Attachment 1 – Responses to EPA 20220211 Inquiries

PO Box 73726
Fairbanks, AK 99707-3726

Electronic Delivery: jensen.amy@epa.gov

June 30, 2022

Ms. Amy Jensen
Regional Wetland Coordinator
U.S. Environmental Protection Agency
Region 10
1200 Sixth Avenue, Suite 155
Seattle, WA 98101-3188

Subject: EPA February 11, 2022 Comment Letter on Public Notice POA-2014-00286

Dear Ms. Jensen,

The attached document, *Peak Gold, LLC Responses to US EPA Region 10 February 11, 2022, Comment Letter to USACE Public Notice POA-2013-00286* (Peak Gold Response) provides responses to EPA from Peak Gold, LLC regarding your February 11, 2022, review letter and its comments to Mr. Gregory Mazer of the U.S. Army Corps of Engineers (USACE), Alaska District, Fairbanks Field Office. In Mr. Mazer's April 1, 2022 letter to Peak Gold, LLC requesting additional information to address EPA's concerns, Mr. Mazer stated, "You may voluntarily elect to contact EPA and/or the USFWS in an attempt to resolve the issues raised by their letters but are not required to do so…"

Peak Gold Response addresses EPA's concerns of the Manh Choh Project disturbing a total of 5.2 acres of wetlands and waters of the United States (WOTUS) on Alaska Native lands of the Native Village of Tetlin. Nearly all of the information in the Peak Gold Response provides information from the support documents for the 404 Wetlands Fill Permit application (Engineering Form 4345) submitted to the USACE on December 31, 2021, and were available to EPA prior to your February 11, 2022 letter.

Should you have any questions, please contact me at 907-490-2207 or bartly.kleven@kinross.com.

Sincerely,

Bartly Kleven

Bartly Kleven
Environmental Services Director, Alaska

Cc: Greg Mazer, USACE, gregory.j.mazer@usace.army.mil

KINROSS Manh Choh
A JV with Contango ORE

Peak Gold, LLC Responses to US EPA Region 10 February 11, 2022, Comment Letter to USACE Public Notice POA-2013-00286

EPA Comments Related to Clean Water Act Section 404(b)(1) Compliance

Manh Choh Project General Information

The Manh Choh Project is located on property owned and controlled by Tetlin, an indigenous Alaska Native community and is considered private Native land. 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 the Native Village of Tetlin, it has been named the Manh Choh Project. The Manh Choh Project (Project) is located 10 miles southeast of Tok, Alaska. The Project is accessed by the current Tetlin Village Road corridor, six miles east of Tok along the Alaska Highway. The Project includes a personnel camp near the Alaska Highway, the new Manh Choh Twin Road for the first 5 miles, and the Manh Choh Site Road to access the remaining facilities (Stantec 2021a).

The local social benefits and community impacts to the Native Village of Tetlin and Southeast Fairbanks Census Area include:

- *Calendar Year 2021 (Kinross Manh Choh 2022)*
    - *Kinross Manh Choh invested over $180,000 locally, supporting a dozen community programs in the areas of education, community activities and local development, cultural preservation, and environmental sustainability. On average, each of theses programs positively impacted 278 people (over 8,000 beneficiaries of programs we support).*
    - *Peak Gold LLC, spent over $1.5 million on local goods and services, directly supporting over a dozen businesses in the Tok/Delta Junction area.*
    - *Manh Choh Project representatives spent over 550 hours meeting with more than 2,500 community members over 200 times throughout the year; 32 of those engagements were open to public meetings to discuss the project.*
- *Quarter 1 2022 (Kinross Manh Choh 2022)*
    - *Manh Choh renewed the community support agreement with the Tetlin Village.*
    - *Manh Choh supported several local area programs and events.*
        - *Tok Wolverine Trap Club – Teaching youth firearm safety and the sport of trap shooting.*
        - *Tok Dog Mushers Association – Assisted in defraying the costs of hosting the 66th running of the Tok Race of Champions, Tok Junior Race of Champions, and*

supported trail and building maintenance. The races provide a safe and healthy activity for families to participate in and learn about culture, sportsmanship, and how to maintain an active Alaska lifestyle.

- *Tok Boy's High School Basketball Team*
- *Tok University of Alaska Fairbanks (UAF) campus – Two in-depth courses to provide courses to area residences.*
    - *EMS Emergency Trauma Training First Responder – class complete by 11 Tetlin residences.*
    - *Professional Skills for the Job Hunt – class completed by nine Tetlin community members.*

- *Kinross Alaska donated $1 million to the University of Alaska Fairbanks for the Indigenous Studies Initiative. The donation will fund the schematic designs and bid specifications needed for the Troth Yeddha' Indigenous Studies Center, a planned 34,000-square-foot facility (Kinross Manh Choh 2022).*
- *Once in production, Manh Choh will be the second largest private employer in the Southeast Fairbanks Census Area (Kinross Manh Choh 2022, Stantec 2021a).*
- *The Manh Choh Project is expected to create 400-600 high-paying jobs during operations and 200-300 jobs during construction (Kinross Manh Choh 2022).*
- *The Manh Choh Mine operations is estimated annual direct payroll of $75 million and estimated $376 million over the estimated life of the mine (Stantec 2021a).*
- *The average annual wage will be about $128,230 (not including benefits), exceeding the average 2020 wage for residents of the Southeast Fairbanks Census Borough ($75,085) by 70% and the Fairbanks North Star Borough ($56,916) by 125%. The Tetlin Village's median annual household income is $21,250, and Tok's median annual household income is $62,583. (Stantec 2021a).*

The Tetlin community land use plan; Tetlin Community Plan 2020 (Native Village of Tetlin 2020) states, in part (Stantec 2021a):

- *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 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.*
        - *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 past several years, provided*

season employment for 10-30 tribal members. In 2015, 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) (Stantec 2021a).

Village of Tetlin Chief Michael Sam supports the Manh Choh Project and has stated, "We look forward to safe and responsible development o 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." (Stantec 2021a, Kinross Alaska 2021)

The proposed project consists of three components: mine development (Manh Choh Mine), ore transport, and ore processing (Stantec 2021a).

Mine development will occur in the Tetlin Hills 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 (Stantec 2021a).

Ore will be hauled from the proposed Manh Choh Mine to Fort Knox, approximately 250 miles one way. 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 discussions with DOT&PF about specifics of this Project to ensure compliance with their requirements (Stantec 2021a).

Ore processing and gold recovery will use existing, permitted facilities at Fort Knox. No ore processing will take place at the Manh Choh site. Therefore, no tailings disposal will take place at Manh Choh. The milled-ore tailings will be disposed of in available storage capacity in the permitted operating Fort Knox tailings storage facilities. The Manh Choh Project does not require any additional federal permitting at Fort Knox (Stantec 2021a).

Construction of the proposed Manh Choh 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 §404 of the Clean Water Act. A §404 permit is required for the placement of fill within jurisdictional WOTUS (Stantec 2021a).

Baseline environmental surveys were undertaken for the Manh Choh Project for meteorological, wetlands, geochemical, surface and ground water quality, fish and wildlife, cultural resources, subsistence, visual *impacts, noise impacts, reclamation and closure, and socioeconomic. A list of the completed environmental baseline reports to support assessment of the existing environment for the Manh Choh Project is provided in Table 1; their purpose descriptions follow Table 1. The baseline reports were provided to the US Army Corps of Engineers (USACE) with the §404 Permit Application on December 31, 2021. The §404 Permit Application Supplemental Information, December 2021 (Stantec 2021b), Manh Choh Project Permittee Responsible Mitigation Plan, December 30, 2021 (Stantec 2021c), and Environmental Information Document (EID) Manh Choh Project, December 31, 2021 (Stantec 2021a) were also included with the §404 Permit Application submittal on December 31, 2021.*

Table 1. Baseline Environmental Reports

Baseline Environmental Reports	***Prepared by***	***Date***
Manh Choh Project Meteorological Monitoring Program 2020-2021 Annual Data Report	*Boreal Environmental Services*	*December 2021*
Manh Choh Project Preliminary Jurisdictional Determination Report	*Stantec Consulting Services, Inc.*	*December 2021*
Manh Choh Project Geochemical Baseline Report	*SRK Consulting (US), Inc.*	*December 2021*
Manh Choh Project Waste Rock Management Plan	*SRK Consulting (US), Inc.*	*December 2021*
Manh Choh Project Hydrogeological Characterization and Groundwater Modeling Summary	*Piteau Associates USA Ltd.*	*December 2021*
Manh Choh Project Water Management Plan	*Piteau Associates USA Ltd.*	*December 2021*
Manh Choh Project Fish Surveys, 2021	*ABR, Inc.-Environmental Research & Services*	*December 2021*
Manh Choh Project Breeding Bird Surveys in the Manh Choh Project Area, Interior Alaska, 2021	*ABR, Inc.-Environmental Research & Services*	*December 2021*
Manh Choh Project Nesting Raptor Survey, 2021	*ABR, Inc.-Environmental Research & Services*	*December 2021*
Manh Choh Project 2021 Cultural Resources Survey and Evaluation of the Manh Choh Project, Tetlin, Alaska	*Higgs Research & Consulting, LLC.*	*December 2021*
Manh Choh Project Subsistence Data Review	*Stephen R Braund & Associates*	*December 2021*
Manh Choh Project Noise Technical Report	*Michael Minor & Associates*	*December 2021*
Manh Choh Project Reclamation and Closure Plan	*SRK Consulting (US), Inc.*	*December 2021*
Manh Choh Project Socioeconomic Baseline Profile	*McKinley Research Group, LLC. (Formerly McDowell Group)*	*May 2021*
Manh Choh Project Summary - A Regional Socioeconomic Profile and Assessment of Potential Economic Impacts	*McKinley Research Group, LLC. (Formerly McDowell Group)*	*December 2021*
Terrestrial Mammal Occurrence Proposed Manh Choh Project	*ABR, Inc.-Environmental Research & Services*	*December 2021*
Visual Simulation Report for the Manh Choh Project	*SRK Consulting (US), Inc.*	*December 2021*

The following provides a brief description for the purpose of the baseline environmental reports.

- ***Manh Choh Project Meteorological Monitoring Program 2020-2021 Annual Data Report***
  - *The purpose of the Manh Choh Project Meteorological Monitoring Program is collecting Prevention of Significant Deterioration (PSD) quality surface meteorological data to support engineering, design, and baseline environmental studies and to use in dispersion*

modeling for support of possible, future air permitting requirements. The monitoring site location was approved by the Alaska Department of Environmental Conservation on September 23, 2020. During the period of November 1, 2020, through October 31, 2021, the monitoring station collected PSD-quality meteorological data for:

- *Ambient air temperature, two and ten meters above ground level*
- *Horizontal wind speed*
- *Horizontal wind direction*
- *Vertical wind speed*
- *Solar radiation*
- *Barometric pressure*
- *Relative humidity*
- *Precipitation*
- *Evaporation*

- o *This report provides details of meteorological measurements collected at the Manh Choh meteorological station during the monitoring program year from November 1, 2020 to October 31, 2021. The report was prepared following the guidance in the Alaska Department of Environmental Conservation PSD Quality Ambient Air Quality and Meteorological Monitoring Annual Data Report Format, Revision 1.8 (August 30, 2018).*

- ***Manh Choh Project Preliminary Jurisdictional Determination Report***
  - o *This report presents the findings of the baseline 2020/2021 fieldwork to determine the areas waters of the United States (WOTUS) including wetlands, streams and ponds and vegetation cover within the 6,024-acre Manh Choh Project study area.*
  - o *The study area mapping is based on the criterial in the U.S. Army Corps of Engineers Wetland Delineation Manual (USACE 1987), the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region (Version 2.0) (USACE 2007), and the 2020 National Wetland Plan List.*
  - o *The results of the field verified mapping shows the majority of the area is uplands; wetlands and waters account for 197.8 acres (3.3 percent) of the study area.*
- ***Manh Choh Project Geochemical Baseline Report***
  - o *This report describes the metal leaching and acid rock drainage potential to support technical evaluations made for the Manh Choh Project and permitting applications.*
  - o *The geochemical characterization study defines waste segregation criteria to inform mine planning, predict contact water chemistry for input into water quality assessments and predict what influence processing Manh Choh ore will have on the Fort Knox Tailings and associated water chemistry.*
  - o *The study uses conventional procedures including acid-base accounting, trace element analysis, mineralogy, leach tests, humidity cells, and onsite barrel tests.*
- ***Manh Choh Project Waste Rock Management Plan***
  - o *This plan documents the procedures for characterizing, classifying, and managing waste rock associate with the Manh Choh Project. The plan includes:*

  - *A summary of the geochemical characterization programs undertaken that define the geochemical behavior of the waste rock.*
  - *The volume of waste rock to be produced according to the current long-range mine plan.*
  - *Waste rock classification according to operational criterial for waste rock management.*
  - *Waste rock placement design and procedures to minimize potential oxidation and solute generation.*
  - *Reclamation and closure activities planned for the waste rock disposal facilities.*

- ***Manh Choh Project Hydrogeological Characterization and Groundwater Modeling Summary***
  - *The report is a culmination of field and office hydrological assessments undertaken from 2012 through 2021 at the Manh Choh Project. The report presents the outcome of that work including:*
    - *Stream flow and baseline surface water quality sampling*
    - *Water level measurements and baseline groundwater sampling*
    - *Ground temperature measurements*
    - *Hydraulic testing and mapping*
    - *Development of a conceptual hydrology and hydrogeological model,*
    - *Numerical groundwater flow and transport modeling*
- ***Manh Choh Project Water Management Plan***
  - *The plan is to minimize the potential for long-term effects from mine operations and closure, based on the baseline and cumulative effects study. The specific goals of the plan are to:*
    - *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*
- ***Manh Choh Project Fish Surveys, 2021***
  - *Fish surveys were conducted in the Manh Choh Project area using a combination of eDNA and traditional fish trapping methods. Of the six species selected for eDNA analysis, four species were detected on two waterbodies. Trapping efforts yielded low returns of fish in 2021, possibly due to limited stream connectivity, lack of acceptable rearing and overwintering habitat, altered stream flow due to beaver activity, and possible predation by Northern Pike. Because surveys conducted across years are critical in assessing inter-annual variability of fish presence and distribution, the 2013 survey data were compared with the 2021 data.*
  - *In 2013, limited fish sampling was conducted on five streams of the project area. The primary purpose of those sampling efforts was to characterize fish presence in area streams in advance of any potential future permitting requirements.*

- *In 2021, fish sampling was conducted of the Manh Choh Project area drainages on both sides of the Tetlin Hills. The objectives of the studies include:*
  - *Sample freshwater streams in the Manh Choh Project area to aid in describing baseline fish conditions*
  - *Increase fish sampling efficiency by supplementing traditional fish-trapping methods for Interior Alaska streams with rapid eDNA water sampling techniques*
  - *Document ambient water quality conditions at sampling sites*
  - *Provide stream gradient mapping to assist in determination of available fish habitat in the project area*

- ***Manh Choh Project Breeding Bird Surveys in the Manh Choh Project Area, Interior Alaska, 2021***
  - *The June 2021 surveys were performed to assess the abundance of breeding landbird and shorebird species in the Manh Choh Project area. The objective of these surveys was to quantitatively assess the occurrence and habitat use of all bird species breeding in the area, including species of conservation concern, to help facilitate the permitting and National Environmental Policy Act (NEPA) processes for the project.*
  - *From the point-count survey data, three metrics of occurrence were calculated for each bird species in the proposed mine area and road corridor:*
    - *Total number of individuals detected*
    - *Percent of total detections, the number of individuals of each species detected as a percentage of the total number of individuals of all species detected*
    - *Average occurrence, the number of individuals detected divided by the numbe of point-counts conducted (i.e., birds per point count)*
    - *For these calculations, observations of "flyover" birds that were not clearly using habitats in the study area were excluded. Birds were also excluded that were only detected before or after the 10-minute point-count period, or that were detected incidentally while traveling between plots. Such detections were included, however, when assembling a comprehensive list of the species observed in the study area.*
  - *A total of 74 point-count plots were surveyed in the Manh Choh Project area, 55 in the proposed mine area and 19 in the access road corridor. Seven plots in the access road corridor could not be sampled due to time and resource constraints. During the field survey, sampling of plots was prioritized in the proposed mine area under the assumption that the majority of the habitat loss and alteration from development would occur there. Survey conditions were generally good throughout the field effort for the detection of birds, with excellent visibility, no precipitation, and light winds at most plots.*

- ***Manh Choh Project Nesting Raptor Survey, 2021***
  - *To locate raptor nests of the Manh Choh Project area, fieldwork was conducted using a focused occupancy survey for nesting raptors in the early nesting season (May 2021) following established helicopter-based survey techniques for cliff- and tree-nesting raptors*

in North America (e.g., Anderson 2007), and specific protocols for eagle nest surveys (USFWS 2007; Pagel et al. 2010).
  - *The survey started with searches for possible tree-nesting raptors along the Tanana and Tok Rivers north of the Alaska Highway, transitioned to surveys for cliff-nesting raptors in the Tetlin Hills, and was completed by surveying north along the Tok River drainage back to the Alaska Highway.*
- ***Manh Choh Project 2021 Cultural Resources Survey and Evaluation of the Manh Choh Project, Tetlin, Alaska***
  - *The Manh Choh Project is considered an undertaking subject to applicable federal-level cultural resource laws and regulations. In particular, the project must be completed in accordance with Section 106 of the National Historic Preservation Act (NHPA: 16 USC 470) and its implementing regulations codified in 36 CFR 800 (as amended 2004). Collectively, these regulations aim to maximize the identification and evaluation of cultural resources within a project's Area of Potential Effect (APE) to minimize or otherwise mitigate potential adverse impacts on significant resources that may result from the undertaking.*
  - *In 2021, background search and field surveys were conducted for cultural resources of the Manh Choh Project area. The study area included the mine development area (approximately 1,850 acres), the corridors of new and existing project access roads (approximately 18 linear miles), and the proposed mine camp (approximately 60 acres).*
  - *The Phase I and Phase II cultural resource field investigations were completed in May, June and July 2021.*
- ***Manh Choh Project Subsistence Data Review***
  - *The purpose of this review is to provide a summary of the relevant subsistence data identified for the five study communities so that subsistence topics are addressed and to facilitate the NEPA process. Specifically, this report describes the methods and results of SRB&A's documentation of existing subsistence data for the five study communities of Tetlin, Northway, Tok, Tanacross, and Mentasta Lake.*
- ***Manh Choh Project Noise Technical Report***
  - *The purpose of this technical report is to provide the results of a noise analysis for the construction and operation of the Manh Choh Project. This report provides a worst-case analysis of noise from the operations of the proposed Manh Choh Mine. In addition to noise, mine related vibration was also reviewed for potential impacts. The proposed mine is accessible from the Alaska Highway via an existing exploration road. The deposit is well defined, and highway haul trucks will be used to transport the material from the proposed Manh Choh Mine to the Fort Knox Mine for processing.*
  - *There are four main components to the noise analysis; general noise from mining operations, highway haul trucks travelling to and from Fort Knox, blasting noise, and occasional noise from helicopters used for exploration and surveys. Projections of noise levels were performed using existing noise models, including the Federal Highway*

Administration Traffic Noise Model and reference construction noise levels, also from the Federal Highway Administration.

