Victoria GOLD CORP

Eagle Gold
Climate Data Report

Project No. A562-2
26 February 2020

LORAX ENVIRONMENTAL

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1. Introduction

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1 Introduction

1.1 Scope of Report

This report presents a summary of all climate data collected for the Eagle Gold Project (Project) since August 2007[1]. Monitoring data from two Project climate stations and four local snow courses are presented to characterize local conditions for the following variables:

- Air temperature;
- Rainfall;
- Snow depth and snow water equivalent (SWE);
- Barometric pressure;
- Relative humidity;
- Wind speed and direction, and;
- Solar radiation.

Measured data are also used to estimate potential evaporation for the Project site.

1.2 Previous Reports

The climate data collected at the Eagle Gold Project site from 2007, up to and including December 2019, have been previously summarized in the following reports:

- *Dublin Gulch Project - Climate and Hydrology Environmental Baseline Report* (2008), prepared by Jacques Whitford AXYS (Burnaby, BC) for StrataGold Corp. (Vancouver, BC), December 2008.
- *Snow Survey Environmental Baseline Report* (2009), prepared by Jacques Whitford Stantec AXYS (Burnaby, BC) for StrataGold Corp. (Vancouver, BC).
- *Eagle Gold Project, Environmental Baseline Report: Climate* (2010), prepared by Stantec (Burnaby, BC) for Victoria Gold Corp., February 2010.
- *Eagle Gold Project, Surface Water Balance Model Report* (2011), prepared by Stantec (Burnaby, BC) for Victoria Gold Corp., June 2011.

[1] Historic climate data collected during 1993 to 1996 for the Project area is summarized in *Eagle Gold Project, Environmental Baseline Report: Climate*, prepared by Stantec (Burnaby, BC) for Victoria Gold Corp., March 2012

- *Eagle Gold Project, Environmental Data Summary Report: Climate 2011 Update* (2011), prepared by Stantec (Burnaby, BC) for Victoria Gold Corp., June 2011.
- *Eagle Gold Project, Environmental Baseline Report: Climate* (2012), prepared by Stantec (Burnaby, BC) for Victoria Gold Corp., March 2012.
- *Victoria Gold Corp., Eagle Gold Project – Climate Baseline Data Summary. VA101-290/6-9* (2013), prepared by Knight Piesold Ltd. (Vancouver, BC) for Victoria Gold Corp., August 2013.
- *Victoria Gold Corp., Eagle Gold – Climate Baseline Report* (2016). Prepared by Lorax Environmental Services Ltd., October 2016. 34 pp.
- *Victoria Gold Corp. Eagle Gold Project – Hydrometeorology Report* (2017). A413-3, prepared by Lorax Environmental Services Ltd. (Vancouver, BC) for Victoria Gold Corp., March 2017.
- *Victoria Gold Corp., Eagle Gold – Climate Baseline Report* (2018). Prepared by Lorax Environmental Services Ltd., March 2018. 35 pp.
- *Victoria Gold Corp., Eagle Gold – Climate Data Report* (2019). Prepared by Lorax Environmental Services Ltd., March 2019. 34 pp.

2. Climate Monitoring Locations

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2 Climate Monitoring Locations

2.1 Meteorological Stations

Climatic parameters are measured at the Project site by two weather stations that were originally installed by Stantec (formerly Jacques Whitford AXYS). The Potato Hills station is situated near the eastern basin divide (1,420 m) and was installed in August 2007. The second station was originally installed near the camp at 823 m in August 2009, and subsequently was moved to its current location in September 2010 (782 m) following construction of new camp facilities.

The Potato Hills station uses an ONSET Hobo datalogger to measure air temperature, rainfall, wind speed and direction, barometric pressure, relative humidity, snow depth and solar radiation at 15-minute intervals. The recording interval was initially set to record at 60-minute intervals from August 14, 2007 to August 13, 2008 and then was switched to record at 15-minute intervals as of August 13, 2008.

A snow sensor was added to the Potato Hills station in April 2011. However, since snow sensor installation, the continuous snow depth data have not been reliable and therefore are not presented in this report. The Potato Hills station experienced repeated failures in 2019 and was decommissioned in October 2019. A replacement station will be installed at Potato Hills in 2020.

The Camp station includes a Campbell Scientific CR800 datalogger measuring air temperature, rainfall, wind speed and direction, barometric pressure, snow depth, solar radiation and relative humidity. All data are recorded at a 15-minute interval at this location. The snow sensor and pyranometer (measuring solar radiation) were added on April and October 2011, respectively. Continuous snow depth data are provided herein for the Camp station, as are records of snow survey measurements for actively measured stations through spring 2019. The precipitation sensor did not return usable data from January 2019 to December 2019. The Camp station is scheduled for servicing in early 2020; at that time the precipitation sensor will be replaced.

The Project climate stations and snow survey locations are presented in Table 2-1 and Figure 2-1.

Table 2-1:
Climate station and snow survey locations.

Station	Elevation (m asl)	UTM E	UTM N	Record Period
Climate Stations				
Camp Station	782	458,164	7,101,036	2009-present
Potato Hills Station	1420	463,544	7,100,833	2007-present
Snow Surveys				
Camp Snow Survey	782	458,164	7,101,036	2009-present
Ann Gulch Snow Survey	875	458,945	7,101,185	2012-2017
Stewart (Snow Survey #2)	995	460,570	7,101,490	Mar. 2012 only
HLF Snow Survey	1078	459,859	7,102,319	2019
Potato Hills Snow Survey	1420	463,290	7,100,568	2009-present

460,000

465,000

7,100,000

N

Ironwood Creek

Fisher Gulch

Haggart Creek

Dublin Gulch

Eagle Pup

HLF Snow Survey

Stewart (Snow Survey #2)

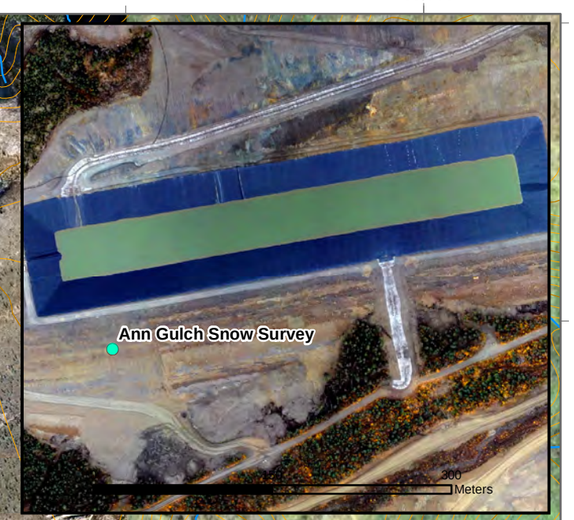
Ann Gulch Snow Survey

Camp Station

Camp Snow Survey

Potato Hills Station

Potato Hills Snow Survey



LEGEND

- Climate Station
- Snow Survey Station
- Watercourse
- Waterbody
- Contour (100m)
- Contour (20m)

Notes:
1. Imagery around mine site taken September 16, 2019
2. Imagery near Potato Hills taken in 2010

DATE SAVED:	Feb 11, 2020
DRAWN BY:	GM
REVIEWED:	LF
VERSION:	1

Coordinate System: *NAD 1983 UTM Zone 8N*
Projection: *Transverse Mercator*
Datum: *North American 1983*
Units: *Meter*

1:20,000

0 200 400 Meters

CLIENT: Victoria Gold Corp

Lorax Environmental

PROJECT:

Eagle Gold Climate Data Report

TITLE: Project Site Climate Station and Snow Survey Locations

PROJECT #: A562-1

FIGURE: 1

P:\@Drafting\Eagle Gold\Drafting Figures\MXD\2020 Hydrology Report\Climate-Snow Survery Stations.mxd

2.1.1 Data Gaps for 2019

This section of the report summarizes data gaps in the climate record for the Potato Hills and Camp climate stations during the period January 2019 to December 2019. Data gaps prior to January 2019 are discussed in previous reports.

Potato Hills Station – The available data spans the period January 2019 to October 10, 2019. However, no climate data are available for the remainder of 2019. Several data gaps greater than 24 hours exist in the Potato Hills climate station record:

- Solar radiation and wind direction data were not collected in 2019.
- Air temperature, wind speed, gust speed and relative humidity data were not recorded to the central datalogger at Potato Hills for the following time periods in 2019: February 1 to February 28; May 10 to June 1; August 17 to August 24; and September 4 to October 7.
- Atmospheric pressure and relative humidity data were not recorded for the following time periods in 2019: February 1 to February 28; May 10 to June 1; August 17 to October 7.
- The snow depth sensor installed at the Potato Hills climate station returned minimally usable data for the periods of March 1 to April 16 and May 2 to May 9.
- A separate Onset event logger is used to record rainfall accumlation at the Potato Hills climate station. The stand-alone event logger was deployed on June 19 and collected rainfall data without gap until August 1.

