STATE OF ALASKA DEPARTMENT OF NATURAL RESOURCES
DIVISION OF MINING, LAND AND WATER

PRELIMINARY DECISION

ADL 232346
Donlin Gold LLC - Application for Easement
Jungjuk and Airstrip Spur Roads
AS 38.05.850

This Preliminary Decision (PD) is the initial determination on a proposed reservation of a private, exclusive easement on state land and is subject to comments received during the public notice period. The public is invited to comment on this PD. The deadline for commenting is **5:00 PM on March 29, 2019**. Please see the comments section of this decision for details on how and where to send comments for consideration.

Proposed Action:
The Department of Natural Resources (DNR), Division of Mining, Land and Water (DMLW) Southcentral Regional Land Office (SCRO) has received a request from Donlin Gold, LLC (Donlin) for reservation of a private, exclusive easement (ADL 232346) to authorize the construction of two intersecting roads that will support the applicant's proposed Donlin Gold Project (Figure 1) at a remote location, approximately 145 miles northeast of Bethel, Alaska, where all supplies and personnel are currently flown to a temporary airstrip.

ADL 232346 proposes to authorize an easement for the construction, use, operation and maintenance of the Donlin-Jungjuk and Airstrip Spur roads to serve the proposed Donlin mine site. As currently proposed, the roads will cross a combination of public and private lands, approximately 18.5 miles of which belong to the State of Alaska. The easement will be approved in two phases: first at a temporary construction width of 500 feet, encompassing 1,124 total acres, more or less, and a second post-construction, final easement width of 150 feet, encompassing 337 total acres, more or less. The primary route is the Donlin-Jungjuk Road which will connect the mine to a proposed port facility (ADL 232200) situated at Jungjuk Creek on the Kuskokwim River, approximately 8 miles downstream from the community of Crooked Creek. A branch route known as the Airstrip Spur Road will intersect with the Donlin-Jungjuk Road and proceed to a proposed airstrip (232199) facility located approximately 8 miles west of the mine.

The Donlin-Jungjuk and Airport Spur roads will cross varied terrain and rely on variable construction methods in order to achieve required engineering and safety standards. The proposed easement on state lands will incorporate the placement of associated necessary infrastructure including bridges, culverts and geofabric.

Donlin's easement application requests a perpetual easement term. However, given Donlin's approximately 27.5-year operating life for the mine, DMLW proposes to issue a 30-year private,

exclusive easement to Donlin under AS 38.05.850. Donlin or its successors in interest will be required to apply for a new easement authorization for continued use a minimum of one year prior to expiration of the proposed 30-year term.

Background:

Donlin Gold, LLC is a limited liability company that is equally owned by Barrick Gold U.S., Inc. and NovaGold Resources, Alaska, Incorporated. Donlin is proposing to develop an open pit, hard rock gold mine, referred to as the Donlin Gold Project, located 10 miles north of the community of Crooked Creek and approximately 145 miles northeast of Bethel, Alaska. The open pit portion of the mine will be located on private land owned by The Kuskokwim Corporation and the subsurface estate containing the ore deposits to be mined is owned by the Calista Corporation. The mine is expected to take three to four years to construct, and Donlin plans to produce over 33 million ounces of gold during the life of the mine, estimated at approximately 27.5 years. Donlin foresees employing up to 3,000 people during mine construction and up to 1,400 people annually during mine operations.

Materials and supplies will be transported to the mine site via barges on the Kuskokwim River from a proposed port facility (ADL 232200). The port will be connected to the mine site by a proposed road (ADL 232346). The airstrip (ADL 232199) will also be connected to the proposed road and will provide an additional way to access the mine and related infrastructure. To date, DMLW has received multiple applications from Donlin to construct associated improvements or extract material on state land, and SCRO will be responsible for adjudicating separate authorizations consisting of:

- ADL 232199 – Lease for an airstrip and associated infrastructure;
- ADL 232200 – Lease for a port facility;
- ADL 232334/ADL 232360 – Material Sale Contract/Material Site;
- ADL 232335/ADL 232361 – Material Sale Contract/Material Site;
- ADL 232336/ADL 232362 – Material Sale Contract/Material Site;
- ADL 232337/ADL 232363 – Material Sale Contract/Material Site;
- ADL 232338/ADL 232364 – Material Sale Contract/Material Site;
- ADL 232339/ADL 232365 – Material Sale Contract/Material Site;
- ADL 232340/ADL 232366 – Material Sale Contract/Material Site;
- ADL 232346 – Easement for access roads;
- ADL 232368 – Easement for a fiber optic cable;
- LAS 31107 – Land Use Permit for a temporary access road;
- LAS 31108 – Land Use Permit for a temporary access road.

Additional applications may be received from Donlin for other projects related to the proposed Donlin Gold Project.

Scope of Review:

The scope of this PD is to determine if it is in the State's best interest to issue ADL 232346.

Authority:
This easement application is being adjudicated pursuant to AS 38.05.850 Permits (and rights-of-way or easements), AS 38.05.035 Powers and Duties of the Director, and AS 38.04.058 Restrictions on easements or right-of-way use.

The authority to execute the PD, FFD, the EA, and the easement has been delegated to the Regional Managers of DMLW.

Administrative Record:
Case file ADL 232346 constitutes the administrative record for the Donlin-Jungjuk and Airstrip Roads easement application.

Legal Description, Location and Geographical Features:
The state land where the proposed easement is located is described as follows:

- **Legal Description:**
  Sections 5, 6, 7, 8, 16, 17, 21, 22, 23, 24, 25 and 26 of Township 20 North, Range 50 West, Seward Meridian;
  Sections 16, 21, 22, 27 and 34 of Township 21 North, Range 50 West, Seward Meridian; and
  Sections 2, 3, 11, 14, 23 and 26 of Township 22 North, Range 50 West, Seward Meridian.

- **Geographical Location:** The proposed Donlin-Jungjuk road will begin at the mine site east of Crooked Creek and run approximately 27.3 miles across state and private lands to the proposed port site on the Kuskokwim River. The proposed Airstrip Spur Road will intersect with the Donlin-Jungjuk Road and run approximately 3 miles across state and private lands to the proposed airstrip west of the mine. Approximately 18.5 miles of road will be located on state lands.

- **Area Geographic Features:** Kuskokwim Mountains

- **Existing Surveys:** None

- **Municipality/Borough:** Unorganized Borough

- **Native Corporations and Federally Recognized Tribes:** Calista Corporation, The Kuskokwim Corporation, Village of Crooked Creek

- **Size:** 1,124 acres, more or less, during construction; 337 acres, more or less post-construction.

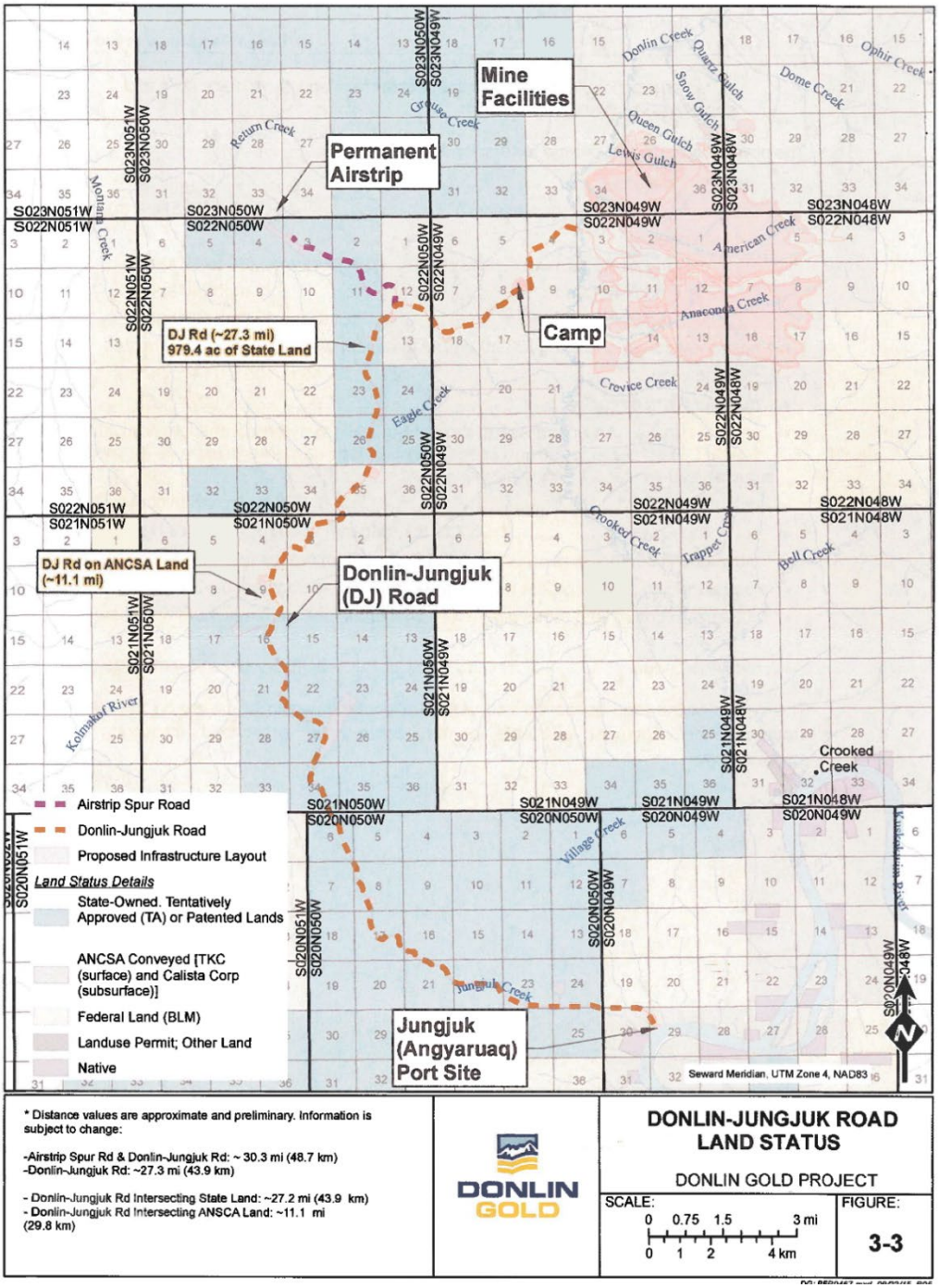

Figure 1: Location of proposed Donlin-Jungjuk and Airstrip Spur Roads Easement.

Title:
The Department of Natural Resources completed title reports on the proposed road easement route. Management rights to the project area is held by the State of Alaska as follows.

- Tentative Approval dated January 7, 2008.
- Tentative Approval dated February 15, 2008.

- Tentative Approval dated May 20, 2008.

Third Party Interests:
There are no known third party interests within the proposed boundary of ADL 232346.

Classification and Planning:
State lands crossed by the proposed easement are subject to the following area plan and classifications.

Kuskokwim Area Plan for State Lands (KAP) and Land Classification Order SC-88-001, adopted on March 22, 1988:

George River Management Unit, Subunit 10b, classified as Mineral Land (11 AAC 55.130), Wildlife Habitat Land (11 AAC 55.230) and Public Recreation Land (11 AAC 55.160).

The Areawide Land Management Policies presented in KAP identify the provision of public access to publicly owned land and resources as a primary goal, but also allows for the limitation of public access. According to the Public Access Management Guidelines listed on page 2-24 of the plan, "Access to public lands may be curtailed at certain times and in certain places to protect public safety, allow special uses, and prevent harm to the environment." In addition, approval of road construction is not identified as a prohibited land use in the management summary for the George River Management Unit or in the individual management intent statement for Subunit 10b. SCRO has determined that the industrial activity, equipment and materials which will characterize traffic on Donlin's proposed roads require the limitation of public use to protect public safety and prevent harm to the environment. Therefore, approval for the placement of private, exclusive access roads at the location requested is compatible with the management guidelines, land use designations and classifications described in KAP.

Pending Kuskokwim Area Plan Determination SC-88-001AA21:
The route of ADL 232346 will include certain unclassified state lands in the vicinity of the proposed Donlin Gold Mine site. A proposed amendment to DNR's KAP and Land Classification Order (No. SC-88-001A21) have been drafted by DMLW's Resource Assessment and Development Section to address management of the state land within the unclassified area. The proposed Area Plan Amendment and Land Classification Order are being issued for public comment concurrently with this decision. Information on how to comment on the proposed Area Plan Amendment and Land Classification Order can be found on the Alaska Online Public Notice System.

Access:
Current access to the easement site is via the Kuskokwim River, all-terrain vehicles, and aircraft. Donlin proposes to construct a port, the Jungjuk Port, and an airstrip which will serve as the points of beginning for the roads described in ADL 232346. Lease authorizations for those portions of the proposed port and airstrip facilities that are situated on state lands are being adjudicated under lease authorizations ADL 232200 and ADL 232199.

Scoping Notice:
A Scoping Notice was conducted August 31, 2016. The comment period closed October 17, 2016. The purpose of the Scoping Notice was to inform interested parties, and receive public input, on the Donlin applications received by DMLW. The information gained as a result of the Scoping Notice has been considered in this PD. The 11 comments submitted serve to inform the decision-making process on the Donlin applications under consideration, however they are not addressed or being responded to in this PD, nor the FFD.

Agency Review:
Two Agency Reviews were conducted for the proposed Donlin authorizations. The first Agency Review was conducted on June 28, 2016, and the deadline to submit comments was August 12, 2016. A second Agency Review was conducted on February 27, 2018, and the deadline to submit comments was April 2, 2018.

The following agencies were included in the reviews:

- DNR DMLW - Mining
- DNR DMLW - Water
- DNR DMLW - Survey
- DNR DMLW - Resource Assessment and Development
- DNR DMLW - Land Sales
- DNR Division of Parks and Outdoor Recreation (DPOR)
- DNR DPOR Office of History and Archaeology, State Historic Preservation Office
- DNR Division of Oil and Gas (DOG)
- DNR Division of Agriculture
- DNR Office of Project Management and Permitting
- Alaska Department of Fish and Game (ADF&G) - Division of Habitat
- ADF&G - Division of Wildlife Conservation
- Alaska Department of Environmental Conservation (ADEC)
- Alaska Department of Transportation and Public Facilities
- Alaska Department of Commerce, Community and Economic Development
- U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service
- U.S. Department of Homeland Security, Coast Guard
- U.S. Department of the Interior, Bureau of Land Management
- U.S. Department of Transportation, Pipeline & Hazardous Materials Safety Administration
- U.S. Department of Defense, Army Corps of Engineers
- U.S. Department of the Interior, Fish & Wildlife Service (USFWS)
- U.S. Environmental Protection Agency

During the 2016 Agency Notice, DMLW received one comment from USFWS. During the 2018 Agency Notice, a comment from ADEC was received concerning the location of a known contaminated site near the easement alignment proposed in ADL 232368, this comment was outside the scope of this PD, and therefore not included herein.

USFWS Comment:

On August 21, 2016, DMLW received the following comment regarding ADL 232346, Private Exclusive Easement for a road connecting the proposed port, airstrip and mine.

"The U.S. Fish and Wildlife Service (Service) provides the following permit specific recommendations, in response to the Donlin Gold Mine lease applications to the State of Alaska. The following permit-specific recommendations provide consistency in our recommendations on this project to the state and the USACE. We look forward to continuing to provide engagement with the state to support early project planning to avoid and reduce project related impacts on fish and wildlife."

Road/Stream Crossings

- Investigate fish species that occur in the area for each proposed culvert location in habitats (perennial and seasonal) likely to support resident and anadromous fish.
- Please provide more detail on the design approach and specific drawings for culverts at fish bearing streams (resident and anadromous). Stream crossing designs should be based on site specific information such as estimates of peak discharge, flow velocities and patterns, channel stability, suspended sediment and bed load transport, flooding regime morphology, and water surface elevations.
- To avoid and minimize impacts to aquatic and riparian habitats, the Service recommends that design criteria for stream crossings protect maintaining riparian and floodplain processes. This includes maintaining the physical processes within the stream floodplain and riparian corridor by promoting natural sediment transport patterns, providing unaltered fluvial (riverine) debris movement, and maintaining or restoring continuity and connectivity of the stream-floodplain-riparian corridor.
- Crossings should consist of a bridge or culvert that spans the floodplain, thereby providing for long-term dynamic channel stability, retention of existing spawning habitats, maintenance of food (benthic invertebrate) production, and minimization of risk of failure.

Disturbance Areas

- To expedite succession of functional habitat, we suggest salvaging and re-spreading topsoil over disturbed areas of surrounding facilities and along barrow ditches of access roads. The first 10-12 inches of soil contains site specific native seed and organic matter that will ultimately conserve resources and promote infill with native vegetation. We suggest salvaging the organic topsoil (by soil type) and spreading the topsoil (by soil type) back over the disturbed areas after construction. Topsoil should be signed as topsoil and stored in a manner that will keep it viable until it is spread back over the disturbed site.
- If placement of materials such as riprap is implemented to stabilize stream banks above or below stream crossings, use topsoil to fill the voids between the stones and seed the surface with native grasses and/or forbs to provide some habitat value and help stabilize the rock.
- Incorporate erosion control measures to reduce erosion on cut and fill slopes and to prevent sediment from entering wetlands/waterways.
- Provide a noxious weed prevention plan to avoid the establishment and spread of undesirable non-native vegetation in disturbed areas.

Avian Habitat Protection

- To protect migratory birds, avoid clearing previously undisturbed ground cover or vegetation during the nesting season. See the attached document, "Land Clearing Timing Guidance for Alaska", for the appropriate dates.
- Recommend a disturbance buffer of 660 feet for eagle nests, and to avoid blasting and other activities that produce extremely loud noises with 0.5 mile of bald eagle nests (or within 1 mile in open areas), unless greater tolerance to the activity (or similar activity) has been demonstrated by the eagles in the nesting area."

SCRO Response:

Donlin has been made aware of these comments through this PD. Donlin is required to follow all local, state, and federal laws and the conditions of necessary related authorizations for the protection of fish and wildlife habitat within the proposed project area.

Easement Discussion:

DMLW is considering issuance of a 30-year private, exclusive easement to Donlin under AS 38.05.850 for use of state land to install the Donlin-Jungjuk and Airstrip Spur roads in support of their proposed gold mine. The post-construction easement will occupy approximately 337 total acres. Authorized infrastructure will include bridges, culverts, geofabric and other components necessary for road construction and operation at the location proposed.

Donlin has requested a private, exclusive easement for these roads in order to restrict public travel between the mine, port and airstrip. Due to the industrial nature of operations, the transport of potentially hazardous materials, and the industrial large-scale vehicles used for transport. SCRO proposes that travel on the requested roads should primarily be limited to Donlin-authorized personnel, vehicles and equipment in order to minimize the risks to the public. SCRO may restrict public use of an easement or right-of-way in order to protect public safety or property in accordance with AS 38.04.058. However, the standard requirements of SCRO-authorized easements on state land require that the Grantee (Donlin) will use the authorized area in a way that does not interfere with the peaceful use and enjoyment of any previously issued easement or right-of-way, and that the Grantor (SCRO) reserves the right to set or modify stipulations governing the use of any conflicting or overlapping authorized uses. Donlin will be required to coordinate its activities to accommodate continued use of other existing private or public easement alignments on affected lands, if any. These easements are described in a Donlin-proposed closure and realignment plan for several pre-existing but not surveyed public easements in the general vicinity of the mine (segments of state omnibus road alignments, RS2477 routes and ANCSA 17(b) easements). At the time of this writing, the proposed closure and realignment plan is being reviewed by SCRO in a separate action and is not subject to comment under ADL 232346. Upon easement closure the state will determine the requirements of reclamation activities for the Donlin-Jungjuk and Airstrip Spur Roads.

In addition, on state lands Donlin will be required to provide a minimum of three public crossings per township, at feasible locations of Donlin's determination based on road design and engineering considerations so that members of the public may cross the proposed private, exclusive easement to reach SCRO-managed public domain lands on either side of the road. Public crossings will be positioned on the road where it crosses state lands within Township 20 North, Range 50 West,

Seward Meridian, Township 21 North, Range 50 West, Seward Meridian and Township 22 North, Range 50 West, Seward Meridian. Details concerning the location and operation of the public crossings must be reviewed and approved by SCRO prior to commencement of road construction by Donlin.

Development Plan:
The development plan (DP) attached to this preliminary decision (Attachment A) and dated October 2018 is under consideration by DMLW. Should the proposed easement be granted, it is anticipated that the DP will need to be updated throughout the life of the easement as activities and/or infrastructure are added or subtracted. All updates must be approved in writing by DMLW before any construction, deconstruction, replacement of infrastructure or change in activity will be permitted. DMLW reserves the right to require additional agency review and/or public notice for changes that are deemed by DMLW to be beyond the scope of this decision.

Hazardous Materials and Potential Contaminants:
The use and storage of all hazardous substances must be done in accordance with existing federal, state and local laws. Debris (including soil) contaminated with used motor oil, solvents, or other chemicals may be classified as a hazardous substance and must be removed from the easement area and disposed of in accordance with state and federal law.
Donlin is expected to follow ADEC's Best Management Practices and must adhere to all ADEC environmental regulations, including but not limited to: checking for leaks, the use of duckponds during refueling, and secondary containment of tanks. The use and storage of all hazardous substances must be done in accordance with existing federal, state and local laws. Debris (such as soil) contaminated with used motor oil, solvents, or other chemicals may be classified as a hazardous substance and must be removed from the project site and disposed of in accordance with state and federal law.

Easement Performance Guaranty (bonding):
In accordance with AS 38.05.035, AS 38.05.860, and 11 AAC 96.060(a) Performance Guaranty, Donlin will be required to submit two performance guaranties for the authorized easement.

- **$95,000.00 EA Cash Bond:** This bond will serve as a default to be forfeited, all or in part, if the applicant fails to submit the survey or other documentation necessary for the issuance of the easement by the required due dates.

- **$550,000.00 Performance and Reclamation Bond:** It is anticipated that this bond amount will be included as a letter of credit or other instrument approved by the Department and covered under one bond submitted to the State for the Donlin applications. This bond will remain in place for the life of the proposed easement. The bond amount is based upon the level of development, amounts of hazardous material and/or substances on site, and the perceived liability to the State. This bond will be used to ensure the applicant's compliance with the terms and conditions of the easement issued for their project. This bond amount will be subject to periodic adjustments and may be adjusted upon approval of any amendments, assignment, changes in the Development Plan, changes in the activities conducted, or changes in the performance of operations conducted on the authorized premises, and as a result of any violations to one or more of the authorizations associated

with this project. DMLW is reserving the right to require a reclamation bond due to noncompliance issues during the term of the easement or near the end of the life of the project.

Insurance:
In accordance with 11 AAC 96.065 Insurance, Donlin will be required to submit proof of liability insurance to DMLW, with the State of Alaska listed as a "NAMED" insured party. Donlin will be responsible for maintaining such insurance throughout the term of the proposed EA and easement.

Survey:
A DMLW-approved as-built survey is required for ADL 232346 to determine the proper location and acreage of installed improvements and the associated easement on state owned, DMLW managed lands. The applicant must acquire survey instructions and coordinate with the DMLW Survey Section for the as-built process. A survey instruction fee per 11 AAC 05.240 may be applicable. A draft must be submitted to the Survey Section prior to the expiration of the EA and a final as-built survey must be approved by DMLW before issuance of the final easement document.

Volumetric Survey:
If material is used from the easement and is put to beneficial use within the Donlin Gold Project, Donlin will be required to submit a written request to SCRO one year prior to construction and acquire Volumetric Survey Instructions from DMLW's Survey Section. Donlin will be required to complete a pre-condition volumetric survey of the easement prior to construction and a post-construction as-built volumetric survey once construction is completed. The pre-construction survey must be submitted for review to the Survey Section and approved prior to construction completion. The approved surveys will be used to calculate the total volume of material used as per the survey instructions.

Entry Authorization:
An entry authorization (EA) is an interim authorization that is issued when a survey is necessary prior to issuance of the easement. DMLW is proposing to authorize Donlin's entry onto state land through the issuance of an EA while Donlin is completing the construction necessary to complete the survey of the easement. The proposed EA would be issued for a five-year term that would begin after the effective date of the FFD. The effective date of the EA is the beginning date of the easement term.

DMLW may choose to extend the EA beyond the initial five-year term if Donlin demonstrates it is working toward meeting the EA's requirements. To request an extension, Donlin must submit a written request prior to the expiration date of the EA, that includes information to document Donlin's progress toward obtaining the survey and certify there have been no changes to the prior approved development plan. The extension of the EA may be subject to applicable fees. DMLW reserves the right to amend the terms of the EA prior to extension.

In accordance with 11 AAC 05. 070(d)(2)(A)(ii), 11 AAC05.070(d)(2)(I) and DMLW Director's Fee Order Number 3, DMLW is setting the fee for the proposed EA at $360.00 per acre, resulting in an annual fee of $404,640.00 This fee is based on the information provided by the applicant and

is subject to revision based on the amount of actual acreage reported on the DMLW approved post-construction as-built survey.

Final Easement Compensation:
In accordance with 11 AAC 05.070(d)(2)(A)(ii) and DMLW Director's Fee Order Number 3, the annual land use fee for a private, exclusive use easement is the yearly fair market rental value of the land, as determined by an appraisal, subject to adjustment at five-year intervals based on the changes in the Consumer Price Index, but no less than the fee prescribed in 11 AAC 05.070(d)(A)(i) for a non-exclusive easement which is currently $480.00 for up to two acres plus $240.00 for each additional acre of state land. The appraised value per acre is projected to be less than $240.00 per acre, therefore, the estimated annual fee for the approximately 337-acre post-construction final easement will be $80,880.00 per year.

In accordance with AS 38.05.565(a)(3) regarding sale or disposal of materials for special purposes, the materials extracted and removed during the construction, use, or maintenance of a facility authorized by a permit, land lease, or right-of-way (easement) and put to beneficial use in a way that alters the character, usefulness, or availability of the materials in their native forms, will be sold under the terms of the permit, land lease or right-of way (easement) at the Representative Regional Sales Price (RRSP) periodically determined by the commissioner for each type of material and for defined geographic regions, under procedures established by regulation.

Under 11 AAC 71.090(c), the current RRSP for rock is $3.00 per cubic yard, and $1.50 per cubic yard for sand and gravel within the Kuskokwim region. If the RRSP changes, the new RRSP will apply to the material used as of the effective date of the price change. Donlin must submit payment and accounting for material removed at the end of construction, determined by the pre-condition and post-construction as-built volumetric surveys of the site.

Co-location:
Donlin has requested the ability to restrict travel on the roads proposed in ADL 232346 and DMLW has proposed the issuance of a private, exclusive easement authorization to allow for that condition. Co-location of third-party interests within the easement will not be allowed unless both Donlin and DMLW have previously approved a written agreement to that effect, which may include revision of the easement's terms and conditions. Any required compensation to the state will be determined by DMLW according to the appropriate State of Alaska regulations and/or fee schedules.

Assignment of Easement:
The proposed easement, if issued, may be transferred or assigned only with written approval from DMLW. An easement will not be assigned if the assignee does not meet or comply with statutory, regulatory or other requirements identified by DMLW, or if the assignee is considered not to be in "good standing" with this or any other agency authorization. DMLW reserves the right to amend the terms of the easement prior to assignment.

