations update
- More discussion and questions

Project history

- 2008: Lease signed
- 2009: Contango ORE began early exploration work
- 2015: Royal Gold became a joint owner
    - Community relations program started and Community Support Agreement signed
        - $100,000 per year to the tribe for community programs/events
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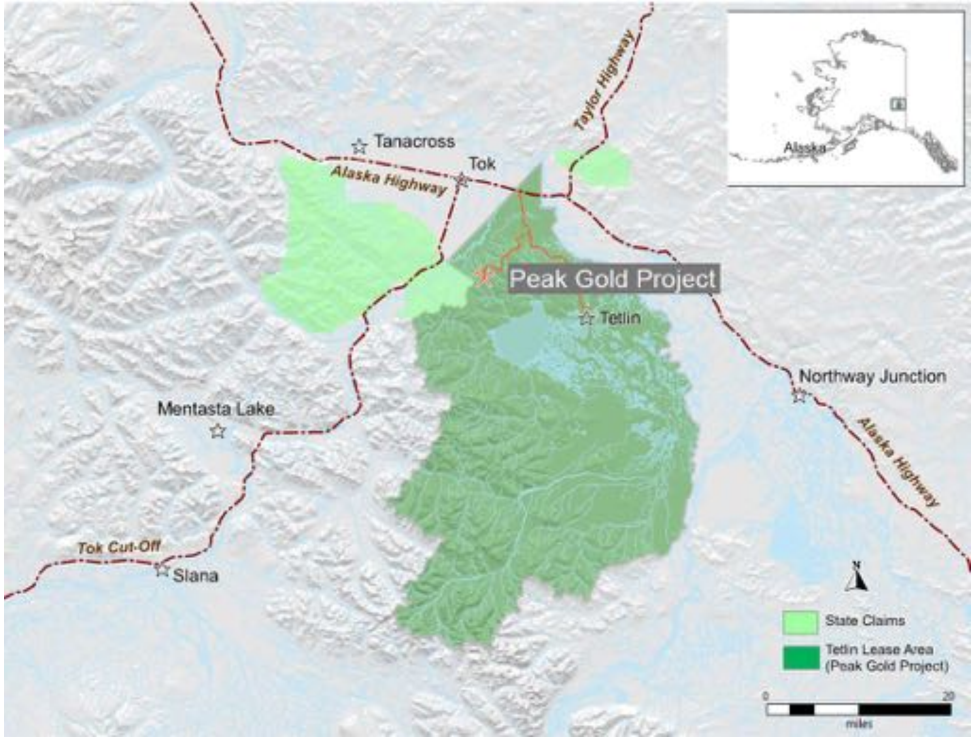
    - Widely recognized as a vital contributor to the well-being of Alaskans, focused on the long-tem sustainability of the community.

Fort Knox employee providing hands-on CPR training to community

The Joint Venture (JV) explained

- Kinross 70% majority project owner and operator
  - Contango ORE 30% interest
- The project partnership and relationship will be between Kinross and Tetlin
  - We are honoring all past agreements



Project team

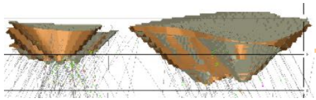
- Jeremy Brans – General Manager
- Anna Atchison – External Affairs Manager
  - **Joy Huntington** will stay on the project for a while
- Shawn Colburn – Project Field Manager
  - Began his exploration career in 2005

The old plan included mining, ore processing, and tailings storage at Tetlin

Ore is mined

then crushed and processed producing…

Gold bars



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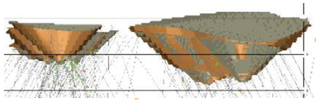
Highway ore hauling is a new step



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Gold bars

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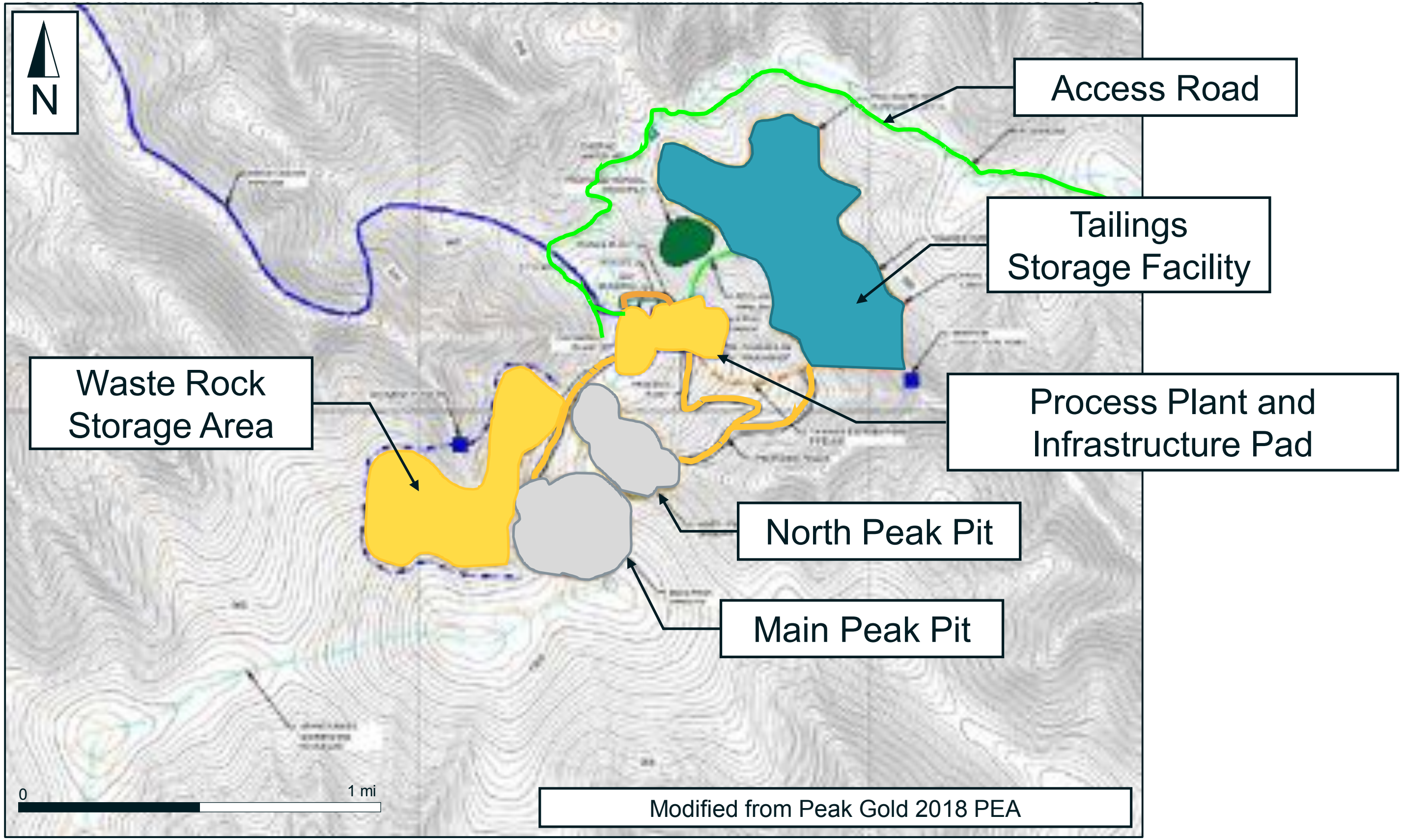
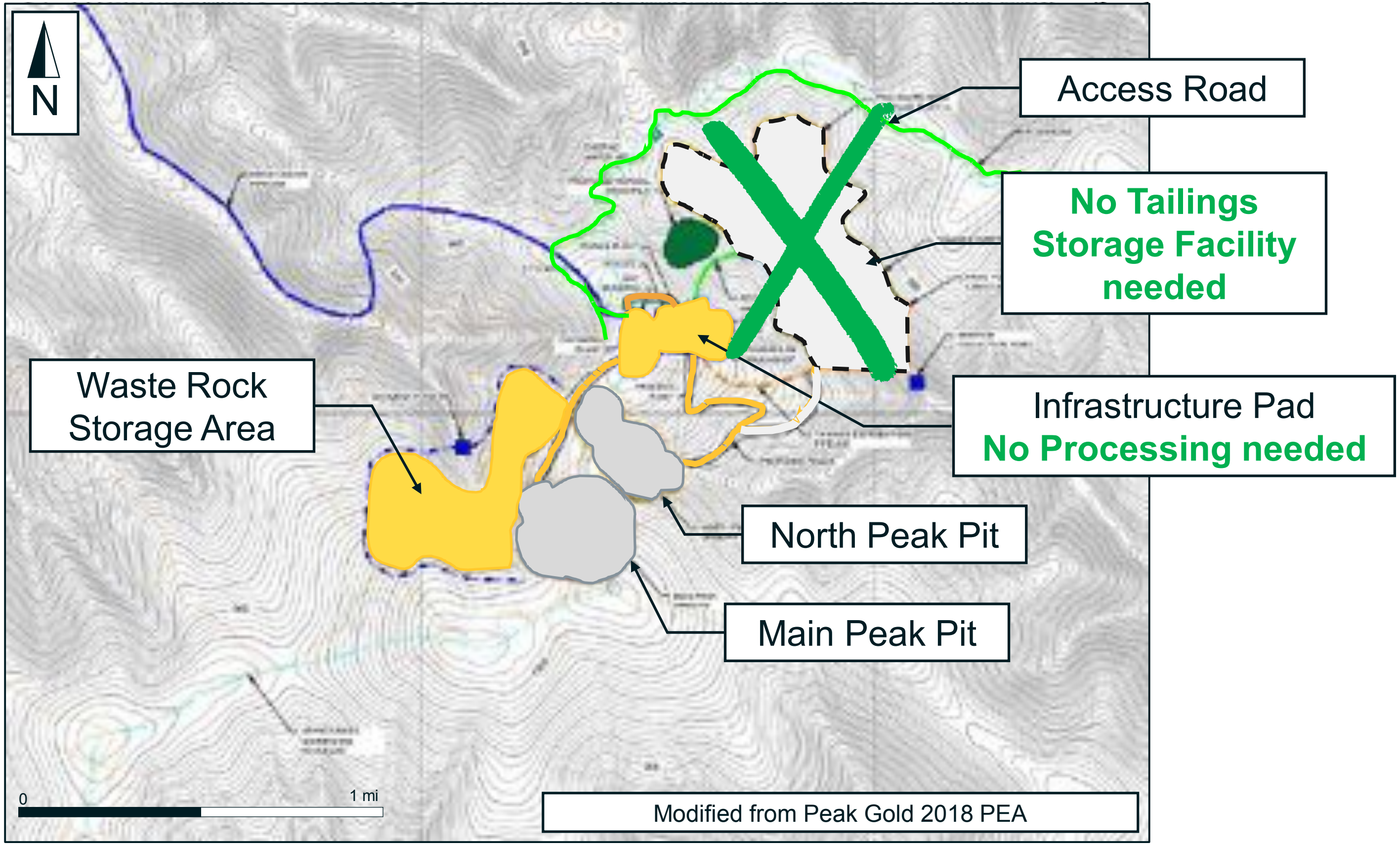


Our plan eliminates the process facility and tailings storage facility, reducing environmental footprint



November 5, 2020

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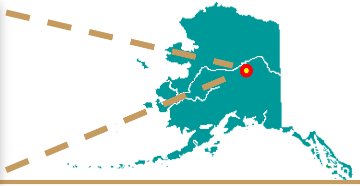
Environmental protection programs

- Continue the groundwater and surface water baseline studies with monthly monitoring on existing and new wells
- Cultural studies – cultural history/heritage input is welcome
- Monitor climatic conditions (have set up a meteorological station)
- Continue wildlife and fish surveys
- Prepare wetlands maps and evaluate ways to mitigate impacts
- Ensure the regulatory stakeholders are familiar with the site and the baseline data collected to date
- Prepare permit applications

Kinross' reclaimed True North mine – after mining

Environmental Reclamation

True North: 1st AK Large-scale Metal Mine to Close



BEFORE

NOW

"Alaska's founders knew **responsible resource development** was key to a secure and prosperous state, and our experience with True North shows that they were right. The developers **leased state land**, **produced a valuable commodity** to serve global markets, **employed Alaskan**, and **paid state taxes and royalties**. When they were done, they remediated the effects of their work and **returned the land** to the state for its next use. The system works.

— ***Corri Feige***, *DNR Commissioner*

Community Relations Update

- **Strong support** for project since announcement
  - Reached out immediately to many different people and groups
- **Local hire** – 2020-21 work season, COVID-19 precautions, training
- **Local purchasing** – researching the available area businesses
- **Community Support Agreement**
  - Additional October COVID support and 2021 planning
- **Roads** and maintenance
- **Renaming** the project – next steps
  - Cultural significance
- **Future presentations** to Tetlin, surrounding villages, and Tok area

Photo from previous work season

Any other questions?

- Anna Atchison, anna.atchison@kinross.com, (907) 490-2218
- Joy Huntington, joy@uqaqti.com, (907) 328-8117

THANK YOU!

KINROSS

C.5 2020 11 23 TETLIN COUNCIL

Agenda

- Welcomes
  - Introduce Shawn Colburn, Field Manager
- Community relations update – Anna
  - Renaming - Joy
  - Contractor Hiring Process – Jeremy
- Royalty issue - Jeremy
- Questions, discussion - All

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Community Relations Update

- **Local hire – Environmental Technician in Training** job now on www.kinross.com; CR Coordinator position to be posted after Thanksgiving
- Good UAF Tok Campus meeting about next year's **education and training programs**
- **Community Support Agreement**
  - Final 2020 payment
- **Renaming** the project
- **Presentations**
  - Community meetings
  - Tok meeting scheduled for Dec 8
  - Next council meeting
- **Contractor hiring process**
- **Royalty issue**

Contractor Hiring Process: Community Development

- **Committed to a positive community footprint**, and that includes spending with local suppliers and contractors.
- Recent 2020 drilling program included local content. Schedule to do this work was very tight so we may not have been aware of all local suppliers.
- Kinross has a **lot of experience with local vendors** and works to set them up for success.
  - Can help local vendors recognize and use their competitive advantages and close the gaps vs. non-local competitors.
- We have a documented **Supply Chain Policy** to ensure that procurement activities are performed in a consistent, legal and fair manner.
  - One of the criteria that Kinross considers is whether a vendor is local, or whether a product or service has local content or employs people locally. This is one criteria – but not the only one. Others are quality, price, and time.
- The **Policy has fundamental rules** to make sure conflicts of interest are avoided.
  - Checks and balances designed to ensure they are objective, fair, and abide by all laws.
  - One important part of the process is **separating roles to avoid conflicts of interest**. Technical people or operators evaluate quality, technical fit and schedule, while 'commercial' or business people look at pricing, contract terms, etc.
  - In addition to avoiding conflicts of interest, this separation of roles **helps ensure that Kinross does not make a short-sighted decision** (e.g. picking the cheapest product…but the quality ends up being an issue; or picking the perfect product…but it costs a fortune).
  - The **decision is not made by a single person.** The decisions and the reasons are documented.

Contractor Hiring Process: Preparing for 2021

- **Establishing a registry** of potential contractors – please have interested community members send us their information. Kinross staff currently working in the Tok area can help facilitate this, and our Project Director is available for discussions.
- For upcoming **2021 field work, local contractors will be invited to bid**, as appropriate. **Local labor will be encouraged.**
- Will have on-going discussions with Tetlin Village Council on **long term training and development priorities** – this includes construction and operation phases (e.g. Trucking).
- We will encourage the larger non-local contractors to **employ local community members** and local business.

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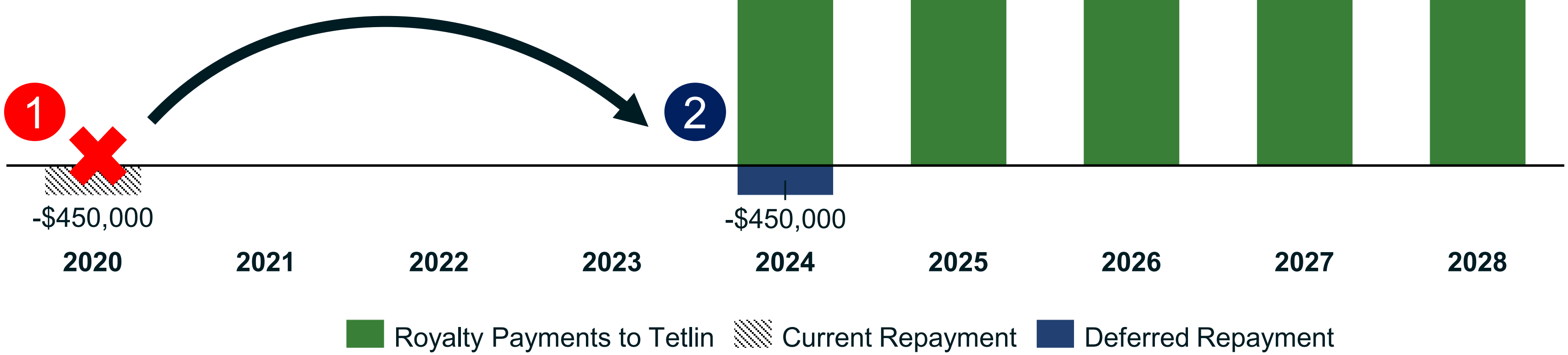
Royalty repurchase history

- Background
  - Under the second amendment to the lease signed in June 2011 the tribe received $75,000 to reduce the royalty by 0.25%. There was no provision to repurchase the royalty in this amendment.
  - Under the third amendment signed in July 2011 the tribe received an additional $150,000 to reduce the royalty by a further 0.50%. This third amendment also granted the option to repurchase the royalty on or before July 15, 2020 as follows:
    - 0.25% for $150,000,
    - 0.5% for $300,000, or
    - 0.75% for $450,000
- So in total the tribe received $225k for a 0.75% royalty, and **would have to pay $450k, twice the amount received, to repurchase the royalty**.
- Kinross did not think it was right to expect the tribe to write a check to repurchase. We did not view this as a typical business decision.
- Current status
  - **Deadline of December 31st to determine the amended repurchase agreement**

Propose Deducting $450k Payment From First Year of Royalty Payments

1. $450k payment deferred until first year of mine production (expected to be 2024)
2. $450k deducted from royalty payments in first year of production. The royalties received by Tetlin in the first year are expected to be considerably higher than $450k



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Note: Royalty payments shown are illustrative based on production of 1.0 million ounces over 4.5 years at a $1,200 gold price. Timing and amount of royalty payments may not match what is shown

Any other questions?