Camp Station – The data record for the Camp climate station spans January 2019 to December 2019. The main data for the Camp climate station is as follows:

- The precipitation sensor did not return usable data from January 2019 to December 2019.

2.2 Snow Surveys

Snow surveys were completed in 2019 at the Camp (Lower) snow course and Potato Hills (Upper) snow course. The Ann Gulch station was no longer available due to construction activities in the area. A new location (HLF) was established in Ann Gulch upgradient from HLF Phase 1 construction activities for the 2019 snow survey season. All snow surveys were generally conducted at, or near to the date that Water Resources Branch of Environment Yukon conducted their monthly surveys, which included the annual maximum snowpack. This peak in terms of SWE measurement typically occurs between late-March to mid-April in the Yukon.

Snow surveys are conducted following the guidelines set out in the *Snow Survey Sampling Guide* (BC Ministry of Environment, 1981). At each site, 10 sampling locations along a transect were sampled for depth and snow water equivalent [SWE] using a Federal snow sampler, and then averaged. As summarized in previous annual reports, snow courses were established at the Project site to discern effects of aspect and elevation gain on local snow accumulation (Table 2-1 and Figure 2-1).

3. Climate Data Summary

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3 Climate Data Summary

3.1 Temperature

Air temperatures at the Project site are consistent with those throughout the Yukon interior. Mean annual air temperature at site is -3.6°C at the Camp station (782 m) and -3.6°C at the Potato Hills station (1,420 m) over their respective periods of record.

Mean, maximum and minimum monthly (based on the daily average) temperatures are presented in Table 3-1 for both stations. At the Camp station, monthly average temperature ranges from -19.8°C in December to 13.5°C in July, and -15.2°C to 11.1°C at the Potato Hills station, for the same months. The minimum (maximum) recorded daily average temperatures were -43.8°C (22.0°C) and -36.6°C (22.9°C) at the Camp and Potato Hills stations, respectively. The minimum (maximum) recorded 15-minute temperatures were -46.4°C (31.6°C) and -37.6°C (31.7°C) at the Camp and Potato Hills stations, respectively.

The monthly mean temperatures signatures for both climate stations are shown in Figure 3-1, and the pattern is consistent with the larger regional picture. During the months of March to October inclusive, the standard lapse rate applies, with temperatures decreasing with rising elevation, and are approximately 3°C cooler at the upper station, on average. However, during the winter months of November to February, temperature inversions are common at the Project site, with temperatures approximately 2.5°C cooler on average in the valley bottom than at the height of land.

The spring/summer lapse rate of -3.7°C/1000 m is consistent with the saturated adiabatic lapse rate (SALR) of -5.0°C/1000 m. Minor deviation from the SALR is likely due to the increased frequency of precipitation during the summer months, when a larger portion of the annual precipitation falls, resulting in warmer and wetter air masses at the Project site. The winter lapse rate of +4.3°C/1000 m is consistent with that reported by Wahl *et al.* (1987), which states that during a temperature inversion, lapse rates can range from 3-5°C/1000 m of elevation gain.

Table 3-1:
Project site monthly air temperature record.

Climate Station	Elevation (m asl)	Temperature (°C)													
		Year		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Camp Station	782	2009	Mean	-	-	-	-	-	-	-	10.5	6.2	-2.6	-13.6	-17.3	-
			Maximum	-	-	-	-	-	-	-	14.0	11.2	2.3	-2.2	-2.8	-
			Minimum	-	-	-	-	-	-	-	6.6	-4.8	-9.7	-22.6	-31.3	-
		2010	Mean	-17.1	-10.8	-6.9	1.1	8.3	12.1	13.6	12.1	4.4	-3.4	-13.5	-24.1	-2.0
			Maximum	-6.7	1.0	1.4	9.4	16.9	15.7	18.0	20.5	11.8	7.1	4.0	-11.2	20.5
			Minimum	-33.4	-25.0	-17.7	-6.8	1.8	7.2	10.3	6.2	-6.1	-10.5	-28.4	-37.7	-37.7
		2011	Mean	-22.9	-21.3	-15.9	-3.2	7.7	11.5	12.8	9.2	5.1	-2.8	-20.7	M	-
			Maximum	-1.3	-1.4	2.1	2.7	16.1	16.1	18.2	14.3	9.7	0.3	-6.4	M	18.2
			Minimum	-38.5	-37.8	-30.3	-11.6	-2.2	7.0	9.5	5.7	0.9	-6.8	-39.1	M	-
		2012	Mean	-25.2	-12.2	-13.4	0.4	5.9	13.3	12.6	10.5	5.0	M	-24.1	-25.9	-
			Maximum	-7.2	0.7	-1.4	4.4	12.6	19.4	16.7	15.6	13.6	M	-10.3	-8.5	19.4
			Minimum	-40.4	-24.2	-24.4	-7.6	-0.4	8.7	8.7	4.5	-0.6	M	-37.1	-41.0	-41.0
		2013	Mean	-21.6	-13.3	-15.5	-8.6	5.0	14.2	14.0	11.9	5.5	-2.5	-18.7	-26.7	-4.7
			Maximum	-9.3	-4.4	0.3	2.9	14.1	22.0	18.5	18.0	14.5	4.9	-4.0	-11.6	22.0
			Minimum	-43.8	-20.9	-26.8	-16.6	-2.6	6.0	9.5	4.9	0.9	-9.9	-39.5	-40.7	-43.8
		2014	Mean	-14.9	-23.4	-13.8	-1.8	7.0	11.0	13.4	10.6	3.7	-3.5	-15.8	-15.2	-3.6
			Maximum	-1.8	-6.4	-3.8	4.5	12.9	16.5	18.6	15.1	9.4	3.4	-3.3	-4.6	18.6
			Minimum	-34.1	-36.8	-24.4	-12.4	2.5	5.4	8.7	4.5	-3.8	-11.9	-33.8	-26.4	-36.8
		2015	Mean	-19.4	-18.1	-11.5	-0.1	10.1	11.2	12.2	9.0	2.9	-1.5	-15.1	-15.2	-3.0
			Maximum	-2.9	-1.7	-1.0	4.4	17.5	15.5	16.8	15.4	7.3	3.4	-4.4	-6.0	17.5
			Minimum	-39.1	-38.3	-26.8	-4.8	-0.9	5.6	7.9	1.6	-4.3	-9.3	-33.1	-34.3	-39.1
		2016	Mean	-13.1	-13.5	-5.1	2.3	8.2	12.4	13.6	11.5	4.1	-8.3	-13.7	-21.9	-1.9
			Maximum	-2.0	-2.6	3.9	7.3	13.7	16.7	17.0	16.6	11.4	-0.7	0.8	-5.4	17.0
			Minimum	-25.4	-29.3	-10.3	-3.3	2.6	8.2	6.1	6.3	-2.5	-20.8	-31.3	-37.9	-37.9
		2017	Mean	-19.6	-18.8	-17.2	-1.4	7.3	M	M	11.8	6.3	-4.1	-22.9	-16.6	-
			Maximum	-3.3	0.1	0.5	5.2	14.3	M	M	16.9	12.5	6.3	-11.6	-0.8	-
			Minimum	-37.1	-28.3	-30.6	-8.6	1.9	M	M	6.6	0.1	-12.8	-36.1	-37.1	-37.1
		2018	Mean	-19.4	-24.3	-11.9	-3.7	5.9	11.8	13.8	9.9	1.9	-3.8	-12.8	-16.0	-3.9
			Maximum	3.0	-14.0	0.3	4.4	11.6	19.2	17.7	17.0	7.2	2.8	-0.3	1.2	19.2
			Minimum	-38.6	-35.8	-26.7	-15.0	-2.3	7.8	9.1	2.9	-2.9	-12.1	-26.4	-28.8	-38.6
		2019	Mean	-20.4	-23.1	-6.2	-0.9	8.7	13.0	15.2	8.6	5.3	-4.6	-14.4	-18.7	-3.1
			Maximum	-8.2	-15.0	4.7	4.0	16.6	19.6	18.9	17.5	10.5	4.9	-4.3	-4.3	19.6
			Minimum	-37.7	-36.3	-20.9	-11.8	-2.0	8.2	11.4	2.8	-3.8	-15.3	-29.7	-38.0	-38.0
		All Years	Mean	-19.4	-17.9	-11.3	-1.6	7.4	12.3	13.5	10.5	4.6	-3.7	-16.8	-19.8	-3.6
			Maximum	3.0	1.0	4.7	9.4	17.5	22.0	18.6	20.5	14.5	7.1	4.0	1.2	22.0
			Minimum	-43.8	-38.3	-30.6	-16.6	-2.6	5.4	6.1	1.6	-6.1	-20.8	-39.5	-41.0	-43.8
Potato Hills Station	1420	2007	Mean	-	-	-	-	-	-	-	-	1.0	-6.9	-12.0	-15.2	-
			Maximum	-	-	-	-	-	-	-	-	8.0	-1.5	-5.5	-9.4	-
			Minimum	-	-	-	-	-	-	-	-	-6.2	-13.8	-27.7	-24.2	-
		2008	Mean	-17.7	-17.2	-11.3	-4.8	3.3	8.7	8.1	5.3	1.9	-7.7	-10.8	-18.6	-5.1
			Maximum	-9.2	-3.4	-2.8	2.7	12.5	14.3	13.4	9.2	6.7	2.4	-5.4	-8.4	14.3

