



STATE OF ALASKA
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
610 UNIVERSITY AVE.
FAIRBANKS, AK 99709-3643

WASTE MANAGEMENT PERMIT

for the

Palmer Project

Permit 2019DB0001

Date: July 17, 2019

This Waste Management Permit is issued to Constantine Mining LLC, 800 West Pender Street, Suite 320, Vancouver, BC V6C 2V6, for the disposal of wastes from Palmer Project as prescribed herein. The Palmer Project is undertaking advanced exploration for copper, zinc, gold, and silver. It is located in the Porcupine Mining District, 35 miles northwest of Haines, Alaska on the eastern margin of the Saint Elias mountain range in the Glacier Creek drainage. The permit is issued under the provisions of Alaska Statutes (AS) 46.03, and the Alaska Administrative Code (AAC), 18 AAC 15, 18 AAC 60, 18 AAC 70, and 18 AAC 72, as amended or revised, and other applicable state laws and regulations. This permit is effective **July 17, 2019**, and expires after **July 16, 2024**. It may be terminated or modified in accordance with AS 46.03.120.

The permit incorporates by reference the *Application for Waste Management Permit for the Palmer Phase II Exploration Project Haines Alaska Upland Mining Lease No. 9100759* March 2019 (*Application*) including *Attachment 1 Monitoring Plan Palmer Advanced Exploration Project Haines, Alaska Phase II - Underground Exploration Upland Mining Lease No. 9100759* March 2019 (*Attachment 1*), *Attachment 2 Water Management Plan Palmer Advanced Exploration Project Haines, Alaska Phase II - Underground Exploration Upland Mining Lease No. 9100759* March 2019 (*Attachment 2*), *Attachment 3 Reclamation Plans and Cost Estimates Phase II - Underground Exploration Upland Mining Lease No. 9100759* March 2019 (*Attachment 3*), *Appendix A Wastewater Discharge System Design Report Phase II - Underground Exploration Upland Mining Lease No. 9100759* March 2019 (*Appendix A*), *Appendix B Surface Water and Groundwater Quality Memos Phase II - Underground Exploration Upland Mining Lease No. 9100759* March 2019, *Appendix C Source Term Predictions Report Phase II - Underground Exploration Upland Mining Lease No. 9100759* March 2019, and *Appendix D Waste Rock Geochemical Characterization Report Phase II - Underground Exploration Upland Mining Lease No. 9100759* March 2019. Changes to the documents incorporated herein must be approved by the Alaska Department of Environmental Conservation (department) if they affect this permit. If the department approves the changes, they become part of this permit.

Gene McCabe
Program Manager

TABLE OF CONTENTS

1 PERMIT COVERAGE & ADOPTED REFERENCES3

1.1 COVERAGE.....3

1.2 ADOPTED REFERENCES4

2 SPECIFIC CONDITIONS5

2.1 SITE-WIDE WASTE DISPOSAL5

2.2 LAND APPLICATION DISPOSAL (LAD) SYSTEM6

2.3 PAG ROCK STORAGE PAD10

2.4 SITE CONSTRUCTION, MAINTENANCE, & OPERATION.....11

2.5 MONITORING12

2.6 REPORTING14

2.7 CORRECTIVE ACTIONS16

2.8 SUSPENSION OF OPERATIONS16

2.9 TERMINATION OF EXPLORATION ACTIVITIES18

3 GENERAL CONDITIONS18

3.1 ACCESS AND INSPECTION.....18

3.2 INFORMATION ACCESS.....18

3.3 CIVIL AND CRIMINAL LIABILITY.....19

3.4 AVAILABILITY19

3.5 ADVERSE IMPACT19

3.6 CULTURAL OR PALEONTOLOGICAL RESOURCES19

3.7 APPLICATIONS FOR RENEWAL.....19

3.8 OTHER LEGAL OBLIGATIONS19

3.9 TRANSFER OF OWNERSHIP19

3.10 TOXIC POLLUTANTS.....19

3.11 POLLUTION PREVENTION20

4 FINANCIAL RESPONSIBILITY20

4.1 AUTHORITY20

4.2 AMOUNT OF FINANCIAL RESPONSIBILITY21

5 GLOSSARY OF ACRONYMS.....22

6 FIGURES.....23

6.1 PROJECT MAP23

6.2 PROJECT CLOSE-UP24

6.3 SURFACE WATER MONITORING SITES – P01, P25, P26, & P2725

6.4 LAD SYSTEM & MONITORING WELLS – MW-01, MW-02, & MW-04.....26

1 PERMIT COVERAGE & ADOPTED REFERENCES

1.1 COVERAGE

The permittee is authorized to land apply non-domestic wastewater from exploration activities and to store and dispose of potentially acid generating (PAG) rock. Discharge water will originate as seepage into an underground exploration ramp. Seepage water will be collected and stored temporarily in underground settling ponds before being pumped to the portal and either 1) directed to a buried upper diffuser for subsurface discharge, and/or 2) directed to two surface settling ponds and from the ponds to a buried lower diffuser for discharge. Regarding PAG rock, preliminary assessment indicates that no PAG rock will be encountered during construction of underground exploration works. However, in the event that PAG rock is encountered, it must be stored on the surface, covered when not being handled, runoff contained, and hauled to the underground ramp for final disposal.

This permit also covers secondary containment for hazardous substances/fuel and monitoring requirements for waste rock, groundwater and surface water. This permit prohibits the discharge of wastewater to surface water.

1.1.1 This permit covers disposal of wastewater, storage and disposal of PAG waste rock, and monitoring at the sites listed under this subheading. See Figures 6.1 and 6.2.

1.1.1.1 Land Application Disposal (LAD) System

Wastewater from mineral exploration's underground workings is disposed through the LAD system. Wastewater may be discharged subsurface through an upper diffuser or a lower diffuser. See Figures 6.1, 6.2, and 6.4. See *Appendix A* to the *Application* for the LAD system design.

1.1.1.1.1 Upper Diffuser

The upper diffuser is located about 200 meters southeast of the portal and buried in a talus slope at a slightly lower elevation than the portal.

1.1.1.1.2 Lower Diffuser

The lower diffuser consists of 1) flow to two settling ponds located approximately 300 meters east northeast and downgradient of the portal, and 2) discharge through a buried diffuser situated about 315 meters east northeast and downgradient of the settling ponds.

1.1.1.2 PAG Rock Storage Pad

The PAG rock storage pad is adjacent to the LAD system's Settling Pond 2. The area and perimeter berms are lined with an impermeable 60-mil geomembrane and has a berms around its perimeter to contain runoff. See Figures 6.1 and 6.2

1.1.1.3 Surface Water Monitoring Sites

Surface water is monitored at five sites: P01 near the source of Glacier Creek, P25 at the mouth of Waterfall Creek downgradient of the LAD system's upper diffuser, P26 in Hangover Creek downgradient of the LAD

system's lower diffuser, and P27 at the midpoint of Glacier Creek and below the exploration impacted area. See Figure 6.3.

