



2020 Annual Reclamation Report No. J20185690RPA

Upland Mining Lease No. 9100759

Palmer Project Porcupine Mining District,
Alaska

Prepared by Constantine Mining LLC.

March 2021

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LOCATION AND ACTIVITY DESCRIPTION

Location

The Palmer Project is a copper-zinc-gold-silver (barite) exploration project located 34 miles northwest of the town of Haines in Southeast Alaska, USA. The project is being advanced as a joint venture partnership between Constantine North Inc. (Constantine) incorporated in Alaska (a wholly owned subsidiary of Constantine Metal Resources Ltd.) and Dowa Metals & Mining Alaska Ltd. (Dowa) incorporated in Alaska (a wholly owned subsidiary of Dowa Metals and Mining Co. Ltd. of Japan), with Constantine Mining LLC as operator.

The Project is in the Porcupine Mining District on the eastern margin of the Saint Elias mountain range. Figure 1 shows the location of the Project. The western boundary of the Project is the international border with the Canadian province of British Columbia. The Project is located proximal to the paved Haines Highway (Alaska Hwy 7), which leads to the town of Haines, Alaska, to the southeast. A secondary gravel logging road connects the project area to the Alaska Hwy 7 via a bridge across the Klehini River at 26-mile. Drill core storage and camp facilities are located on privately-owned land at the Big Nugget Camp located on Porcupine Creek, approximately 7 miles from the 26-mile bridge.

Project Activity

Constantine began exploratory surface drilling at the Palmer Project in 2006. Existing surface access onto the Glacier Creek valley is via a gravel road that extends approximately 4 miles from the previously mentioned logging road. Constantine upgraded and extended the Glacier Creek access road, under approval from the ADNR and BLM, in 2014, 2016, 2017 and 2018. No work was performed in 2019 or 2020. *The road extension and disturbance associated with surface drilling are bonded through a state-wide pool and is addressed under a separate annual reclamation report, submitted to DNR under APMA 5960 (CNI, 2020).*

Currently, Constantine is proposing the development of an underground exploration ramp to support underground drilling. The underground development is broken into two Phases; Phase I is partial construction of the supporting surface infrastructure and the Phase II includes the construction of the adit and operation of the wastewater disposal system. All works associated with underground exploration are on fee simple Mental Health Trust (MHT) lands for which MHT holds title to both the surface estate and the subsurface mineral estate. The lands are leased to Constantine under MHT Upland Mining Lease No. 9100759 (see Figure 1 for Phase I & II site boundary).

Phase I

Constantine submitted *Phase I Plan of Operations* to MHT, and associated Reclamation Plan to Alaska Department of Natural Resources (ADNR) for approval in early 2018. The Phase I Plan of Operations proposed to extend the Glacier Creek access road for 0.7 miles to a future portal location and build additional surface infrastructure associated with plans to begin an underground exploration program, including the construction of two water settling ponds, waste rock storage areas, the construction of snow avalanche defense structures, and excavation of trenches which will eventually be used for a buried Land Application Disposal System (LAD) to dispose of underground seepage water during future underground activities (Figure 2). On June 14th, approval of the Reclamation Plan was provided by the ADNR (No. J20185690RPA). The total approved surface disturbance is for **17 acres**. The reclamation plan and cost estimate associated with Phase I was approved by the ADNR on June 14th, 2018 (No. J20185690RPA). Shortly thereafter, in June 2018,

Constantine Mining LLC posted a US \$155,403 deposit in an account held with First National Bank with the ADNR to cover temporary and permanent reclamation activities associated with Phase I. In July 2020, the company replaced the \$155,403 deposit with a surety bond for the same amount. Work on Phase I was initiated in 2018, and included road pioneering, and ground clearing and leveling for proposed infrastructure.

Phase II

The Final *Phase II Plan of Operations* and Reclamation Plan and Cost Estimate was submitted to ADNR and MHT on April 11th, 2019. The Phase II Plan of Operations proposed the excavation of roughly 2,012 m of an underground exploration ramp, exploration drilling, construction and operation of the LAD system and associated settling ponds, and the construction of ancillary facilities (Figure 2 and Figure 3). On July 23rd, 2019 Constantine received approval from MHT to complete work outlined in the Plan of Operations. The ADNR amended the existing Reclamation Plan Approval obtained for Phase 1 to incorporate Phase II activities; the final authorization for Phase II work was issued on July 17th, 2019 (J20185690RPA), approving a reclamation cost estimate of \$1,011,542. Note that the bonding for Phase I surface infrastructure stands until underground development is begun. **No work was completed in 2020.**

This report summarizes disturbance as of 2020 associated with the Phase II Plan of Operations and fulfills the annual reporting requirements for the ADNR Reclamation Plan Approval (no. J20185690 RPA).