Climate Station	Elevation (m asl)	Temperature (°C)													
		Year		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
			Minimum	-33.1	-31.9	-29.6	-16.8	-0.6	4.6	2.8	1.7	-7.7	-21.3	-19.6	-27.2	-33.1
		2009	Mean	-19.3	-17.2	-16.7	-4.4	M	M	12.6	7.4	3.3	-5.3	-12.8	-11.9	-
			Maximum	-0.5	-10.4	-7.0	9.4	M	M	22.8	16.2	10.4	-1.9	-4.9	-3.8	-
			Minimum	-34.8	-30.3	-25.2	-13.0	M	M	6.6	3.1	-6.3	-14.2	-19.1	-21.2	-34.8
		2010	Mean	-14.5	-9.7	-9.4	-1.8	5.2	8.8	10.5	9.7	2.3	-5.3	-11.7	-18.2	-2.9
			Maximum	-5.1	-1.8	-2.9	6.3	15.1	13.4	15.2	19.5	8.8	3.1	-1.4	-8.8	19.5
			Minimum	-30.9	-26.4	-16.5	-8.3	-4.0	2.7	6.2	3.4	-9.3	-10.4	-23.1	-25.6	-30.9
		2011	Mean	-15.5	-18.3	-13.9	-5.6	4.8	8.8	10.3	7.0	4.1	-5.7	-18.0	-13.0	-4.6
			Maximum	-5.6	-3.6	-1.4	1.3	15.3	13.9	15.7	11.4	20.4	-1.2	-9.1	-8.8	20.4
			Minimum	-28.0	-30.2	-23.2	-13.0	-7.2	2.2	5.9	5.3	-5.5	-12.1	-29.0	-20.0	-30.2
		2012	Mean	-19.8	-11.1	-13.4	-1.9	3.1	11.3	10.9	M	M	-8.4	-18.8	-19.4	-
			Maximum	-6.8	-5.1	-1.7	1.8	9.5	18.5	17.9	M	M	3.3	-8.0	-6.5	-
			Minimum	-30.3	-19.5	-22.6	-8.0	-2.5	5.5	5.5	M	M	-16.8	-24.0	-29.2	-
		2013	Mean	-17.6	-11.3	-14.2	*-10.4*	*2.8*	12.1	11.6	11.0	3.0	-2.9	-16.0	-19.5	-4.3
			Maximum	-5.5	-4.9	-5.1	*-2.5*	*13.5*	22.2	17.4	19.9	10.2	1.3	-4.7	-3.4	22.2
			Minimum	-36.6	-15.5	-24.8	*-18.4*	*-6.2*	2.0	5.3	1.7	-1.8	-8.5	-28.9	-29.1	-36.6
		2014	Mean	-10.0	-15.9	-11.5	-3.4	*5.6*	8.7	11.8	8.7	2.1	-5.6	-11.6	-11.4	-2.7
			Maximum	0.6	-7.8	-5.1	3.2	*11.5*	17.6	15.6	13.9	8.5	0.9	-5.0	-5.4	17.6
			Minimum	-27.3	-26.3	-19.9	-13.5	*0.4*	1.7	7.4	1.7	-5.2	-12.1	-22.5	-19.2	-27.3
		2015	Mean	-14.4	-13.8	-9.6	*-2.3*	*8.6*	*8.6*	*9.5*	7.1	0.1	-3.7	-13.5	-13.6	-3.1
Potato Hills Station	1420		Maximum	-3.9	-2.3	-0.5	*1.4*	*16.5*	*13.6*	*14.9*	17.0	4.9	2.0	-4.3	-5.6	17.0
			Minimum	-31.7	-32.7	-24.3	*-6.5*	*-3.2*	*1.9*	*4.4*	-2.0	-6.1	-10.7	-28.3	-25.3	-32.7
		2016	Mean	-9.2	-10.4	-6.2	M	7.2	12.0	12.2	9.3	2.8	-6.8	-10.1	-16.2	-
			Maximum	-4.4	-5.2	3.4	M	15.4	19.4	17.7	13.9	8.5	-0.7	-2.0	-8.8	-
			Minimum	-14.0	-20.4	-12.4	M	0.5	5.0	5.3	3.6	-3.4	-15.6	-18.2	-25.1	-
		2017	Mean	-13.0	-13.3	-16.7	-3.2	4.5	9.7	M	M	M	M	-17.4	-10.2	-
			Maximum	-3.4	-1.1	-3.6	3.9	11.9	16.7	M	M	M	M	-9.4	-1.6	-
			Minimum	-27.2	-21.5	-28.0	-12.4	-0.5	0.3	M	M-	M	M	-26.5	-22.8	-
		2018	Mean	-14.4	-16.9	-12.0	-6.1	M	M	M	M	M	-3.3	-9.9	M	-
			Maximum	0.9	-10.8	0.6	1.5	M	M	M	M	M	1.3	-2.0	M	-
			Minimum	-26.0	-26.4	-22.9	-18.1	M	M	M	M	M	-13.4	-17.3	M	-
		2019	Mean	-16.0	M	-5.1	-3.5	M	11.1	13.6	8.9	M	M	-10.8	M	-
			Maximum	-6.9	M	3.8	2.4	M	17.1	18.0	22.9	M	M	-3.5	M	-
			Minimum	-28.0	M	-14.5	-16.8	M	2.1	7.7	4.6	M	M	-17.3	M	-
		All Years	Mean	-15.1	-14.1	-11.7	-4.3	5.0	10.0	11.1	8.3	2.3	-5.6	-13.3	-15.2	-3.6
			Maximum	0.9	-1.1	3.8	9.4	16.5	22.2	22.8	22.9	20.4	3.3	-1.4	-1.6	22.9
			Minimum	-36.6	-32.7	-29.6	-18.4	-7.2	0.3	2.8	-2.0	-9.3	-21.3	-29.0	-29.2	-36.6

Notes:
1. Values are calculated from average daily temperatures.
2. Data is considered missing for a month when there are less than 25 days of data available for that month (beginning of data record until end of 2019).
3. Monthly values in italics for the Potato Hills station, for the period of 2013 through 2015 have been infilled using monthly regression relationships with temperature data from the Camp station.
4. Monthly values in gray for the period of June 2014 to March 2015, May through July 2016 and November 2019 were recorded by a standalone HOBO temperature sensor.
5. 'M' denotes data missing due to a sensor/datalogger malfunction.
6. Monthly temperature lapse rates presented in Section 3.1 are based on a comparison of monthly average temperature data from the Camp and Potato Hills stations.

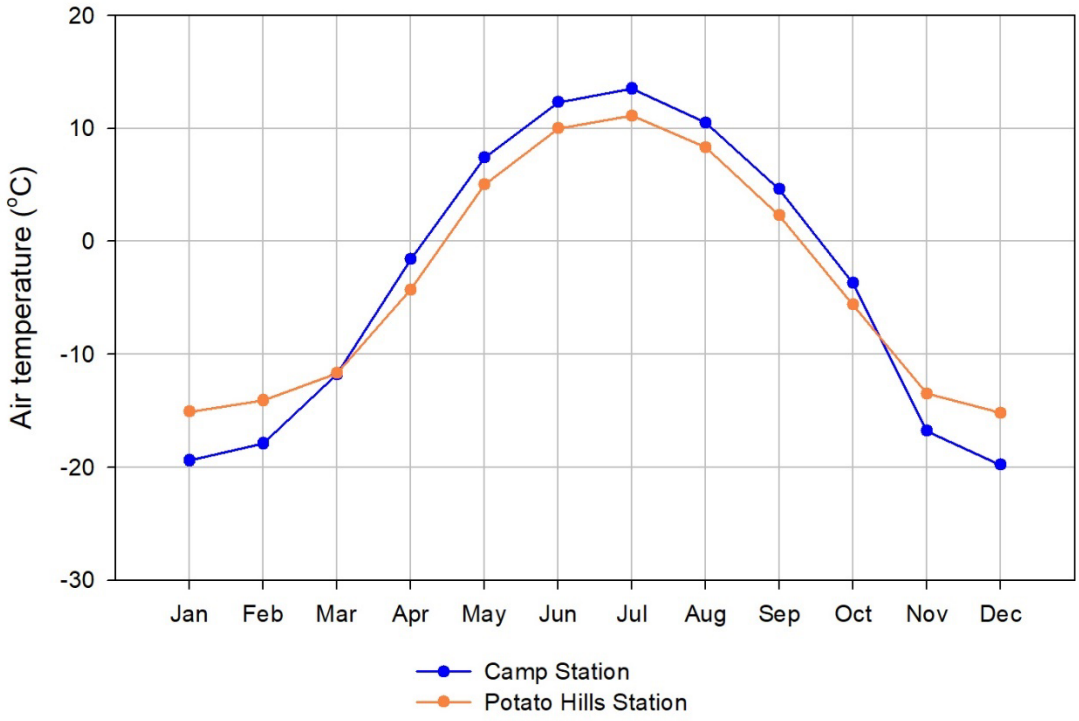

Figure 3-1: Monthly mean air temperature for the Project climate stations for the available period of record.