- Anna Atchison
  anna.atchison@kinross.com
  (907) 490-2218

- Joy Huntington
  joy@uqaqti.com
  (907) 328-8117

THANK YOU!

C.6 2020 12 15 PROJECT INTRODUCTION TO KINROSS TETLIN VILLAGE

Project Update

December 15, 2020

KINROSS

Agenda

- Virtual meeting logistics
- Project history
- The Joint Venture (JV) explained
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Photo from previous work season, pre-COVID

Project history

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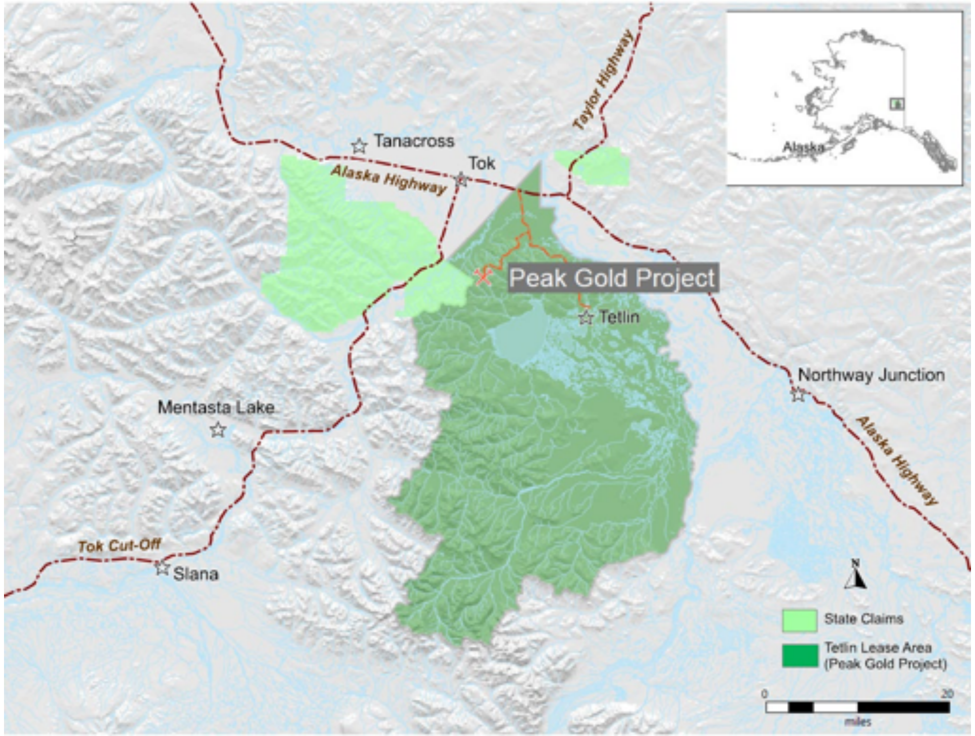
Who is Kinross Gold?

Fort Knox employee providing hands-on CPR training to community

- **Values based company with employees worldwide**
  - Responsibly producing gold in Interior Alaska for over 24 years
  - Putting People First; rigorous safety program
  - Outstanding Corporate Citizenship
    - Committed to maximizing local purchasing and employment
    - Committed to protecting biodiversity, air and water quality, and to meet or exceed environmental regulatory requirements wherever we operate
    - Widely recognized as a vital contributor to the well-being of Alaskans, focused on the long-tem sustainability of the community.

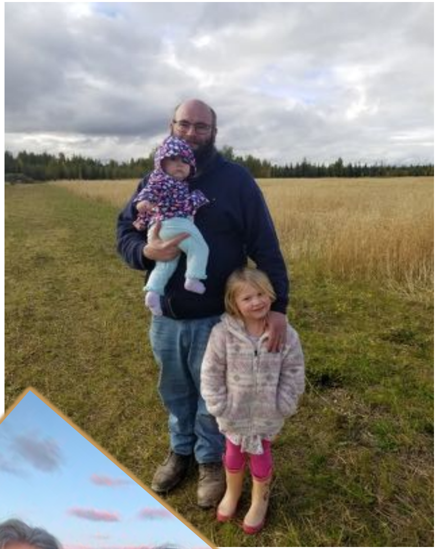
The Joint Venture (JV) explained

- Kinross 70% majority project owner and operator
  - Contango ORE 30% interest
- The project partnership and relationship will be between Kinross and Tetlin
  - We are honoring all past agreements

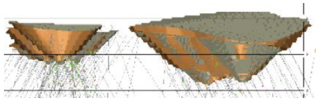


Project team

- Jeremy Brans – General Manager
- Anna Atchison – External Affairs Manager
    - **Joy Huntington** will stay on the project for a while
- Shawn Colburn – Project Field Manager
    - Began his exploration career in 2005



The old plan included mining, ore processing, and tailings storage at Tetlin



Two open pit mines

Ore is mined

then crushed and processed producing…

Gold bars

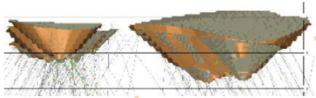
Tailings

Waste is stored

All infrastructure is built at the Tetlin site

Kinross plans to haul ore to an existing gold processing plant, rather than building a new one

Highway ore hauling is a new step



Two open pit mines

Ore is mined

then crushed

and hauled to Fort Knox

Waste is stored

Mining and crushing Tetlin site

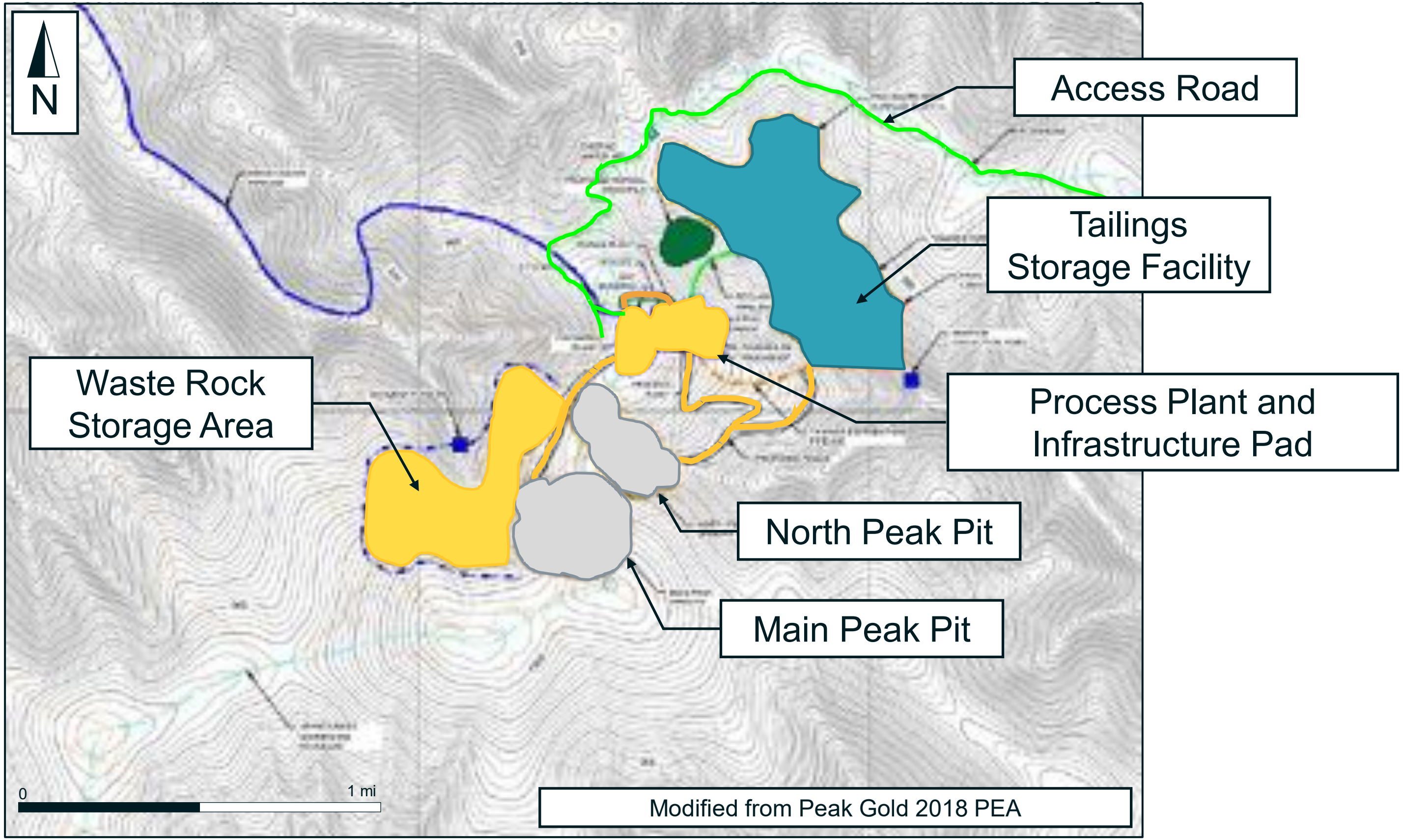
Processing and tailings at Fort Knox instead of Tetlin

Processing

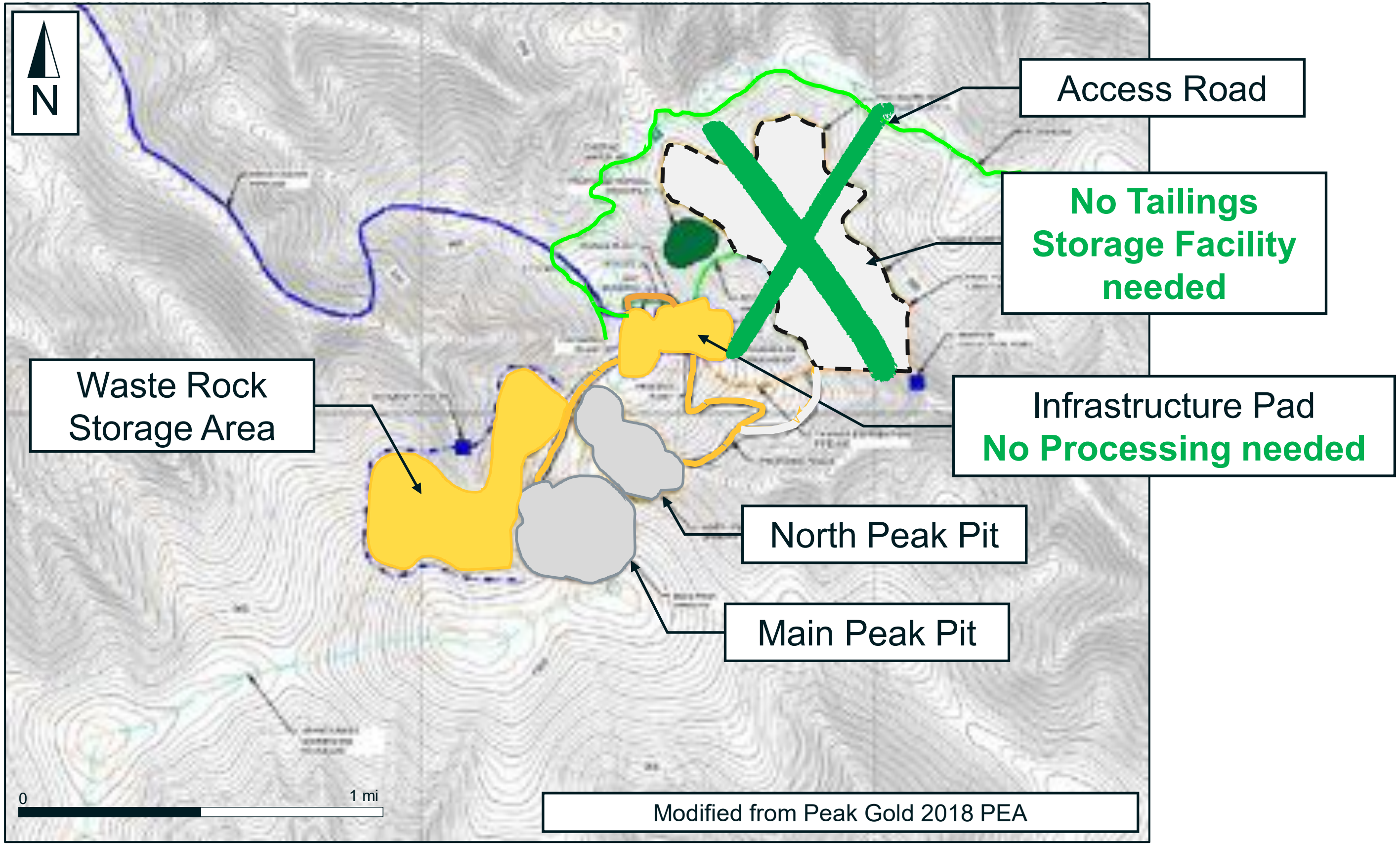
Gold bars

Tailings

The old plan required a process facility and tailings storage facility on Tetlin land



Our plan eliminates the process facility and tailings storage facility, reducing environmental footprint



PROJECT TIMELINE

The Peak Gold Joint Venture Project
Community engagement, environmental baseline studies, and exploration field work like drilling are on-going and consistent through the project's timeline.

Exploration

Gold is Discovered

Exploration for minerals began in 2009. From 2009 to 2014 Juneau Exploration and Contango ORE discovered and outlined a high-grade gold skarn deposit at the Main Peak zone.

Then in 2015 a partnership started between Royal Gold and Contango ORE operating under a land lease with the village of Tetlin. This operating agreement has allowed the Joint Venture to expand the definition of the Main Peak deposit and outline North Peak, a parallel deposit.

Prelim. Economic Assessment

Economic Viability

The PEA[1] was published in 2018, by JDS Energy and Mining Inc.

The objective of the PEA is to determine the economic viability potential of a mining project.

Scoping Study

We Are Here!

Scoping

This study will provide more information on the production plan, location of infrastructure, environmental mitigation required, capital cost as well as initial estimates of employment numbers.

Targeting to complete in 2021.

Feasibility Study and Permitting

Further Studies

Once further results of the field work and tests are received, the team will finalize the production plan, project configuration, capital costs and have more information on potential employment. The team will continue the environmental monitoring and involving the public during this phase of the project.

Targeting to complete in 2022.

Project Execution

Detailed Design

Once the project team has received final approvals, the project will move into detailed engineering, equipment procurement, construction, and commissioning.

Targeting to complete in 2023.

Operations

Production

This project will benefit local residents and will contribute to the state economy by providing additional employment opportunities and benefits. Additionally, preliminary estimates for the Peak Gold project include 1) a mine life of 4.5 years, starting in 2024; 2) a total life of mine production of 1 million recovered gold equivalate ounces at an average mining grade of approximately six grams per ton; and 3) an initial project capital expenditure of $110 million.

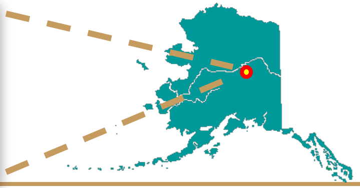
Targeting to start in 2024.

Environmental protection programs

- Continue the groundwater and surface water baseline studies with monthly monitoring on existing and new wells
- Cultural studies – cultural history/heritage input is welcome
- Monitor climatic conditions (have set up a meteorological station)
- Continue wildlife and fish surveys
- Prepare wetlands maps and evaluate ways to mitigate impacts
- Ensure the regulatory stakeholders are familiar with the site and the baseline data collected to date
- Prepare permit applications

Environmental Reclamation

True North: 1st AK Large-scale Metal Mine to Close



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— ***Corri Feige***, *DNR Commissioner*

Community Relations Update

- **Strong support** for project since announcement
  - Reached out immediately to many different people and groups
- **Local hire** – 2020-21 work season, COVID-19 precautions
  - Environmental Tech in Training & Community Relations Coordinator roles open!
- **Community Support Agreement**
  - Additional October COVID support and 2021 planning
- **Roads** and maintenance
- **Renaming** the project – next steps
  - Cultural significance
- **Future presentations** to Tetlin, surrounding villages, and Tok area

Any other questions?

- Anna Atchison, anna.atchison@kinross.com, (907) 490-2218
- Joy Huntington, joy@uqaqti.com, (907) 328-8117

THANK YOU!

KINROSS

C.7 2021 02 22 TVC MEETING

PEAK GOLD

Tetlin Village Council Meeting

February 22, 2021

Current staffing requirements and hiring

Role	Hiring Manager	Notes
Env. Tech in Training	Bartly Kleven	Offer made to candidate.
Community Relations Rep	Anna Atchison	Prefer to hire from Tetlin, must hire from local area.
Geotechs 1	Shawn Colburn	Candidate from Tetlin Tribe – in recruitment stage.
Geotechs 2	Shawn Colburn	Candidate from Tetlin Tribe – in recruitment stage.
Geotechs 3	Shawn Colburn	Candidate from Tetlin Tribe – in recruitment stage.
Geotechs 4	Shawn Colburn	Candidate from Tetlin Tribe – in recruitment stage.
Geotechs 5	Shawn Colburn	Candidate from Tetlin Tribe – in recruitment stage.
Geotechs 6	Shawn Colburn	Candidate from Tetlin Tribe – in recruitment stage.
Geotechs 7	Shawn Colburn	Candidate from Tetlin Tribe – in recruitment stage.
Geotechs 8	Shawn Colburn	Candidate from Tetlin Tribe – in recruitment stage.
Geotechs 9	Shawn Colburn	Tbd.
Geotechs 10	Shawn Colburn	Tbd.

Request:

- Please supply names and spread the word for the Community Relations Rep role!
- Is there interest for someone to serve as a part time traffic counter for the Village road?