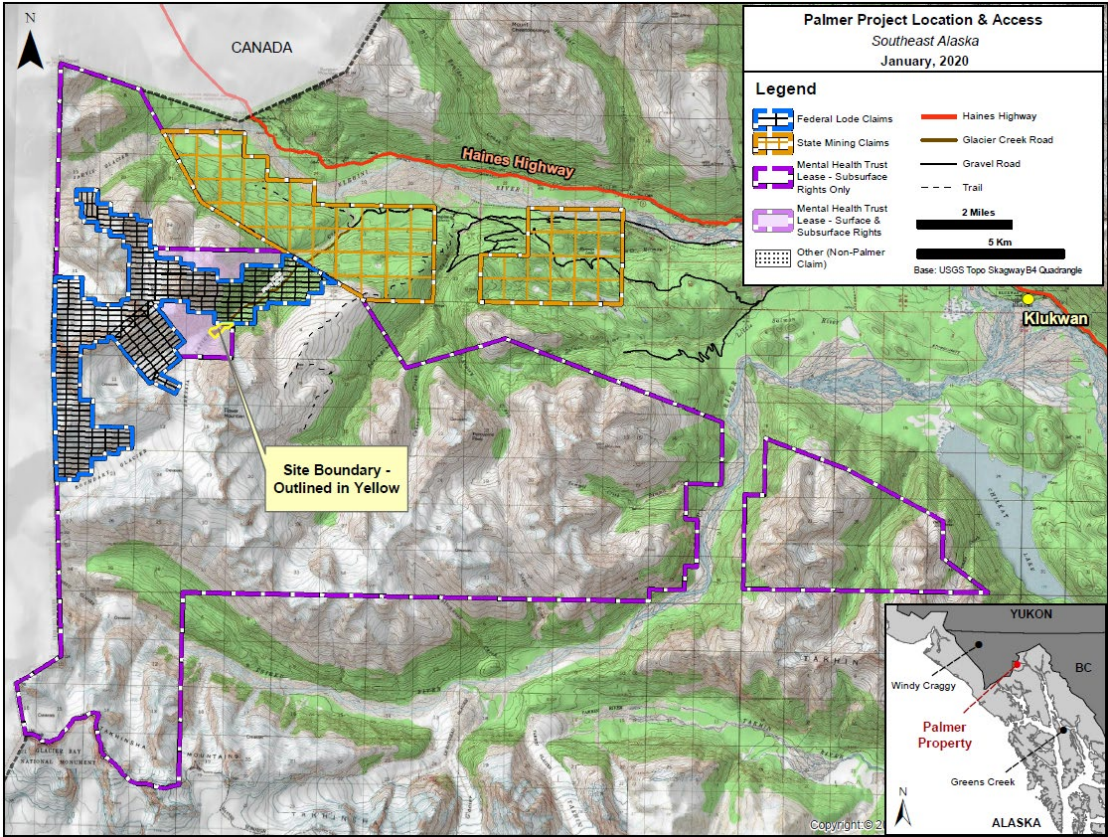


Figure 1 Palmer Project Property Map showing Site Boundary area under J20185690

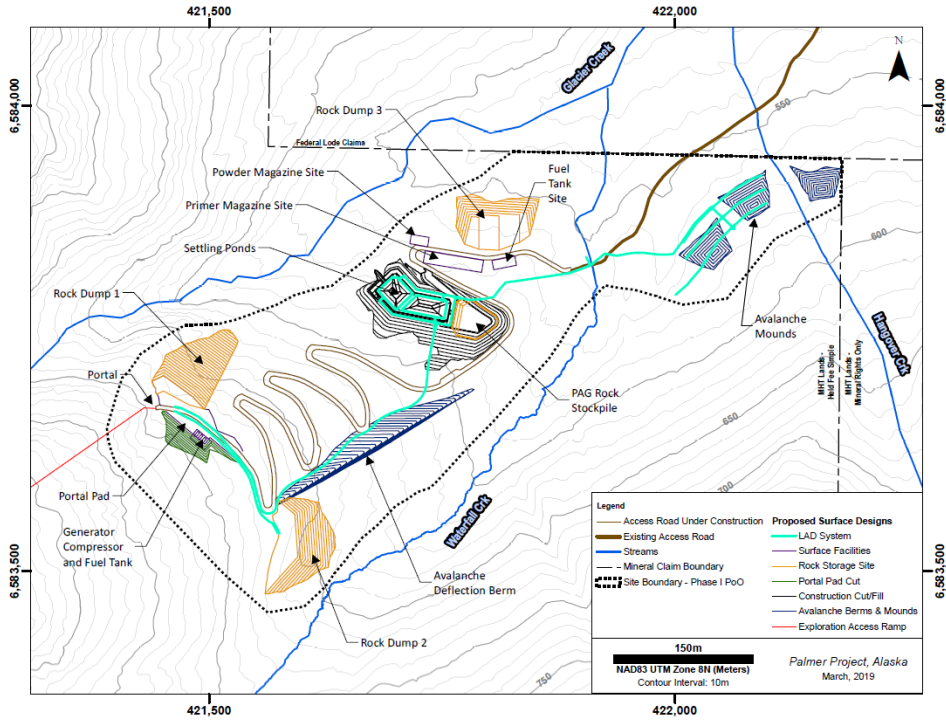


Figure 2 Conceptual designs for the major Phase I (Glacier Creek road, ponds, trench for future LAD system, laydown area, portal pads, avalanche berms and mounds) and Phase II (exploration access ramp, settling ponds) components.

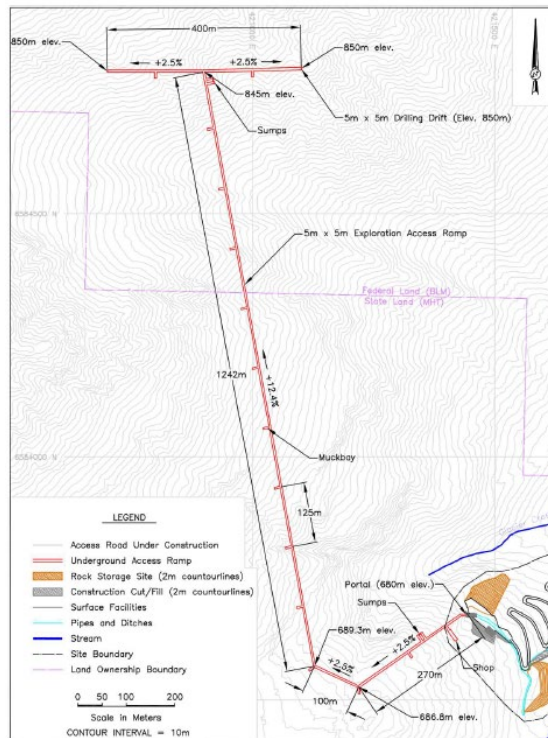


Figure 3 Conceptual design for Phase II exploration access ramp.

SITE DISTURBANCE

Constantine has prepared reclamation plans for both temporary closure and permanent closure scenarios, approved by the ADNR. The access road on Trust lands will be left in-place at closure per an understanding with the Trust.