3.2 Rainfall

Gauge precipitation data is collected at the Project site using tipping bucket rain gauges, which have not been adapted to measure snowfall. Therefore, the precipitation data presented in Table 3-2 is for rainfall only, collected between the months of March and October, inclusive. Generally, precipitation falls as snow from November through March, with precipitation falling as a mix of rain and snow in April and October. Rainfall data for March is included in the table below, where the temperature record indicates that precipitation would have fallen as rain (*i.e.*, daily average air temperature was above zero).

Table 3-2:
Project site monthly rainfall data.

Climate Station	Elevation (m asl)	Rainfall (mm)													
		Year		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Camp Station	782	2009		-	-	-	-	-	-	-	-	35.0	*8.0*	S	S	-
		2010		S	S	5.0	9.0	20.0	62.0	34.0	28.0	25.0	*12.0*	S	S	195.0
		2011		S	S	11.0	10.0	16.0	31.0	75.0	44.0	40.0	*9.0*	S	S	236.0
		2012		S	S	13.0	1.0	22.0	18.0	74.6	29.8	24.0	*4.8*	S	S	187.2
		2013		S	S	8.6	10.4	34.6	25.6	28.4	35.2	58.6	*25.2*	S	S	226.6
		2014		S	S	5.4	8.8	9.2	52.8	43.2	70.4	28.8	*23.2*	S	S	241.8
		2015		S	S	20.8	13.0	8.2	28.8	64.0	62.0	38.6	*13.4*	S	S	248.8
		2016		S	S	6.2	4.4	14.0	32.6	55.0	31.0	25.6	*2.6*	S	S	171.4
		2017		S	S	S	2.2	24.4	M	M	12.8	20.4	*6.0*	S	S	-
		2018		S	S	12.0	1.4	63.2	49.4	1.6	34.4	4.6	*12.4*	S	S	179.0
		2019		S	S	M	M	M	M	M	M	M	M	S	S	-
		All Years	Mean	S	S	10.3	6.7	23.5	37.5	47.0	38.6	30.1	11.7	S	S	210.7
			Maximum	S	S	20.8	13.0	63.2	62.0	75.0	70.4	58.6	*25.2*	S	S	248.8
			Minimum	S	S	5.0	1.0	8.2	18.0	1.6	12.8	4.6	*2.6*	S	S	171.4
Potato Hills Station	1420	2007		S	S	S	-	-	-	-	24.0	100.8	*2.0*	S	S	-
		2008		S	S	3.4	4.8	58.4	52.0	201.2	130.0	11.2	*1.2*	S	S	462.2
		2009		S	S	S	3.0	M	50.8	12.6	75.4	44.4	*1.2*	S	S	-
		2010		S	S	1.0	6.2	16.4	77.2	45.8	39.4	4.2	*5.4*	S	S	195.6
		2011		S	S	0.2	7.2	21.2	38.0	92.8	83.8	34.4	*0.4*	S	S	278.0
		2012		S	S	S	0.6	9.6	24.2	64.8	37.8	21.0	*4.6*	S	S	162.6
		2013		S	S	2.2	0.2	29.6	33.2	18.0	18.2	63.8	*10.0*	S	S	175.2
		2014		S	S	S	M	M	M	M	M	M	*M*	S	S	-
		2015		S	S	S	M	M	M	M	48.5	27.1	*10.0*	S	S	-
		2016		S	S	D	D	14.5	23.0	38.3	42.6	24.6	*0.6*	S	S	-
		2017		S	S	D	D	16.2	25.8	46.3	21.8	53.0	*6.1*	S	S	-
		2018		S	S	D	D	D	46.5	13.5	77.0	4.0	*3.8*	S	S	-
		2019		S	S	D	D	D	D	18.5	D	D	D	S	S	-
		All Years	Mean	S	S	1.7	3.7	22.7	38.0	55.2	54.4	35.3	4.1	S	S	254.7
			Maximum	S	S	3.4	7.2	58.4	77.2	201.2	130.0	100.8	*10.0*	S	S	462.2
			Minimum	S	S	0.2	0.2	9.6	9.5	12.6	18.2	4.0	*0.4*	S	S	162.6

Notes:
1. Winter precipitation data (October through April in many years) are unreliable due to the majority falling as snow. The months where no rainfall was recorded due to freezing conditions are denoted by an 'S'.
2. Data for the month of October are in italics, as rainfall is not measured for the entire month.
3. 'M' denotes when there are less than 25 days of data available for that month.
4. In August 2015, the primary rain gauge at the Potato Hills Station was replaced by a standalone tipping bucket rain gauge. The replacement gauge is deployed each spring (i.e., in April or May) then decommissioned in the autumn (October). Missing data at Potato Hills Station denoted by 'D' indicate time periods during which the standalone tipping bucket rain gauge was not functioning.

3.3 Snow Water Equivalent and Continuous Snow Depth Data

As discussed in Section 2.2, snow data have been collected at three snow courses[2] at the Project site since 2009. Furthermore, the annual maximum snow water equivalent (SWE) value generally occurs in late-March or early-April at the Project site. Field measurements from site show that snow density is generally lower earlier in the season, corresponding to colder temperatures, but increases through winter as the snowpack deepens, consolidates and as snow melt progresses.

Project site snow survey data is summarized in Table 3-3 for period of record 2009 to 2019. Annual maximum SWE values range from 72 mm to 161 mm at the Camp snow course, 98 mm to 117 mm (shorter record) at the Ann Gulch snow course and from 190 mm to 410 mm at the Potato Hills snow course.

The Potato Hills snow survey was conducted in the immediate vicinity of the weather station from 2009 to 2011. However, due to the exposed location, snow redistribution resulted in variable measurements, and therefore the survey was moved to its current and more sheltered location in 2012, several hundred metres to the south-east (Figure 2-1). Note that high snowpacks did not allow access to the Potato Hills snow course in March 2012, and therefore the survey was conducted at Stewart Gulch (Snow Survey #2; see Figure 2-1). Snow surveys conducted at the Heap Leach facility in 2019 were primarily above or below the diversion ditch as indicated in Table 3-3.

[2] See Note 1 in Table 3-3.

Table 3-3:
Project site snow survey data.