Anticipated job opportunities - Preliminary

Mining (Tok Area/Camp)

Sample Jobs	Training Required/Preferred
Haul Truck Operator	Apprenticeship at FK
Loader Operator	1-3 years
Grader Operator	1-3 years
Excavator Operator	1-3 years
Shovel Operator	5+ years
Heavy Duty/Light Duty Mechanic	Trades school/apprenticeship
Drill & Blast Assistant	3 years
Surveyor	Trade school/apprentice
Safety Supervisor	5+ years
Logistics	Apprenticeship at FK
Warehouse	Apprenticeship at FK

Trucking (Fairbanks)

Sample Jobs	Training Required/Preferred
Highway Hauler	4+ years
Off-highway Hauler	5+ years
Maintenance	Apprenticeship
Labor/Support	On-job training
Loader Operator	1-3 years
Security	Apprenticeship

Camp (Tok Area/Camp)

Sample Jobs	Training Required/Preffered
Cook/Chef	Culinary school
House Keeping	On-job training
Admin	On-job training
Security	On-job training
Camp Ops & Maintenance	Apprenticeship

Environment/Community Relations (Tok Area/Fort Knox)

Sample Jobs	Training Required/Preferred
Environmental Technician	On the job training
Community Relations Rep	On the job training
Wildlife Monitoring	On the job training
Environmental Manager	University degree +experience
Environmental Supervisor	University degree +experience

Technical Services (Tok Area/Fort Knox)

Sample Jobs	Training Required/Preferred
Mine Engineer	University Degree
Geologist	University Degree
Geotechnical Engineer	University Degree
Surveyor	Apprenticeship
Plumber	Certified
Electrician	Certified
Welder	Certified
Diesel Mechanic	Certified
Power Plant Operator	Certified
HR Rep	On the job training

Request

- How many people would be interested in these job opportunities?

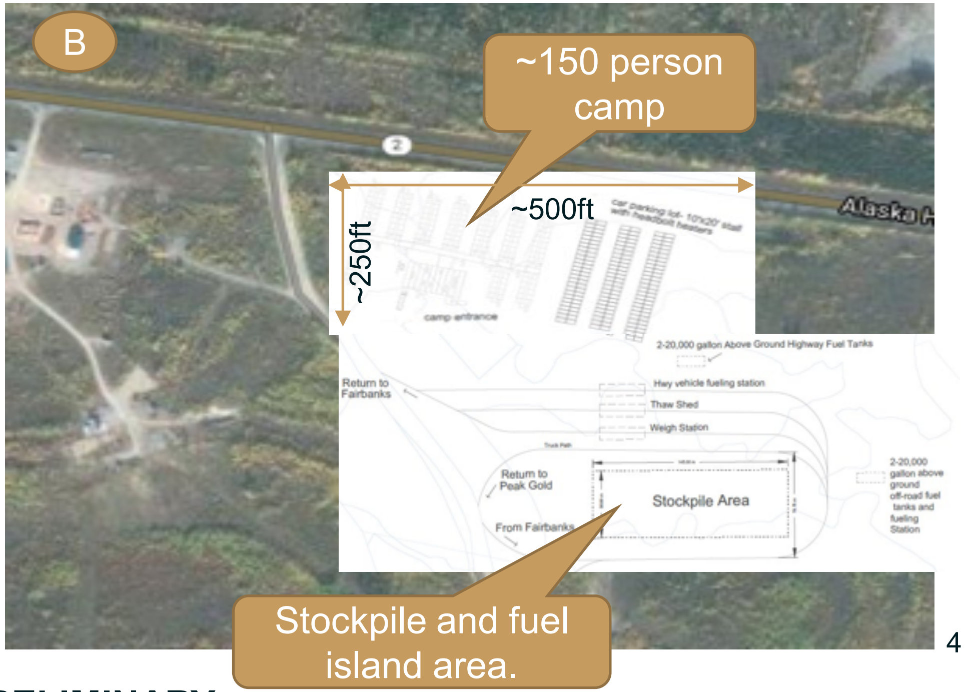
FOR DISCUSSION PURPOSES ONLY- PRELIMINARY

Potential Camp Locations

Criteria	Alt A	Alt B	Alt C
Description	**In Tok**	**Hwy 2 & Tetlin Village Road**	**Tetlin Village Road & Mine Access Road**
Distance to Village	Furthest	Neutral	Closest
Wetlands Impact	None	None	Potential Impact.
Distance to Pit	Furthest	~18 miles	~10 miles
Access	Uncontrolled	Controlled	Controlled
Land Ownership	Private	Tetlin	Tetlin
Emergency Services	Located in Tok	~10 minutes one way	~15 minutes one way
Power Supply	AP&T	AP&T	AP&T

Suggested Option – **Alternative B**

- The site fronts on Hwy 2 and the Tetlin Village road
- Controlled access
- The site is relatively flat and large enough to accommodate the camp facilities, parking, and vehicular access.
- Distance to mine is approximately 18 miles from location.
- Above grade electric power is located in a utility easement adjacent to the site running parallel to the access road.



Access road alternatives

- **Alternative B** <u>(preferred)</u>:
  - Minor realignment required to meet <10% grade.
  - Trade-off between grade for safety, wetlands impact and capital cost.

FOR DISCUSSION PURPOSES ONLY- PRELIMINARY

Community Relations

- Update on how things have been going
  - What we are hearing-- excitement for jobs and business use, traffic concerns
  - Tok stakeholder visits in January (Tetlin Refuge, Health Clinic, School District, and others)
  - Started local area Community Investment program
    - Sponsor of the 65th running of the Tok Junior Race of Champions and Tok Race of Champions
    - Tok Youth Hockey (through Tok School) -- main tournament sponsor of the 18U state hockey tournament
    - Request from local youth trap shooters (gun safety focus)
- Next Community Support Agreement invoice (March 10)
- Renaming and need for project identity and logo
  - Need to start ordering banners and swag

Toured UAF's Tok Campus with Crystal Wilson

Met with Chief Demit and daughter Macy

FOR DISCUSSION PURPOSES ONLY- PRELIMINARY

PEAK GOLD LLC

C.8 2021 04 06 DELTA MEETING

Introduction to the Kinross Manh Choh Project

April 6, 2021

KINROSS Manh Choh
A JV with Contango ORE

FOR DISCUSSION PURPOSES ONLY – PRELIMINARY

Agenda

1. Introductions
2. Who is Kinross Gold?
3. Project History
4. Change in Project Plan
5. Project Timeline
6. Current Status
7. Anticipated Job Opportunities - Preliminary
8. Local Business Optimization
9. Trucking
10. Additional Information and Photos
11. Q&A

AK Heat coaches/tourney organizers thanking Kinross for main sponsorship

Manh Choh project site looking north

oh
DRE

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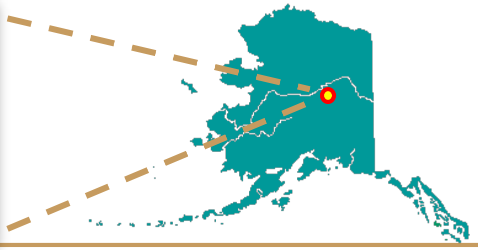

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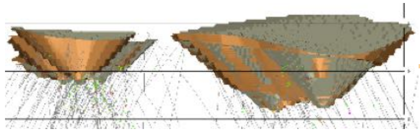
- 2008: Surface and subsurface landowner Native Village of Tetlin starts to explore its mineral potential
- 2009: Contango began early exploration work
- 2015: Royal Gold became a joint owner of Project
  - Community Relations program started and Community Support Agreement signed
  - $100,000 per year to the tribe for community programs/events
- 2016: Education Support Program began – University of Fairbanks courses, GED prep course, speaking to students at the schools
- 2018: Preliminary Economic Assessment complete
- September 30, 2020, Kinross becomes 70% majority owner and operator; Contango ORE 30%
- Kinross initiates Scoping Study and honors all past agreements

Photo from previous work season, pre-COVID-19

The old plan included mining, ore processing, and tailings storage at Tetlin



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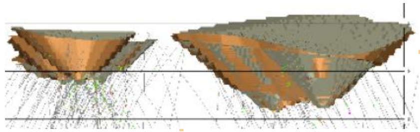

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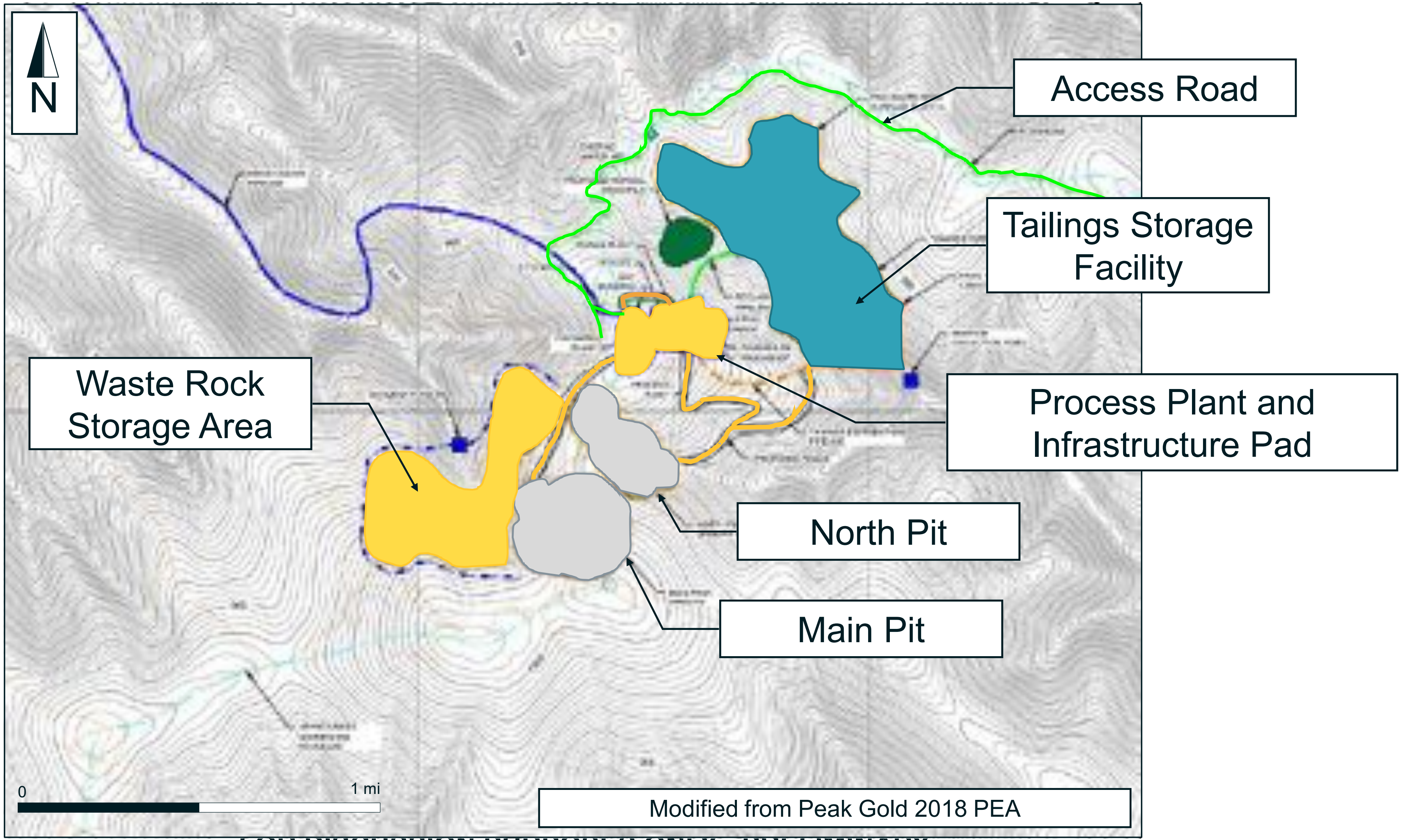
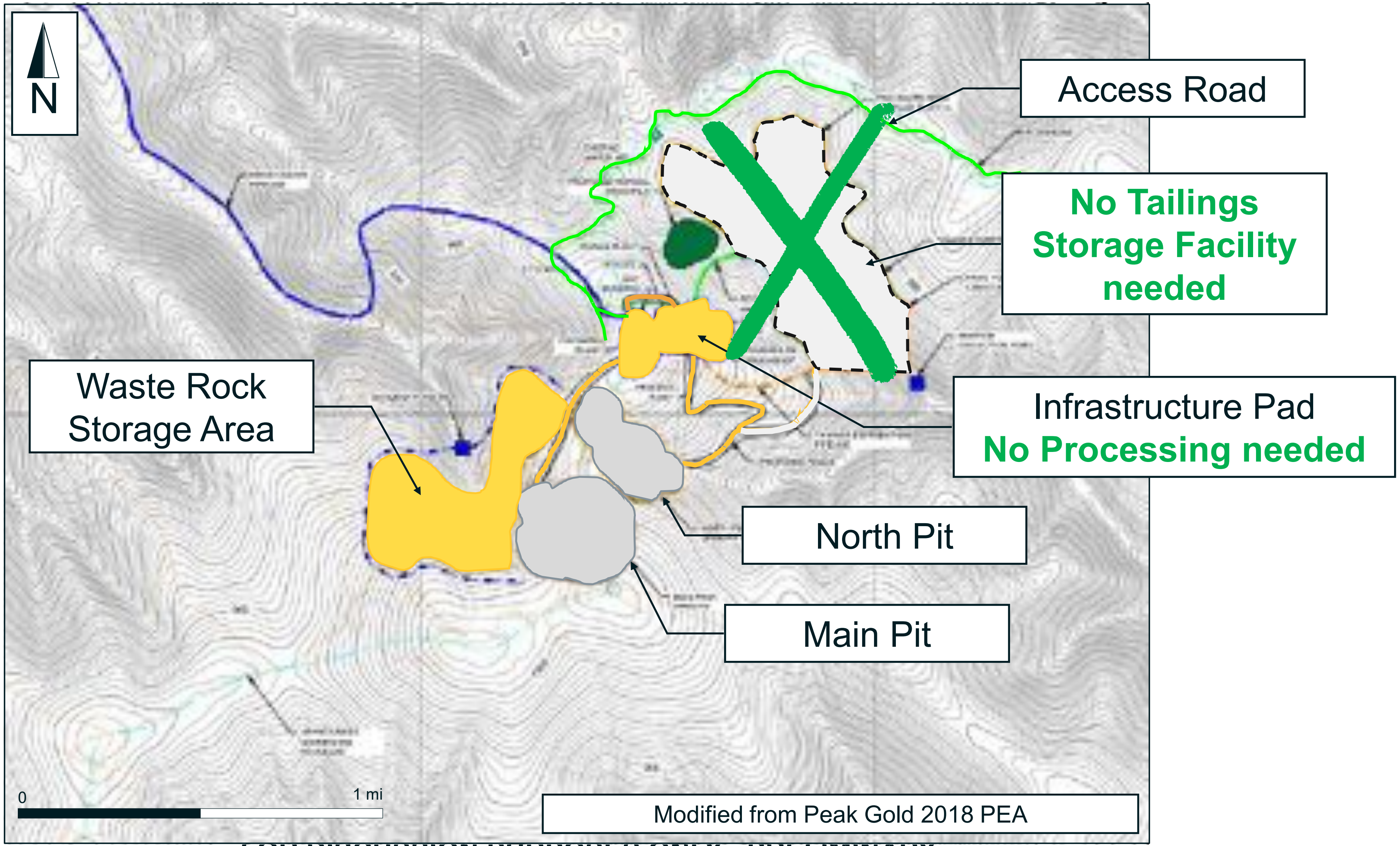


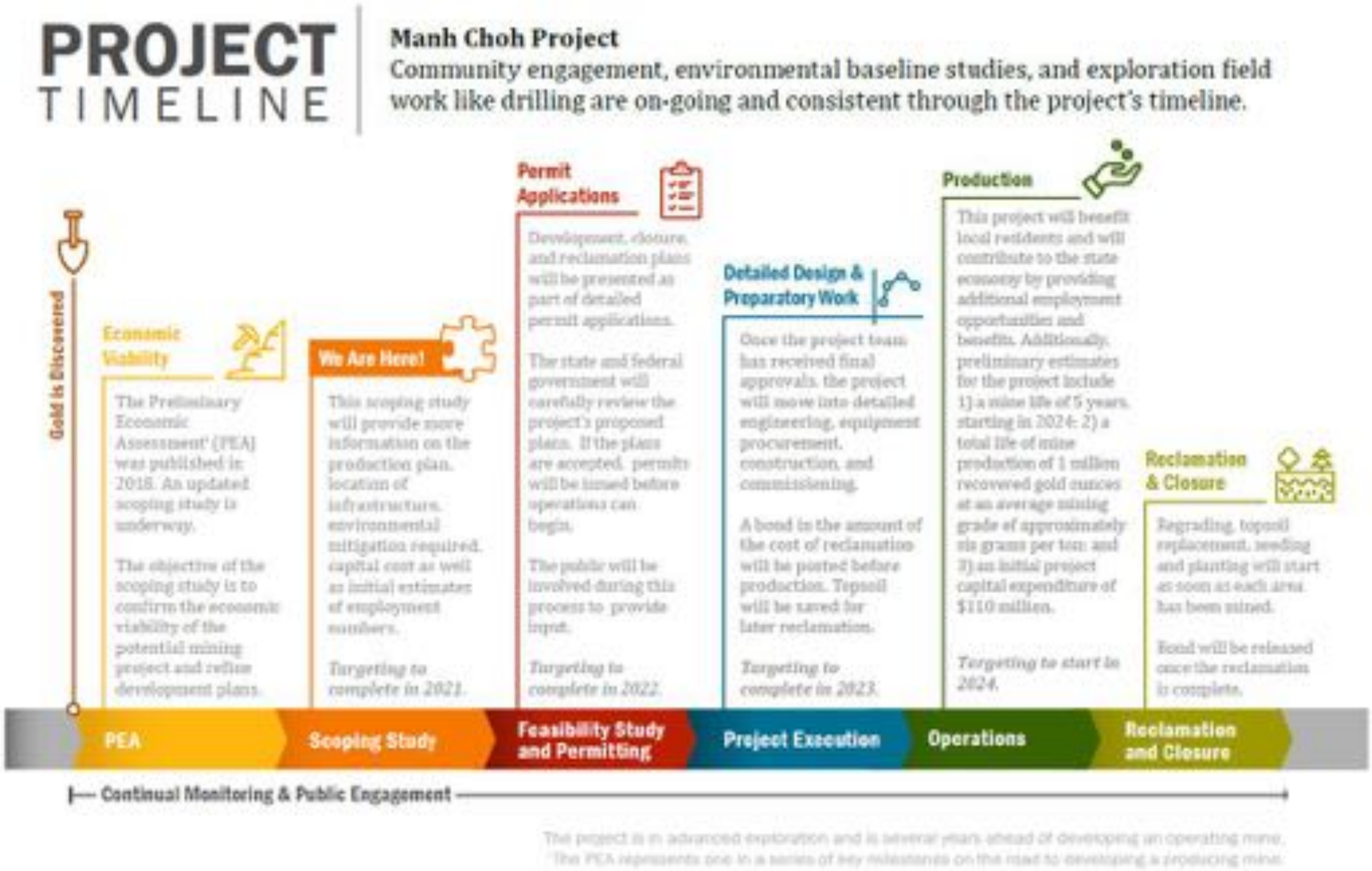
FOR DISCUSSION PURPOSES ONLY - PRELIMINARY

Our plan eliminates the process facility and tailings storage facility, reducing environmental footprint



FOR DISCUSSION PURPOSES ONLY - PRELIMINARY

Project Timeline



FOR DISCUSSION PURPOSES ONLY - PRELIMINARY

Current Focus

- **Environmental:**
  - Continue the groundwater and surface water baseline studies
  - Cultural studies and wildlife surveys
  - Prepare wetlands maps and evaluate ways to mitigate impacts
  - Prepare permit applications for Q4 2021 submission
  - Hired Environmental Tech in-Training from Tetlin

- **Drilling:**
  - 10 metallurgical and 3 geotech holes completed by the end of 2020
  - 2021 drill program underway
  - Focus on hiring locally; COVID protection plans continue.