Reclamation:
In the DP for ADL 232346, Donlin proposes that certain reclamation work in disturbed areas would take place concurrent with construction of the roads (including stabilization, erosion control,

sediment control, seeding and placement of available growth media, among other measures). However, Donlin has proposed that the final alignment of the estimated 337-acre Donlin-Jungjuk and Airstrip Spur roads will remain in place following closure of the mine site for continued use to transport personnel, materials and supplies during the required post-closure monitoring and operation of a water treatment facility.

Public Notice of the Preliminary Decision:
This PD will be advertised for a 60-day public comment period. Notice will be posted on the Alaska Online Public Notice System at http://aws.state.ak.us/OnlinePublicNotices/Default.aspx and the post offices in Crooked Creek, Red Devil, Sleetmute, Holy Cross, Aniak and Bethel. Courtesy notices will also be mailed or e-mailed to neighboring property owners, DNR permit, lease and, easement holders, and other interested parties on January 28, 2019, for a 60-day public comment period.

Comment(s):
This PD is subject to both public and agency comments, and all comments received by the comment deadline will be considered in the FFD.

Written comments on this PD must be received in this office no later than 5:00 PM on March 29, 2019 to be considered.

To submit comments, please choose one of the following methods:

Postal: Department of Natural Resources
Division of Mining, Land and Water
Southcentral Regional Land Office
ATTN: Donlin Team
550 West 7th Avenue, Suite 900C
Anchorage, AK 99501-3577

Website: http://dnr.alaska.gov/mlw/notice/donlin/
Email: dnr.scro.donlin@alaska.gov
Fax: (907) 269-8913

Questions about the proposed private, exclusive easement can be directed to Cynthia Zuelow-Osborne@ (907) 269-8575.

If public comments result in significant changes to the PD, additional public notice will be given.

Recommendation:
DMLW has completed a review of the information provided by the applicant, examined the relevant land management decisions, and has found that the proposed easement is consistent with all applicable statutes and regulations. This decision also considers the submitted agency comments. DMLW considered three criteria to determine if the proposed easement provides the best interest to the State and development of its natural resources. The criteria include direct economic benefit to the State, indirect economic benefit to the State, and encouragement of the development of the State's resources.

benefit to the State. Indirect economic benefits provided by the proposed authorization include creation of jobs and increased activity in the local communities. Moreover, this authorization is in the State's best interest as it furthers development of natural resources and supports increased economic activity regionally and statewide. It is recommended that DMLW issue a 30-year easement to Donlin for the construction, use, operation and maintenance of the Donlin-Jungjuk and Airstrip Spur roads in support of the proposed Donlin Gold Project.

Cynthia Zuelow-Osborne 01-24-19

Cynthia Zuelow-Osborne, Natural Resource Specialist III Date

Preliminary Decision:

It is the determination of DMLW that it may be in the State's best interest to issue an easement under AS 38.05.850 for 30 years to Donlin, as described above. DMLW will issue an EA prior to easement issuance to allow for a survey and appraisal to be completed. The final-easement annual fee will be calculated using DMLW's approved final survey. The EA annual fee will be $404,640.00. Donlin will be required to submit a $95,000.00 EA cash bond, and a performance bond of $550,000.00. Additionally, Donlin will be required to submit proof of insurance to DMLW, with the State of Alaska listed as a "NAMED" insured party. This application shall now proceed to public notice.

for 1/24/19

Clark Cox, Regional Manager Date
Southcentral Regional Land Office, Division of Mining, Land and Water

Attachments:

Attachment A – Development Plan
Attachment B – Location Map

Attachment A
Development Plan

PLAN OF DEVELOPMENT
JUNGJUK ROAD AND AIRSTRIP SPUR ROAD
Donlin Gold Project

October 2018

4720 Business Park Blvd. Suite G-25
Anchorage, Alaska 99503

Prepared By:

SRK Consulting (U.S.), Inc.
11901 Business Blvd., Suite 110
Eagle River, Alaska 99577

Attachment A
Development Plan

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FIGURES

TABLES

ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
ADF&G	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
ADOT	Alaska Department of Transportation
ANSCA	Alaska Native Settlement Claims Act
LRFD	Load and Resistance Factor Design

UNITS OF MEASURE

cm	centimeters
ft.	foot/feet
ha	hectare
km	kilometers
kph	kilometers per hour
lb	pound
m	meter
mm	millimeters
mph	miles per hour

APPENDIX

Appendix A: Preliminary Plan and Profiles

Attachment A
Development Plan

1.0 INTRODUCTION

The proposed Donlin Gold project is approximately 277 miles (446 km) west of Anchorage, 145 miles (233 km) northeast of Bethel, and 10 miles (16 km) north of the village of Crooked Creek (Figure 1-1). Bethel, 73 river miles (117 km) upstream from the mouth of the Kuskokwim River on the Bering Sea, is the regional center for the Yukon–Kuskokwim region of Alaska. Bethel is 177 river miles (285 km) southwest of the proposed Jungjuk (Angyaruaq) Port site. The city of Aniak, also on the Kuskokwim River, approximately 57 river miles (92 km) southwest of the proposed Jungjuk Port site, is the regional center for the middle Kuskokwim Valley.

Currently there is no road or rail access to the site, and all personnel and supplies are transported by air to an existing airstrip. The project is completely isolated from existing power distribution networks and other public utility infrastructure.

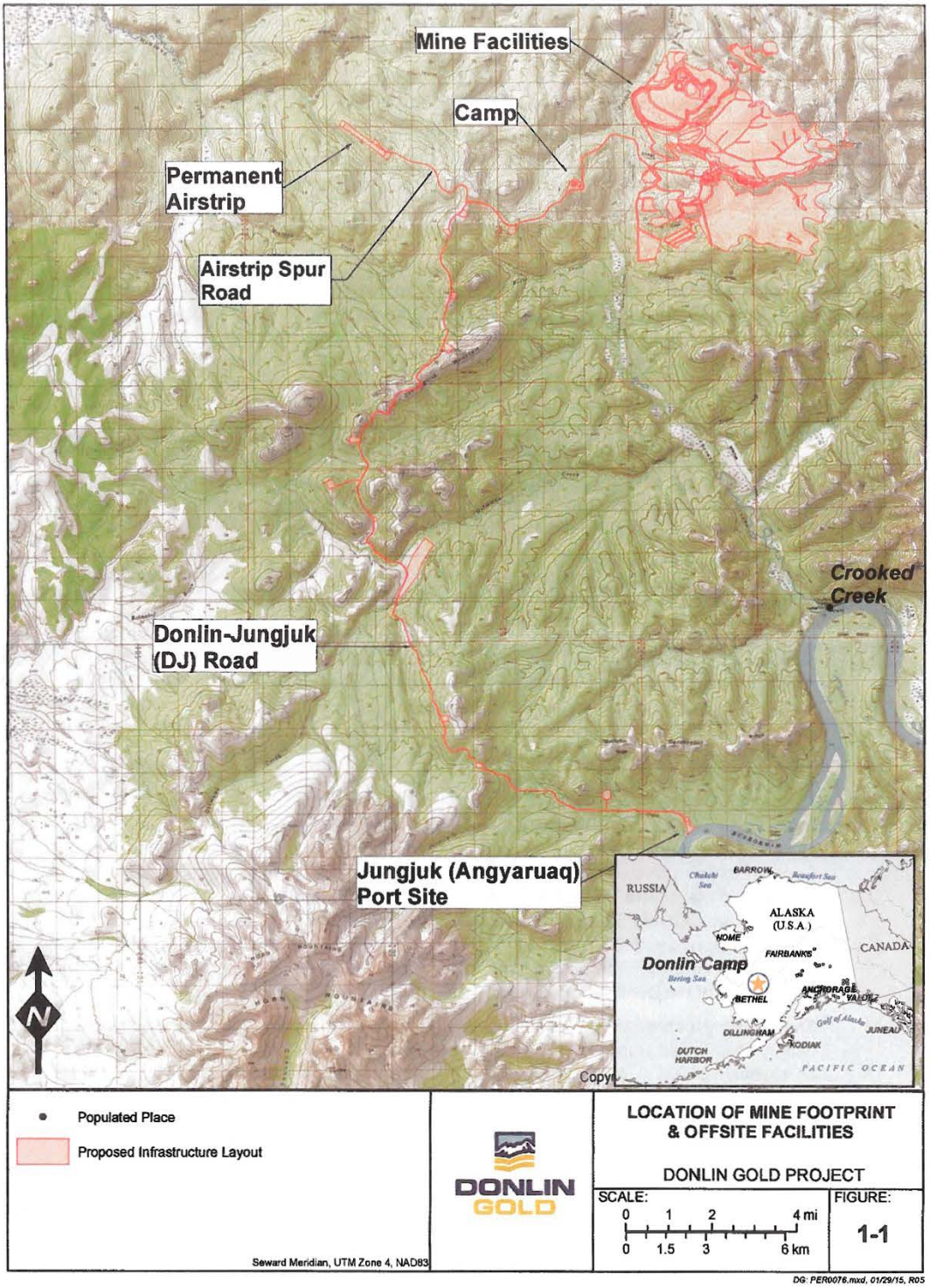
Included in separate development plans and permit applications, Donlin Gold has proposed development of the Jungjuk Port and an airstrip (Permanent Airstrip). The Jungjuk Port would be located on the north bank of the Kuskokwim River immediately upstream of the mouth of Jungjuk Creek and approximately 8 miles (12.9 km) downstream of the nearest village, Crooked Creek. The new Permanent Airstrip would be located approximately 8 miles (12.9 km) by road west of the proposed Donlin Gold mine site. At present there is no road connection amongst the proposed Jungjuk Port site, the proposed new Permanent Airstrip site and the proposed Donlin Gold mine site.

Donlin Gold is proposing the construction, operation and maintenance of the Donlin-Jungjuk Road and the Airstrip Spur Road. The approximately 27 mile (44 km) gravel Donlin-Jungjuk Road would connect the proposed mine with the proposed Jungjuk Port. In addition, the approximately 3.0 mile (4.8 km) gravel Airstrip Spur Road from the Donlin-Jungjuk Road would provide access to the proposed Permanent Airstrip. The Donlin-Jungjuk Road and Airstrip Spur Road traverse both State of Alaska and The Kuskokwim Corporation (surface) and Calista Corporation (subsurface) lands.

The proposed Donlin-Jungjuk Road and Airstrip Spur Road alignments would traverse highly varied terrain types, and several different construction methods would be used throughout the project. In general, half the Donlin-Jungjuk Road would be built by conventional cut-and-fill techniques utilizing any suitable native sub-grade material for development of the road prism. This simple approach can be followed in most of the mountainous or upland sections of the road, or in areas of well-drained granular soils. Clearing requirements would be minimal because approximately 90% of the route traverse's terrain is forested with scattered scrub black spruce and light brush. Typically, the scrub spruce and brush would be removed by a tracked excavator and placed in a berm on the down-slope side of the clearing limits.

This Donlin-Jungjuk Road and Airstrip Spur Road Plan of Development provides information and details regarding the location and description of the proposed roads subject to final design requirements.

Attachment A
Development Plan



2.0 ROAD PROJECT AND ROUTE DESCRIPTION

Establishment of the Donlin-Jungjuk Road and Airstrip Spur Road is an integral component in the overall development of the proposed Donlin Gold Project. Both the Donlin-Jungjuk Road and Airstrip Spur Road are essential to support the construction and on-going operation of the proposed Donlin Gold mine and the proposed construction of the natural gas pipeline (Donlin Gold Project, Plan of Development, *Natural Gas Pipeline, Revision 1*, December 2017).

The proposed Donlin-Jungjuk Road segment is approximately 27.3 miles (43.9 km) long by 28 ft. (8.5 m) wide (double-lane) and connects the Jungjuk Port with the proposed Donlin Gold mine site. The Airstrip Spur Road segment is approximately 3.0 miles long (4.8 km) by 28 ft. (8.5 m) wide (double-lane) and connects the Permanent Airstrip to the Donlin-Jungjuk Road (Figure 1-1). Typical shoulder to toe design slopes for both roads would be 2:1. For construction purposes Donlin Gold is proposing a 500 ft. (152 m) wide temporary construction corridor for building each road. Following construction and based on an as-built survey, Donlin Gold would request an approximately 150 ft. (45.7 m) wide right-of-way that would include approximately 50 ft. (15 m) on each side of the road plus the toe to toe width of the road prism for each road. Donlin Gold does not anticipate construction disturbance to extend beyond the 150 ft. (45.7 m) wide right-of-way within the 500 ft. (152 m) wide temporary corridor. The temporary corridor allows Donlin Gold flexibility during construction to shift the alignment as necessary within the corridor to address unforeseen conditions or other concerns.

The Donlin-Jungjuk Road would traverse varied terrain from the mine site to the Kuskokwim River Jungjuk Port site near the mouth of Jungjuk Creek as shown in Appendix A. The Jungjuk Port (Donlin Gold Project, Plan of Development, *Jungjuk Port Site,* 2018) is located on the north bank of the Kuskokwim River, approximately 8 miles (12.9 km) downstream of the village of Crooked Creek; there is currently no road connection between the two locations. The Donlin-Jungjuk Road would be approximately 27 miles (44 km) long to a point where it ties in to the mine site (mine site battery limits) just east of Crooked Creek. Both the Donlin-Jungjuk Road and Airstrip Spur Road would be new construction in an untracked region, with no passage through or near any settlements or communities, and no junctions with any existing road system. Both routes were delineated and engineered to avoid and minimize wetland impacts where feasible and practicable, as well as the required engineering and safety requirements. The 3.0 mile (4.8 km) Airstrip Spur Road, beginning at the tie to the proposed Donlin-Jungjuk Road at approximately route mile 5.3 (8.6 km), would serve as the access route to the Permanent Airstrip. The mine camp facilities would be located at approximately route mile 2.3 (3.7 km) of the Donlin-Jungjuk Road.

The following abbreviated Donlin-Jungjuk Road route description begins at the mine site battery limits (road station 0+000 as shown in Appendix A) in the Crooked Creek valley, at an elevation of 332 ft. (101 m) above mean sea level (amsl). The route first trends to the southwest for roughly 13 miles (21 km), ascending to upland ridges before reaching its high point elevation of 1,257 ft. (383 m) at Juninggulra Mountain. This interval includes extensive sections along ridge crests or side-slopes where fill and cut/fill sections would be needed. Cut-and-fill construction would be used at rocky slopes and barren ridges in the highest intervals. Except for Crooked Creek, at the beginning of the route, there are

no significant drainage crossings over this section, and the terrain is generally moderately rolling to hilly. Elevation gain or loss is less than 660 ft. (200 m).

From approximately mile 13 of the Donlin-Jungjuk Road, the route trends southerly and descends to cross Getmuna Creek Valley (elevation 490 ft. [150 m]). From the Getmuna Creek alluvial flat, the route ascends a sparsely treed ridgeline for approximately two miles (3.2 km) before contouring along a moderate ridge slope for another two miles (3.2 km). Most of alignment along the ridge slope would be side-cut in good soils with shallow bedrock. Numerous springs and seeps are found along this section of the alignment. From route mile 21.9 (35.2 km) the route begins to descend easterly to the Jungjuk Creek valley and, after two crossings of Jungjuk Creek, proceeds along the north side of this valley to the proposed Jungjuk Port site on the Kuskokwim River. The last 2.5 miles (4 km) of the proposed Donlin-Jungjuk Road route traverses gentle slopes vegetated with sparse scrub black spruce and occasional intervals of permafrost.

Simple fill-type embankments would be constructed on most of the ridge-line sections to preclude surface disturbance and reduce snow-drifting on the roadway. A geofabric underlay would be provided in areas identified as having significant amounts of permafrost or wet soils.

Approximately 50 identified streams or drainage crossings occur along the Donlin-Jungjuk Road route, but only 6 are significant enough to require bridging. The Crooked Creek Bridge would be a conventional single-span steel girder structure, while the structures over Getmuna and Jungjuk creeks would be site-fabricated corrugated steel arch type spans.

Culverts required for other stream and drainage crossings would vary in diameter from 24 to 72 inches (600 to 2,400 mm); all culverts can be installed as rolled units. All bridges and culverts would be two-lane. Stream crossings are typically in nearly level to moderately sloping terrain with simple approach requirements. Permafrost has been identified at a few locations but would have no major impact on crossing development or road construction. All bridge sites are confirmed to have good foundation conditions and to be suitable for pad-type abutments. Material sites have been identified along the Donlin-Jungjuk Road route, Donlin Gold Project, *Material Sites Plan of Development,* SRK 2015, to provide materials for construction and maintenance purposes. In general, 13 material sites have been located at regular intervals along the alignment, precluding the need for extended haulage of construction rock.

No bridges are required for the Airstrip Spur Road.

3.0 BRIDGE REQUIREMENTS AND DESIGN

Based on preliminary road design, the Donlin-Jungjuk Road would require approximately 50 stream and drainage crossings (*Donlin Creek Project, Feasibility Study Update 2*, AMEC 2011). Six (6) of those would be engineered with single-span, two lane bridges (Table 3-1), and the remaining with culverts (Section 3.1). For the bridges, one (1) steel girder and five (5) steel arch bridge type structures would be required along the Donlin-Jungjuk Road from the mine to the Jungjuk Port. In general, very heavy equipment and vehicles are expected to be transported in parts and assembled at the mine site and would therefore not contribute to the bridge loading criteria.

Table 3-1: Jungjuk Road Bridge Crossings

Stream Name	Road MP / Station mile (km)	Type
Crooked Creek	0.18 / 0+290	Steel Girder Bridge
North Fork Getmuna Creek	16.1 / 25+967	Steel Arch Bridge
South Fork Getmuna Creek	17.2 / 27+666	Steel Arch Bridge
Getmuna Tributary	17.5 / 28+234	Steel Arch Bridge
Jungjuk Creek, Upper Crossing	24.1 / 38+737	Steel Arch Bridge
Jungjuk Creek, Lower Crossing	24.8 / 39+905	Steel Arch Bridge

The bridges are designed for two lanes of off-highway trucks. The design is based on the provisions of American Association of State Highway and Transportation Officials (AASHTO) Load and Resistance Factor Design (LRFD) Bridge Design Specification (2005) assuming a service life of 25 years.

The structures on the Donlin-Jungjuk route are all designed to the Forest Service Bridge Design & Construction Manual for Permanent and Temporary Structure (BCFS) i.e., BCFS L-100 off-highway truck (gross vehicle weight 200,000 lb. [91 tonnes]), plus the following:

- Caterpillar 785C mining truck, unloaded, with a gross vehicle weight of 225,200 lb. (102 tonnes)
- Double 18-line Scheuerle Intercombi trailer, the autoclave vessel transporter, with a gross vehicle weight of 1,462,998 lb. (664 tonnes). The live load from the autoclave transporter governs the design.

Since these vehicles would not use the route regularly, they would be required to travel along the centerline of the bridges at a maximum speed of 6 mph (9.7 kph) when using the road.

Further hydrology study would be undertaken prior to detail engineering design phase of the project. Based on the minimum channel width requirement, the span length of the bridge over Crooked Creek, measured from center to center of the abutments, is 84 ft.-7 inches (25.8 m). To accommodate wide-design vehicles, including the autoclave transporter, the bridge is 24 ft.-5 inches (7.45 m) wide. The superstructure would consist of pre-cast concrete panels supported by three lines of steel I-girders.

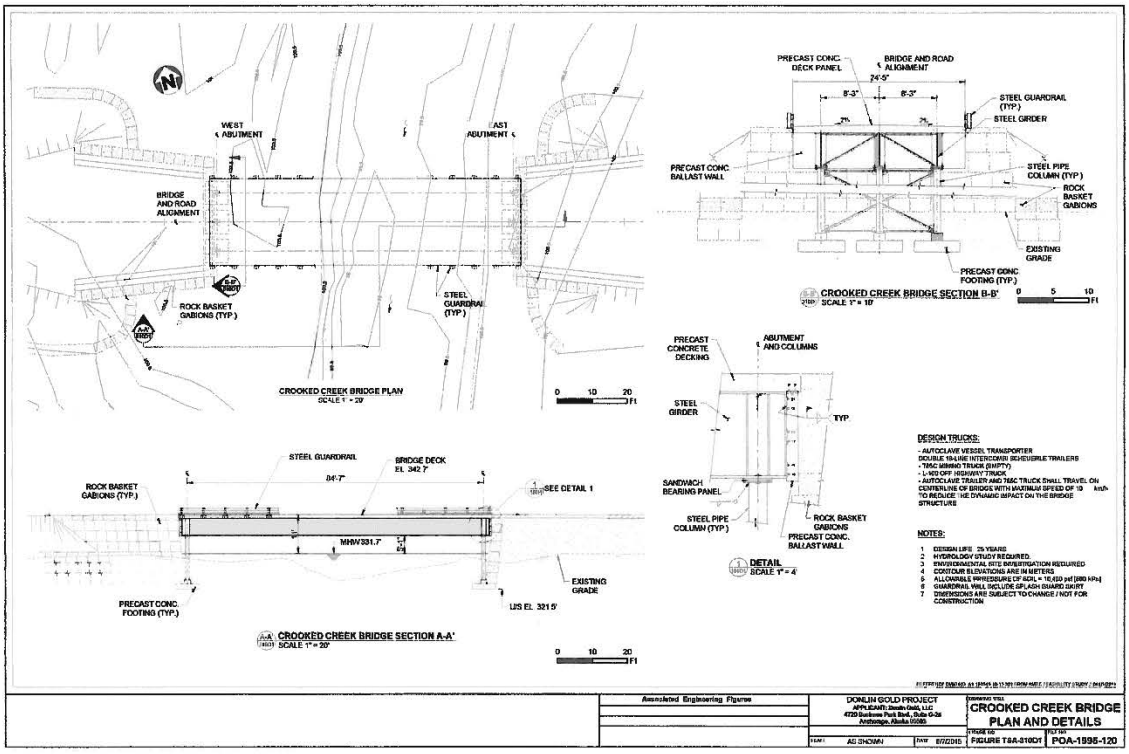
Considering the available quarries on site, gabion rock baskets are the most feasible option for retaining soil at the abutments. The baskets would be placed behind the piles or columns at the base and would be extended to the road elevation at both abutments. Steel

girders and deck slab would be extended from both abutments, covering the gap between the ballast walls and the piles (or columns) at road elevation. Pre-cast concrete vertical panels attached to the girders at each end would retain the backfill behind the girder.

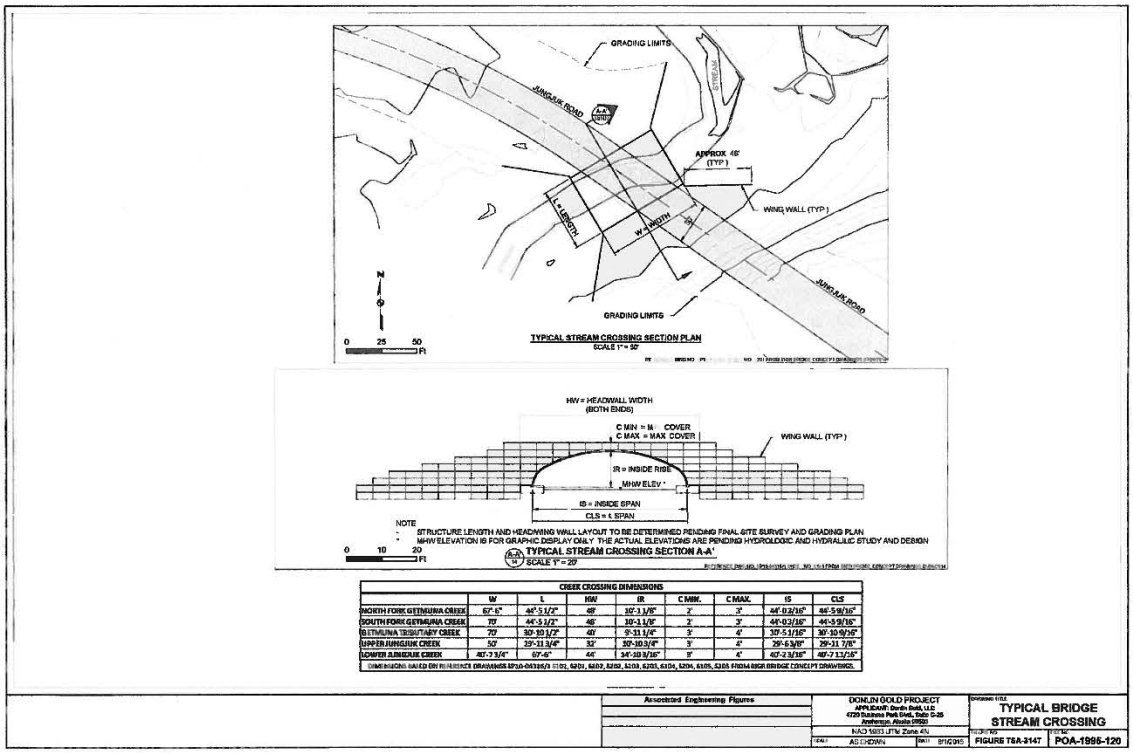
According to geotechnical information and recommendations from RECON LLC, pad foundations are proposed, as illustrated in Figure 3-1 and Figure 3-2.

To accommodate the proposed construction schedule and to minimize impact on the environment, all structural components of the bridge and arch structures would be pre-fabricated. All components would be trucked to the crossing locations and installed on site. Abutments and approaches to all creek crossings are relatively simple and pose no special challenges. Granular fill can be sourced locally. Rip-rap armor rock would be placed at both the upstream and downstream ends of the bridges to protect the pad footings from erosion.

Attachment A
Development Plan



Attachment A
Development Plan



3.1 Culverts

Based on preliminary engineering it is estimated that 44 culverts sized between 24 and 72 inches (61 and 183 cm) in diameter would be required. The actual number and diameter size for culverts would be determined during final engineering design. All culverts would be two-lane and can be installed as "rolled" units. Final culvert design would meet or exceed the ADOT culvert design standard for resource roads, and where applicable also the ADOT/ADF&G Memorandum of Agreement guidance document. Consideration would be given to natural channel morphology, icing conditions and drainage area characteristics and would be completed during final design engineering.

3.2 Road Design Assumptions and Analysis

The primary purpose of the Donlin-Jungjuk Road is to transport freight by mostly conventional highway vehicles including tractors and trailers. However, critical elements of the design would be dictated by specific oversize and overweight loads associated with mine facility construction. The Airstrip Spur Road would also be used to transport freight as well as personnel. These roads are intended for the exclusive use of mine traffic, and the designs assume that mine operations would control and manage traffic on them.