Year	Camp Station (728 m)				Ann Gulch (Snow Survey #2; 995 m)				HLF Station (1,078 m)				Potato Hills Station (1,420 m)			
	Survey Date	Depth (cm)	SWE (mm)	Density (%)	Survey Date	Depth (cm)	SWE (mm)	Density (%)	Survey Date	Depth (cm)	SWE (mm)	Density (%)	Survey Date	Depth (cm)	SWE (mm)	Density (%)
2009	2009-04-21	69	112	16%	-	-	-	-	-	-	-	-	2009-04-21	126	410	33%
2010	2010-03-31	50	99	20%	-	-	-	-	-	-	-	-	2010-03-31	103	278	27%
	2010-04-21	69	112	16%	-	-	-	-	-	-	-	-	2010-04-21	126	405	32%
2011	2011-03-28	55	93	17%	-	-	-	-	-	-	-	-	2011-03-28	105	251	24%
2012	2012-03-20	78	161	21%	-	-	-	-	-	-	-	-	2012-03-20	99	237	24%
	2012-04-20	56.4	79	14%	-	-	-	-	-	-	-	-	2012-04-22	117	262	22%
2013	-	-	-	-	2013-02-20	69.6	97.1	14%	-	-	-	-	2013-02-28	95.6	184.9	19%
	2013-03-02	60.9	108.3	18%	2013-03-02	66.9	115	17%	-	-	-	-	-	-	-	-
	2013-04-02	59.3	108.4	18%	2013-04-02	61.8	117.2	19%	-	-	-	-	2013-04-03	90	189.7	21%
	2013-05-05	57.6	106	18%	2013-04-16	62.2	85.1	14%	-	-	-	-	-	-	-	-
	-	-	-	-	2013-05-03	58	105.3	18%	-	-	-	-	2013-05-05	116.8	166.5	14%
2014	2014-03-12	56.8	126	22%	2014-03-12	51	94	18%	-	-	-	-	2014-03-11	97.5	276	28%
	2014-04-02	54.6	100	18%	2014-04-02	46	98	21%	-	-	-	-	2014-04-02	96.2	275	29%
	-	-	-	-	-	-	-	-	-	-	-	-	2014-05-08	69.6	258	37%
2016	2016-03-02	53	118	22%	2016-03-02	52.6	117	22%	-	-	-	-	2016-03-02	95.4	214	22%
	2016-04-09	38	140	37%	2016-04-09	22.2	115	52%	-	-	-	-	2016-04-10	107.4	257	24%
	-	-	-	-	-	-	-	-	-	-	-	-	2016-05-03	95	226	24%
2017	2017-03-17	50.9	89	17%	2017-03-17	50.3	100	20%	-	-	-	-	2017-03-17	84	206	25%
	2017-04-13	46	117	25%	2017-04-13	30.1	82	27%	-	-	-	-	2017-04-13	98	244	25%
	2017-05-04	7	28	40%	2017-05-04	0	0	NA	-	-	-	-	2017-05-03	89	236	27%
2018	2018-02-28	53	100	19%	-	-	-	-	-	-	-	-	2018-02-28	85.1	203	24%
	2018-04-04	53.9	109	20%	-	-	-	-	-	-	-	-	2018-04-04	90.5	219	24%
	2018-05-16	-	-	-	-	-	-	-	-	-	-	-	2018-05-16	80.7	226	28%
2019	2019-03-02	48.3	94.0	20%	-	-	-	-	2019-03-02	56.2	119	21%	2019-03-02	78.7	205	26%
	2019-04-01	25.3	72.0	31%	-	-	-	-	2019-04-02	37.2	93	25%	2019-04-01	79.3	171	22%
	2019-04-30	0.0	0.0	-	-	-	-	-	2019-04-30	31.7	71	18%	2019-04-30	91	200	22%
	2019-05-16	0.0	0.0	-	-	-	-	-	-	-	-	-	2019-05-16	48.3	111	23%
	2019-06-01	0.0	0.0	-	-	-	-	-	-	-	-	-	2019-06-01	0.0	0.0	-

Notes:
1. Snow survey data for Potato Hills collected on 2012-03-20 is from the Stewart Gulch survey (Snow Survey #2) at 995 m asl (see Figure 2-1).
2. No snow surveys were conducted at site in 2015.
3. Snow survey data for Heap Leach Facility collected on 2019-04-02 from above and below the diversion ditch, respectively.
4. Snow survey data for Heap Leach Facility collected on 2019-04-30 from above the diversion ditch.

3.3-1 Continuous Snow Depth Data

Continuous snow depth data is summarized for the Camp climate station in Figure 3-2.

The upper panel of Figure 3-2 shows the evolution of the snowpack for the 2012 to 2019 time-period, with pack depth showing initial and appreciable accumulation through the months of November and December, typically reaching maximum depth by mid-March each year. These data then show snowpack depth remains deep and relatively stable to April.

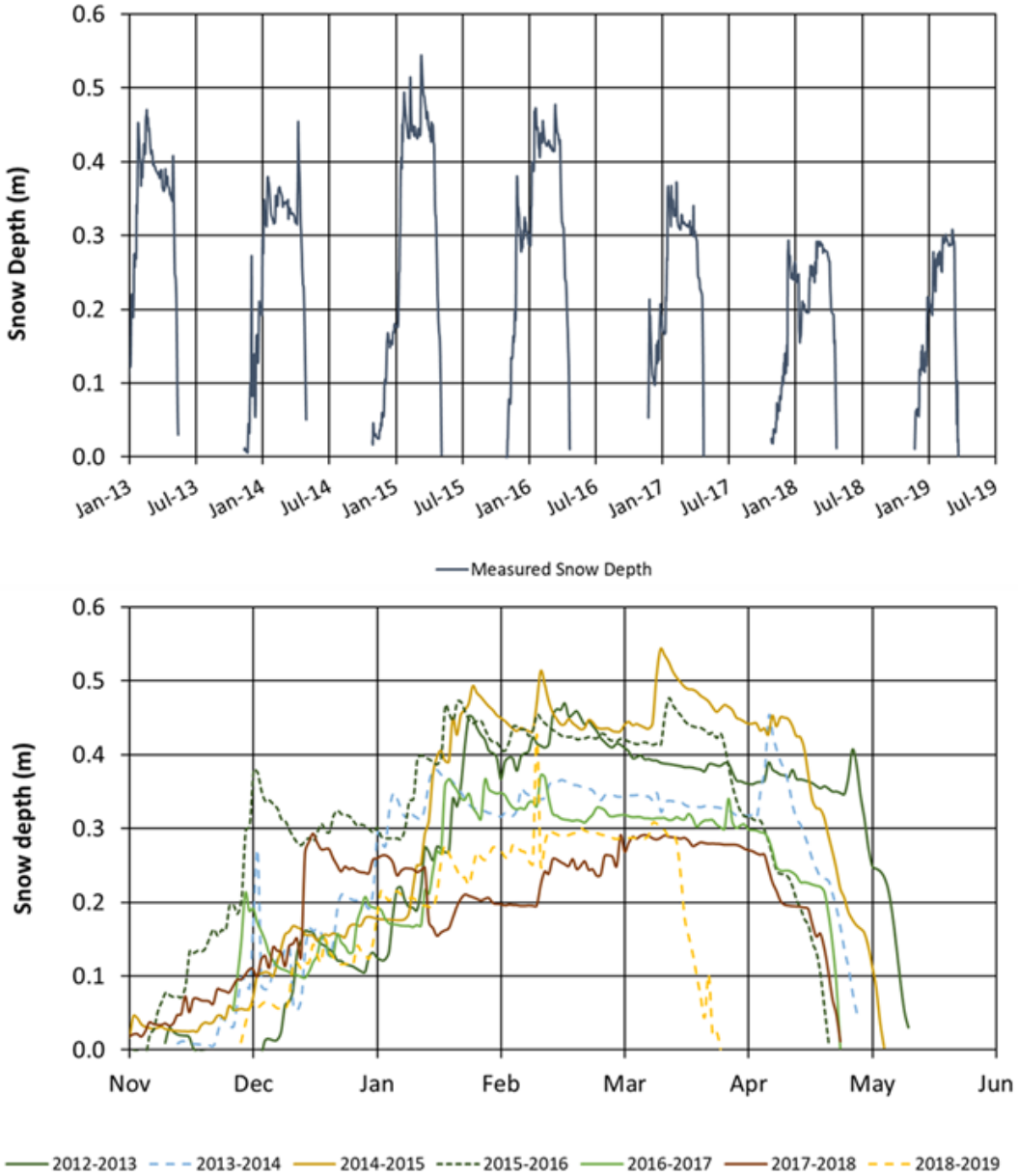

Figure 3-2: Summary of recent (2012-2019) continuous snow depth data for the Camp climate station.

The lower panel of Figure 3-2, illustrates the timing and rate of snowpack loss for the Camp climate station. While variable from year to year, these data show snowpack losses typically begin in earnest by mid- to late-April, with the duration of melt lasting 15-20 days. Interestingly, the duration of melt in 2019 was fairly typical. However, data in Figure 3-2 show the timing of melt was roughly early by a month compared to prior years of observation.

3.4 Barometric Pressure

Barometric pressure provides a measure of the weight exerted by the atmosphere on the earth's surface at a point and provides a direct indication of changes in the synoptic weather pattern (*e.g.*, dropping barometric pressure can indicate the approach of a warm front). As expected, barometric pressure decreases with elevation at site, and is generally elevated during the summer months in comparison to the winter season (Table 3-4). When the Potato Hills climate station experienced a malfunction between May 2014 and July 2015, Table 3-4 was populated with data recorded by a standalone HOBO temperature/pressure logger for this time period. Annual average barometric pressure is 91.9 kPa at the Camp station, and 84.9 kPa at the Potato Hills station.

Table 3-4:
Project site monthly average barometric pressure data.