- ***Manh Choh Project Reclamation and Closure Plan***
  - The purpose of this Reclamation and Closure Plan (RCP) is to provide guidelines for implementing stabilization and reclamation procedures for the various facilities associated with the proposed Manh Choh Project. These guidelines are based on the best available reclamation technologies. Revisions to this RCP will be made to address changes in the design, construction, operations, and concurrent stabilization and reclamation of the facilities.
  - *Revisions to the RCP are made to:*
    - *Reflect changes in the operating plans and mining schedules*
    - *Account for the stabilization and reclamation of previous phases or specific components of the facility*
    - *Incorporate information and actual operating experience developed during the initial phases of the project*
    - *Allow the incorporation of new design information if subsequent phases of the project are developed*
    - *Allow for the utilization of new, reasonable and practical reclamation techniques as they are developed*
- ***Manh Choh Project Socioeconomic Baseline Profile***
  - *This report presents socioeconomic baseline data for key social and economic conditions in the project area by:*
    - *Primary study area, including the Interior Alaska community of Tetlin. Where possible, data is presented for Tetlin, Tok, and the Southeast Fairbanks Census Area.*
    - *Secondary study area, including Fairbanks North Star Borough, to which ore from the Manh Choh Mine will be trucked for processing at the Fort Knox Mine mill.*
  - *Indicators were compiled at the most specific geographic level available. Using the most current data, indicators include:*
    - *Demographic characteristics, such as population, population growth/decline trends, projected population change, age, gender, race/ethnicity factors, among others.*
    - *Socio-economic determinants and outcomes, including household characteristics, educational attainment levels, employment and top employers, labor force characteristics, average earnings, poverty rates, and the number of local businesses. This includes a description of key economic sectors in the study area.*
    - *Social infrastructure description, including transportation, water/sewer, energy, education facilities, internet connectivity, and health infrastructure, and available data on state capital spending in the immediate area.*

    - *Local institutions and description of governance, including tribal organizations, housing authorities, government entities, and other key institutions.*
    - *Public health indicators, such as wellness, behavioral health, chronic disease, and injury rates.*
    - *Educational indicators, including K-12 school enrollment, high school graduation rates, and standardized testing outcomes.*
    - *Brief descriptions of historical and cultural background of the immediate project area, including subsistence harvesting and practices.*
  - *Data sources include the Alaska Department of Labor and Workforce Development, Alaska Department of Education and Early Development, Alaska Department of Health and Social Services, Alaska Department of Commerce, Community, and Economic Development, Alaska Department of Fish and Game, U.S. Census Bureau American Community Survey, and others. Phone calls to local agencies and organizations were made to verify the validity of published data on infrastructure and facilities. Data previously collected for Kinross Fort Knox (BZH indicators) on the Fairbanks North Star Borough were incorporated for the secondary study area.*
- ***Manh Choh Project Summary - A Regional Socioeconomic Profile and Assessment of Potential Economic Impacts***
  - *The purpose of this study is to evaluate the potential economic benefits related to construction and operation of the Manh Choh Project. The summary includes:*
    - *Employment and payroll benefits*
      - *Construction phase*
      - *Mine operations phase*
    - *Government taxes and fees*
    - *Royalty payments*
    - *Regional infrastructure development*
    - *Population related impacts*
    - *Reclamation and Legacy Impact*
- ***Terrestrial Mammal Occurrence Proposed Manh Choh Project***
  - *Existing information on the occurrence of terrestrial mammals in the proposed Manh Choh Project area was compiled to assess the presence and habitat use of mammals in the region of the project and surrounding terrain in the Tetlin Hills in Interior Alaska. This information will be used to assess potential impacts to mammals in the permitting and National Environmental Policy Act processes for the project.*
- ***Visual Simulation Report for the Manh Choh Project***
  - *Because the Project and surrounding areas are located on Tetlin Land, no visual resource management inventories have been conducted and no procedures or visual resource management categories have been established. In the absence of other authorities, use of the definitions and procedures for assessing changes to the visual landscape defined by the BLM. The BLM developed a standard visual assessment*

methodology, known as the Visual Resource Management (VRM) system, to inventory and manage scenic values on lands under its jurisdiction. Scenic value inventories are carried out through Visual Resource Inventories (VRI). This methodology was developed in response to the Federal Land Policy Management Act (FLPMA) of 1978, as amended, and the National Environmental Policy Act of 1969, as amended, both of which address visual resources and the need for the development of a systematic, interdisciplinary approach to visual resource management and assessment.

- *A visual simulation is a realistic visual portrayal which demonstrates the perceivable changes in landscape features caused by a proposed management activity. Visual simulations were developed at four locations surrounding the Manh Choh Project. The four location simulations included three visual analysis scenarios:*
  - *Existing viewshed is current landscape and does not include simulations of the project facilities.*
  - *Full-buildout scenario includes the simulated proposed project components at the point of full-buildout.*
  - *Post-reclamation scenario includes the simulated project components as they would be configured after reclamation activities.*
  - *The simulations required for the Full-buildout and Post-reclamation scenarios have been created using Peak Gold-provided mine component topography, Autodesk® Civil 3D, Autodesk® 3ds Max, and Adobe Photoshop® software.*

The following documents were also provided to the USACE with the §404 Permit Application on December 31, 2021.

- *Manh Choh Project Monitoring Plan, December 202. Prepared by Peak Gold, LLC.*
- *Manh Choh Project Reclamation and Closure Plan, December 2021. Prepared by SRK Consulting (U.S.), Inc.*
- *Manh Choh Project Solid Waste Management Plan, December 2021. Prepared by Peak Gold, LLC.*
- *Manh Choh Project Support Document for the Waste Management Permit and Plan of Operations, Manh Choh Mine, December 2021. Prepared by Peak Gold, LLC.*
- *Manh Choh Project Water Management Plan, December 2021. Prepared by Piteau Associates USA Ltd.*

EPA Comment 1 – Aquatic Resource Information

EPA has compiled some additional information regarding the area to better understand the potential effects of the proposed project, and we provide this information herein to support the Corps' analysis.

The Tanana and Tok Rivers have their headwaters in mountain streams in eastern Alaska near the Yukon border. The Tanana River flows northwest to meet with the Delta River, a Wild and Scenic River, before joining the Yukon River across the state. The upper Tanana River is a critical reach of the river system, along with the confluence with Tok river, and Tetlin Lake as they serve important functions for wildlife, fisheries, subsistence, and recreation. This reach is where fish and wildlife migrate to reproduce seasonally. The areas of the Upper Tanana River Valley through the Tetlin National Wildlife Refuge (TNWR) are known for being a migratory corridor from numerous species of protected birds, including but not limited to the Bald Eagle, Golden Eagle, Hudsonian Godwit, Lesser Yellowlegs, and Olive-sided Flycatcher.

Alaska recognizes any fish-bearing waterbody as essential fish habitat regardless of species and life stage. National Marine Fisheries Service (NMFS) considers all freshwaters classified anadromous waters as essential fish habitat but defers to the Alaska Anadromous Waters Catalog (AWC) for classifications. According to the AWC, the Tanana River in the vicinity of Tok and Tetlin supports Coho salmon.[10] The Upper Tanana River has known populations and subsistence fishing of Arctic Grayling, Burbot, Lake Trout, Northern Pike, and Whitefish.[11] Furthermore, the TNWR is a highly used area for numerous protected species, some which are highly migratory. Humpback Whitefish have been observed moving between the TNWR and downstream areas of the Tanana River to spawn. While there are no significant salmon runs in the upper Tanana River drainage, the TNWR has recorded small runs of chum salmon and an occasional chinook and coho.[12] Based on the life histories of salmonid species, it is logical to presume these species use the downstream reaches of the Tanana River as well.

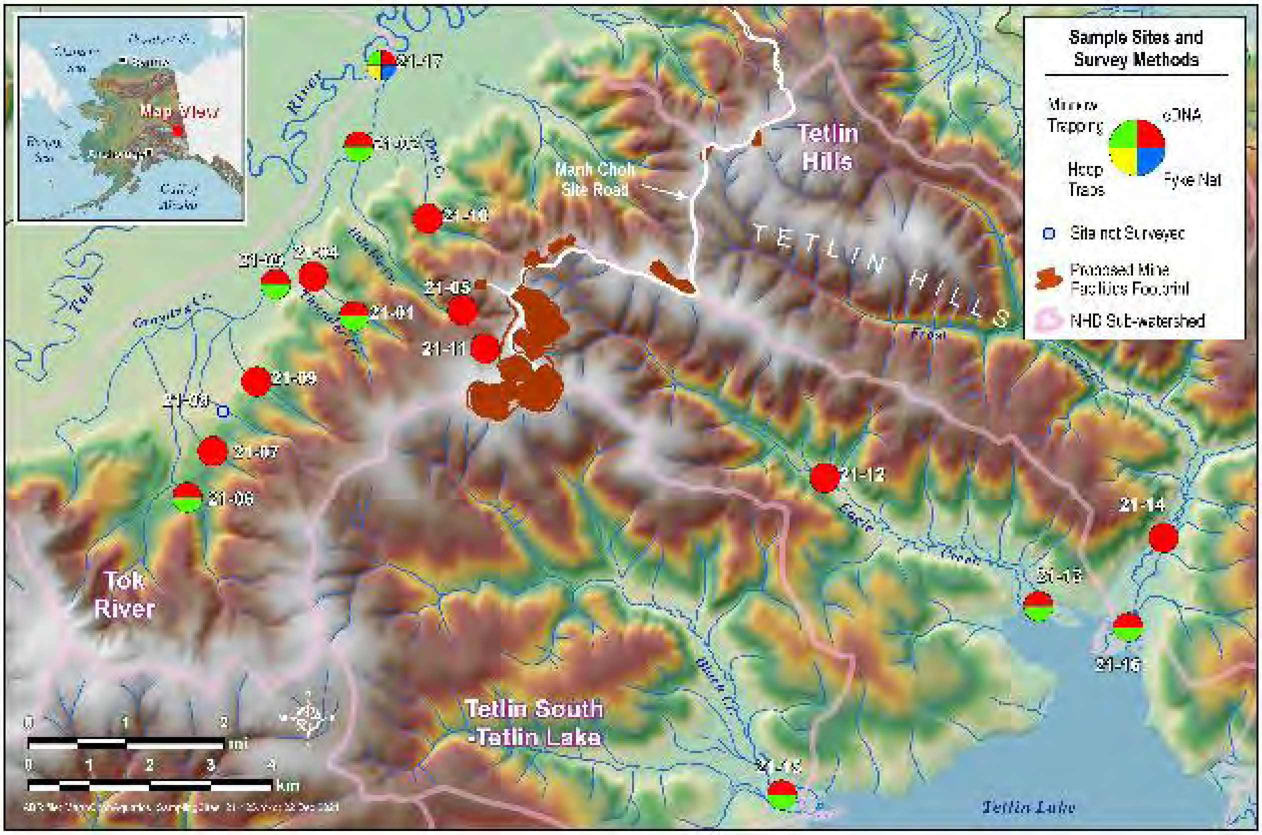
Peak Gold, LLC (Peak Gold) Response 1.

<u>Fish Habitat</u>

The area of analysis included the proposed Manh Choh Mine, including the Tetlin Village Road. This area of analysis was chosen because it represents the area where the Manh Choh Project is most likely to affect the resource. No impacts are anticipated on the highway transportation route to Fort Knox (Stantec 2021a).

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 (Figure 1) in the region.

Figure 1. Study Area and Sampling Sites (ABR 2021b)



The National Hydrography Dataset (NHD) does indicate a flowline crossing the Tetlin Village Road. Field inspections with Alaska Department Fish & Game (ADF&G) revealed there is no surface water, and the team reached the concurrence this habitat did not support fish (Stantec 2021a).

ABR (2021b) found that the Manh Choh Project 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 Manh Choh Project) 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.

No direct or indirect impacts are anticipated to fish habitat, anadromous waters, or fish species. Sampling of waters in the Manh Choh Project 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 Manh Choh Project would result in no impacts to fish (Stantec 2021a).

<u>Breeding Bird Survey</u>

In June 2021, a point count survey (Figures 2 and 3) 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).

The survey observed 38 bird species, including three species that were only detected incidentally while moving between survey points (ABR 2021a). All but two 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 one 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).

Figure 2. Mine Area Buffer and Point-Count Plot Locations (ABR 2021a)

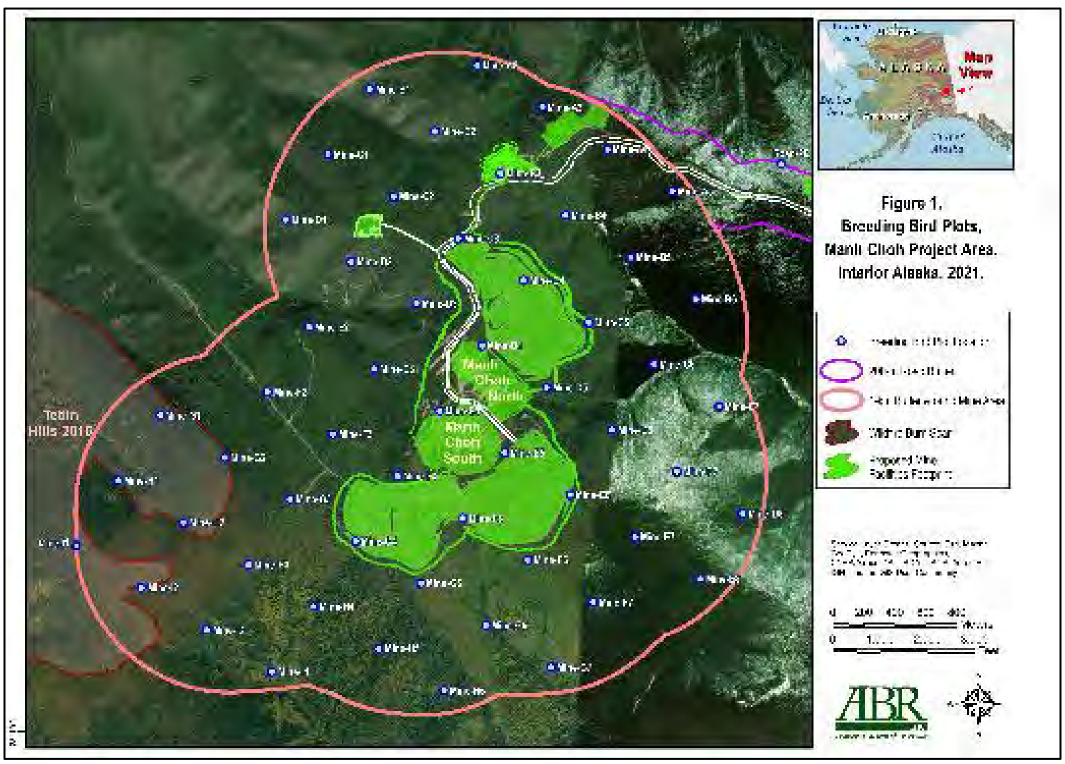
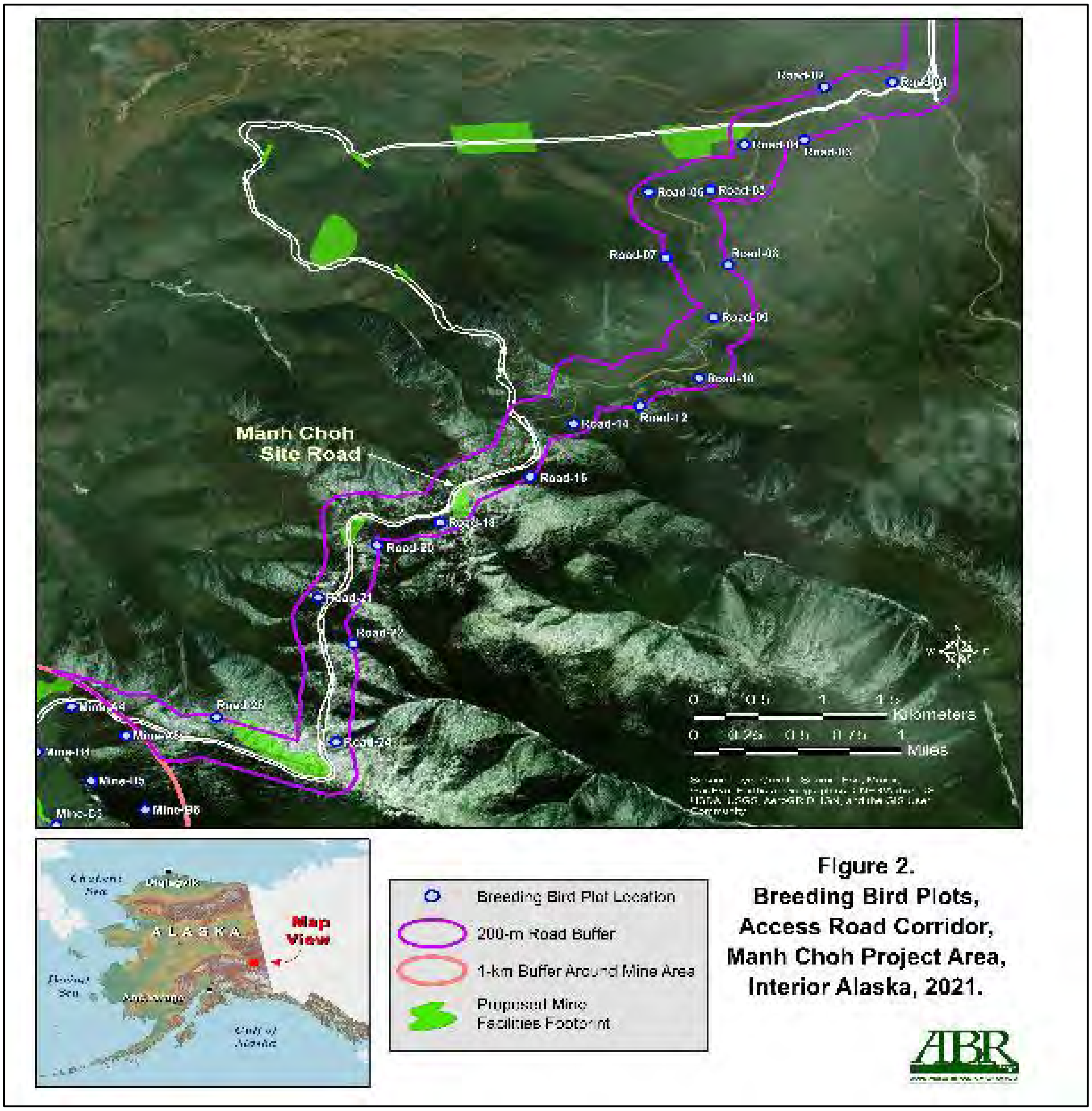


Figure 3. Access Road Corridor Buffer and Point-Count Plot Locations (ABR 2021a)

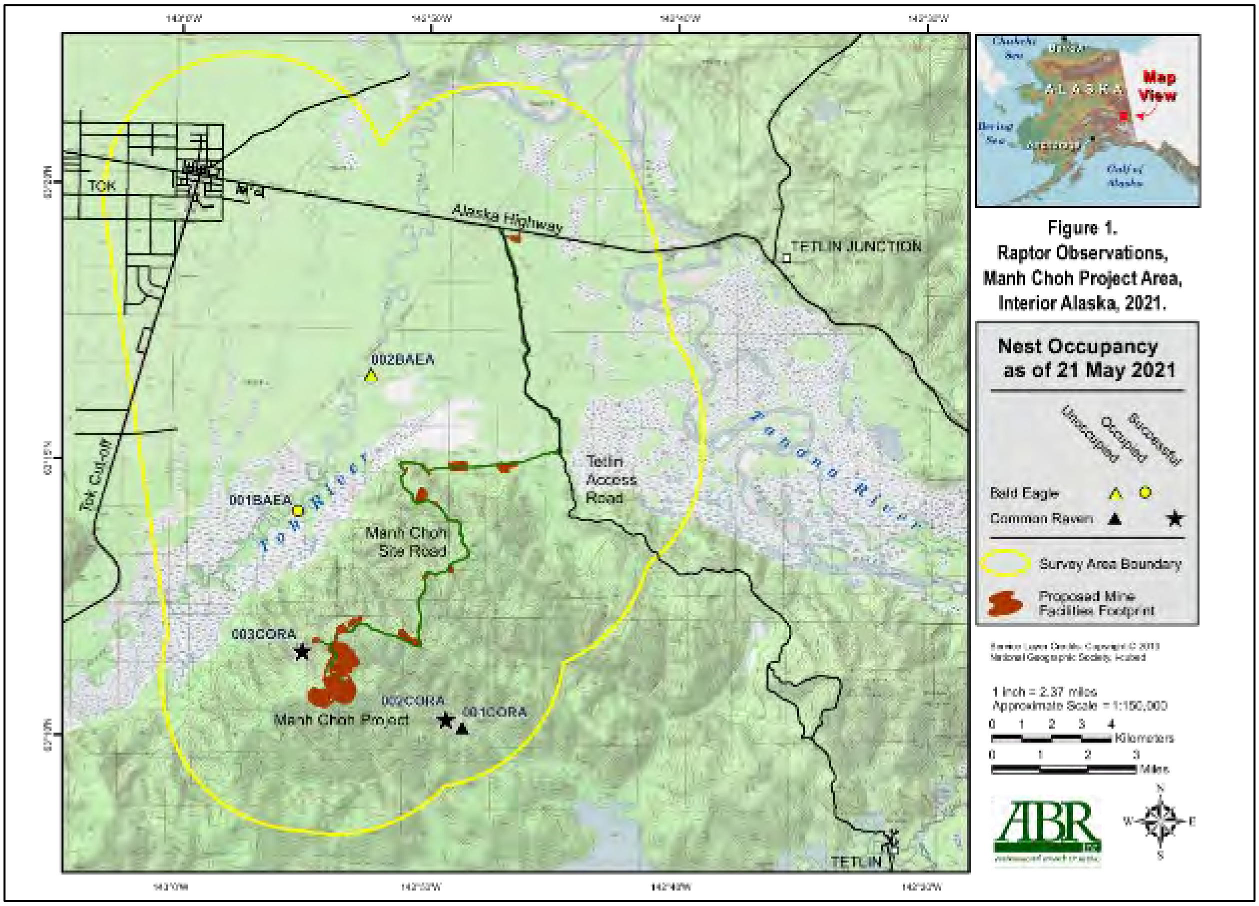


<u>Nesting Raptor Survey</u>

ABR (2021c) conducted a May 2021 raptor nest survey (Figure 4) 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.