No activity took place in 2020, thus no reclamation work was completed. Since no construction took place in 2019 or 2020, disturbance remained at 2018 levels at an estimated total of **8.05 acres** (excluding the road). All disturbance associated with Phase II approvals are on fee simple claims, within the Phase II site boundary (see Figure 1). Existing disturbance are tabulated below and shown on Figure 4. The disturbance as of the end of the 2020 field season is illustrated in Photo 1 (no change from 2019). Additional details regarding past disturbance are available in the 2018 Annual Reclamation Report submitted to ADNR in March 2019.

Table 1 Summary of Disturbance Components and Associated Acreage of Disturbance, 2020 (no change from 2019)

Item	Acreage
Road including Cut & Fill	9.4
Avalanche Deflection Berm Clearing	2.79
Sediment Pond & Rock Stockpile Clearing	3.06
Portal Pad Fill Area	0.44
LAD Clearing	1.74
MW-03 Clearing	0.02
TOTAL	17.45
TOTAL (Excluding Road)	8.05

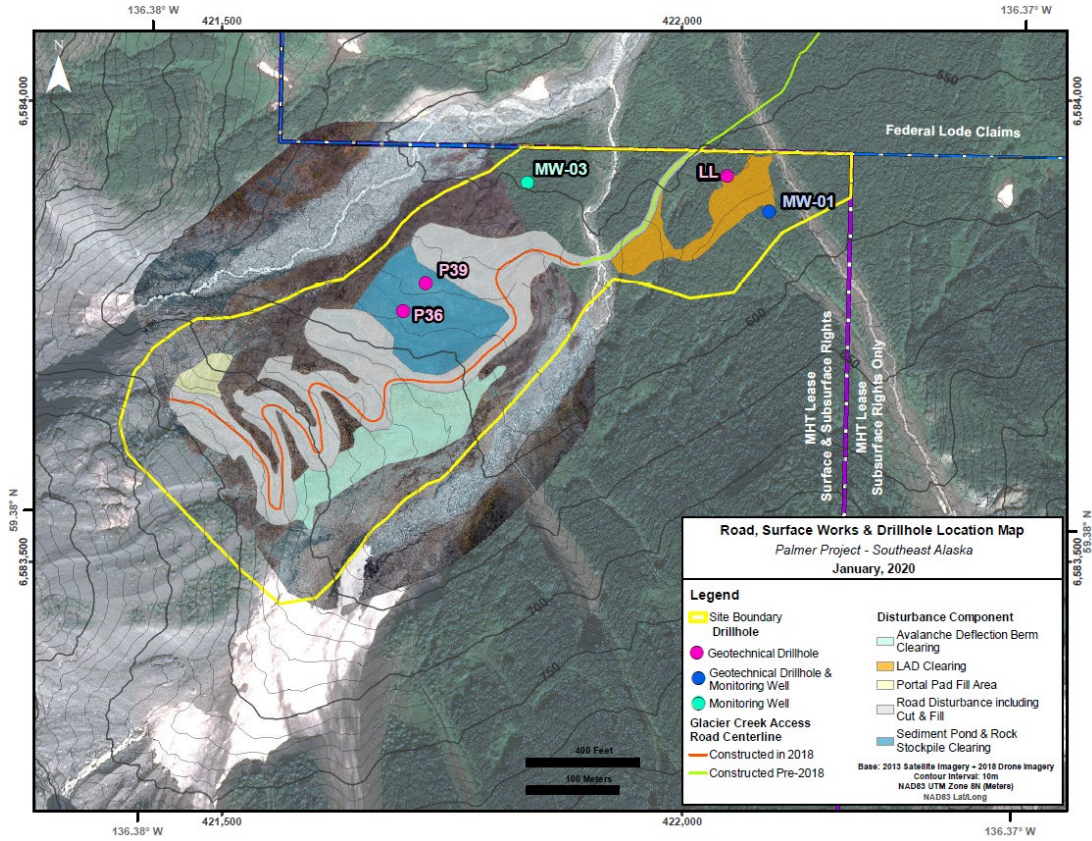


Figure 4 Location map of disturbance components as of 2020. Note no new disturbance was created in 2019 or 2020.



Photo 1 Aerial photo, looking SE, showing land clearing associated with Phase I & II Plan of Operations (on MHT Lands) July 31, 2019

FINANCIAL RESPONSIBILITY

The reclamation plan and cost estimate associated with Phase I was approved by the ADNR on June 14th 2018 (No. J20185690RPA). Shortly thereafter, In June 2018, Constantine Mining LLC posted a US \$155,403 deposit in an account held with First National Bank with the ADNR to cover temporary and permanent reclamation activities associated with Phase I. In July 2020, the company replaced the \$155,403 deposit with a surety bond for the same amount.

The reclamation plan and cost estimate associated with Phase II was approved by the ADNR on July 17th 2019 and was incorporated as amendment of the existing Reclamation Plan Approval No. J20185690RPA. This reclamation plan and reclamation cost estimate supersede the reclamation plan and cost estimate included in Constantine's Phase I Plan of Operations. The ADNR approved a reclamation cost estimate of \$1,011,542 associated with Phase II activities (to be clear, this figure includes the Phase I cost estimate).

As no work was completed in 2020, and underground development has not begun yet, no additional financial assurance or bonding has been put into place above what is discussed above.

MONITORING

Compliance Monitoring – Waste Management Permit

The Waste Management Permit #2019DB0001 (WMP) was issued to Constantine Mining LLC by the State of Alaska, Department of Environmental Conservation (ADEC) on July 17th, 2019. The WMP authorizes the management and disposal of underground seepage water and waste rock associated with Phase II.

The WMP was remanded by ADEC in September 2019 for an informal review largely due to the Maui v. Hawaii Wildlife Case which challenged the permitting authority for disposal of wastewater to groundwater. In August 2020 Constantine notified ADEC that an evaluation and re-design of the LAD system was underway to ensure that the LAD was compliant with the changing legal environment. Constantine is currently collecting additional information on site hydrology to inform the LAD re-design. The results of these studies will be submitted to the ADEC as supporting documentation for the LAD re-design and WMP amendment. The WMP remains under remand at the time of writing this report.