Climate Station	Elevation (m asl)	Barometric Pressure (kPa)												
		Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Camp Station	782	2009	-	-	-	-	-	-	-	91.6	91.3	91.7	90.1	91.9	-
		2010	91.2	91.2	90.5	91.2	91.9	91.5	91.8	91.8	91.8	91.2	91.7	91.9	91.5
		2011	91.8	92.2	91.9	91.6	92.1	91.9	91.8	91.8	91.4	91.3	91.1	91.2	91.7
		2012	91.2	91.5	90.9	91.9	91.8	91.3	92.2	92.2	91.8	92.5	92.1	91.5	91.7
		2013	91.9	91.2	92.3	92.2	92.2	92.4	92.5	92.0	91.4	91.9	92.1	92.5	92.1
		2014	91.7	92.3	92.0	91.6	92.4	92.0	92.2	92.1	92.0	91.3	92.3	91.6	92.0
		2015	92.2	92.5	91.9	91.4	92.5	92.2	92.1	92.0	91.6	91.7	91.3	91.0	91.9
		2016	91.3	91.6	91.5	91.8	92.4	92.1	92.2	92.5	92.0	92.1	91.1	92.0	91.9
		2017	91.8	91.7	92.0	92.0	91.9	M	M	91.9	91.9	91.7	92.1	92.3	-
		2018	91.9	92.6	92.3	91.9	91.9	91.9	92.7	92.0	92.9	91.9	91.9	91.2	92.1
		2019	91.9	92.9	92.3	91.8	92.1	92.3	92.3	92.5	91.9	91.9	91.9	91.0	92.1
		Average	91.7	92.0	91.8	91.8	92.1	92.0	92.2	92.0	91.8	91.8	91.6	91.6	91.9
Potato Hills Station	1420	2007	-	-	-	-	-	-	-	85.5	85.1	84.1	84.7	84.0	-
		2008	84.1	84.3	84.6	84.9	85.4	85.4	85.2	85.4	85.3	84.4	84.3	85.0	84.9
		2009	84.7	84.8	84.5	85.3	85.4	86.0	85.8	85.4	85.0	85.1	83.4	85.1	85.0
		2010	84.4	84.5	83.9	84.7	85.5	85.2	85.5	85.5	85.3	84.3	84.6	84.4	84.8
		2011	84.9	84.8	84.6	84.6	85.3	85.2	85.2	85.2	84.6	84.5	83.7	84.4	84.8
		2012	83.8	83.3	84.0	84.9	84.5	84.8	85.3	85.5	85.0	85.4	84.8	84.1	84.6
		2013	84.6	84.1	85.1	84.9	85.4	85.8	85.8	85.4	84.7	85.0	84.8	85.0	85.1
		2014	84.6	85.0	84.8	84.7	85.8	85.1	85.6	85.4	85.2	84.5	85.4	84.8	85.1
		2015	85.2	85.6	85.0	85.6	M	M	85.9	85.3	84.8	84.8	84.2	83.9	-
		2016	84.3	84.5	84.5	M	M	M	M	85.9	85.2	85.1	84.0	84.7	-
		2017	84.6	84.6	84.7	85.1	85.1	85.3	M	M	M	M	84.7	85.2	-
		2018	84.7	85.2	85.2	84.9	M	M	M	M	M	85.0	84.7	M	---
		2019	84.6	M	85.3	84.9	M	85.7	85.8	M	M	M	84.8	M	-
		Average	84.5	84.6	84.7	85.0	85.3	85.4	85.6	85.4	85.0	84.7	84.5	84.6	84.9

Notes:
1. Monthly values in gray for the period of June 2014 to March 2015 and November 2019 were recorded by a standalone HOBO barometric pressure sensor.
2. 'M' denotes data missing when there are less than 25 days per month due to a sensor malfunction.

3.5 Relative Humidity

Relative humidity is a measure of the water vapour content of an air parcel, expressed as a percentage of the total water vapour required for the air to be fully saturated at a given temperature. Therefore, at colder temperatures, less water vapour is required to achieve a high relative humidity, and conversely at higher temperatures, more water vapour is required to obtain the same relative humidity value.

Given that air temperatures are well below zero during the winter, relative humidity values are elevated throughout the winter, and lower during the summer. With respect to monthly patterns for relative humidity, the annual minimum is expected to occur in the month of May. All monthly average relative humidity values from both climate stations are provided in Figure 3-3 and Table 3-5. Annual average relative humidity is 70% at the Camp station, and 77% at the Potato Hills station.

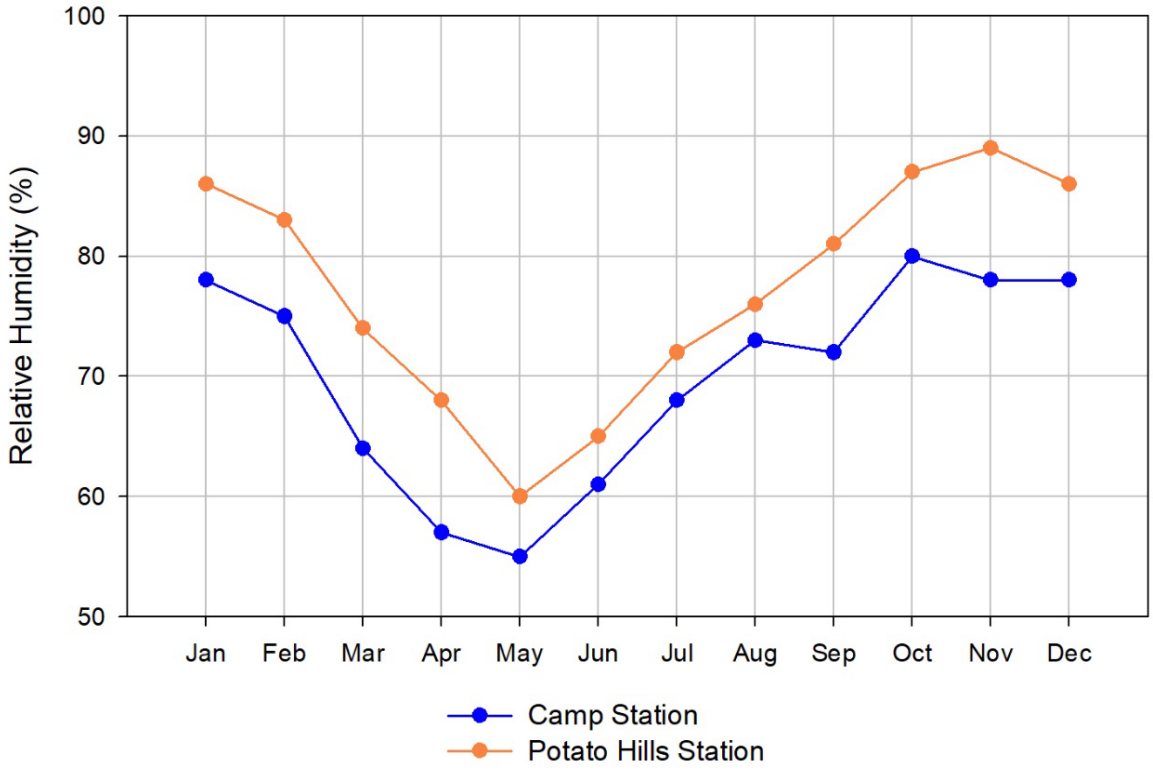

Figure 3-3: Project site average monthly relative humidity for the period of record.

Table 3-5:
Project site monthly average relative humidity measurements.

Climate Station	Elevation (m asl)	Relative Humidity (%)												
		Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Camp Station	782	2009	-	-	-	-	-	-	-	82	76	73	80	79	-
		2010	77	76	60	54	49	66	68	66	65	79	80	73	68
		2011	76	71	62	61	56	64	74	77	73	81	75	81	71
		2012	73	75	66	59	57	59	70	70	71	75	70	73	68
		2013	75	80	64	52	61	60	63	70	76	84	77	71	69
		2014	83	71	59	58	53	59	67	76	71	82	78	82	70
		2015	80	78	68	62	49	62	71	75	75	84	80	82	72
		2016	82	79	71	62	55	59	72	73	72	75	82	75	71
		2017	78	73	59	56	58	M	M	70	79	83	75	81	-
		2018	76	72	64	51	64	65	61	77	64	76	82	79	69
		2019	77	72	67	55	52	54	62	64	73	83	78	77	68
		Average	78	75	64	57	55	61	68	73	72	80	78	78	70
Potato Hills Station	1420	2007	-	-	-	-	-	-	-	63	83	88	81	88	-
		2008	82	79	74	69	67	60	77	82	83	91	90	74	77
		2009	76	80	81	70	37	68	53	85	85	82	91	86	75
		2010	86	83	75	65	55	72	75	71	72	90	89	86	76
		2011	85	80	64	75	63	67	77	82	79	90	90	89	78
		2012	93	90	87	73	73	69	74	71	73	84	82	86	80
		2013	87	94	73	65	63	62	67	70	86	92	87	85	78
		2014	91	72	59	66	59	M	M	M	M	M	M	M	-
		2015	M	M	M	M	M	M	85	80	88	96	95	94	-
		2016	88	90	86	M	M	M	M	78	77	81	92	86	-
		2017	86	83	73	66	67	61	M	M	M	M	89	84	-
		2018	84	77	73	61	M	M	M	M	M	80	89	M	-
		2019	89	M	72	67	M	59	67	73	M	M	M	M	-
		Average	86	83	74	68	60	65	72	76	81	87	89	86	77

Notes: 1'M' denotes data missing for at least 14 days in the month due to a sensor malfunction.