1.1.1.4 Groundwater Monitoring Sites

Monitoring wells MW-01 and MW-02 are situated at the LAD system's lower diffuser. Monitoring well MW-01 is located upgradient of the lower diffuser discharge and monitoring well MW-02 provides groundwater quality samples immediately downgradient of the lower diffuser discharge. See Figure 6.4. Groundwater monitoring site MW-04 will also be included as a monitoring site following the conditions of Permit Part 2.2.5.2.

1.2 ADOPTED REFERENCES

In addition to the stipulations in this permit, the permittee shall adhere to the applicable requirements of 18 AAC 15 *Administrative Procedures*, 18 AAC 60 *Solid Waste Management*, 18 AAC 70 *Alaska Water Quality Standards (WQS)*, and 18 AAC 72 *Wastewater Disposal*. The permittee shall also adhere to department-approved plans authorized under the permit. When the terms of this permit differ from the terms of department-approved project documents adopted by reference in this section, the most recent term with written department approval is controlling. If there is doubt as to which conflicting term is newer, this permit shall control. Department-approved plans adopted by reference in this section must be updated within 90 days of permit issuance incorporating any changes necessary to be consistent with the terms of this permit, and these plans may be revised provided that written department approval is received. The department-approved plan adopted by reference into this permit includes the *Application for Waste Management Permit for the Palmer Phase II Exploration Project Haines, Alaska Upland Mining Lease No. 9100759* March 2019 (*Application*) with the following attachments and appendices:

- 1.2.1 *Attachment 1 Monitoring Plan Palmer Advanced Exploration Project Haines, Alaska Phase II - Underground Exploration Upland Mining Lease No. 9100759* March 2019 (*Attachment 1*),
- 1.2.2 *Attachment 2 Water Management Plan Palmer Advanced Exploration Project Haines, Alaska Phase II - Underground Exploration, Upland Mining Lease No. 9100759* March 2019 (*Attachment 2*),
- 1.2.3 *Attachment 3 Reclamation Plans and Cost Estimates Phase II - Underground Exploration Upland Mining Lease No. 9100759* March 2019 (*Attachment 3*).
- 1.2.4 *Appendix A Wastewater Discharge System Design Report Phase II – Underground Exploration Upland Mining Lease No. 9100759* March 2019 (*Appendix A*)
- 1.2.5 *Appendix B Surface Water and Groundwater Quality Memos Phase II – Underground Exploration Upland Mining Lease No. 9100759* March 2019
- 1.2.6 *Appendix C Source Term Predictions Report Phase II – Underground Exploration Upland Mining Lease No. 9100759* March 2019, and
- 1.2.7 *Appendix D Waste Rock Geochemical Characterization Report Phase II – Underground Exploration Upland Mining Lease No. 9100759* March 2019

2 SPECIFIC CONDITIONS

2.1 SITE-WIDE WASTE DISPOSAL

While this permit is in effect and subject to the limitations in Section 2.1.1, the permittee is authorized to dispose of PAG waste rock in the underground exploration ramp and wastewater that seeps into the exploration ramp through the LAD system. The underground tunnel, PAG storage pad, and LAD system, including piping Upper and Lower diffusers and settling ponds are treatment works. This permit only applies during exploration activities and does not apply during mining or beneficiation.

2.1.1 Limitations

- 2.1.1.1 Except as otherwise authorized in an Alaska Pollutant Discharge Elimination System permit, the permittee shall control and treat onsite surface water, groundwater and seepage as necessary to prevent offsite water quality exceedances.
- 2.1.1.2 Best management practices indicated in Part 2.1.3 Nitrates and Nitrate Source Control of the *Application* must be implemented to minimize the addition of nitrogen compounds to wastewater.
- 2.1.1.3 The permittee shall ensure that all wastewater and PAG rock are deposited in a manner that will not damage or otherwise jeopardize the integrity of containment.
- 2.1.1.4 The permittee shall implement a program to minimize the likelihood that any area containing contaminated water within the facility boundary becomes attractive to waterfowl, shorebirds, or other wildlife.
- 2.1.1.5 Activities at the Palmer Project, which will cause a significantly greater amount of wastewater and PAG waste rock to be generated and disposed in the permitted facilities, require the prior approval of the department.
- 2.1.1.6 The following materials shall not be disposed onsite.
 - 2.1.1.6.1 Acute hazardous wastes, as defined by 18 AAC 60.990(157), including radioactive material, explosives, strong acids and untreated pathogenic waste; however, this prohibition does not preclude disposal of natural minerals found in exploration rock; or
 - 2.1.1.6.2 Contaminated soils, spill booms, and liners used for the containment of spilled hazardous substances, chemicals used in the cleanup of hazardous substance spills, or other hazardous substance spill cleanup wastes.
- 2.1.1.7 When monitoring as specified in Section 2.5 is required, the groundwater in the monitoring wells must not show a statistically significant increase, according to 18 AAC 60.830(h), in constituent concentration above WQS. When a statistically significant increase in a concentration of a constituent above its WQS is discovered, corrective action outlined in Section 2.7 must be implemented.
- 2.1.1.8 The limitations in Section 2.1.1 do not preclude, and authorization is

hereby given for, disposal of non-hazardous solid wastes such as settled solids from sumps, ditches, and degritting basins and ash from combustion of scrap wood material.

- 2.1.1.9 The department may set or modify permit conditions based on monitoring results or changes in facility processes in accordance with permit amendment or modification procedures.

2.2 LAND APPLICATION DISPOSAL (LAD) SYSTEM

2.2.1 The permittee is allowed to discharge wastewater from the exploration tunnel into the LAD system. The LAD system discharges at two different subterranean sites, the upper diffuser and the lower diffuser.

2.2.2 Land application must not adversely impact vegetation. If any stress or evidence of adverse impact to the vegetation is detected, application must be halted and the department must be notified according to Section 2.7.

2.2.3 Land application discharge shall not form a connection with waters of the U.S.

2.2.4 Advancement of the exploration ramp shall cease before influent flow to the LAD system exceeds its maximum discharge capacity.

2.2.5 Upper Diffuser

The disposal of wastewater through the LAD system's upper diffuser on a long term basis is prohibited unless specific written approval from DEC has been received. The request for long term approval to discharge wastewater through the LAD system's upper diffuser shall include data acquired during a trial period of usage for the LAD system's upper diffuser. During the trial period the following requirements apply.

2.2.5.1 Discharge shall not exceed 50 gallons per minute (gpm);

2.2.5.2 A shallow groundwater monitoring well, MW-04, shall be installed and developed downgradient of the LAD system's upper diffuser between Waterfall Creek and the diffuser to document groundwater quality;

2.2.5.3 In the event that developing MW-04, a shallow groundwater well in the designated area of the Waterfall Creek drainage, is not practicable, then DEC may rely on the baseline groundwater quality from a reference monitoring well located downgradient of the LAD system's upper diffuser and within the Waterfall Creek drainage;

2.2.5.4 Before the trial period commences, the monitoring well shall be sampled at least three times at weekly intervals to establish background groundwater quality for the parameters and minimum level of quantification as shown in Table 5;

2.2.5.5 The trial period shall be during the snow free season and last 120 days from the day that wastewater discharge is initiated;

2.2.5.6 Beginning with the onset of discharge for the trial period, the discharge water and the monitoring well water shall be sampled on the same day with at least a monthly frequency;

2.2.5.7 Water quality samples shall be analyzed for the parameters listed in Table 1; and

2.2.5.8 Surface expression of wastewater discharge from the LAD system's upper

diffuser is prohibited.