Quarterly sampling has been conducted on surface water (4 stations) and groundwater (2 stations) as required by the WMP. This sampling is summarized in the *2020 Annual (4th Quarter) Monitoring Report* submitted to the ADEC in March 2021. The annual report is included as Appendix A: Waste Management Permit - 2020 Annual Monitoring Report.

Other Monitoring and Studies

Other environmental monitoring activities conducted in 2020 are summarized in Appendix A: Waste Management Permit - 2020 Annual Monitoring Report, and include:

- Hydrometric surveys of surface water (voluntary)
- Groundwater level and temperature monitoring (voluntary)
- Storm water monitoring (as required by Alaska Pollutant Discharge Elimination System (APDES) Construction General Permit (CGP))
- Meteorological monitoring (voluntary)

APPENDIX A: WASTE MANAGEMENT PERMIT - 2020 ANNUAL MONITORING REPORT

Note: appendices of the Waste Management Permit annual report are available from the ADEC

2020 Annual (4th Quarter) Monitoring Report

Palmer Advanced Exploration Project Haines, Alaska

Waste Management Permit 2019DB0001



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1.0 INTRODUCTION

1.1 BACKGROUND

The Waste Management Permit #2019DB0001 (WMP) was issued to Constantine Mining LLC by the State of Alaska, Department of Environmental Conservation (DEC) on July 17th, 2019. The WMP authorizes the management and disposal of underground seepage water and waste rock associated with advanced exploration at the Palmer Project (the Project) and is effective until July 16th, 2024.

The WMP outlines monitoring and reporting requirements (Sections 2.5 and 2.6). This report includes the monitoring period for the fourth quarter of 2020 and satisfies Section 2.6.3, which requires annual reporting on monitoring activities. This is the second annual reporting period since the issuance of the WMP in July 2019, and includes data collected in the four quarters of 2020.

1.2 PROJECT ACTIVITIES

The surface construction and underground development described in the WMP and Plan of Operations (approved by DNR under J20185690RPA) has not yet commenced. As a result, waste authorized by the WMP has not been generated to date. Monitoring associated with operating site infrastructure is therefore not included in this report (as described in Sections 2.5.1, 2.5.2, 2.5.3, 2.5.4, 2.5.5.3, and 2.5.5.4 of the WMP) and data presented in this report continue to characterize near baseline conditions.

Constantine's annual surface exploration program was completed in August of 2020 and included only surface mapping and environmental work (no drilling was conducted). The surface program is authorized separately by DNR, BLM, and TLO, and will be summarized in the Annual Reclamation Statement submitted to the DNR under MLUP #5690. Sporadic environmental work continues year-round.

2.0 ENVIRONMENTAL MONITORING

2.1 Surface Water Monitoring

2.1.1 BACKGROUND

Four surface water stations in the Project area have been monitored since as early as 2008: P01 (Glacier Creek upstream), P27 (Glacier Creek midpoint), P25 (Waterfall Creek), and P26 (Hangover Creek; see Figure 1 and Table 1). Water quality sampling and analytical procedures are performed in accordance with Constantine's Quality Assurance Project Plan (QAPP), prepared by Integral Consulting in 2018, revised by HDR in October 2019 (as per Section 2.5.5.6 of the WMP). Samples are analyzed by ALS Environmental Laboratory for conventional parameters, settleable solids, cations/anions, total/dissolved metals following SM and EPA methods. Field parameters including pH are also collected at each site during the sampling event (more detail is available in the Project QAPP). Quarterly sampling during 2020 is summarized in Table 2. Despite multiple attempts, sampling was only possible at P27 during Q1 due to high avalanche risk in the Upper Valley and travel difficulties caused by COVID-19.

Table 1 Surface water monitoring stations

Station	Station Location	Description	Date sampling initiated	No. of water quality sampling events
P01	Upper Glacier Creek	Upstream of exploration impacted area; near source of Glacier Creek	September, 2008	27
P27	Midpoint of Glacier Creek	Below exploration impacted area	February, 2017	17
P25	Waterfall Creek	Downgradient of the proposed LAD upper diffuser	February, 2017	16
P26	Hangover Creek	Downgradient of the proposed LAD lower diffuser	July, 2017	15