3.6 Wind Speed and Direction

The predominant wind direction at the climate stations in 2018 was north, and west-northwest, for the Camp and Potato Hills stations, respectively. No wind direction data was collected at the Potato Hills station in 2019. Wind speeds averaged 1.2 m/s at the Camp station, and 2.4 m/s at the Potato Hills station, on an annual basis (Table 3-6; Figure 3-4). The maximum recorded gust speed at the Camp station was 23.5 m/s over a 15-minute interval (August 15, 2016). At the Potato Hills station, wind speeds averaged 23.5 m/s over a 1-hour period (November 3, 2010; 15-min maximum gust of 23.9 m/s), and during the same event, wind speeds in excess of 20 m/s were recorded for a 4.5-hour period. As shown in Table 3-6, the mean monthly wind speeds for both stations are higher in the spring, summer, and autumn months, and lower in the winter, with annual average monthly minimums occurring in December, and annual maximum winds in April and May.

Table 3-6:
Project site monthly average wind speed data.

Climate Station	Elevation (m asl)	Wind Speed (m/s)												
		Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Camp Station	782	2009	-	-	-	-	-	-	-	1.4	1.2	1.2	1.1	0.7	-
		2010	1.2	1.1	2.2	2.0	1.9	1.5	1.4	1.3	1.5	1.2	0.7	1.0	1.4
		2011	0.6	1.2	1.3	1.8	1.7	1.5	1.3	1.2	1.4	0.9	0.9	0.2	1.2
		2012	0.9	1.2	1.6	1.4	1.9	1.3	1.4	1.3	1.5	1.1	1.3	0.7	1.3
		2013	0.8	0.9	1.2	2.2	1.5	1.7	1.5	1.3	1.6	0.8	0.7	0.7	1.2
		2014	0.1	0.8	1.3	1.5	1.8	1.6	1.5	1.2	1.2	1.3	0.9	0.5	1.2
		2015	0.2	0.3	1.1	1.4	1.6	1.6	1.2	1.2	1.3	1.1	0.7	0.0	1.0
		2016	0.7	0.7	1.4	1.5	1.7	1.5	1.2	1.3	1.2	1.2	0.5	0.5	1.1
		2017	R	R	1.6	1.7	1.6	2.1	1.3	1.2	1.0	0.8	0.5	R	-
		2018	0.5	0.7	1.3	1.7	1.5	1.5	1.5	1.4	1.4	1.1	0.7	0.8	1.2
		2019	0.3	0.8	1.3	1.8	1.7	1.8	1.5	1.5	1.2	1.0	1.0	1.1	1.3
		Average	0.6	0.9	1.4	1.7	1.7	1.6	1.4	1.3	1.3	1.1	0.8	0.6	1.2
Potato Hills Station	1420	2007	-	-	-	-	-	-	-	2.3	2.3	3.0	3.0	0.8	-
		2008	2.8	3.7	3.6	3.6	3.6	3.1	3.1	2.8	1.7	1.3	2.6	3.1	2.9
		2009	3.2	2.5	3.2	3.0	3.1	2.7	2.9	2.0	2.0	3.4	2.3	2.1	2.7
		2010	2.1	2.1	3.9	3.6	2.7	2.0	2.6	2.7	3.0	2.8	1.5	1.0	2.5
		2011	2.0	3.2	3.4	3.2	3.4	2.0	1.8	2.3	1.2	0.4	2.0	1.4	2.2
		2012	0.0	0.2	1.4	2.0	2.9	1.8	1.9	2.0	2.9	2.5	2.6	0.7	1.7
		2013	1.7	0.7	2.9	4.8	2.6	2.3	2.5	1.8	2.9	2.2	2.1	2.2	2.4
		2014	1.6	2.6	2.5	3.0	2.7	M	M	M	M	M	M	M	-
		2015	M	M	M	M	M	M	0.9	1.8	2.5	1.4	0.0	0.0	-
		2016	1.3	2.7	2.8	M	M	M	M	2.1	2.1	1.6	1.3	0.6	-
		2017	2.2	2.8	2.5	3.1	2.6	2.5	M	M	M	M	1.6	1.0	-
		2018	2.8	2.7	2.7	3.2	M	M	M	M	M	2.5	0.7	M	-
		2019	0.7	M	3.0	3.1	M	2.8	2.0	M	M	M	M	M	-
		Average	1.9	2.3	2.9	3.3	3.0	2.4	2.2	2.2	2.3	2.1	1.8	1.3	2.4

Notes:
1. Zero value for January 2012 is likely due to icing of the wind sensor.
2. 'M' denotes data missing when there are less than 25 days per month due to a sensor malfunction and R an indicator the wind sensor affected by rime.

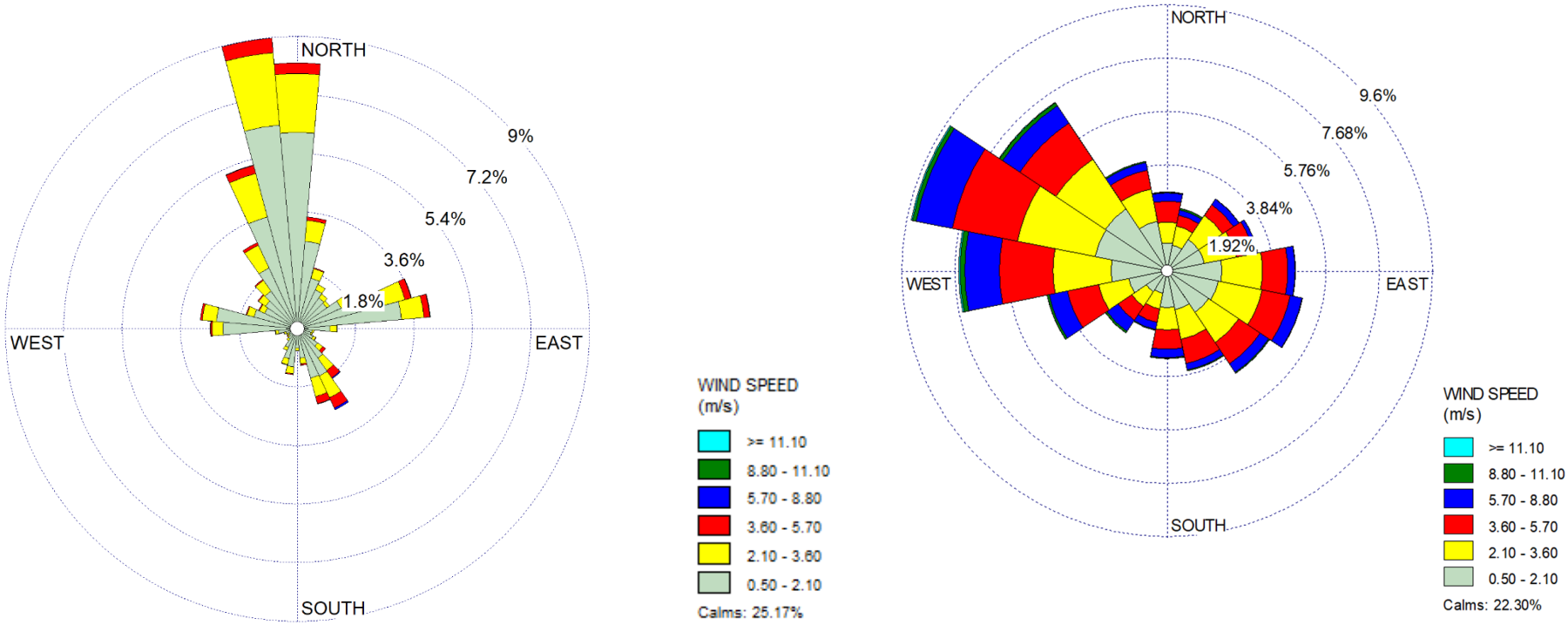

Figure 3-4: Project site wind roses for the Camp station (a) and the Potato Hills station (b). Wind roses are based on hourly averages of 15-minute readings of wind speed and direction. No wind direction data was available from the Potato Hills station in 2019.