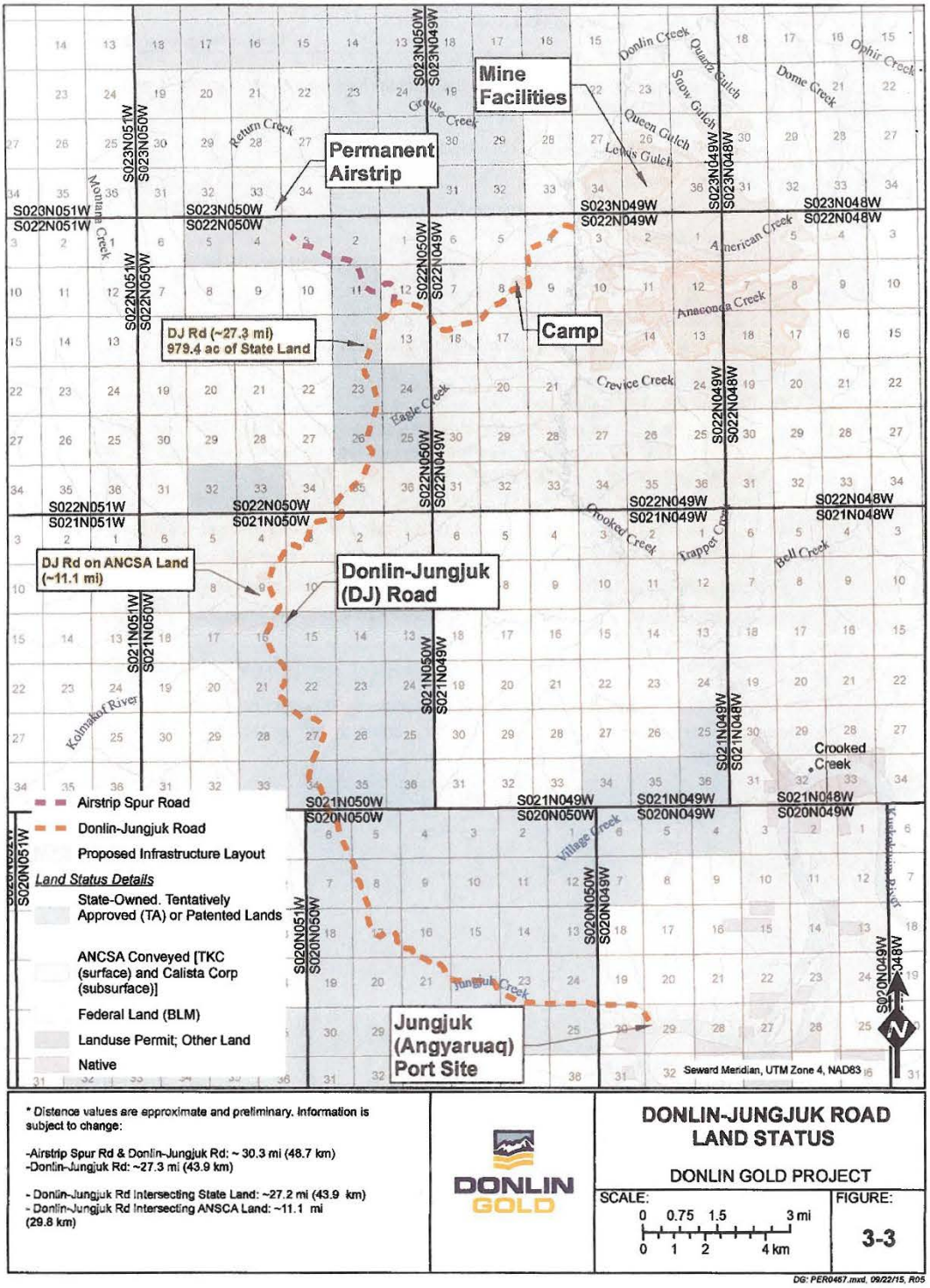
The design criteria would also consider the need to use high-volume, efficient earthworks equipment for a construction project of this magnitude and accelerated schedule. In addition, it has been determined that driving most of the large mine development equipment to the site from the port facility, and thereby minimizing the need for assembly in the field, offers significant cost and schedule benefits.

The equipment required for this type and scope of project cannot work efficiently and safely within the confines of a single-lane road, and gains in productivity offset the additional costs involved in constructing a two-lane road. Given the significant operational and safety benefits of a two-lane road, it was decided that all road segments would be developed as two-lane.

The road embankment design is dictated partly by the size and weight of vehicles and loads to be transport over the roads. Mill and process facility component weights, as well as high axle loads associated with some of the selected mine equipment, have been taken into account and typically control design. The performance criteria associated with the design of the Donlin-Jungjuk Road includes:

- service type- private industrial road for mine development, and operations support
- support 190-ton haul truck (Cat 785C) travel on road surface (empty)
- support autoclave transport
- location and routing to minimize development cost and provide for efficient long-term transport from port site to mine
- as far as practicable, minimize areas of disturbances
- as far as practicable, minimize construction requirements
- as far as practicable, minimize stream crossings and avoid anadromous streams as far as practicable, route over lands with favorable ownership/management

Attachment A
Development Plan



* Distance values are approximate and preliminary. Information is subject to change:

-Airstrip Spur Rd & Donlin-Jungjuk Rd: ~ 30.3 mi (48.7 km)
-Donlin-Jungjuk Rd: ~27.3 mi (43.9 km)

- Donlin-Jungjuk Rd intersecting State Land: ~27.2 mi (43.9 km)
- Donlin-Jungjuk Rd intersecting ANSCA Land: ~11.1 mi (29.8 km)

DONLIN GOLD

DONLIN-JUNGJUK ROAD LAND STATUS

DONLIN GOLD PROJECT

SCALE: 0 0.75 1.5 3 mi / 0 1 2 4 km

FIGURE: 3-3

DG: PER0467.mxd, 09/22/15, R05

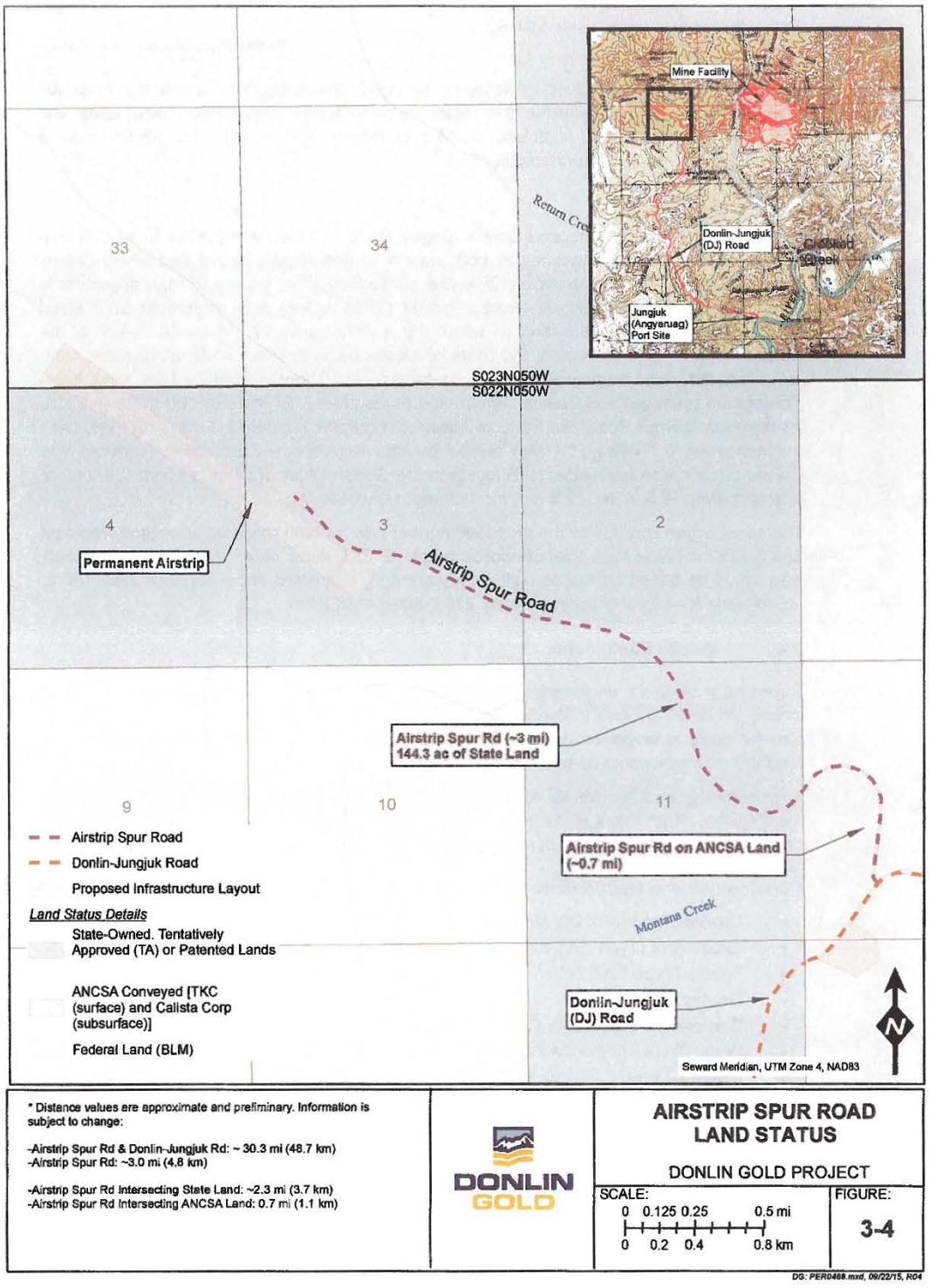
- as far as practicable, route over the best surface and subsurface soils and geotechnical conditions.

The physical construction criteria for the road would include:

- maximum grades.....7.5%
- road surface width (berms excluded).....28 to 30 ft. (8.5 to 9 m)
- design speed:
  - moderate terrain.....35 to 45 mph (60 to 72 kph)
  - rough terrain.....25 mph (40 kph)
  - mountainous terrain.....15 mph (24 kph)
- horizontal curve.....425 ft. (130 m) typical minimum with 200 ft. (60 m) permitted
- clearing width.....45 to 100 ft. (14 to 30 m)
- minimum turning radius.....82 ft. (25 m)
- vertical curve.....American Association of State Highway and Transportation Officials (AASHTO) standard for design speed or specialized carrier requirements for oversize loads K=20 typical & K=15 minimum
- ditches.....2 ft. (0.6 m) typical minimum
- cut or fill slopes.....0.25:1 to 3:1, depending on rock and soil type
- minimum fill depth.....3.3 to 6.5 ft. (1 to 2 m) (varies with quality of subgrade)
- road surfacing...10-inch (254 mm) depth of crushed rock/gravel at -3 inches (-76 mm)
- culverts.....corrugated metal pipe (cmp) 24 inches (610 mm) minimum with thaw pipes as needed
- two-lane bridge.....24 ft. 5 inches (7.4 m) wide deck

The design of the road horizontal and vertical alignments would be based on the AASHTO standards for alignment elements or as required for prescribed transport vehicle specifications.

Attachment A
Development Plan



Given the currently available information, all conditions anticipated along the proposed alignments appear to be within the realm of conventional construction techniques and practices. There are no apparent extreme conditions that would necessitate massive earthworks, tunneling, or stabilization efforts.

3.3 Land Status

The land status for the proposed Donlin-Jungjuk Road and the Airstrip Spur Road is shown in Figures 3-3 and 3-4 and includes both state land and Alaska Native Settlement Claims Act (ANSCA) corporation lands (surface and subsurface). The proposed road alignment is comprised of a Donlin-Jungjuk Road segment (27.28 miles) and an Airstrip Spur Road segment 3.03 miles). Of the land on which the approximately 27.3 miles (43.9 km) of the Donlin-Jungjuk Road is located, the State of Alaska owns approximately 16.16 miles (26.0 km), with the remaining approximately 11.1 miles (17.9 km) owned by The Kuskokwim Corporation (surface) and Calista Corporation (subsurface). Of the total 3.0 miles (4.8 km) for the Airstrip Spur Road, the State of Alaska owns approximately 2.3 miles (3.7 km), with the remaining 0.7 miles (1.1 km) owned by The Kuskokwim Corporation (surface) and Calista Corporation (subsurface). Altogether, the State of Alaska owns a combined total of approximately 18.5 miles (29.8 km) for the proposed roads.

The construction corridor for the proposed right-of-way for both roads on state land would be 500 ft. (152 m) wide for a total of approximately 1,123.6 acres (454.7 ha). The final right-of-way would be based on the as-built survey currently estimated to be approximately 150 ft. (46 m) wide for a total of approximately 336.6 acres (136.2 ha).

3.4 Mobile Equipment

Based on preliminary engineering it is estimated that 44 culverts sized between 24 and 72 inches (61 and 183 cm) in diameter would be required. The actual number and diameter size for culverts would be determined during final engineering design. All portions of the road with culverts would be two-lane.

The following is a typical list of mobile equipment required for road construction and maintenance. The actual equipment type and quantity could vary during detail engineering design as deemed necessary during the life of the mine.

Construction and Maintenance Mobile Equipment

- Dozers (Type CAT D6, D8 & D10)
- Excavators (Type CAT 320, 330, 345, 385)
- Trucks (Type CAT 740)
- Graders (Type CAT 14H)
- Compactors (Type CAT CS563, 815, 825, 563)
- Water Trucks (Type CAT 725)
- Loaders (Type CAT 950, 963, 992, 980, 963, 988H, IT28)
- Generators & Lighting Equipment (Type 6 kW to 1500 kW)
- Light trucks (Type Ford 150, 250, 350)
- Fueling vehicles

During construction temporary camp facilities could be used to accommodate workers for road construction, the port installation and if necessary development of the airstrip. Actual camp locations would be determined during the final engineering design phase but would take advantage of material site locations to prevent additional ground disturbance.

4.0 GOVERNMENT AGENCY INVOLVEMENT

- Alaska Department of Natural Resources (ADNR)
- Alaska Department of Fish and Game (ADF&G)
- Alaska Department of Environmental Conservation (ADEC)
- Alaska Department of Transportation (ADOT)
- U.S. Army Corps of Engineers (USACE)

5.0 CONSTRUCTION

Early completion of the Donlin-Jungjuk Road and Airstrip Spur Road is essential to the overall Donlin Gold project schedule as both mine and pipeline construction activities are dependent on supplies, materials, equipment and personnel being transported via the Donlin-Jungjuk Road from the Port or Permanent Airstrip to the Project for construction purposes and later for mine operation and eventually closure.

Construction of the Donlin-Jungjuk Road and Airstrip Spur Road is anticipated to begin very early in the project life, as these roads would be required to support mine construction.

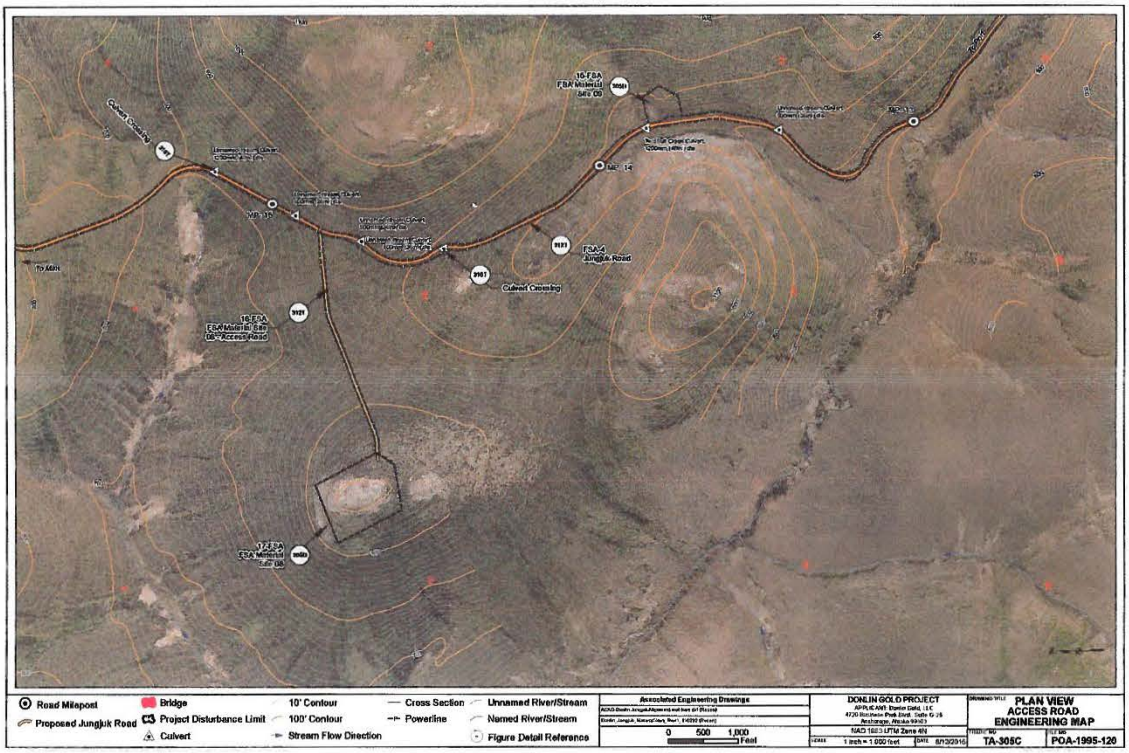
Construction of temporary access roads on state land to Material Sites 8 and 16 would require separate authorizations from Alaska Department of Natural Resources (ADNR).

The temporary access road to Material Site 8 (MS-8) would originate at approximately road station 22+100 (mile 13.7) of the proposed Donlin-Jungjuk Road, and traverse west in an area of naturally vegetated open tundra and shrub to MS-8. The road construction corridor would be approximately 3,300 ft (1,006 m) long and 150 ft (46 m) wide. The road would be approximately 20 ft. (6 m) wide and 3,300 ft. (1,006 m) long. The toe to toe dimensions of the road would range from 33 ft (10 m) to 49 ft (15 m) depending on fill requirements which would range from 3 ft (1 m) to 7 ft (2 m) in depth along the road. No culverts would be necessary.

The temporary access road to MS-16 would originate at approximately road station 41+100 (mile 25.5) of the proposed Donlin-Jungjuk Road, and traverse north to MS-16.

The road construction corridor would be approximately 1,500 ft (450 m) long and 150 ft (46 m) wide. The road would be approximately 20 ft. (6 m) wide and 1,500 ft. (450 m) long. The toe to toe dimensions of the road would range from 33 ft (10 m) to 49 ft (15 m) depending on fill requirements which would range from 3 ft (1 m) to 7 ft (2 m) in depth along the road. Two 24-inch diameter culverts would be installed to maintain surface drainage from west to east.

Attachment A
Development Plan



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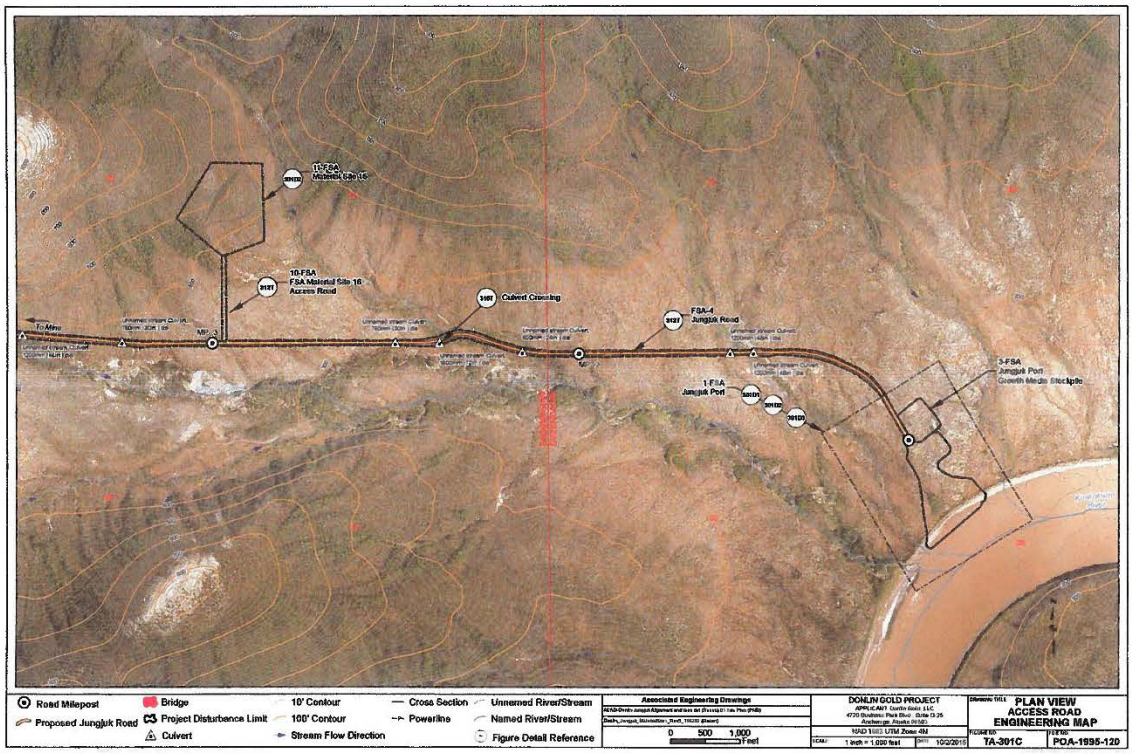


6.0 AS-BUILT SURVEY

Following completion of construction an as-built survey of the Donlin-Jungjuk Road and the Airstrip Spur Road would be completed for the permanent right-of-way.

7.0 RECLAMATION AND CLOSURE PLAN

During reclamation and closure the Jungjuk Port facilities would be reclaimed, leaving only a small barge landing area and the Donlin-Jungjuk Road to the mine site. The Permanent Airstrip and Airstrip Spur Road would remain as long-term assets to the land owners with non-essential facilities removed and as appropriate impacted areas reclaimed (*Donlin Gold Project Description*, SRK 2016. *Donlin Gold Project Reclamation and Closure Plan*, SRK 2017). The Airstrip Spur Road would remain to allow personnel transport and materials and supplies to be delivered for post closure requirements, monitoring, and operation of water treatment facility. Any material sites that may be authorized as part of the right-of-way for construction and maintenance purposes would be closed and reclaimed as provided in the specific material site reclamation plan or *Donlin Gold Project Reclamation and Closure Plan*, SRK 2017.

8.0 OPERATION AND MAINTENANCE

The Donlin-Jungjuk Road and Airstrip Spur Road traverse varied terrain and subsurface soil conditions, including areas of permafrost and intervals of ice-rich soils susceptible to thermal degradation and settlement. Given these conditions, road surface maintenance and embankment rehabilitation would be ongoing throughout the mine operating life, particularly over the first several years. The need for ready access to material sources to facilitate regular upgrading and maintenance has been taken into consideration. The typical road embankment design allows for efficient maintenance.

The road designs, including the placement and sizing of culverts, takes into consideration the seasonal drainage, high flow events and spring runoff requirements for the routes. Appropriate best-management practices would be applied for road maintenance during construction and operations. Both roads would be operated and maintained as part of the proposed Donlin Gold Project for as long as required.

The Jungjuk-Donlin Road from the minesite to its junction with the Airport Spur Road, and the Airport Spur Road, would be operated year-round. The Jungjuk-Donlin Road from its junction with the Airport Spur Road, to the Jungjuk Port Facility, would not be operated during the winter months. Winter travel to the port could take place with specialized winter travel equipment on an occasional basis.

All bridge structures would be maintained throughout their assumed design service life. The Crooked Creek Bridge would be maintained beyond its assumed service life of 25 years to accommodate continued use of the road to the mine site however the five-steel arch bridge type structure crossings would be removed and low water crossings constructed at the end of mine life.

8.1 Fuel Handling and Storage

Fuel would be delivered from the Port to the mine fuel storage tank farm site in B-train tanker trucks (Typical 2 x 7250 gal). The B-train tanker trucks would be loaded by port staff and parked adjacent to the fueling area. Empty tankers returning from the mine would be swapped with full tankers thus reducing standby time to a minimum. An estimated peak annual transport of diesel fuel is 42.3 million gallons. This would require an average of 27 trips per day with a 3.25 hour round trip travel time. The total number of trips in a peak year would require 2,963 fuel tanker trips along the roadway.

The 2.8 USMgal (10.6 ML) diesel tank at the port would serve as a temporary storage buffer for the main fuel storage facility at the mine site, allowing barges to be unloaded without delay. The mine site will have an estimated 37.5 USMgal of diesel fuel storage capacity.

Facilities and management practices would be designed and implemented as required to meet or exceed applicable Federal, State, and fire code requirements. Fire extinguishers and spill response supplies would be available in sufficient amounts at practical locations. The standard operating procedures for handling fuel transfers, inspections, training requirements, and spill response practices, would be documented in the required:

- Facility Response Plan (FRP)

- Spill Prevention Contingency and Countermeasures Plan (SPCC)
- Oil Discharge Prevention and Contingency Plan (ODPCP)

8.2 Hazardous Substances

A large volume of reagents and other hazardous goods would be moved annually via the port to the mine. All cargos shipped to the port in containers or as break-bulk classed as hazardous would be packaged and identified in accordance with the requirements of the applicable legislation and regulations. Processes and practices for the packaging, handling, storage, and marking of all hazardous materials would be developed and subject to applicable approval. Personnel who provide logistics and transport services would be certified to handle, store, and transport these materials.

Typical chemicals/reagents listed below require special handling. The actual chemicals/reagents could vary during detail engineering design as deemed necessary during the life of the mine:

- Potassium Amyl Xanthate
- Methyl Isobutyl Carbinol (MIBC) and F549
- Nitric Acid
- Lime (calcium oxide)
- Sodium Cyanide
- Activated Carbon
- Caustic soda (Sodium hydroxide)
- Mercury Suppressant (UNR 829)
- Flocculants
- Sulfur
- Copper sulfate
- Fluxes (borax, sodium nitrate, and silica sand)
- Water Softening and Anti-Scalant Agents
- Ferric Sulphate
- Sulphuric Acid
- Sodium hydroxide
- Polymer
- Potassium Permangenate
- Sodium Metabisulfite
- Cleaning-In-Place (HC1, NaOH)
- Microsand
- Liquid Elemental Mercury
- Spent Activated Carbon (Mercury)

From the port shipping containers would be returned to marine terminals in Seattle or Vancouver on the backhaul trips of the barges. Most, but not all, would be empty and would be available to be used to transport off-site recyclable materials, empty return drums, as well

as hazardous and non-hazardous waste that cannot be managed at the mine site, such as solvents, antifreeze, batteries, and chemicals or other materials.

Return shipments of hazardous waste or other hazardous materials would be manifested, packaged, labeled, and handled according to the applicable regulations of the U.S. Department of Transportation (USDOT), U.S. Coast Guard (USCG), Resource Conservation and Recovery Act (RCRA) and other applicable laws. Personnel handling these shipments would be trained in accordance with the applicable regulations. Hazardous waste would be sent to a designated Treatment, Storage, and Disposal Facility (TSDF) according to the applicable RCRA regulations.

Movement of reagents and other hazardous goods from Jungjuk Port to the mine site would conform to regulatory and permit requirements and approved spill and response plans. The current estimates for cargo transport calls for 10 tractor-trailer units, with an fleet average of 27 trips per day and a peak season traffic estimate of 2,917 trips over the summer freight season.

8.3 Snow Removal

Snow removal would be incorporated in the on-going operations of the project when and where appropriate. In general snow removal during operation of the mine would only take place along the portion of the roads operated year-round (between the mine site and the airstrip).

9.0 REFERENCES

Much of the information used in the preparation of this Plan of Development was derived from Donlin Gold documents from the following sources:

AMEC Americas Limited. Donlin Creek LLC, Donlin Creek Gold Project, *Feasibility Study Update 2.* November 2011

British Columbia, Ministry of Forests, Lands, and Natural Resource Operations. *Forest Service Bridge Design and Construction Manual, Engineering Branch,* July 30, 1999

RECON. *Donlin Gold Offsite Infrastructure Supplementary Geotech Technical Memorandum.* December 2013

SRK Consulting. Donlin Gold Project, *Plan of Operation, Project Description.* December 2016

SRK Consulting. Donlin Gold Project, *Plan of Operation, Reclamation and Closure Plan.* December 2017.