2.2.6 Lower Diffuser

The following requirements apply to the disposal of wastewater through the LAD system's lower diffuser.

2.2.6.1 Flow to the lower diffuser is limited to 500 gpm;

2.2.6.2 Monitoring well MW-01 provides background water quality upgradient of the lower diffuser and monitoring well MW-02 serves to detect LAD system impacts on downgradient, groundwater quality. Monitor MW-01 and MW-02 according to Section 2.5; and

2.2.6.3 MW-02 monitors groundwater quality downgradient of the lower diffuser. Groundwater in MW-02 must not exceed the triggers listed in Table 1. If any of the triggers in Table 1 are exceeded, then corrective action as designated in Section 2.7 must be implemented.

Table 1: Corrective Action Triggers for Groundwater in MW-02

Parameter ¹	Units	Trigger
aluminum	mg/L ²	15
arsenic	µg/L ³	10
cadmium ⁴	µg/L	0.40
calcium ⁵	mg/L	NA
copper ⁴	µg/L	53
iron	mg/L	29
lead ⁴	µg/L	6.2
magnesium ⁵	mg/L	NA
manganese	µg/L	550
mercury	µg/L	0.012
nitrate as N	mg/L	10
pH	s.u. ⁶	<6.5 or >8.5
selenium	µg/L	5
sulfate	mg/L	250
total dissolved solids	mg/L	500
zinc ⁴	µg/L	186
<ol style="list-style-type: none"> 1. total recoverable concentrations 2. milligrams per liter 3. micrograms per liter 4. Parameter has a hardness-based trigger using the 15th percentile of the background hardness, 168 mg/L as CaCO₃. Hardness is calculated as follows: (2.497 x [Ca]) + (4.118 x [Mg]). 5. Parameter is used to calculate hardness. 6. standard units 		

2.2.7 Monitoring site P25 at the mouth of Waterfall Creek serves to monitor potential impacts, if any, from the LAD system’s upper diffuser on downgradient water quality. Surface water sampled at P25 must not exceed the triggers listed in Table 2. If any of the triggers in Table 2 are exceeded, then corrective action as designated in Section 2.7 must be implemented.

Table 2: Corrective Action Triggers for Surface Water at Site P25

Parameter ¹	Units	Trigger
aluminum	mg/L	10
arsenic	µg/L	10
cadmium ²	µg/L	0.37
calcium ³	mg/L	NA
copper ²	µg/L	24
iron	mg/L	16
lead ²	µg/L	4.3
magnesium ³	mg/L	NA
manganese	µg/L	290
mercury	µg/L	0.012
nitrate as N	mg/L	10
pH	s.u.	<6.5 or >8.5
selenium	µg/L	8.2
sulfate	mg/L	650
total dissolved solids	mg/L	1,037
zinc ²	µg/L	146
1. total recoverable concentrations 2. Parameter has a hardness-based trigger using the 15th percentile of the background hardness, 126 mg/L as CaCO ₃ . 3. Parameter is used to calculate hardness. Hardness is calculated as follows: (2.497 x [Ca]) + (4.118 x [Mg]).		

2.2.8 Monitoring site P26 in Hangover Creek serves to monitor potential impacts, if any, from the LAD system’s lower diffuser on downgradient water quality. Surface water sampled at P26 must not exceed the triggers listed in Table 3. If any of the triggers in Table 3 are exceeded, then corrective action as designated in Section 2.7 must be implemented.

Table 3: Corrective Action Triggers for Surface Water at Site P26

Parameter ¹	Units	Trigger
aluminum	mg/L	21
arsenic	µg/L	10
cadmium	µg/L	0.79
calcium ²	mg/L	NA
copper	µg/L	70
iron	mg/L	39
lead ²	µg/L	4.3
magnesium ²	mg/L	NA
manganese	µg/L	970
mercury	µg/L	0.012
nitrate as N	mg/L	10
pH	s.u.	<6.5 or >8.5
selenium	µg/L	5
sulfate	mg/L	299
total dissolved solids	mg/L	573
zinc ³	µg/L	147
1. total recoverable concentrations 2. Parameter is used to calculate hardness. Hardness is calculated as follows: (2.497 x [Ca]) + (4.118 x [Mg]). 3. Parameter has a hardness-based trigger using the 15th percentile of the background hardness, 127 mg/L as CaCO ₃ .		

2.2.9 Monitoring site P27 is located at about the midpoint of Glacier Creek below all exploration activities and serves to monitor potential impacts, if any, from the cumulative exploration activity on downgradient water quality. Surface water sampled at P27 must not exceed the triggers listed in Table 4. If any of the triggers in Table 4 are exceeded, then corrective action as designated in Section 2.7 must be implemented.

Table 4: Corrective Action Triggers for Surface Water at Site P27

Parameter ¹	Units	Trigger
aluminum	mg/L	43
arsenic	µg/L	10
cadmium ²	µg/L	0.39
calcium ³	mg/L	NA
copper ²	µg/L	133
iron	mg/L	16
lead	µg/L	6.4
magnesium ³	mg/L	NA
manganese	µg/L	2,200
mercury	µg/L	0.012
nitrate as N	mg/L	10
pH	s.u.	<6.5 or >8.5
selenium	µg/L	5
sulfate	mg/L	268
total dissolved solids	mg/L	500
zinc	µg/L	470
1. total recoverable concentrations 2. Parameter has a hardness-based trigger using the 15th percentile of the background hardness, 162 mg/L as CaCO ₃ . 3. Parameter is used to calculate hardness. Hardness is calculated as follows: (2.497 x [Ca]) + (4.118 x [Mg]).		

2.3 PAG ROCK STORAGE PAD

- 2.3.1 Solids and liquids on the PAG rock storage pad shall be contained within an area lined by an impermeable geomembrane.
- 2.3.2 The PAG rock storage pad shall be surrounded by berms to contain runoff within the geomembrane lined area.
- 2.3.3 PAG rock must be covered by an impermeable cover when not being handled.
- 2.3.4 The amount of PAG rock placed on the storage pad is limited to no more than 4,000 cubic meters (5,230 cubic yards).
- 2.3.5 PAG storage pad water must be contained in the lined area, and may not be discharged without written department approval.
- 2.3.6 PAG rock must be managed as indicated in Part 3.2 Development Rock Monitoring, Handling and Disposal of the *Application*.

2.4 SITE CONSTRUCTION, MAINTENANCE, & OPERATION

2.4.1 Specific

The LAD system and the PAG rock storage pad shall be constructed as indicated in the *Appendix A*.

2.4.2 General

2.4.2.1 Changes that may have a significant impact on surface or groundwater quality; information on engineering changes to the wastewater disposal systems that may affect water quality; new waste treatment processes; changes to ground and surface water interception, conveyance or monitoring systems; or the addition of new waste streams to the discharge that could significantly change the quality or increase the quantity of pollutants in a waste stream must be submitted to the department and approval must be obtained prior to any such changes or discharges.