Table 2 Surface water monitoring stations sampled in 2020

Station	Quarters Sampled
P01	2,3,4
P25	2,3,4
P26	2,3,4
P27	1,2,3,4

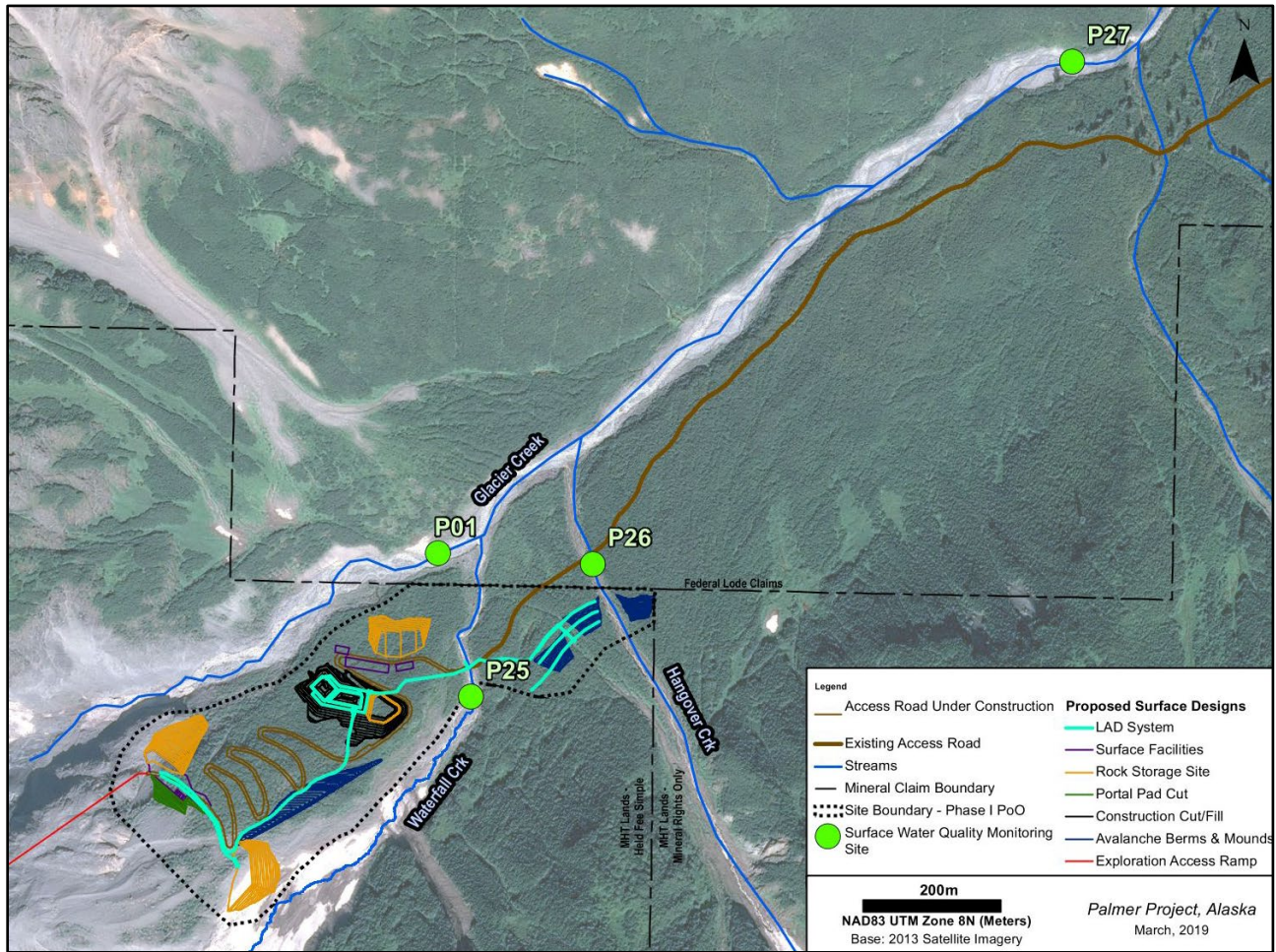


Figure 1 WMP Surface water quality monitoring stations

2.1.2 WATER QUALITY

As per the WMP (Section 2.5.5.2), surface water is generally monitored on a quarterly basis at four sites: P01, P27, P25, and P26 (Figure 1). The fourth quarterly sampling was conducted for surface sites on November 22 and 23, 2020.

Trigger limits are defined in the WMP for P27, P25, and P26. All water quality parameters fell below the defined trigger limits during 2020, including the fourth quarter (see Table 3 and Appendix C). Natural exceedances of Alaska Water Quality Standards (AWQS) were observed at P01 (t-Al, t-Mn, t-Fe and DO), P25 (t-Al, t-Fe, t-Se, SO_4^{2-} , TDS and DO), P26 (t-Fe) and P27 (t-Al, t-Mn, and t-Fe; see Appendix C).

Concentrations of water quality parameters at each surface water monitoring station over time are presented graphically in Appendix A, and raw water quality data is digitally available in Appendix D. Appendix C presents an annual summary of water quality collected in 2020, including a comparison of analytical results to AWQS.

Table 3 Q4 Surface water quality results compared to WMP trigger limits

Parameter	Units	P25		P26		P27	
		Result	Trigger	Result	Trigger	Result	Trigger
aluminum	mg/L	0.0348	10	0.0403	21	0.179	43
arsenic	µg/L	<0.1	10	0.14	10	<0.1	10
cadmium	µg/L	0.0411	0.37	0.0305	0.79	0.0791	0.39
calcium	mg/L	170	NA	117	NA	95.2	NA
copper	µg/L	<0.5	24	<0.5	70	0.57	133
iron	mg/L	0.078	16	0.064	39	0.275	16
lead	µg/L	<0.05	4.3	<0.05	4.3	0.062	6.4
magnesium	mg/L	19.1	NA	6.83	NA	12.2	NA
manganese	µg/L	1.53	290	1.61	970	6	2200
mercury	µg/L	<0.005	0.012	<0.005	0.012	<0.005	0.012
nitrate as N	mg/L	0.189	10	0.0774	10	0.215	10
pH	s.u.	8.44	<6.5 or >8.5	8.1	<6.5 or >8.5	8.19	<6.5 or >8.5
selenium	µg/L	5.77	8.2	3.35	5	2.11	5
sulfate	mg/L	418	650	222	299	207	268
total dissolved solids	mg/L	697	1037	434	573	374	500
zinc	µg/L	<3	146	<3	147	55.5	470

2.1.3 WATER QUANTITY

Constantine voluntarily collects hydrometric data from the monitoring stations, when safe to do so. Three surface water stations were successfully surveyed during the fourth quarter (surveyed on November 23rd, 2020). Hangover Creek (P26) was not surveyed due to low water levels. Instantaneous discharge data is presented in Figure 2.