SRK Consulting. Donlin Gold Project, *Plan of Development, Natural Gas Pipeline Revision 1.* December 2013

Appendix A: Preliminary Plan and Profiles

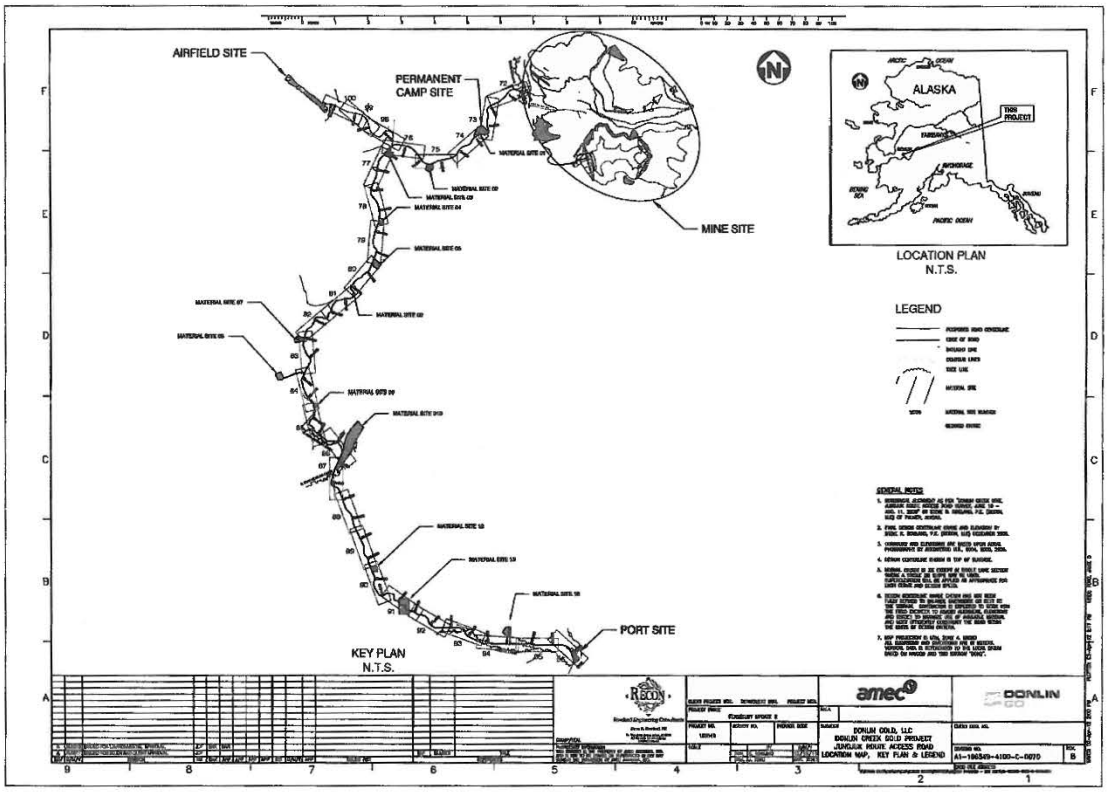
Attachment A
Development Plan

Location of Activity				
State Land Crossed by Donlin-Jungjuk Road and Airstrip Spur Road Subject to Final Engineering Design				
Meridian	Township	Range	Section	Quarter Section
Seward	020N	050W	25	NE
Seward	020N	050W	25	NW
Seward	020N	050W	24	SE
Seward	020N	050W	24	SW
Seward	020N	050W	26	NE
Seward	020N	050W	23	SE
Seward	020N	050W	23	SW
Seward	020N	050W	22	SE
Seward	020N	050W	22	NE
Seward	020N	050W	22	SW
Seward	020N	050W	22	NW
Seward	020N	050W	21	NE
Seward	020N	050W	21	SE
Seward	020N	050W	21	NW
Seward	020N	050W	16	SW
Seward	020N	050W	16	SE
Seward	020N	050W	17	SE
Seward	020N	050W	17	NE
Seward	020N	050W	17	SW
Seward	020N	050W	17	NW
Seward	020N	050W	8	SW
Seward	020N	050W	8	NW
Seward	020N	050W	7	NE
Seward	020N	050W	5	SW
Seward	020N	050W	6	SE
Seward	020N	050W	6	NE
Seward	020N	050W	6	NW
Seward	021N	050W	34	SE
Seward	021N	050W	34	NE
Seward	021N	050W	34	NW
Seward	021N	050W	27	SE
Seward	021N	050W	27	SW
Seward	021N	050W	27	NE
Seward	021N	050W	27	NW
Seward	021N	050W	22	SW
Seward	021N	050W	22	NW
Seward	021N	050W	21	SE
Seward	021N	050W	21	NE
Seward	021N	050W	16	SE
Seward	021N	050W	16	NE

Attachment A
Development Plan

Location of Activity				
State Land Crossed by Donlin-Jungjuk Road and Airstrip Spur Road Subject to Final Engineering Design				
Seward	022N	050W	26	SE
Seward	022N	050W	26	NE
Seward	022N	050W	23	SE
Seward	022N	050W	23	NE
Seward	022N	050W	14	SE
Seward	022N	050W	14	NE
Seward	022N	050W	11	SE
Seward	022N	050W	11	NE
Seward	022N	050W	11	NW
Seward	022N	050W	2	SE
Seward	022N	050W	2	SW
Seward	022N	050W	3	SE
Seward	022N	050W	3	SW
Seward	022N	050W	3	NW

Attachment A
Development Plan



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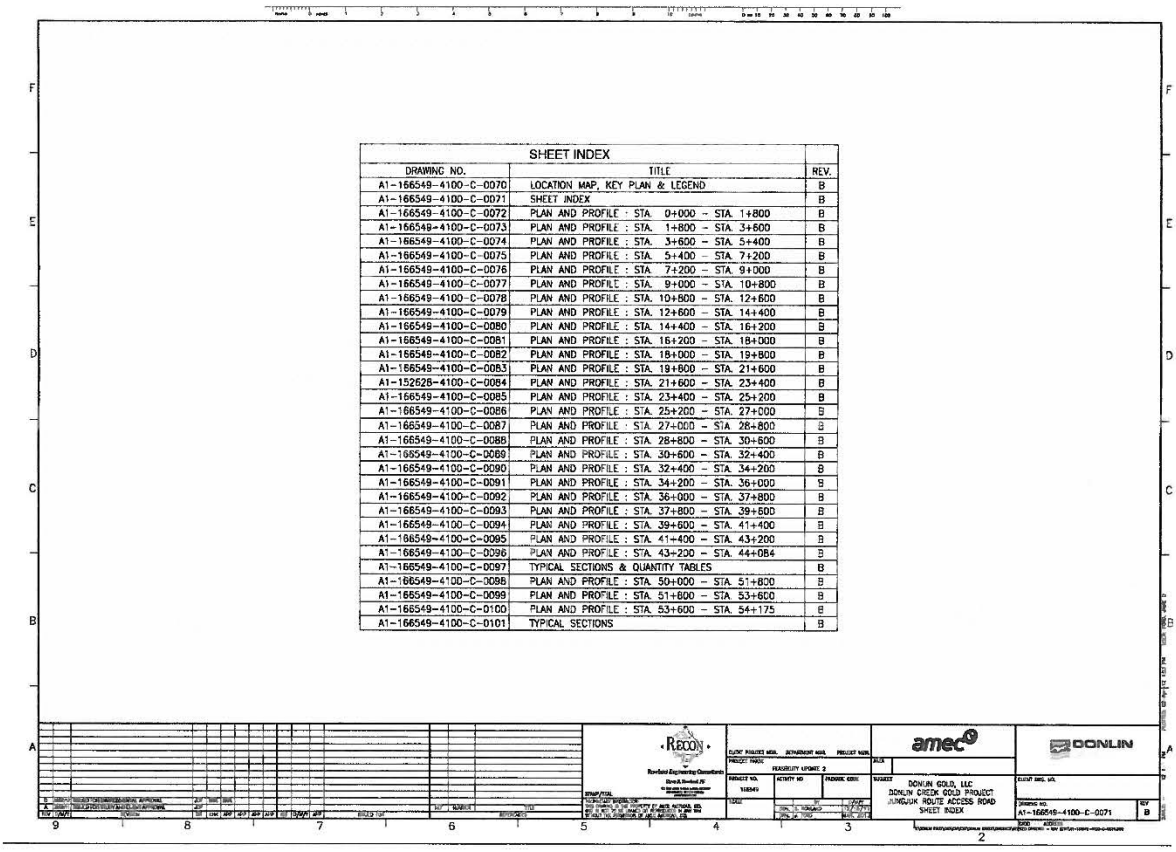

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DRAWING NO.	TITLE	REV.
A1-166549-4100-C-0070	LOCATION MAP, KEY PLAN & LEGEND	B
A1-166549-4100-C-0071	SHEET INDEX	B
A1-166549-4100-C-0072	PLAN AND PROFILE : STA. 0+000 – STA. 1+800	B
A1-166549-4100-C-0073	PLAN AND PROFILE : STA. 1+800 – STA. 3+600	B
A1-166549-4100-C-0074	PLAN AND PROFILE : STA. 3+600 – STA. 5+400	B
A1-166549-4100-C-0075	PLAN AND PROFILE : STA. 5+400 – STA. 7+200	B
A1-166549-4100-C-0076	PLAN AND PROFILE : STA. 7+200 – STA. 9+000	B
A1-166549-4100-C-0077	PLAN AND PROFILE : STA. 9+000 – STA. 10+800	B
A1-166549-4100-C-0078	PLAN AND PROFILE : STA. 10+800 – STA. 12+600	B
A1-166549-4100-C-0079	PLAN AND PROFILE : STA. 12+600 – STA. 14+400	B
A1-166549-4100-C-0080	PLAN AND PROFILE : STA. 14+400 – STA. 16+200	B
A1-166549-4100-C-0081	PLAN AND PROFILE : STA. 16+200 – STA. 18+000	B
A1-166549-4100-C-0082	PLAN AND PROFILE : STA. 18+000 – STA. 19+800	B
A1-166549-4100-C-0083	PLAN AND PROFILE : STA. 19+800 – STA. 21+600	B
A1-152626-4100-C-0084	PLAN AND PROFILE : STA. 21+600 – STA. 23+400	B
A1-166549-4100-C-0085	PLAN AND PROFILE : STA. 23+400 – STA. 25+200	B
A1-166549-4100-C-0086	PLAN AND PROFILE : STA. 25+200 – STA. 27+000	B
A1-166549-4100-C-0087	PLAN AND PROFILE : STA. 27+000 – STA. 28+800	B
A1-166549-4100-C-0088	PLAN AND PROFILE : STA. 28+800 – STA. 30+600	B
A1-166549-4100-C-0089	PLAN AND PROFILE : STA. 30+600 – STA. 32+400	B
A1-166549-4100-C-0090	PLAN AND PROFILE : STA. 32+400 – STA. 34+200	B
A1-166549-4100-C-0091	PLAN AND PROFILE : STA. 34+200 – STA. 36+000	B
A1-166549-4100-C-0092	PLAN AND PROFILE : STA. 36+000 – STA. 37+800	B
A1-166549-4100-C-0093	PLAN AND PROFILE : STA. 37+800 – STA. 39+600	B
A1-166549-4100-C-0094	PLAN AND PROFILE : STA. 39+600 – STA. 41+400	B
A1-166549-4100-C-0095	PLAN AND PROFILE : STA. 41+400 – STA. 43+200	B
A1-166549-4100-C-0096	PLAN AND PROFILE : STA. 43+200 – STA. 44+084	B
A1-166549-4100-C-0097	TYPICAL SECTIONS & QUANTITY TABLES	B
A1-166549-4100-C-0098	PLAN AND PROFILE : STA. 50+000 – STA. 51+800	B
A1-166549-4100-C-0099	PLAN AND PROFILE : STA. 51+800 – STA. 53+600	B
A1-166549-4100-C-0100	PLAN AND PROFILE : STA. 53+600 – STA. 54+175	B
A1-166549-4100-C-0101	TYPICAL SECTIONS	B

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DONLIN

FEASIBILITY UPDATE 2

DONLIN GOLD, LLC
DONLIN CREEK GOLD PROJECT
JUNEAU ROUTE ACCESS ROAD
SHEET INDEX

A1-166549-4100-C-0071 B

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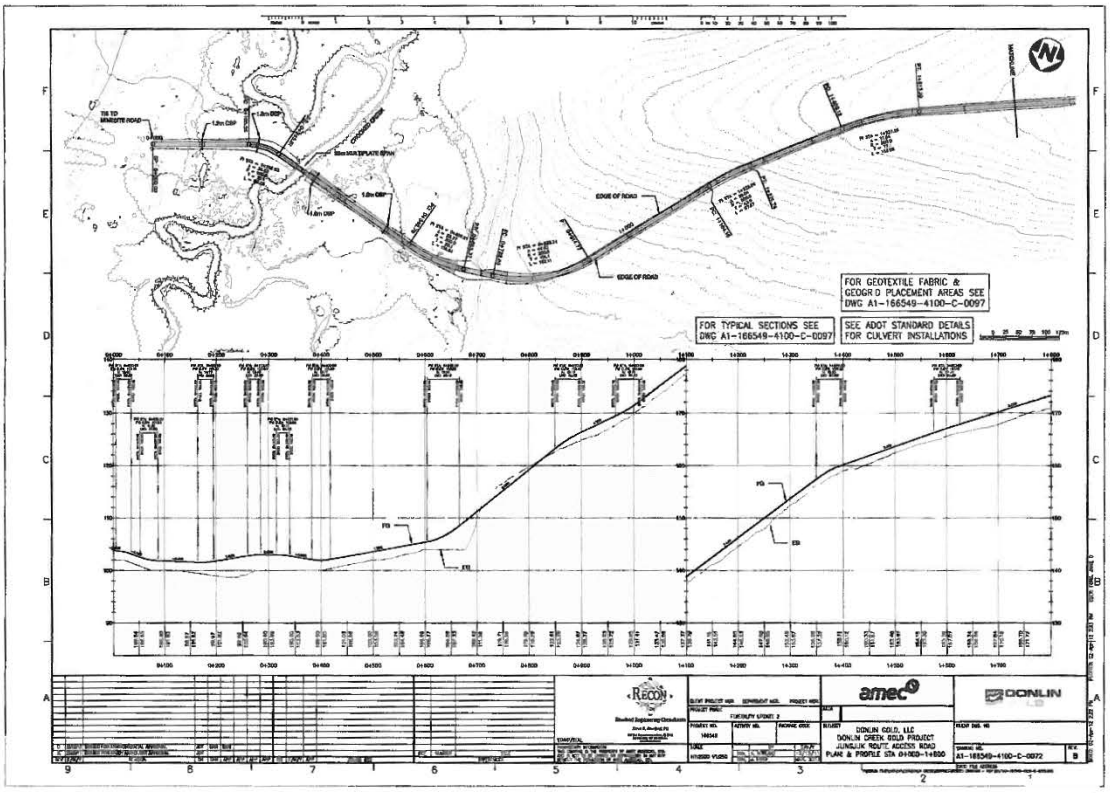

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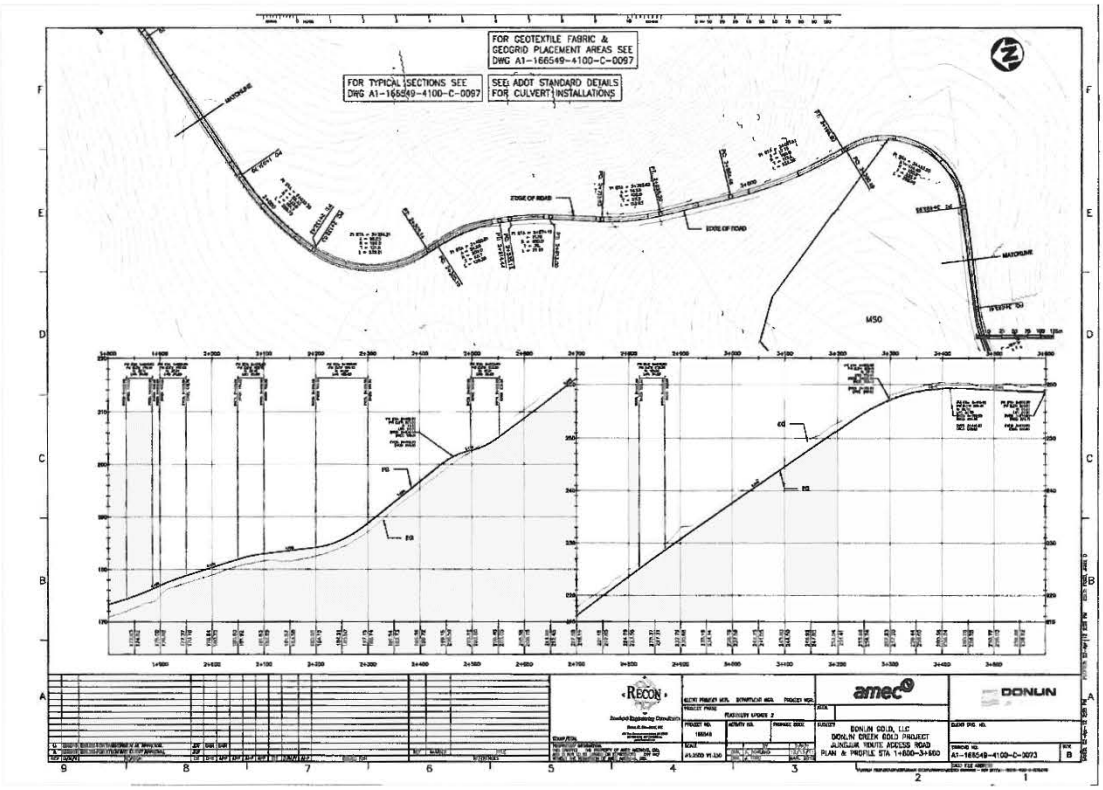

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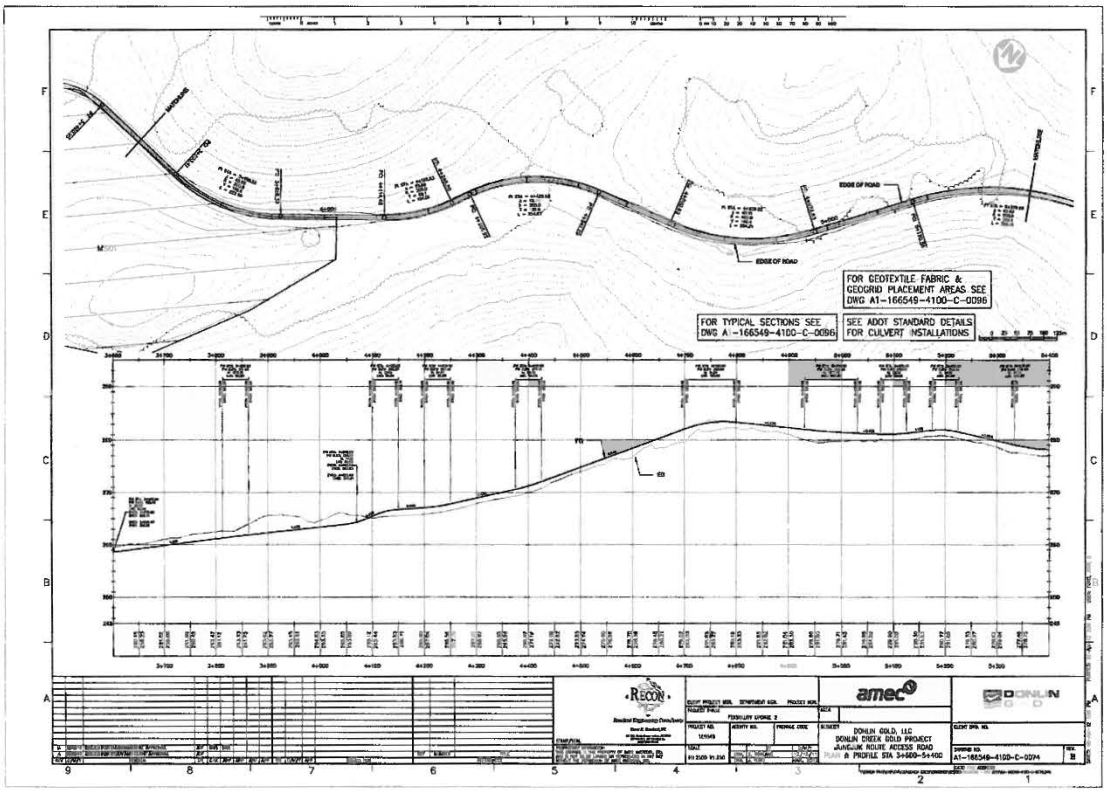

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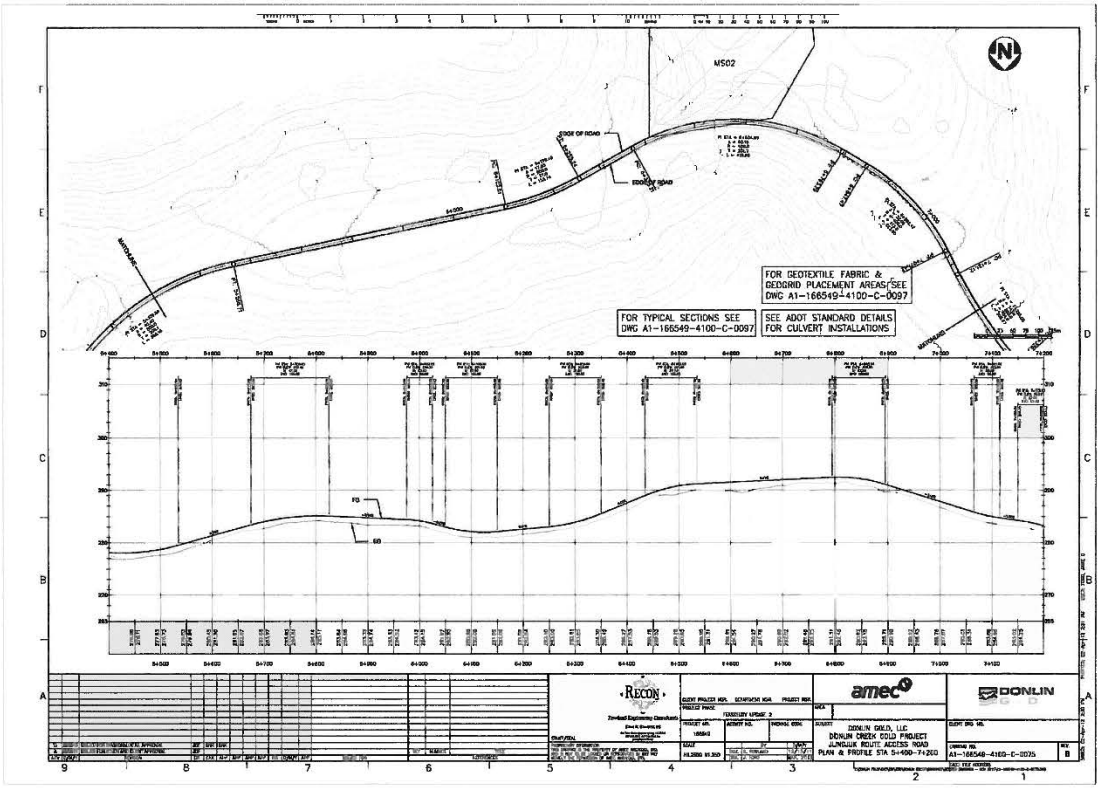

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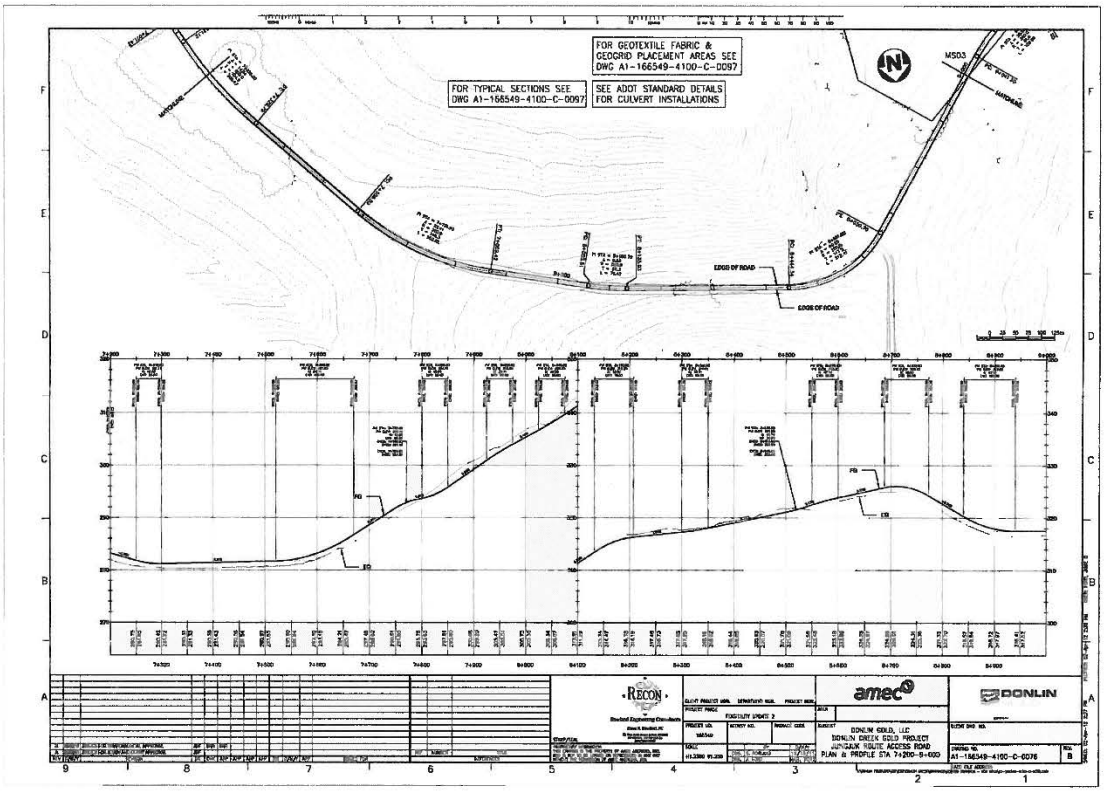