2.4.2.2 The permittee shall develop the project in accordance with department-approved plans and amendments thereof, which are submitted by the applicant as required by this permit and referenced in Section 1.2. Pollution prevention concepts shall be incorporated into operations plans for the project.

2.4.2.3 The permittee shall construct and maintain wastewater collection systems and control wastewater in accordance with plans approved by the department.

2.4.2.4 The permittee shall ensure that removal of settled solids deposited from the LAD system settling ponds is done in a manner that will not damage or otherwise jeopardize the integrity of the containment.

2.4.2.5 The permittee shall not dispose of PAG rock or wastewater in quantities exceeding the design capacity of the disposal facilities.

2.4.2.6 The permittee shall control and treat wastewater as necessary to prevent causing downgradient offsite water quality exceedances in waters of the State.

2.4.2.7 The LAD system and its appurtenances shall be properly operated and maintained.

2.4.3 Secondary Containment

2.4.3.1 Secondary containment of all hazardous substances, as defined at AS 46.03.826(5), must be impermeable to those stored hazardous substances.

2.4.3.2 The permittee shall provide and maintain secondary containment for all tanks containing hazardous or toxic materials and piping associated with that tankage. For a given containment area, secondary containment must provide a storage volume greater than or equal to 110 percent of the largest tank or the total volume of permanently manifolded tanks.

2.4.3.3 The permittee must design and install secondary containment structures in a manner that ensures that hazardous substances/fuel will not escape from the structures. To prevent such discharges, facilities shall be maintained in good working condition at all times by the permittee.

- 2.4.4 The permittee shall maintain fuel handling and storage facilities in a manner that will minimize the discharge of hazardous substances.
- 2.4.5 Notification
- 2.4.5.1 The permittee shall notify the department in writing at least 15 days before the introduction of a new chemical into the process or wastewater treatment streams that could significantly change the quality or increase the quantity of pollutants in a wastewater stream(s). Safety Data Sheets on such new chemicals must be forwarded to the department at time of notification and maintained onsite. Introduction of the new chemical into the process requires written department approval.
- 2.4.5.2 Under 18 AAC 72.600, the permittee shall submit engineering plans to the department at least 60 days before construction or modification of an applicable system, and receive department approval of any changes that will significantly modify the quality or quantity of a waste stream, the operation of a wastewater treatment component, or the LAD system covered under this permit.
- 2.4.5.3 With respect to any department-approved change as described in Section 2.4.2.2, the permittee must submit to the department within 90 days after completing construction:
- 2.4.5.3.1 As-built drawings of the process components showing changes potentially affecting performance as required in 18 AAC 72.600,
- 2.4.5.3.2 A summary of the quality control activities that were carried out during construction, and
- 2.4.5.3.3 The revised operating plans that reflect modifications made during construction.

2.5 MONITORING

The monitoring plan, *Attachment 1*, submitted by Constantine Mining LLC and approved by the department, is incorporated into this permit. Future department-approved changes to project monitoring will be included as modifications to *Attachment 1* and do not require re-issuance or modification of this permit. *Attachment 1* shall contain monitoring procedures to include the following and must be updated within 90 days of permit issuance or prior to commencing Phase II, as needed, to conform to the permit.

- 2.5.1 Visually monitor the all facilities for signs of damage or potential damage from settlement, ponding, leakage, instability, frost action, erosion, thawing of the waste, or operations at the site. Also, check for signs of stress to vegetation and wildlife at the facility, the presence of aufeis, and sheen on discharged water. Visual monitoring shall be at least weekly and documented monthly.
- 2.5.2 Monitor surface and groundwater near the site to ensure that WQS or natural conditions are protected and based on representative sample results.
- 2.5.3 Whenever the upper or lower diffuser is discharging wastewater, it shall be inspected on a daily basis.
- 2.5.4 Waste rock must be monitored as indicated in Part 3.2 Development Rock Monitoring, Handling and Disposal of the *Application*.

- 2.5.5 Groundwater, surface water, and discharged wastewater monitoring shall be meet the requirements below.
- 2.5.5.1 Groundwater must be sampled at MW-01 and MW-02 and meet the requirements in Table 3.
 - 2.5.5.2 Surface water must be sampled at the following sites: P01, P25, P26, and P27 and meet the requirements in Table 5.
 - 2.5.5.3 Flow of discharged wastewater from the upper and lower diffusers must be measured continuously to assure that each does not exceed its design daily average flow rate.
 - 2.5.5.4 Wastewater from the upper and lower diffusers must be sampled after the last treatment process and before discharge and meet the requirements of Table 3.
 - 2.5.5.5 All samples must be analyzed for the parameters listed in Table 5 and must achieve a minimum level of quantification (ML) that is equivalent to or less than those listed therein. The permittee may request different MLs. The request must be in writing and must be approved by DEC.

Table 5: Water Quality Monitoring Requirements

Parameter¹	Units	Minimum Sampling Frequency	Minimum Level of Quantification
aluminum	mg/L	quarterly ²	0.087
arsenic	µg/L	quarterly	1
cadmium	µg/L	quarterly	0.01
copper	µg/L	quarterly	0.5
hardness, calculated	mg/L	quarterly	
iron	mg/L	quarterly	0.1
lead	µg/L	quarterly	0.1
manganese	µg/L	quarterly	1
mercury	µg/L	quarterly	0.012
nitrate as N	mg/L	quarterly	1
pH	s.u.	quarterly	± 0.1
selenium	µg/L	quarterly	0.05
sulfate	mg/L	quarterly	1
total dissolved solids	mg/L	quarterly	1
zinc	µg/L	quarterly	3

1. Measure total recoverable concentrations.
 2. Calendar quarter when water is flowing and samples can be safely gathered
 3. Hardness is calculated as follows: (2.497 x [Ca]) + (4.118 x [Mg]).

- 2.5.5.6 The permittee shall adhere to the Quality Assurance Project Plan (QAPP) contained in *Attachment 1* and approved by the department. The permittee shall update and maintain the QAPP to include the following:

- 2.5.5.6.1 The QAPP will reflect the current sampling program for the LAD system. Any significant changes in the QAPP procedures shall be submitted to the department for approval.
 - 2.5.5.6.2 The QAPP shall ensure water quality samples are analyzed by a laboratory that follows EPA-approved procedures, quality control requirements, reporting and documentation procedures.
 - 2.5.5.6.3 The QAPP must be designed to assist in planning for the collection and analysis of water samples in support of the permit and in explaining data anomalies when they occur.
 - 2.5.5.6.4 Throughout all sample collection and analysis activities, the permittee must use chain-of-custody procedures described in the QAPP.
 - 2.5.5.6.5 The permittee must amend the QAPP whenever there is a modification in sample collection, sample analysis, or other procedure addressed by the QAPP.
 - 2.5.5.6.6 A copy or copies of the QAPP must be made available to the department upon request.
- 2.5.6 Discharged wastewater, groundwater and surface water monitoring and corrective action monitoring shall be in accordance with Section 2.7, Article 7 of 18 AAC 60 Solid Waste Management Regulations, *Attachment 1*, and the QAPP.
- 2.5.7 The department may modify monitoring requirements, including the establishment of additional compliance points in response to trends showing changes in the concentration or load of parameters being monitored.
- 2.5.8 If the permittee monitors any surface or groundwater identified in the *Attachment 1*, more frequently than required, the permittee shall notify the department that the additional monitoring has occurred in the next quarterly report after the monitoring has occurred. The results of such monitoring shall be available for inspection by the department, and the permittee shall provide copies of the results to the department upon request.

