APPENDIX 9-A

Baseline Air Quality and Noise at the Coffee Gold Project 2015

Baseline Air Quality and Noise at the Coffee Gold Project 2015

PRESENTED TO

Kaminak Gold Corp.

MARCH 22, 2016
ISSUED FOR USE
FILE: ENVMIN03048-01

Tetra Tech EBA Inc.
Suite 1000 – 10th Floor, 885 Dunsmuir Street
Vancouver, BC V6C 1N5 CANADA
Tel 604.685.0275 Fax 604.684.6241

This page intentionally left blank.

EXECUTIVE SUMMARY

Kaminak Gold Corporation (Kaminak) is proposing to construct and operate an open pit gold mine located in west-central Yukon, approximately 130 km south of Dawson City, known as the Coffee Gold Project. Tetra Tech EBA Inc. (Tetra Tech) was retained by Kaminak to conduct the necessary air quality and noise baseline studies and effects modelling for its Coffee Gold Project.

Tetra Tech conducted air quality and noise baseline studies at the Coffee Gold Project site in 2015. The air quality study consisted of both particulate matter concentration monitoring in the ambient air as well as dustfall sampling and metals analysis. Noise monitoring was conducted to collect ambient sound level data around the site.

Air and noise monitoring activities were undertaken at various locations around the property in both late-March and late-June 2015, in order to describe the pre-Project baseline conditions for both winter and summer. A meteorological monitoring station was also positioned on site to record the corresponding weather data during air and noise monitoring activities.

The primary results of this baseline monitoring study are as follows:

Parameter	Season	Min	Max	Average
Total Suspended Particulate Matter (TSP)	Winter	0.001 mg/m^3	0.065 mg/m^3	0.002 mg/m^3
	Summer	<0.001 mg/m^3	0.20 mg/m^3	0.041 mg/m^3
PM_{10}	Winter	0.001 mg/m^3	0.061 mg/m^3	0.002 mg/m^3
	Summer	<0.001 mg/m^3	0.193 mg/m^3	0.040 mg/m^3
$PM_{2.5}$	Winter	0.001 mg/m^3	0.034 mg/m^3	0.002 mg/m^3
	Summer	<0.001 mg/m^3	0.177 mg/m^3	0.040 mg/m^3
Noise (LA_{eq})	Winter (Day)	19.9 dBA	69.0 dBA	38.2 dBA
	Winter (Night)	19.8 dBA	36.9 dBA	23.0 dBA
	Summer (Day)	19.2 dBA	78.2* dBA	47.4 dBA
	Summer (Night)	24.7 dBA	65.5* dBA	53.8*dBA

**Affected by rain and thunderstorm activity.*

Concentrations of other Criteria Air Contaminants including Carbon Monoxide (CO) Nitrogen Oxides (NOx) and Sulphur Dioxide (SO_2) as well as Green House Gases (GHG's) in the area are expected to be typical of pristine areas and have therefore been assumed to be equivalent to provincial/territorial averages for pristine areas. As such these contaminants have not been included in the on-site monitoring activities conducted.

Parameter	Minimum	Maximum	Average
Nitrogen Oxides (NOx)*	<0.1 ppb	0.2 ppb	0.15 ppb
Sulphur Dioxide (SO2)*	<0.1 ppb	<0.1 ppb	<0.1 ppb
Carbon Monoxide (CO)**	3.1	4.3	3.6 ppm
Green House Gas (CO_2)***	-	-	400 ppm

** Casino Mining Corporation, Air Quality Baseline 2013 "Casino Project, Proposal for Executive Committee Review, Jan 2014"*

*** United States Environmental Protection Agency Carbon Monoxide Monitoring data for Fairbanks North Star: (2005 – 2008)*
https://www3.epa.gov/airtrends/carbon.html

**** Global average concentration data for 2015*

Effects modelling, which will predict air quality and noise conditions during the construction and operations phases of mine development, and subsequent reporting, are currently underway.

TABLE OF CONTENTS

LIST OF TABLES IN TEXT

LIST OF FIGURES IN TEXT

APPENDIX SECTIONS

FIGURES

APPENDICES

ACRONYMS & ABBREVIATIONS

ALS	ALS Environmental
asl	Above sea level
CAC	Criteria Air Contaminants
CCME	Canadian Council of Ministers of the Environment
EPA	U.S. Environmental Protection Agency
MOE	B.C. Ministry of Environment
NAPS	National Air Pollution Surveillance Program
OGC	BC Oil and Gas Commission
PEA	Preliminary Economic Assessment
$PM_{2.5}$	Particulate Matter (2.5 microns or smaller)
PM_{10}	Particulate Matter (10 microns or smaller)
TSP	Total Suspended Particles (typically defined as 300 microns or smaller)

LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Kaminak Gold Corp. and their agents. Tetra Tech EBA Inc. (Tetra Tech EBA) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Kaminak Gold Corp., or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this report is subject to the terms and conditions stated in Tetra Tech EBA's Services Agreement. Tetra Tech EBA's General Conditions are provided in Appendix A of this report.

1.0 INTRODUCTION

Tetra Tech EBA Inc. was retained by Kaminak Gold Corporation (Kaminak) to conduct pertinent air quality and noise baseline studies and effects modelling for its Coffee Gold Project (Coffee Project or Project). Air quality monitoring consisted of measuring both the concentration of particulate matter in the ambient air as well as the rate of deposition onto the ground (dustfall). Sampling was undertaken at various locations around the property in both late-March and late-June 2015 in order to describe typical pre-existing baseline conditions for both winter and summer prior to construction of the Project. This report summarizes the 2015 data collection program. Effects modelling, which will predict air quality and noise conditions during the construction and operations phases of the mine, and subsequent effects assessment, are currently underway.

1.1 Project Description

Kaminak Gold Corporation proposes to construct and operate the Coffee Gold Project, a high-grade oxidized gold deposit located in west-central Yukon, approximately 130 km south of Dawson City (Figure 1-1). The proposed method of ore extraction will be open-pit mining. The property covers an aggregate area of 60,230 ha (JDS 2016). The Coffee Gold Project is located approximately 40 km northwest of the Casino Copper and Gold Project which is currently in the environmental assessment review phase.

The Project plans to recover a total of 1.9 million ounces of gold over a ten-year mine life. The most recent Project infrastructure description contained in the Feasibility Study (JDS 2016) calls for the construction of four open pits (Supremo, Latte, Double Double and Kona), three waste rock storage facilities (west, north and south), various haul roads, an on-site heap leach facility, event pond embankments, primary, secondary and tertiary crushing systems, ore stockpiles, a power generation facility, waste management facilities, a new airstrip, and an access road which runs between the Coffee Gold Project and Dawson City, of which the majority is already pre-existing. Currently, a 23 km access road connects the Coffee barge landing site and camp, situated on the bank of the Yukon River, and the gold deposits. The Project infrastructure is shown in Figure 1-2. The pits are shaded green (Latte), grey (Supremo), yellow (Double Double) and blue (Kona). The waste rock dumps are shaded brown. The event pond embankments, plant site and ore stockpiles are also shown in the lower left of the figure.

1.2 Project Setting

The Coffee Gold Project is located in the near-pristine mountainous environment of the Dawson Range Mountains in central-Yukon, 130 kilometres away from the nearest town of Dawson City with a population of 1,319 (Statcan 2011 census). The Dawson Range Mountains of the Klondike Plateau, situated on the gradual southwest to northeast slope between Coffee Peak (elevation 1,707 m asl) and the Yukon River (approximate elevation 430 m asl). The Coffee Gold property has several V-shaped creek valleys and smooth ridges with elevations ranging from 1,290 m in the Supremo pit area to 430 m at the camp and barge site at the bank of the Yukon River. The general creek valley/ridge orientation is southwest to northeast towards the Yukon River. The exception is Latte Creek, which runs west to east along the southern portion of the property before its confluence approximately 9.5 km east of the pit and dump areas with Coffee Creek, which runs southeast to northwest towards the Yukon River. The property is located away from population centers and is only accessible via the existing access road, by boat, or helicopter.

The land has been disturbed from its natural state only by the construction of a few access roads, helicopter and drill rig pads on the property and the exploration camp and barge site set up on the bank of the Yukon River. Intermittent exploration activity and baseline studies on the property are the only sources of anthropogenic influence. The Casino Copper and Gold Project, located 40 km to the southeast, is currently in the environmental assessment stage and the low-level of activity currently occurring on and around the Casino property would be expected to have a negligible effect at Coffee.

1.3 Scope of Baseline Studies

With respect to air quality, Project-related emissions of criteria air contaminants (CAC) are expected to be typical of an open pit mining operation, consisting mainly of particulate matter as a result of intensive earth-moving activities (e.g., clearing of overburden, blasting, wind erosion of stockpiles and loose pit/waste rock material, loading, haul roads, etc.) with minor emissions of gaseous contaminants (e.g., Nitrogen Oxides (NO_x), Sulphur Dioxide (SO_2), and Greenhouse Gases (GHG's)) due to fuel combustion from (for example) heavy machinery, light vehicle exhaust, and generators. At its remote location, the ambient baseline concentrations of NO_x and SO_2 are expected to be negligible with the concentrations in the ambient air likely to be below instrument or laboratory detection thresholds, and the concentration of GHG's is expected to be consistent with pristine background conditions. Therefore the collection of baseline air quality at the Coffee Gold Project refers herein to particulate matter – both the concentration in the air and the rate of deposition onto the ground (dustfall). Particulate matter is generally categorized into three size fractions for air quality purposes, as they relate to the effects on humans, animals, and vegetation.

Total Suspended Particles (TSP) describe all size fractions of airborne particulate matter (dust or smoke) and aerosols. Particulate matter can clog stomatal openings of plants, interfering with photosynthesis functions and can lead to growth stunting or mortality in some plant species. The finer fractions of TSP are respirable and can cause chronic and acute effects on pulmonary and respiratory function in humans and animals.

Of the finer TSP fractions, two particle size classifications are described in most air quality standards. PM_{10} (smaller than 10 microns; μm) is derived mainly from the Earth and contains oxides of iron, calcium, silicon and aluminum. PM_{10} emissions associated with the Project would be in the form of suspended road and windblown dust and would be produced by material handling and grinding and crushing operations typical of open pit mining. $PM_{2.5}$ (smaller than 2.5 microns) is produced mainly from combustion processes and by atmospheric reactions between precursor gases such as sulphur dioxide and nitrogen oxides, but is also a smaller component of suspended dust. Particles larger than 2.5 μm are efficiently removed by gravitational settling and remain in the atmosphere for a short time (on the scale of minutes). Particles less than 2.5 μm transport further from the source and can persist in the atmosphere for a longer period of time (on the scale of hours).

The largest natural contributor of particulate matter at the pre-construction Project site is forest fires during the summer. Forest fire smoke is transient in nature, migrating in the direction of the wind. The intensity of forest fire activity is highly variable year-to-year depending on the prevailing meteorological conditions for the region. 2015 was an extremely dry year for western Canada and forest fires were extremely prevalent. Dry, non-vegetated loose soils are also a source of windblown dust, however the majority of the property is covered with trees, shrubs, and herbs. In the winter, snow cover and frozen ground generally eliminates sources of windblown dust, however the area can be subject to arctic haze during the early spring. During spring and summer, pollen levels from vegetation increase in the air along with other suspended organic materials.

With respect to noise, ambient environmental noise is a conglomeration of sources that generally results in a relatively constant and steady background noise. Sources include wind in trees and shrubs, birds, and animal noise, and meteorological events such as rainfall and thunder. As natural activity follows its daily cycle and as meteorological conditions change, sound levels may vary slightly from hour to hour. Ambient noise levels in a rural environment are typically higher during the day than at night. Superimposed on the steady background are intermittent noisy events of brief duration such as a passing vehicle, aircraft, a helicopter, snowmobile etc. These short-duration single noise events are typically excluded from baseline noise characteristics if they deviate markedly from other observations in the sample, especially if they are not considered as part of normal baseline conditions.

The most common descriptor of noise intensity is the logarithmic A-weighted sound level (dBA) based on the range of human hearing. Since noise levels typically vary over time, the A-weighted equivalent sound level (LA_{eq}) is used to describe the average sound level over a given time period.

1.4 Study Objectives

The main objectives of the air and noise baseline data collection programs were to:

- Measure pre-Project levels of particulate matter in the ambient air on, and in the vicinity of, the Project site
- Measure pre-Project levels of particulate matter (dust) deposition on, and in the vicinity of, the Project site and determine the metals content of ambient dust
- Measure pre-Project environmental noise levels on, and in the vicinity of, the Project site including noise-sensitive areas;
- Provide background reference levels to assess potential project-related effects through modelling; and
- Establish locations for on-going air quality and noise monitoring through the life of the Project.

2.0 BACKGROUND REVIEW

2.1 Legislation, Regulations, and Guidelines

The air quality and noise surveys were conducted according to the most relevant standards and guidelines for the Yukon Territory and the mining industry. With respect to air quality, Canadian Council of Ministers of the Environment's (CCME) '*Ambient Air Monitoring Protocol for* $PM_{2.5}$ *and Ozone – Canada-wide Standards for Particulate Matter and Ozone*' (CCME 2011) provides guidelines for methodology, instrument siting, and data quality. Yukon Environment's '*Yukon Ambient Air Quality Standards*' (Yukon 2010) provide maximum acceptable concentration levels of criteria air contaminants (CAC) in ambient air. In addition, BC Ministry of Environment's (MOE) '*British Columbia Ambient Air Quality Objectives*' (MOE 2015) provides additional reference levels for airborne particulate matter and historical reference objectives for dustfall related to the mining industry.

The summer dustfall collection program was conducted in accordance with American Society for Testing and Materials' (ASTM) '*Standard Test Method for Collection and Measurement of Dustfall (Settleable Particulate Matter)*' (ASTM 2010) which provides methodology, design, and siting guidance for dust collection. The winter survey utilized snow cores which were obtained in surveys conducted in accordance with MOE's '*Snow Survey Sampling Guide*' (MOE 1981).

Noise surveys were conducted with reference to collection methods and siting requirements described in ISO 1996-2:2007 '*Acoustics – Description, measurement and assessment of environmental noise – Part 2: Basic quantities and assessment procedures*' (ISO 2007) with reference to the Environmental Protection Agency's (EPA) '*Environmental Noise Survey Guidance Document*' (EPA 2003) and BC Oil and Gas Commission's (OGC) '*British Columbia Noise Control Best Practices Guideline*' (OGC 2009). There are currently no federal or territorial noise guidelines for the mining industry. Typical rural baseline sound levels are described in many documents including OGC (2009) and are used here as reference.