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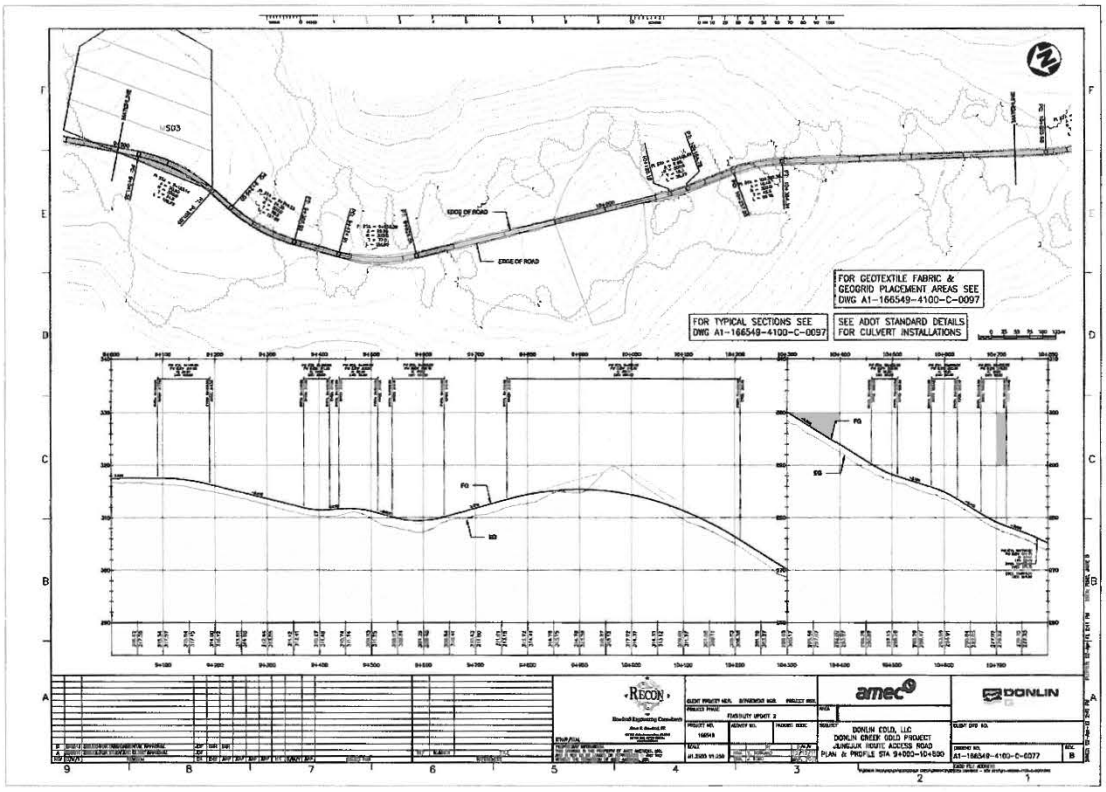

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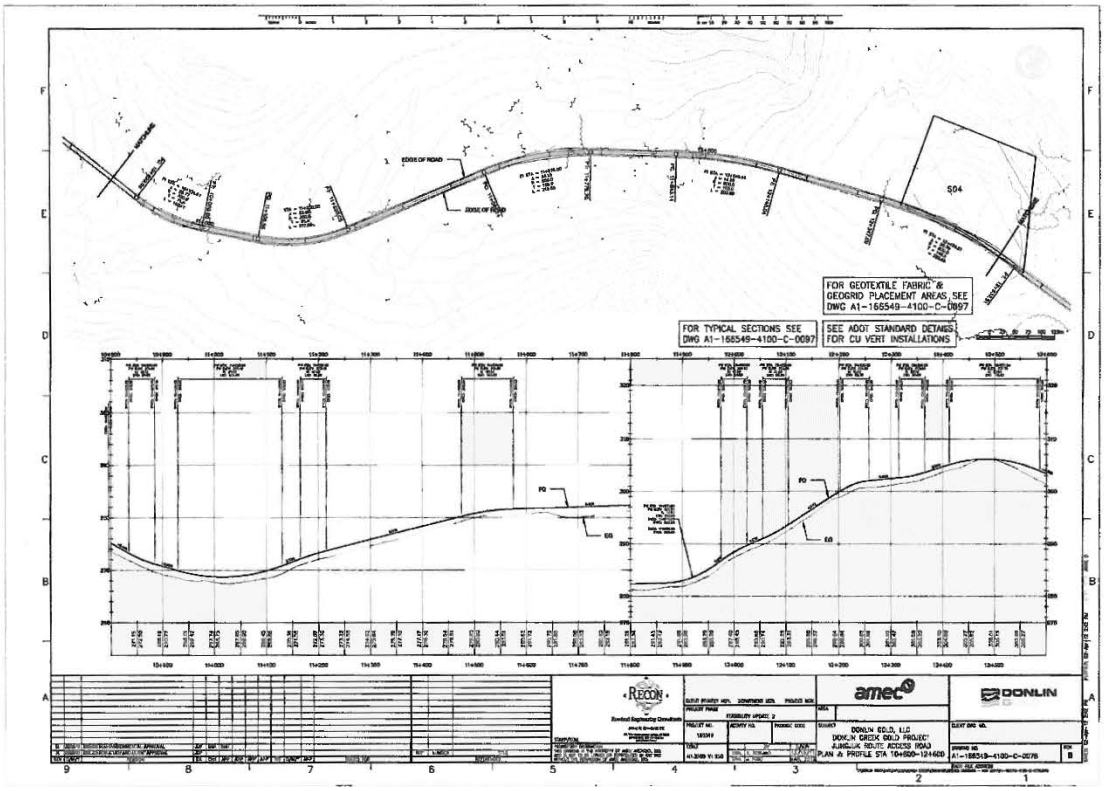

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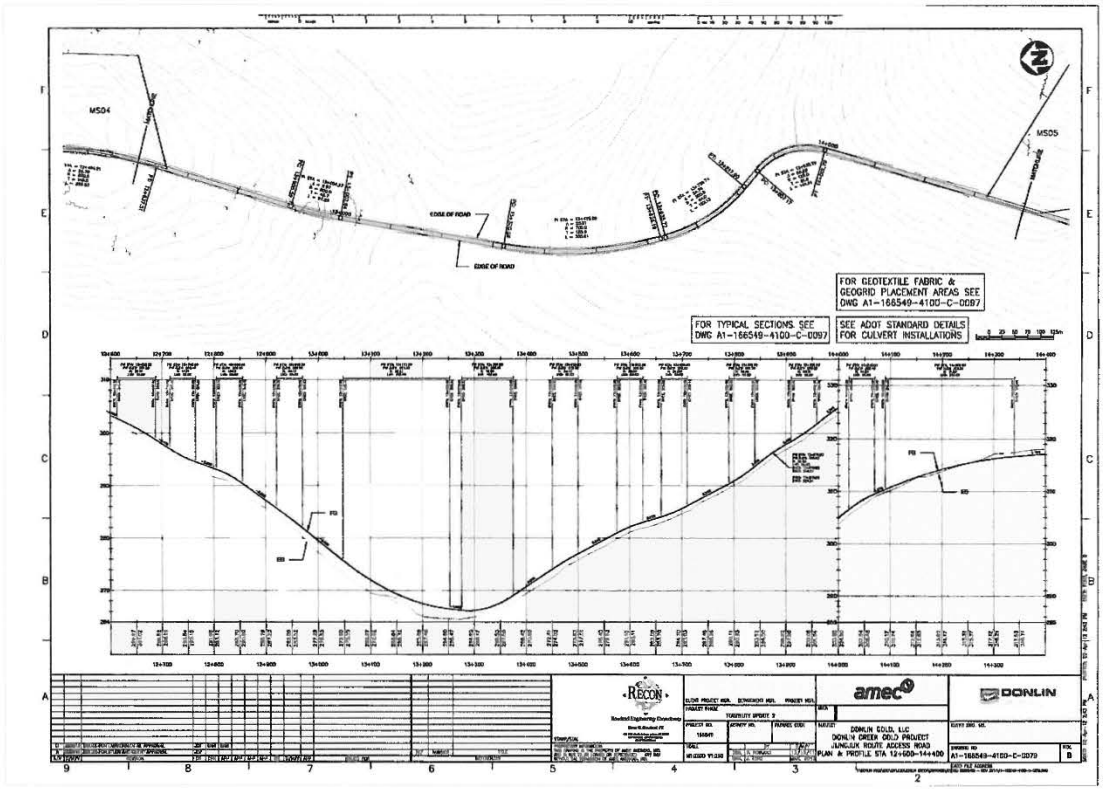

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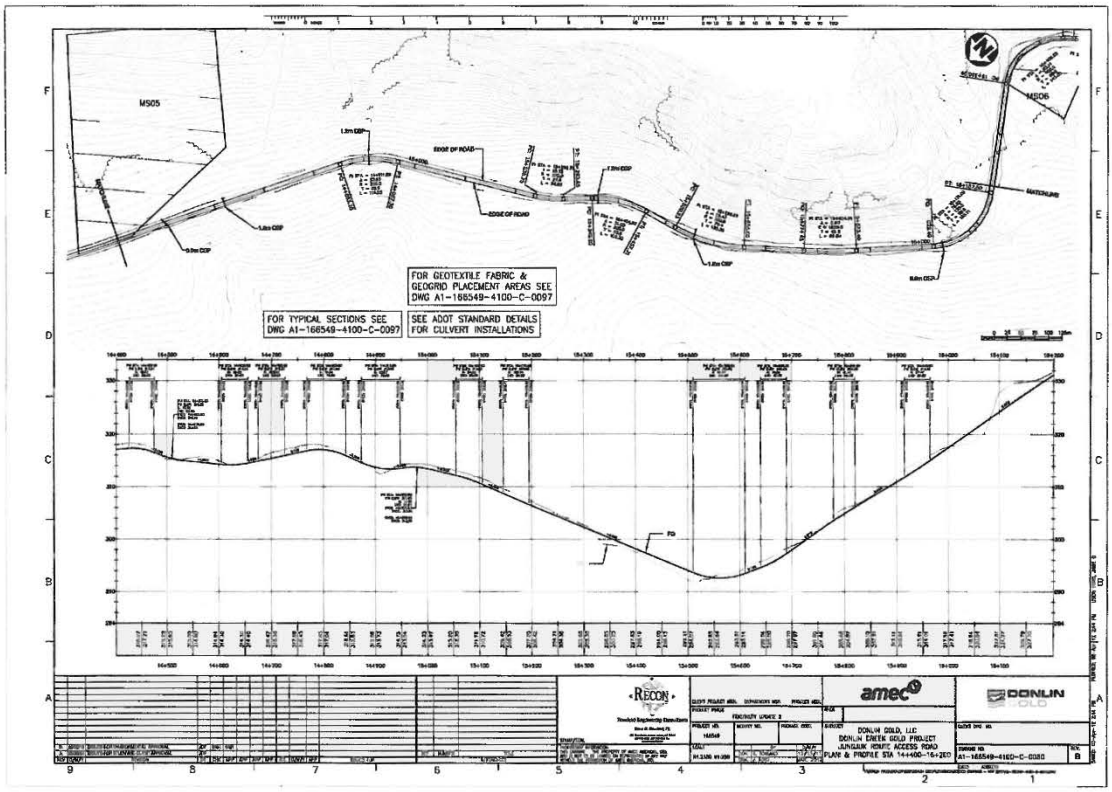

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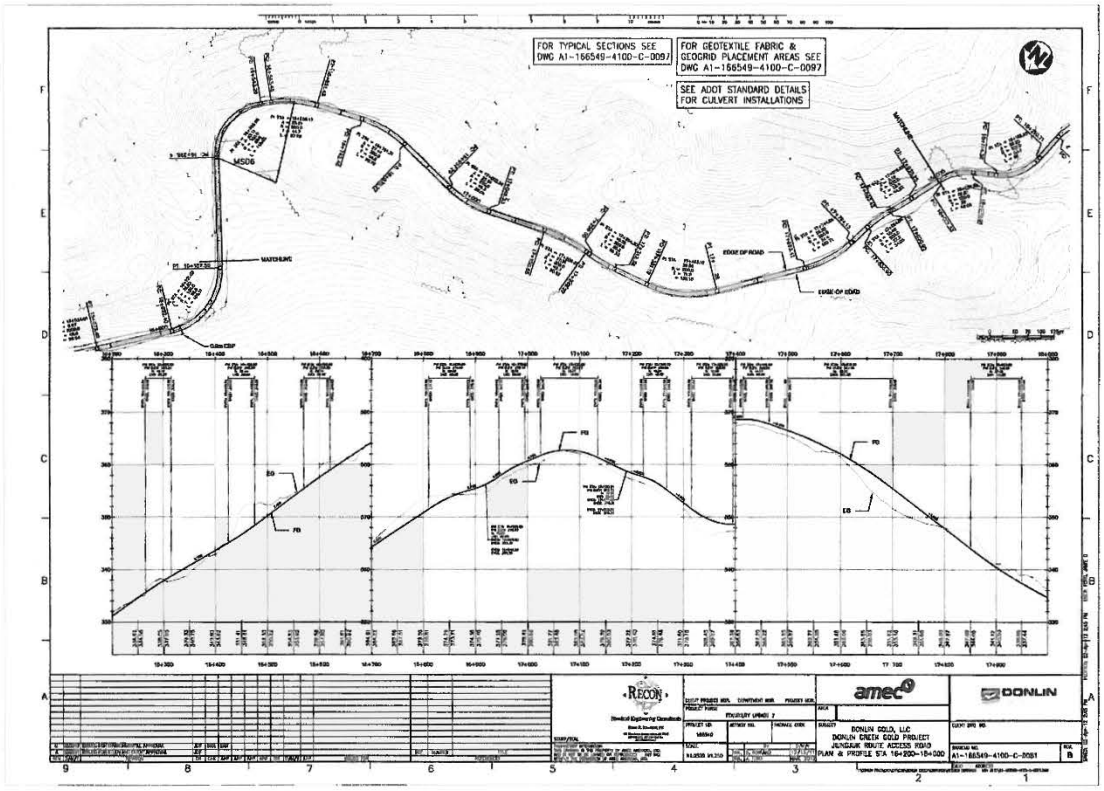

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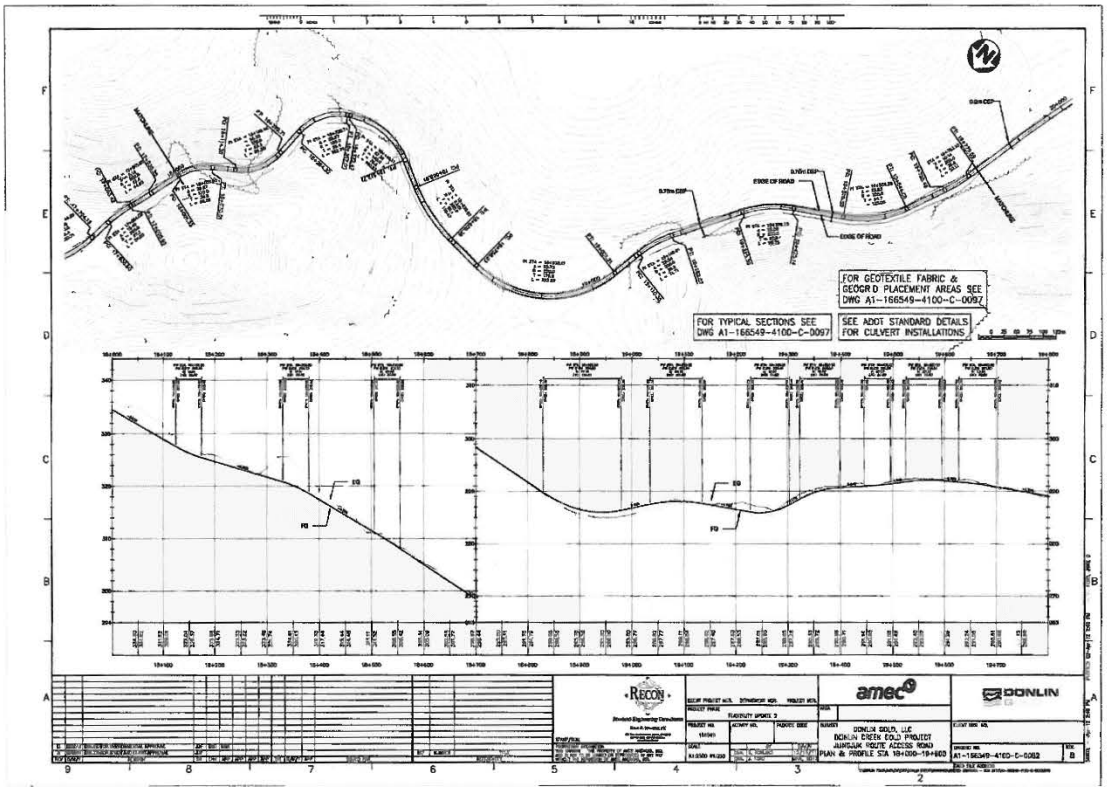

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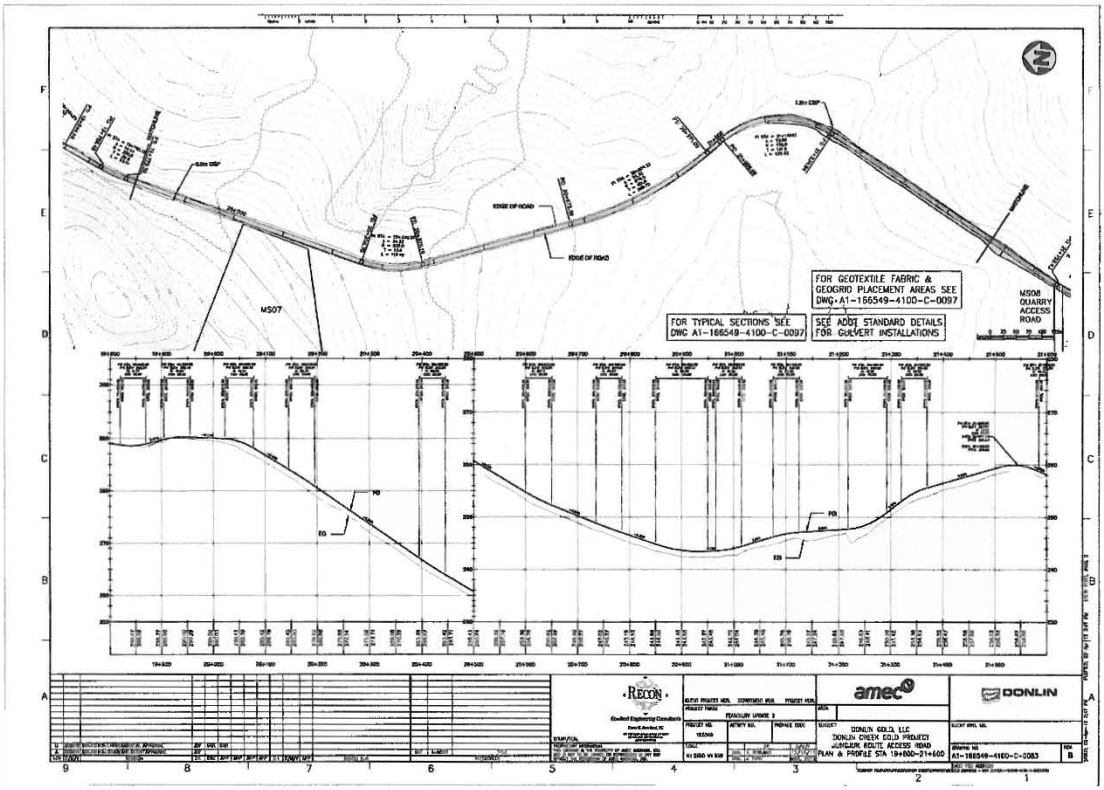

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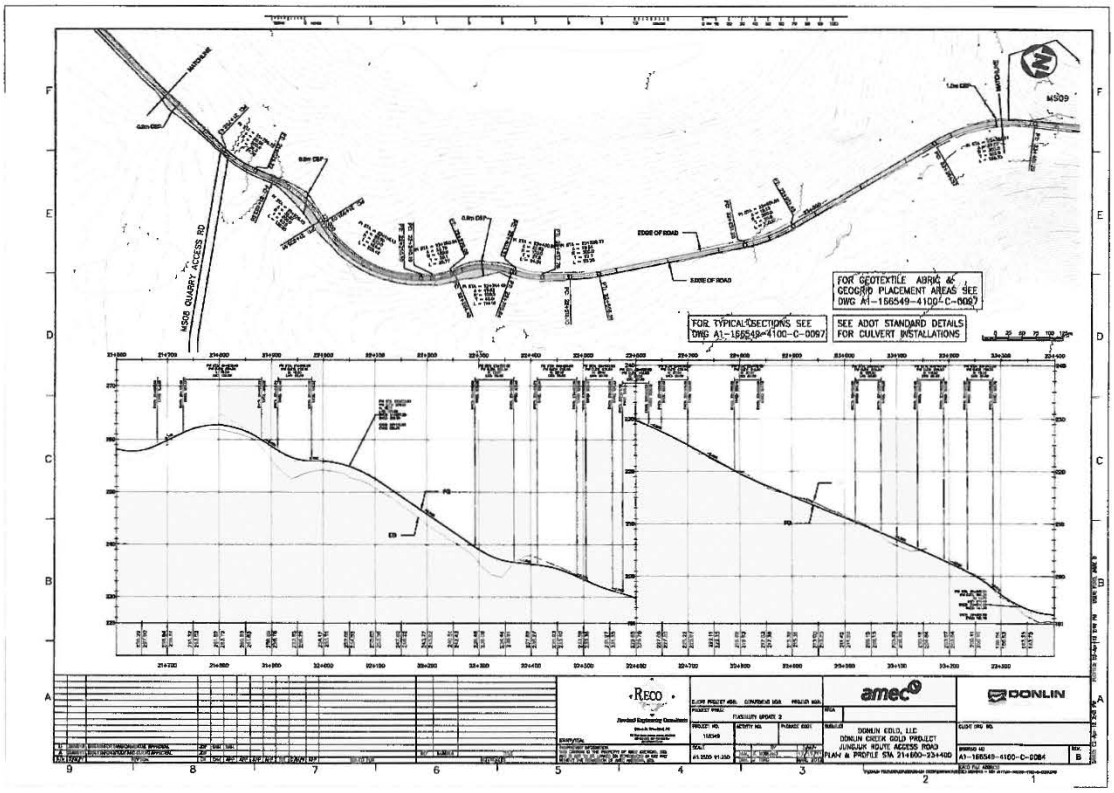

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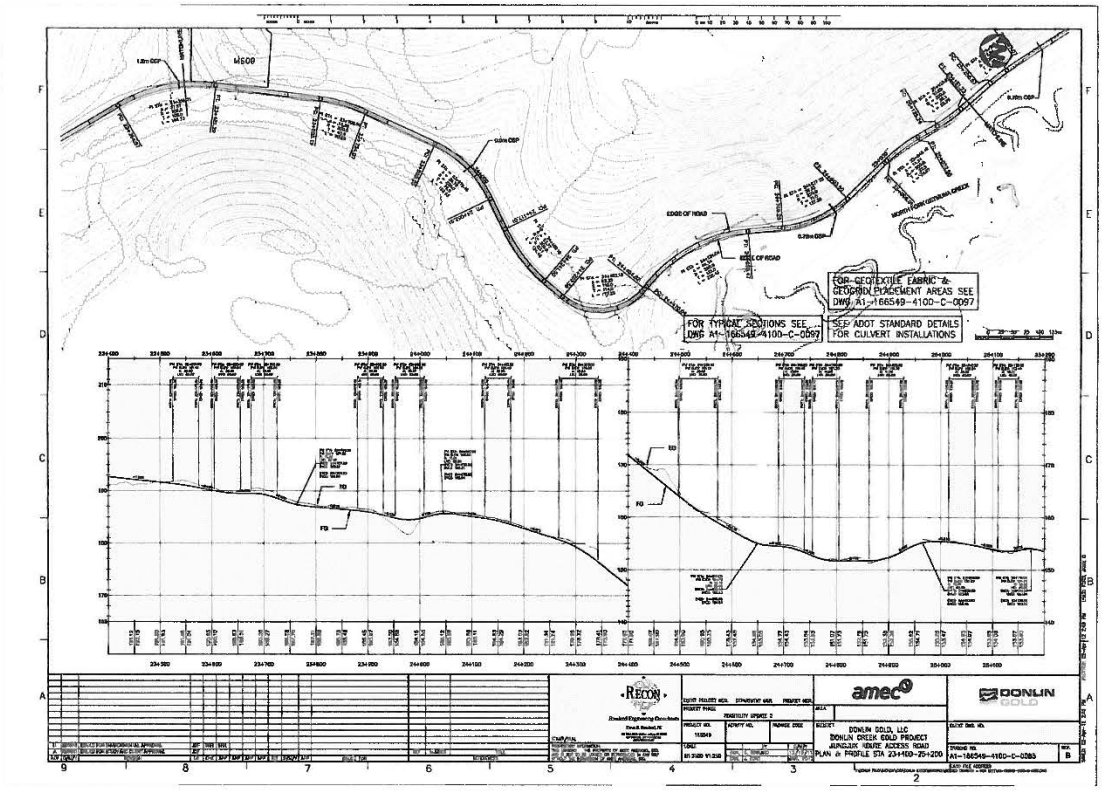

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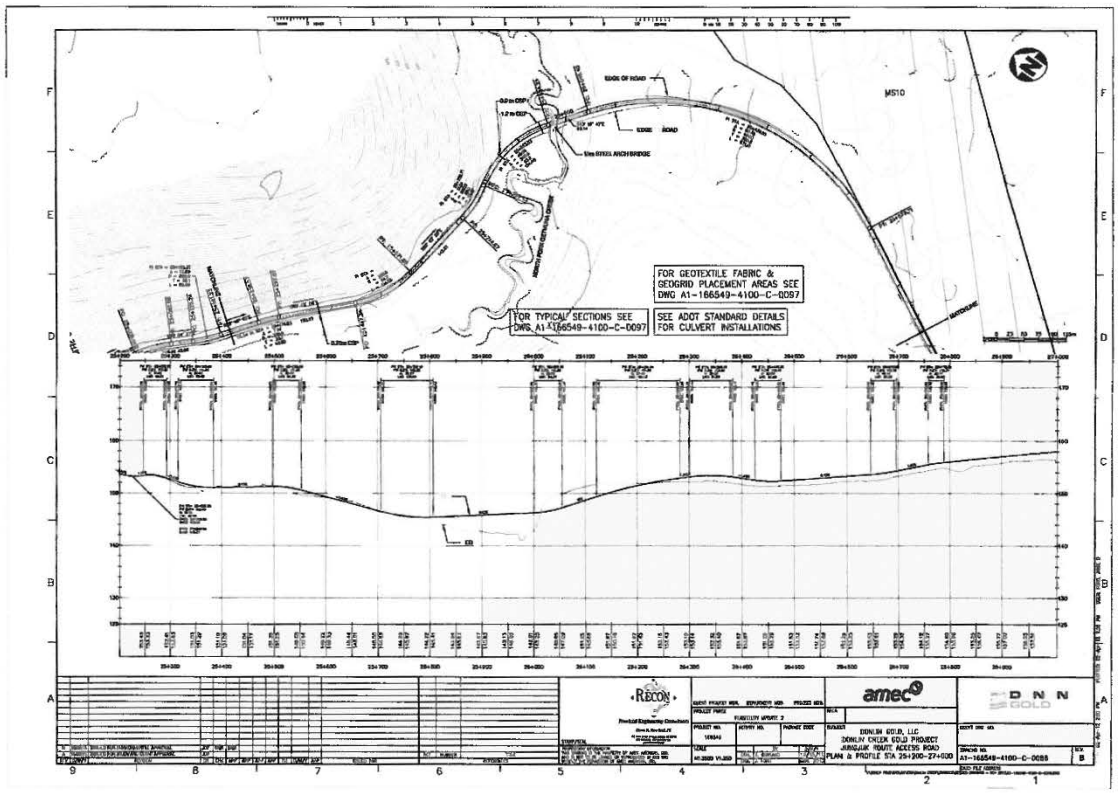