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).

Figure 4. Location and Status of Raptor Nests (ABR 2021c)



<u>Species of Conservation Concern</u>

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).

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

<u>Waterfowl</u>

No waterfowl nesting habitat was observed in the area of analysis during the wetland, vegetation, or bird surveys (ABR 2021a, Stantec 2021c). 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 (Stantec 2021a).*

EPA Comment 2 – Alternatives Analysis – 40 CFR 230.10(a)

The Guidelines require that no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge, that meets the project purpose, which has less adverse impacts on the aquatic ecosystem.[13] The Corps is therefore only able to issue a permit for the least environmentally damaging practicable alternative (LEDPA).[14] Identification of the LEDPA is achieved by performing an alternatives analysis that evaluates the direct, secondary/indirect, and cumulative impacts to jurisdictional waters resulting from each alternative considered. Project alternatives that are not practicable and do not meet the project purpose are eliminated. The LEDPA is the remaining alternative with the fewest impacts to aquatic resources, so long as it does not have other significant adverse environmental consequences.

Based on the information provided in the PN and PRM, EPA believes other potentially practicable alternatives should also be evaluated to respond to the Guidelines requirements related to determining the LEDPA. The following comments highlight information relevant to the LEDPA analysis that the Corps should consider.

Based on our review of the PN, the proposed project may impact additional WOTUS along the haul route that have not been disclosed. The PN indicates the applicant plans to transport the excavated ore approximately 240 miles to an existing gold mill for processing at Fort Knox. EPA estimates the project would require the transport of more than 70,000 trucks per year (up to 8 trucks per hour- 4 loaded, 4 empty, every hour) and may even operate 24 hours a day.[15] The PN also indicates that the Manh Choh Twin Road would be built parallel to the Tetlin Village Road for approximately 5 miles from the Alaska Highway intersection to where it would meet the Manh Choh Site Road. The need to construct an entirely new road parallel to the existing Tetlin Village Road has not been disclosed in the PN or as part of the project purpose, but EPA assumes this road is needed for safety given the heavy truck traffic expected.

The LEDPA should be determined based on an evaluation of the combination of alternative sites with a site design that provides the least impacts to WOTUS. The distance and route taken to the processing facility is a critical aspect in siting this project, and the project purpose does not appear to be water-dependent; therefore, alternative sites (i.e., processing at the extraction location) are presumed to be available, unless clearly demonstrated otherwise by the applicant.[16] If the applicant has already evaluated alternative sites that do not impact aquatic resources, such as alternative locations for the Manh Choh Twin Road, it would be beneficial to provide that analysis. Other alternatives to be considered in the alternatives analysis may include analyses of alternate haul routes, alternate ore processing locations, and building additional culverts into constructed gravel roads to allow for maintenance of wetland equilibrium and function adjacent to the road.

Peak Gold Response 2:

Stantec (2021d) delineated the wetlands in the study area (Appendix 1) in 2020 and 2021 (Table 2). 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 2021d). No streams are being crossed by the Manh Choh Twin Road or the Manh Choh Site Access Road as shown on the figures of Appendix 1. Neither road crosses a perennial, intermittent or ephemeral stream. No access roads to any gravel pits, lay down areas, or mine facility cross a stream. The Alaska Highway system roads from the intersections of the Alaska Highway and the Tetlin Village Road and Twin Road to the intersection of the Steese Highway and the existing Fort Knox Mine access road are paved (not gravel roads). Therefore, the §404 Permit Application, §404 Permit Application Supplemental Information (Stantec 2021c), and the Environmental Information Document (Stantec 2021a) does not address direct and secondary impacts on the watersheds of the Tok and Tanana Rivers since the paved Alaska highways are not gravel and are for public and commercial use, which are operated and maintained by the Alaska Department of Transportation and Public Facilities.*

Table 2. Wetlands and Waters in the Study Area (Stantec 2021d)

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)	*5,826.3*	*96.7%*
Total Study Area*	***6,024.2***	***100.0%***

**Apparent inconsistencies in sums are the result of rounding.*

The Proposed Action would remove wetland habitat by filling existing wetlands for infrastructure (Table 3). 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 2021d).

Table 3. Impact to Wetlands (Stantec 2021a)

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*

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. The calculation presented below includes the entire project footprint for each alternative (Table 4).

Table 4. Alternative Wetlands Impact

Alternative	***Wetlands***	***Waters***	***Upland***	***Total***
Proposed Action	*5.1*	*0.1*	*924.0*	*929.1*
Alternative 1	*44.6*	*0.3*	*1217.1*	*1262.0*
Alternative 2	*90.9*	*1.0*	*1043.2*	*1135.0*
Alternative 3	*6.1*	*0.1*	*1022.2*	*1028.4*
Alternative 4	*5.2*	*0.1*	*1001.4*	*1006.7*

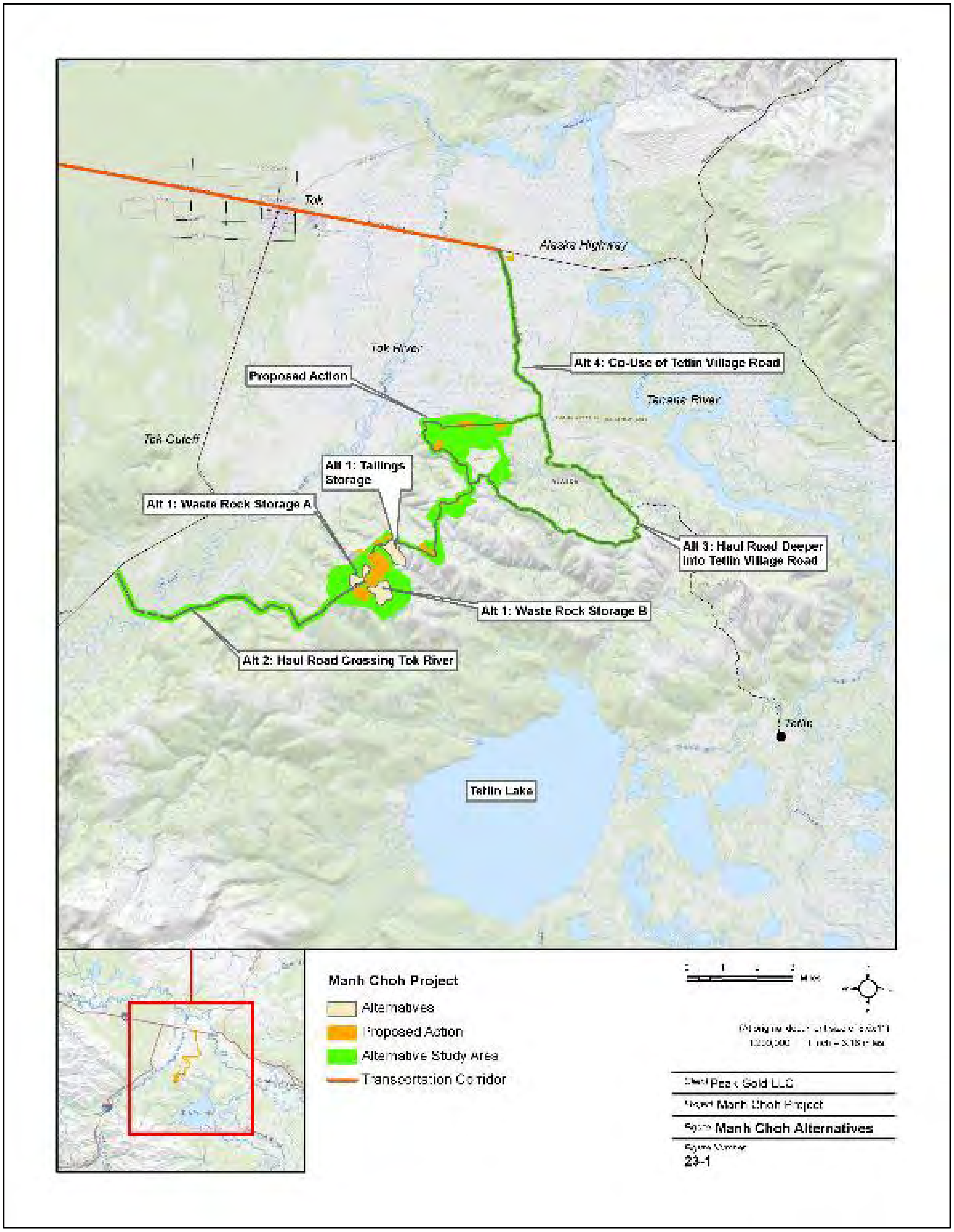
**Apparent inconsistencies in sums are the result of rounding.*

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

Manh Choh Project Alternatives and Refinements

Numerous alternatives were evaluated during the design process (Stantec 2021b). Onsite ore processing and tailings disposal, and three access routes were reviewed and discarded. The four alternatives are shown in Figure 5 and described below.

Figure 5. Manh Choh Project Alternatives (Stantec 2021b)



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 crushing system with a mill generates tailings (waste) that would have to be permanently stored in a tailings storage site on Native Village of Tetlin land. Figures 6 and 7 show a rough concept from early 2020(Stantec 2021b) .

This alternative would have required onsite 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 tailing storage facility would increase the potential impact to land and water resources (Stantec 2021b).

Waste rock dumps were relocated and reconfigured to avoid and minimize wetland impacts. In 2020, one waste dump configuration crossed the largest wetland complex in the mine area (Figure 6). After wetland delineations in 2020, this waste rock dump was moved to the current proposed location to avoid wetlands (Stantec 2021b). Table 4 identifies a total of 44.9 acres wetlands and waters disturbance for ore processing and tailings disposal at the Manh Choh site, which is an increase of 39.7 acres from the proposed action.

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 (Stantec 2021b). Table 4 identifies a total of 1,262 acres of ground disturbance for having ore processing and tailings disposal at the Manh Choh site, which is an increase of 332.9 acres from the proposed action.

Although it is certainly theoretically plausible to build an ore processing and tailings disposal facility at the Manh Choh site, it is clear from the analysis that the GHG emissions would be 18% larger when compared to the Ore transport and Fort Knox processing alternative; additional narrative of GHGs is provided in Response 4. In addition, an on-site diesel power generation plant would be required for on-site processing emitting not only GHGs but other pollutants as well. The onsite processing alternative would have more significant environmental impacts (including wetlands) and compared to the Ore transport proposal is not reasonable or practical.

Figure 6. Manh Choh Alternative 1 (Stantec 2021b)

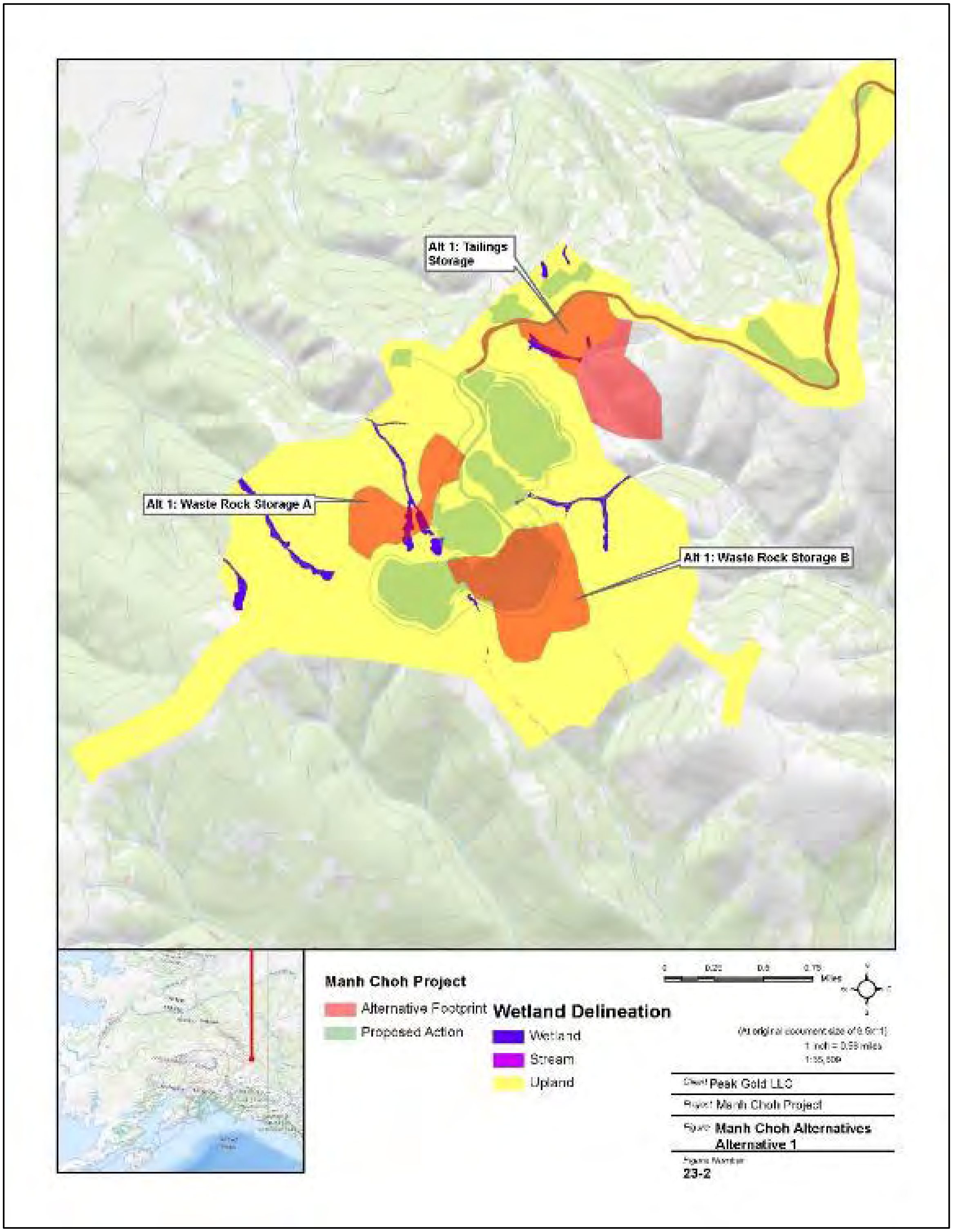
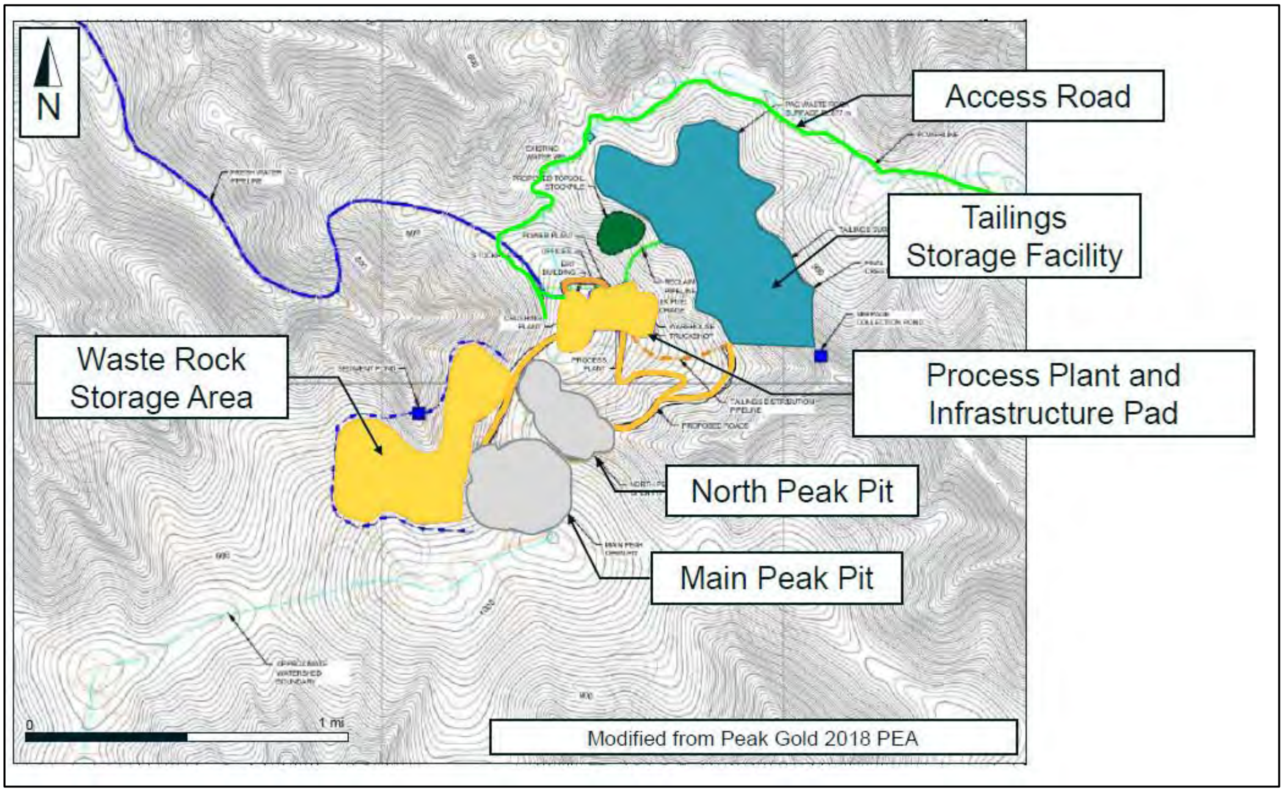


Figure 7. Manh Choh Process Facility and Tailings Storage Facility Alternative 1 (Stantec 2021a, Kinross Alaska 2020)



Alternative 2: Ore Transportation Haul Road Crossing Tok River (Stantec 2021b)

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 private 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. In addition, with a planned short mine life, the option to build a permittable bridge was not economically feasible.

Alternative 3: Haul Road Deeper into Tetlin Village Road (Stantec 2021b)

Under this alternative access to the proposed mine site would start at approximately mile 9 of the Tetlin Village Road, following better topography towards the proposed mine area. This alternative was originally thought to have the potential for lower grade sections, allowing for safer mine 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, 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.

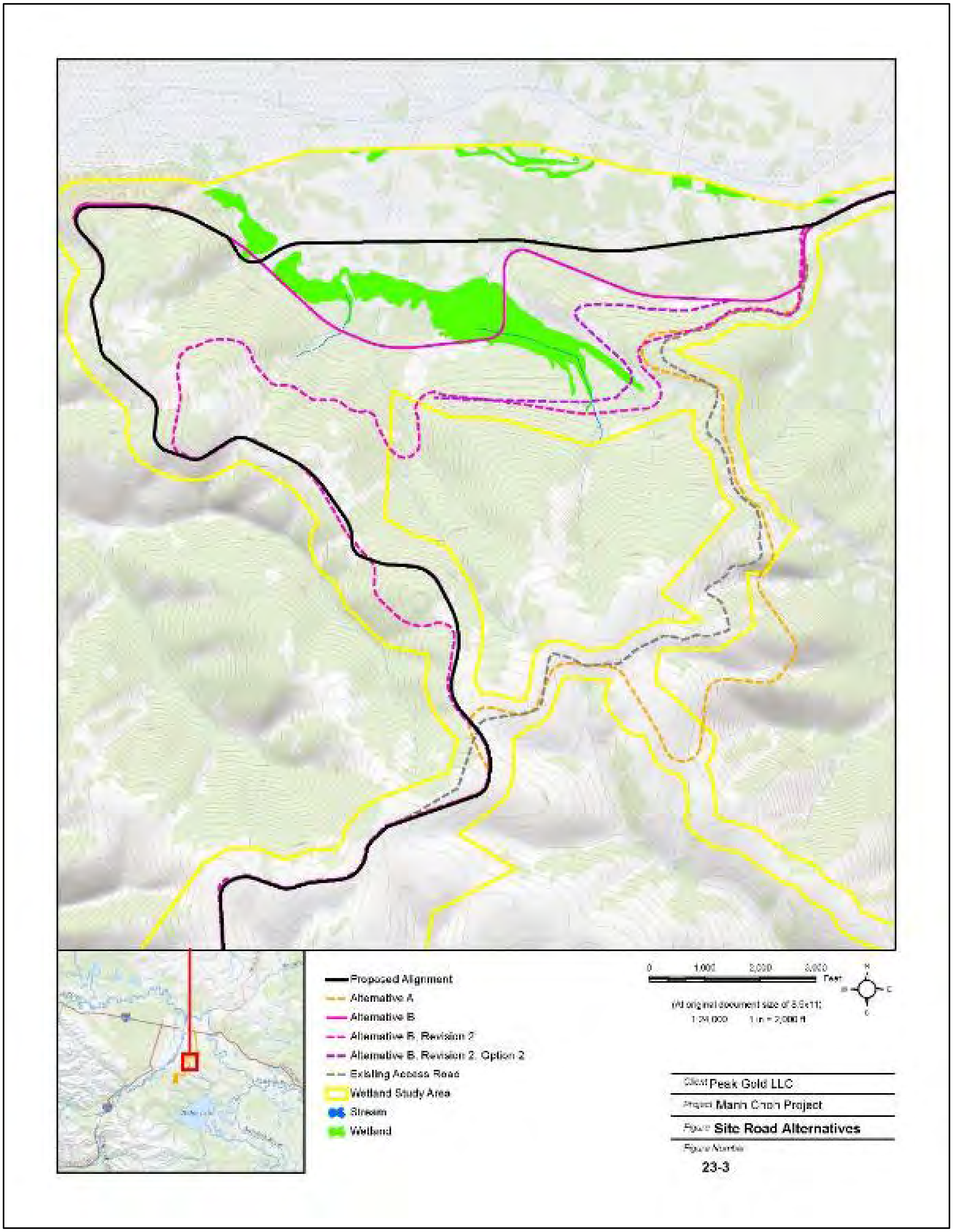
Alternative 4: Co-Use of Existing Tetlin Village Road (Stantec 2021b)

Under this alternative, the Project considered widening and co-locating mine traffic and village traffic 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 crucially would have negative potential life and safety impacts to Tetlin Village residents by increasing the potential for vehicle collisions.