3.7 Solar Radiation

Solar radiation (or solar irradiance) is a measure of the power per unit area provided by the Sun, in watts per square meter (W/m^2). Given the high-latitude location of the Project site, day length, and therefore solar radiation, fluctuate greatly on a seasonal basis. The average annual minimum of 1 W/m^2 (Camp station) and 3 W/m^2 (Potato Hills station) occur in the month of December, while the average annual maximum of 209 W/m^2 and 224 W/m^2 occur in June the Camp station and in May at the Potato Hills station, respectively. The Camp station location in the valley bottom results in slightly lower incident solar radiation, presumably due to the shading effect of the surrounding terrain. The monthly average and maximum solar radiation values for both stations are presented in Table 3-7 for their periods of record.

Table 3-7:
Project site monthly maximum and average incoming solar radiation data.

Climate Station	Elevation (m asl)	Maximum Solar Radiation (W/m^2)												
		Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Camp Station	782	2011	-	-	-	-	-	-	-	-	-	194	214	28	-
		2012	28	272	716	917	951	801	1022	832	708	423	172	119	1022
		2013	181	291	718	748	951	920	1005	810	741	461	191	38	1005
		2014	35	123	579	838	937	954	913	791	731	403	203	29	954
		2015	39	398	629	845	950	991	965	867	634	470	215	8	991
		2016	142	358	628	852	951	999	951	826	659	391	158	78	999
		2017	28	388	563	904	961	M	M	859	688	381	129	34	-
		2018	224	238	561	833	969	1008	926	885	684	382	84	36	1008
		2019	31	589	617	815	944	954	873	891	644	438	70	73	954
		Maximum	224	589	718	917	969	1008	1022	891	741	470	215	119	1022
Potato Hills Station	1420	2007	-	-	-	-	-	-	-	954	714	517	206	67	-
		2008	148	484	564	988	1047	1159	1162	1117	863	344	197	51	1162
		2009	179	302	856	976	979	1118	1086	908	768	488	188	69	1118
		2010	109	396	704	971	1069	1112	1079	944	838	472	247	77	1112
		2011	184	377	802	957	1136	1174	1124	1037	767	441	201	131	1174
		2012	31	34	126	1042	1126	1216	1251	934	897	483	163	78	1251
		2013	124	252	938	787	1071	1199	1233	1026	838	564	243	103	1233
		2014	162	356	667	1127	1021	M	M	M	M	M	M	M	-
		2015	M	M	M	M	M	M	662	1096	766	536	101	71	-
		2016	177	344	823	M	M	M	M	M	M	M	M	M	-
		2017	M	M	M	M	M	M	M	M	M	M	M	M	-
		2018	M	M	M	M	M	M	M	M	M	M	M	M	-
		2019	M	M	M	M	M	M	M	M	M	M	M	M	-
		Maximum	184	484	938	1127	1136	1216	1251	1117	897	564	247	131	1251

Climate Station	Elevation (m asl)	Average Solar Radiation (W/m^2)												
		Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Camp Station	782	2011	-	-	-	-	-	-	-	-	-	40	12	2	-
		2012	3	44	165	263	237	174	184	153	84	42	10	2	113
		2013	4	18	108	181	201	225	198	154	77	36	9	1	101
		2014	2	10	106	162	204	208	183	128	96	23	11	1	95
		2015	2	14	86	155	242	210	176	144	80	32	5	1	96
		2016	4	27	76	150	200	228	170	148	102	49	7	2	97
		2017	2	25	97	173	192	M	M	147	82	28	6	1	-
		2018	6	21	93	178	178	195	204	128	117	44	4	1	98
		2019	2	24	89	162	208	224	203	152	91	30	5	2	99
		Average	3	23	103	178	208	209	188	144	91	36	8	1	100
Potato Hills Station	1420	2007	-	-	-	-	-	-	-	162	87	37	11	2	-
		2008	9	38	98	163	193	222	180	132	83	22	10	3	96
		2009	7	35	95	184	250	228	244	116	81	42	8	3	108
		2010	6	34	96	183	233	210	191	178	115	35	10	3	108
		2011	8	35	106	187	250	221	199	152	100	46	13	7	110
		2012	1	2	6	110	163	189	203	168	93	46	11	3	83
		2013	7	16	112	171	246	245	218	169	82	36	11	3	110
		2014	7	43	122	178	234	M	M	M	M	M	M	M	-
		2015	M	M	M	M	M	M	185	163	89	35	5	1	-
		2016	5	34	94	M	M	M	M	M	M	M	M	M	-
		2017	M	M	M	M	M	M	M	M	M	M	M	M	-
		2018	M	M	M	M	M	M	M	M	M	M	M	M	-
		2019	M	M	M	M	M	M	M	M	M	M	M	M	-
		Average	6	30	91	168	224	219	203	155	91	37	10	3	102

Notes:

1. Solar radiation is zero at night.
2. Maximum values are based on an hourly/sub-hourly recording interval.
3. Zero values are included in the calculation of averages.
4. 'M' denotes data missing when there are less than 25 days per month due to a sensor malfunction

3.8 Potential Evaporation

15-minute potential evaporation rates were computed for the Camp station using available climate and the Ref-ET calculator – a compiled, stand-alone computer program that calculates reference evapotranspiration (ASCE, 2005). For the period of available record (Jan 2013 to Dec 2019), a 15-minute climate input file was prepared for the Eagle Gold site. The input variables required by Ref-ET are: maximum air temperature, minimum air temperature, relative humidity, incoming solar radiation, atmospheric pressure and wind speed. Albedo values were estimated to be 0.6 during winter and 0.18 for snow-free months.

From the assembled climate inputs, Ref-ET returned potential evaporation (PE) computations at daily time-step based on an array of evaporation models (*e.g.,* Penman-Monteith model, Priestley-Taylor formulation). Presented in Table 3-8 (monthly tabulations) are resulting outputs from Ref-ET for months March to October. May to end-September PE for the Camp station is estimated to range from 367-448 mm with the Penman-Monteith equation resulting in average PE estimates ~4% mm higher than PE calculated using the Priestley-Taylor equation. The highest monthly rates of PE are expected in May, June, July and August of each year.

Table 3-8:
Potential evaporation (PE) estimates for the Camp station.

Potential Evaporation (mm)										
Period	**Method**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**Average (2012-2019)**
Mar	PM	---	17	21	17	24	18	20	24	20
	P-T	---	16	19	16	16	13	25	19	18
Apr	PM	---	40	47	47	57	56	51	50	50
	P-T	---	40	46	46	48	50	59	47	48
May	PM	---	78	91	113	106	97	78	96	94
	P-T	---	82	85	108	86	80	83	92	88
Jun	PM	---	114	98	97	126	---	94	113	107
	P-T	---	116	96	97	109	---	99	109	104
Jul	PM	87	102	91	80	91	---	108	106	95
	P-T	93	102	90	86	86	---	113	107	97
Aug	PM	69	74	55	61	79	83	60	69	69
	P-T	70	73	56	63	67	68	67	65	66
Sep	PM	36	30	33	27	45	34	44	34	35
	P-T	26	24	28	23	30	25	49	30	29
Oct	PM	6	3	10	10	12	5	14	4	8
	P-T	4	3	4	5	5	4	17	4	6
Total (Mar-Oct)	PM	---	461	441	455	541	---	470	496	478
	P-T	---	453	419	440	447	---	511	473	456
Total (May-Sep)	PM	---	397	367	378	448	---	384	418	400
	P-T	---	397	354	378	378	---	410	403	385

Notes:
1. PM and P-T Indicate potential evaporation (PE) estimates based on Penman–Monteith and Priestley–Taylor approaches respectively.
2. PE Estimates computed using Eagle Camp/Lower 15-min climate data (i.e., air temperature, relative humidity, wind speed, precipitation, solar radiation and atmospheric pressure measurements) and Ref-Et software

4. Closure

Victoria
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4 Closure

We trust that this report meets your expectations at this time. Please contact the undersigned with any questions or comments.

Sincerely,

LORAX ENVIRONMENTAL SERVICES LTD.

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Hydrologist

References

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References

ASCE, 2005. ASCE Standardized Reference Evapotranspiration Equation. American Society of Civil Engineers. 216 p.

British Columbia Ministry of Environment. 1981. *Snow Survey Sampling Guide*. Published by the Water Management Branch, Surface Water Section. 31 pp.

Wahl, H.E., Fraser, D.B., Harvey, R.C. and Maxwell, J.B. 1987. *Climate of Yukon*. Atmospheric Environment Service, Environment Canada, Ottawa, Ontario.