The Project will require the preparation of a Project Proposal pursuant to the *Yukon Environmental and Socio-economic Assessment Act* (YESAA) which will be screened by the Executive Committee of the Yukon Environmental and Socio-economic Assessment Board (YESAB). This study and report form part of the baseline studies that have been conducted at the Coffee Gold Project in 2014 and 2015 and supports the submission of the Project Proposal.

2.2 Published Parameter Baseline Data

A review of the available, published data for concentrations of Criteria Air Contaminants including Carbon Monoxide (CO) Nitrogen Oxides (NOx) and Sulphur Dioxide (SO_2) as well as Green House Gases (GHG's) in the study area was conducted. The following background data on these contaminants, presented in Table 2.1 below, is expected to be representative of the local near pristine areas of the study area.

Table 2.1: Published Background Data

Parameter	Minimum	Maximum	Average
Nitrogen Oxides (NOx)*	<0.1 ppb	0.2 ppb	0.15 ppb
Sulphur Dioxide (SO2)*	<0.1 ppb	<0.1 ppb	<0.1 ppb
Carbon Monoxide (CO)**	3.1	4.3	3.6 ppm
Green House Gas (CO_2)***	399ppm	400ppm	400 ppm

** Casino Mining Corporation, Air Quality Baseline 2013 "Casino Project, Proposal for Executive Committee Review, Jan 2014"*

*** United States Environmental Protection Agency Carbon Monoxide Monitoring data for Fairbanks North Star (2005-2008r:*
https://www3.epa.gov/airtrends/carbon.html

**** Global average concentration data for 2015 – NOAA/ESRL*

2.2.1 Nitrogen Oxide and Sulphur Dioxide

In 2013 the Casino Mining Corporation, conducted baseline air quality monitoring including passive monitoring for Nitrogen Oxides and Sulphur Dioxide which were published in the "Casino Project, Proposal for Executive Committee Review, Jan 2014" on the company website "casinomining.com".

The results of that monitoring indicated that the average levels of these contaminants in the area are extremely low, with maximum measured concentrations of Nitrogen Oxides of 0.2 ppb, less than 1% of the provincial Air Quality Standard of 32 ppb. The Sulphur Dioxide concentrations in the atmosphere were lower than the method detection limit (0.1 ppb) for the passive monitors employed resulting in a maximum measured concetration of <0.1 ppb, also less than 1% of its provincial Air Quality Standard of 11 ppb.

2.2.2 Carbon Monoxide

The United States of America's Environmental Protection Agency (US EPA) publishes annual 8 hour average Carbon Monoxide data for a number of monitoring stations located across their country on their website (https://www3.epa.gov/airtrends/carbon.html). The nearest US EPA monitoring station is located in the Fairbanks North Star county (Latitude: 64.83278, Longitude: -147.731). The available Carbon Monoxide data from this station for the past ten (10) years has been averaged for reference. These measured concentrations range from 3.1 ppm to 4.3 ppm, which are more than 60% of the provincial Air Quality Standard of 5 ppm.

2.2.3 Green House Gas (CO_2)

The United States of America, National Oceanic & Atmospheric Administration (NOAA) collects and published data on average CO_2 concentrations in the atmosphere on its website: *(www.esrl.noaa.gov/gmd/ccgg/trends/*). *As global CO_2 levels are expected to rise for the foreseeable future, the 2015 January average of 399 ppm has been taken as a minimum value with the maximum value taken as the recent January 2016 concentration of 402 ppm.*

3.0 METHODS

The typical baseline air quality and noise measurement is the undisturbed condition, i.e., exclusive of any anthropogenic alteration to the land cover or emissions due to project-related activities. The mine site is located in a nearly undisturbed environment and the air quality and noise levels recorded in the area can be assumed to be pristine at baseline.

3.1 Air Quality

As mentioned in Section 1.3, baseline data collected prior to any substantial Project activity provide a reference level against which anticipated Project-related effects can be compared, as determined through the use of advanced air dispersion modelling.

Two sampling events were undertaken in 2015 to establish baseline air quality conditions: one occurring in late-March (25 to 29) when the ground was still covered with snow, and the other occurring in late-June (24 to 28). The timing of the winter sampling event was selected based on the operational temperature range of the recording device (recommended no colder than 0˚C), hence the spring date.

Air quality sampling consisted of two types of monitoring:

- volumetric sampling for determining the concentration of particle fractions in the air
- passive sampling to determine the rate of particulate matter deposition onto the ground

Volumetric sampling was conducted with a TSI DustTrak DRX 8533 aerosol monitor, a portable, battery-operated, laser-scattering photometer with a built-in sampling pump and internal unattended logging capabilities that can simultaneously measure size-segregated mass fraction concentrations. The units are contained within an environmental enclosure to protect them from weather. While enclosed in the case, the DustTrak's inlet valve is connected to an omni-directional sampling inlet and attached to a simple builder's level tripod approximately 1 m above the ground (Figure 3-1).

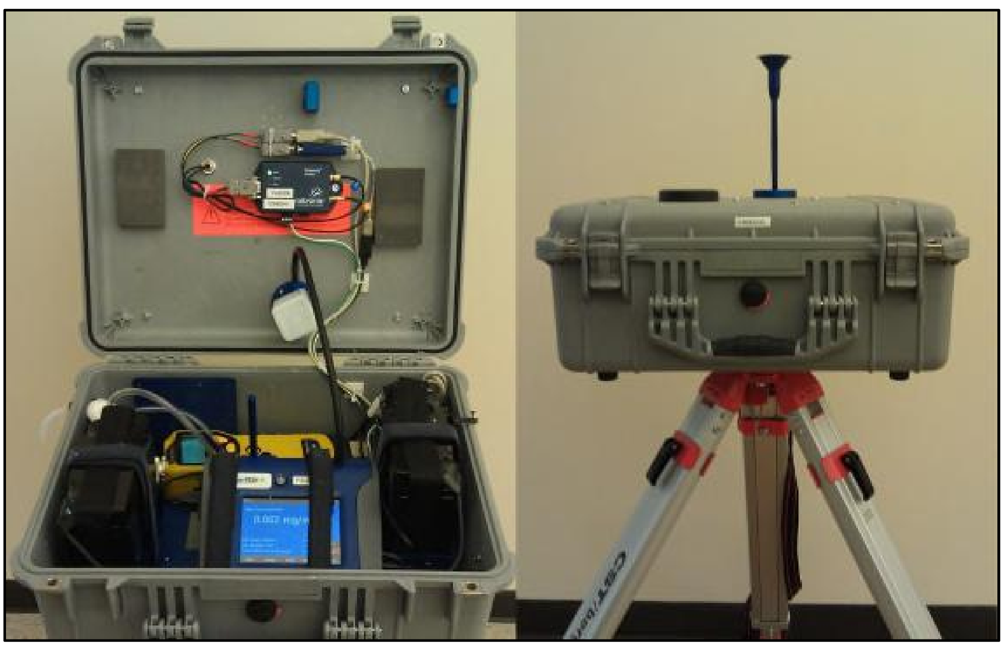


Figure 3-1: DustTrak 8533 installed in an Environmental Enclosure with Inlet

During both sampling periods, two DustTraks were set up at pre-determined monitoring locations on the Property for approximately 24-hour periods according (where possible) to National Air Pollution Surveillance Program (NAPS) siting requirements, as described in CCME (2011). The monitoring locations and the rationale for selection are further described in Section 3.3. At the start of, and following, each sampling event, the inlet flow rate of the instrument was verified and re-calibrated if necessary. The instrument was also checked periodically throughout each sampling event.

Dust deposition measurements were collected in both winter and summer. For the winter measurement, between April 1 and 4, Lorax Environmental conducted a snow survey on site as part of their hydrometeorological data collection program. At selected snow course locations, determined by Tetra Tech EBA, snow cores, taken in accordance with British Columbia/Yukon Snow Survey standards, were placed into individual plastic sample bottles and sent to ALS Environmental (ALS) in Whitehorse for weighing. Redundant cores were sampled at each location (two or three) to confirm the measurements. Fixed (non-organic), volatile (organic), and total dust depositional rates for the winter period were then determined by ALS, in units of $mg/dm^2 \cdot day$, with the known diameter of the snow corer (3.77 cm) and the number of days since the snowpack began to accumulate for winter (October 15 for a total of 169 days to the sample date on April 2).

During the summer, dustfall was collected according to ASTM (2010). Plastic collection canisters filled with a small amount of algaecide to prevent bacteria growth were provided by ALS. During the June site visit, canisters were installed at four pre-determined air quality monitoring locations around the Coffee Gold Project site (Section 3.3). At each site, the canisters were installed on stands at approximately two metres above the ground, in duplicate for redundant measurement. According to ATSM standards, the canisters were contained within a plastic wind shield, with bird spikes placed around the perimeter of the shield to reduce the possibility of contamination from bird droppings. Dustfall collection occurred over two thirty-day periods (end-June to end-July and end-July to end-August). After a thirty-day sampling period, the canisters were collected by Kaminak staff, labelled, sealed, and sent to ALS for weighing and determination of depositional rates of fixed, volatile, and total dustfall. The metals content of the dust samples was also analyzed at this time.

3.2 Noise

Baseline noise samples were collected at the Coffee Gold Project during the March and June site visits using a Casella CEL-633 Type 2 sound level meter capable of logging data. This instrument has an audible range from 20 to 140 dBA that can capture low sound levels which are typical for undisturbed wilderness, as well as higher sound levels. The CEL-633 is installed within an environmental enclosure to protect the instrument from weather, with a cable running through a connector to the unit's microphone, installed approximately 1.5 m above the ground on a builder's level tripod and protected by a wind screen and bird spikes (Figure 3.2).

Figure 3-2: Casella CEL-633 Noise Meter installed in an Environmental Enclosure with Microphone and Wind Screen

According to noise monitoring guidelines, the sampler was kept a minimum of three metres away from obstacles. Noise measurements were generally made once every second and averaged over one minute intervals, however colder temperatures during the March sampling event, particularly overnight, severely reduced the unit's battery life so the sampling frequency was altered in an attempt to obtain a full night time noise sample. Each location was monitored for approximately 24 consecutive hours; however, overnight temperatures in March reduced the duration of the overnight samples as highlighted below in Section 4.3.

Noise data were checked for quality in post-processing using the Casella Insight software where sound level spikes not related to environmental baseline noise could be easily identified and omitted from the statistical calculations. The most frequent omission was the noise recorded at the end of a file when field staff arrived at the monitoring site via helicopter or truck and walked up to the noise monitor, or at the beginning of a sampling run when the reverse occurred. Technician and vehicle/helicopter noises were also omitted when the unit was periodically checked for battery life but the sample file was not re-started. Other spikes occurring in the middle of a run with no accompanying field notes were not omitted as they likely represent a short-duration higher-intensity natural noise such as thunder or wildlife/bird/insects coming close to the microphone.

Statistical averaging of the noise interval data was carried out in Excel following the quality review. Because of the logarithmic nature of the dB scale, sound levels over each interval are not additive. Instead the logarithm is first inverted (converted to sound intensity) after which the following equation is applied to generate a total value:

$$L_{total} = 10 \cdot log_{10}(10^{\frac{LAeq1}{10}} + 10^{\frac{LAeq2}{10}})$$

As an example, a conversation (~60 dBA) in a library (~40 dBA) would not result in a noise level of 100 dBA. Rather, the conversation would raise the overall noise level to 60.04 dBA, meaning that the background noise would no longer be audible. However if two conversations occurred simultaneously at the same 60 dBA level, the overall noise level would increase to 63 dBA.

Daytime environmental noise level is generally higher than that at night (OGC 2009). LA_{eq} values were therefore determined for both daytime and nighttime. Since the March event occurred close to the equinox and the June event occurred just following the solstice, there was a difference in the amount of daylight hours between the two surveys. For the June (summer) sampling event, the daytime period was considered as occurring between the hours of 04:00 and 23:00 while the nighttime period was between the hours of 23:00 and 04:00. For the March (winter) event, the daytime period was considered as occurring between the hours of 08:00 and 21:00 while the nighttime period was between the hours of 21:00 and 08:00.

To avoid artificially elevated noise levels, sampling is recommended under “neutral” meteorological conditions (EPA 2003), which include:

- Average wind speeds of less than 5 m/s (preferred) with an upper limit of 7 m/s
- No active precipitation or fog

In addition, air temperature and relative humidity requirements are those which allow the sound meter to be operated within manufacturer’s specifications, which include:

- Air temperature above 0˚C
- Relative humidity below 90%

Hourly weather parameters recorded at the Coffee Creek meteorological station during each noise survey and conditions which translated into relevant omissions due to weather are described further in Section 4.1.

3.3 Monitoring Locations

Monitoring locations were selected in consideration of several factors including the spatial description of the proposed mine infrastructure (i.e., the major dust emission sources once the mine is operational), helicopter landing access as identified by Kaminak, the topography, the prevalent wind conditions, and for noise, sensitive locations for wildlife as determined by Project biologists. Potential effects to humans have not been considered due to the extremely remote location.

Using the proposed pit and dump areas presented in the PEA and preliminary diagnostic meteorological modelling using CALMET, a screening air dispersion model was run with CALPUFF which identified general areas on the property with the highest predicted air quality effects. The selected monitoring sites establish locations that should be maintained for ongoing monitoring during the life of the Project. Table 3.1 lists the monitoring locations for baseline air quality (including dustfall) and noise. The sites are also shown as a map in Figure 3-3.

Table 3.1: Air Quality, Summer Dust Fall and Noise Monitoring Locations

Monitoring Location	Abbr.	Air		Dust	Noise		Coordinates		Notes
		Mar	**Jun**	**Summer**	**Mar**	**Jun**	**Latitude**	**Longitude**	
Meteorological Station	MET	✓	✓	✓	✓	✓	62.873595° 62.874461° 62.874853°	-139.185917° -139.181990° -139.181769°	AQ/Noise – Winter AQ - Summer Noise – Summer
Double Double	DD	✓	✓	✓			62.878513°	-139.363983°	
ROM	ROM		✓			✓	62.869182°	-139.398867°	Inaccessible winter
Saddle		✓					62.878513°	-139.363983°	Winter Only
Helipad 1 (NW Ridge)	H1	✓	✓	✓	✓	✓	62.903516°	-139.395301°	
Helipad 4 (S Ridge)	H4	✓	✓		✓	✓	62.851395°	-139.320814°	
Helipad 6 (NE Ridge)	H6	✓	✓	✓			62.898871°	-139.294798°	
Winter Camp	CAMP	✓					62.911955°	-139.089727°	Winter Only

As described in Section 3.1, winter dustfall samples were taken from snow survey cores and collected by Lorax Environmental. The locations of the snow cores, shown in Figure 3.3, are listed in Table 3.2 along with comments from Lorax field staff during the survey.