Current Focus

- **Community Relations:** Strong support for project since announcement
- The primary project partnership and relationship will be between Kinross and Tetlin
  - We are honoring all past agreements such as the Community Support Agreement
  - Local hire & business use, 2020-21 work season, COVID-19 precautions
  - Commenced local area Community Investment program
  - Will be hiring a f/t Community Relations Coordinator from Tetlin/Tok
  - Importance of new project name, selected by the Tetlin Village Council
  - Continue to consult directly with the Council on important steps such as road and camp locations
  - Contracted with McKinley Research (formerly McDowell) to conduct social impact and socio-economic analyses
  - Engaged UAF as key research partner in the areas of culture, village infrastructure, metallurgy, carbon offset, other sustainability projects

Tetlin Village Council Leadership Meetings	13
Stakeholder Meetings	17
Community Zoom Meetings	4

2020 Meeting Numbers

FOR DISCUSSION PURPOSES ONLY - PRELIMINARY

Anticipated job opportunities - Preliminary

Mining	Trucking	Camp	Environment/CR[1]	Technical Services
Sample Jobs	**Sample Jobs**	**Sample Jobs**	**Sample Jobs**	**Sample Jobs**
Haul Truck Operator	Highway Hauler	Cook/Chef	Environmental Technician	Mine Engineer
Loader Operator	Off-highway Hauler	Housekeeping	Community Relations Rep	Geologist
Grader Operator	Maintenance	Admin	Wildlife Monitoring	Geotechnical Engineer
Excavator Operator	Labor/Support	Security	Environmental Manager	Surveyor
Shovel Operator	Loader Operator	Camp Ops & Maintenance	Environmental Supervisor	Plumber
Heavy Duty/Light Duty Mechanic	Security			Electrician
Drill & Blast Assistant				Welder
Surveyor				Diesel Mechanic
Safety Supervisor				Power Plant Operator
Logistics				
Warehouse				

FOR DISCUSSION PURPOSES ONLY - PRELIMINARY

Local Business Opportunities

- **Committed to a positive community footprint**, and that includes spending with local suppliers and contractors
- The table on the right shows a list of local suppliers located in Delta Junction
- This list is a work in progress, businesses are welcome to share their information if they do not see themselves on the list.

CONSTRUCTION SERVICES & GOODS	
Airport Equipment Rentals Inc.	Construction Equipment Rental
Copper Current Inc.	Construction, General & Electrical Contractors
Delta Concrete Products	Concrete Products
Delta Industrial Services	Construction & Contractors Equipment Rental
Heritage Homes LLC	General Contractors
J & J Specialties	General Contractors
M2C1 International, LLC	Contractors, Engineers, Consulting Engineers
Morley Electric	Electrical Contractors
University Redi-Mix	Concrete Products
Weidner Construction	General Contractors
FUEL & AUTOMOTIVE SERVICES	
Buffalo Fuel Inc.	Gas, Natural Gas
Cable Guy Towing & Recovery LLC	Auto Repair, Towing, Roadside Service
Delta Fuel Industries	Gas Stations, Natural Gas
Delta Petro-Wash	Gas Stations, Natural Gas
Tesoro	Gas Stations, Natural Gas
OTHER SERVICES & GOODS	
Tanana Adventure Sports	Hardware Store, Sporting Goods, Rentals
Granite View True Value Home Center	Hardware Store
Golden Eagle Outfitters inc.	Aircraft Charter Rental

Trucking

- Route is ~240 miles one-way; 90% on public highways
- We are in early stages of understanding the trucking requirements for the project and options available for the contractors
- Early discussions with the Department of Transportation to better understand seasonal restrictions
- Generally, we will have a steady number of trucks for the majority of the year, with a slight dip in numbers of trucks for the seasonal restrictions (6-8 weeks of the year)
- The base case production rate is 3,900 tons/day for the project, which calculates to roughly 2-4 trucks each way/hour.

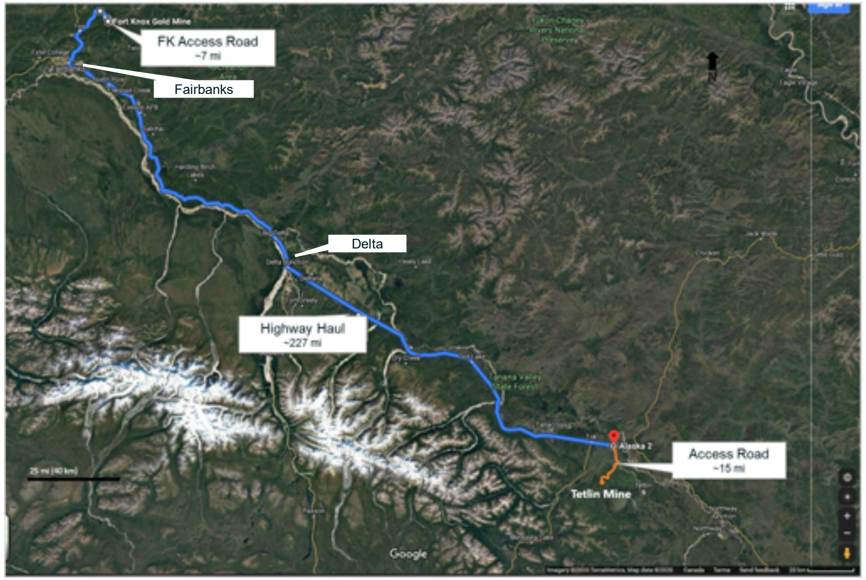


Image of On-Highway Truck Proposed

Additional Photos: 2020 Field Program

FOR DISCUSSION PURPOSES ONLY - PRELIMINARY

Additional Photos

Current Site Photo

Monitoring Well Road Flagging

Infill Rig

Any other questions?

- Anna Atchison, anna.atchison@kinross.com, (907) 490-2218

Fall 2020 Edition

PROJECT NEWSLETTER

KINROSS

The Tetlin Project is a joint venture between Kinross Gold Corporation and Contango Ore, Inc. operating under a lease with the Tetlin Village Council. Kinross is the majority owner and operator.

New project partner Kinross Gold Corporation

By Anna Atchison, Kinross Gold

Kinross Gold is a global mining company with approximately 9,000 employees. In Alaska, we have been responsibly operating the Fort Knox mine outside of Fairbanks for nearly 25 years. Fort Knox is the highest producing gold mine in Alaska and a significant contributor to the Fairbanks economy.

We are honored and excited to partner with Tetlin Village on developing this project. While there are still a number of project details we are working out together, we know a few things for certain:

- Kinross is a values-driven organization that stands by its commitments.
- We prioritize safety above all else in all operations and the communities that we work in.
- During the pandemic, we will work closely with the village to develop a safe work plan.

Another key Kinross commitment is a strong focus on environmental responsibility. An example of our environmental focus is the decision not to have a tailings facility at the project in Tetlin. Instead, we will truck the ore to our existing Fort Knox mine. This means a much smaller environmental footprint in Tetlin because we are utilizing existing processing facilities.

Kinross takes a legacy approach to our relationships with the communities where we work. This means that before we start mining we plan responsibly from permitting to reclamation and through working together with the community to ensure that benefits from the mine last long after eventual mine closure. Also that we work together with the community to develop community programs ahead of time, whether that be in education, health initiatives or other areas of joint interest.

We encourage you to view our recently published Sustainability Report at www.kinross.com to learn more about our operations all over the world and our commitment to operating in collaboration with the communities that host us.

We are eager to share more about our approach and the plans for the project in the coming months. Ideally, we would meet everyone in person, but due to the pandemic we will be creative and utilize virtual meetings and written materials.

We will also look for ways to discuss the jobs that will be available, once the project starts to move into the next phases toward production. Kinross' core business values include a commitment to local hiring and local purchasing, as much as is possible.

Lastly, it is very important that we rename the project to honor the Upper Tanana Athabascan people and the land that we will be working on. Early on, we asked for the Village Council's help in this and it is our hope that we will be able to complete this before the end of the year. Please contact me at Anna.Atchison@Kinross.com if you have any questions or concerns, and stay tuned for more information in the Spring 2021 newsletter.

For more info, find us online:

- The Kinross World newsletter: www.kinrossworld.com
- Facebook: www.facebook.com/KinrossGold
- Instagram: @kinrossgoldcorp
- Twitter: @kinrossgold

What's Inside

- Meet Kinross Alaska Project Team
- Message from CORE ~ New Joint Venture
- Community Programs Update
- Project Exploration Update
- Environmental and Water Work Update
- Project Timeline

THANK YOU!

KINROSS

Manh Choh

A JV with Contango ORE

C.9 2021 04 09 AMA MC PROJECT UPDATE

Kinross Manh Choh Project Update

April 9, 2021

KINROSS Manh Choh
A JV with Contango ORE

FOR DISCUSSION PURPOSES ONLY – PRELIMINARY

Agenda

1. Kinross Company Values
2. Project History
3. Change in Project Plan
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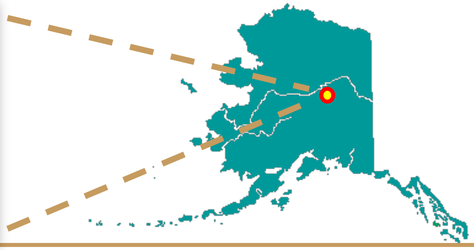

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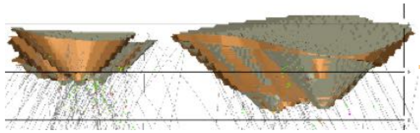

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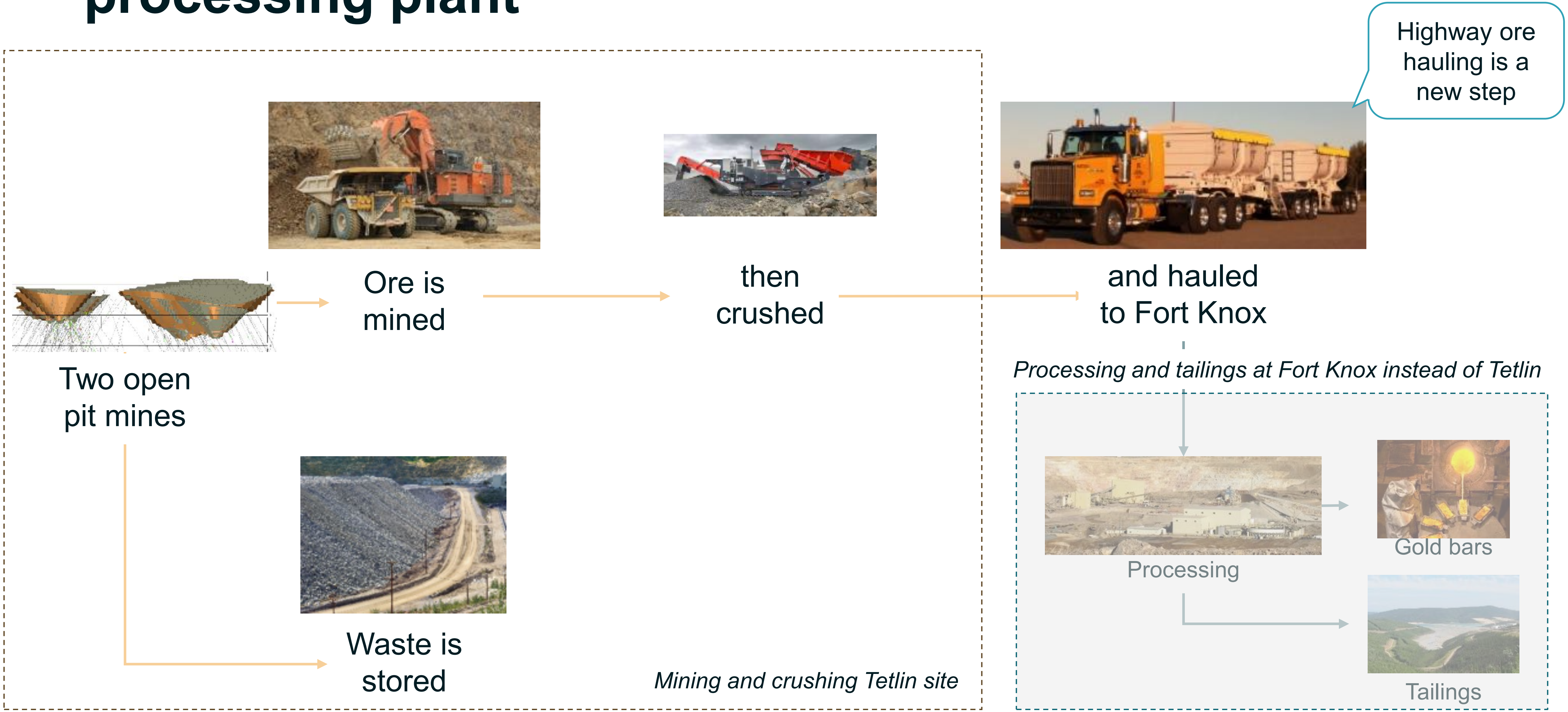
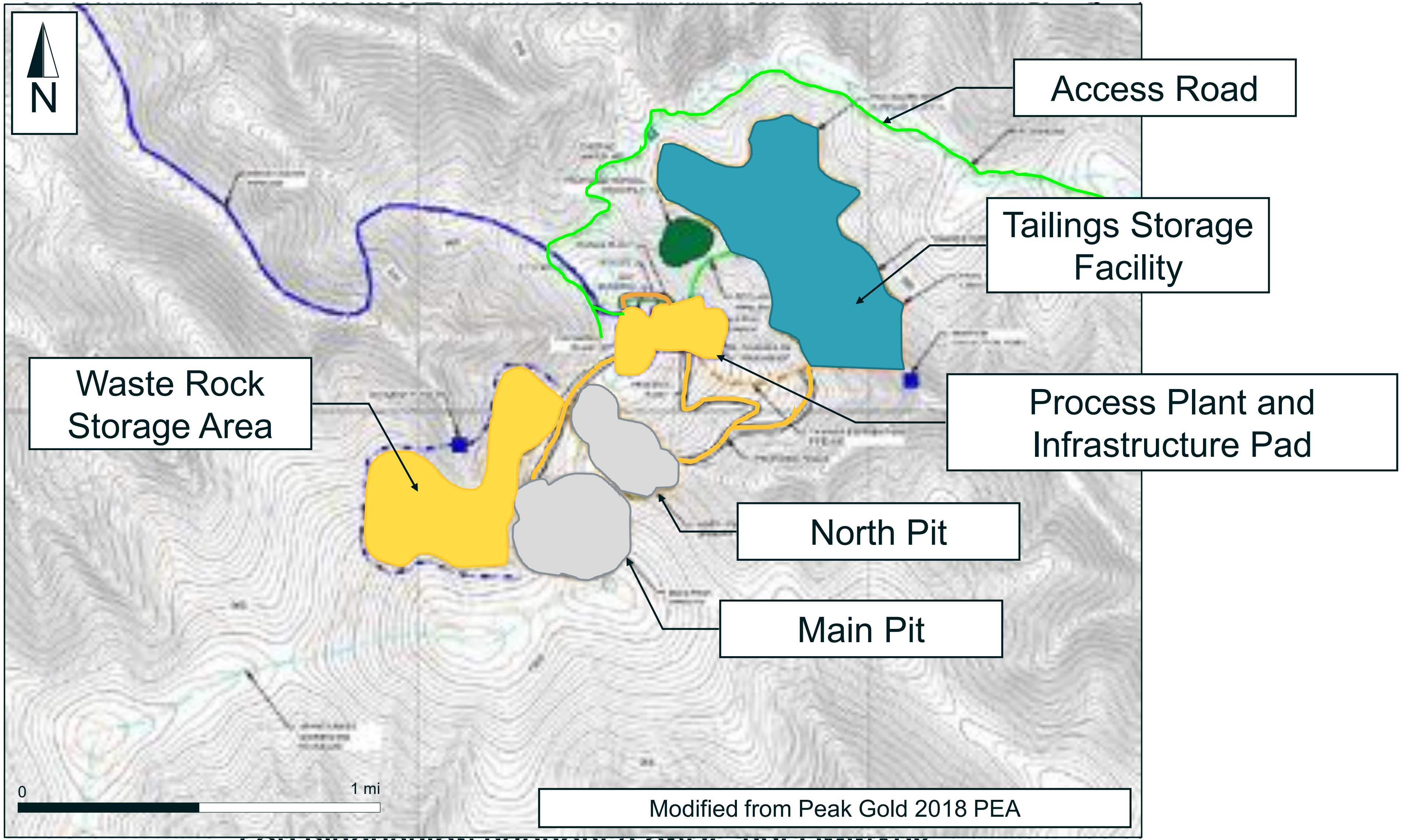
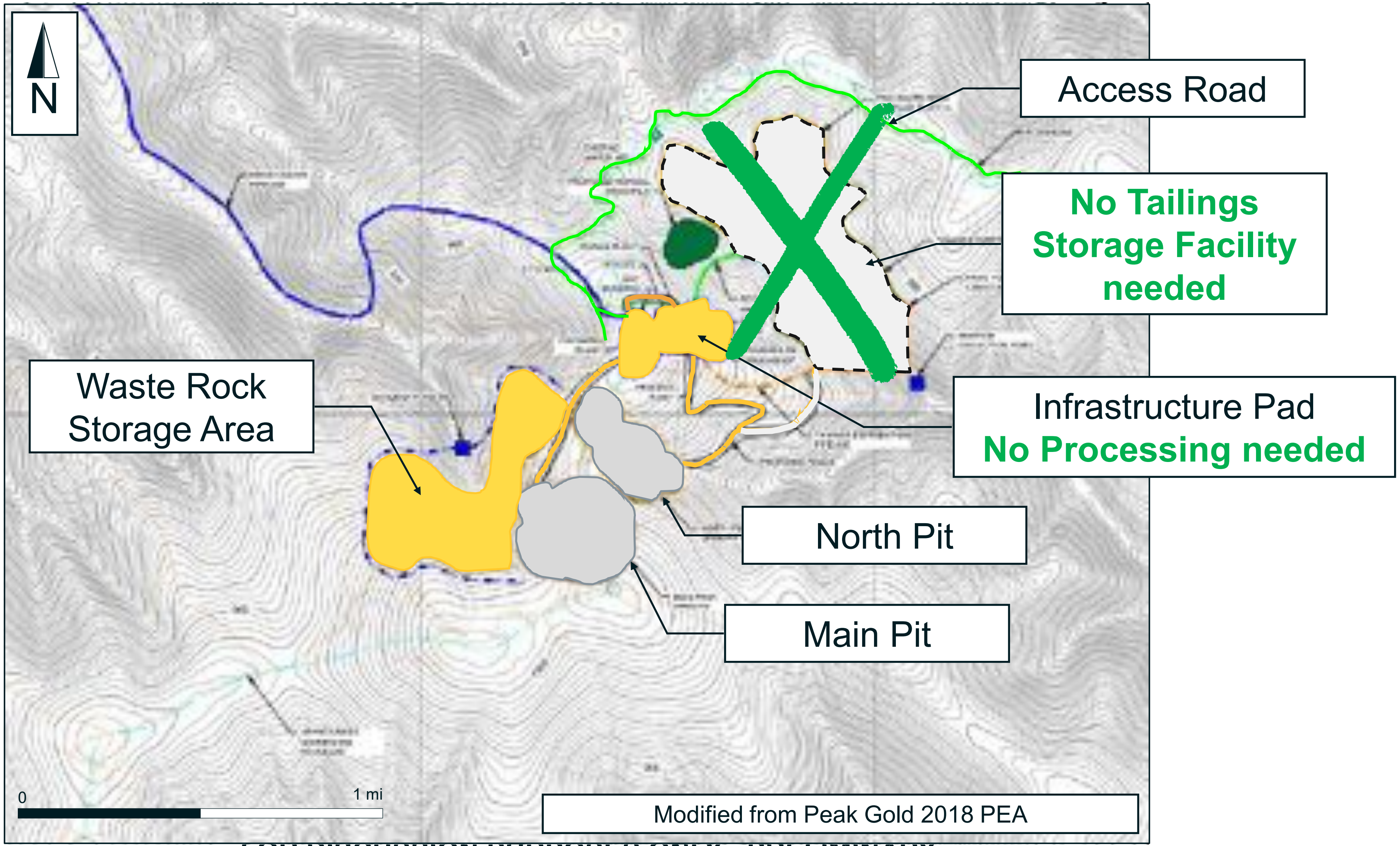