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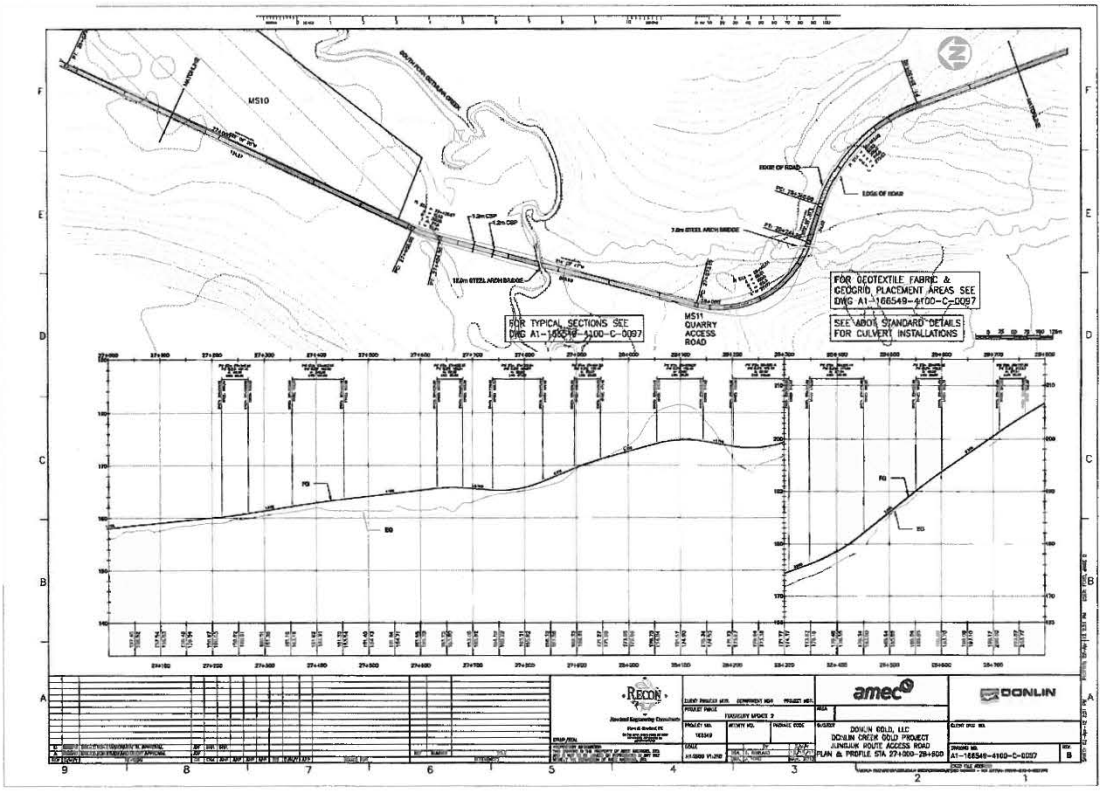

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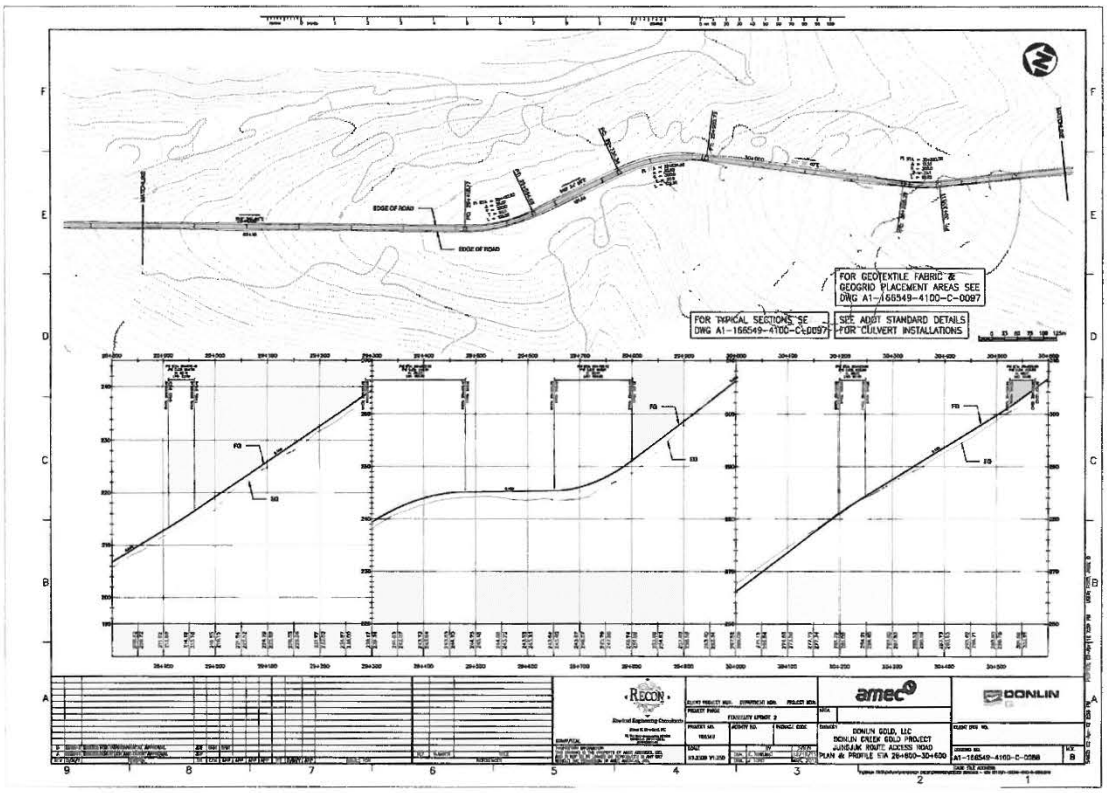

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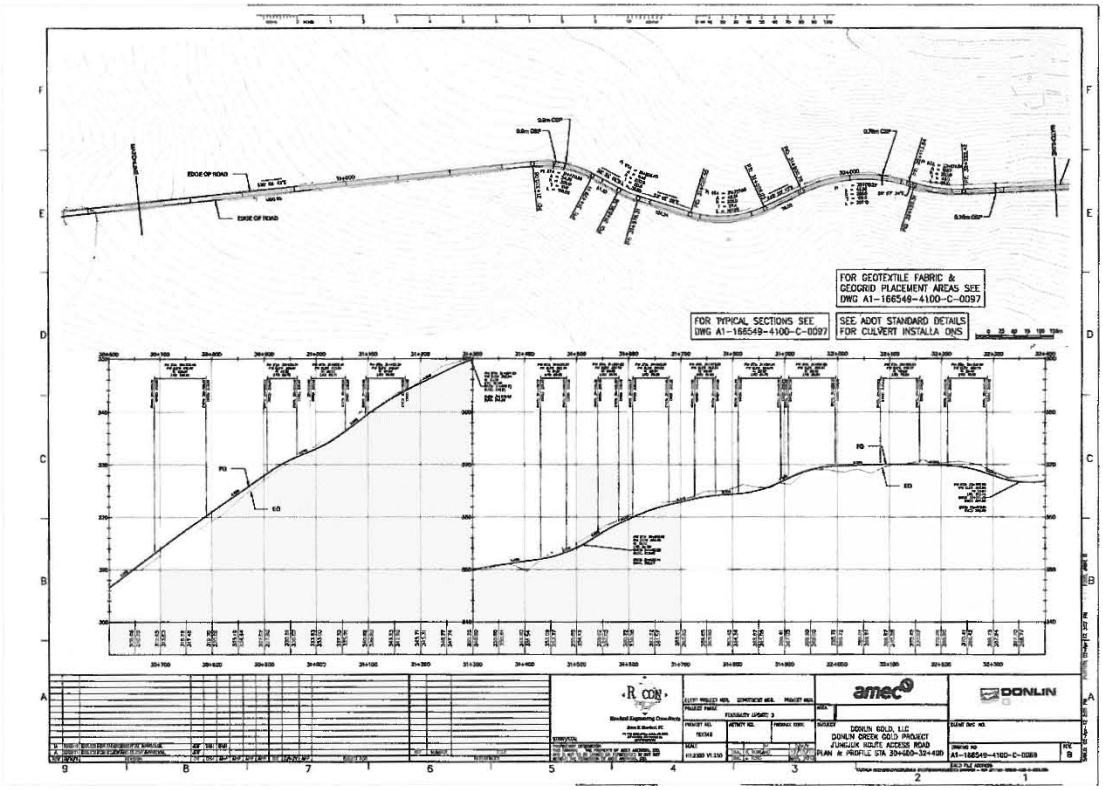

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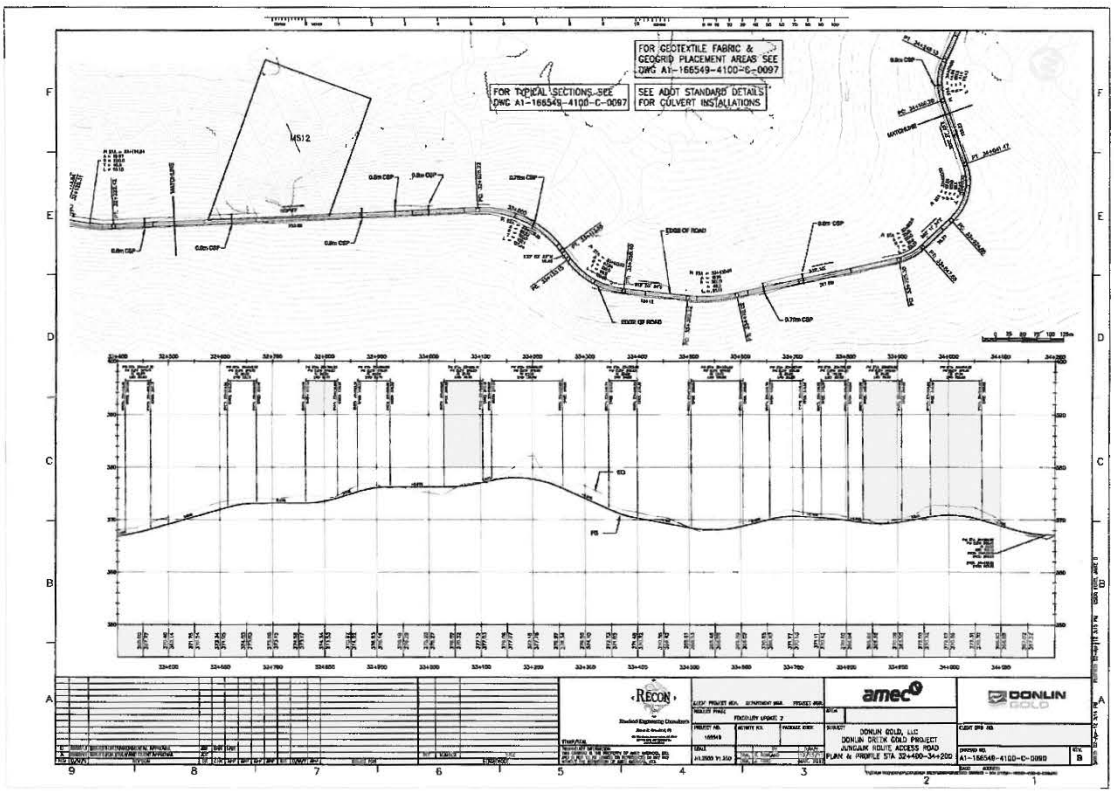

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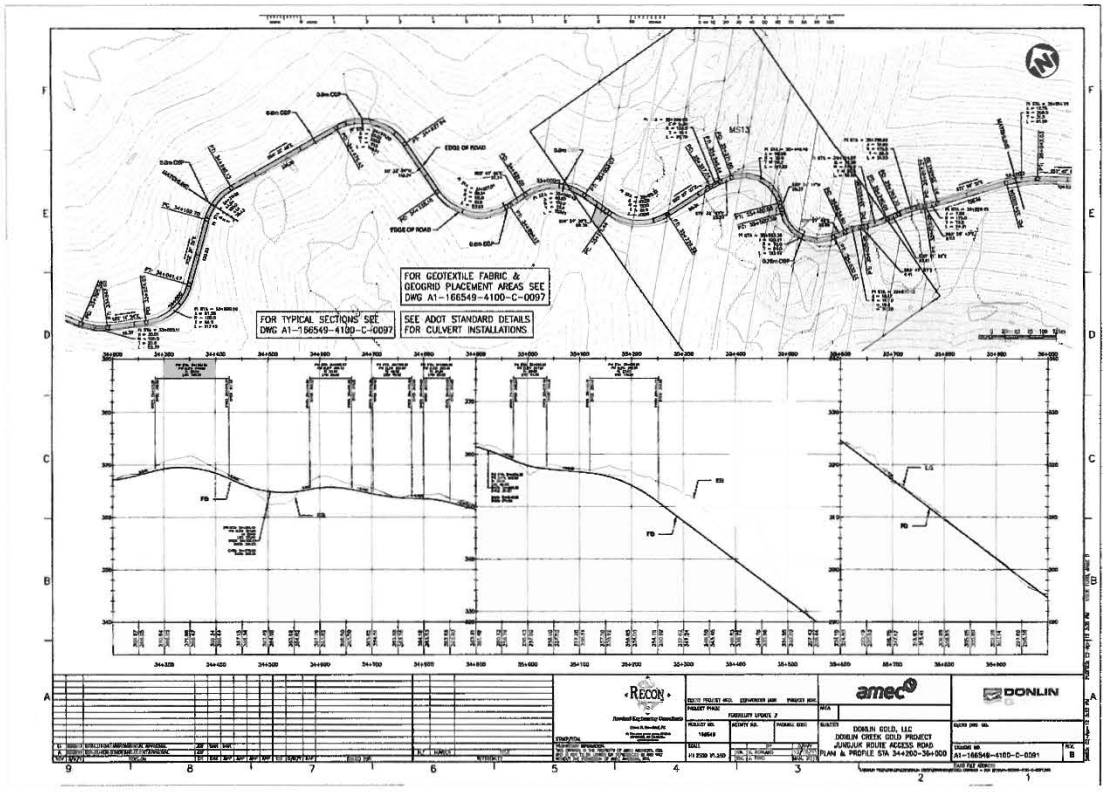

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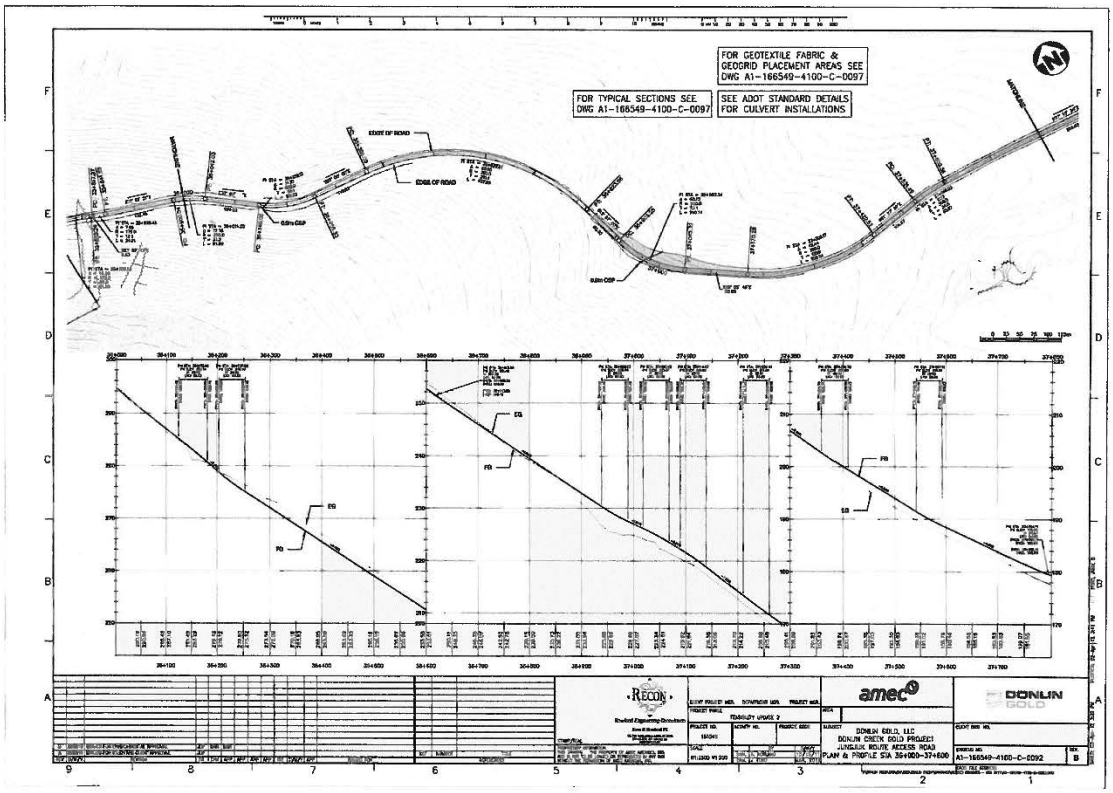

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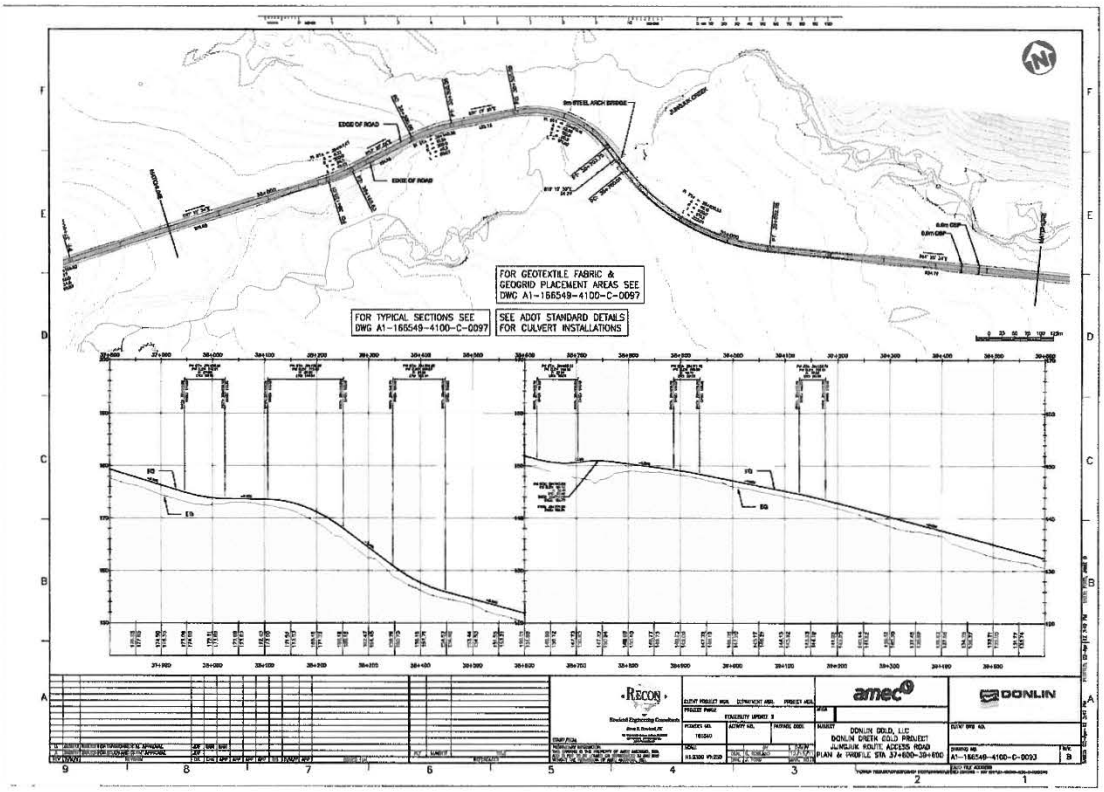

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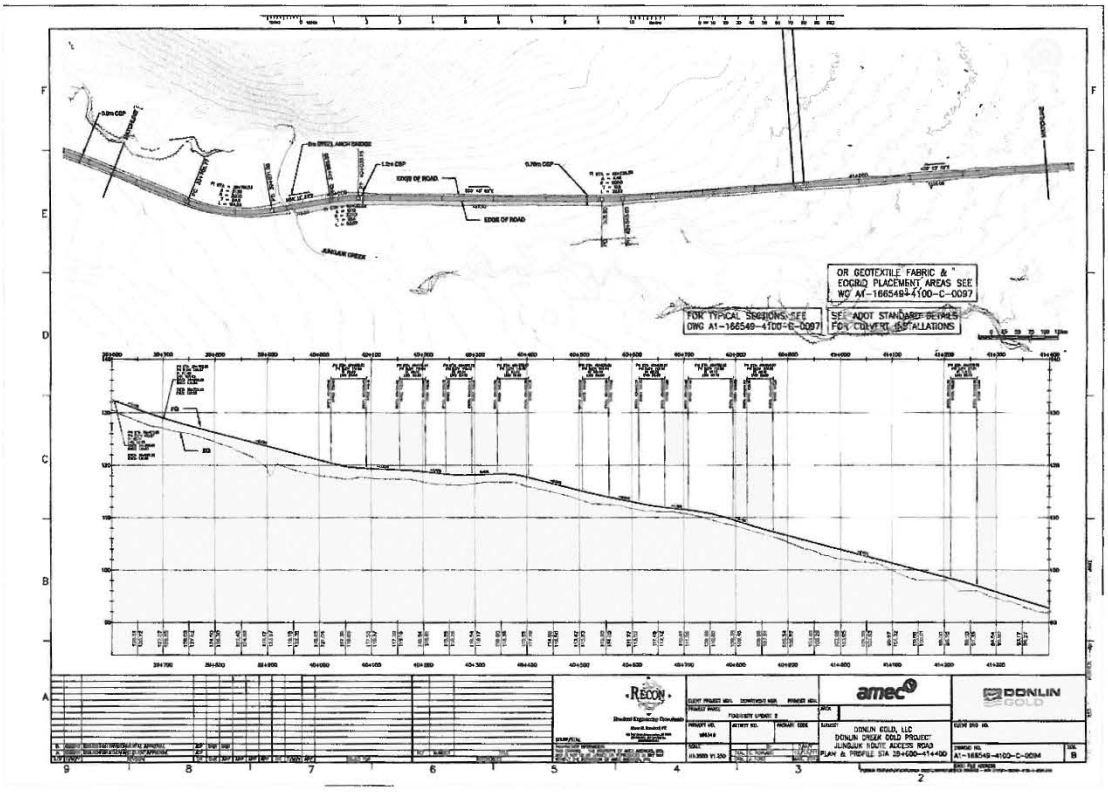

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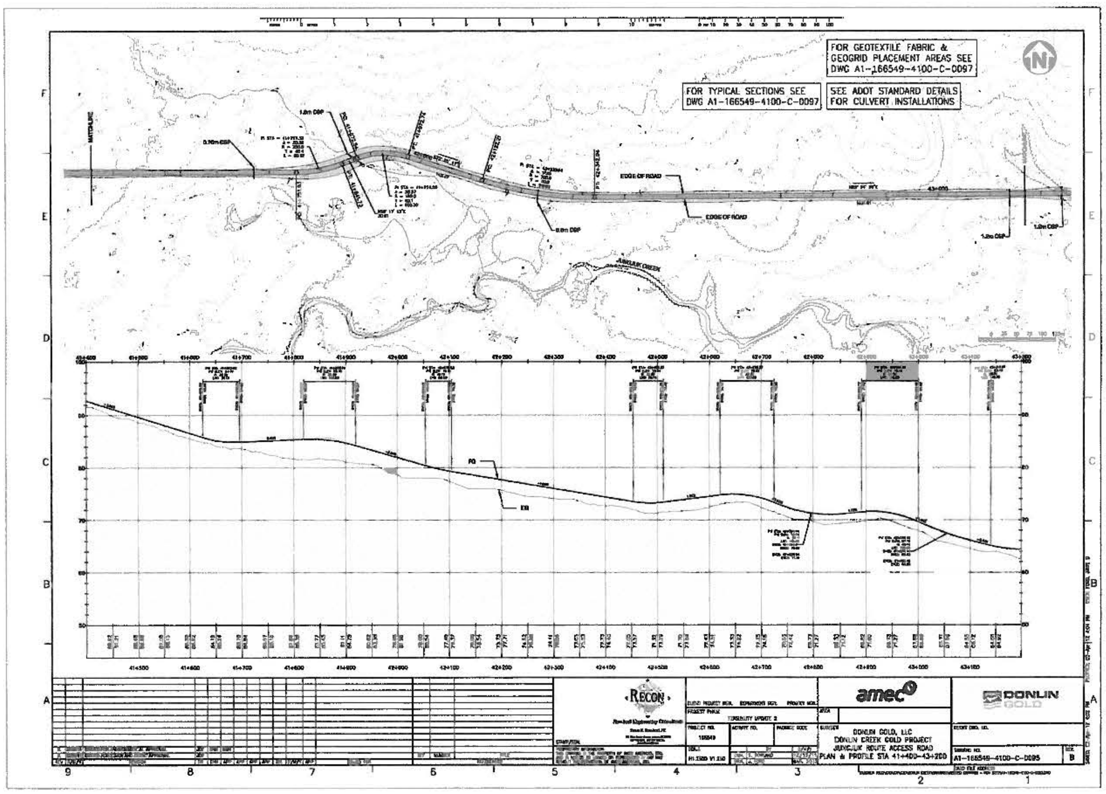

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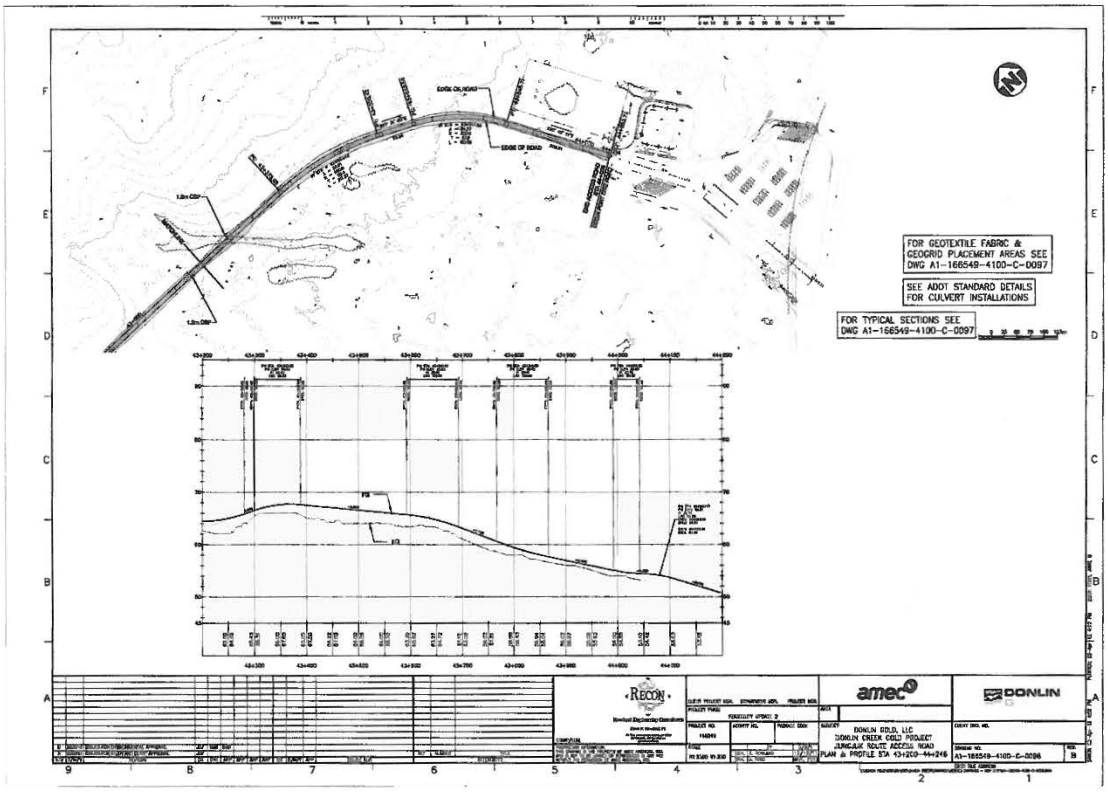