Table 3.2: Snow Survey Locations used for Winter Dustfall Collection

Sampling Location	Number of Samples	Coordinates		Snow Survey Notes
		Latitude	**Longitude**	
CC-East	3	62.869°	-139.390°	
KAM-WX-SS	3	62.873°	-139.182°	Very rocky ground (under snow), hard to get a dirt plug. Could still clearly see holes from last snow survey.
CC-North	2	62.890°	-139.310°	Lots of drifting at this site - prevailing winds from south. Lots of air pockets at the base, and rocks. Not a good site, not recommended for future surveys
CC-South	2	62.885°	-139.311°	20 cm sun/wind crust and facets below to ground
CC-West	2	62.889°	-139.358°	This snow course is located fairly close to drill pads, may influence dust measurements

Site-specific descriptions and relevant observations during the monitoring survey are described in the following sub-sections.

3.3.1 Monitoring Location MET

Monitoring station MET is located in the vicinity of the installed Coffee Creek meteorological station, along the northern ridge of the Latte Creek valley. This location is approximately 7 km east of the proposed pit infrastructure (Figure 3-4). The site was selected due to ease of access, co-location with the meteorological station, and the observed wind pattern (the location is in one of three general downwind directions from the proposed major dust emitting areas, Figure 1-3). It is located near the access road providing a good location for on-going monitoring of road dust and transport of mine activity-generated particulate matter away from the property to the east. The site is well-exposed to winds in all directions with sparse small trees and shrubs. Air quality, summer dustfall, and noise were collected at the MET site. Snow survey location KAM-WX-SS is also in the vicinity of MET, therefore winter dustfall determined from snow cores can be considered as representative.

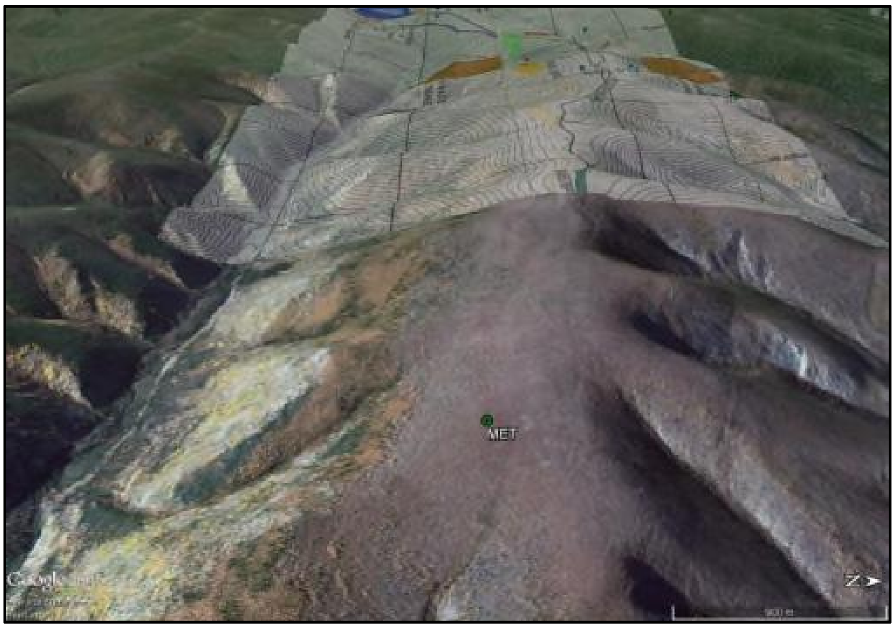


Figure 3-4: Google Earth Image of Monitoring Location MET (Looking West)

The aluminum wind screen around the meteorological station’s precipitation gauge produces noise in windy conditions. During winter sampling, the noise monitor was set up 20 m away from the station. Noise levels may be slightly elevated (Figure 3-5). The summer sampling was conducted 240 m away from the station and would not be affected (Figure 3-6).

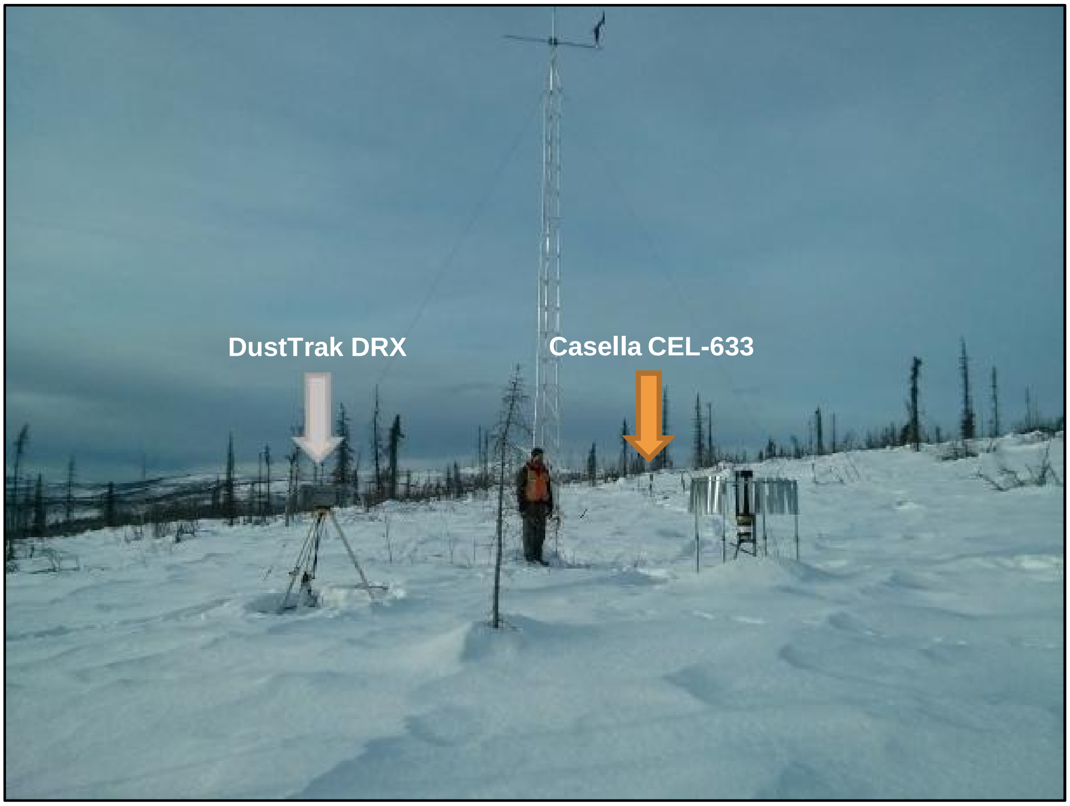


Figure 3-5: Air Quality and Noise (in background) Samplers at Monitoring Location MET, March 2015

Figure 3-6: Air Quality and Noise Samplers at Monitoring Station MET, June 2015

3.3.2 Monitoring Location DD

Monitoring location DD, in the vicinity of the proposed Double Double pit, was selected as it is located in the middle of the proposed pit infrastructure, therefore higher air quality effects were predicted during screening model runs. DD also provides an excellent location for longer-term monitoring for coarser-fraction particulate matter during the construction and operational phases of the mine. The exact location used in 2015, however, may require some adjustment during construction of the mine. Access to the location is by road. The tree cover in this area is thick with taller conifers (Figure 3-7). Siting choices were limited due to the presence of the road and inaccessibility of alternate locations. As a result, instrument siting did not adhere to recommended spacing criteria (>20 m from trees, unrestricted air flow in 3 of the 4 wind quadrants; Figure 3-8). Particulate matter and dustfall measurements, particularly in summer, may have been elevated due to proximity to tree pollen and road-generated dust from vehicles using the access road.

Figure 3-7: Air Quality Sampler at Monitoring Location DD, March 2015

Figure 3-8: Dust Collection Canisters and Air Quality Sampler (behind shrub) at Monitoring Location DD, June 2015

3.3.3 Monitoring Location ROM (Summer Only – Winter Inaccessible)

Monitoring location ROM, in the vicinity of the proposed mining plant infrastructure, was selected to provide baseline conditions and a possible long-term monitoring location in the vicinity of the run-of-mine and crushed ore stockpiles and the processing plant (Figure 3-9). It is also located west of the proposed pit and dump infrastructure and was an area predicted in screening modelling to have higher air quality effects. The location is a good choice for on-going monitoring as mine staff would frequently be working in the area and a constant reliable power source, a requirement for continuous volumetric air quality sampling, would be accessible. Both volumetric air quality and noise sampling occurred at ROM during the June survey. The site was inaccessible in the winter.

Figure 3-9: Casella Noise Sampler at Station ROM, June 2015

3.3.4 Monitoring Location Saddle (Winter Only)

Monitoring location Saddle was selected during the winter survey in lieu of preferred location ROM which was not accessible. Like DD, Saddle is located in the middle of the proposed pit and dump infrastructure. The site is located approximately 50 m upslope from the end of the property access road. The area has many sparse, shorter conifers and shrubs and siting is excellent (Figure 3-10).

Figure 3-10: Air Quality Sampler at Monitoring Location Saddle, March 2015

3.3.5 Monitoring Location H1

Monitoring location H1 is situated 30 m downslope, on the eastern aspect, from the peak of the ridge (helicopter pad) running between Dan Man Creek and Halfway Creek, north of the proposed pit areas (Figure 3-11). The location is one of the highest points on the property, at an approximate elevation of 1,190 m asl (the elevation of the ridge top is 1,220 m). The site was selected based on preliminary air dispersion screening model results which predicted higher air quality effects along the ridge due to proposed mining activity and prevailing winds. The site has very sparse tree cover and low shrubs and exposure is excellent. The site may be suitable for long-term monitoring as it captures transport of mine activity-generated particulate matter away from the property to the north.

Figure 3-11: Google Earth Image of Monitoring Location H1 (Looking Southeast)

Air quality and noise were monitored at H1 in both summer and winter and dust deposition was collected in summer. During the summer survey, the noise sensor malfunctioned shortly after being installed on June 25 (at 15:27) and no data were recorded for the majority of the afternoon or overnight. The sampler was checked in the morning and the issue was corrected. Noise data at H1 therefore cover the period June 26, 8:35 to 16:26 and nighttime measurements were not recorded in the summer. Thunderstorms were observed throughout the afternoon of June 26 which elevated noise levels (Figures 3-12 to 3-14). Rainfall was recorded by the Coffee Creek meteorological station between 15:00 and 17:00 on March 26 and these data have been omitted from noise statistical calculations, described in Section 4.3.

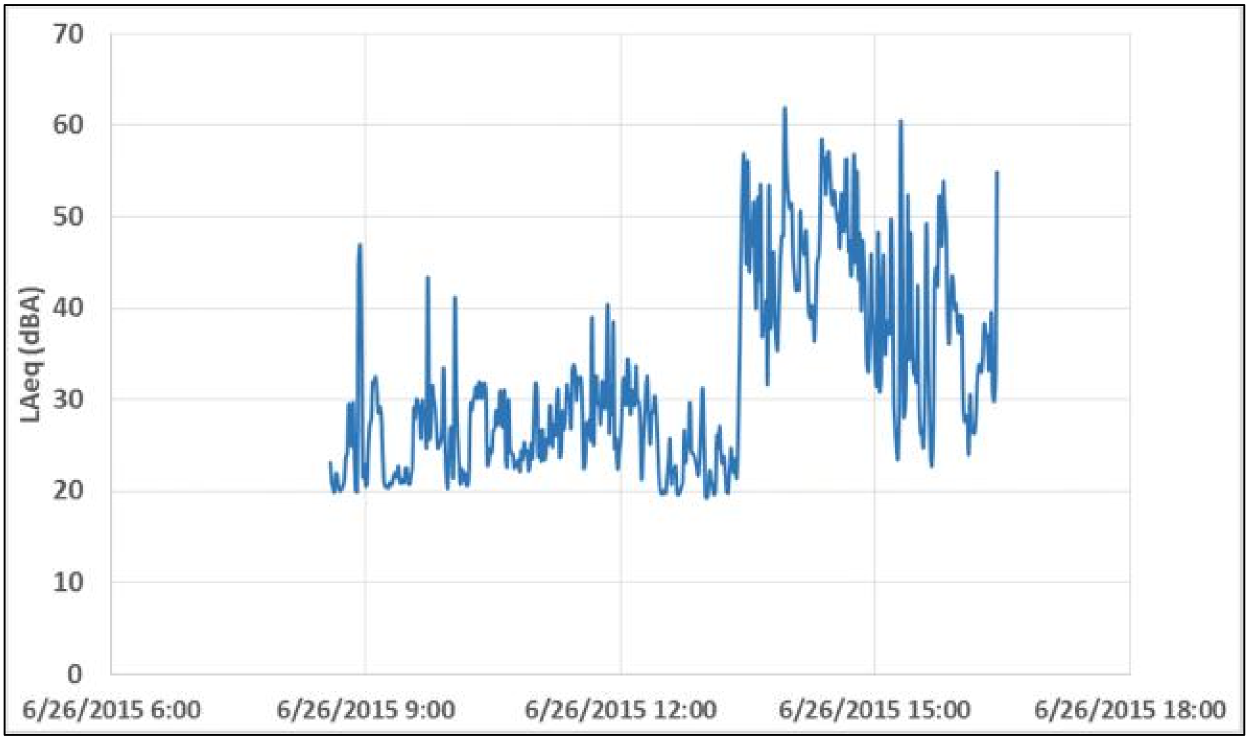


Figure 3-12: One-Minute Averaged Noise Level Recorded at H1 (Thunderstorm Activity beginning at 13:30)

Figure 3-13: Noise and Air Quality Sampler at Monitoring Location H1, March 2015

Figure 3-14: Air Quality and Noise Samplers, Dust Collection Canisters at Monitoring Location H1, June 2015

3.3.6 Monitoring Location H4

Monitoring location H4 was selected in consultation with Project wildlife biologists as a noise sensitive location for caribou. The site is situated on the southern ridge of Latte Creek valley (Figures 3-15 to 3-18) providing an excellent location for air quality monitoring across the valley, south of proposed Project infrastructure. Tree cover is very sparse with small shrubs and instrument siting is excellent. Air quality and noise were sampled at H4.