The old plan required a process facility and tailings storage facility on Tetlin land



FOR DISCUSSION PURPOSES ONLY - PRELIMINARY

Our plan eliminates the process facility and tailings storage facility, reducing environmental footprint



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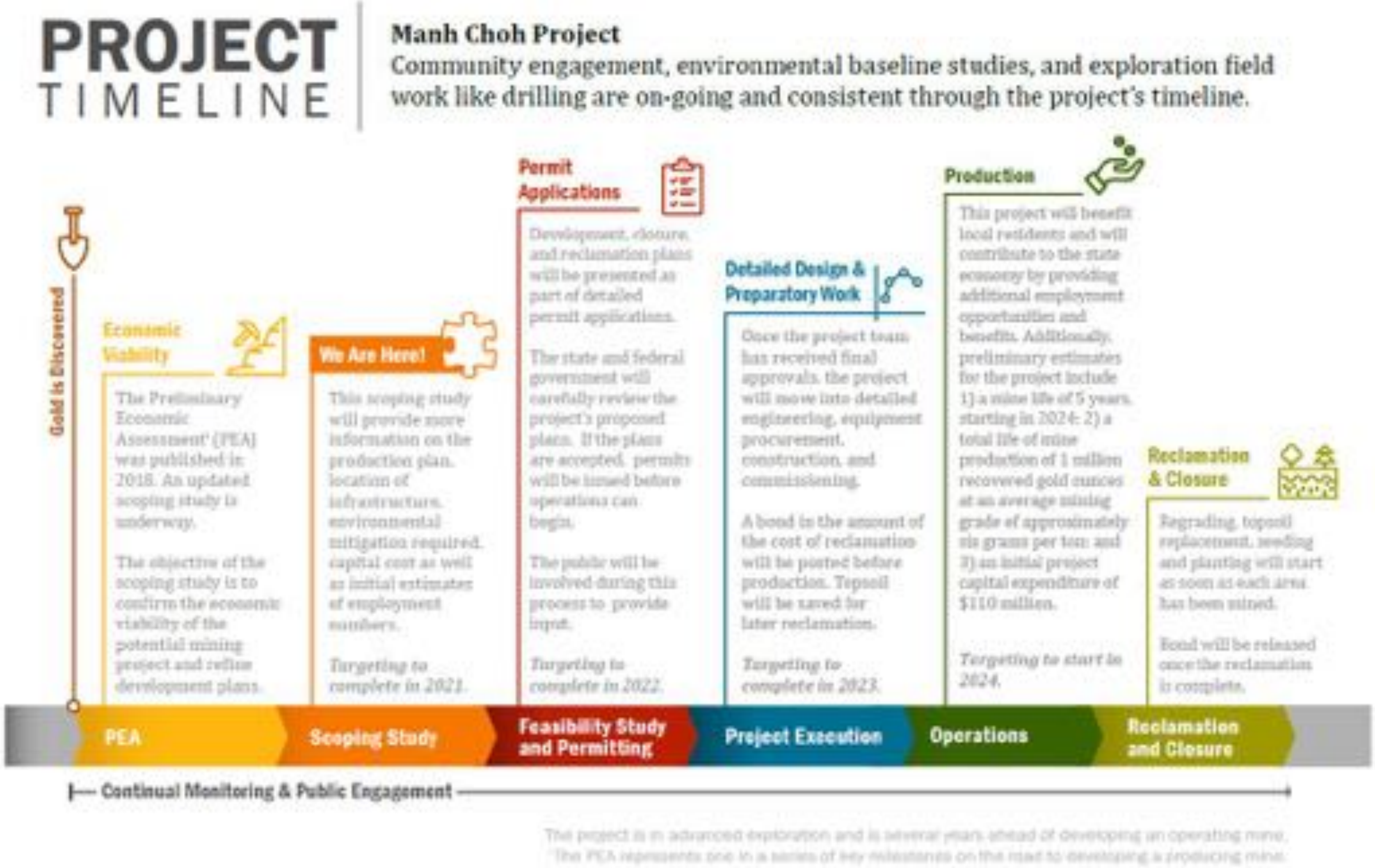
Project Timeline



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Current Focus

- **Environmental:**
  - Continue the groundwater and surface water baseline studies
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  - Prepare wetlands maps and evaluate ways to mitigate impacts
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- **Drilling:**
  - 10 metallurgical and 3 geotech holes completed by the end of 2020
  - 2021 drill program underway
  - Focus on hiring locally; COVID protection plans continue.

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- **Community Relations:** Strong support for project since announcement
- The primary project relationship is directly between Kinross and Tetlin
    - We are **honoring all past agreements** such as the Community Support Agreement
    - **Local hire & business use**, 2021 work season, COVID-19 precautions
    - Commenced local area **Community Investment program**
    - Will be hiring a f/t **Community Relations Coordinator** from Tetlin/Tok
    - Importance of **new project name**, selected by the Tetlin Village Council
    - Continue to **consult directly with the Council** on important steps such as road and camp locations
    - Contracted with McKinley Research (formerly McDowell) to conduct **social impact and socio-economic analyses**
    - **Engaged UAF as key research partner** in the areas of culture, village infrastructure, metallurgy, carbon offset, other sustainability projects

Tetlin Village Council Leadership Meetings	13
Stakeholder Meetings	17
Community Zoom Meetings	4

2020 Meeting Numbers

Anticipated Job Opportunities - Preliminary

Mining	Trucking	Camp	Environment/CR[1]	Technical Services
Sample Jobs	**Sample Jobs**	**Sample Jobs**	**Sample Jobs**	**Sample Jobs**
Haul Truck Operator Loader Operator Grader Operator Excavator Operator Shovel Operator Heavy Duty/Light Duty Mechanic Drill & Blast Assistant Surveyor Safety Supervisor Logistics Warehouse	Highway Hauler Off-highway Hauler Maintenance Labor/Support Loader Operator Security	Cook/Chef Housekeeping Admin Security Camp Ops & Maintenance	Environmental Technician Community Relations Rep Wildlife Monitoring Environmental Manager Environmental Supervisor	Mine Engineer Geologist Geotechnical Engineer Surveyor Plumber Electrician Welder Diesel Mechanic Power Plant Operator

Local Business Optimization

- Sustainable long-term enhancement to community skill-base and businesses which outlasts the project life

- Maximize the use of local enterprises and resources and ensure that our contractors and suppliers also maximize local employment

- Implement skills capacity building programs to improve the overall technical skills of the local work force

- Consult frequently with locals to foster communication and transparency as the project progresses

- Developing supplier registries
  - This list is a work in progress, businesses are welcome to share their information if they do not see themselves on the list
- Spring Tok Contractor Fair planned

CONSTRUCTION SERVICES & GOODS	
Airport Equipment Rentals Inc.	Construction Equipment Rental
Copper Current Inc.	Construction, General & Electrical Contractors
Delta Concrete Products	Concrete Products
Delta Industrial Services	Construction & Contractors Equipment Rental
Heritage Homes LLC	General Contractors
J & J Specialties	General Contractors
M2C1 International, LLC	Contractors, Engineers, Consulting Engineers
Morley Electric	Electrical Contractors
University Redi-Mix	Concrete Products
Weidner Construction	General Contractors
FUEL & AUTOMOTIVE SERVICES	
Buffalo Fuel Inc.	Gas, Natural Gas
Cable Guy Towing & Recovery LLC	Auto Repair, Towing, Roadside Service
Delta Fuel Industries	Gas Stations, Natural Gas
Delta Petro-Wash	Gas Stations, Natural Gas
Tesoro	Gas Stations, Natural Gas
OTHER SERVICES & GOODS	
Tanana Adventure Sports	Hardware Store, Sporting Goods, Rentals
Granite View True Value Home Center	Hardware Store
Golden Eagle Outfitters inc.	Aircraft Charter Rental

Trucking

- Route is ~240 miles one-way; 90% on public highways
- We are in early stages of understanding the trucking requirements for the project and options available for the contractors
- Early discussions with the Department of Transportation to better understand seasonal restrictions
- Generally, we will have a steady number of trucks for the majority of the year, with a slight dip in numbers of trucks for the seasonal restrictions (6-8 weeks of the year)
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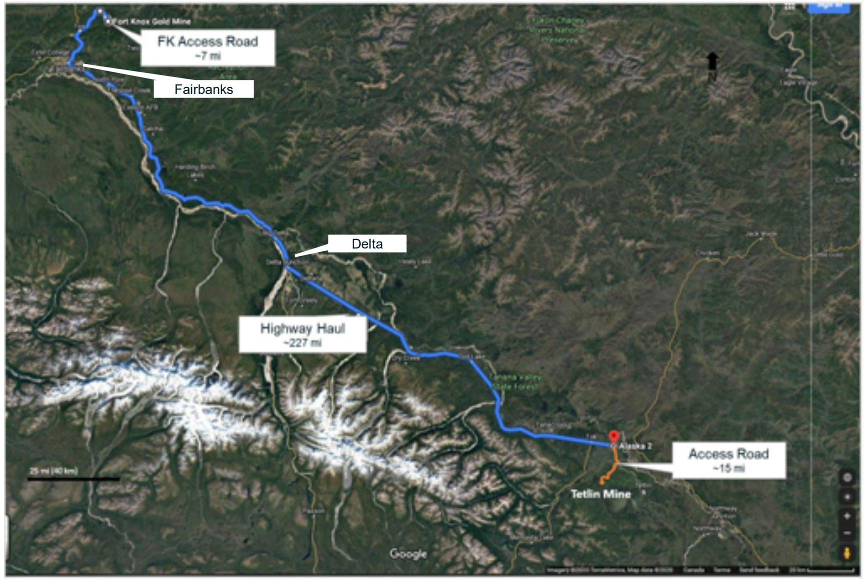


FOR DISCUSSION PURPOSES ONLY - PRELIMINARY

Additional Photos: 2020 Field Program

Additional Photos

Current Site Photo

Monitoring Well Road Flagging

Infill Rig

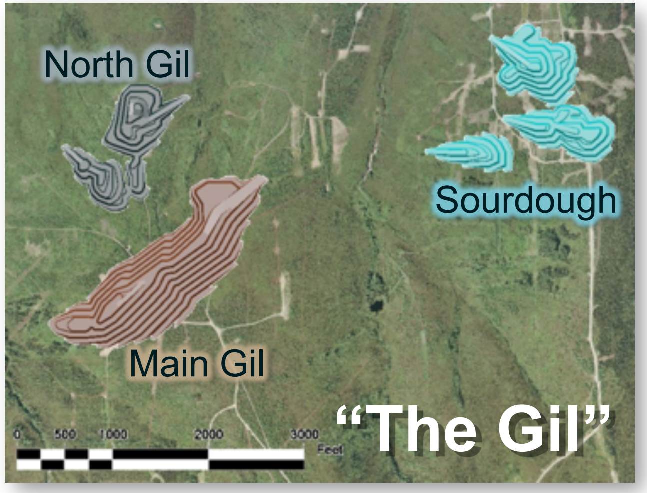
FOR DISCUSSION PURPOSES ONLY - PRELIMINARY

Gil Project: 35+ Years in the Making

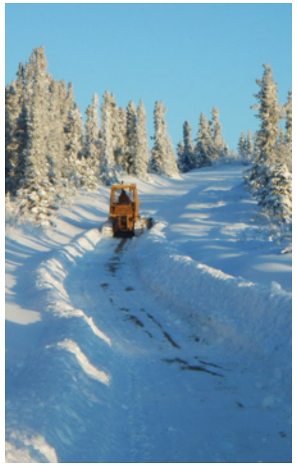
~160koz
PRODUCTION

~2 year
MINE LIFE

0.6g/t
GRADE



Fort Knox Road Network
Will not use the public highway system



Permitting underway

Production expected to start:
Q4 2021

- Studying since **2000's**, actively exploring since **1982**
- Shift to leverage the Fort Knox mill and strong gold price encouraged development

80+ Jobs Created

+ Increase in taxes/fees paid to state

Any other questions?

- Anna Atchison, anna.atchison@kinross.com, (907) 490-2218

THANK YOU!

Fall 2020 Edition

PROJECT NEWSLETTER

KINROSS

The Tetlin Project is a joint venture between Kinross Gold Corporation and Contango Ore, Inc. operating under a lease with the Tetlin Village Council. Kinross is the majority owner and operator.

New project partner Kinross Gold Corporation

By Anna Atchison, Kinross Gold

Kinross Gold is a global mining company with approximately 9,000 employees. In Alaska, we have been responsibly operating the Fort Knox mine outside of Fairbanks for nearly 25 years. Fort Knox is the highest producing gold mine in Alaska and a significant contributor to the Fairbanks economy.

We are honored and excited to partner with Tetlin Village on developing this project. While there are still a number of project details we are working out together, we know a few things for certain:

- Kinross is a values-driven organization that stands by its commitments.
- We prioritize safety above all else in all operations and the communities that we work in.
- During the pandemic, we will work closely with the village to develop a safe work plan.

Another key Kinross commitment is a strong focus on environmental responsibility. An example of our environmental focus is the decision not to have a tailings facility at the project in Tetlin. Instead, we will truck the ore to our existing Fort Knox mine. This means a much smaller environmental footprint in Tetlin because we are utilizing existing processing facilities.

Kinross takes a legacy approach to our relationships with the communities where we work. This means that before we start mining we plan responsibly from permitting to reclamation and through working together with the community to ensure that benefits from the mine last long after eventual mine closure. Also that we work together with the community to develop community programs ahead of time, whether that be in education, health initiatives or other areas of joint interest.

We encourage you to view our recently published Sustainability Report at www.kinross.com to learn more about our operations all over the world and our commitment to operating in collaboration with the communities that host us.

We are eager to share more about our approach and the plans for the project in the coming months. Ideally, we would meet everyone in person, but due to the pandemic we will be creative and utilize virtual meetings and written materials.

We will also look for ways to discuss the jobs that will be available, once the project starts to move into the next phases toward production. Kinross' core business values include a commitment to local hiring and local purchasing, as much as is possible.

Lastly, it is very important that we rename the project to honor the Upper Tanana Athabascan people and the land that we will be working on. Early on, we asked for the Village Council's help in this and it is our hope that we will be able to complete this before the end of the year. Please contact me at Anna.Atchison@Kinross.com if you have any questions or concerns, and stay tuned for more information in the Spring 2021 newsletter.