2.6 REPORTING

- 2.6.1 When a statistically significant increase in the concentration of a constituent above a WQS is discovered at a groundwater or surface water monitoring as listed in Tables 1 through 4., or if noncompliance with a permit requirement is discovered, the permittee shall verbally notify the department no later than the end of the next working day after discovery, and shall conduct corrective actions according to Section 2.7.
- 2.6.2 The permittee shall provide the department with quarterly monitoring reports summarizing inspection and monitoring results required in Section 2.5. The reports shall satisfy the following conditions.
- 2.6.2.1 Due Dates - Reports for the first three calendar quarters are due within 60 days after the quarter ends, and the report for the fourth calendar quarter shall be submitted by March 1st of the following year.

- 2.6.2.2 Form – Reports shall be provided in electronic form using commercially available software or according to other electronic reporting requirements approved by the department. Paper copies of the reports are not required unless specifically requested.
- 2.6.2.3 Content - Reports shall contain a narrative portion discussing data and information collected during the preceding quarter.
- 2.6.2.4 Graphing - Reports shall present water quality data in graphical form indicating trends as well as the margin of compliance with limits.
 - 2.6.2.4.1 Graphs of concentration measurement versus time must include the past five years of data, if available, and may contain all historic data.
 - 2.6.2.4.2 The graphs must also include the parameter, units, and applicable permit limit or WQS.
 - 2.6.2.4.3 Multiple stations, identified using symbols in a legend, may be included in the same graph.
 - 2.6.2.4.4 Scales shall be proportioned to display the limit or WQS, as indicated by a highlighted line, near the top of the graph or when data exceeds the limit, the maximum value shall be near the top of the graph.
 - 2.6.2.4.5 Formatting shall allow addition of new data to each graph’s cumulative data when producing the next quarterly report.
 - 2.6.2.4.6 For graphical purposes, non-detect values shall be plotted at one half the method detection limit (MDL), and values between the minimum level of quantification (ML) and MDL shall be plotted at the value of the qualified measurement.
- 2.6.3 Annual Report - In addition to satisfying the requirements of Section 2.6.2, the fourth calendar quarter report serves as the annual report. The annual report shall:
 - 2.6.3.1 Be submitted to the department by March 1st of the following year;
 - 2.6.3.2 Contain an electronic copy (preferably Excel) of the water quality data for the reporting year, including the past five years’ data, if available, and may contain all historic data in spreadsheet form. When a value is less than the ML, it must be identified as less than the ML, and the ML must be provided. Non-detect values must be identified as less than the MDL or non-detect and the MDL must be provided in the electronic water quality data spreadsheets; and
 - 2.6.3.3 Address the adequacy of the financial responsibility including, but not limited to, significant changes in reclamation activity costs, concurrent reclamation, expansion or other changes to the operation of the facility.
- 2.6.4 The permittee shall provide the department with copies of any amendments to the Reclamation Plan Approval (RPA) issued by Alaska Department of Natural Resources (DNR), when they affect the waste disposal operations authorized by the permit.
- 2.6.5 All records, information, and reports resulting from the monitoring activities

required by this permit, including but not limited to all records of analyses performed, calibration and maintenance of instrumentation, and recordings from continuous monitoring instrumentation, shall be retained in Alaska for observation by the department for a minimum of five years. Upon request from the department, the permittee shall submit certified copies of such records.

2.6.6 Any onsite wildlife casualties associated with facility activities shall be reported to appropriate State agencies, including the department, within one working day of discovery.

2.6.7 All reports submitted under the requirements of this permit shall be sent to:

Dept. of Environmental Conservation
Division of Water
610 University Ave.
Fairbanks, AK 99709
(907) 451-2136

2.6.8 Knowingly making a false statement, by the permittee, the operator or other employees, including contractors, on any such report may result in the imposition of criminal penalties as provided under AS 46.03.790.

2.7 CORRECTIVE ACTIONS

2.7.1 The permittee shall comply with 18 AAC 60.815 if the visual monitoring program in Section 2.5.1 discovers damage or potential damage to the waste disposal-related facility that could lead to water quality violations.

2.7.2 When a statistically significant increase in a constituent concentration above a WQS is discovered in any of the water sampling locations, the permittee shall comply with 18 AAC 60.820-860. Statistical significance shall be determined using one of the methods outlined in 18 AAC 60.830(h). The permittee shall comply with the notification requirements in 18 AAC 60.850(c) upon determining a statistically significant increase in a constituent concentration.

2.7.3 For a single constituent, when a statistically significant increase in concentration above its WQS is discovered at a water monitoring station or if noncompliance with a permit requirement is discovered, the permittee shall:

2.7.3.1 Orally notify the department no later than the end of the next working day;

2.7.3.2 Determine the extent of the exceedance or noncompliance;

2.7.3.3 In consultation with the department and documented in writing, implement a plan to restore compliance and determine the cause of the exceedance or noncompliance;

2.7.3.4 Submit to the department, within seven working days after an exceedance or noncompliance is verified by the permittee, a plan for corrective actions to prevent adverse environmental impacts and avoid future exceedances of a similar nature; and

2.7.3.5 Implement the corrective actions as approved by the department.

2.8 SUSPENSION OF OPERATIONS

2.8.1 Suspension of operations is defined as a suspension of seasonal exploration

- activities for more than one year but less than three years. The length of time for the period of suspension may be extended beyond three years by written authorization from the department. The permittee shall submit a conceptual suspension of operations plan to the department either (i) 90 days after the effective date of the permit or (ii) 90 days prior to commencing phase II exploration, whichever is later.
- 2.8.2 The permittee must notify the department within three days of suspending operations. The notice shall provide the nature of and reason for the suspension and its anticipated duration.
- 2.8.3 No later than ten days after operations have been suspended, the permittee shall submit a detailed and updated suspension of operations plan that supersedes the suspension of operations conceptual plan required by Section 2.8.1 with current information and specific details. The suspension plan shall address the following:
- 2.8.3.1 Explanation of what would reasonably result in resuming or permanently terminating exploration activities;
- 2.8.3.2 Reclamation or construction activities during the period of temporary suspension;
- 2.8.3.3 Procedures, methods, and schedule to be implemented for the treatment, disposal, or storage of wastewater;
- 2.8.3.4 The control of surface and groundwater drainage to and from the facility and the surrounding area;
- 2.8.3.5 The control of erosion from the waste rock disposal areas and any other disturbed areas within the facility boundary;
- 2.8.3.6 The storage of hazardous materials during the period of suspended operations; and
- 2.8.3.7 Procedures for maintaining and monitoring the LAD system and the temporary PAG rock storage pad and site-wide water balance.
- 2.8.4 The department shall have 15 days to review and approve or request modifications to the suspension plan.
- 2.8.5 Once a suspension of operations plan has been approved, it becomes enforceable under the conditions of this permit and full implementation of the approved suspension plan is required. The plan can be amended by submitting a revised plan to the department for approval.
- 2.8.6 During suspension of operations, the permittee shall:
- 2.8.6.1 Continue pollution control activities associated with waste disposal and management, including but not limited to dust control, maintenance of the drainage diversion structures, maintenance of all discharge and leakage control structures and processes, as specified by the suspension plan.
- 2.8.6.2 Continue monitoring and reporting activities of all active portions of the site as specified by this permit or the suspension plan.
- 2.8.7 Written department approval is required before resuming exploration after a

period of temporary closure.