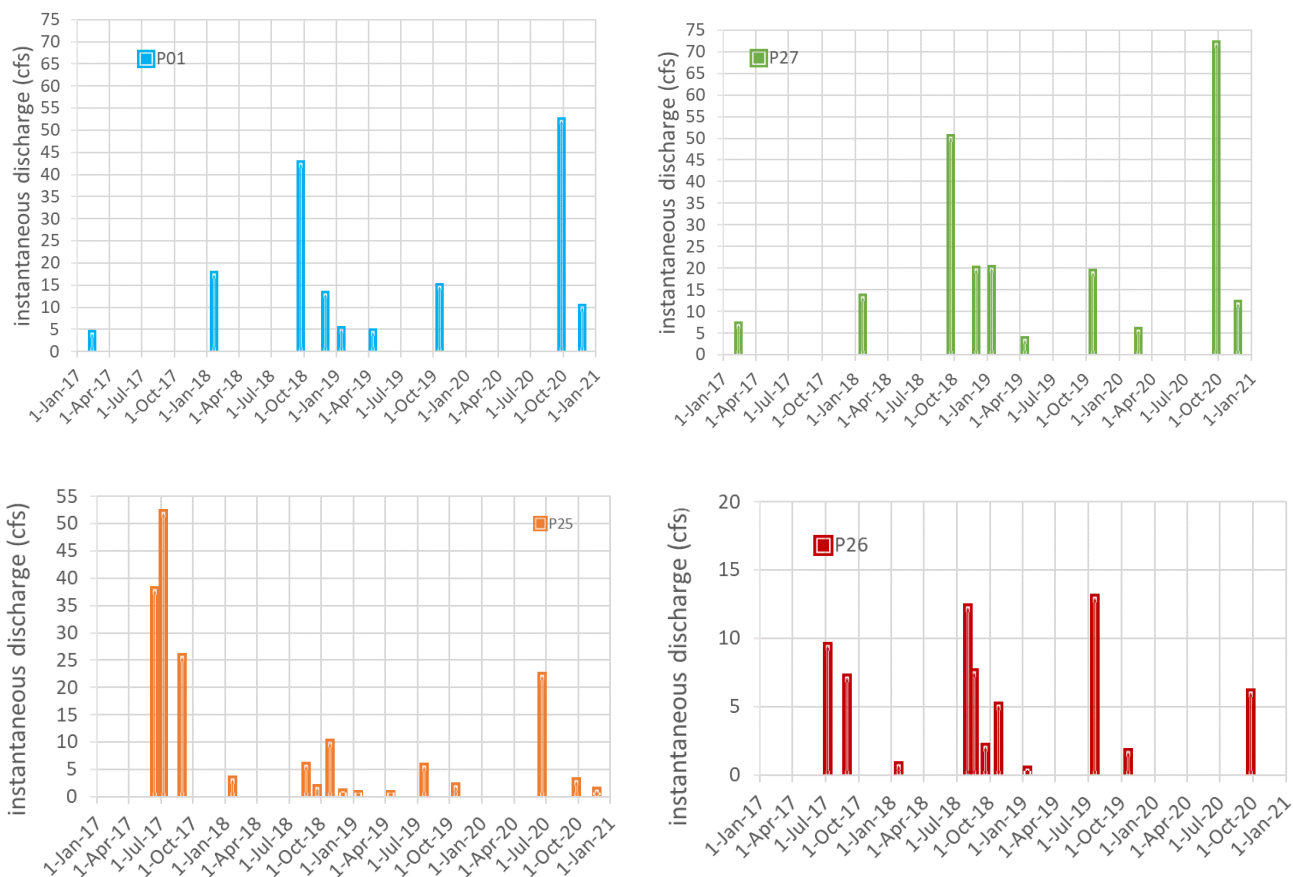


Figure 2 Flow measurements collected from surface water monitoring stations over time.

2.2 Groundwater Monitoring

2.2.1 Background

In 2018 Constantine developed two groundwater monitoring wells above and below the proposed LAD lower diffuser site (MW-01 and MW-02, respectively), and began sampling on roughly a quarterly basis. Groundwater monitoring sites are depicted in Figure 3, and sampling events are summarized in Table 4. No data is available for MW-04, as the proposed shallow groundwater monitoring well has yet to be developed (see Figure 3 for proposed location). Quarterly sampling during 2020 is summarized in Table 5. No sampling was conducted in Q1 due to high avalanche risk and travel difficulties due to COVID-19.

Water quality sampling and analytical procedures have been performed in accordance with Constantine's QAPP, prepared by Integral Consulting in 2018. Note that all future sampling events will be performed under the QAPP revised by HDR in October 2019 (as per Section 2.5.5.6 of the WMP). Samples are analyzed by ALS Environmental Laboratory for conventional parameters, settleable solids, cations/anions, total/dissolved metals following SM and EPA methods. Field parameters including pH are also collected at each site during the sampling event (more detail is available in the Project QAPP).

Table 4 Groundwater monitoring stations

Station	Description	Date sampling initiated	No. of water quality sampling events
MW-01	Upgradient of proposed LAD lower diffuser	September, 2018	10
MW-02	Downgradient of proposed LAD lower diffuser	September, 2018	10

Table 5 Groundwater monitoring stations sampled in 2020

Station	Quarters Sampled
MW-01	2,3,4
MW-02	2,3,4

* note sampling did not occur in Q1 due to avalanche risk and COVID-19 travel advisory

2.2.2 Water Quality

As per the WMP (Section 2.5.5.1), groundwater is monitored on a quarterly basis at two well sites: MW-01 and MW-02 (Figure 3). The fourth quarter sampling event occurred on November 21st, 2020.

Trigger limits have been defined in the WMP for MW-02. All parameters fell below trigger limits during 2020, including the fourth quarter (see Table 6 and Appendix D). Natural exceedances in AWQS were observed at MW-02 (t-Al, t-Mn, t-Fe) from samples collected in Q3 and Q4.

Concentrations of water quality parameters at groundwater monitoring stations over time are presented graphically in Appendix A, and raw water quality data is digitally available in Appendix D. Water quality for MW-03, located below the proposed sediment control ponds is also included in Appendix D. Appendix C presents an annual summary of water quality collected in 2020, including a comparison of analytical results to AWQS.

Table 6 MW-02 Q4 water quality results compared to WMP trigger limits

Parameter	Units	Result	Trigger
aluminum	mg/L	6.98	15
arsenic	µg/L	0.56	10
cadmium	µg/L	0.158	0.4
calcium	mg/L	65.5	NA
copper	µg/L	25.8	53
iron	mg/L	13.7	29
lead	µg/L	1.64	6.2
magnesium	mg/L	9.89	NA
manganese	µg/L	481	550
mercury	µg/L	<0.025	0.012
nitrate as N	mg/L	0.397	10
pH	s.u.	8.31	<6.5 or >8.5
selenium	µg/L	1.66	5
sulfate	mg/L	71.1	250
total dissolved solids	mg/L	222	500
Zinc	µg/L	90.4	186

2.2.3 Groundwater Level and Temperature

Groundwater depth and temperature has been voluntarily collected since August 2018 when the wells were installed. Groundwater level is measured in each groundwater monitoring well once every 6 hours, using transducers installed at the bottom of each well. Pressure transducer depth is compensated using barometric pressure, and depths are verified with manual measurements of the water level recorded during each sampling event.