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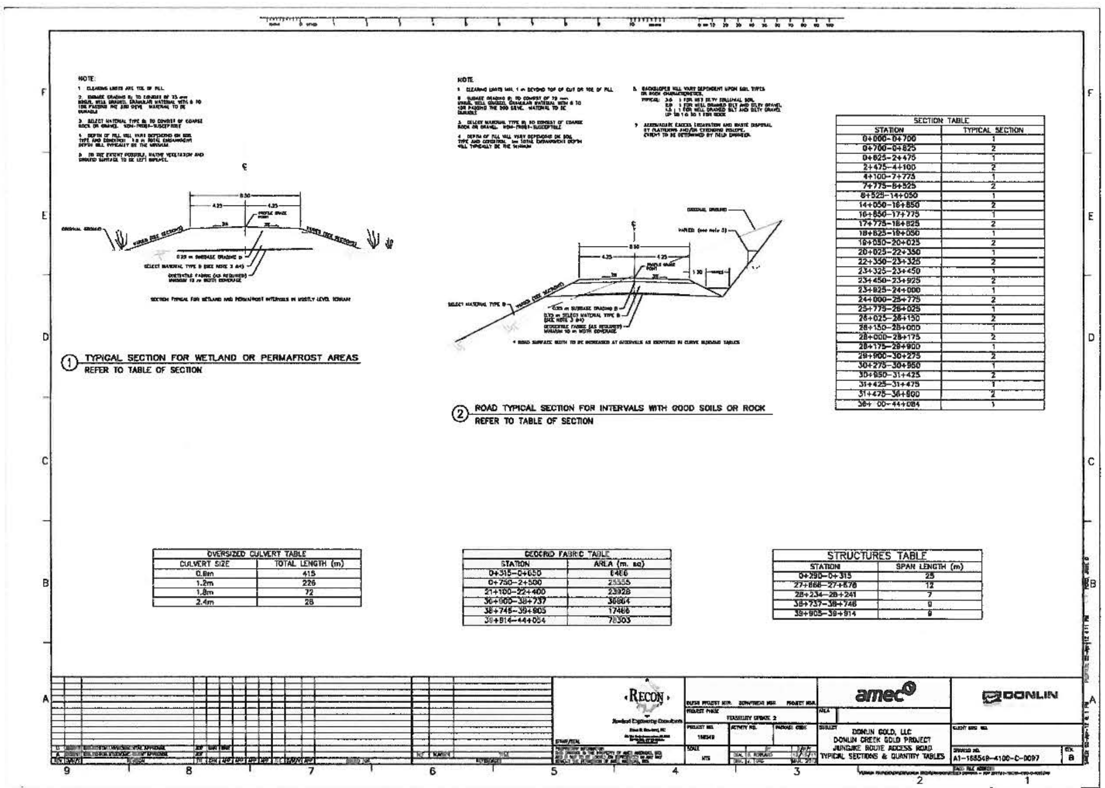


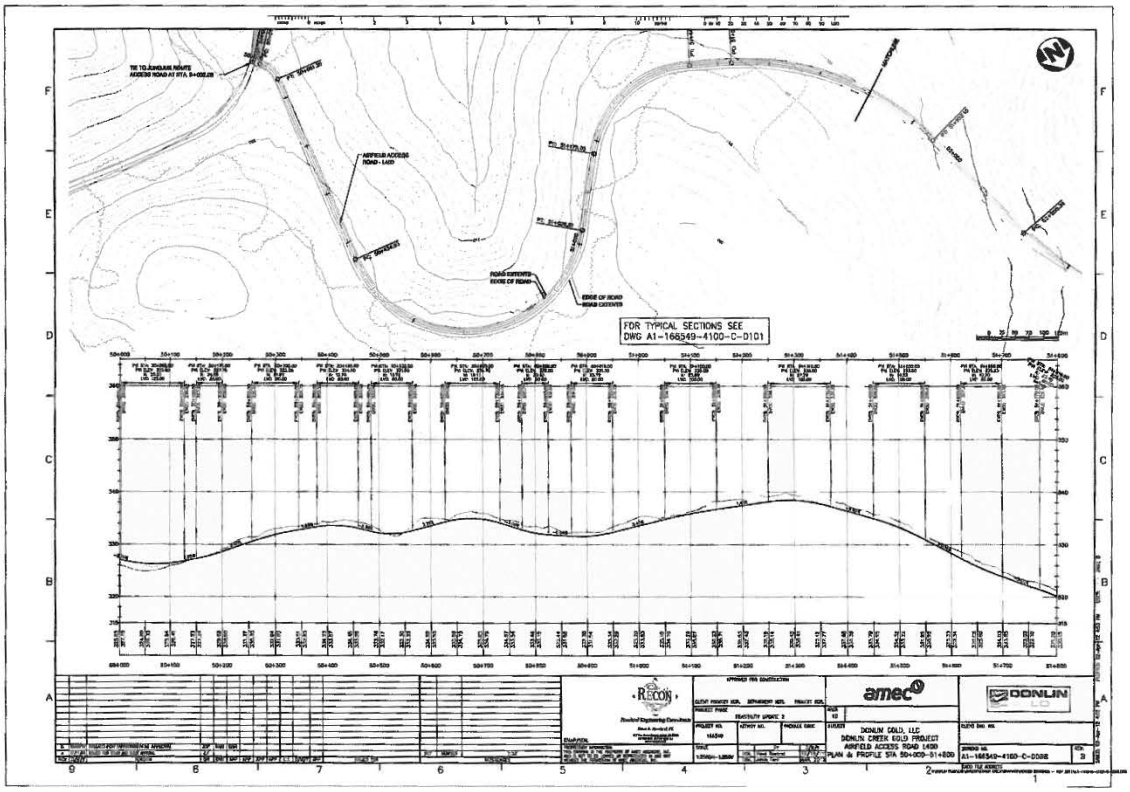
SECTION TABLE	
STATION	TYPICAL SECTION
0+000-0+700	1
0+700-0+825	2
0+825-2+475	1
2+475-4+100	2
4+100-7+775	1
7+775-8+525	2
8+525-14+050	1
14+050-16+850	2
16+850-17+775	1
17+775-18+825	2
18+825-19+050	1
19+050-20+025	2
20+025-22+350	1
22+350-23+325	2
23+325-23+450	1
23+450-23+925	2
23+825-24+000	1
24+000-25+775	2
25+775-26+025	1
26+025-26+150	2
26+150-28+000	1
28+000-28+175	2
28+175-29+900	1
29+900-30+275	2
30+275-30+950	1
30+950-31+425	2
31+425-31+475	1
31+475-36+900	2
36+ 00-44+084	1

OVERSIZED CULVERT TABLE	
CULVERT SIZE	TOTAL LENGTH (m)
0.8m	415
1.2m	226
1.8m	72
2.4m	28

GEOGRID FABRIC TABLE	
STATION	AREA (m. sq)
0+315-0+650	6486
0+750-2+500	25555
21+100-22+400	23928
36+900-38+737	30864
38+746-39+805	17486
39+814-44+054	78303

STRUCTURES TABLE	
STATION	SPAN LENGTH (m)
0+290-0+315	25
27+668-27+678	12
28+234-28+241	7
38+737-38+746	9
39+805-39+814	9

Attachment A
Development Plan



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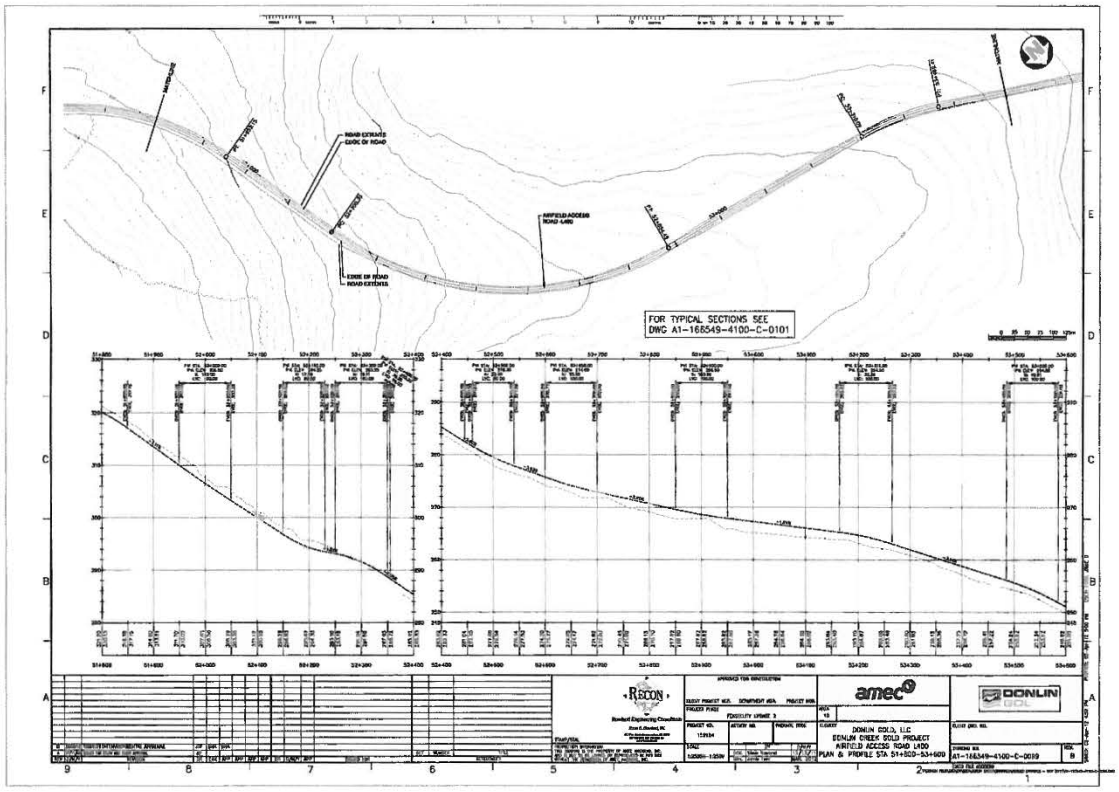

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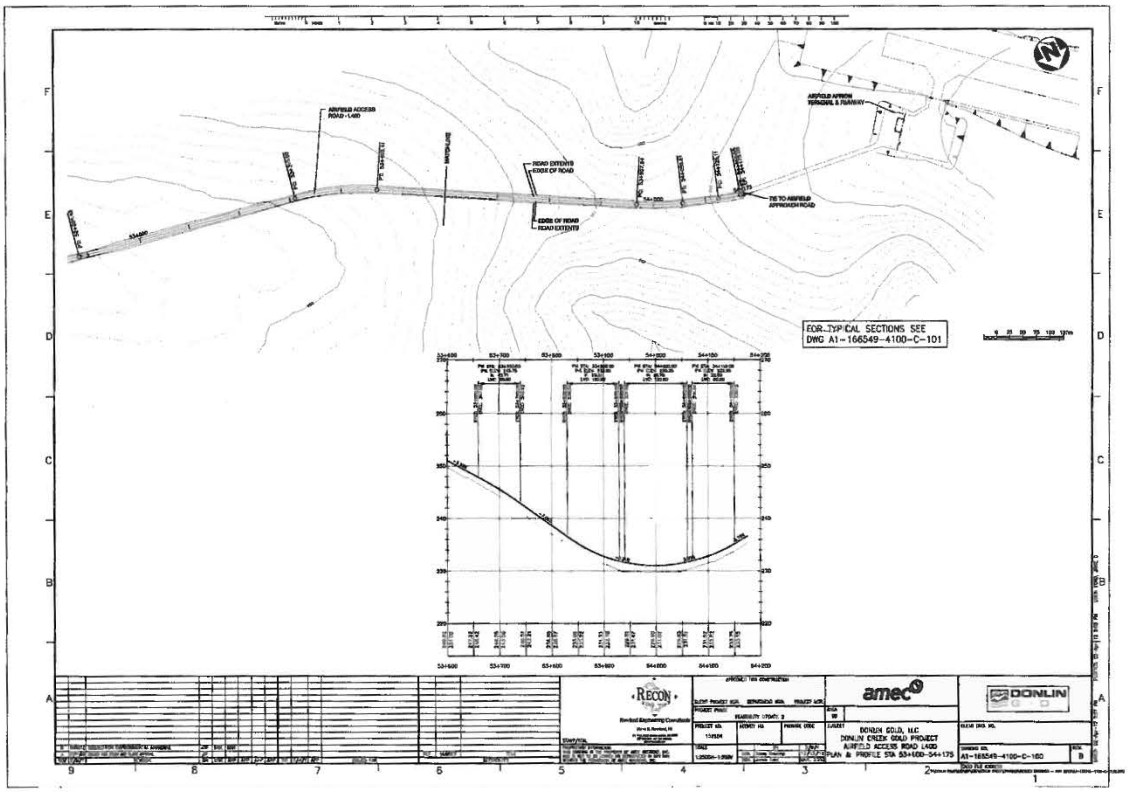

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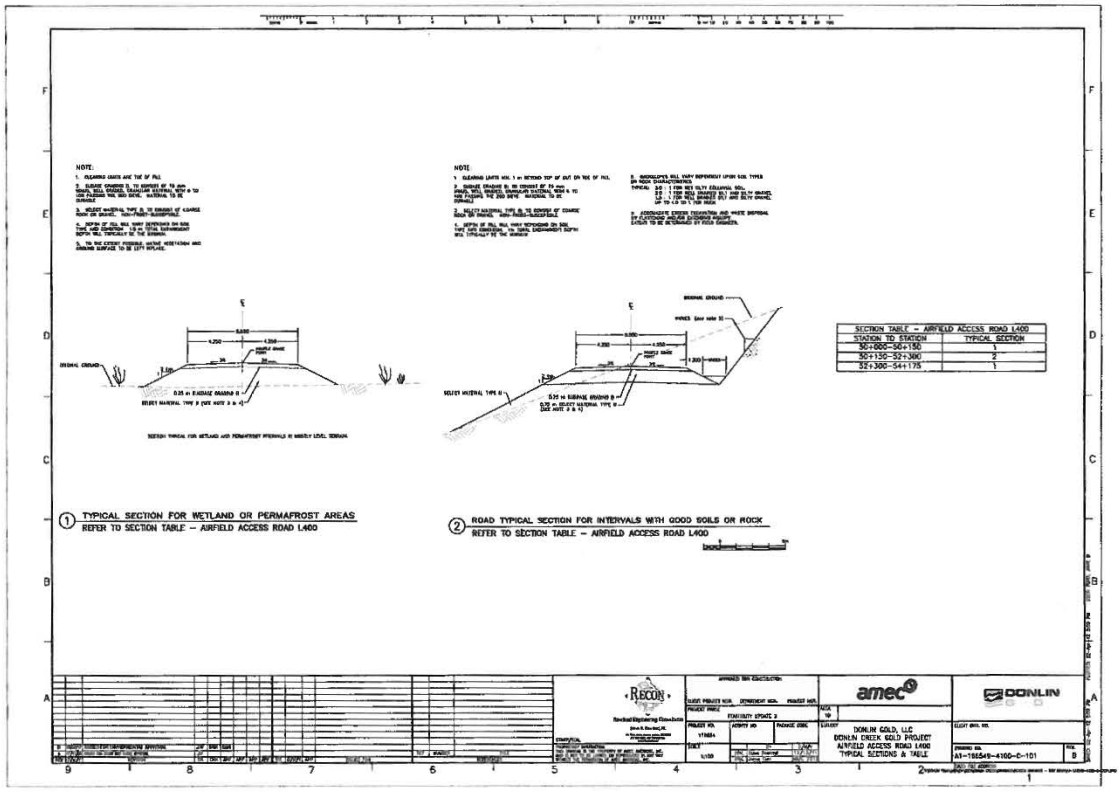

RECLAMATION PLAN
JUNGJUK ROAD AND AIRSTRIP SPUR ROAD

Donlin Gold Project

August 2018

4720 Business Park Blvd. Suite G-25
Anchorage, Alaska 99503

Prepared By:

SRK Consulting (U.S.), Inc.
11901 Business Blvd., Suite 110
Eagle River, Alaska 99577

Attachment A
Development Plan

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FIGURES

TABLES

ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
ADOT	Alaska Department of Transportation
ANSCA	Alaska Native Settlement Claims Act
Calista	Calista Corporation
LRFD	Load and Resistance Factor Design
USACE	U.S. Army Corps of Engineers

UNITS OF MEASURE

amsl	above mean sea level
cm	centimeters
ft	foot/feet
ha	hectare
km	kilometers
kph	kilometers per hour
lb	pound
m	meter
mm	millimeters
mph	miles per hour

APPENDIX

Appendix A: Preliminary Plan and Profiles

Attachment A
Development Plan

1.0 INTRODUCTION

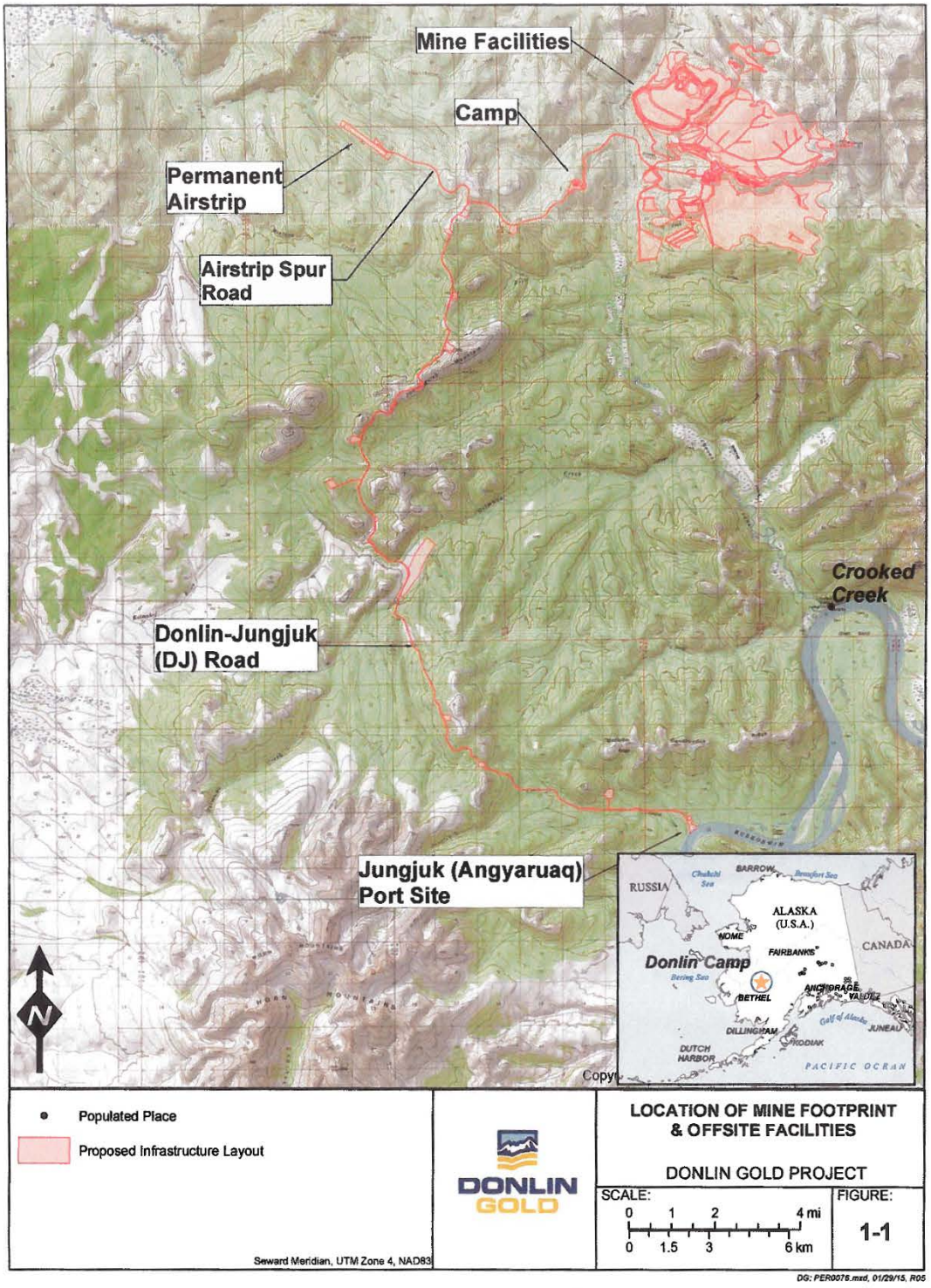
Donlin Gold is proposing the construction, operation and maintenance of the Donlin-Jungjuk Road and the Airstrip Spur Road. The approximately 27-mile (44 km) gravel Donlin-Jungjuk Road would connect the proposed mine with the proposed Jungjuk Port. In addition, the approximately 3.0-mile (4.8 km) gravel Airstrip Spur Road from the Donlin-Jungjuk Road would provide access to the proposed Permanent Airstrip. The Donlin-Jungjuk Road and Airstrip Spur Road traverse both State of Alaska and The Kuskokwim Corporation (surface) and Calista Corporation (Calista) (subsurface) lands.

The proposed Donlin-Jungjuk Road and Airstrip Spur Road alignments would traverse highly varied terrain types, and several different construction methods would be used throughout the project. In general, half the Donlin-Jungjuk Road would be built by conventional cut-and-fill techniques utilizing any suitable native sub-grade material for development of the road prism. This simple approach can be followed in most of the mountainous or upland sections of the road, or in areas of well-drained granular soils. Clearing requirements would be minimal because approximately 90% of the route traverse's terrain is forested with scattered scrub black spruce and light brush.

For construction purposes Donlin Gold is proposing a 500 ft. (152 m) wide temporary construction corridor for building each road. Following construction and based on an as-built survey, Donlin Gold would request an approximately 150 ft. (45.7 m) wide right-of-way that would include approximately 50 ft. (15 m) on each side of the road plus the toe to toe width of the road prism for each road. The purpose of the 500 ft. (152 m) wide temporary construction corridor is to provide Donlin Gold a planning corridor that allows Donlin Gold the flexibility of adjusting the alignment of the road within the 500 ft (152 m) to accommodate for unforeseen circumstances or conditions either in the final design stage or if encountered in the field during construction. Once the constructed final alignment is established Donlin Gold would seek the final 150 ft (47.5 m) wide easement for the road based on an as built survey. No land disturbance is anticipated outside of the final 150 ft (47.5 m) easement corridor that would require reclamation action.

This Donlin-Jungjuk Road and Airstrip Spur Road reclamation plan addresses Donlin Gold's responsibilities and proposed reclamation actions that would be implemented throughout the life of the Donlin Gold Project.

Attachment A
Development Plan



2.0 RECLAMATION

The Donlin-Jungjuk Road would traverse varied terrain from the mine site to the Kuskokwim River Jungjuk Port site near the mouth of Jungjuk Creek as shown in Appendix A of the Donlin Gold Plan of Development for the Donlin-Jungjuk Road and Airstrip Spur Road. Both the Donlin-Jungjuk Road and Airstrip Spur Road would be new construction in an untracked region.

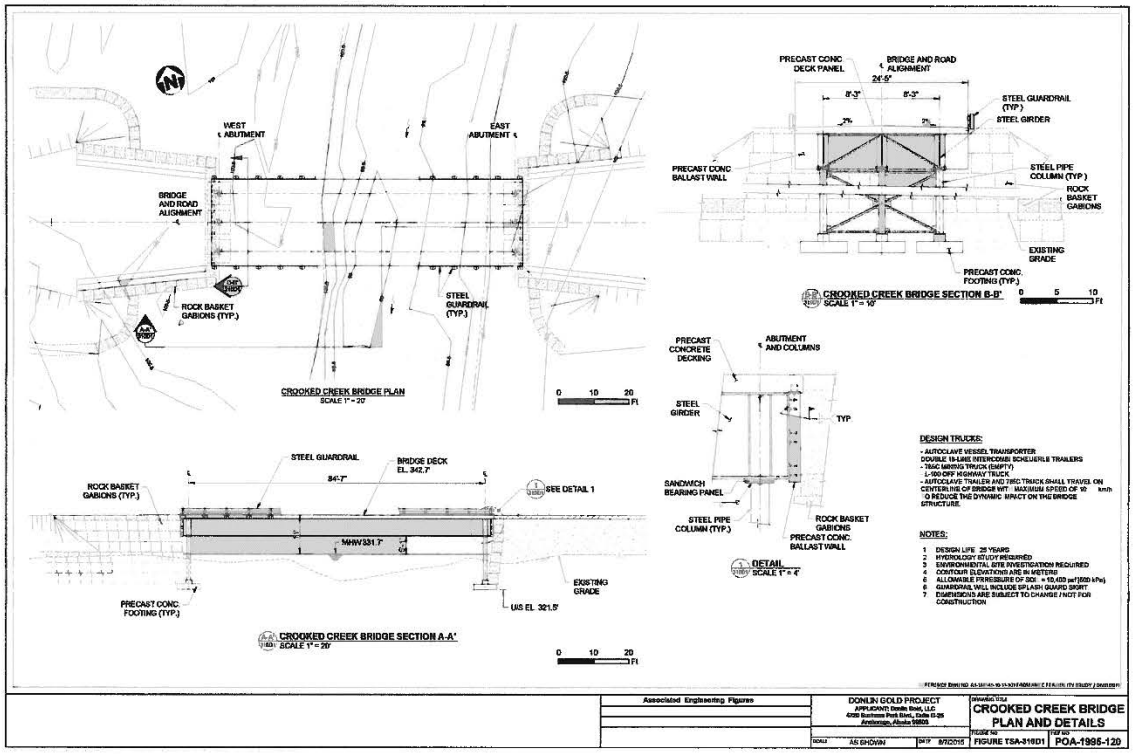
- Concurrent reclamation – Donlin Gold would initiate concurrent reclamation of disturbed areas during construction of the roads. The disturbed areas would be stabilized, prepared for vegetation growth where applicable and for management for erosion control, sediment control and storm water runoff, and seeded. During construction Donlin would undertake proper handling, stockpiling or placement of available growth media.
- Reclamation at mine closure - Donlin Gold proposes that the Donlin-Jungjuk Road to the mine site and the Permanent Airstrip and Airstrip Spur Road would remain as long-term assets to the land owners as Donlin Gold would continue to rely on the roads to allow personnel transport and materials and supplies to be delivered for post closure requirements and operation of the water treatment facility.
- Post Reclamation and Closure - Donlin Gold would perform reclamation monitoring and maintenance of the Donlin-Jungjuk Road and the Airstrip Spur Road.

Reclamation of Temporary Access Roads to Material Sites

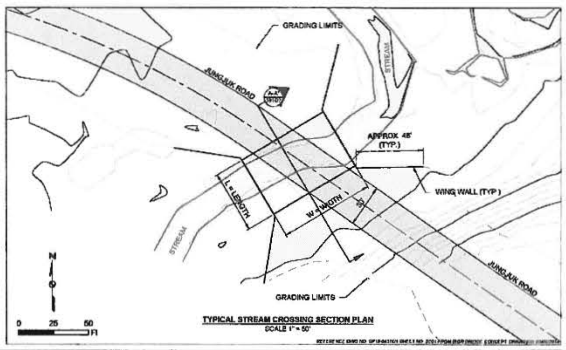
All temporary access roads would be reclaimed when no longer required. Two temporary access roads would be constructed to material sites (MS) on state land (MS 8 and 16). Both roads would be reclaimed when access to each individual material site was no longer needed. The roads would be ripped, as necessary, to eliminate the effects of compaction, contoured to be compactable with the surrounding topography and to establish natural drainage areas, covered with a layer of growth media, if available, and scarified to allow natural revegetation by native plant species to occur or if necessary the site(s) could be seeded. Any berms, side-cast material, and road drainage ditches would be reclaimed in the process.