Manh Choh Site Roads Refinements (Stantec 2021b):

After leaving Manh Choh Twin Road at mile post 5, alternative road routes were considered to create a safe access to the mine site from the base of the Tetlin Hills. From the base of the hills, the existing access road was considered too steep for haul trucks. Two alternatives were evaluated, Alternative A and B (Figure 8). Alternative A was also determined too steep for mining equipment and discarded. After field investigations, it was noted the Alternative B route would cross a wetland complex. Two revisions to Alternative B closer to the existing road were also investigated for aquatic resources; both crossed streams or swales. After further investigation along the base of the hill, the wetland team found that the larger valley terrace to the north was uplands and also found an upland corridor between two wetland complexes. This allowed for the road to run on level ground on the terrace before turning up the hillside through the upland corridor between wetlands. This resulted in a total impact to wetlands form the Manh Choh Site Road of 0.01-acre. The two revisions to Alternative B were discarded as the proposed route was shorter, avoided wetlands and cultural sites, and had less cut and fill than the revisions.

Figure 8. Manh Choh Site Road Alternatives (Stantec 2021b)



Resource Categories Alternative Analysis (Stantec 2021a):

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 5 provides a visual summary of the relative impact for each alternative and are specifically discussed in Appendix A of the Environmental Information Document (Stantec 2021a).

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

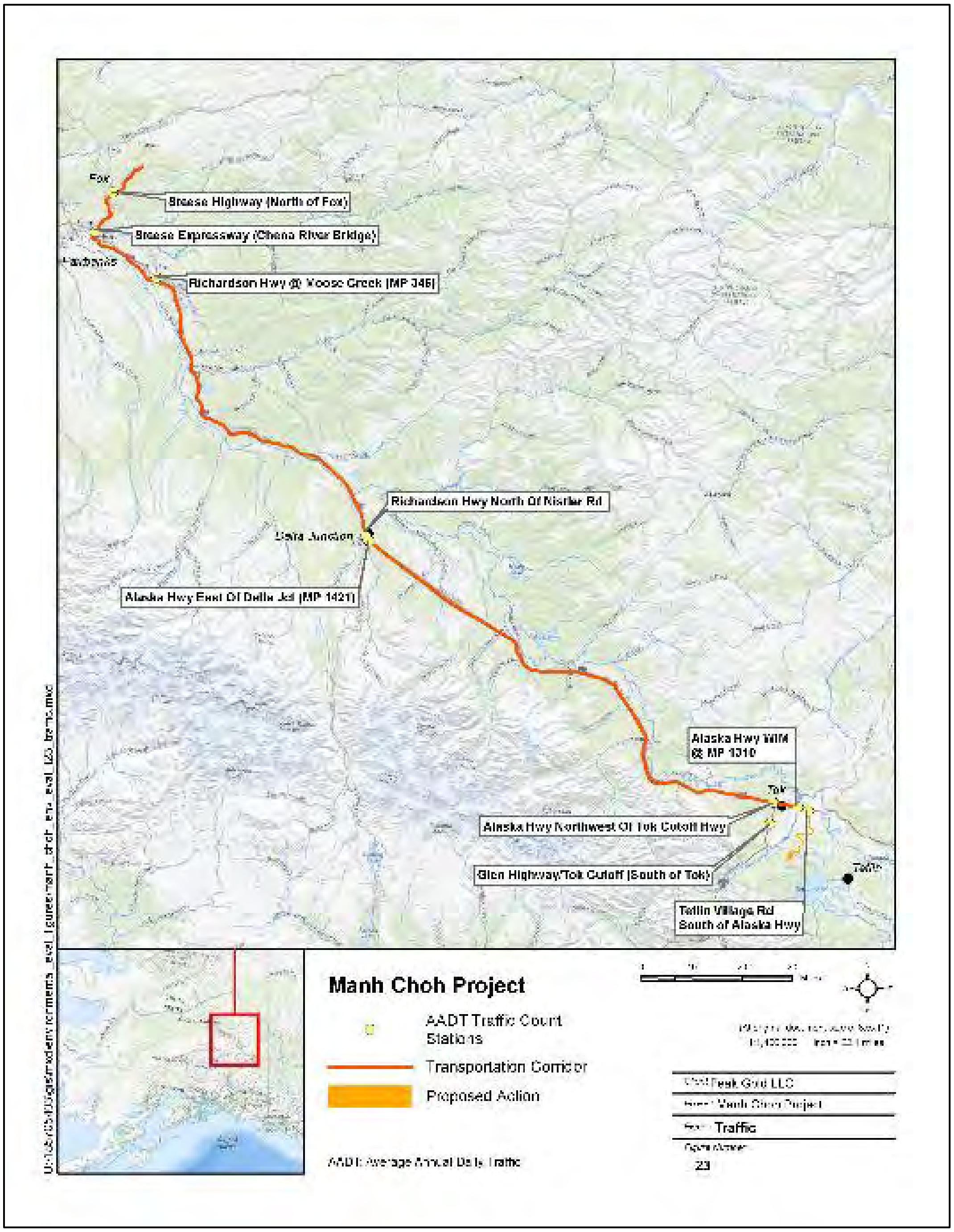
Table 5. Alternatives Impact Summary (Stantec 2021a)

	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*

<u>*Highway Transportation (Stantec 2021a)*</u>

The area of analysis includes the proposed Manh Choh Mine and the highway transportation route to Fort Knox (Figure 9). This area of analysis was chosen because it represents the area where the Proposed Action is most likely to affect the resource.

Figure 9. Ore Haul Route (Stantec 2021a)



Transportation routes for the Proposed Action include (Stantec 2021a):

- *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 6). 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 (Stantec 2021a).

Table 6. 2017 - 2020 Road and Traffic Characteristics (Stantec 2021a)

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)

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) (Stantec 2021a).

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 is listed in Table 7. 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 Manh Choh Project (Table 7).*

Table 7. Traffic Impacts (Stantec 2021a)

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 (Stantec 2021a).

During the Manh Choh Project, traffic will increase for the life of the mine. The transportation of mined ore material will occur on highways and access roads from Manh Choh Mine to Fort Knox, approximately 250 miles one way. The additional average annual daily trips (AADT) for the Manh Choh Project is up to 192 (i.e., 4 trips north, and 4 trips south, every hour) (Stantec 2021a).

The paved 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 7. The Project'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 Project (Table 7) except for the Tetlin Village Road. Due to the impact of the Tetlin Village Road, Peak Gold, LLC will be constructing the Twin Road to improve traffic safety and impact to the Tetlin Village Road (Stantec 2021a).

Ore will be transported on paved Alaska public highways by covered road- legal highway trucks. No federal, state, and local road-use permits (i.e., ADOT & PF, USACE, ADNR, ADEC) are required for road legal vehicles for transporting ore from the Manh Choh Mine to the Fort Knox Mine (Stantec 2021a).

Manh Choh Impact Summary (Stantec 2021a)

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.

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 8).

Table 8. Impact Definitions (Stantec 2021a)

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.*
	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).*

Table 9 summarizes the Manh Choh Project's potential impacts that range from negligible to minor.

Table 9. Impact Summary (Stantec 2021a)

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.

<u>Non-Issue Resource Categories</u>

Environmental consequences described are issues-based. This means only the resource categories anticipated to be affected by the Manh Choh Project 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 Stantec (2021a) analysis (Table 10).

Table 10. Non-Issue Resource Categories (Stantec 2021a)

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.*

EPA Comment 3 – Compliance with other Environmental Standards (40 CFR 230.10(b)

The Guidelines specify that no discharge of dredged or fill material shall be permitted if it causes or contributes, after consideration of disposal site dilution and dispersion, to violations of any applicable water quality standard or violates any applicable toxic effluent standard or prohibition under section 307 of the CWA.[17] This project has the potential to result in indirect and cumulative impacts to water quality in the Tok and Tanana River watersheds from the additional haul traffic, potential accidents involving mine ore, and fugitive dust from trucks, etc., which may contribute to exceedances of water quality standards related to metals. EPA recommends the applicant evaluate the risk of potential spills from trucks to wetlands and other WOTUS along the entire transportation network. We believe a project of this scale should include a thorough emergency response plan, complete with training, preparedness, and complete cleanup capabilities.

EPA expects the NEPA document for the project will evaluate information on impacted waters in the planning area, the nature of the impacts, and specific pollutants likely to affect those waters; how the proposed project will coordinate with on-going protection efforts; any mitigation measures required to be implemented to avoid degradation of waters; and how the project will meet the antidegradation provisions of the CWA. The Guidelines also prohibit degrading water quality within water bodies that are currently meeting water quality standards. Harmful compounds like mercury, arsenic, and acid can be present in mined rock and present risks for human health and environmental degradation. Geochemical testing of ore and waste rock should be used to identify potentially harmful compounds, and if present, these compounds should be managed to reduce risk to human health and the environment. Similarly, acid-base accounting should be completed to evaluate the acid generating potential of waste rock. Proposed waste rock piling is likely to result in weathering and leeching of harmful compounds into WOTUS. These toxic chemicals may pose a risk to human health by cumulatively biomagnifying throughout the food web and eventually affecting humans through consumption of subsistence foods. Ultimately, the project evaluation will need to clearly demonstrate that the project would not cause or contribute to further exceedances of water quality standards to comply with the Guidelines.

We note that the Corps has served as the lead federal agency for several proposed hard rock mine projects in Alaska. These projects include, but are not limited to, the following: Pebble Project, Donlin Gold Project, Greens Creek Mine, Red Dog Mine Extension – Aqqaluk Project, Pogo Gold Mine Project, and the Kensington Gold Project. The NEPA evaluations completed for these major federal actions established a precedent, which we recommend be considered in determining the appropriate level of NEPA review and documentation to evaluate the Clean Water Act Section 404 permit application for the proposed Manh Choh Mine.

Peak Gold Response 3:

Piteau Associates USA Ltd. conducted a hydrogeological characterization and groundwater modeling (Piteau 2021a) for the Manh Choh Project. Transient predictive simulations were developed to assess impacts to groundwater levels, flow, and water quality during operations and closure. Semi-annual stress periods were established to reflect wet and dry seasons for all predictive scenarios, which were simulated *by the seasonal application of recharge. Three transient flow models were developed to simulate three periods of mine development: dewatering of both open pits during operations, refilling of the backfilled North Pit while mining in the South Pit continues, and refilling of the South Pit and long-term closure (Piteau 2021a).*

Simulations were completed in MODFLOW-USG (USGS, 2013) to assess the potential for constituent transport due to groundwater flow at the reclaimed Manh Choh Pits post-closure. The transport model simulation includes a 300-year period following closure and reclamation of the mine site, to allow long-term simulation of constituent concentrations that may discharge to the headwaters (Piteau 2021a).

The closure model simulations indicate that all constituents will be below ADEC guideline values at groundwater discharge areas at 100 years post closure. Reducing the storage and porosity in the model generated the most significant effects to groundwater concentrations for sulfate, manganese, and selenium. The reduced storage generated an increased hydraulic gradient and greater transport velocities, resulting in greater mass transport. Despite the increased transport, the model shows that mixing will act to reduce concentrations in receiving streams to below the guideline values. Arsenic groundwater concentrations were most sensitive to the no-sorption case and remained well under the guideline values at the discharge point for all cases (Piteau 2021a).

<u>*Impacts to Water Quality*</u>

The CWA §401 Water Quality Certification submitted to the Alaska Department of Environmental Conservation (ADEC) and USACE on December 31, 2021, states, "The Manh Choh Project is on a ridge with mine facilitates located to avoid and minimize discharge to wetlands and streams. The minimal fill material placed into wetlands will be clean fill for construction of mine access roads and a diversion ditch. The fill material has been analyzed to ensure no contaminants are present. No fill will be discharged into open waters or flowing streams. The road material will be contained on site by construction placement and the use of on-site best management practices (BMPs). Waste rock has been analyzed and will be sorted. Historic exploration roads, trenches and surface disturbance has been encompassed into the design to reduce impacts." The Manh Choh §401 Certification Supplemental Data was also attached to the §401 Water Quality Certification submittal.

The §404 Wetlands Fill Permit Application Form 0710-003 states, "Mine planning and design maximized the use of uplands surrounding the mineral resource at the Manh Choh Project, to the greatest extent practicable to avoid wetlands. Mine Pit locations are fixed by resource location. Mine infrastructure will place fill material in wetlands for waste rock storage, diversion ditch, and access roads. All mine haul roads have been designed to meet Mine Safety and Health Administration safety requirements for grade, width and safety. The Manh Choh Twin Road will be constructed to provide safe and segregated travel conditions for mine and local traffic. The Project will be fully bonded for reclamation and closure with the State of Alaska." The §404 Permit Application Supplemental Information (Stantec 2021b) was also attached to the §404 Wetlands Fill Permit Application Form 0710-003 submittal.

Past, present, and reasonably Foreseeable Future Actions (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. 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 (Stantec 2021a).*

An extensive water quality study of the Manh Choh Project site was performed by Piteau Associates. Piteau Associates prepared the Manh Choh Project Hydrogeological Characterization and Groundwater Modeling Summary, December 2021 (Piteau Associates 2021a). The report was submitted to the USACE on December 31, 2021, with the §404 Permit Application. The summary report included the following study narratives:

- *Climate, Surface Water Hydrology and Water Quality*
- *Geology*
- *Hydrogeology*
- *Conceptual Groundwater Model*
- *Water Balance and Water Quality*
- *Groundwater Model*

Groundwater:

Groundwater quality sampling has occurred since 2016, for a total of 15 wells and one groundwater seep (Figure 10). 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. Average natural concentrations of antimony and arsenic, two constituents of concern above, exceed ADEC guidelines for wells at Manh Choh. 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 (Table 11) (Piteau Associates 2021a, Stantec 2021a).

Figure 10. Groundwater and Surface Water Monitoring Locations (Piteau Associates 2021a, 2021b)

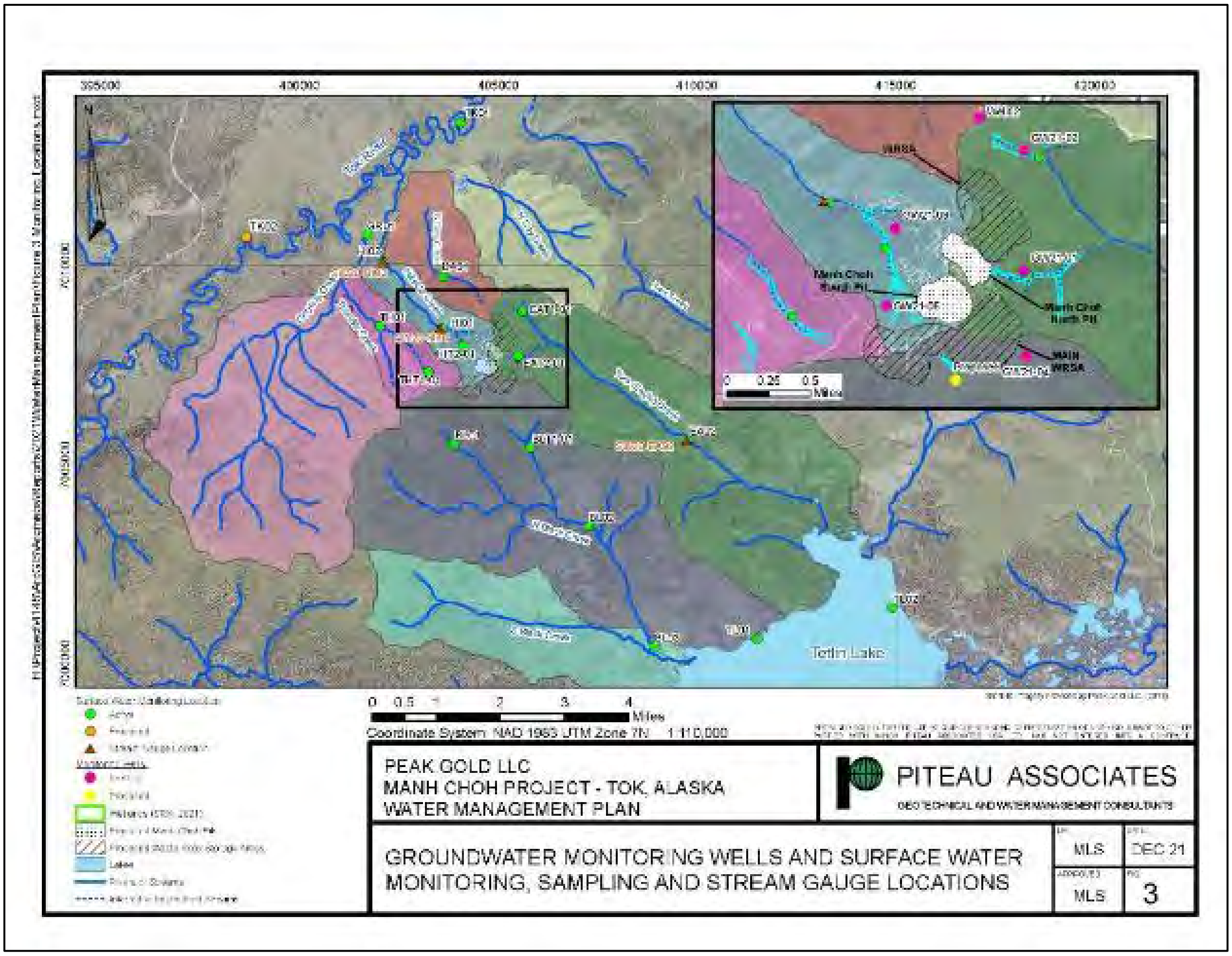


Table 11. Groundwater Monitoring: Count of ADEC Guideline Exceedance for Select Parameters (Piteau Associates 2021a, Stantec 2021a)

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		

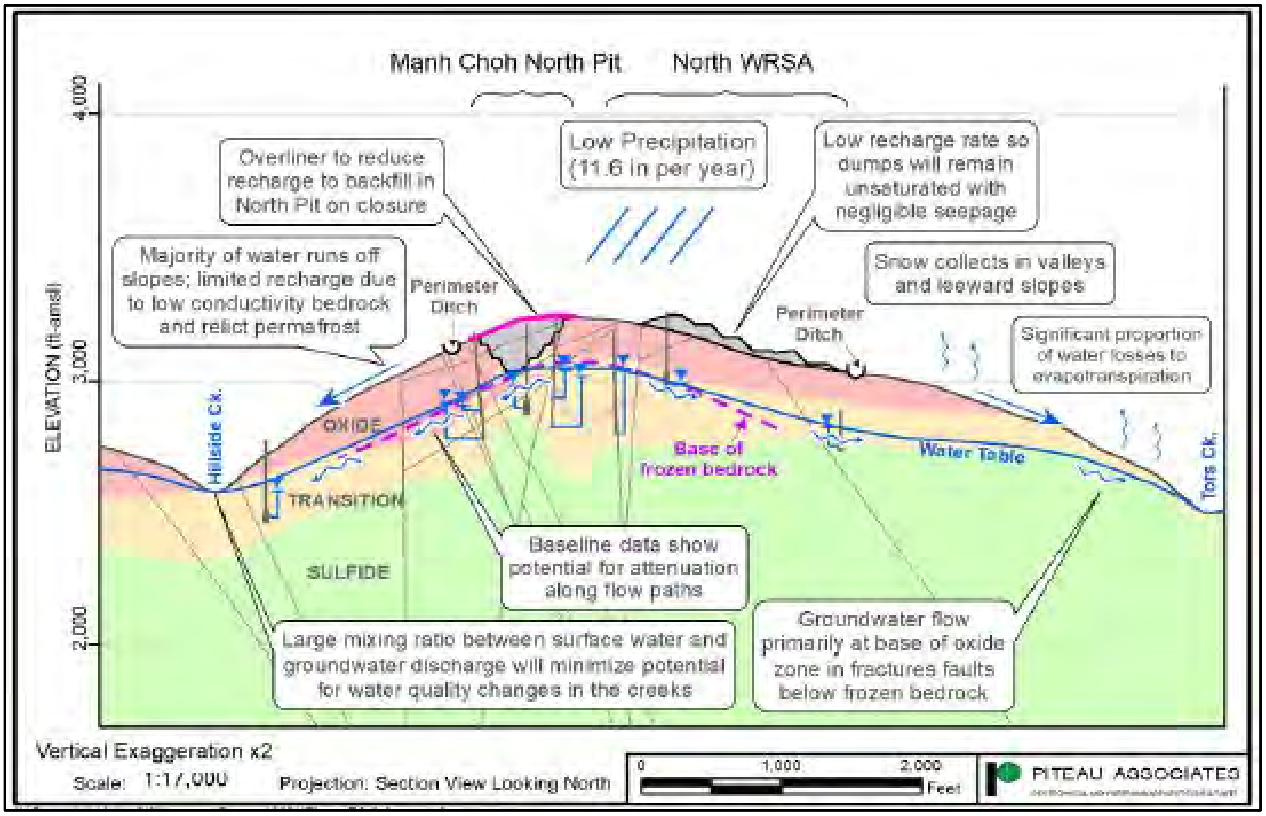
Source: Piteau Associates (2021)
Notes:
Al- aluminum; As- Arsenic; Sb- Antimony; Cu Copper; Cd-Cadmium; Fe-Iron; Pb- Lead; Mn- Manganese; WAD- Cy- Cyanide.
ADEC guidelines for Cd, Cu, Pd, Ni, Ag and Zn are hardness dependent and vary between locations, based on average hardness values
pH is a range between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

Arsenic and sulfate are two key naturally occurring constituents of concern identified which have contrasting behavior in water. 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. Comparing these can highlight the different processes in surface water and groundwater. Elevated arsenic in groundwater is consistently associated with elevated sulfate concentrations across the range of wells. In contrast, arsenic is relatively depleted versus sulfate in most surface waters. 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 2021a).