Groundwater level data was downloaded during the fourth quarter sampling event and is presented in Figure 4.

2.1 Storm Water Monitoring

2.1.1 Background

Constantine's road construction activities operate under an Alaska Pollutant Discharge Elimination System (APDES) Construction General Permit (CGP). As terms of this permit, Constantine developed Storm Water Pollution Prevention Plans (SWPPP) and submitted Notices of Intent (NOI) to the DEC. Only one open NOI remains active: Phase 4a (AKR10FV18), issued June 8, 2018, which covers the extension of the access road for exploration work on MHT land.

2.1.2 Monitoring

SWPPP inspections began on May 10th (area was still snow covered) and continued until October 14th, 2020. No construction occurred and no issues were observed.

2.2 Meteorological Monitoring

Constantine voluntarily collects hourly meteorological data from two stations in the Project Area. The Annual Meteorological Report (2019/2020) is available to State regulators upon request.

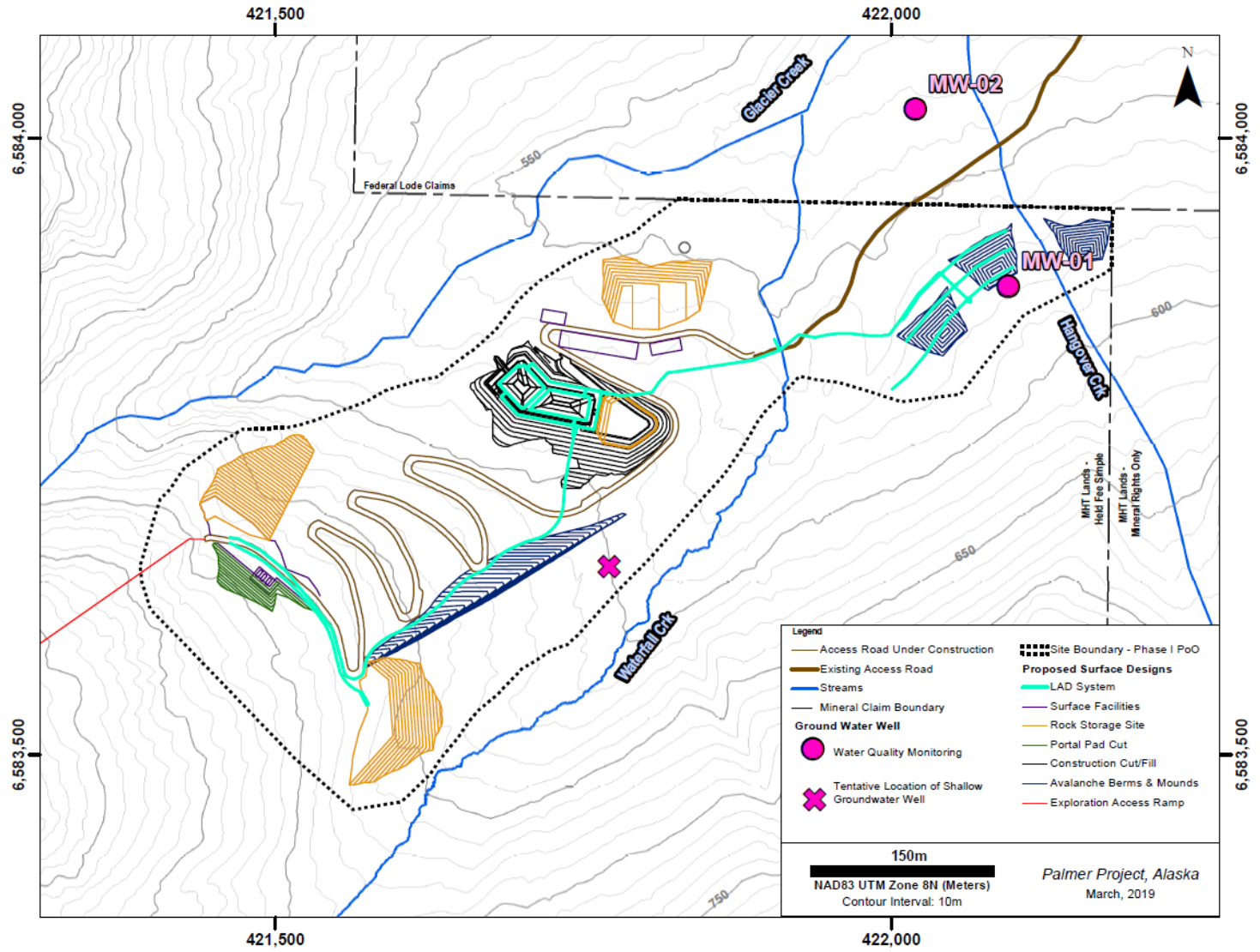


Figure 3 WMP Groundwater quality monitoring stations

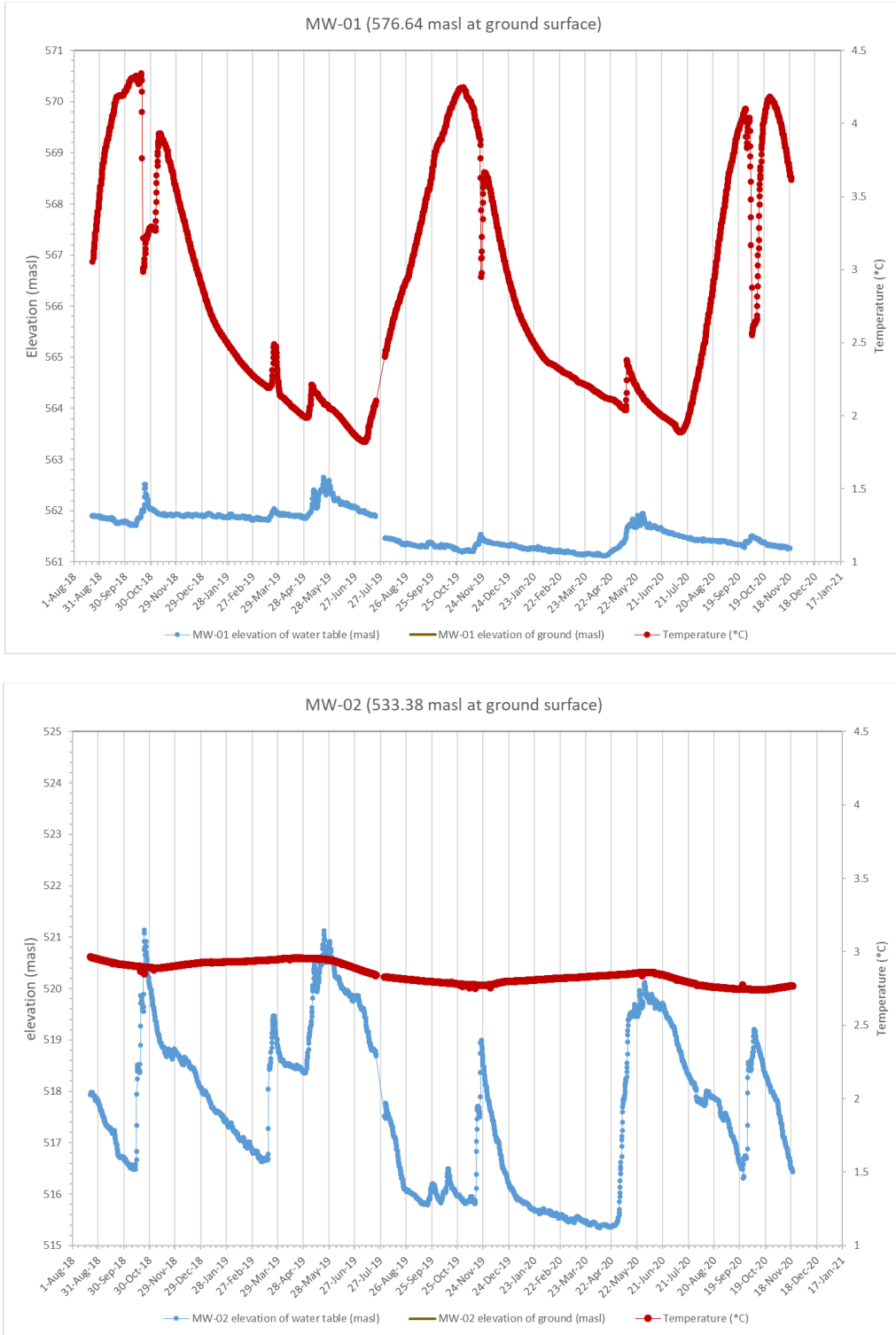


Figure 4 Water elevation and temperature over time at monitoring wells

3.0 OTHER COMPLIANCE ITEMS, UPDATES AND STUDIES

3.1 WMP COMPLIANCE

The following deliverables have been completed in compliance with the Waste Management Permit:

	WMP Section	Detail
1	Section 2.5	The monitoring plan (initially submitted in March 2019) was updated and submitted to the DEC on October 15, 2019.
2	Section 2.5.5.6	An updated QAPP was finalized by HDR and submitted to DEC on October 15, 2019.
3	Section 2.6.2	A quarterly report summarizing monitoring activities for Q3 was submitted to DEC on November 29, 2019. This report included historical data; all stations were successfully sampled.
4	Section 2.6.3	An annual report summarizing 2019 monitoring activities (Q3 and Q4) was submitted to DEC on February 29 th 2020. This report included historical data.
5	Section 2.6.2	A quarterly report summarizing monitoring activities for Q1 was submitted to DEC on May 28, 2020. This report included historical data. Note that despite several attempts, only P27 was collected during the Q1 sampling event due to safety issues (avalanche and evolving COVID-19 situation)