During the winter noise survey, helicopters and drills were working 2 to 3 km west of the site which may have elevated noise levels at times. Overnight temperatures were below the recommended operational range of the Casella CEL-633 (0˚C), reducing battery life. The averaging/logging interval was increased from one-minute to ten minutes for the overnight survey in an attempt to conserve battery, however even with the conservation, the instrument only recorded data until 3:00 AM, allowing for 5 hours of nighttime noise data.

During the summer survey, thunderstorms and rain were prevalent throughout the evening of March 26 and overnight, subsiding by morning. Rain-affected noise data were removed as per recommended protocol from the daytime noise statistical calculations; however, the overnight value, absent of any non-affected measurements, includes noise data made with intermittent precipitation and is elevated as a result. The overnight data should only be used for reference purposes.

Figure 3-15: Google Earth Image of Monitoring Location H4 with Preliminary Site Plan Overlay

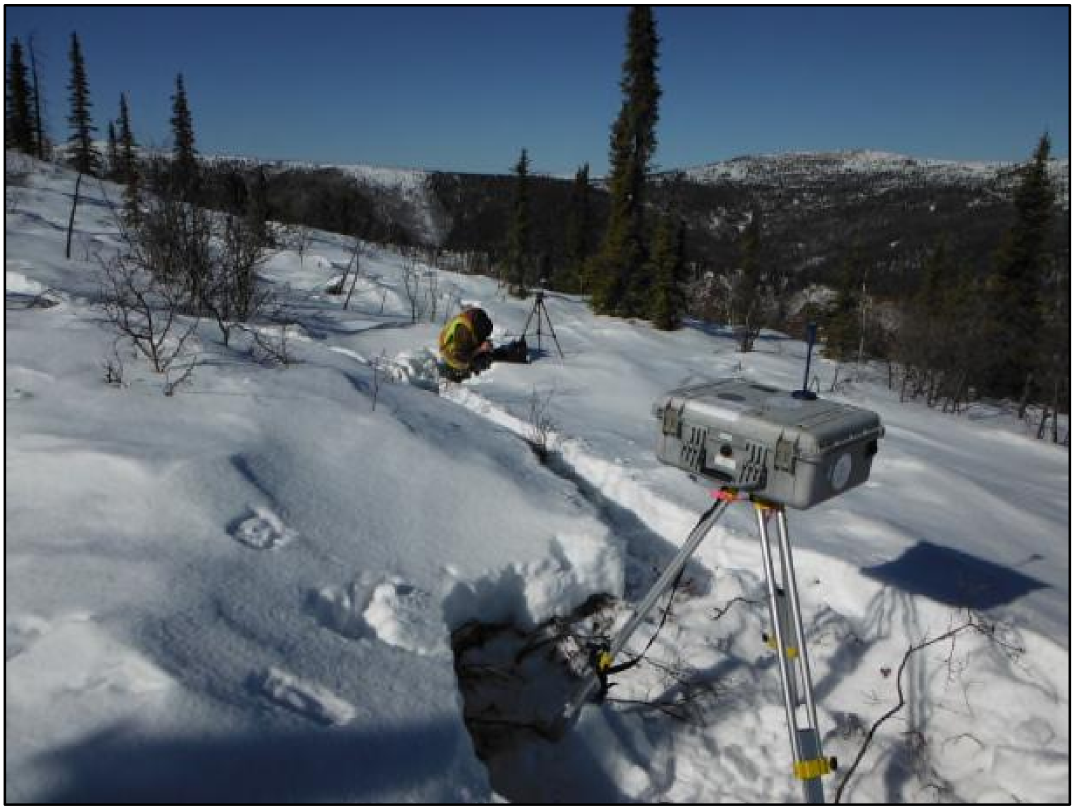


Figure 3-16: Air Quality and Noise Samplers at Monitoring Location H4, March 2015

Figure 3-17: Air Quality Sampler at Monitoring Location H4, June 2015

Figure 3-18: Noise Sampler at Monitoring Location H4, June 2015

3.3.7 Monitoring Location H6

Monitoring location H6 is situated on a ridge, northeast of the proposed pit areas (Figures 3-19 to 3-22). The site was selected based on preliminary air dispersion screening model results which predicted higher air quality effects along the ridges northeast of project infrastructure due to proposed mining activity and the prevailing winds. The constructed helipad is on the northern aspect of the gradually sloping ridge at approximately 1,085 m (the highest elevation of the ridge is 1,255 m). The site has very sparse tree cover and low shrubs and exposure is excellent. Air quality was monitored in both winter and summer. Noise was sampled at H6 in winter as the preferred ROM site was inaccessible. Dust deposition was also collected at H6 during the summer.

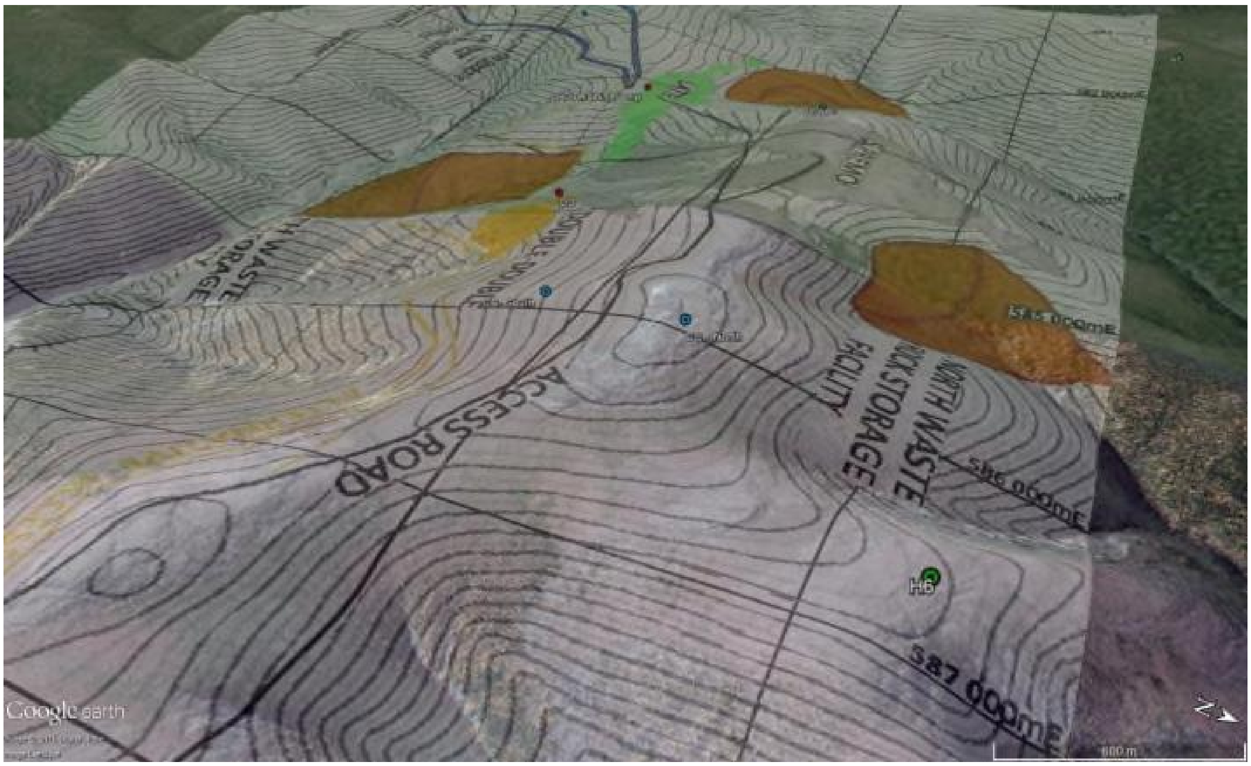


Figure 3-19: Google Earth Image of Monitoring Location H6 with Preliminary Site Plan Overlay

Figure 3-20: Air Quality Sampler at Monitoring Location H6, March 2015

Figure 3-21: Air Quality Sampler at Monitoring Location H6, June 2015

Figure 3-22: Dust Collection Canisters at Monitoring Location H6, June 2015

3.3.8 Monitoring Location CAMP (AQ – Winter Only)

Air quality sampling near the camp and barge was conducted as an alternative to the inaccessible ROM. Location CAMP provides air quality conditions at the elevation of the Yukon River, northeast of the Project footprint (Figure 3-23). Although a site was selected away from the main camp area, anthropogenic influences would be observed in the data here. Monitoring was not conducted at this location in summer as the preferred ROM site was accessible.

Figure 3-23: Air Sampling at Monitoring Location CAMP

4.0 RESULTS AND DISCUSSION

Meteorological conditions during the study period relevant to the survey are described in Section 4.1. Air quality, dustfall, and noise data recorded over the study period are summarized in Sections 4.2 through 4.4. Air quality and noise data, which have been checked for quality, and copies of ALS Environmental dust analysis reports are presented in Appendices B through D.

4.1 Meteorological Conditions

Predominant winds, as recorded by the onsite meteorological station between July 2012 and July 2015, are from the northwest, northeast, and south (Figure 4-1). North-westerly winds occur more commonly in the summer, while northeasterly winds occur more commonly in the winter. Southerly winds occur throughout the year.

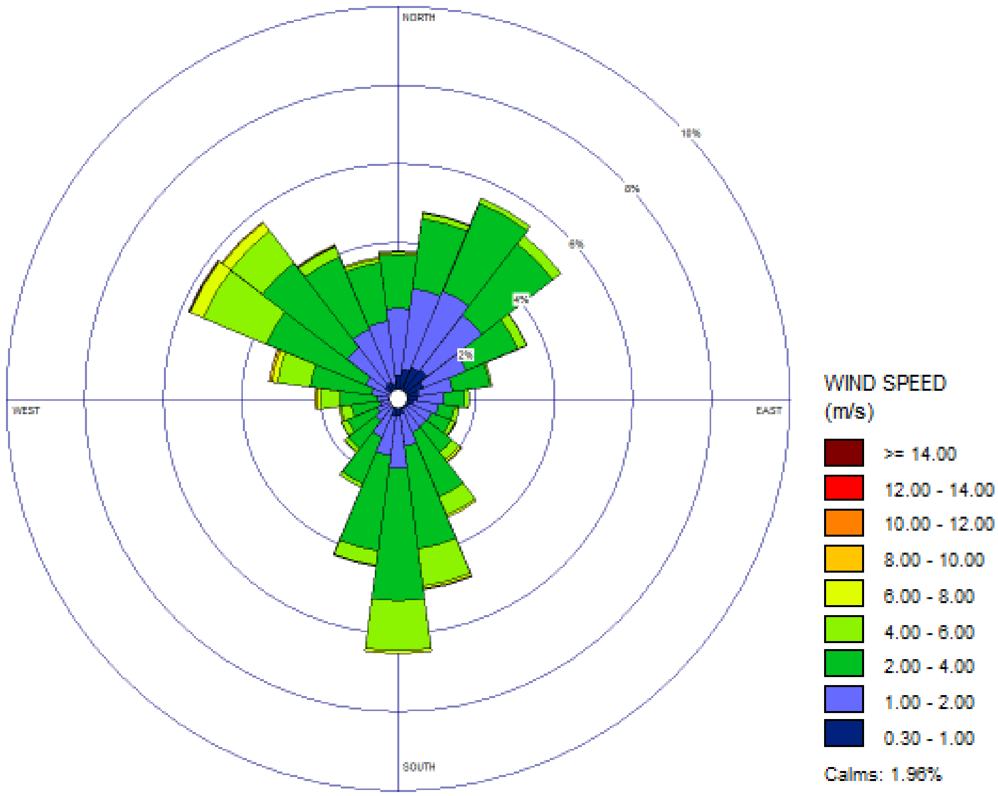


Figure 4-1: Coffee Creek Meteorological Station Wind Rose (July 2012 – July 2015)

March Survey

Clear skies and generally sub-zero temperatures (particularly at night) were prevalent during the March sampling event. The Coffee Creek meteorological station precipitation gauge was not functional during this time period, however the observed weather was generally clear or partly cloudy skies with no precipitation. Figures 4-2 and 4-3 below highlight the meteorological conditions on site during the March survey.

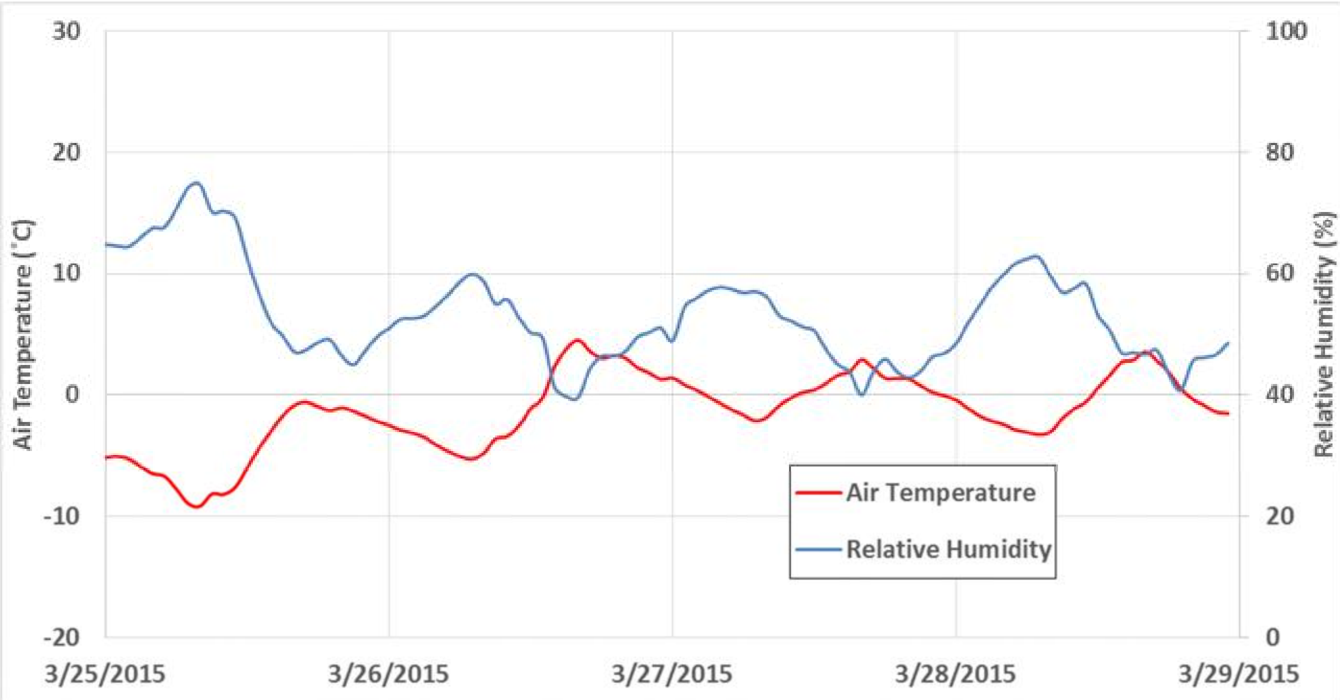


Figure 4-2: Air Temperature and Relative Humidity during March Sampling Event (Coffee Creek Met Station)

Figure 4-3: Hourly-Averaged Wind Speed during March Sampling Event (Coffee Creek Met Station)

Summer Survey

The summer of 2015 was unusually dry for the region and there was a high amount forest fire activity in the Yukon which persisted for the majority of the summer. As a result, smoky conditions were prevalent during the beginning of the summer survey. Forest fire smoke, whether lightning or human caused, is a normal, albeit transient, occurrence and should therefore be considered as part of the natural fluctuation in baseline ambient air quality. During the time of the survey, thunderstorms were also a regular occurrence, producing rain which was heavy at times. Such thunder storms represent a natural occurrence and have also been considered as part of the natural fluctuation in baseline ambient air and noise quality.