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. 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. Infiltration testing in shallow test pits around the Project has indicated that the shallow soils have low permeability and will form a good foundation for perimeter trenching to capture and convey water around site. The underlying weathered bedrock is seen to be permeable and would readily accept water from infiltration basins excavated to a deeper level, after removal of the fine-grained soil cover (Piteau Associates 2021a).

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. The low rates of groundwater inflow to the pits, low bedrock hydraulic conductivity and deep-water table mean that drawdown is expected to be limited to the local areas of the pit walls. The conceptual groundwater model is presented in Figure 11 (Piteau Associates 2021a).

Figure 11. Hydrogeology Model Cross Section (Piteau Associates 2021a, 2021b)



The goal for mine closure is to keep potentially metal leaching waste rock in North Pit dry and to keep potentially acid generating waste rock in South Pit submerged. Backfill in North Pit will be placed above the predicted post-closure water table. The current plan is to place an over-liner above the North Pit backfill such that post closure infiltration is negligible (Piteau Associates 2021a)

A groundwater and solute transport model has been constructed to help optimize the closure plan. The model predicts post-closure water elevations in North Pit can be maintained below about 2940 ft above mean sea level (ft-amsl), so most of the backfill material will remain above the water table, and any downgradient seepage will be negligible (Piteau Associates 2021a).

A program of enhanced filling with water is planned for the South Pit to minimize the time the backfill remains unsaturated. Water for the enhanced filling program will be derived from the on-going water management infrastructure, supplemented by pumping from the existing water supply wells, as required. The model predicts that post-closure water levels in South Pit can be maintained above 2965 ft-amsl, so the reclaimed backfill will remain submerged (Piteau Associates 2021a).

Mass transport model simulations indicate that dissolved constituents that could percolate from the South Pit backfill will undergo downgradient mixing with other groundwater local to the pit. Concentrations of non-conservative constituents such as arsenic will reduce along the groundwater flow paths due to *sorption and other natural attenuation processes identified in baseline water quality data. The model indicates that virtually all parameters in the downgradient headwaters will be below the ADEC guideline values. Manganese could exceed its guideline value in the Hillside Creek headwaters after 180 years during dry months when creek flows are fed by minor groundwater discharge, but much of this is likely to be lost to evapotranspiration around the margins of the creek during the summer months. 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 2021a)*

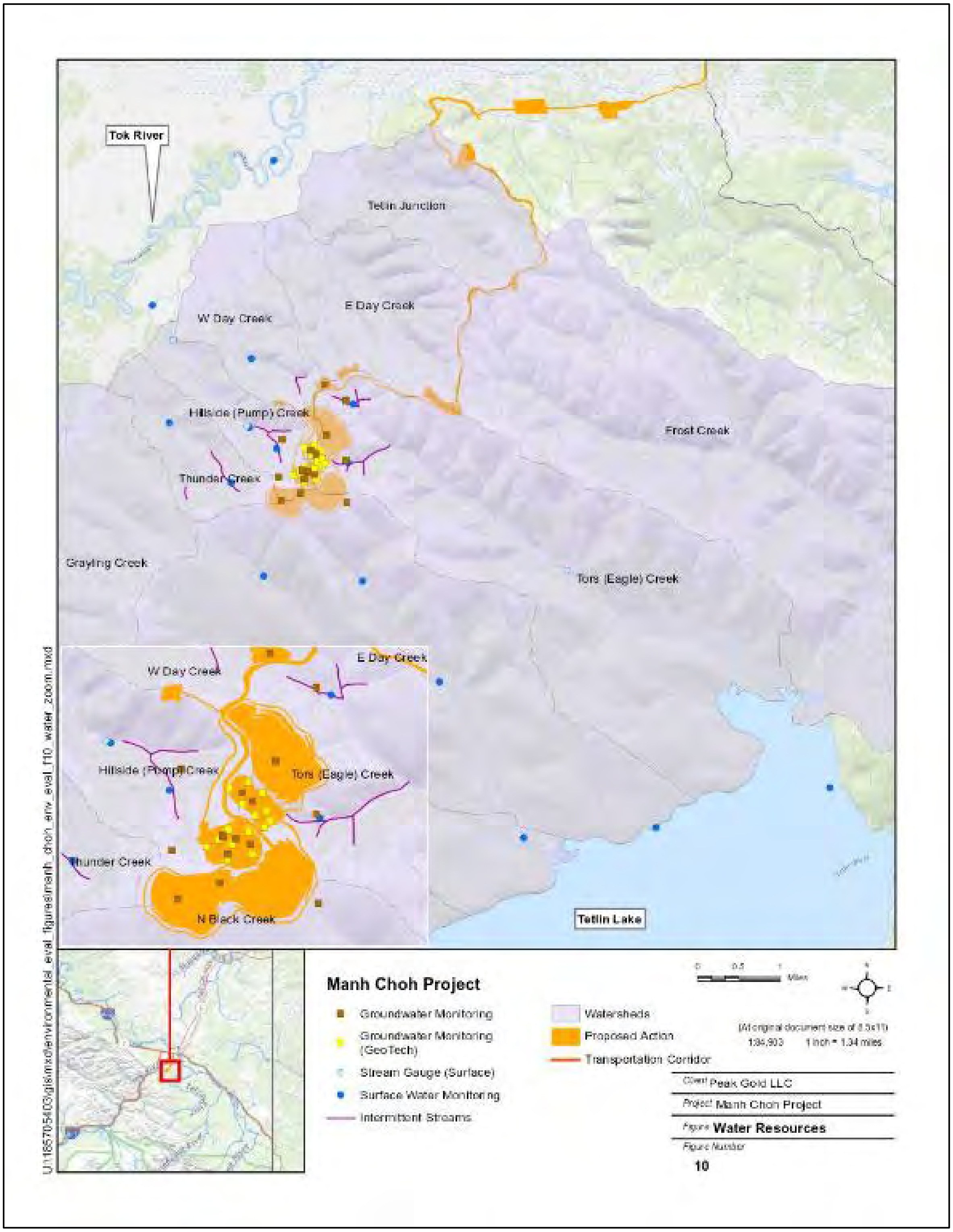
During mine operations, bedrock groundwater levels will be monitored by an array of grouted-in vibrating wire piezometers and monitoring wells completed around the perimeter of the facility. Surface water monitoring will use the baseline stations, with roughly the same monitoring and sampling schedule. Monitoring objectives during operations are to assess: (i) downgradient water quality in the project area streams, (ii) whether groundwater drawdown remains local, as predicted, (iii) pore pressures for slope stability monitoring, (iv) the overall performance of the water management plan, including any water that is infiltrated, and (v) continued refinement of the conceptual hydrology and water quality models. (Piteau Associates 2021a)

Surface Water:

Surface water monitoring data is available from 19 sites around Manh Choh since 2012 (Figure 12). Stream discharge is perennial in all catchments. 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. Baseflows range between approximately 10 gallons per minute (gpm) and 100 gpm, depending on location within the catchment (Piteau Associates 2021a).

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

Figure 12. Groundwater and Surface Water Monitoring Locations (Stantec 2021a)



KINROSS Manh Choh
A JV with Contango ORE

Table 12. Surface Water Monitoring: Count of ADEC Guideline Exceedance of Select Parameters (Piteau Associates 2021a, Stantec 2021a)

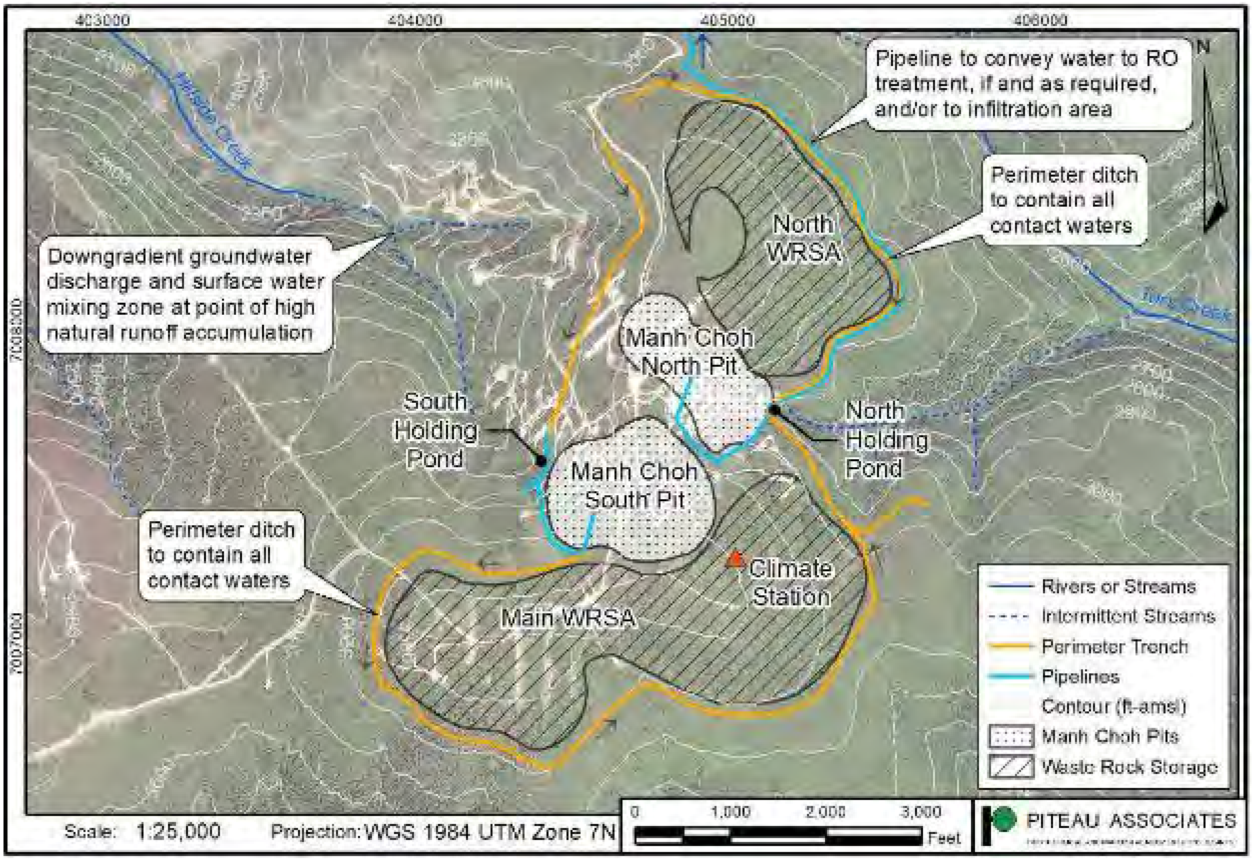
Basin	Catchment	Station	Number of Samples	pH	Alkalinity	Al	As	Cd	Cu	Fe	Pb	Mn	Hg	Ni	WAD-Cy
Tetlin	Tors (Eagle) Creek	EAT1-01	13	1		7				7		11			1
		EAT2-01	10	1	2	9	7	3	2	3	8	3			1
		EA02	17	4		1						1			
	Black Creek	BLT01-01	12	2		1						1			
		BL01 (BLT02-01)	17	6	1	7		1	1	3	2	3			
		BL02	15	4		3				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.

From the Hydrogeological Characterization and Groundwater Modeling Summary, Piteau Associates developed the Manh Choh Project Water Management Plan, December 2021 (Piteau Associates 2021b). The Water Management Plan was submitted to the USACE on December 31, 2021, with the §404 Permit Application. The Water Management Infrastructure layout is shown in Figure 13. The specific goals of the Water Management Plan are to;

- *Contain contact surface water during operations and into early closure;*
- *Retain water within it natural catchments wherever possible;*
- *Return the site to conditions consistent with its natural state after closure, and;*
- *Minimizing the long-term exposure of waste rock to the local environment.*

Figure 13. Layout of Manh Choh Facilities and Water Management Infrastructure (Piteau Associates 2021a, 2021b)



<u>*Geochemical Testing of Ore and Waste Rock*</u>

The following geology and geochemical analysis and language was completed by SRK Consulting (2021a & 2021b) and was included in the Environmental Information Document prepared by Stantec (2021a). Mining of the South and North Pits will generate waste rock and ore.

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).

Ore:

The ore is potentially acid generating (PAG) and non-acid generating (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).

Waste Rock:

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

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 SRK Consulting 2021a).

Analysis of 96 waste rock samples showed that 83% of all oxide materials are classified as potentially acid generating (PAG) and there is a potential for rapid onset of acidification of PAG in 35% of the QMS oxides and 68% of the skarn oxides. The transition and sulfide materials are not likely to generate rapid onset PAG but there is still potential for acid generation in the longer term; 44% of the QMS sulfides and 74% of the skarn sulfides are classified as PAG. All types of waste rock showed 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. Other parameters which were elevated in at least some of the waste rock samples were: silver, cadmium, cobalt, copper, lead, selenium. Highest concentrations were typically reported in the skarns. Some of the oxide materials demonstrated acidic conditions in the initial stages of humidity cell testing. The leachates from the majority of sulfide materials were circum-neutral for 117 weeks but one of the QMS sulfides is trending towards acidic conditions. Arsenic was consistently mobilized in all humidity cells (SRK Consulting 2021a).

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 will be managed so that PAG and/or ML are not released during the active operations of the mine (SRK Consulting 2021a).

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. Other parameters found to be elevated in at least some of the waste rock samples were Ag, Cd, Co, Cu, Pb, Se. Highest concentrations were typically reported in the skarns(SRK Consulting 2021a) .

The geochemical characterization test work available to date was used to develop recommendations for block model parameters used to predict the domains for waste rock management (SRK Consulting 2021a).

Site specific neutralization potential / acid generating potential (NP/AP*) ratios were developed for oxide and sulfide material. Oxide materials may generate acidity at low sulfur content and should therefore be classified using NP*/AP* only but sulfide and transition waste should be classified on NP*/AP* and sulfide* *content because at low sulfur concentrations, oxidation of small concentrations of sulfide produces low amounts of acid that can be readily neutralized by silicate minerals in addition to carbonate (SRK Consulting 2021a).*

Thresholds for high and low metal leaching were developed for oxide and sulfide materials based upon As/S molar ratios. Arsenic is identified as a parameter of concern and the expectation is that arsenic mobility will be different for sulfide and oxide materials due to a difference in mineralogical hosts. The molar ratios were developed using the relationship between As/S in solids and the rate of arsenic leaching indicated by humidity cell tests (SRK Consulting 2021a).

Source terms were developed in consultation with Piteau who are responsible for the site wide water quality model. The sources are(SRK Consulting 2021a):

- *Runoff from waste rock dump surfaces during snowmelt;*
- *Runoff from waste rock dump surfaces during summer rainstorms;*
- *Waste rock dump porewaters;*
- *Pit backfill pore waters;*
- *Pit wall runoff; and*
- *Infrastructure fill pore waters.*

The source term concentrations should be viewed as "screening level" to evaluate project water quality effects against water quality standards. The results are not geochemical predictions (i.e., they are not ion balanced) (SRK Consulting 2021a).

A number of input values were used; specific values were provided by Piteau and Peak Gold, LLC, and generic values were based on professional experience. Average rates from humidity cell tests (Table 13) were used to calculate a range of non-acidic weathering rates based on the assumption that wastes will be managed to prevent the onset of acidification, or that mining will result in locally acid generating materials becoming mixed. Selected analog concentrations are used for certain parameters and it is intended that these values will be replaced with site specific knowledge as leach tests and on-site kinetic tests are monitored (SRK Consulting 2021a).