For more info, find us online:

- The Kinross World newsletter: www.kinrossworld.com
- Facebook: www.facebook.com/KinrossGold
- Instagram: @kinrossgoldcorp
- Twitter: @kinrossgold

What's Inside

- Meet Kinross Alaska Project Team
- Message from CORE ~ New Joint Venture
- Community Programs Update
- Project Exploration Update
- Environmental and Water Work Update
- Project Timeline

KINROSS

Manh Choh

A JV with Contango ORE

C.10 2021 04 GREATER FAIRBANKS CHAMBER OF COMMERCE

GFCC

Kinross Alaska: New Future, Exciting Projects

April 20, 2021

KINROSS

Cautionary Statement on Forward-Looking Information

All statements, other than statements of historical fact, contained or incorporated by reference in or made in giving this presentation and responses to questions, including but not limited to any information as to the future performance of Kinross, constitute “forward looking statements” within the meaning of applicable securities laws, including the provisions of the Securities Act (Ontario) and the provisions for “safe harbor” under the United States Private Securities Litigation Reform Act of 1995 and are based on expectations, estimates and projections as of the date of this presentation. Forward-looking statements contained in this presentation include without limitation, statements with respect to mine life extensions, costs and timing of development activities, the receipt of necessary permits and the timing for such receipt, future production, production costs of sales, all-in sustaining cost and capital expenditures, continuous improvement and other cost savings opportunities; future development, mining activities, production and growth, including but not limited to cost and timing; success of exploration or development of operations; the results of any studies including, without limitation, feasibility studies; the future price of gold and silver; expected capital requirements; government regulation including federal, state and local tax laws and the application thereof and the impact of any tariffs imposed by the U.S., Canadian or other governments; and environmental risks. The words “assumption”, “budget”, “estimate”, “expect”, “feasibility”, “forward”, “future”, “indicate”, “on track”, “opportunity”, “phased”, “plan”, “positive”, “potential”, “prospective”, “progressing”, “project”, “risk”, “study”, “target”, or variations of or similar such words and phrases or statements that certain actions, events or results may, can, could, would, should, might, indicates, or will be taken, and similar expressions identify forward looking statements. Forward-looking statements are necessarily based upon a number of estimates and assumptions that, while considered reasonable by Kinross as of the date of such statements, are inherently subject to significant business, economic and competitive uncertainties and contingencies. Many of these uncertainties and contingencies can affect, and could cause, Kinross’ actual results to differ materially from those expressed or implied in any forward looking statements made by, or on behalf of, Kinross. Statements representing management’s financial and other outlook have been prepared solely for purposes of expressing their current views regarding the Company’s financial and other outlook and may not be appropriate for any other purpose. There can be no assurance that forward looking statements will prove to be accurate, as actual results and future events could differ materially from those anticipated in such statements. All of the forward looking statements made in this presentation are qualified by these cautionary statements, and those made in our filings with the securities regulators of Canada and the U.S., including but not limited to those cautionary statements made in the “Risk Factors” section of our most recently filed Annual Information Form, the “Risk Analysis” section of our Management’s Discussion and Analysis, and the “Cautionary Statement on Forward-Looking Information” in our news release, to which readers are referred and which are incorporated by reference in this presentation, all of which qualify any and all forward-looking statements made in this presentation. These factors are not intended to represent a complete list of the factors that could affect Kinross. Kinross disclaims any intention or obligation to update or revise any forward-looking statements or to explain any material difference between subsequent actual events and such forward-looking statements, except to the extent required by applicable law.

Other information

Where we say "we", "us", "our", the "Company", or "Kinross" in this presentation, we mean Kinross Gold Corporation and/or one or more or all of its subsidiaries, as may be applicable.

The technical information about Fort Knox contained in this presentation has been prepared under the supervision of Mr. John Sims, an officer of the Company who is a “qualified person” within the meaning of National Instrument 43-101.

Agenda

1	**Who we are:** Kinross Alaska • Safety • Environment • Community
2	**Executing** the new Projects • Manh Choh • Gil-Sourdough

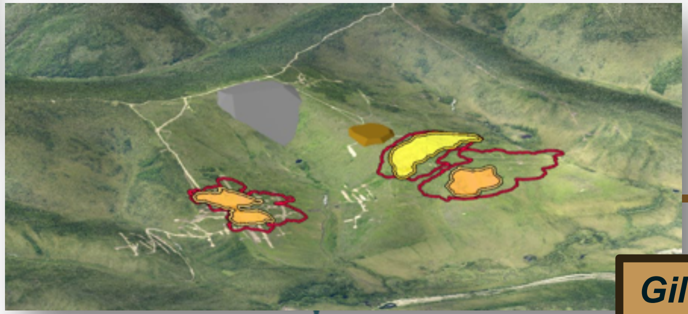
KINROSS

Who We Are: Kinross Alaska

KINROSS

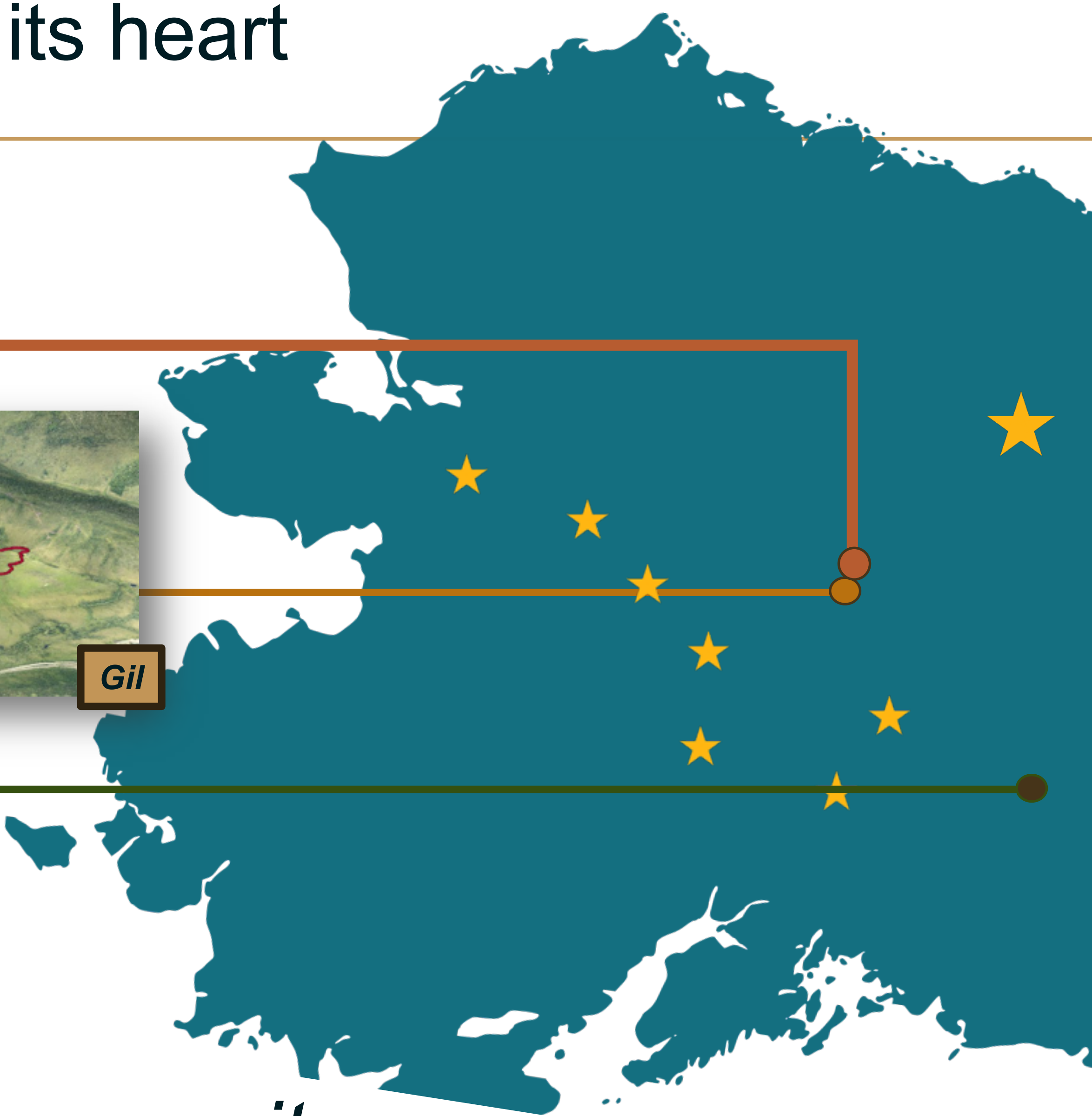
Kinross **Alaska,** with **Fort Knox** at its heart

Fort Knox



Gil

Manh Choh



*An exciting **future** awaits…*

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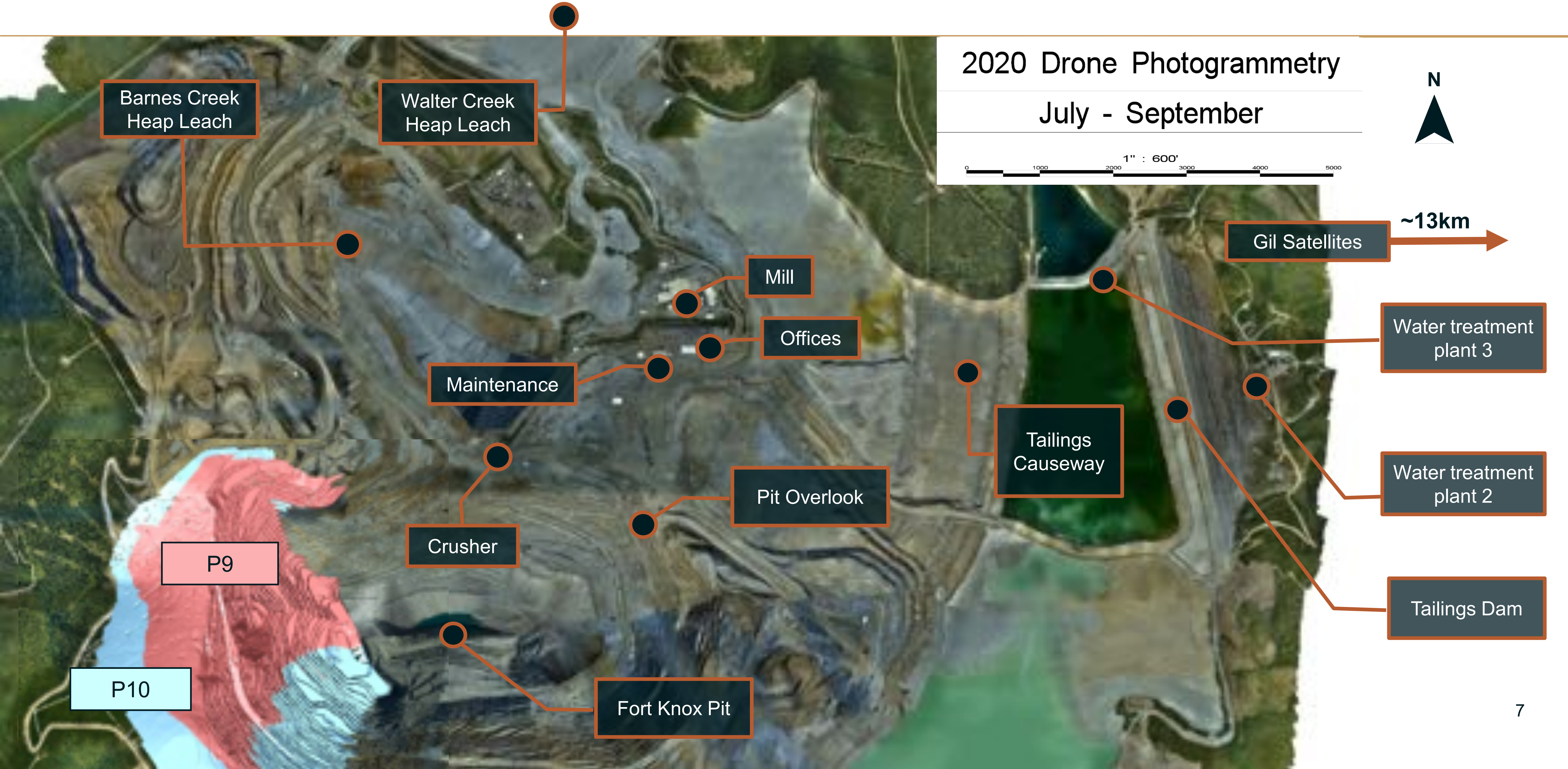
Fort Knox at a Glance

- Wholly owned subsidiary of **Kinross Gold Corporation**
- First commercial gold pour December 1996
- **Safely operates** 24-hours a day, 365 days a year
- Excellent environmental **compliance** and community **benefit** footprint
- Conventional **open pit** mining method
    - Mill, tailings storage facility, water storage reservoir, Walter Creek and Barnes Creek heap leach facilities

Fort Knox: Layout in Detail



First Priorities: Health & Safety

SEE IT. OWN IT. SOLVE IT.

KINROSS Fort Knox

CRITICAL RISK MANAGEMENT

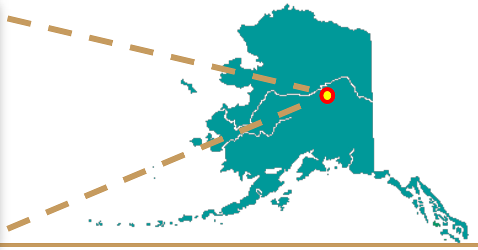
CRM

STOP™

GET SAFETY GOING™

Sentinels of Safety

First Priorities: Environment
True North: 1st AK Large Metal Mine to Close



BEFORE

NOW

"Alaska's founders knew **responsible resource development** was key to a secure and prosperous state, and our experience with True North shows that they were right. The developers **leased state land**, **produced a valuable commodity** to serve global markets, **employed Alaskan**, and **paid state taxes and royalties**. When they were done, they remediated the effects of their work and **returned the land** to the state for its next use. The system works.

— ***Corri Feige**, DNR Commissioner.*

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Sustainability Partnership:
Alaska Abandoned Mine Restoration Initiative

TROUT UNLIMITED

KINROSS

1st Partnership of its kind in **Alaska**

Important next step for the alliance

At least **3 Years** of financial investment

Corporate Donations Committee funding **~80%** .

Kinross' investment = **5-to-1** federal match

- Will allow Trout Unlimited, the Forest Service, and other agencies to advance important reclamation work:
  - Continue Resurrection Creek (Hope area) land, water and fish species **restoration efforts** and **identify other potential projects** in Alaska;
  - Leverage support to **expand our capacity and grow** the initiative
    - Possibly attract new private or public investment partners interested in legacy projects

First Priorities: Corporate Social Responsibility
Significant Contributor to Fairbanks and Alaska

How Fort Knox Spending Flows Through
Alaska's Economy

Fairbanks North Star
$11MM in property tax
8.2% of borough tax revenue

Fort Knox

State of Alaska
$4.5MM in tax
(mining license, permits, etc.)

Goods & Services
$260MM
350 Alaskan Businesses

DIRECT
Fort Knox spending with Alaska businesses

DIRECT
Fort Knox wages paid to employees

Total Wages
$121MM
(direct, indirect, induced)

Support
88 Alaskan Nonprofit Organizations

INDIRECT
Vendor spending impacts on jobs and payroll

INDUCED
Employee spending impacts on jobs and payroll

Total Jobs
1215
Direct Jobs: 650

*The **best** legacy **outcome** for a mining company is that **local people** would be **happy** for you to **come back** and **mine again***

We are historically a mining town and in the middle of a mineral belt. They are a company that does a good operation. **They have done it right**, in terms of **employment** and the **environment**. They leave the impression that you can **extract Alaska resources responsibly** and be a good contributor to the community and a good example in Fairbanks and the state.

— *Community stakeholder*

Fort Knox is **environmentally sound**. They are a **credible** community partner when it comes to taking care of the environment.

— *Community stakeholder*

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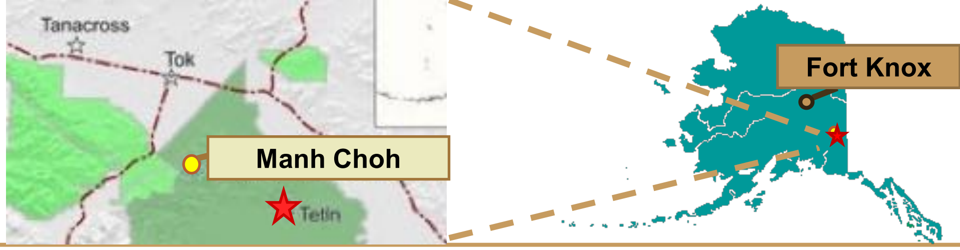
Executing the new plan
KINROSS

Manh Choh Joint Venture



KINROSS

Manh Choh

A JV with Contango ORE

"We look forward to the **safe** and **responsible** development of the project and the **positive benefits** it is expected to generate for our **community**.

We also look forward to further building a **relationship** with Kinross, a company with a **strong track record** in Alaska, and are pleased to see further investment plans for the project.