Figures 4-4 and 4-5 below highlight the meteorological conditions on site during the Summer survey.

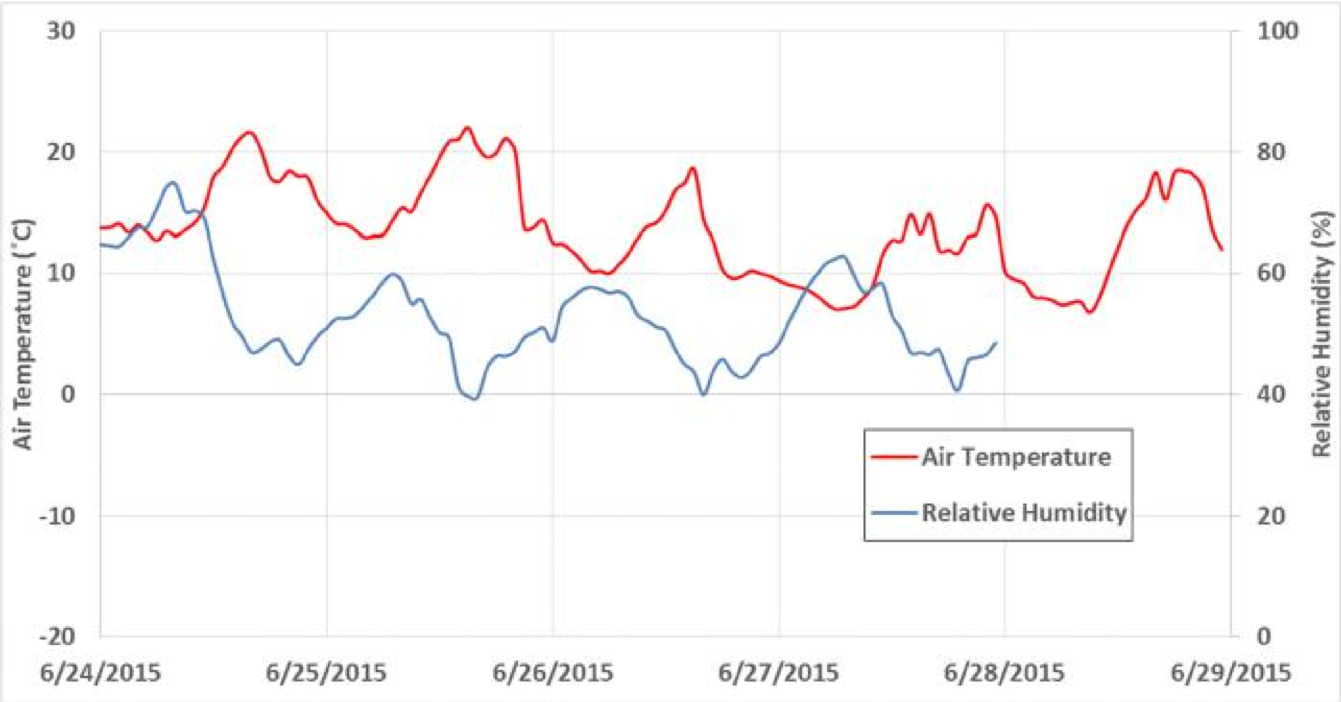


Figure 4-4: Air Temperature and Relative Humidity during June Sampling Event (Coffee Creek Met Station)

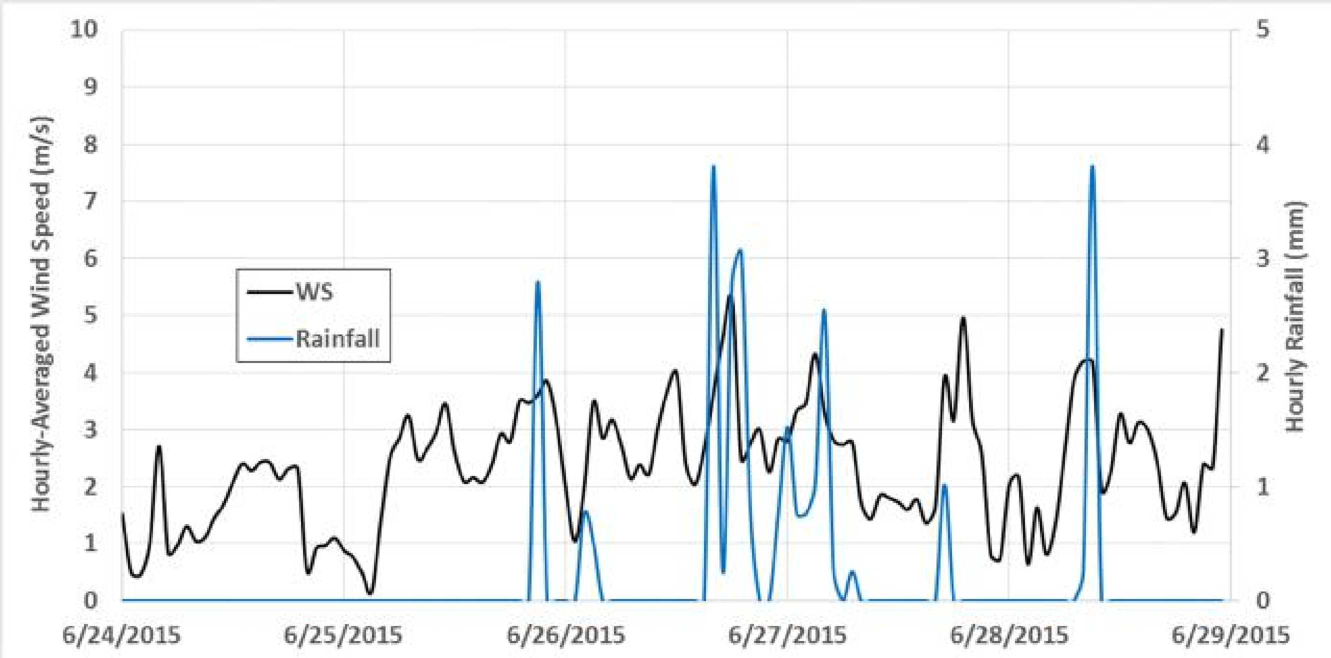


Figure 4-5: Wind Speed and Rainfall during June Sampling Event (Coffee Creek Met Station)

4.2 Air Quality

The smoky conditions associated with forest fires during the summer survey period resulted in notably elevated particulate matter readings. When precipitation occurred, smoke dissipated and particulate matter levels decreased into the range of those observed during the winter. Forest fire smoke has been considered as part of the natural fluctuation in baseline ambient air quality.

Real-Time Monitoring

The results of the real-time ambient particulate matter monitoring campaigns are summarised below in the following sections. Monitoring results have been reviewed for data quality and adjusted to remove anomalies where necessary.

Zero Drift Adjustments

A Zero Drift was noted for the following units during the following monitoring periods:

- DD (8533112906) during the June 27, 2015 sampling period
- MET (8533152307) during the June 27, 2015 sampling period
- ROM (8533112906) during the June 26 and 27, 2015 sampling period
- PAD 4 (8533152307) during the June 26, 2015 sampling period.

The Zero Drift in all of these instances resulted in negative (-) monitoring results being recorded for at least a portion of these periods. This issue has been corrected for according to the following methodology.

A minimum particulate matter concentration (~ 0.000 mg/m^3) was assumed based on the pristine conditions and measured data from the unaffected monitoring campaign dataset and used as a reference minimum concentration to renormalize the affected data according to the following formula:

$$\text{Concentration}_{\text{Adj. }i} = \text{Concentration}_{i} + (\text{Reference Minimum Conc.} - \text{Measured Minimum Conc.})$$

Where:

Concentration $_{\text{Adj. }i}$:	Concentration at time i adjusted to correct for Zero Drift
Concentration $_{i}$:	Original measured concentration at time i
Reference Minimum Conc.:	Minimum ambient concentration from the unaffected dataset
Measured Minimum Conc.:	Minimum measured concentration value in the affected dataset

Monitoring Campaign Data

The average particulate matter concentration in the air recorded by the DustTrak samplers during each sampling event is presented in Table 4.1 for the winter survey and in Table 4.2 for the summer survey. The majority of airborne particulate matter is in the respirable size fraction – particles smaller than 2.5 microns. Although the relative ratios of one-minute readings for each size fraction do show some variance on occasion over the course of the study at some sites, likely due to road dust from passing vehicles, there is little-to-no difference when averaged over several hours. This would be expected in a pristine environment covered with trees and shrubs, as the main constituents of the baseline PM are aerosols such as pollen and other organic material.

Open sources of larger-fraction particulate matter are not present at baseline conditions (with the exception of the access road and clearings). Earth-moving activities associated with the construction and operations stages of the mine are expected to emit a notable amount of particulate matter in the vicinity of the mine footprint, resulting in higher airborne concentrations of PM2.5, PM10, and TSP on and around the property.

The data summarized in Tables 4.1 and 4.2 represent the averages of the quality reviewed one-minute interval data over each sampling period. The tables also include relevant observations which assist in understanding the readings. The time series of quality reviewed one-minute data for each monitoring campaign are presented in Appendix B.

Table 4.1: Detailed Summary of Coffee Gold Winter (March) 2015 Air Quality Baseline Survey

Location	Start Date	Start (PST)	End (PST)	Run Time (hrs)	Observations	Avg. Particulate Matter Concentration (mg/m³)		
						$PM_{2.5}$	PM_{10}	TSP
H4	Mar. 25th	13:56	18:51	4:55	Sunny, Temp 0˚C	0.003	0.003	0.003
	Mar. 25th	19:00	6:46	11:46	Clear, Temp -4˚C	0.003	0.003	0.003
H6	Mar. 25th	15:03	19:21	4:18	Sunny, Temp -1˚C	0.004	0.004	0.004
	Mar. 25th	19:32	5:48	10:16	Clear, Temp -4˚C	0.003	0.003	0.003
H1	Mar. 26th	8:01	18:47	10:46		0.001	0.001	0.001
	Mar. 26th	18:54	6:50	11:56	Temp 2˚C	<0.001	0.001	0.001
DD	Mar. 26th	9:54	19:06	9:12		0.002	0.002	0.002
	Mar. 26th	19:28	7:40	12:12		0.001	0.001	0.001
MET	Mar. 27th	8:23	20:13	11:50		0.001	0.002	0.002
	Mar. 27th	20:20	8:07	11:47		0.001	0.001	0.001
	Mar. 28th	8:18	19:56	11:38		0.002	0.002	0.002
	Mar. 28th	20:02	7:47	11:45		0.002	0.002	0.002
CAMP*	Mar. 27th	9:02	19:29	10:27		0.004*	0.004*	0.004*
	Mar. 27th	19:34	6:17	10:43		0.004*	0.004*	0.004*
SAD	Mar. 28th	7:40	19:32	11:52	Snowmobile activity	0.001	0.001	0.001
	Mar. 28th	19:38	7:13	11:35		0.002	0.002	0.002

*may be influenced by human activity due to proximity

It can be seen from these data that the average ambient particulate matter concentrations in the study area are extremely low as would be expected of a pristine area during the winter months, with snow on the ground and few sources of particulate in the vicinity.

Table 4.2: Detailed Summary of Coffee Gold Summer (June) 2015 Air Quality Baseline Survey

Location	Start Date	Start (PST)	End (PST)	Run Time (hrs)	Observations	Avg. Particulate Matter Concentration (mg/m³)		
						$PM_{2.5}$	PM_{10}	TSP
DD	Jun. 24th	16:32	8:20	15:48	T-Storms (16:30 - 17:30), smoke	0.090	0.092	0.092
	Jun. 25th	8:31	14:30	5:59	Increase in smoke/haze around noon	0.073	0.074	0.074
	Jun. 27th	16:31	9:25	16:54	showers, then clear after 19:00, raining morning, no wind	0.003*	0.003*	0.003*
MET	Jun. 24th	15:31	7:45	16:14	T-Storms (16:30 - 17:30), smoke	0.109	0.109	0.109
	Jun. 25th	8:01	13:47	5:46	Increase in smoke/haze around noon	0.070	0.070	0.070
	Jun. 27th	18:31	10:29	15:58	showers, then clear after 19:00, raining morning, no wind	0.003*	0.003*	0.003*
H1	Jun. 25th	15:31	15:30	23:59	Haze and smoke, T-storm around 8 PM, rain overnight	0.072	0.072	0.072
H6	Jun. 25th	16:02	8:13	16:11	T-storm around 8 PM, rain overnight	0.064	0.065	0.065
	Jun. 26th	8:43	16:00	7:17	Pt. cloudy - minor haze	0.045	0.045	0.045
H4	Jun. 26th	17:11	17:10	23:59	rain all night, sun & cloud, showers in afternoon	0.006*	0.006*	0.006*
ROM	Jun. 26th	17:31	15:52	22:21	rain all night, sun & cloud, showers in afternoon	0.003*	0.004*	0.004*
	Jun. 27th	16:31	9:25	16:54	showers, then clear after 19:00, raining morning, no wind	0.003*	0.003*	0.003*

Data adjusted to correct for Zero Drift.