2.9 TERMINATION OF EXPLORATION ACTIVITIES

2.9.1 Termination of exploration activities is defined as the permanent cessation of those activities. Updated reclamation and monitoring plans must be submitted for approval within 90 days after initiating termination of exploration. The updated plans must address current conditions at the facility. Updates and changes to those plans must be approved in writing by the department.

2.9.2 Although this permit is limited to a period of five years from the date of issuance (unless administratively extended), it is the intent of the department to re-issue this permit with the following conditions to apply to LAD system reclamation, post-cessation treatment and monitoring and post closure care and monitoring. These conditions may be updated, modified or amended by the department as necessary to address new information and future changes to the facility, reclamation and closure plans, regulations or other pertinent considerations for long-term environmental protection. Closure of the waste disposal facilities will be complete when the following criteria are met:

2.9.2.1 Termination of exploration at the site must be implemented and completed according to the conditions of this permit and with the *Attachment 3* to the *Application*, which is incorporated by reference into this permit; and

2.9.2.2 Reclamation shall be performed as outlined in *Attachment 3* to the *Application*.

2.9.3 The permittee shall maintain the facility correcting any erosion or settlement that may impair water quality or otherwise threaten the environment, up until the time that this permit, or any successor permit, is transferred to another entity or terminated by the department.

2.9.4 Post-closure monitoring of surface water quality and visual monitoring for settlement, seeps, and erosion is required annually for at least 60 months after termination of wastewater discharge.

2.9.5 The permittee shall assess the conditions at the facility and respond accordingly throughout the reclamation and post-closure care periods. At the end of the post-closure monitoring period, the department will determine whether post-closure care and monitoring should be extended beyond 60 months after termination of wastewater discharge, based upon the information collected by that time.

3 GENERAL CONDITIONS

3.1 ACCESS AND INSPECTION

The permittee shall allow the Commissioner or designated representative access to the permitted facility at reasonable times to conduct scheduled or unscheduled inspections or tests to determine compliance with this permit, state laws, and regulations.

3.2 INFORMATION ACCESS

Except where protected from disclosure by applicable State or Federal law, all records and reports submitted in accordance with the terms of this permit shall be available for public inspection at the State of Alaska, Department of Environmental Conservation, Fairbanks, Alaska.

- 3.3 CIVIL AND CRIMINAL LIABILITY
Nothing in this permit shall relieve the permittee from any potential civil or criminal liability for noncompliance with the permit or with applicable laws.
- 3.4 AVAILABILITY
The permittee shall post or maintain a copy of this permit available to the public at the facility.
- 3.5 ADVERSE IMPACT
The permittee shall take all necessary means to minimize any adverse impacts to the receiving waters or lands resulting from noncompliance with any limitation specified in this permit, including any additional monitoring needed to determine the nature and impact of the noncomplying activity. The permittee shall cleanup and restore all areas adversely impacted by the noncompliance.
- 3.6 CULTURAL OR PALEONTOLOGICAL RESOURCES
Should cultural or paleontological resources be discovered as a result of this activity or work which would disturb such resources, is to be stopped, and the State Historic Preservation Office, Division of Parks and Outdoor Recreation, DNR is to be notified promptly at (907) 465-4563.
- 3.7 APPLICATIONS FOR RENEWAL
In accordance with 18 AAC 15.100(d), an application for renewal or amendment of this permit must be made no later than 120 days before the expiration date of the permit or the planned effective date of the amendment.
- 3.8 OTHER LEGAL OBLIGATIONS
This permit does not relieve the permittee from the duty to obtain any other necessary permits from the department or from other local, state, or federal agencies, and to comply with the requirements contained in any such permits. All activities conducted and all plans implemented by the permittee pursuant to the terms of this permit shall comply with all applicable local, state, and federal laws and regulations.
- 3.9 TRANSFER OF OWNERSHIP
In the event of any change in control or ownership of the permitted facility, the permittee shall notify the succeeding owner or controller of the existence of this permit by letter, a copy of which shall be forwarded to the Director of the Division of Water. The original permittee remains responsible for permit compliance unless and until the succeeding owner or controller agrees in writing to assume such responsibility, and the department approves assignment of the permit. The department will not unreasonably withhold such approval.
- As between the State and the permittee, no transfer of this permit shall relieve the permittee of any liability arising out of operations conducted prior to such transfer, regardless of whether such liability accrues before or after such transfer.
- 3.10 TOXIC POLLUTANTS
If during the life of this permit a new or revised toxic pollutant (including oil, grease, or solvents) concentration standard is established in accordance with 18 AAC 70 for a pollutant managed at this facility and that standard is more stringent than previously, then upon the effective date of the new rule, this permit automatically adopts the new toxic pollutant concentration standard and applies it to management of facility wastes

going forward from the date of adoption. Authorized discharges made prior to any standards change or adoption will not be subject to ex post facto clean up requirements.

3.11 POLLUTION PREVENTION

In order to prevent and minimize present and future pollution, when making management decisions that affect waste generation, the permittee shall consider the following order of priority options as outlined in AS 46.06.021:

- 1st waste source reduction,
- 2nd recycling of waste,
- 3rd waste treatment, and
- 4th waste disposal.

4 FINANCIAL RESPONSIBILITY

4.1 AUTHORITY

Under AS 46.03.100(f), 18 AAC 15.090, and 18 AAC 60.265, the department is required to secure proof of financial responsibility for reclamation and long term care and maintenance, including wastewater treatment and monitoring at the facility.