— *Village of* ***Tetlin Chief***
Michael Sam

Project History

- 2008: Surface and subsurface landowner Native Village of Tetlin starts to explore its mineral potential
- 2009: Contango began early exploration work
- 2015: Royal Gold became a joint owner of Project
    - Community Relations program started and Community Support Agreement signed
    - $100,000 per year to the tribe for community programs/events
- 2016: Education Support Program began – University of Fairbanks courses, GED prep course, speaking to students at the schools
- 2018: Preliminary Economic Assessment complete
- September 30, 2020, Kinross becomes 70% majority owner and operator; Contango ORE 30%
- Kinross initiates Scoping Study and honors all past agreements

Photo from previous work season, pre-COVID-19

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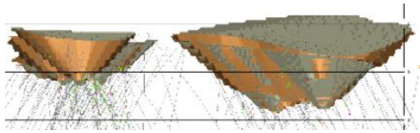
The old plan included mining, ore processing, and tailings storage at Tetlin



Two open pit mines

Ore is mined

then crushed and processed producing…

Gold bars

Waste is stored

Tailings

All infrastructure is built at the Tetlin site

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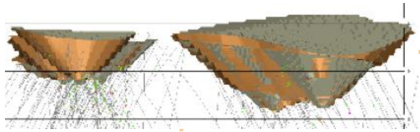
Kinross plans to haul ore to an existing gold processing plant

Highway ore hauling is a new step



Two open pit mines

Ore is mined

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Mining and crushing Tetlin site

and hauled to Fort Knox

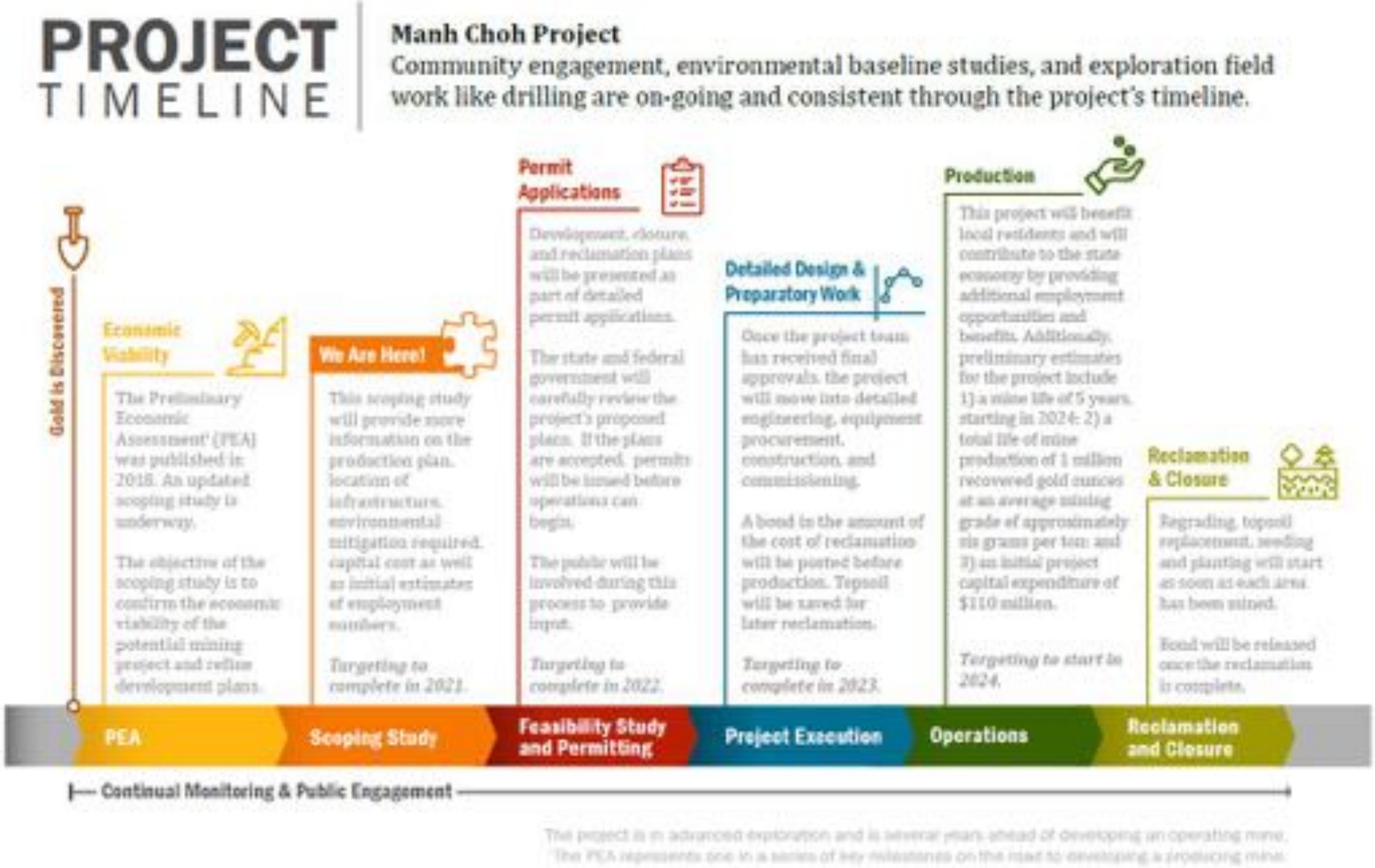
Processing and tailings at Fort Knox instead of Tetlin

Processing

Gold bars

Tailings

Project Timeline



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Grader Operator	Maintenance	Admin	Wildlife Monitoring	Geotechnical Engineer
Excavator Operator	Labor/Support	Security	Environmental Manager	Surveyor
Shovel Operator	Loader Operator	Camp Ops & Maintenance	Environmental Supervisor	Plumber
Heavy Duty/Light Duty Mechanic	Security			Electrician
Drill & Blast Assistant				Welder
Surveyor				Diesel Mechanic
Safety Supervisor				Power Plant Operator
Logistics				
Warehouse				

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J & J Specialties	General Contractors
M2C1 International, LLC	Contractors, Engineers, Consulting Engineers
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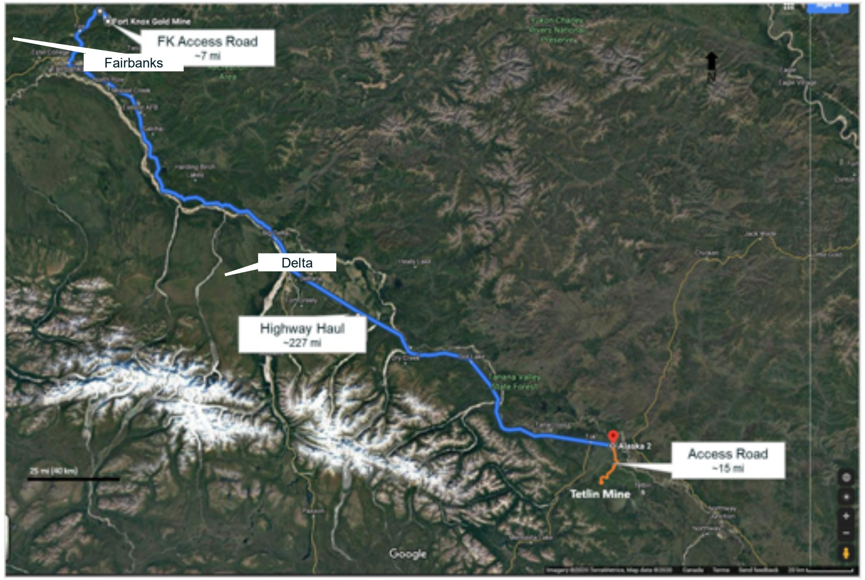

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2020 Field Program

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2020 Field Program

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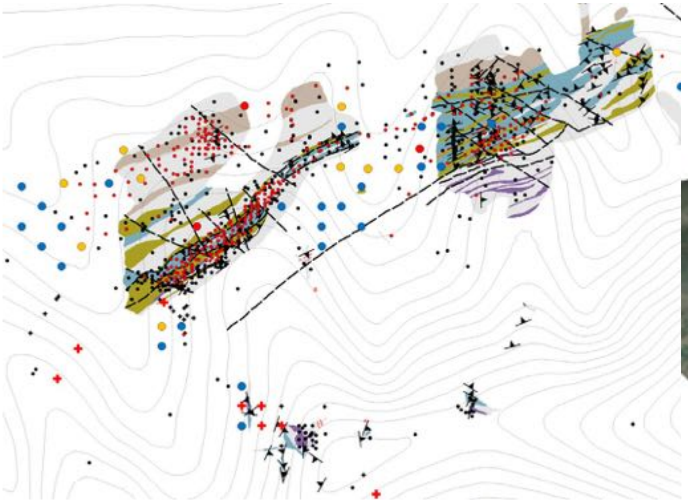
Infill Rig

Gil Project: 35+ Years in the Making

1982 -1993

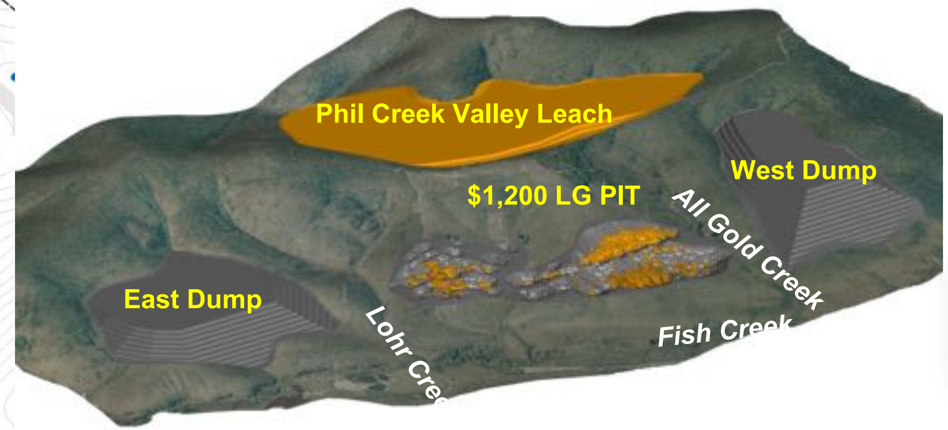
First Claims and Exploration



Result: Excitement for new mine near Fort Knox!

2006 - 2015

Study as "stand alone" mine



Result: Major capital, $1600 Au breakeven, and more environmental disturbance

2018 - Now

Focus studies on high grade to Fort Knox

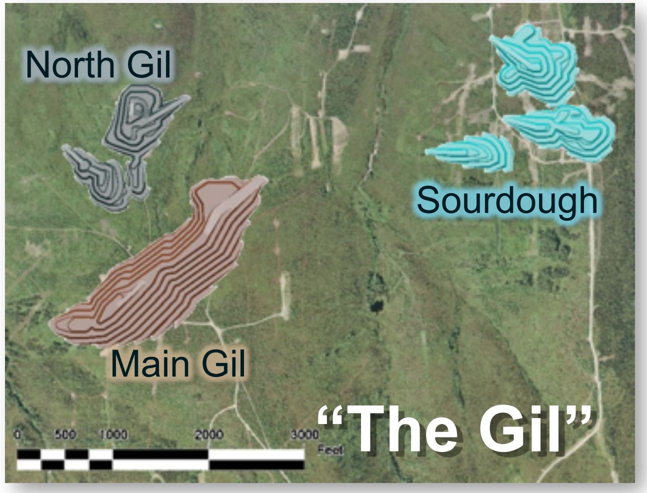
Result: Modest capital, ~$1200 Au breakeven, and mitigated environmental disturbance

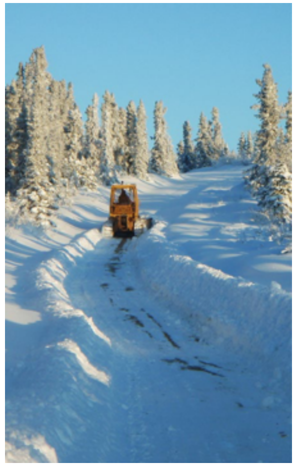
Gil Project: 35+ Years in the Making

~160koz
PRODUCTION

~2 year
MINE LIFE

0.6g/t
GRADE





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80+ Jobs Created

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C.11 2021 10 COMMUNITY MEETING TANACROSS

Fall 2021
Community Meetings

KINROSS Manh Choh
A JV with Contango ORE

Agenda

- Housekeeping Requests
- Project History
- Who is Kinross?
- Project Overview
- Preliminary Timeline
- Community Relations and Benefit Footprint Update
- Anticipated Job Opportunities
- Proposed 2022 Construction Plans
- Trucking and Traffic Safety
- Questions/Discussion

Housekeeping Requests – Zoom

Please keep your microphone muted.

Use “Chat” to view the chat window or send a message.

Select “Raise Hand” under “Reactions” to indicate you have a question/comment. The presentation will pause periodically to allow for questions. Please identify yourself when speaking.

Make sure you are identified by name. Open the “Participants” window, hover your mouse over your name, select “More” and then “Rename.”

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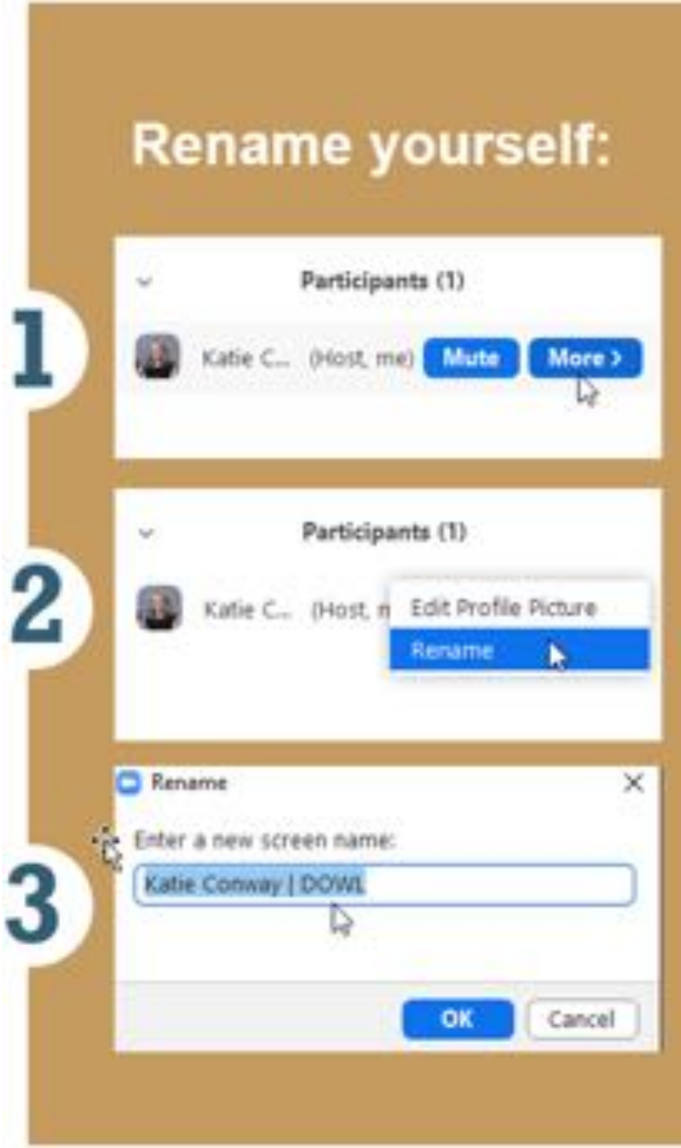

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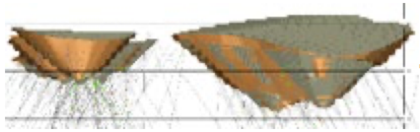

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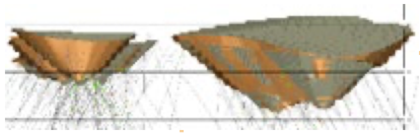

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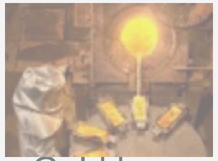

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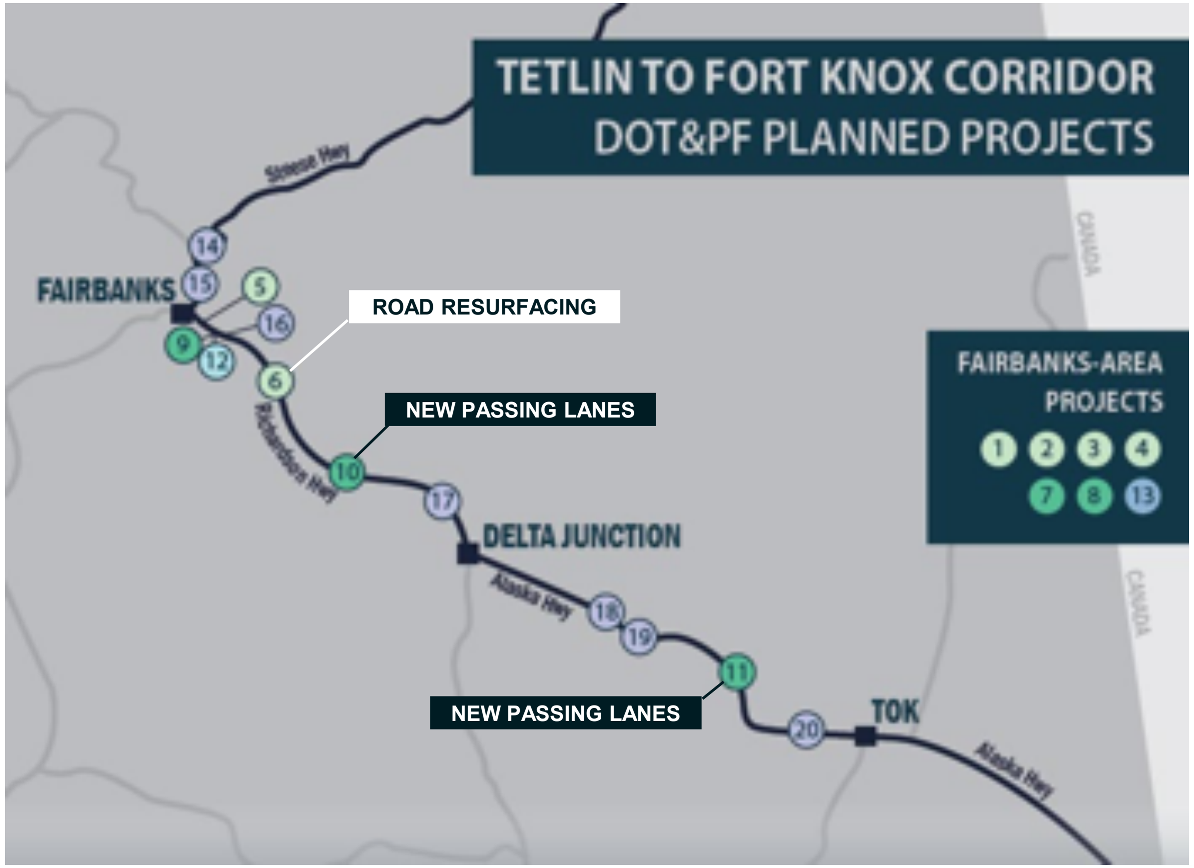

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Alaska Dept. of Transportation & Public Facilities, Northern Region | October 2021 | dot.alaska.gov/nreg/tetlintofortknox

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THANK YOU!