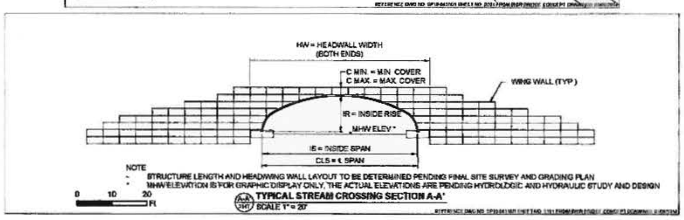
The 2 culverts installed in the temporary access road to MS 16 would be removed and natural drainage areas established and stabilized.

Attachment A
Development Plan



Attachment A
Development Plan





CREEK CROSSING DIMENSIONS

	W	L	HW	IR	C MIN.	C MAX.	IS	CLS
NORTH FORK GETMUNA CREEK	67'-6"	44'-5 1/2"	48'	10'-1 1/8"	2'	3'	44'-0 3/16"	44'-5 9/16"
SOUTH FORK GETMUNA CREEK	70'	44'-5 1/2"	48'	10'-1 1/8"	2'	3'	44'-0 3/16"	44'-5 9/16"
GETMUNA TRIBUTARY CREEK	70'	30'-10 1/2"	40'	8'-11 1/4"	3'	4'	30'-5 1/16"	30'-10 9/16"
UPPER JUNGJUK CREEK	50'	29'-11 3/4"	32'	10'-10 3/4"	3'	4'	29'-6 3/8"	29'-11 7/8"
LOWER JUNGJUK CREEK	40'-7 3/4"	67'-6"	44'	14'-10 3/16"	3'	4'	40'-2 3/16"	40'-7 11/16"

DIMENSIONS BASED ON REFERENCE DRAWINGS SP10-04336/1 5101, 5201, 5102, 5202, 5103, 5203, 5104, 5204, 5105, 5205 FROM BRIDGE CONCEPT DRAWINGS.

Associated Engineering Figures	DONLIN GOLD PROJECT APPLICANT: Donlin Gold, LLC 4720 Business Park Blvd., Suite G-25 Anchorage, Alaska 99503	DRAWING TITLE: TYPICAL BRIDGE STREAM CROSSING
	NAD 1983 UTM Zone 4N	
	SCALE: AS SHOWN — DATE: 8/1/2015	FIGURE TSA-314T — POA-1995-120

2.1 General Reclamation Procedures

Clearing

Scrub spruce and brush would be removed and placed in a berm on the down-slope side of the road way clearing limits or chipped and used during reclamation.

Growth Media/ seedbed preparation

Growth media would be stripped, saved and used for preparing seedbeds as road construction progresses. Top soil and overburden would have been stockpiled for easy access in spreading along the shoulders. The growth media would be spread using a minimum of passes to limit compaction. Controlled dozer tracking may be performed during placement of the growth media to roughen the surface, lightly compact the soil, increase water retention, and prevent erosion.

Based on experience with reclamation of exploration disturbances on the Donlin Gold site, and at other mine sites in Alaska (Czapla and Wright 2012), a minimum of 6 inches (15 cm) of growth media, if available, would be applied to those sites requiring additional growth media to establish a vegetative cover by seeding or to promote natural re-invasion by native species. However, application depth and need may vary depending on available or existing growth media at the site and site conditions. Growth media would be applied by scraper or dump truck and spread by a dozer or grader or a dozer where operationally possible. In some locations hydro seeding may be required. Some locations may require ripping or scarifying prior to placement of growth media.

Seed and Seeding

The general reclamation seed mixes proposed for use are listed in the following tables. The seed mixes consist of native species that have been used extensively in other Alaska reclamation activities.

Table 2-1: Proposed Reclamation Seed Mix- (Hydric) Wetland

Common Name	Scientific Name	Percentage of Mix
'Egan' American sloughgrass	*Beckmannia syzigachne*	45%
'Norcoast' Bering Hairgrass	*Deschampsia beringénsis*	40%
'Arctared' Red Fescue	*Festuca rubra*	10%
'Alyeska' Polargrass	*Artagrostis latifolia*	5%

Table 2-2: Proposed Reclamation Seed Mix- (Mesic) Upland

Common Name	Scientific Name	Percentage of Mix
'Arctared' Red Fescue	*Festuca rubra*	**40%**
'Norcoast' Bering Hairgrass	*Deschampsia beringénsis*	**40%**
'Wainwright' slender wheatgrass	*Elymus trachycaulus*	**10%**
'Gruening' Alpine Bluegrass	*Poa alpina*	**10%**
'Nortran' Tufted Hairgrass	*Deschampsia caespitosa*	**0% unless substituted for Norcoast**

As with any seed mix, a degree of flexibility is necessary depending on seed availability and site-specific conditions; the mix may be modified. The mix may change over time to include forbs and woody species, depending on factors such as internal and external research results, changes in technology, changes in land management philosophy, and commercial availability. Native species would be the preferred mix, unless information developed by the ADNR Plant Materials Center and onsite test plots indicates other, more desirable species meet the post-mining land use criteria. Seeding would be done via drill seeding, broadcast seeding via ground or aerial application, and hydro-seeding. The seed mix used would be certified weed free.

The preferred method for concurrent reclamation would be broadcast seeding. Broadcast seeding would be used on terrain considered too steep or rocky for seed drill equipment. Hydro-seeding may be employed where safety is a primary consideration. The application rate for hydric or wetlands seeding using the presently proposed seed mix would be 15 lbs (5 kg) of pure live seed (PLS) per acre. Approximately 15 to 30 lbs (5 to 14 kg) of PLS per acre would be applied for mesic or upland areas depending on surface contours, grade, aspect, and rockiness of the specific site.

In addition to seeding, upon completion of seedbed preparation, select areas would be left unseeded in order to evaluate the potential for natural recolonization of the site. If these areas do not meet the revegetation, they would be seeded using the methods described above.

Mulch

Mulches may be necessary to protect the seed and help retain soil moisture during the critical germination process. Numerous types of materials have been used successfully as mulch in revegetation efforts. However, experience has proven that straw or grass hay at a rate of 12 st (11 t) per acre is most cost effective. Slopes too steep for equipment generally require an application of hydro-mulch via a hydro-seeder at an approximate rate of 1 st (0.9 t) per acre. Commercial hydro-mulch generally consists of wood fiber byproducts or other forms of cellulose. If mulch application is necessary, it would be applied following seeding and soil amendment application with a certified weed free standard straw (or hay) blower mounted behind a truck or tractor.

If necessary, the mulch would then be crimped into the seedbed using a cultipacker or shallow set disk harrow to prevent wind blow and increase microhabitat for seed germination. On those areas where a hydro-seeder may be used, hydro-mulch, if needed, would be incorporated into the seed and amendment mix for one-time application. The hydro-mulch would contain a tackifier, if necessary, to help hold the mulch mix in place.

Control of Invasive Species

During vegetation establishment, weed control practices would be implemented to limit the growth and spread of noxious weeds and benefit the revegetation process. The control program would include the use of weed-free mulch when used in the reclamation program, and all seeds would be tested and certified "weed-free" before planting. The primary method of control would be to seed disturbed areas as soon as practicable after the seedbed has been prepared.

Revegetation Timing

Seeding would be implemented after spring break-up until mid-July to allow the seed to take advantage of the summer moisture period, following seedbed preparation. Depending construction timing, the seeding operation may have to wait until seasonally possible.

Revegetation Cover Criterion

A vegetative cover criterion of at least 70% would be achieved prior to requesting bond release. Experience in Alaska has shown this goal would likely be reached within the first 5 years.

The reclamation goal of at least 30% vegetative cover over a three-year period is an interim action level criterion, which would indicate whether additional reclamation action would need to be taken to establish a viable vegetative cover and a continuing natural succession of plant species. Further action could include reseeding the area, additional application of soil amendments, and/or incorporation of additional growth media on a particular site. Donlin Gold would be responsible for determining the cause and resolution of substandard revegetation cover.

Remedial Action/ Adaptive Management

If monitoring/inspection indicate that performance standards may not be realized by the 5th year, additional seeding, fertilizing, or an adaptive management alternative may be used following consultation with and approval by ADNR.

Monitoring and Maintenance

Success of reclamation would be monitored in two ways:

1. Physical reclamation such as earthwork and growth media application would be checked for excess erosion problems periodically and immediately following major rain storms. Remedial action to correct instability would be taken as soon as feasible following detection of substantial erosion or loss of growth media. Areas of permafrost and intervals of ice-rich soils susceptible to thermal degradation and settlement would be inspected to determine if any road surface maintenance and embankment rehabilitation was required, particularly over the first several years.
2. Vegetation success would be monitored qualitatively by visual inspection on an ongoing basis by Donlin Gold and ADNR personnel, and quantitatively once per year. A consulting professional would conduct quantitative analysis at the end of the growing season (end of August).

Donlin Gold would seek release of the reclamation surety as quantitative data indicate the revegetation cover criterion presented above has been met.

The schedule for on-site monitoring would be determined in coordination with the site-wide monitoring for the Donlin Gold Project to the extent practicable. Generally, the road construction reclamation would be inspected in the spring following thaw and again in August at the end of the growing season and if determined necessary following a large rain storm event that could result in damage to the roads or reclamation.

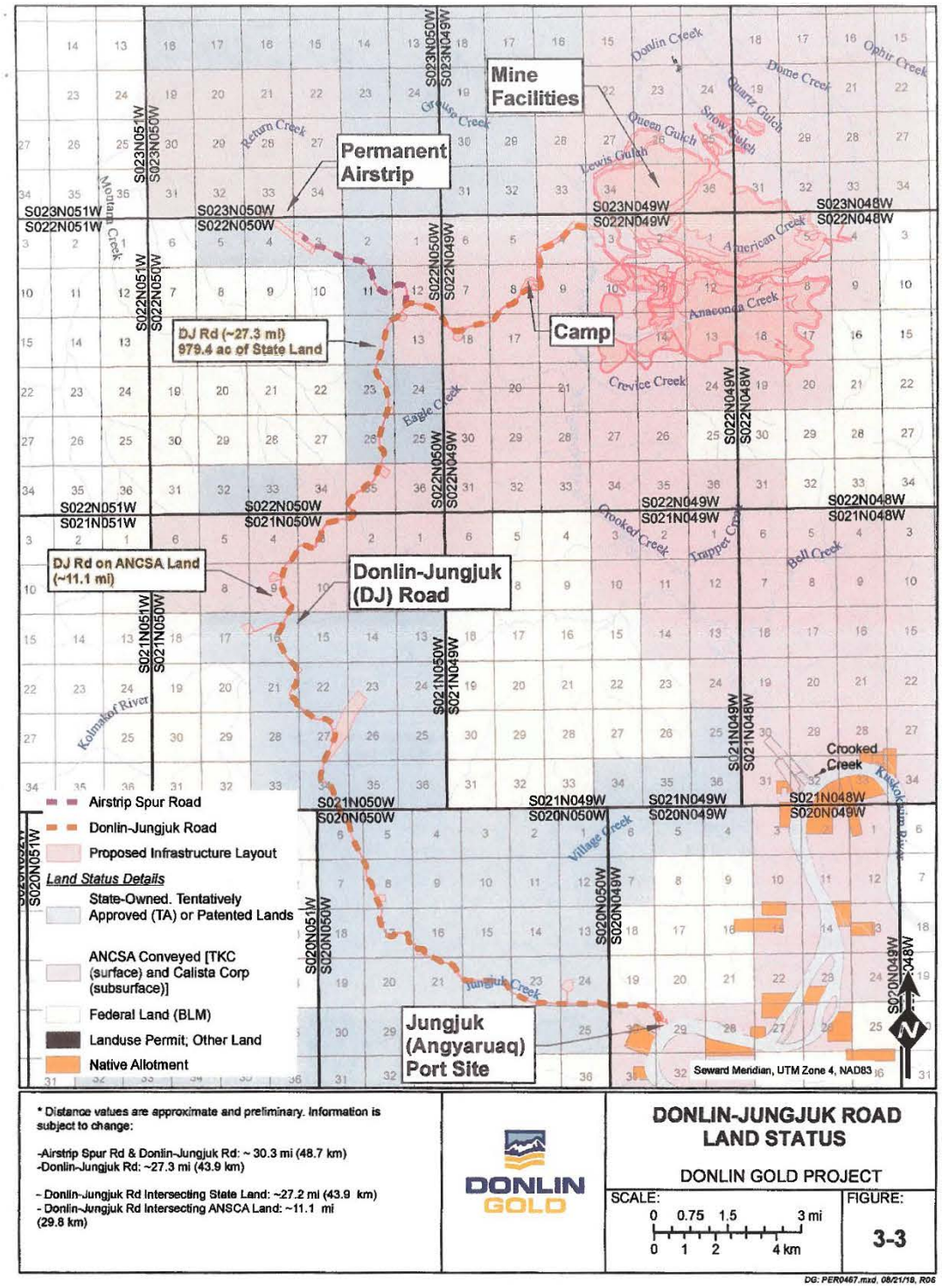
Culverts

Approximately 44 culverts sized between 24 and 72 inches (61 and 183 cm) in diameter would be required. The actual number and diameter size for culverts would be determined during final engineering design. All culverts would be two-lane and can be installed as "rolled" units. Consideration would be given to natural channel morphology, icing conditions and drainage area characteristics and would be install consisted with final design requirements. Concurrent reclamation would be performed using BMPs to ensure that the area around each culvert opening was stabilized and erosion control and sediment control measures were implemented.

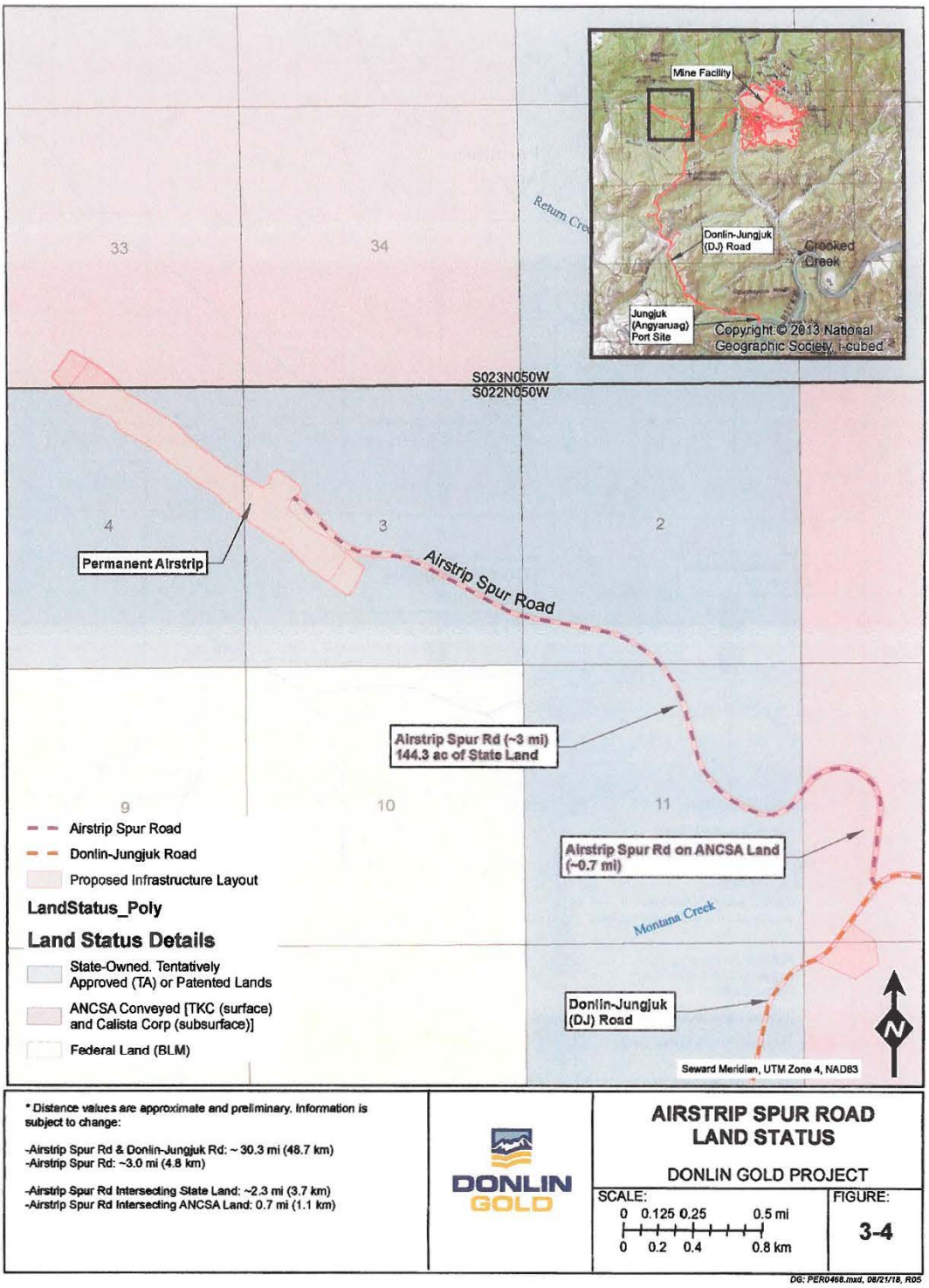
Bridges

Following installation of each of the 6 bridges that would be required, reclamation would be implemented at each site and all bridge embankments stabilized and erosion control and sediment control BMP measures were implemented.

Attachment A
Development Plan



Attachment A
Development Plan



3.0 ESTIMATE OF RECLAMATION COSTS

Concurrent reclamation costs are carried as operating costs and later deducted from the total bond amount on a per acres basis

Airstrip Spur Road and Jungjuk Road Reclamation at Mine Closure - for the purposes of this document approximately 258 acres of disturbance (including access road to Jungjuk port, airstrip spur road, roads for post-closure monitoring, and to the Water Treatment Plant) is used for the annual post closure maintenance cost of $146,100.

Post Closure Road/Airport Maintenance Costs*

Equipment	Qty	h/day/ unit	Total hrs/ year	Equip. Unit Costs ($)	Labor Unit Costs ($)	Total Annual Equip ($)	Total Annual Labor ($)	Total Annual Cost ($)
325C Excavator	1	0.5	182.5	$66.88	$60.81	$12,205.60	$11,097.83	$23,303.43
14G Grader, All-Wheel Drive, Cat 16H or Equivalent, site & off-site roads	1	0.5	182.5	$147.31	$60.81	$26,884.08	$11,097.83	$37,981.90
Water truck (5,000 Gallon)	1	0.5	182.5	$45.06	$60.81	$8,223.45	$11,097.83	$19,321.28
CS533E Vibratory Roller	1	0.5	182.5	$53.21	$60.81	$9,710.83	$11,097.83	$20,808.65
Dump Truck, 12 cub yds, yard maintenance, snow removal	1	0.5	182.5	$34.92	$56.78	$6,372.90	$10,362.35	$16,735.25
Small Dozer D7R	1	0.5	182.5	$92.34	$60.81	$16,852.05	$11,097.83	$27,949.88
Light Truck (Truck and Foreman included in Water Treatment Crew)	0	0.5	0.0	$14.11	$30.47	$-	$-	$-
Total Annual Costs (entered in another User Sheet)						**$80,248.90**	**$65,851.48**	***$146,100.38**

*Decommissioning airstrip, airstrip spur road, and Jungjuk Road – costs associated with permanent decommissioning would be determined, if necessary, at the time of mine closure.

4.0 REFERENCES

Much of the information used in the preparation of this Plan of Development was derived from Donlin Gold documents from the following sources:

AMEC Americas Limited. Donlin Creek LLC, Donlin Creek Gold Project, *Feasibility Study Update 2.* October 2011

Czapla, P, & Wright, S, 2012. *Interior Alaska Revegetation & Erosion Control Guide*, State of Alaska Plant Material Center.

RECON. *Donlin Gold Offsite Infrastructure Supplementary Geotech Technical Memorandum.* December 2013

SRK Consulting. Donlin Gold Project, *Plan of Operation, Project Description.* July 2012

SRK Consulting. Donlin Gold Project, *Plan of Operation, Reclamation and Closure Plan.* December 2017

SRK Consulting. Donlin Gold Project, Donlin-Jungjuk Road and the Airstrip Spur Road *Plan of Development Revision 1.* August 2018

Appendix A – Preliminary Plan and Profiles

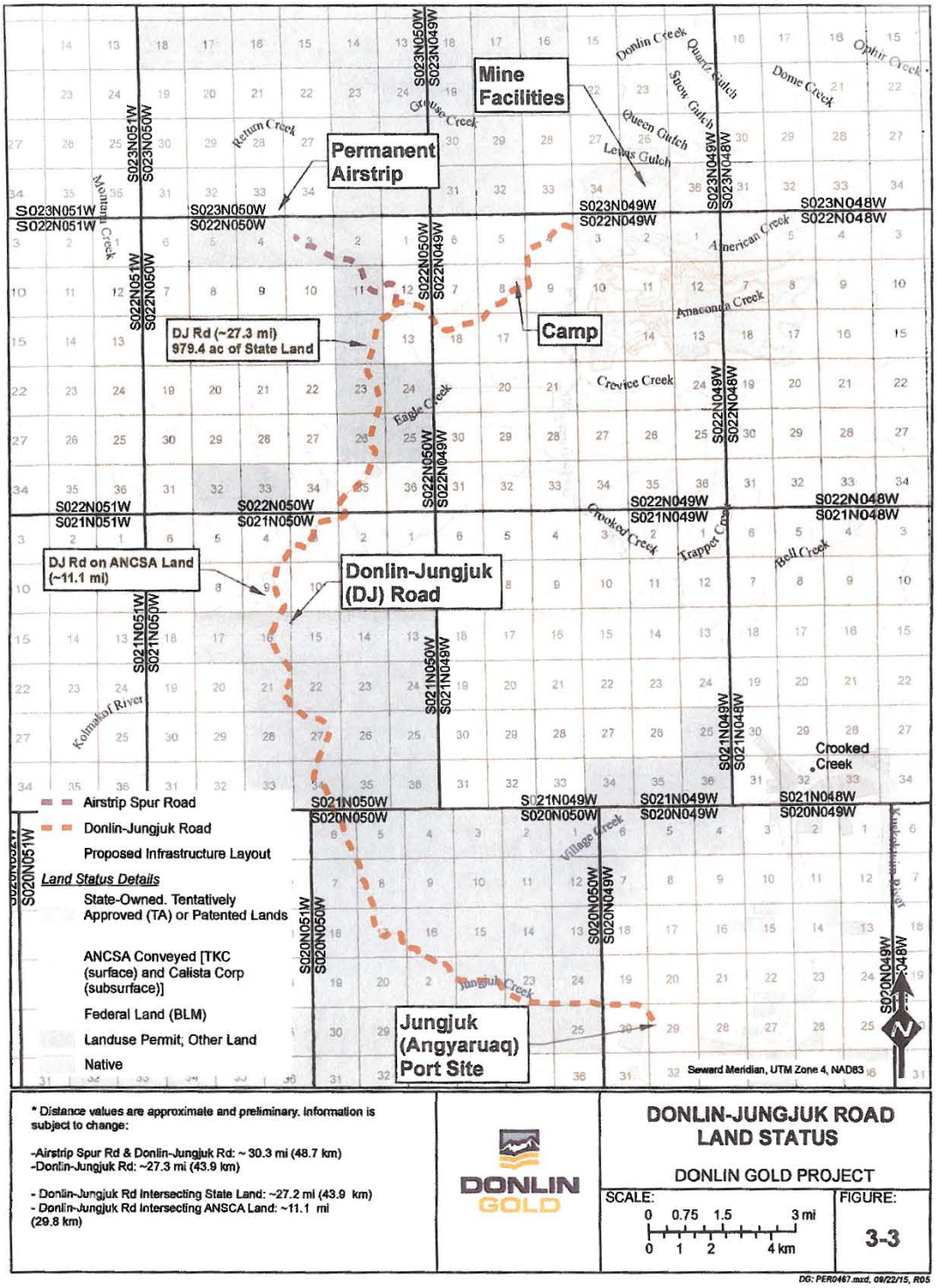
Attachment A
Development Plan

Location of Activity				
State Land Crossed by Donlin-Jungjuk Road and Airstrip Spur Road Subject to Final Engineering Design				
Meridian	Township	Range	Section	Quarter Section
Seward	020N	050W	25	NE
Seward	020N	050W	25	NW
Seward	020N	050W	24	SE
Seward	020N	050W	24	SW
Seward	020N	050W	26	NE
Seward	020N	050W	23	SE
Seward	020N	050W	23	SW
Seward	020N	050W	22	SE
Seward	020N	050W	22	NE
Seward	020N	050W	22	SW
Seward	020N	050W	22	NW
Seward	020N	050W	21	NE
Seward	020N	050W	21	SE
Seward	020N	050W	21	NW
Seward	020N	050W	16	SW
Seward	020N	050W	16	SE
Seward	020N	050W	17	SE
Seward	020N	050W	17	NE
Seward	020N	050W	17	SW
Seward	020N	050W	17	NW
Seward	020N	050W	8	SW
Seward	020N	050W	8	NW
Seward	020N	050W	7	NE
Seward	020N	050W	5	SW
Seward	020N	050W	6	SE
Seward	020N	050W	6	NE
Seward	020N	050W	6	NW
Seward	021N	050W	34	SE
Seward	021N	050W	34	NE
Seward	021N	050W	34	NW
Seward	021N	050W	27	SE
Seward	021N	050W	27	SW
Seward	021N	050W	27	NE
Seward	021N	050W	27	NW
Seward	021N	050W	22	SW
Seward	021N	050W	22	NW
Seward	021N	050W	21	SE
Seward	021N	050W	21	NE
Seward	021N	050W	16	SE
Seward	021N	050W	16	NE

Attachment A
Development Plan

Location of Activity				
State Land Crossed by Donlin-Jungjuk Road and Airstrip Spur Road Subject to Final Engineering Design				
Seward	022N	050W	26	SE
Seward	022N	050W	26	NE
Seward	022N	050W	23	SE
Seward	022N	050W	23	NE
Seward	022N	050W	14	SE
Seward	022N	050W	14	NE
Seward	022N	050W	11	SE
Seward	022N	050W	11	NE
Seward	022N	050W	11	NW
Seward	022N	050W	2	SE
Seward	022N	050W	2	SW
Seward	022N	050W	3	SE
Seward	022N	050W	3	SW
Seward	022N	050W	3	NW

Attachment B
Location Map



* Distance values are approximate and preliminary. Information is subject to change:

-Airstrip Spur Rd & Donlin-Jungjuk Rd: ~ 30.3 mi (48.7 km)
-Donlin-Jungjuk Rd: ~27.3 mi (43.9 km)

- Donlin-Jungjuk Rd intersecting State Land: ~27.2 mi (43.9 km)
- Donlin-Jungjuk Rd intersecting ANSCA Land: ~11.1 mi (29.8 km)

DONLIN GOLD

DONLIN-JUNGJUK ROAD LAND STATUS

DONLIN GOLD PROJECT

SCALE: 0 0.75 1.5 3 mi / 0 1 2 4 km

FIGURE: 3-3

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