- 4.1.1 The permittee shall provide the department with proof of financial responsibility for reclamation and closure of the facilities and post-closure monitoring. The proof of financial responsibility shall cover costs incurred for suspension of operations, reclamation and closure, and monitoring of all project facilities. An overview of the areas covered by the financial responsibility for reclamation and closure is shown in Figure 6.1.
- 4.1.2 The department will review and modify if necessary, the financial responsibility requirements including adjustments for concurrent reclamation, expansion, or other changes to the operation of the facility. The permittee shall address the adequacy of the financial responsibility in the annual report required in Section 2.6.3.
- 4.1.3 The proof of financial responsibility may be in the form of a trust fund, surety bond, letter of credit, insurance, or another department-approved mechanism.
- 4.1.4 Approved proof of financial responsibility must remain available through the post-closure period and may not be released in its entirety until the department certifies in writing that closure of the facility and the required post-closure monitoring have been successfully concluded or that another entity has assumed responsibility for permit compliance, reclamation and closure activities, and post-closure monitoring.
- 4.1.5 The permittee must provide acceptable proof of financial responsibility before collaring the portal. The department will accept or reject the financial surety as expeditiously as possible but in no event later than 30 days after its receipt.
- 4.1.6 If the permittee is unable to provide acceptable proof of financial responsibility to the department within the time period stated above, this permit will expire automatically at that time, notwithstanding any other approvals to the contrary, unless the department's failure to act is responsible for the delay in accepting or rejecting this proof.

- 4.1.7 If the permittee fails to comply with the terms and conditions of this permit and if the department concludes that such failure may prevent, inhibit or delay satisfactory reclamation and closure or post-closure monitoring of the facility, then the department may exercise its rights, under an approved mechanism, to access financial responsibility funds and use them for reclamation and closure and post-closure activities.
- 4.1.8 The permittee can apply to have the amount of the financial responsibility adjusted during the life of the permit if, for example, concurrent reclamation has been completed or if annual adjustment for inflation is needed.

4.2 AMOUNT OF FINANCIAL RESPONSIBILITY

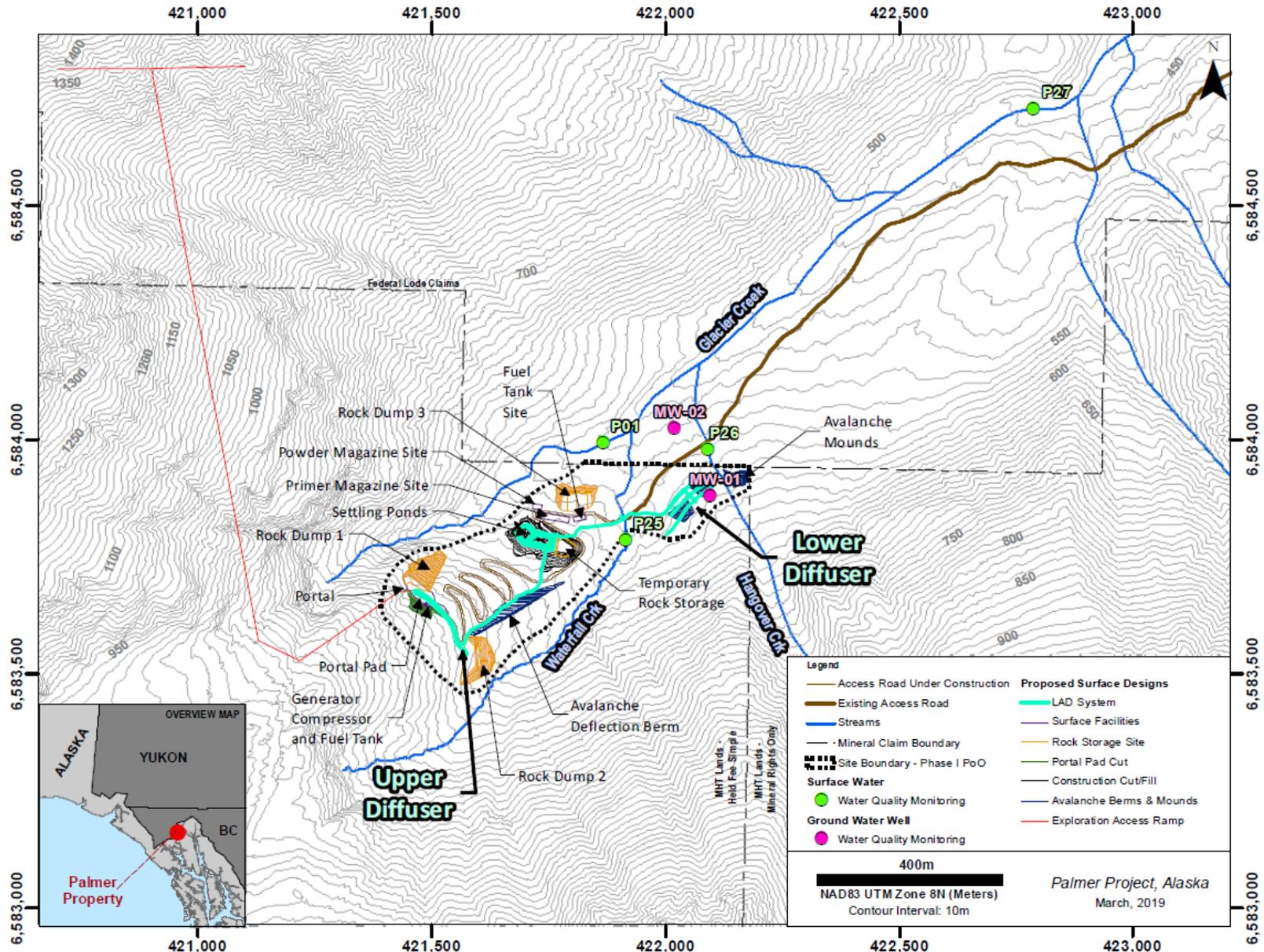
DNR issued a RPA #J20185690RPA to Constantine Mining LLC for the Palmer Project. Review of Phase II reclamation plans and associated costs, *Attachment 3*, was conducted in consultation and agreement between DNR and the department. The amount of financial responsibility, satisfying AS 46.03.100(f), 18 AAC 15.090, and 18 AAC 60.265, established in the *Attachment 3* is \$1,116,996.