KINROSS

Manh Choh

A JV with Contango ORE

BACK UP SLIDES

Environmental Studies

- Wetland mitigation opportunities identified for review
- Cultural studies and wildlife surveys
- Prepare permit applications for Q4 2021 submission
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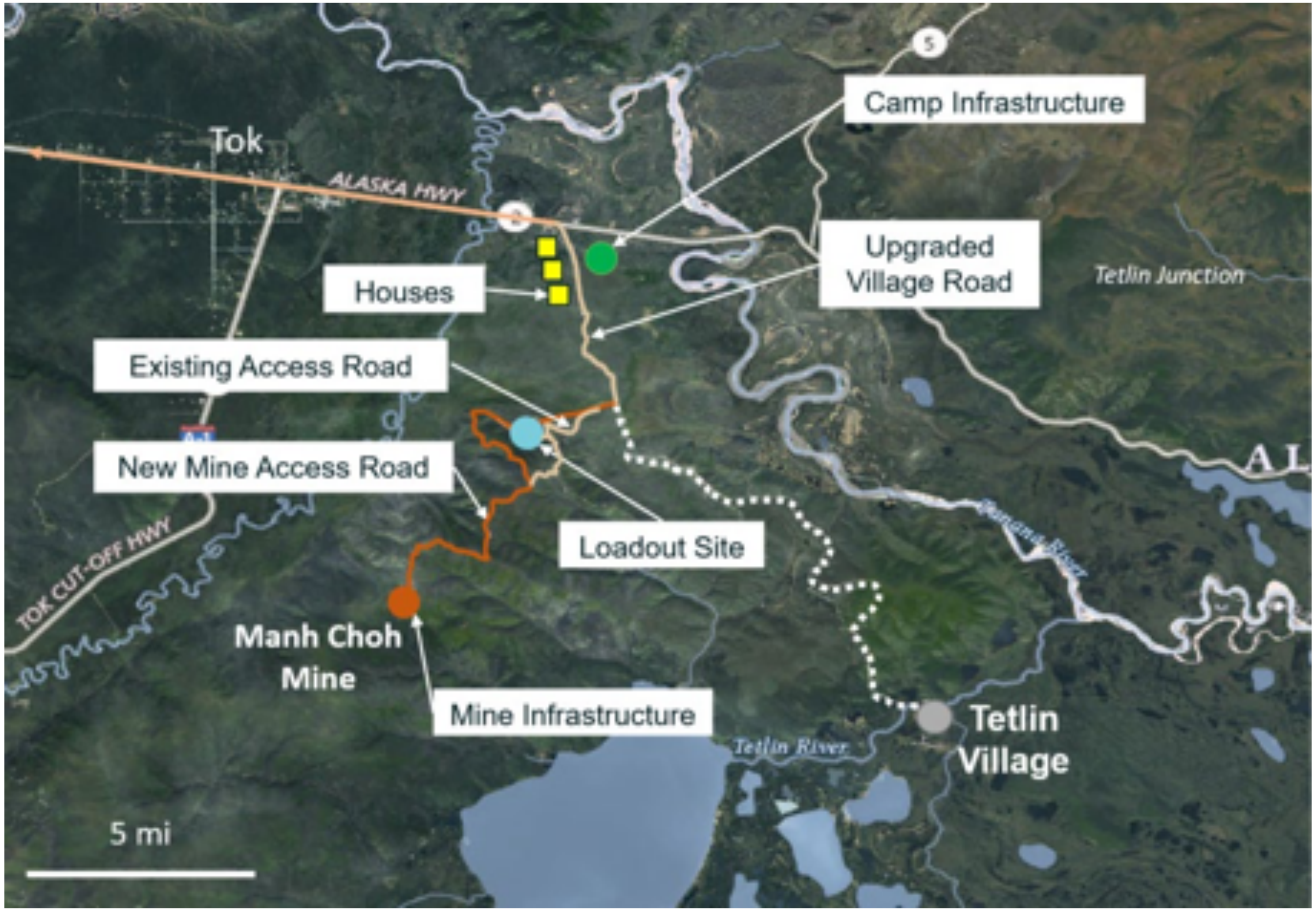
Site Layout - Preliminary



Legend	Description
Green circle	Camp Infrastructure • Camp • Parking Area • Septic field • Back Up Generation
Light blue circle	Loadout Site • Ore Stockpiles • Maintenance Facilities • Truck Scale • Fuel Storage • Offices
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Yellow square	Houses

B.12 2021 10 SALCHA_HARDINGLAKE COMMUNITY MEETING

Fall 2021
Community Meetings

KINROSS Manh Choh
A JV with Contango ORE

Agenda

- Housekeeping Requests
- Project History
- Who is Kinross?
- Project Overview
- Preliminary Timeline
- Community Relations and Benefit Footprint Update
- Anticipated Job Opportunities
- Proposed 2022 Construction Plans
- Trucking and Traffic Safety
- Questions/Discussion

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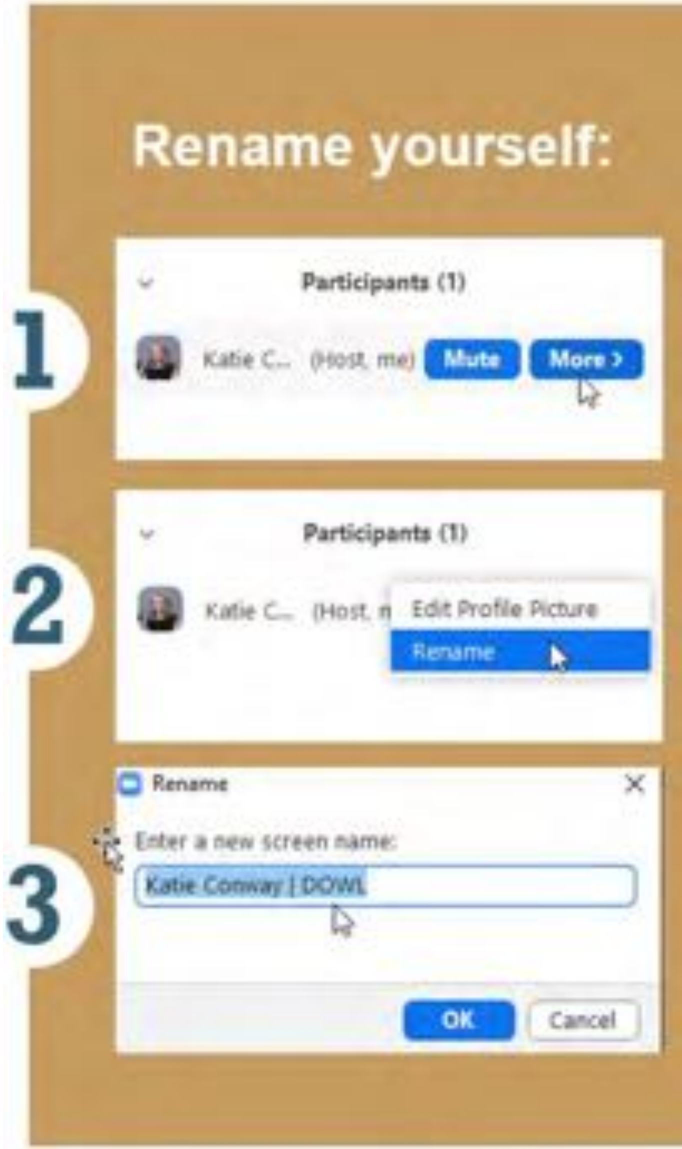

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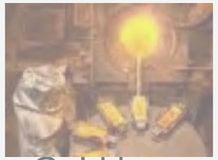

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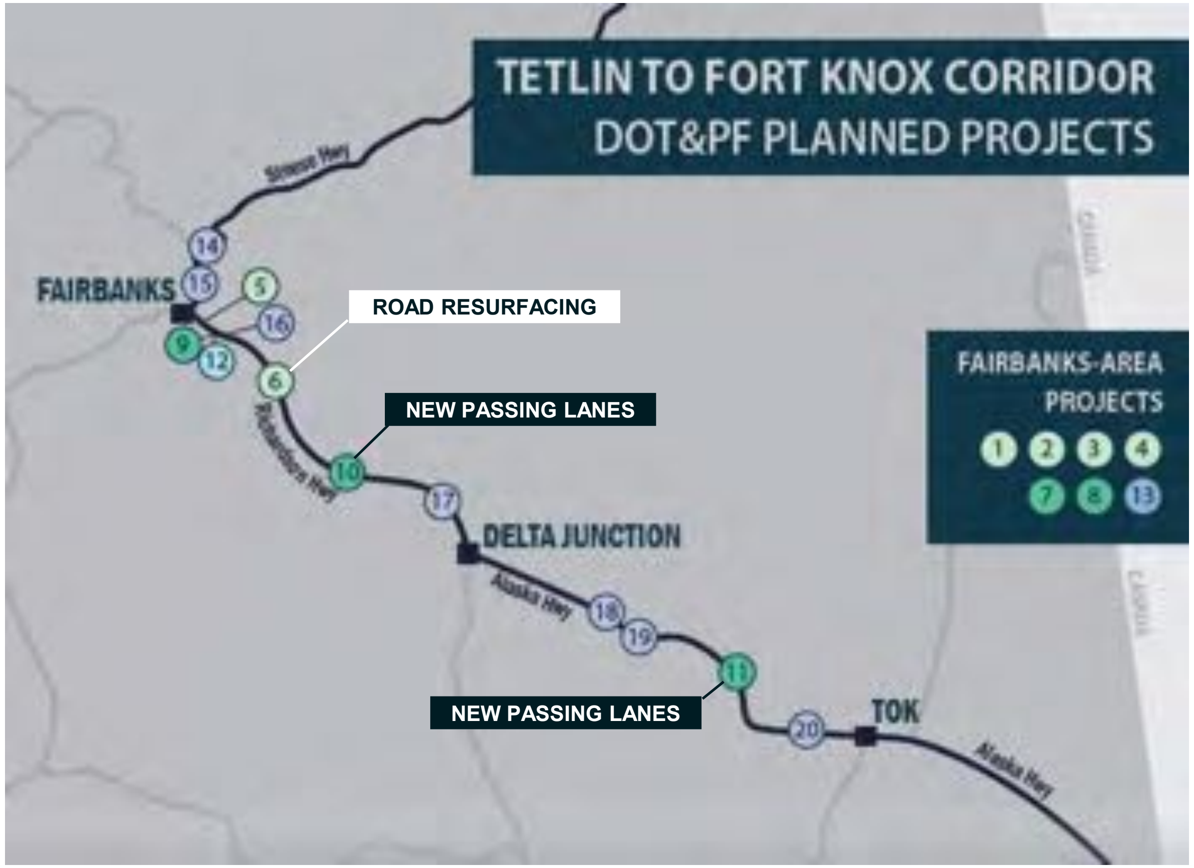

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KINROSS

Manh Choh

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C.13 2021 SUMMER NEWSLETTER

Summer 2021 Edition

PROJECT NEWSLETTER

KINROSS Manh Choh
A JV with Contango ORE

The Manh Choh Project is a gold exploration joint venture between subsidiaries of Kinross Gold Corporation and Contango ORE operating under a lease with the Tetlin Village. Kinross is the majority owner and operator.

Employee Spotlight

Doreen Mark, Environmental Technician In-Training

Doreen is an Environmental Technician In-Training and works on the Manh Choh project. She collects water samples at 17 sites, along with maintaining the weather stations.

She enjoys her job and has been able to do many new things, like ride in a helicopter and hike up to the weather stations to view Tetlin Lake and the Tok flats, something she's never seen before. Doreen really likes the people she is working with and going up to Fort Knox for training. She had been waiting for a job opportunity like this for a long time and very happy for it. Her knowledge had been sitting on the shelf for a long time and she is happy that she is now able to use her knowledge from her years in college and experience working on exploration projects.

Doreen studied very hard and recently received her Storm Water Pollution Prevention Plan (SWPPP) certification and Visible Emissions Method 9 Certification.

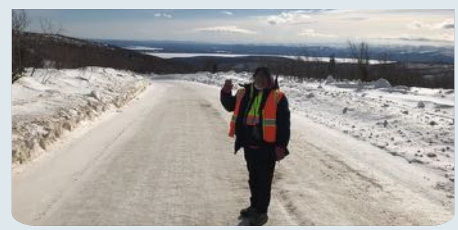
"I had a rough start in early in life and set six long term goals:

1. change my life,
2. have God in my life,
3. be clean and sober,
4. own a house,
5. have a family, and
6. have a full time job and work."

Doreen said that she has completed her goals with this job.

"We look forward to the safe and responsible development of the project and the positive benefits it is expected to generate for our community,"

- Village of Tetlin Chief, Michael Sam



Top: *Doreen in front of Manh Choh*

Bottom: *Geology Technicians: Donny Waechter, Andrew Forward, Nick Lock and Andrew Via*

For more information, contact Anna Atchison, External Affairs Manager
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What's Inside

Community Relations Update

Jeremy Brans, Vice-President and General Manager, Fort Knox, and Village of Tetlin Chief, Michael Sam, at the Manh Choh renaming announcement.

Number of Scheduled Stakeholder Meetings	**21**
Unscheduled Informal Stakeholder Meetings	**32**
Total Number of Stakeholders Engaged With	**132**

First Quarter Engagements

During a meeting with the Tetlin Village Council in February, we were ecstatic to learn that they had finalized the new name of the project Manh Choh, meaning "big lake" in Upper Tanana Athabascan, which refers to the Tetlin Lake, a beloved landmark and source of local pride in Tetlin. Our goal is that our neighbors and friends in the Upper Tanana region feel just as proud of this project in the future. The other exciting news is that we hired seven tribal members and one local resident for year-round and field-related positions with two more in the process of getting hired. Kinross could not be happier to welcome local expertise and talent. We awarded local contracts to eight local businesses as well.

We also provided $7,500 in community donations for the Tok Dog Mushers Association, Tok Youth Hockey, and the Tok Wolverine Trap (to support youth trap club) in addition to community support funding programs for the Tetlin community.

Over the last few months we have continued engaging with key stakeholders in the Upper Tanana sub-region, as well regional and local entities. We held a series of meetings in Tok in February and had in-depth conversations with the Superintendent of the Alaska Gateway School District, Tetlin Refuge leadership, Alaska Departments of Public Safety and Transportation and Public Facilities local representatives, UAF Tok Campus leadership, Tok Chamber of Commerce leadership, Tanacross tribal leadership and our team got a tour of the beautiful new Upper Tanana Health Center, as well as the biomass facility. We also met in Fairbanks with Chief PJ Simon from Tanana Chiefs Conference (TCC) and held virtual meetings with the TCC Employment and Training department, and the Delta Junction Mayor and City Administrator. We presented to the Delta Junction City Council using a virtual platform as well.

We are in the process of scheduling meetings in the Upper Tanana communities, depending on their comfort with in-person local meetings. We are eager to meet with people face-to-face and safety is our number one priority. Please stay tuned for more information on upcoming meetings, both virtual and in-person. We recently acquired office space in Tok and look forward to inviting the community for an open house & barbecue this summer.

Upcoming Community Meetings

Please join us for a socially distanced community meeting / BBQ near you.

Tok – June 14, 5-7pm

Delta Junction – June 15, 5-7pm

Fox – June 16, 5-7 pm

Meeting with TCC Chief / Chairman "PJ" Pollack B. Simon, Jr. – March 2021

Tok Hockey Tournament – March 2021

Regulatory Update

The team is continuing with data collection and is currently focused on generating a comprehensive baseline database.

With summer field work fast approaching the team is getting ready to complete the following tasks this field season:

- Set up a local office to store samples and equipment
- Complete the installation of wells for sampling
- Conduct cultural and historic surveys
- Conduct wildlife and bird surveys
- Clear a location for the helicopter landing pad
- Additional wetlands delineation surveys
- Construct storm water runoff controls

Kinross Environmental Department Staff photo

Sunset on the Tok River

Field Work Update

After concluding the 2020 drilling program in late December, the Kinross team began contracting the 2021 field program with the goal of an early start to complete a significant portion of the drilling while the ground is frozen for better access. The team was successful with a quick turnaround for contracting, hiring field personnel, and final planning. Going into the 2021 program lessons learned from the abbreviated 2020 program were applied to help improve the COVID management strategy and workplace safety at the core shack and in the field.

Safety for the field program involved improving field communications by modifying the radios previously used, including external antennas for vehicles and multiple repeaters to reduce blind spots on the road. Significant effort was also placed into road maintenance and keeping the road in the best condition possible during winter and thaw. At the core shack more work was done improving the ergonomics of the work area and correcting hazards in and around the building.

The program officially kicked off with the heavy equipment for drill pad construction mobilizing to site on February 18th. Two core drills contracted through Ruen Drilling arrived the following week on February 24th with the first hole of the 2021 season collared on February 27th.

The 2021 program includes drilling for multiple disciplines to collect the data to complete engineering designs, resource modeling, and permitting. The geotechnical pit slope drilling is to understand key faults and rock strength for engineering parameters. Infill drilling to further refine the geologic model, mineralization, and other key mining parameters. Ground water monitoring well to collect water geochemistry samples. Infrastructure geotechnical work to ensure roads, buildings, and waste dump areas are built safely in suitable areas. Finally, exploration drilling will be completed.

By the end of Apri,l 20,000 feet of drilling in 54 drillholes has been completed. Work will continue through Q2, drilling additional holes, processing the core for analytical testing, completing reclamation of disturbance.

PROJECT TIMELINE

Manh Choh Project

Community engagement, environmental baseline studies, and exploration field work like drilling are on-going and consistent through the project's timeline.

Kinross Manh Choh
a JV with Contango ORE
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Stop the Spread

Help prevent the spread of respiratory diseases like COVID-19.

- Avoid close contact with people who are sick.
- Cover your cough or sneeze with a tissue, then throw the tissue in the trash.
- Avoid touching your eyes, nose, and mouth.
- Clean and disinfect frequently touched objects and surfaces.
- Stay home when you are sick, except to get medical care.
- Wash your hands often with soap and water for at least 20 seconds.

For more information visit: www.cdc.gov/COVID19