Table 13. Summary of Mineralogy Waste Rock Results in Humidity Cells (SRK Consulting 2021a)

Mineral Group	Minerals (wt. %)	HC-01	HC-02	HC-03	HC-04	HC-05	HC-06	HC-07	HC-08	HC-09	Manh Choh HC-1	Manh Choh HC-2	Manh Choh HC-3	Manh Choh HC-4	Manh Choh HC-5	Manh Choh HC-6	Manh Choh HC-7
		Skarn Sulfide North Pit	Skarn Sulfide South Pit	Skarn Sulfide South Pit	Skarn Sulfide South Pit	QMS Oxide South Pit	QMS Sulfide South Pit	QMS Sulfide South Pit	QMS Sulfide South Pit	QMS Oxide North Pit	Skarn Oxide North Pit	Skarn Oxide North Pit	Skarn Oxide South Pit	Calc-Schist Oxide North Pit	QMS Oxide South Pit	Calc-Schist Sulfide North Pit	Skarn Sulfide South Pit
		TA7642	PK19001	PK19002	TA7158	PK19004	PK19005	TA7638	TA7632	TA7154	ZS8665	ZS8666	ZS8667	ZS8668	ZS8669	ZS8670	ZS8671
Sulfide Minerals	Chalcopyrite	0.05	0.4	0.05	0.01	0.02	0.02	0.01	0.01	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.61
	Sphalerite/Galena	0.01	0.01	0.01	-	0.01	-	-	0.01	0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	Pyrite/Marcasite	1.2	2.6	0.7	0.2	0.6	0.2	0.2	0.09	2.0	<0.1	<0.1	<0.1	<0.1	<0.1	0.11	1.16
	Pyrrhotite	0.3	0.41	1.0	0.1	0.3	-	0.2	0.05	0.6	<0.1	<0.1	<0.1	<0.1	0.27	0.03	14.01
	Arsenopyrite	0.05	-	-	-	-	-	0.1	-	-	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.36
	Total Sulfides	**1.6**	**3.4**	**1.7**	**0.4**	**1.1**	**0.2**	**0.5**	**0.2**	**2.7**	**0.0**	**0.0**	**0.0**	**0.0**	**0.3**	**0.2**	**16**
Bulk Silicate Minerals	Quartz	24	46	42	52	45	23	32	28	24	27	33	36	32	45	36	27
	K-Feldspars	16	18	15	3.2	8.5	38	8.8	2.9	23	27	7.0	19	25	8.4	6.9	24
	Plagioclase Feldspar	20	4.6	17	12	15	12	27	16	13	6.3	4.1	16	3.2	7.2	3.6	5.0
	Amphibole (Actinolite / Ferro-Actinolite)	3.3	1.1	3.0	1.3	3.4	4.7	2.7	0.2	5.4	0.8	1.7	2.4	0.2	0.3	0.4	2.7
	Pyroxene (Diopside)	0.2	0.3	0.2	0.3	0.3	0.6	0.4	0.1	0.5	-	-	-	-	-	-	-
	Epidote	-	-	-	-	-	-	-	-	-	0.5	0.5	1.0	0.0	0.1	0.1	2.6
Clay/Mica Minerals	Chlorite / Clinochlore / Chamosite	8.8	6.6	4.8	5.9	4.7	4.5	7.1	12	7.8	9.6	23	6.5	8.3	11	9.8	7.6
	Kaolinite (clay)	0.6	0.9	0.1	0.3	0.2	0.3	0.2	0.6	0.1	3.6	0.6	2.4	4.3	0.6	0.7	0.2
	Muscovite/Illite	11	10	4.8	19	16	7.5	11	34	11	19	13	10	23	23	31	7.1
	Biotite/Phlogopite	2.2	0.3	0.4	1.9	2.2	2.7	1.9	1.6	1.6	3.1	2.6	2.0	1.1	1.1	0.9	1.7
Phosphate Minerals	Apatite	-	-	-	-	-	-	-	-	-	0.2	0.4	0.2	0.03	0.2	0.1	0.1
Carbonate Minerals	Calcite/Dolomite	1.2	4.8	1.8	1.0	0.4	2.7	2.6	-	3.7	0.03	0.02	-	0.04	0.01	6.6	2.6
Others	Iron Oxides	1.9	1.0	0.2	0.3	0.4	0.7	0.5	0.2	1.5	1.7	1.3	0.9	2.1	2.3	3.4	1.4
	Almandine	2.9	1.6	1.9	1.4	1.5	1.2	2.6	1.7	2.5	-	-	-	-	-	-	-
	Sphene/Titanite	1.4	0.7	7.4	0.8	1.1	1.3	1.5	0.9	1.7	1.0	0.3	1.0	0.3	0.6	0.2	1.1
	Others	1.4	0.6	0.5	0.3	0.6	0.3	0.5	0.5	1.2	0.1	0.3	0.2	0.1	0.1	0.3	1.0

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

Waste Rock Dump Design:

The current mine schedule targets an average mining rate of approximately 40,000 tpd of total material that would be mined by bulk open pit mining methods. Waste rock alone would be extracted from the open pits at an average mining rate of 35,000 tpd. This mining rate is subject to change based on operational considerations during the life of the project (SRK Consulting 2021b).

The key to the success of this WRMP would be the identification of the various material types in the field and at the active mining face. This approach would require a material identification system that is built into the ore control system. Sources of information include (SRK Consulting 2021b):

- *Daily survey control.*
- *Maintaining an up to date 3-D block model.*
- *Blasthole sampling and logging to assist in this waste characterization.*
- *Possibly bench face sampling including mapping and visual inspections.*

Blasthole cuttings would be collected during drilling operations for analysis. The number of blasthole samples collected would depend on the geologic conditions within the blast area and the blasthole pattern and will be defined as needed to set dig limits. These samples would be submitted for ABA testing and calculation of NP/AP*. The sampling and testing would be completed on the same schedule as ore determination in order to be effectively included in the short-term mine planning process (SRK Consulting 2021b).*

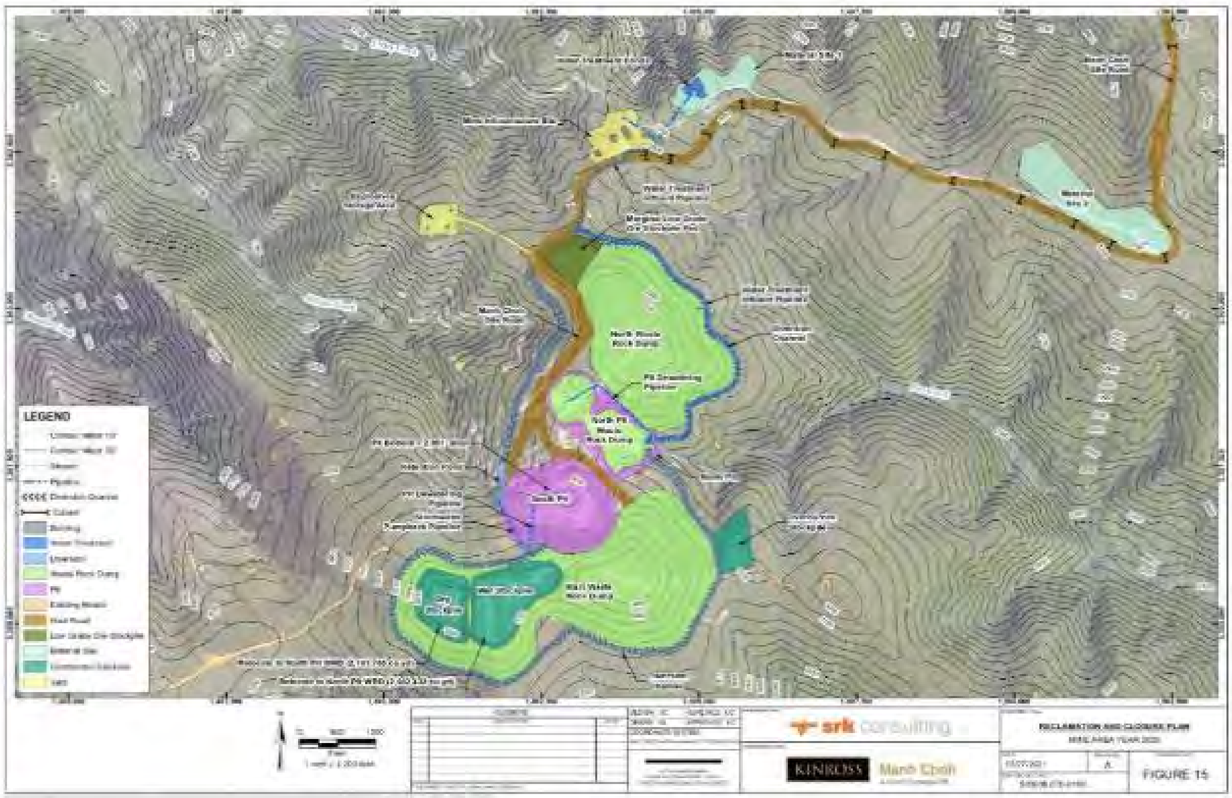
The resulting information would be used to assign material types to the areas of the active bench. Each area would be assigned a destination code based on classification of the material. An automated routing and tracking system would be used that integrates the ore control data with a global positioning system (GPS)-enabled loading and hauling fleet to route and track material. Each of the shovels working in ore and waste at the proposed Manh Choh Project would be equipped with GPS positioning to allow real-time updates of the digging face in relation to ore grades and waste rock types (SRK Consulting 2021b).

An electronic map would be developed by the short-range planner to differentiate between the ore and waste types. This electronic map would be available to the shovel operator in real time via an on-board computer screen so the type of material loaded into the truck would be always known. When equipment is loading from a particular area, a code would be assigned to the truck being loaded and the designation would appear on the operator's screen. The system would record the volume of each waste rock type mined during each shift and its ultimate destination. This mining methodology would ensure that ore and waste rock types are mined and delivered to the correct location(SRK Consulting 2021b).

The waste rock would be routed to one of nine destinations (SRK Consulting 2021b) (Figure 14):

- *North WRD*
- *Main WRD*
- *Waste rock stockpile dry disposal*
- *Waste rock stockpile wet disposal*
- *Overburden stockpile*
- *Manh Choh North Pit Backfill Dry*
- *Manh Choh North Pit Backfill Submerged*
- *Manh Choh South Pit Backfill Dry*
- *Manh Choh South Pit Backfill Submerged*

Figure 14. Mine Facility Locations (SRK 2021b)



The estimated tonnage by facility is summarized in Table 14 and taken from the WRMP.

Table 14. Waste Rock Tonnages by Facility (SRK Consulting 2021b)

Waste Rock Classification	Tonnages by Facility (Maximum Inventory)										
	Waste Rock Stockpile "Dry Disposal - Rehandled"	Waste Rock Stockpile "Wet Disposal - Rehandled"	Main WRD¹	North WRD	Overburden Stockpile	Manh Choh North Pit Backfill Dry	Manh Choh North Pit Backfill Wet	Manh Choh South Pit Backfill Dry	Manh Choh South Pit Backfill Wet	Manh Choh South Pitwall Backfill²	Roads and Infrastructure
Sulfide PAG	0	2,733,723	0	0	0	173,644	0	0	2,733,723	0	0
Sulfide Rapid Onset PAG	0	18,674	0	0	0	67	0	0	18,674	0	0
Sulfide NAG High Metals	0	0	0	0	0	174,051	0	0	0	0	0
Sulfide NAG Low Metals	0	0	565,441	477,916	0	0	36,123	0	0	196,704	0
Transition PAG	314,745	4,010,346	0	0	0	3,530,000	0	0	4,010,346	0	0
Transition Rapid Onset PAG	0	312,417	0	0	0	95,331	0	0	312,417	0	0
Transition NAG High Metals	329,165	0	0	0	0	1,405,718	0	0	0	0	0
Transition NAG Low Metals	0	0	2,726,755	803,076	0	0	597,031	0	446,436	1,058,397	44,960
Oxide PAG	1,334,842	0	1,779,014	660,412	0	3,190,544	0	0	0	533,145	0
Oxide Rapid Onset PAG	363,868	0	3,941,391	1,064,151	0	661,158	0	0	0	1,174,265	0
Oxide NAG High Metals	1,377,154	0	0	0	0	1,743,667	0	0	0	0	0
Oxide NAG Low Metals	0	0	6,849,597	2,555,153	0	0	1,226,921	0	1,041,683	2,920,037	2,613,508
Overburden	0	0	0	0	611,646	0	0	0	0	0	0

Source: Kinross

¹Approximately 1.5 Mt of waste rock from Main WRD is rehandled into the Manh Choh South Pit buffer zone at closure. The material will comprise Transition NAG Low Metals and Oxide NAG Low Metals.

²An additional 5.5 Mt of waste rock from Main WRD is rehandled to the Manh Choh South Pit to slope down the exposed pit walls for closure.

Spill Prevention and Response

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. Manh Choh 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 (Stantec 2021a).*

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 (Stantec 2021a).

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 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 (Stantec 2021a).

Manh Choh Project:

In accordance with 40 CFR §112.8, the Manh Choh Project will require a Spill Prevention, Control, and Countermeasures Plan (SPCC) for managing oil pollution prevention. The SPCC for the Manh Choh Project has not been developed at this time; however, it will be developed and implemented before construction and mining activities begin in accordance with 40 CFR §112 requirements. Currently, the Manh Choh Exploration Project has an implemented SPCC which complies with the 40 CFR §112 requirements.

The Manh Choh Project will also require spill prevention and response procedures in accordance with the Alaska Pollutant Discharge Elimination System (APDES) Multi-Sector General Permit for Storm Water Discharges Associated with Industrial Activity (MSGP) Permit Number AKR060000, Section 4.2.4. Section 4.2.4 states, "A permittee must minimize the potential for leaks, spills and other releases that may be exposed to storm water and develop plans for effective response to such spills if or when they occur. At a minimum, the permittee must implement…" Spill prevention and response procedures are identified in the Storm Water Pollution Prevention Plan (SWPPP) as specified by MSGP Permit Number AKO60000, Section 5. The MSGP SWPPP for the Manh Choh Project has not been developed at this time; however, it will be developed and implemented before mining activities begin at the Manh Choh Mine. The SWPPP will also include the Manh Choh Site Road and Twin Road.

Prior to mining activities at the Manh Choh Project, construction activities will be required to have spill prevention and response procedures in accordance with the APDES General Permit for Discharges from Large and Small Construction Activities (CGP) Permit Number AKR100000, Section 4.8. Spill prevention and response procedures are identified in the SWPPP as specified CGP Permit Number AKR100000, Section 5.3.6.7. The CGP SWPPP has not been developed at this time; however, it will be developed and implemented before construction activities begin at the Manh Choh Mine, Site Road, and Twin Road.

Currently, the Manh Choh Exploration Project has an implemented SWPPP which complies with the MSGP Permit Number AKR60000, Sections 4.2.4 and 5 requirements.

The Manh Choh Project will require an Emergency Response Plan (ERP) in accordance with Kinross Environmental Management System (EMS) Standard 4.1, Environmental Emergency Preparedness. The Manh Choh ERP has not been developed at this time; however, it will be developed and implemented before mining activities begin at the Manh Choh Project. The Manh Choh ERP will be developed in accordance with federal and state requirements with respect to emergency preparedness and spill response, including 40 CFR §262.16, 40 CFR 279.22, 40 CFR 112, and 30 CFR. The ERP will include requirements for Manh Choh Project contractors.

Ore Transportation on Public Highways

Peak Gold will contract an ore hauling transportation company capable of safely transporting ore between the Manh Choh Mine and Fort Knox Mine. The transportation company will develop and implement an ERP that will specifically address Manh Choh ore transportation for spill prevention and response procedures (regardless of the type of incident). The contractor will coordinate with Peak Gold during development of the ERP and will provide its ERP to Peak Gold for implementation into the Manh Choh Project emergency management system.

EPA Comment 4 – Significant Degradation – 40 CFR 230.10(c)

The Guidelines prohibit issuance of a CWA Section 404 permit if project activities will cause or contribute to significant degradation of the Nation's waters including degradation to: (1) human health and welfare; (2) aquatic life and other wildlife: (3) aquatic ecosystem diversity, productivity, and stability; and (4) recreation, aesthetic, and economic values. The Guidelines require the prediction of cumulative effects to the extent reasonable and practical.[18] The Guidelines also require that information about secondary effects on aquatic ecosystems be considered. Secondary effects are the effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials but do not result from actual placement of the materials.[19]

As mentioned previously, the PN does not disclose the impacts on WOTUS from the operation of the facility, notably the effects from the facility operating potentially 24 hours a day, with constant transport of ore via truck on gravel roads. EPA has concerns that the future and cumulative impacts of relying on public highway transit has not been evaluated for potential negative impacts. The PN does not mention the planned haul route or provide details for the transportation of ore being hauled to Fort Knox for processing. EPA recommends including details related to the current traffic load and predicted mine traffic on the public highways between the mine and processing sites for both the near-term construction and long-term operation and maintenance. Increased traffic with mine haul trucks would increase noise for residents and migratory birds, the potential for vehicle accidents, and impacts to WOTUS near the roads from fugitive dust. Additionally, the highway infrastructure would require maintenance and potentially upgrades during operation, which may increase in frequency and need due to the proposed hauling. The applicant's current proposal does not reflect these expected connected actions.

EPA recommends that additional analyses of these potential impacts be conducted to determine the significance of the direct and secondary impacts on the natural and human environment. At a minimum, an appropriate analysis of the cumulative effects of increased highway traffic and WOTUS near the haul route in the project area should be performed to assess the significance of their effects in this section of Tok and Tanana River watersheds. Given the potential for water quantity and quality impacts to occur to the nearby aquatic systems (e.g., effects on in-stream water quality parameters from fugitive dust such as turbidity, dissolved oxygen, removal of foraging habitat, etc.,), impacts to listed salmonids and other aquatic organisms that utilize the area should be evaluated and disclosed.

EPA also has concerns about the impacts related to the construction of the two new gravel roads to access the mine site. Based on our review of the PN, it is unclear if the applicant has identified or addressed potential impacts from periodic maintenance activities or how many culverts will require construction and maintenance to maintain hydrology of the area. The long-term analysis of such an action should include contingencies for any repair or emergency activities within regulated aquatic environments.

Executive Order 13990, Section 5. Accounting for the Benefits of Reducing Climate Pollution requires federal agency actions to evaluate the full cost of GHG emissions by accounting for global damages to facilitate sound decision-making, which directly relates to the NEPA compliance process. On February 26, 2021, the Interagency Working Group (IWG) on the SC-GHG published the *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide*, which identified the interim social cost of carbon to be $51.00. [20] This interim value should be used by agencies when monetizing the value of changes in GHG resulting from federal actions. EPA recommends that the Corps provide estimates of the monetized damages associated with incremental increases of GHG emissions to include the SC- GHG consistent with this technical support document for this project in the NEPA analysis. We recommend discussing the effects that the project may have on its local environment regarding climate change, whether the project will exacerbate or protect local resources from the future effects of climate change. Predictions of GHG emissions during operations should include the entire transportation network, including, trains, trucks, etc. travelling to and delivering ore and fuel and other materials to and from the facility.[21]

EPA recommends that the NEPA document for this project include a discussion of effects that changes in the climate may have on the proposed project and the project area, including its long-term infrastructure. Such an analysis could help inform the development of measures to improve the resilience of the proposed project. If projected changes could notably exacerbate the environmental impacts of the project, EPA recommends these impacts also be considered as part of the NEPA analysis. Wetlands that rarely dry out are expected to shift to more frequent drying in some areas, and wetlands that currently are frequently dry may be lost in some areas.[22] In other areas where precipitation is expected to increase or the timing is expected to change, wetlands that occasionally dry out may become wetter.[23] It is important to evaluate how the mitigation area and associated wetlands will be constructed with respect to localized climatic changes over time.

Peak Gold Response 4:

Ore Transportation on Gravel Roads

No streams are being crossed by the Manh Choh Twin Road or the Manh Choh Site Access Road as shown on the figures of Appendix 1. Neither road crosses a perennial, intermittent or ephemeral stream. No access roads to any gravel pits, lay down areas, or mine facility cross a stream. The Alaska Highway system roads from the intersections of the Alaska Highway and the Tetlin Village Road and Twin Road to the intersection of the Steese Highway and the existing Fort Knox Mine access road are paved (not gravel roads) and do not produce dust from highway traffic. Therefore, the §404 Permit Application, §404 Permit Application Supplemental Information (Stantec 2021c), and the Environmental Information Document (Stantec 2021a) does not address direct and secondary impacts on the watersheds of the Tok and Tanana Rivers since the paved Alaska highways are not gravel. However, loaded highway trucks will be covered to minimize dust emissions (Stantec 2021a).

Peak Gold actively worked to address potential secondary impacts on water quality from gravel access roads into the project design, construction, and maintenance. The design, construction, monitoring, and maintenance will together minimize impacts to nearby aquatic areas. Road design and construction will minimize risk of erosion. Roads were routed specifically to avoid impacts to wetlands and other water bodies. Monitoring by Alaska Certified Erosion and Sediment Control Lead (CESCL) personnel (CGP Permit AKR100000, Appendix C, Qualified Person) will ensure any potential issues are identified and addressed promptly. Contingencies such as grading, material pickup, and implementation of new BMPs are available to address potential erosive conditions if required.

Design:

The project incorporated erosion and sedimentation controls into the project design. The roads were routed specifically to avoid impacts to wetlands and other waterbodies. Road side slopes, material composition, and design features have been specifically designed to minimize erosion from the road prism.

Erosion and sedimentation are also actively managed throughout Alaska by the Alaska Pollutant Discharge Elimination System (APDES) permit system (Multi-Sector General Permit for Storm Water Discharges (MSGP) Permit AKR60000 and General Permit for Discharges from Large and Small Construction Activities (CGP) Permit AKR100000) and Storm Water Pollution Prevention Plans (SWPPP). The Manh Choh's exploration project currently operates under MSGP Permit AKR60000 Authorization Number AKR06GA93. The project will apply for a CGP for construction, and an MSGP for operation. The existing SWPPP will be amended and implemented for the Project's mining activities and will include potential pollutant sources, storm water control measures (e.g., storm water retention basins, ditch check dams, interception and diversion ditches, water bars, brush berms, surface grading), schedules and procedures for monitoring, with associated maps and figures. These plans will be prepared and implemented to control erosion and sedimentation during construction activities.

Construction and Operation:

During construction activities, Peak Gold plans to suppress erosion and sedimentation by selecting these Best Management Practices (BMPs) in accordance with the CGP Permit AKR100000 required SWPPP. The CGP SWPPP has not been developed at this time; however, it will be developed and implemented before construction activities begin at the Manh Choh Mine, Site Road, and Twin Road.