During the summer survey, elevated levels of particulate matter were recorded during the first three days of sampling due to persistent forest fire smoke. As winds shifted in direction, ambient readings fluctuated accordingly – increasing when winds came from the direction of the forest fire(s) and decreasing when they were from a different direction and as lingering smoke dispersed.

On days when precipitation occurred (June 26 – 28), ambient readings dropped substantially, to levels similar to those observed during the winter survey. During a rainfall event, particulate matter is scavenged out of the air as it adheres to water particles and is deposited onto the ground. Other meteorological factors affecting the concentration of particulate matter in the air include the wind speed (turbulence-induced mixing), incident solar radiation (convection and vertical air movement), and the vertical temperature structure of the air (tendency of air to rise).

Figure 4-6 below is a time series plot of the $PM_{2.5}$ readings as well as the corresponding wind direction and precipitation data taken at all sites during the summer survey. These plots illustrate the higher levels of $PM_{2.5}$ observed over the first three (3) days of the study, fluctuating due to changes in wind direction, as shown by the thin green line. The data indicates that at least one (1) of the forest fire(s) responsible for elevated $PM_{2.5}$ levels was located southeast of the property as the spikes in $PM_{2.5}$ concentration occurring late in the day on June 25 (illustrated by the red and black lines) were associated with southeasterly winds observed at the same time. The rain (blue line, lower panel) which fell late in the day on June 25 substantially lowered $PM_{2.5}$ levels. Continued rainfall from the evening of June 26 through to midday of June 27 resulted in $PM_{2.5}$ levels near the winter baseline. It is likely that the rainfall event also affected the fire as PM remained low through the rest of the survey.

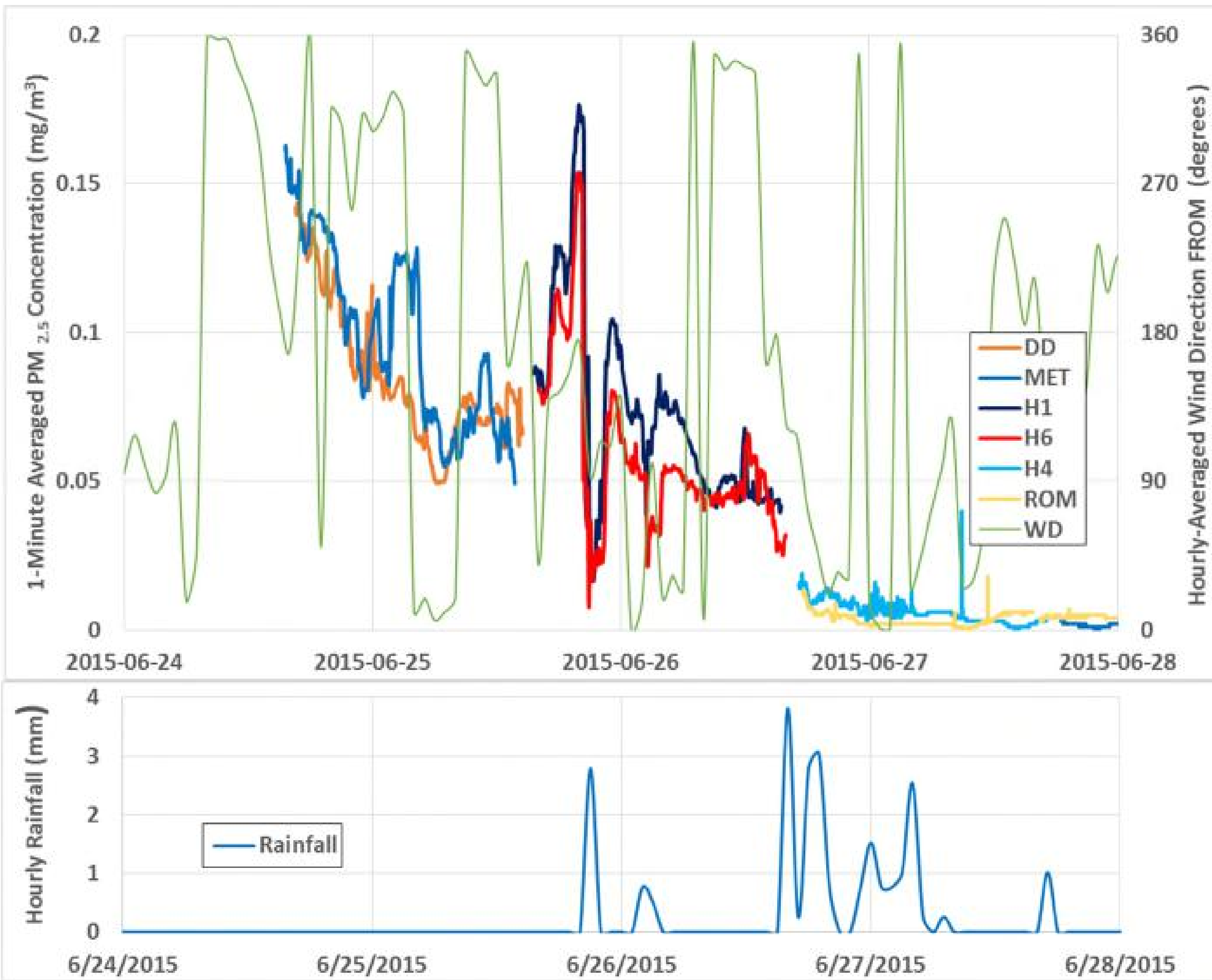


Figure 4-6: Time Series of $PM_{2.5}$ Concentration, Wind Direction and Rainfall – June Air Quality Survey

Airborne concentrations recorded on the first three (3) days of the survey exceeded the Yukon Ambient Air Quality Standards for $PM_{2.5}$ (0.030 mg/m^3 averaged over 24 hours), however this would be expected during a summer of high forest fire activity as was the case in 2015. As shown by the data, elevated $PM_{2.5}$ levels due to forest fire smoke are transient in nature and decrease rapidly with precipitation.

Table 4.3 below provides a condensed summary of the complete ambient air quality baseline monitoring data illustrating the range and average concentrations of each PM size fraction for both summer and winter conditions.

Table 4.3: Summary of Coffee Gold 2015 Air Quality Ambient Baseline Monitoring

Parameter	Season	Min	Max	Average
Total Suspended Particulate Matter (TSP)	Winter	0.001 mg/m^3	0.065 mg/m^3	0.002 mg/m^3
	Summer	<0.001 mg/m^3	0.20 mg/m^3	0.041 mg/m^3
PM_{10}	Winter	0.001 mg/m^3	0.061 mg/m^3	0.002 mg/m^3
	Summer	<0.001 mg/m^3	0.193 mg/m^3	0.040 mg/m^3
$PM_{2.5}$	Winter	0.001 mg/m^3	0.034 mg/m^3	0.002 mg/m^3
	Summer	<0.001 mg/m^3	0.177 mg/m^3*	0.040 mg/m^3*

**Exceedance of Yukon Ambient Air Quality Standards for $PM_{2.5}$ (0.030 mg/m^3 averaged over 24 hours)*

It can be seen from the data above that the average measured $PM_{2.5}$ concentration during the summer period exceeds the Yukon Ambient Air Quality Standards for $PM_{2.5}$ (0.030 mg/m^3 averaged over 24 hours). It can be seen from the data presented in Figure 4.6 above that this exceedance is most likely due to smoke and haze from forest fire events in the area. This should be taken into consideration when using this data in future.

4.2.1 Dust Deposition

Table 4.4 presents the baseline dust deposition rates measured at the Coffee Gold Project in 2015 (winter, July and August) as determined by laboratory analysis. The values presented in Table 4.4 represent the average weight of dust samples collected at one location unless otherwise noted (i.e., if the weight of one sample was below detection limits and therefore could not be confirmed). The standard deviation (σ) is also presented for reference to show how closely the sample weights from a single location agreed.

Table 4.4: Summary of Coffee Gold Project Baseline Total Dust Deposition Rates – 2015 Survey

Sampling Location	Winter 2014/15		July 2015		Aug 2015	
	Dustfall (mg/dm^2.day)	σ	Dustfall (mg/dm^2.day)	σ	Dustfall (mg/dm^2.day)	σ
KAM-WX-SS/MET	0.16	0.025	0.71	0.34	0.32*	-
H6			0.21	0.025	n/a**	-
H1			0.21*	-	0.12*	-
DD			1.43†	0.27	0.60*	-
CC-North	0.27	0.145				
CC-South	0.12*	-				
CC-West	0.12*	-				
CC-East	0.18	0.144				
Overall Average	0.17		0.64		0.34	

* Based on single sample due to one sample being below detection limit of 0.10 mg/dm^2.day
** (n/a) both samples below detection limit of 0.10 mg/dm^2.day
† Siting does not adhere to spacing criteria from trees

Total dustfall consists of a non-organic portion (fixed) and an organic portion (volatile). The ratio of fixed to volatile dustfall is shown in Table 4.5 for those samples where weights were above the minimum detection limit. At DD, as well as at CC-North, a larger component of the dust was determined to be organic while at MET, the ratio was nearly even. Tree cover is much more prominent in the proposed pit infrastructure area where both CC-North and DD were collected. The siting of the dust collection buckets near trees at DD also likely had some effect on the dust composition and deposition rate.

Table 4.5: Summary of Dust Components – 2015 Survey

Sampling Location	Winter 2014/15		July 2015		Aug 2015	
	Fixed	Volatile	Fixed	Volatile	Fixed	Volatile
KAM-WX-SS/MET	-	-	50%	50%	41%*	59%*
DD			12%	88%	20%*	80%*
CC-North	29%*	71%*				

* Based on single sample due to one sample being below detection limit of 0.10 mg/dm^2.day

There are no existing territorial or federal ambient air quality standards for dustfall, however Pollution Control Objectives developed by the BC Ministry of Environment and the BC Department of Lands, Forest and Water Resources in the 1970s for the Mining, Smelting and Related Industries state a lower level of 1.7 mg/dm^2.day (for sensitive environmental situations) and an upper level of 2.9 mg/dm^2.day (where it can be shown that unacceptably deleterious changes will not follow). The criteria were rescinded in 2006, however the ambient air quality objectives continue to be used in British Columbia for reference purposes.

Tables 4.6 and 4.7 present the results of the metal concentration analysis from dustfall samples collected in July and August, respectively. The values, taken as the average of both samples at a site, are presented in mg/dm^2.day and represent baseline conditions. A large portion of the metal concentrations presented in the laboratory reports were below detection limits, which is a function of the amount of sample collected and the resolution of the laboratory instrumentation, and are not listed in the tables. These metals constituents may exist in the dust sample but could not be appreciably measured.

Table 4.6: Concentration of Metals in Dust – July (Average of Two Samples)

Metal	Rate of Deposition (mg/dm^2.day)			
	MET	H6	H1	DD
Aluminum (Al)	0.00682	0.00177	0.00170	0.00429
Antimony (Sb)	0.000086	0.000097	0.000005	0.000159
Arsenic (As)	0.000014	0.000006	0.000004	0.000021
Barium (Ba)	0.000124	0.000044	0.000045	0.000143
Calcium (Ca)	0.00460	0.00476	0.00334	0.01005
Chromium (Cr)	0.000021*			
Cobalt (Co)	0.0000045	0.0000061*	0.0000037	
Copper (Cu)	0.000335	0.000286	0.000350	0.000161
Iron (Fe)	0.00732	0.00340	0.00287	0.00475
Lead (Pb)	0.0000092	0.0000042	0.0000054	0.0000071
Magnesium (Mg)	0.00343	0.00105	0.00108	0.00514
Manganese (Mn)	0.000320	0.000130	0.000246	0.001302
Nickle (Ni)	0.000022			
Phosphorus (P)	0.0080			0.0176
Potassium (K)	0.0148		0.0037	0.0354
Silicon (Si)	0.0101	0.0036*	0.0026	0.0067
Sodium (Na)	0.0030		0.0022*	0.0037*
Strontium (Sr)	0.0000243	0.0000146	0.0000143	0.0000337
Titanium (Ti)	0.00035*			
Uranium (U)	0.00000040			
Zinc (Zn)	0.000460	0.000335	0.000280	0.000600

Table 4.7: Concentration of Metals in Dust – August (Average of Two Samples)

Element	Rate of Deposition (mg/dm^2.day)			
	MET	H6	H1	DD
Aluminum (Al)	0.00223	0.00057	0.00059	0.00072
Antimony (Sb)	0.0000152		0.0000038*	0.0000063
Arsenic (As)	0.0000034*			0.0000012*
Barium (Ba)	0.0000402	0.0000119	0.0000124	0.0000351
Calcium (Ca)	0.00304	0.00139	0.00176	0.00196
Copper (Cu)	0.000207	0.000213	0.000350	0.000114
Iron (Fe)	0.00298			0.00075*
Lead (Pb)	0.0000028	0.0000026*	0.0000026	0.0000007*
Magnesium (Mg)	0.001245	0.000415	0.000455	0.001736
Manganese (Mn)	0.0001010	0.0000401	0.0000399	0.0001897
Phosphorus (P)	0.0021			0.0071
Potassium (K)	0.00400			0.01224
Silicon (Si)	0.0033			0.0010*
Sodium (Na)	0.0019*			
Strontium (Sr)	0.0000121	0.0000051*	0.0000063	0.0000072
Zinc (Zn)	0.000141	0.000250	0.000113	0.000177

* Based on single sample due to one of two samples being below detection limit
No data means both samples below detection limit. This element may exist in the sample but could not be measured

The most prevalent metals found in the ambient dust, in terms of percentage of sample for all metals above detection limits, are presented in Table 4.8.