6	Section 2.6.2	A quarterly report summarizing monitoring activities for Q2 was submitted to DEC on Aug 29, 2020. This report included historical data; all stations were successfully sampled.
7	Section 2.6.2	A quarterly report summarizing monitoring activities for Q3 was submitted to DEC on Nov 20, 2020. This report included historical data; all stations were successfully sampled.

3.1 WMP UPDATE

On August 10th, 2020 Constantine submitted a letter informing the DEC of their intent to modify the Wastewater Discharge System Design as set out in Appendix A of the WMP. On August 31st, the DEC accepted a redesign with the condition that no construction can commence until the design is complete. Monitoring requirements remain in place.

3.2 HYDROLOGY WORK

Constantine conducted additional hydrological work in the fourth quarter to support the redesign of the Wastewater Discharge System. This work is ongoing and the results will be submitted as supporting documentation once the Wastewater Discharge System Design is complete.

4.0 FINANCIAL RESPONSIBILITY

Addressing Annual Reporting Section 2.6.3.3:

No construction activity has occurred on site since the Waste Management Permit has been issued. As a result, there are no changes in reclamation activity costs, concurrent reclamation, expansion or other changes to the operation of the facility (as it has not yet been built). The financial responsibility will be re-evaluated concurrent with the Wastewater Discharge System redesign.

5.0 SUMMARY

Reporting for 2020 is abbreviated, as construction has not begun on proposed infrastructure approved by the WMP; construction will not begin until the Wastewater Discharge System is redesigned and approved by the ADEC. Therefore, visual, development rock, and water quality monitoring associated with proposed Project infrastructure has not yet begun.

Quarterly sampling was successfully completed in 2020, except for Q1, where only P27 was sampled due to avalanche risk in the upper valley and COVID travel advisories.

Additional monitoring in 2020 included hydrometric surveys at surface water sites. Ground water level and temperature, and the ongoing collection of meteorological data. Hydrology studies supporting the redesign of the Wastewater Discharge System are ongoing and will be available at a later date.