The Manh Choh Project will also require spill prevention and response procedures in accordance with the APDES MSGP Permit AKR060000. The MSGP SWPPP for the Manh Choh Project has not been developed at this time; however, it will be developed and implemented before mining activities begin at the Manh Choh Mine. The SWPPP will also include the Manh Choh Site Road and Twin Road.

- *Storm Water Pollution Plan*
  - *BMPs will be used to limit erosion and reduce sediment in precipitation runoff from the Manh Choh Project facilities, roads, and disturbed areas during construction, operations, and reclamation.*
  - *Specific BMPs include, but not 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.*
- *Dust*
  - *Implement dust control management measures to minimize the presence of fugitive dust, including:*
    - *Minimizing vehicular traffic and limiting vehicle speeds on haul roads, as much as practicable.*
    - *Applying water for dust suppression.*
- *Vegetation*
  - *Ground disturbing activities are minimized, and disturbed areas are revegetated with seed recommended for the region by ADNR's A Revegetation Manual for Alaska, 2008.*
  - *Equipment will be cleaned prior to entering and exiting Tetlin Hills portion of the project site to minimize spread of vegetative materials.*
  - *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 (covered road-legal highway trucks), and the Site Road (non-road legal mine trucks) to the loading facility at the base of the hill.*
- *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.*
  - *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.*

Maintenance:

Peak Gold plans to suppress erosion and sedimentation by selecting these BMPs.

- *Dust*
  - *Implement dust control management measures to minimize the presence of fugitive dust, including:*
    - *Applying water or chemical dust suppressant to haul roads and disturbed area where appropriate.*
- *Storm Water Pollution Prevention Plan*
  - *BMPs will be maintained in accordance with each specified schedule in the SWPPP.*

Monitoring:

The site is monitored and managed using personnel that have CESCL certification which requires passing an initial two-day (16-hour) training class with one-day (8-hour) refresher training required every three years (https://www.ak-cescl.com). The site will be inspected daily by CESCL certified staff. Appropriate *corrective actions will be undertaken immediately if problems with drainage, sediment, or containment are noted during inspection of access roads or mine site.*

Throughout the life of the project, staff will monitor the gravel roads for evidence of erosion and sedimentation. Through the established stormwater permitting process, there will be a defined boundary that no material or sediment can leave the site. Staff will monitor this boundary. If erosion or sedimentation is noticed, then remediation will take place.

Contingencies:

Staff will conduct monitoring to note erosion or sedimentation. If any is found, the remediation will be designed to fit the specific site and problem. Potential solutions may include grading, material pickup, and implementation of new BMPs.

Tetlin Village Road Dust:

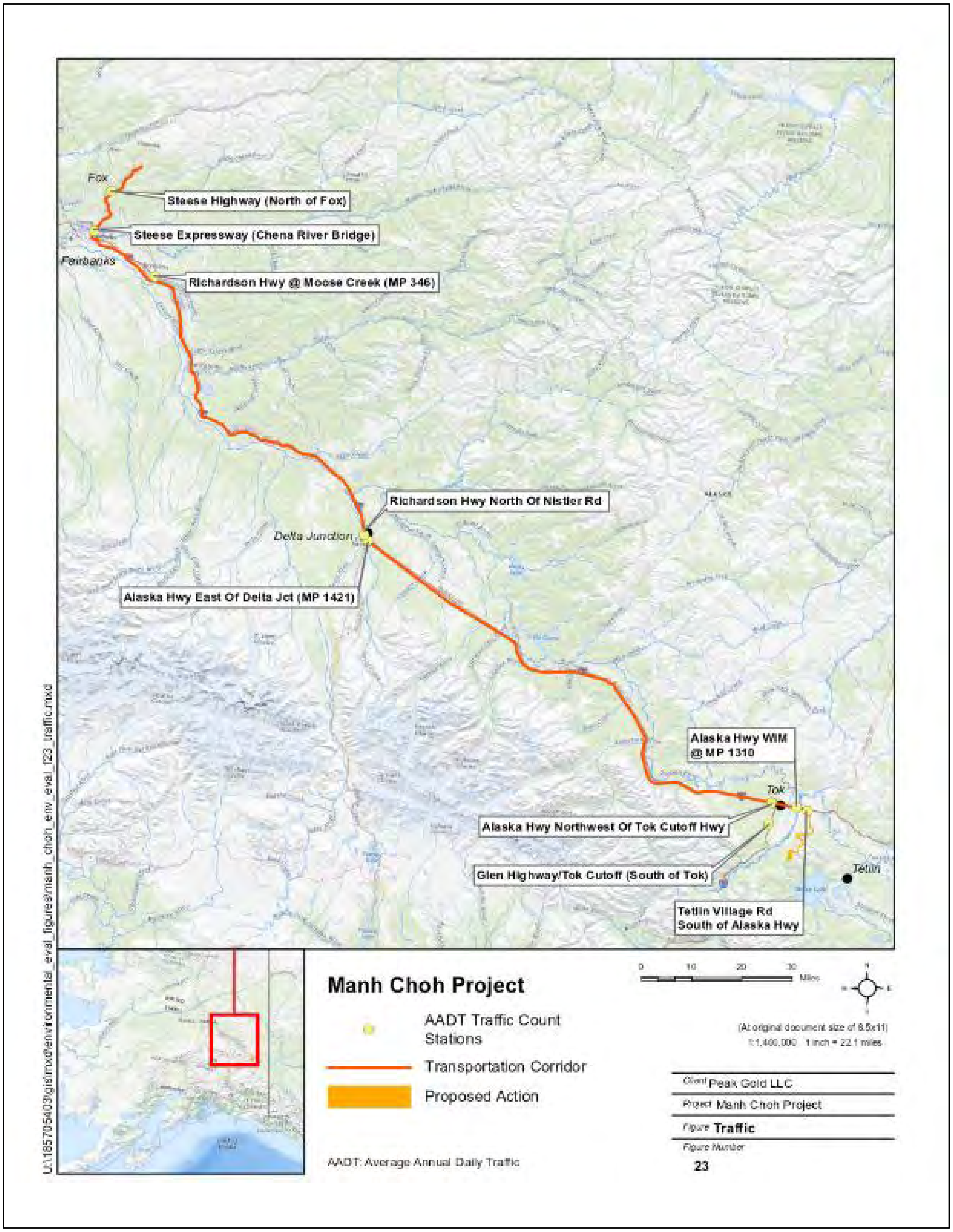
The Tetlin Village Road is a non-public private gravel road that provides access to Tetlin Village from Alaska Highway 2. With the construction of the Twin Road, the Tetlin Village Road will not be used by any Manh Choh Project traffic. Fugitive dust from the Village's private traffic will be similar to that of the pre-Manh Choh Project. However, should wetlands be impacted by significant fugitive dust from the Tetlin Village Road use, discussions with the Native Village of Tetlin (property owner) will be conducted to determine what actions should be taken and implemented.

Highway Traffic

During the preparation of the Environmental Information Document by Stantec (2021a), traffic counts and transportation routes were identified (Environmental Information Document (EID) Manh Choh Project). The proposed Manh Choh Mine is accessed from Alaska Highway 2 six miles east of Tok, along the existing unpaved Tetlin Access Road, and an existing exploration road. The area of traffic analysis includes the proposed Manh Choh Mine and the highway transportation route to Fort Knox (Figure 15). This area of analysis was chosen because it represents the area where the Project is most likely to affect the resource. The transportation routes for the Project include:

- *Tetlin Village Road and to be constructed Twin Road;*
- *Alaska Highway 2 from the Tetlin Village Road to Delta Junction;*
- *Richardson Highway from Delta Junction to Fairbanks; and*
- *Steese Highway from Fairbanks to Fort Knox, including passing through Fox.*

Figure 15. Traffic Route and Count Stations (Stantec 2021a)



Each road is also assigned a functional classification (Table 15). These classes are given to the roads according to the character of service they are intended to provide. In general, these classes are (Stantec 2021a):

- *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 safety.*
- *Major Collector: These roads link arterial and local roads and perform some duties each.*
- *Local: These roads provide access to homes, businesses, and other property.*

Table 15. Road and Traffic Characteristics (Stantec 2021a)

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)

The Project will use the Alaska highway system to transport ore from Manh Choh to Fort Knox. 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) (Stantec 2021a).

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 12. 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 Project (Stantec 2021a). (Table 16).

Table 16. Traffic Impacts (Stantec 2021a)

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 (Stantec 2021a).

The Project will have minor regional impacts on the traffic resources except for the Tetlin Village Road. Due to the impact of the Tetlin Village Road, Peak Gold, LLC will be constructing the Twin Road to improve traffic safety and impact to the Tetlin Village Road (Stantec 2021a).

Climate Change

Peak Gold has assessed climate change impacts of its proposed Manh Choh Project within the broader framework of Kinross' corporate climate change strategy (Stantec 2021a) 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 greenhouse gas (GHG) emissions; and*
- *Working with Tetlin Village to implement community projects with GHG reduction benefits.*

In the EID (Stantec 2021a), Peak Gold characterized GHG emissions from Manh Choh to be negligible with short-term duration. The short-term duration is due to the mine life of only 4.5 years. The negligible magnitude is due to the estimate of Manh Choh Scope 1 and Scope 2 emissions (including the entire transportation network) in Table 17, and GHG emissions are identified in Manh Choh's Application for an Air Quality Minor Permit (Boreal Environmental Services 2021a).

Table 17. GHG Emissions (Boreal Environmental Services 2022)

	GHG Emissions (tonnes/year)	Manh Choh Proportion	Notes
Manh Choh Project	124,752	--	Scope 1 and 2 average for peak production years (2024-2027)
Global Mining – Gold	100,400,000	0.12%	
Global Mining – All	450,000,000	0.03%	Does not include coal mining fugitive methane
Global Total	52,400,000,000	0.0002%	

Although the Manh Choh Project GHG emissions will be immaterial in the context of global emissions, Peak Gold's lead JV partner, Kinross, nevertheless has publicly stated its corporate commitment to work toward the goals of the Paris Agreement with the ultimate objective of achieving net-zero emissions by 2050. In working toward this objective, Kinross is advancing a strategy to include tangible GHG reductions by 2030 based on fuel efficiency and switching to renewable energy where feasible (Boreal Environmental Services 2022).

With respect to climate change effects the Project would have on the local environment, it is important to note that GHG emissions from a specific project do not cause localized impacts that can be compared to an ambient air quality standard the way criteria pollutants, such as nitrogen oxides or sulfur dioxide, can be. GHGs, such as carbon dioxide, are ubiquitous in the atmosphere and, therefore, impacts from GHG are global in nature rather than local. Consequently, local climate change impacts from Project GHG emissions will be virtually nonexistent (Boreal Environmental Services 2022).

Climate change adaptation and resiliency are important considerations in Manh Choh mine design even though the mine has a short time horizon of only 4.5 years. Climate change impacts that could affect mines include water stress – whether more frequent droughts or severe rainstorms and flooding. The 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 (Stantec 2021a).

Managing stormwater runoff is an important long-term issue. The 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 over the relatively short mine life (Stantec 2021a).

All waste rock storage areas are designed to minimize recharge and to isolate potentially acid generating 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 (Stantec 2021a).

Although it is certainly theoretically plausible to build an ore processing and tailings disposal facility at the Manh Choh site, it is clear from the analysis that the GHG emissions would be 18% larger when compared to the Ore transport and Fort Knox processing alternative. In addition, an on-site diesel power generation plant would be required for on-site processing emitting not only GHGs but other pollutants as well. The onsite processing alternative would have more significant environmental impacts (including wetlands) and compared to the Ore transport proposal is not reasonable or practical.

Social Cost of GHG

The issue of measuring the social cost of greenhouse cases (SC-GHG) estimates referenced on page 6 of EPA's letter is involved in ongoing litigation so the EID did not attempt to monetize the cost of GHG emissions. That number can be obtained through a simple calculation. Based on the $51 per metric ton estimate in the EPA comment letter, the calculated value is $6,362,352 per year (124,752 tonnes per year x $51).

Alternative GHG Analysis

It would be possible to mill ore onsite at Manh Choh rather than trucking it to Fort Knox for milling, but GHG emissions would increase under this alternative. Table 18 compares milling under the proposed action at Fort Knox versus milling onsite at Manh Choh for the peak production years of 2024 to 2027. As the table demonstrates, onsite milling at Manh Choh would increase GHG emissions by about 18% (Boreal Environmental Services 2022).

Table 18. GHG Comparisons

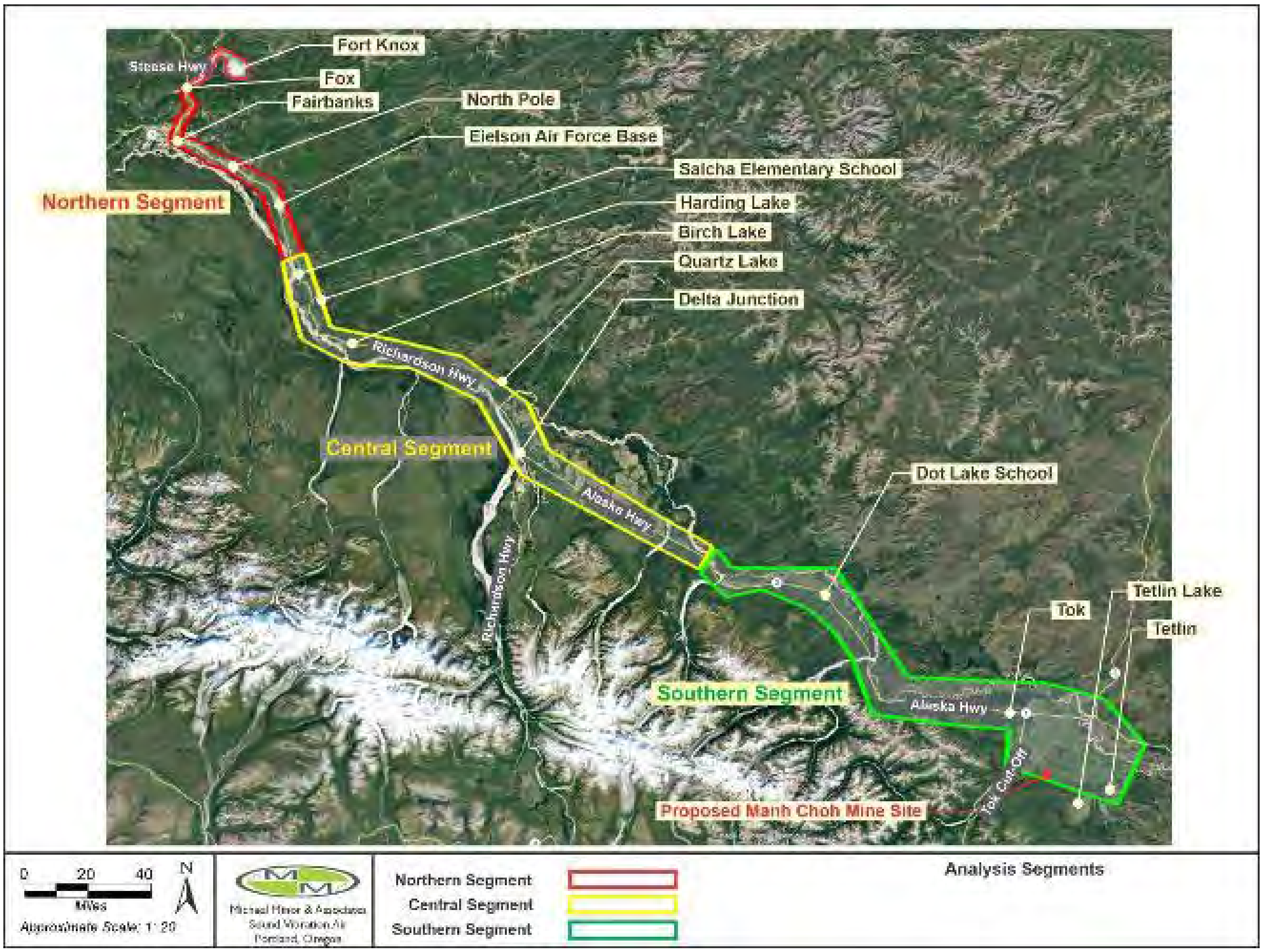
	Proposed Action Milling at Fort Knox (tonnes GHG/year)	*Alternative Milling at Manh Choh (tonnes GHG/year)*
Scope 1 and 2 Emissions	*124,752*	*225,912*
Scope 3 Emissions (Fort Knox)	*67,445*	*0*
Total:	*192,197*	*225,912*
Increase:	*---*	*+33,715 (18%)*

Noise

A noise analysis for the construction and operation of the Manh Choh Project was performed by Michael Minor & Associates in 2021. The analysis' technical report (Michael Minor & Associates 2021) was submitted to the USACE on December 31, 2021, with the §404 permit application. This report provides a worst-case analysis of noise from the operations of the proposed Manh Choh Mine. In addition to noise, mine related vibration was also reviewed for potential impacts. Included as part of the report are general information on the project, an introduction to acoustics, information on the existing conditions, such as land use and noise levels, and an analysis of project related noise levels during the operation of the proposed mine. The report is intended to meet all requirements, guidelines, regulations, and standards of the US Environmental Protection Agency (EPA), US Bureau of Mines, US Office of Surface Mining Reclamation and Enforcement, and the National Research Council for the preparation of an environmental noise analysis of a mining project (Michael Minor & Associates 2021).

Figure 16 provides a general overview of the area noise analysis segments and identifies the relative locations of the proposed Manh Choh mine, Fort Knox Mine, and select communities and landmarks for reference. More detailed maps are provided in the analysis section of the report. The entire area is included due to the use of highway haul trucks to move material from the proposed Manh Choh Mine to the Fort Knox Mine for final processing. This will require highway haul trucks traveling from the proposed Manh Choh Mine to Fort Knox via the Alaska Hwy and Steese Hwy to deliver materials, and then returning to the proposed Manh Choh Mine to repeat the process on a frequent basis. Therefore, it is not only mine operations that were evaluated, but also the noise from the highway haul trucks traveling back and forth between the two mines (Michael Minor & Associates 2021).

Figure 16. Noise Analysis Segments (Michael Minor & Associates 2021)



There are four main components to the noise analysis; general noise from mining operations, highway haul trucks travelling to and from Fort Knox, blasting noise, and occasional noise from helicopters used for exploration and surveys. Projections of noise levels were performed using existing noise models, including the Federal Highway Administration Traffic Noise Model and reference construction noise levels, also from *the Federal Highway Administration. To aid in understanding of this information a detailed summary of acoustics is included in the body of the report (Michael Minor & Associates 2021).*

Prior to performing the noise study, a review of the project area land use along with measurements and calculations of existing noise levels throughout the haul route and near the proposed mine was performed. Land uses in the study area includes residential, parklands, industrial, and undeveloped. In addition, noise monitoring and traffic counts were performed at 19 locations along the haul route with 17 locations monitored twice. The data was used to validate the noise models and establish the existing noise environment (Michael Minor & Associates 2021).

The most notable noise source from mine operations at nearby noise sensitive land uses in the corridor, which includes residences, hotels, churches, schools, and parks, is material haulage from the proposed mine to Fort Knox via the Alaska Highway from Tok to Fairbanks, the Steese Expressway to the intersection of the Steese and Elliott Highways, and the final leg along the Steese Highway to Fort Knox (Michael Minor & Associates 2021).

Material haulage, along with blasting, employee's transportation, and mine related operations could increase noise levels by 10 to 19 dB at five cabins located along Tetlin Access Road during late night hours. During daytime hours, these same five cabins are predicted to have increases of 10 to 11 dB, with 12 to 17 dB increases during late evening and early morning hours. Even with the increases, hourly noise levels at the cabins are not predicted to exceed 43 dBA Leq, which is similar to the existing noise in many small communities and villages in the area, including Tok and Dot Lake (Michael Minor & Associates 2021).

For other areas along the haul route, north of the Tetlin Access Road, noise levels are predicted to increase by up to 7 to 8 decibels (dB) during the late night hours around 2:00 am for most rural areas, including Tok, Dot Lake, some parts of Delta Junction, Birch Lake, Salcha, and some residences near the access road to Fort Knox. Even with the increases, typical hour equivalent sound pressure level (Leq) noise levels during the quietest overnight hours are not predicted to exceed 50 dBA at any location that did not already have noise levels approaching or exceeding 50 dBA, with some locations remaining below 40 dBA (Michael Minor & Associates 2021).

Noise level increases during daytime hours are substantially lower than those predicted for overnight hours. The worst-case traffic noise level increases during daytime hours ranged from only 1 to 2 dB (modeled for 2:00 pm). Finally, an additional analysis of evening and morning hours was also performed using traffic data from 10:00 pm (typically also similar to 5:00am volumes). During this period, increases of 1 to 6 dB can be expected, with the highest noise level increases occurring in less populated areas such as Tok, Dot Lake, and some locations near Fort Knox along Ridge Run and Fish Creek Road (Michael Minor & Associates 2021).