Table 4.8: Prevalence of Metals Concentration in Dust at Coffee Gold Project – July and August

Element	Percentage of Dust Sample		
	Average	High Sample	Low Sample
Potassium (K)	29.4%	39.2%	20.4%
Calcium (Ca)	27.5%	53.2%	8.7%
Phosphorus (P)	16.8%	21.0%	11.2%
Silicon (Si)	15.2%	18.4%	7.9%
Iron (Fe)	13.5%	19.4%	5.6%
Aluminum (Al)	12.6%	20.7%	5.0%
Magnesium (Mg)	8.8%	14.9%	5.9%
Copper (Cu)	3.0%	9.8%	0.2%
Zinc (Zn)	1.6%	3.5%	0.7%
Manganese (Mn)	1.1%	1.8%	0.5%

Metals with concentrations less than 1% are not shown

ALS Environmental Laboratory results, including the measured weights and metals speciation for all dust samples, are contained in Appendix C.

4.3 Noise

The following section provides a summary of the noise monitoring data collected during the summer and winter monitoring campaigns.

Winter (March) Survey

While weather parameters were within the acceptable range for quality noise measurement during the majority of the March survey, overnight temperatures were below the minimum operational range of the Casella CEL 633 (0°C), which reduced battery life. As a result, noise typically did not log throughout the entire night. As described in Section 3.2, during the March survey, nighttime measurements were assumed to begin at 21:00 based on daylight, providing several hours of nighttime measurement despite the temperature/battery issue. The file end times and duration of the night time noise record are listed in Table 4.9.

Table 4.9: Overnight March Noise Survey Sampling End Times (March)

Sampling Location	Date (2015)	Overnight Record End Time (AM)	Duration of Night Time Record (hrs:min)
H4	March 26th	2:50	5:50
H1	March 27h	4:40	7:40
MET	March 28h	5:09	8:09
MET	March 29h	3:51	6:51

Summer Survey

During the time of the summer survey, thunderstorms were a regular occurrence, producing rainfall, heavy at times, which is amplified by the Casella's wind shield, affecting the noise survey. Periods when heavy rain was recorded by the Coffee Creek meteorological station have been removed from the record unless otherwise noted. Thunder produced by the storms also produced slightly elevated noise levels – as illustrated in Figure 3-11. No omissions were made due to thunder as it represents a natural occurrence of the baseline ambient environment.

Overall Noise Results

Table 4.10 presents the summary of the 2015 Coffee Gold Project noise survey by monitoring location. The average A-weighted noise level (LA_{eq}) has been provided for both daytime and nighttime at each monitoring location, based on the timing definitions described in Section 3.2. Noise levels recorded during hours when precipitation was observed by the Coffee Creek meteorological station have been omitted from the calculations. The exception is the overnight average for H4 as precipitation occurred throughout the measurement period and is only provided in Table 4.9 above as a reference. The full time series of quality reviewed sound pressure levels, including relevant observations and notes, are contained in Appendix D.

Table 4.10: Summary of Coffee Gold Baseline Noise Survey 2015 by Location

Sampling Location	Average LA_{eq} Noise Level (dBA)			
	March (Winter)		June (Summer)	
	Daytime	Nighttime	Daytime	Nighttime
MET	24.5	22.4	37.4	n/a
ROM	n/a	n/a	36.6*	26.6
H1	29.9	25.5	45.0*	n/a
H4	31.0	25.2	32.5*	56.8†

*exclusive of time periods with precipitation – may include periodic thunder
†inclusive of time periods with precipitation – use with discretion

Table 4-11 below provides a simple summary of the study area baseline noise monitoring results.

Table 4.11: Summary of Coffee Gold Baseline Noise Results

Parameter	Season	Min	Max	Average
Noise (LA_{eq})	Winter (Day)	19.9 dBA	69.0 dBA	38.2 dBA
	Winter (Night)	19.8 dBA	36.9 dBA	23.0 dBA
	Summer (Day)	19.2 dBA	78.2* dBA	47.4 dBA
	Summer (Night)	24.7 dBA	65.5* dBA	53.8*dBA

**Affected by rain and thunderstorm activity.*

Background levels recorded at the property are typical for a remote mountainous site. As described in OGC (2009), average daytime noise levels are typically 5 to 10 dBA higher than at night. Noise levels recorded during the summer were slightly elevated due to the prevalence of thunderstorms throughout the survey period, which is typical for the region. Site-specific variations are due to exposure differences (wind, sound-attenuating obstacles) and nearby exploration activity, such as the drilling program occurring in March in the vicinity of H4.

5.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
Tetra Tech EBA Inc.

Signature REDACTED

Signature REDACTED

Prepared by:
Travis Miguez, B.Sc., P.Met
Project Scientist – Meteorology & Air Dispersion Modelling
Direct Line: Phone Number REDACTED
Email REDACTED

Reviewed by:
Doug McLaren, P.Eng.
Senior Air Quality Engineer
Direct Line: Phone Number REDACTED
Email REDACTED

/TM

REFERENCES

ASTM 2010. '*Standard Test Method for Collection and Measurement of Dustfall (Settleable Particulate Matter)*'. American Society for Testing and Materials.

Casino 2014. '*Casino Copper and Gold Project Proposal for Executive Committee Review*'. Casino Mining Corporation. Section 8 – Air Quality & Section 9 - Noise. January 3, 2014.

CCME 2011. '*Ambient Air Monitoring Protocol for PM2.5 and Ozone - Canada-wide Standards for Particulate Matter and Ozone*'. Canadian Council of Ministers of the Environment. 2011.

EPA 2003. '*Environmental Noise Survey - Guidance Document'*.

ERM 2014. '*Harper Creek Project – Application for an Environmental Assessment Certificate – Environmental Impact Statement'.* Appendix 10-A– Noise Baseline Report*.* Prepared for Harper Creek Mining Corp. August 2014.

ISO 2007. '*Acoustics - Description, measurement and assessment of environmental noise - Part 2: Basic quantities and assessment procedures'*.

JDS 2016. Feasibility Study Report for the Coffee Gold Project, Yukon Territory Canada. JDS Energy & Mining Inc. Prepared for Kaminak Gold Corporation. February 2016.

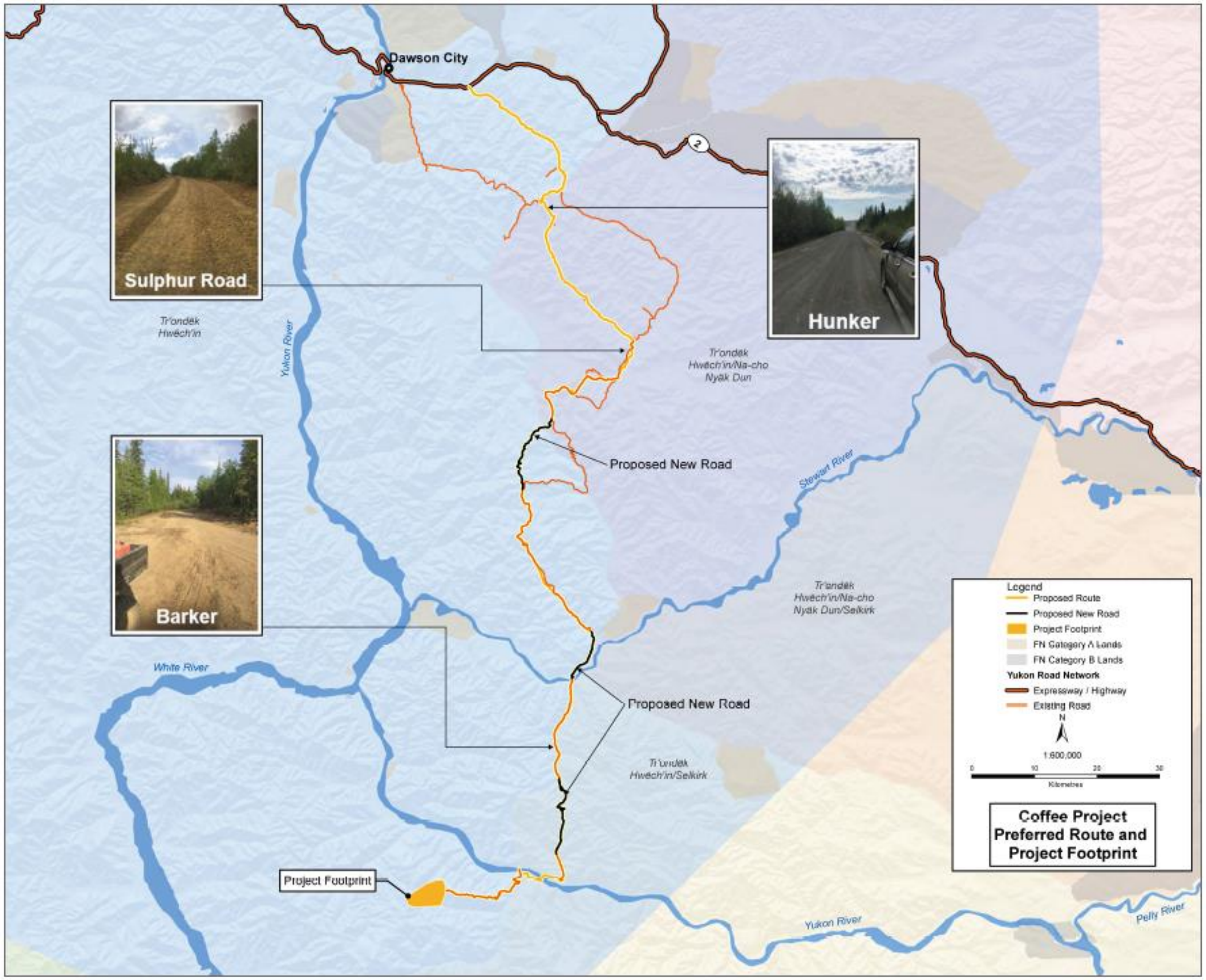
MOE 2015. British Columbia Ambient Air Quality Objectives.

OGC 2009. '*British Columbia Noise Control Best Practices Guideline'*. BC Oil and Gas Commission. March 2009.

Ed Dlugokencky and Pieter Tans, NOAA/ESRL (www.esrl.noaa.gov/gmd/ccgg/trends/)

United States Environmental Protection Agency Carbon Monoxide Monitoring data for Fairbanks North Star (2005-2008r: https://www3.epa.gov/airtrends/carbon.html

FIGURES



LEGEND

Source: Hemmera

NOTES

STATUS
ISSUED FOR USE

CLIENT

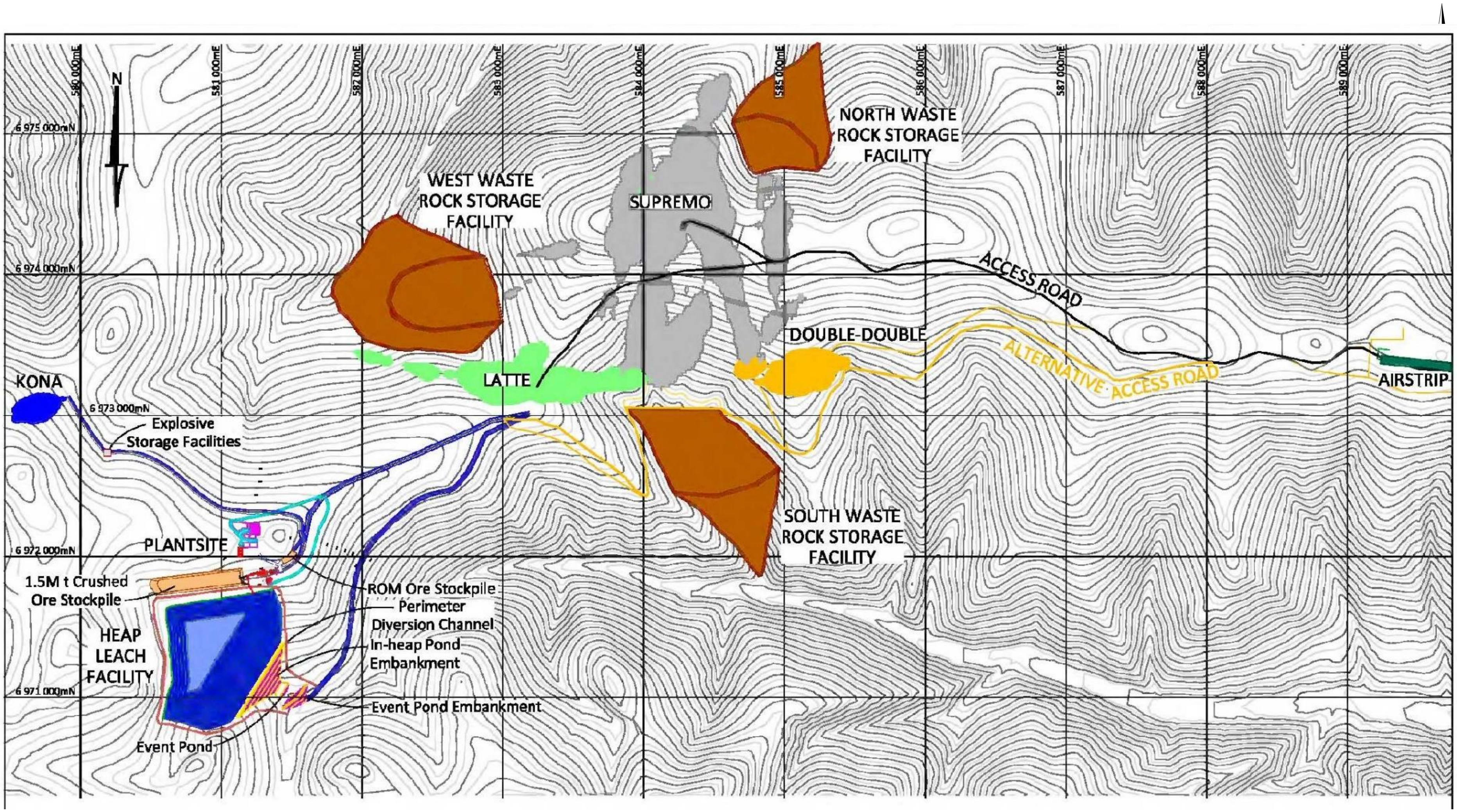
KAMINAK GOLD CORPORATION

TETRA TECH EBA

BASELINE AIR QUALITY AND NOISE AT THE COFFEE GOLD PROJECT 2015

Project Footprint and Preferred Access Route

PROJECT NO.	DWN	CKD	APVD	REV	
ENVMIN03048-01	TM	JAS	JAS		**Figure 1-1**
OFFICE	**DATE**				
EBA-VANC	February 21, 2017				



LEGEND

Source: Preliminary Economic Assessment Technical Report Coffee Project Yukon Territory, Canada
JDS Energy & Mining Inc. 2015