5 GLOSSARY OF ACRONYMS

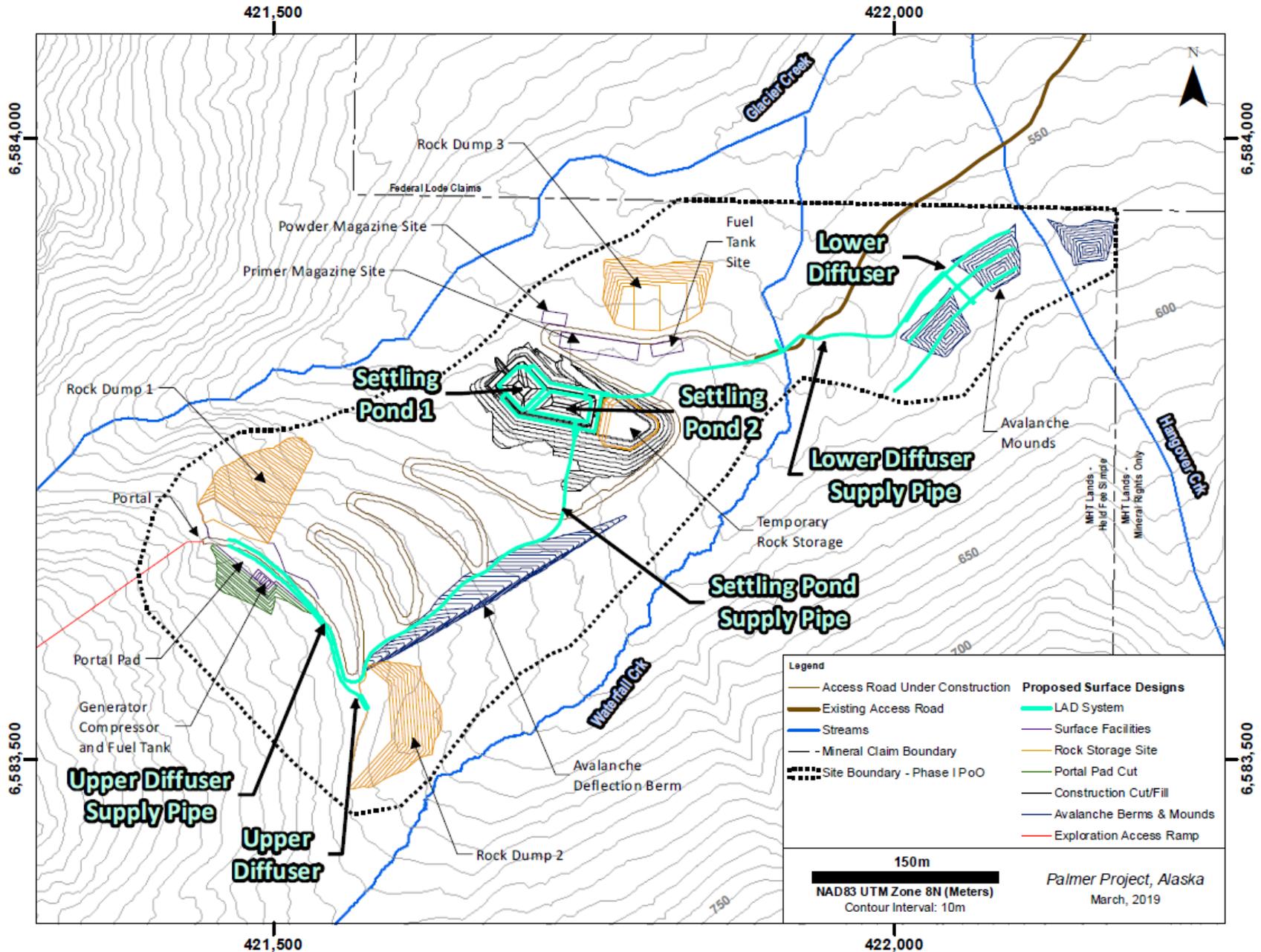
AAC	Alaska Administrative Code
AS	Alaska Statutes
DNR	Alaska Department of Natural Resources
gpm	Gallons per Minute
LAD	Land Application Disposal
MDL	Method Detection Limit
ML	Minimum Level of Quantification
PAG	Potentially Acid Generating
QAPP	Quality Assurance Project Plan
RPA	Reclamation Plan Approval
WQS	Alaska Water Quality Standards (18 AAC 70)

6 FIGURES

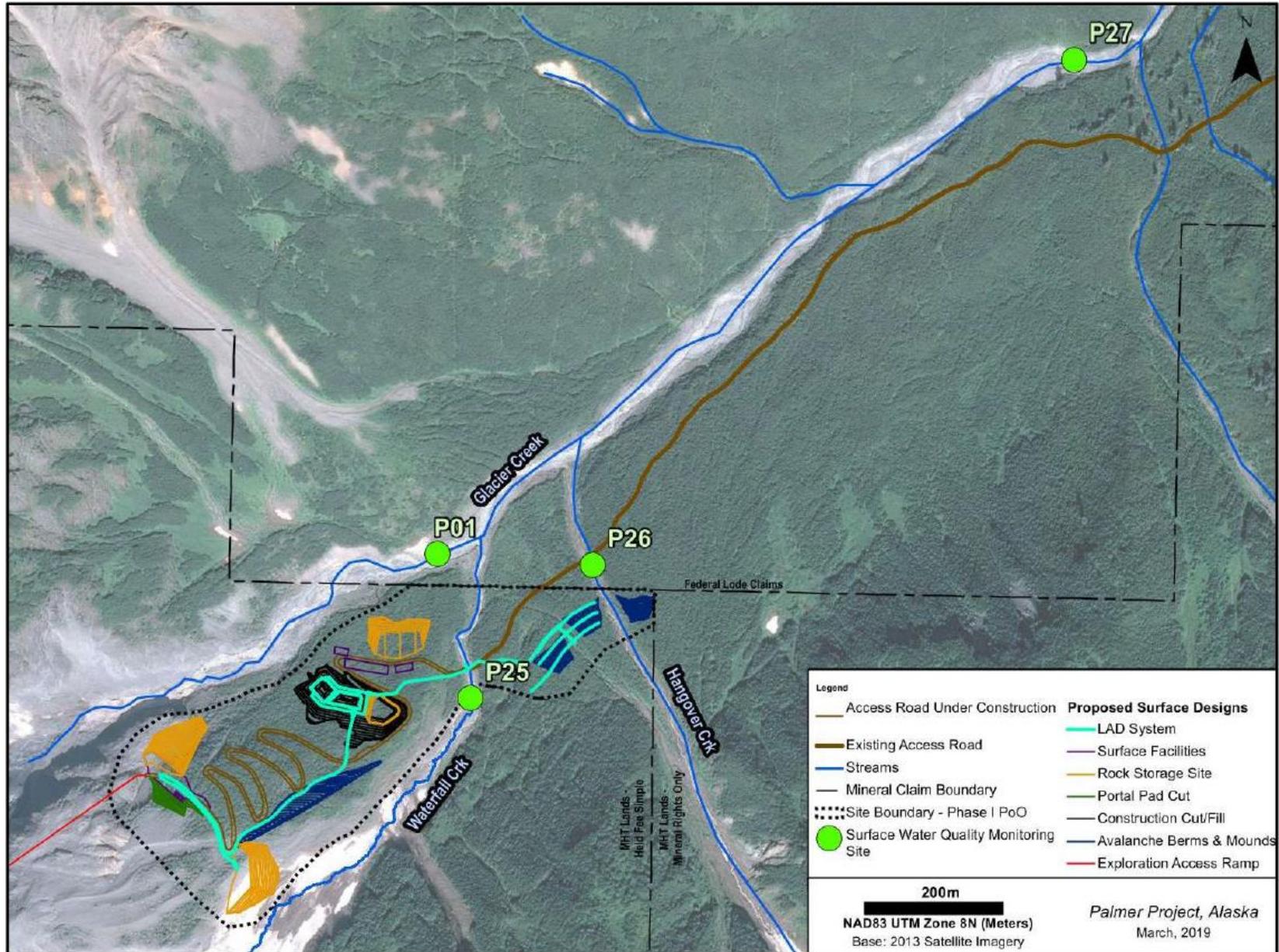
6.1 PROJECT MAP



6.2 PROJECT CLOSE-UP



6.3 SURFACE WATER MONITORING SITES – P01, P25, P26, & P27



6.4 LAD SYSTEM & MONITORING WELLS – MW-01, MW-02, & MW-04