Noise related to mining operations and blasting may be audible at some receivers within 10 miles (Tok, Tetlin Village, Tok River Recreation Area, and Butch Kuth Avenue) when atmospheric conditions (wind, temperature, and pressure) are favorable for noise transmission. Atmospheric conditions that could result in increased noise transmission could include wind blowing toward a noise sensitive area, colder temperatures, temperature inversions and high humidity. During other periods, most locations would not be able to discern any noise from the proposed mine (Michael Minor & Associates 2021).

The proposed mine would help to mitigate noise by using late model and well maintained highway haul trucks for the trips to and from Fort Knox and by training drivers to operate the truck in an efficient manner that also reduces noise levels, such as restricting the use of engine compression breaks (i.e., Jake breaks) to emergency situations. No additional noise mitigation has been identified at this time (Michael Minor & Associates 2021).

Vibration from the operation of the proposed mine, including blasting, will not affect any nearby properties. As shown in the noise analysis, all receivers (residences, schools, and other noise sensitive uses) are over 3,000 feet from the proposed mine. At those distances, mine related vibration would not be noticeable (Michael Minor & Associates 2021) .

Vibration from the highway haul trucks along the Alaska Highway and Steese Highway could be noticeable at locations within 100 feet of the travel lanes on rough roadways. The magnitude of the vibration would be similar to vibration levels from heavy trucks already in use along the corridor. In most cases, haul truck related vibration would not be noticeable at distances greater than 50 to 100 feet from the travel lanes (Michael Minor & Associates 2021).

Overall, noise from actual mining operations is simply too far from most noise sensitive land uses, including residential areas, hotel/motels, schools and churches, to cause a notable increase in the overall noise levels. However, due to being located away from the Alaska Highway, and thereby having lower background noise levels, when the noise levels at the five cabins along Tetlin Access Road are predicted to have nighttime increase of 10 to 19 dB over the background ambient the hourly noise levels remain below 43 dBA Leq (Michael Minor & Associates 2021).

At all other areas evaluated, noise levels from the proposed mine are predicted to remain below 28 dBA Lmax at all nearby noise sensitive properties. Noise from blasting, which typically will not occur more than once per day, is not predicted to exceed 31.5 dBA at any noise sensitive properties near the proposed mine (Michael Minor & Associates 2021).

Noise from the haul trucks along the highway haul routes could increase noise levels by up to 7 to 8 dB over existing conditions during late night hours. However, even with the increase noise levels at sensitive properties during the same time are all predicted to remain below 58 dBA, which is 8 dB below the FHWA and ADOT&PF traffic noise criteria. Finally, a cumulative analysis of all mine related noise sources predicted worst case cumulative noise levels increases of 7 dB at the Tok River Recreational Site and along the Alaska Highway in Tok. North of Tok the cumulative noise level is the noise level from the haul trucks, with increase of 7 to 8 dB (Michael Minor & Associates 2021).

EPA Comment 5 – Mitigation Sequence – 40 CFR 230.10(d)

The 1990 Memorandum of Agreement regarding Mitigation under CWA Section 404(b)(1) Guidelines between EPA and the Corps (1990 EPA/Corps MOA) established a three-part process, known as the mitigation sequence (avoid, minimize, and compensate), to help guide mitigation decisions and determine the type and level of mitigation required. This sequence is also embedded in the requirements of the 2008 Final Rule on Compensatory Mitigation[24] and should be followed in that order. All three steps of the sequence are mandatory, and one step may not substitute for any other. The first step in the sequence requires impacts to the aquatic ecosystem be avoided whenever practicable. Compensatory mitigation is intended to offset unavoidable impacts that result after avoidance and minimization has been applied. Appropriate and practicable steps used to avoid, minimize, and compensate for any unavoidable impacts must be outlined prior to issuance of a permit, in accordance with both the Guidelines and the 1990 EPA/Corps MOA regarding mitigation.[25]

EPA appreciates that the applicant has proposed compensatory mitigation within the same watershed as the project impacts, the Upper Tanana River watershed. The applicant has submitted a Permittee-Responsible Mitigation (PRM) Plan, which states the long-term goal of the PRM Plan is "establish productive wildlife habitat upon completion of mining and reclamation at the mine site that aligns with the goals and land use objectives of the Native Village of Tetlin."[26] The Applicant plans to replace two culverts near the proposed mine site for the benefit of the Native Village of Tetlin. The PRM Plan states that the applicant would restore hydrology of degraded stream channels and enhance wetlands but does not quantify the functional lift of specific acreage or linear feet of stream that would be impacted by proposed actions.

There does not appear to be any accounting for the loss of wetland and stream function of the temporarily affected WOTUS, or the temporal lag associated with the enhanced wetlands. The Guidelines require that "the district engineer shall require, to the extent practicable, additional compensatory mitigation to offset temporal losses of aquatic functions that will result from the permitted activity."[27] Temporal loss is defined in the Guidelines as, "the time lag between the loss of aquatic resource functions caused by the permitted impacts and the replacement of aquatic resource functions at the compensatory mitigation site. Higher compensation ratios may be required to compensate for temporal loss."[28] Although the applicant intends to construct the wetland mitigation area concurrently, to account for the temporal lag of regrowth EPA recommends construction of the mitigation area in advance of the project area.[29]

The PN states that proposed mine activities are expected to last 4.5 years, and the PRM states the mitigation construction would occur concurrently. Full reestablishment of native vegetation is not expected for at least five years post project completion, as even rapid-growing subarctic perennials do not reach mature size until after year 3.[30] Section 2.10 of the PRM indicates seasonal monitoring will occur for two successive years to determine if changes are recommended.[31] Because projects involving channel construction are far more challenging to effectively implement, we recommend continued monitoring of performance standards for a minimum of seven years.

The Guidelines identify that "Compensatory mitigation requirements must be commensurate with the amount and type of impact that is associated with a particular DA permit."[32] They also identify that: "the amount of required compensatory mitigation must be, to the extent practicable, sufficient to replace lost aquatic resource functions. If a functional or condition assessment or other suitable metric is not used, a minimum one-to-one acreage or linear foot compensation ratio must be used."[33] The proposed mitigation does not appear to provide sufficient offset of the proposed impacts to WOTUS.

EPA recommends that the applicant complete functional wetland and stream assessments to determine the existing aquatic resource function and the potential for functional lift. EPA also recommends that the applicant further consider other permittee-responsible mitigation opportunities along the Tetlin to Fort Knox Corridor, as well as the possibility of restoration of previously mined streams and wetlands in the local Tetlin and Tok areas that could be rehabilitated. EPA believes compensation credits could potentially be generated by replacing stream and wetland crossings if the enhancement of aquatic resource function could be quantified, but such compensation can only be generated through actions that would otherwise be unaffected by the project.

Peak Gold Response 5

Peak Gold responded to the USACE's April 1, 2022, request for additional information. The following is the same narrative (Peak Gold, LLC 2022) provided to the USACE on May 4, 2022.

Detailed investigation of potential Permittee Responsible Mitigation (PRM) sites was undertaken in and outside of the impacted watershed. The three proposed PRM projects restore and enhance higher value wetlands and improve and expand potential fish bearing stream habitat and their associated floodplains near the project, thus benefiting the aquatic resources of the watershed and sufficiently compensating for the unavoidable loss of aquatic resources due to project impacts.

The PRM projects follow the watershed approach, §404 sequencing, and flexibility outlined by EPA and USACE in their June 15, 2018, Memorandum of Agreement on Mitigation for Wetlands in Alaska. The wetland impacts at the Manh Choh project site total 5.2 acres. Black spruce wetlands total 3.8 acres and were found along the Manh Choh Twin Road corridor. The remaining 1.4 acres included one swale along the Twin Road corridor and impacts within the mine site at the top of the hill. Additionally, the mine site impacts an 80-foot non-RPW seep that emerges and then re-infiltrates. Although technically a stream, functionally this feature is equivalent to a Slope-HGM wetland.

Functional Assessments are typically used in Alaska to determine credits needed to offset unavoidable impacts to wetlands and waters. The Manh Choh project is in an area where neither mitigation bank credits, nor in-lieu fees entities are available. Therefore, to provide mitigation for the project, permittee-responsible mitigation (PRM) was proposed, based on the steps outlined in the USACE 2008 Mitigation Rule.

As noted in the PRM plan submitted to USACE with the §404 permit application on December 31, 2021, options for PRM in the area are limited. No opportunities for creation of wetlands and/or ponds were identified.

Three PRM project sites are proposed for mitigation. Rather than creation of aquatic resources, the projects involve replacement of existing poorly functioning culverts with correctly engineered culverts. This will ensure connectivity through the culverts whenever flow is present, and limit ponding and sedimentation near the culverts.

Through their many years of Alaska-based wetland delineation, functional, assessment, permitting, and mitigation experience, the Stantec team has found that a rough hierarchy exists in functional scores, with the highest scores typically found in Riverine and Slope HGM wetlands due to stream inlets and outlets with the ability to export nutrients, the presence of and fluctuation of surface water, and the diversity of vegetation providing better productivity and habitat values. Depressional and Flat HGM wetlands, especially those without inlets and outlets, perform fewer functions and typically score lower than Slope and Riverine HGM wetlands.

ALASKA WETLANDS ASSESSMENT METHOD

The Alaska Wetland Assessment Method (AKWAM) functional assessments (Appendix 4) were used to evaluate functional losses and gains from the proposed project and the PRM sites. For credits, after the AKWAM score was determined, the credits were adjusted due to minor risk factor (1.25) using the 2018 Alaska District: Credit Debit Methodology. The risk of these projects was determined to be low; if an initial culvert replacement fails to meet project goals and/or standards, the short- and long-term management of the project would involve rehabilitating or reconstructing the culverts until the project has met standards.

Function Lost in Impacted Wetlands

As shown in the project Preliminary Jurisdictional Determination report and the Section 404 permit application, the majority of impacted wetlands are classified as Flat HGM and occur along the Manh Choh Twin Road (3.8 acres). These wetlands are already degraded due to proximity to the existing Tetlin Village Road and the long-term impacts of the 1990 fire. Road maintenance, fire breaks, and the clearing of burned wood after the fire have degraded adjacent wetlands. The black spruce wetlands impacted by the Twin Road are likely drying out due to changes in the flooding regime/location of flooding of the Tanana and Tok Rivers, but also due to the 1990 fire. During the two seasons of wetland work, the soils in all wetlands sampled along this road corridor were not saturated nor had water tables. Hydrology was based on secondary indicators, with the compact silt soils showing gleyed coloring. Because there are no streams flowing into or out of the impacted spruce wetlands, functional scores are lower than the Slope and Riverine HGM wetlands proposed for functional lift in the mitigation plan.

The evaluation of the Flat HGM wetlands impacted by the project resulted in a functional score of 0.325 multiplied by the number of acres (3.8) = 1.235 debits.

Wetlands impacted near the mine site are primarily Slope HGM and total 1.4 acres. These exist at the very top of watersheds and are higher value than the Flat HGM wetlands impacted. Impacts from the project occur at the top of the wetlands, no fragmentation will occur.

The evaluation of the Slope HGM wetlands impacted by the project resulted in a functional score of 0.65 multiplied by the number of acres (1.4) = 0.91 debits.

In total, to off-set the wetland impacts of the project, the PRM sites would need a functional lift equal to or greater than 2.145.

Functions Gained in PRM Wetlands

As shown in the AKWAM evaluation, the proposed PRM Area 1 and 2 projects improve the functionality of Slope and Riverine HGM wetlands adjacent to streams impacted by existing culverts near the proposed project area. Replacing the culverts will improve the hydrologic connectivity of the wetlands and reduce sedimentation, improving functions including nutrient cycling, sediment stabilization and removal, water storage, and aquatic and terrestrial habitat support. Alaska Department of Fish and Game (ADF&G) approves of the culvert replacement, and also states in the Fish Habitat Permit FH22-III-0019 (Appendix 2) that slimy sculpin may be present in the intermittent stream that is hindered by the inadequate culverts at the lower mitigation site.

<u>PRM Area 1</u>

At PRM Area 1 the stream channel will improve with culvert replacements. Culvert replacement provides opportunity for expanded fish (if present) and aquatic species habitat upstream for at least 1,000ft. On the upstream side of the road, ponding and sediment load will be reduced. Downstream regular stream flow will be established for up to 900 feet or more. Wetlands adjacent to the steam (15acres) will receive additional nutrient contributions, surface and subsurface water, while maintaining hydrophytic vegetation/habitat communities and reducing the encroachment of upland and invasive plant species. Proper culverts will also reduce the chance that in high water events stream water overtops the roadway, which would wash additional sediment into the wetland.

The evaluation of the Riverine HGM wetlands functionally improved (lift) by the project is determined by evaluating the present condition upstream and downstream, then determining the functional lift after PRM is completed for both upstream and downstream wetlands.

Upstream 5 acres improves from a functional score of 0.622 to 0.633.
Difference between current and future condition-Delta = 0.01
Adjusted Delta = 0.01/1.25 = 0.008
Credits = 5 acres.008 = 0.044*

Downstream 15 acres improves from a functional score of 0.533 to 0.677
Difference between current and future condition Delta = 0.14
Adjusted Delta = 0.14/1.25 = 0.112
*Credits = 15 acres*0.112 = 1.73*

Total credits generated = 1.777 at PRM area 1.

PRM Area 2

At PRM Area 2 the culvert replacement and upgrades will allow continued flow downstream to the tributaries of Tetlin Lake. This will reduce ponding and sedimentation upstream that has impacted approximately 0.15 acres. Aufeis forms at this location due to the slope of the wetland and the ponding of the water at the roadway. Aufeis contributes to the erosion of the site and sedimentation downstream.

With properly sized culvert(s) in place the upstream wetlands will revegetate into a more natural state. Downstream, sediment loads will be reduced over the length of the 3,000 feet to the tributary below. With less sediment, this small channel will stabilize. Wetland vegetation in the swale will recover/regrow.

The evaluation of the Slope HGM wetlands functionally improved (lift) by the project is determined by evaluating the present condition upstream and downstream, then determining the functional lift after PRM is completed for both upstream and downstream wetlands.

Upstream 0.5 acres improves from a functional score of 0.6375 to 0.7
Delta = 0.0625
Adjusted Delta = 0.0625/1.25 = 0.05
Credits = 0.5 acres.05 = 0.025*

Downstream 1.5 acres improves from a functional score of 0.5375 to 0.6625
Delta = 0.125
Adjusted Delta = 0.125/1.25 = 0.1
*Credits = 1.5 acres*0.1 = 0.15*

Total credits generated = 0.175 at PRM area 2.

PRM Area 3

The PRM Area 3 location was chosen based on comments from residents of Tetlin Village. Sun Lake, which is northwest of Tetlin Village, hosts resident fish. The culvert under the access road flows to Tetlin River, however, the culvert is perched so during low water fish passage is difficult or impossible. The residents rely on fish for subsistence; this project would increase access for fish to Sun Lake, improving/expanding fish habitat. Resident fish harvested by the community include pike, whitefish, arctic grayling, northern sucker, and burbot. Some or all of these species may use Sun Lake and its outlet during parts of their life cycle.

The Alaska Department of Fish and Game maintains the Fish Passage Inventory Database for many streams along the road system in Alaska. Culverts are graded based on numerous factors; however, the three critical variables are stream gradient, outfall height, and constriction ratio.

The culvert was evaluated based on the site visit and review of the photographs below. As a low gradient stream, an improved culvert will not change the gradient, however, the new culvert will be embedded, and have a more natural substrate. The perched outfall will no longer be an obstacle to fish passage and the constriction ratio, currently estimated at 0.5:1, will improve with a properly sized culvert.

Neither AKWAM nor the SQT captures the importance of providing proper fish passage through culverts, nor the expanded habitat available to fish. For the three areas proposed in the PRM plan, PRM Area 3 is qualitatively the most important for fish, other aquatic species, and for the residents of Tetlin Village.

At PRM Area 3 the stream channel will improve with culvert replacements. Culvert replacement would provide perennial access for fish and aquatic species to the 68-acre Sun Lake. Wetland fringe around Sun Lake (up to 10.3 acres) will provide habitat for fish and other aquatic species.

A Fish Habitat Permit will be applied for the culvert replacement project at PRM Area 3 from the ADF&G, and work will not begin until the permit is issued.

No wetlands are functionally lifted upstream or downstream; downstream wetlands receive water perennially from the Tetlin River.

As recommended by USACE in their April 1, 2022, letter (in response to USFWS floodplain comments), Peak Gold will design and construct the stream crossings to not only convey typical flows as well as large flood flows (e.g., 100- year event), but also utilize a stream simulation approach to support aquatic organisms within and immediately adjacent to the crossing as much as practicable. Such an approach will include establishing channel conditions within and adjacent to the crossing that are laterally and vertically stable, support a self-sustaining low-flow channel, include elements that provide hydraulic roughness as well as habitat, and facilitate water dispersal over a floodplain during high flow events.

Overall Gain for the Watershed

Peak Gold's three PRM projects restore and rehabilitate higher value wetlands and waters near the project impacts resulting in an expected net benefit to the watershed and aquatic resources. The PRM plan provides a benefit to the watershed while adequately compensating for project impacts.

The three PRM sites (Appendix 5) were selected because they exhibit some or all of the problems identified by EPA as stated in USACE Question 1, paragraph 2 for gravel roads. The Tetlin Village Road receives minimal maintenance outside of snowplowing. The roadbed is reduced to fine silts over the course of the summer. With culvert replacement the roadbed at these locations will be removed and replaced with better materials. Culverts will be properly imbedded into the substrate to allow fish passage if present. The reconstruction of the roadbed, drainage ditches, and culvert replacement will all be done to elevate issues at the wetland crossings, many noted in the EPA comments above.

Wetland losses for the project total 2.145 debits. Credits through functional lift in higher value wetlands total 1.952 (Table 19). Although the proposed credits do not quite match the debits, additional improvements to subsistence use fisheries, reduced environmental pollution from roadbed erosion, and community safety were not captured by the functional assessment tool but are arguably just as valuable as the functions that were measured.

Table 19. AKWAM Credit-Debit Summary

PRM Area	***AKWAM Wetland Credits***
PRM Area 1	*1.777*
PRM Area 2	*0.175*
PRM Area 3	*NA*
Total	*1.952*

STREAM QUANTIFICATION TOOL

As suggested by the USACE, Stream Quantification Tool (SQT) and Debit Calculator (V1.0) User Manual, for the Alaskan Interior, June 2021 (https://stream-mechanics.com/wp-content/uploads/2021/06/AK-SQT-v1_FINAL_User-Manual_20210521.pdf) was used to determine functionality of existing stream reaches and for predicting the proposed conditions. Results using the SQT method are:

PRM Area 1

This project lowers and enlarges the culverts to ensure upstream and downstream connectivity whenever flow is present. This will provide improvements to the Functional Category "Hydraulics." The current hydraulics in the culverts when flow is present are "Functioning at Risk" with a score of 0.38. The PRM project improves flow dynamics for approximately 450 feet, and results in a Category score of 1.00 "Functioning."

PRM Area 2

The only metric expected to change in the SQT is "Concentrated Flow Points." By removing the sediment source from erosion caused by aufeis formation, concentrated flow points in the reach is being reduced from 1 to 0. This results in a Functional Lift of 0.10 to the Hydrology Functional Category of the SQT. Because other Functional Categories are not expected to change from the culvert replacement, they were not evaluated. The improvement to the stream from the culvert replacement is calculated at 1.3 Functional Feet.

PRM Area 3

This project embeds and enlarges a perched, constricted culvert to ensure upstream and downstream connectivity. This will provide improvements to the Functional Category "Hydraulics" for the portion of stream upstream from the culvert (approximately 150 feet). The current hydraulics for the reach upstream from the culvert is "Functioning at Risk" with a score of 0.63. The PRM project improves flow dynamics, resulting in a Category score of 1.00 "Functioning." The "Biology" function may also improve, although we did not try to measure this in the SQT due to a lack of available data. Based on the improvement to the "Hydraulics" function, the SQT shows a mitigation yield of 10.5 function feet of lift.

Table 20. SQT Mitigation Yield Summary

PRM Area	Function Feet of Lift
PRM Area 1	54.0
PRM Area 2	1.3
PRM Area 3	10.5
Total	65.8

The PRM plan combines uplift to higher value wetlands and provides lift to at minimum one fish bearing stream. The PRM plan adequately mitigates the unavoidable impacts of the project, while providing a benefit to the watershed.

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