NOTES

STATUS
IISSUED FOR USE

CLIENT

KAMINAK GOLD CORPORATION

TETRA TECH EBA

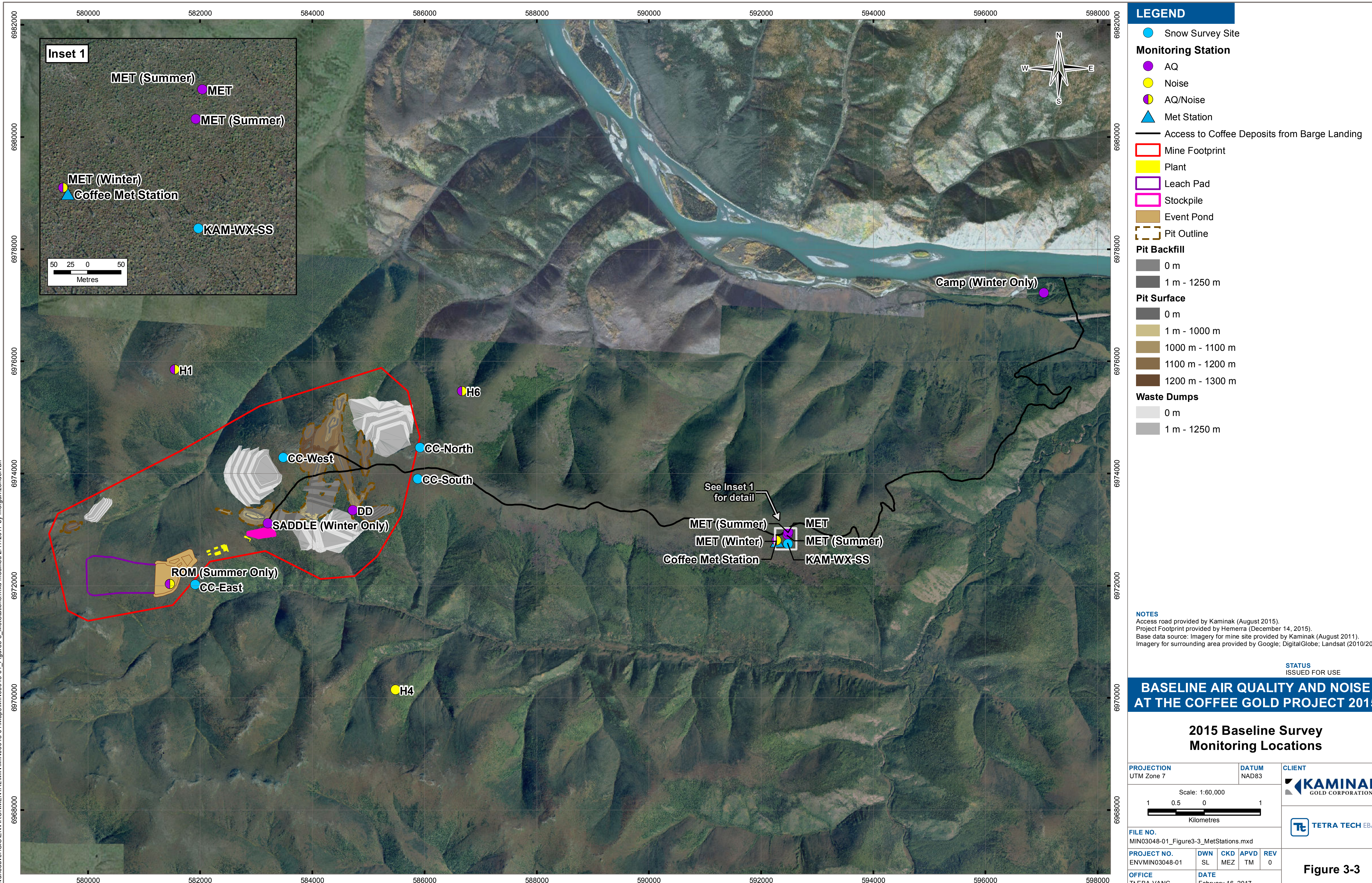
BASELINE AIR QUALITY AND NOISE AT THE COFFEE GOLD PROJECT 2015

Proposed Coffee Gold Project Site Infrastructure (from Preliminary Economic Assessment)

PROJECT NO.	DWN	CKD	APVD	REV
ENVMIN03048-01	TM	JAS	JAS	

OFFICE	DATE
EBA-VANC	February 21, 2015

Figure 1-2



Inset 1
MET (Summer)
MET
MET (Summer)
MET (Winter)
Coffee Met Station
KAM-WX-SS
50 25 0 50
Metres
Camp (Winter Only)
H1
H6
CC-North
CC-West
CC-South
DD
SADDLE (Winter Only)
ROM (Summer Only)
CC-East
H4
See Inset 1 for detail
MET (Summer)
MET (Winter)
Coffee Met Station
MET
MET (Summer)
KAM-WX-SS
LEGEND
Snow Survey Site
Monitoring Station
AQ
Noise
AQ/Noise
Met Station
Access to Coffee Deposits from Barge Landing
Mine Footprint
Plant
Leach Pad
Stockpile
Event Pond
Pit Outline
Pit Backfill
0 m
1 m - 1250 m
Pit Surface
0 m
1 m - 1000 m
1000 m - 1100 m
1100 m - 1200 m
1200 m - 1300 m
Waste Dumps
0 m
1 m - 1250 m
NOTES
Access road provided by Kaminak (August 2015).
Project Footprint provided by Hemerra (December 14, 2015).
Base data source: Imagery for mine site provided by Kaminak (August 2011).
Imagery for surrounding area provided by Google; DigitalGlobe; Landsat (2010/2013).
STATUS
ISSUED FOR USE
BASELINE AIR QUALITY AND NOISE AT THE COFFEE GOLD PROJECT 2015
2015 Baseline Survey Monitoring Locations
PROJECTION
UTM Zone 7
DATUM
NAD83
CLIENT
KAMINAK GOLD CORPORATION
Scale: 1:60,000
1 0.5 0 1
Kilometres
TETRA TECH EBA
FILE NO.
MIN03048-01_Figure3-3_MetStations.mxd
PROJECT NO.
ENVMIN03048-01
DWN
SL
CKD
MEZ
APVD
TM
REV
0
OFFICE
Tt EBA-VANC
DATE
February 16, 2017
Figure 3-3
Q:\Vancouver\GIS\ENVIRONMENTAL\MIN\MIN03048-01\Maps\MIN03048-01_Figure3-3_MetStations.mxd modified 2/17/2017 by morgan.zondervan

APPENDIX A
TETRA TECH'S GENERAL CONDITIONS

GENERAL CONDITIONS

GEO-ENVIRONMENTAL REPORT

This report incorporates and is subject to these “General Conditions”.

1.0 USE OF REPORT AND OWNERSHIP

This report pertains to a specific site, a specific development, and a specific scope of work. It is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site or proposed development would necessitate a supplementary investigation and assessment.

This report and the assessments and recommendations contained in it are intended for the sole use of Tetra Tech EBA’s client. Tetra Tech EBA does not accept any responsibility for the accuracy of any of the data, the analysis or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than Tetra Tech EBA’s Client unless otherwise authorized in writing by Tetra Tech EBA. Any unauthorized use of the report is at the sole risk of the user.

This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of Tetra Tech EBA. Additional copies of the report, if required, may be obtained upon request.

2.0 ALTERNATE REPORT FORMAT

Where Tetra Tech EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed Tetra Tech EBA’s instruments of professional service), only the signed and/or sealed versions shall be considered final and legally binding. The original signed and/or sealed version archived by Tetra Tech EBA shall be deemed to be the original for the Project.

Both electronic file and hard copy versions of Tetra Tech EBA’s instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except Tetra Tech EBA. The Client warrants that Tetra Tech EBA’s instruments of professional service will be used only and exactly as submitted by Tetra Tech EBA.

Electronic files submitted by Tetra Tech EBA have been prepared and submitted using specific software and hardware systems. Tetra Tech EBA makes no representation about the compatibility of these files with the Client’s current or future software and hardware systems.

3.0 NOTIFICATION OF AUTHORITIES

In certain instances, the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by Tetra Tech EBA in its reasonably exercised discretion.

4.0 INFORMATION PROVIDED TO TETRA TECH EBA BY OTHERS

During the performance of the work and the preparation of the report, Tetra Tech EBA may rely on information provided by persons other than the Client. While Tetra Tech EBA endeavours to verify the accuracy of such information when instructed to do so by the Client, Tetra Tech EBA accepts no responsibility for the accuracy or the reliability of such information which may affect the report.

APPENDIX B

QUALITY REVIEWED AIR QUALITY DATA

An electronic copy of this file has been provided with the digital version of the Project Proposal. The digital file is an Excel spreadsheet and contains: *4 tabs, 7 columns and 5,289 rows <QAQCed_AQ_Data>*

APPENDIX C

DUSTFALL LABORATORY ANALYSES (WEIGHT AND METALS)

Project 704-ENVMIN03048.2.002
Report To Travis Miguez, Tetra Tech EBA Inc. ~ VAN
ALS File No. L1600492
Date Received 17-Apr-15 15:00
Date 24-Apr-15

RESULTS OF ANALYSIS

Sample ID	CC-EAST-1	CC-EAST-2	CC-EAST-3	#1	#2	#3	CC-NORTH-1	CC-NORTH-2	CC-SOUTH-1	CC-SOUTH-2	CC-WEST-1	CC-WEST-2
Date Sampled	02-APR-15	02-APR-15	02-APR-15	02-APR-15	02-APR-15	02-APR-15	02-APR-15	02-APR-15	02-APR-15	02-APR-15	02-APR-15	02-APR-15
Time Sampled	15:30	15:40	16:00	09:00	09:30	21:30	11:40	12:00	12:30	13:00	13:10	13:30
ALS Sample ID	L1600492-1	L1600492-2	L1600492-3	L1600492-4	L1600492-5	L1600492-6	L1600492-7	L1600492-8	L1600492-9	L1600492-10	L1600492-11	L1600492-12
Matrix	Dustfall	Dustfall	Dustfall	Dustfall	Dustfall	Dustfall	Dustfall	Dustfall	Dustfall	Dustfall	Dustfall	Dustfall

Particulates

Fixed Dustfall	<0.10	<0.10	<0.10	<0.10	0.15	<0.10	0.12	<0.10	<0.10	<0.10	<0.10	<0.10
Volatile Dustfall	0.16	0.11	0.43	<0.10	<0.10	<0.10	0.29	<0.10	<0.10	<0.10	<0.10	<0.10
Total Dustfall	0.21	0.15	0.48	0.13	0.18	<0.10	0.41	0.12	<0.10	0.12	0.12	<0.10

Results Summary L1650553

Job Reference ENVMIN03048-01 2.001
Report To Kristina Gardner, Tetra Tech EBA Inc.
Date Received 30-Jul-2015 12:30
Report Date 10-Aug-2015 10:51
Report Revision 1

Client Sample ID			DD1	DD2	HG1	HG2	HI1	HI2	MET1	MET2
Date Sampled			22-Jul-2015	22-Jul-2015	23-Jul-2015	23-Jul-2015	23-Jul-2015	23-Jul-2015	22-Jul-2015	22-Jul-2015
Time Sampled			0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
ALS Sample ID			L1650553-1	L1650553-2	L1650553-3	L1650553-4	L1650553-5	L1650553-6	L1650553-7	L1650553-8
Parameter	Lowest Detection Limit	Units	Dustfall	Dustfall	Dustfall	Dustfall	Dustfall	Dustfall	Dustfall	Dustfall
Particulates (Dustfall)										
Fixed Dustfall	0.10	mg/dm2.day	0.21	0.14	<0.11	<0.11	<0.11	<0.11	0.25	0.46
Volatile Dustfall	0.10	mg/dm2.day	0.95	1.56	0.17	<0.11	<0.11	<0.11	0.12	0.60
Total Dustfall	0.10	mg/dm2.day	1.16	1.70	0.23	0.18	0.21	<0.11	0.37	1.05
Metals (Dustfall)										
Aluminum (Al)-Total	0.000083	mg/dm2.day	0.00353	0.00504	0.00121	0.00233	0.00181	0.00159	0.00595	0.00768
Antimony (Sb)-Total	0.0000028	mg/dm2.day	0.0000808	0.000238	0.0000948	0.0000999	0.0000043	0.0000048	0.0000568	0.000115
Arsenic (As)-Total	0.0000028	mg/dm2.day	0.0000172	0.000025	0.0000061	0.0000063	0.0000046	0.0000036	0.0000124	0.0000148
Barium (Ba)-Total	0.0000014	mg/dm2.day	0.000125	0.000161	0.0000393	0.0000487	0.0000463	0.0000443	0.000115	0.000133
Beryllium (Be)-Total	0.000014	mg/dm2.day	<0.000029	<0.000051	<0.000025	<0.000025	<0.000017	<0.000015	<0.000014	<0.000014
Bismuth (Bi)-Total	0.000014	mg/dm2.day	<0.000029	<0.000051	<0.000025	<0.000025	<0.000017	<0.000015	<0.000014	<0.000014
Boron (B)-Total	0.00028	mg/dm2.day	<0.00058	<0.0010	<0.00051	<0.00049	<0.00034	<0.00030	<0.00028	<0.00029
Cadmium (Cd)-Total	0.0000014	mg/dm2.day	<0.0000029	<0.0000051	<0.0000025	<0.0000025	<0.0000017	<0.0000015	<0.0000014	<0.0000014
Calcium (Ca)-Total	0.00055	mg/dm2.day	0.0103	0.0098	0.0058	0.00371	0.00323	0.00345	0.00426	0.00493
Chromium (Cr)-Total	0.000014	mg/dm2.day	<0.000029	<0.000051	<0.000025	<0.000025	<0.000017	<0.000015	<0.000014	0.000021
Cobalt (Co)-Total	0.0000028	mg/dm2.day	<0.0000058	<0.000010	0.0000061	<0.0000049	0.0000035	0.0000039	0.0000042	0.0000048
Copper (Cu)-Total	0.000014	mg/dm2.day	0.000160	0.000162	0.000145	0.000427	0.000315	0.000384	0.000276	0.000394
Interval	1	days	0	0	0	0	0	0	0	0
Interval	1	days	0	0	0	0	0	0	0	0
Iron (Fe)-Total	0.00083	mg/dm2.day	0.0039	0.0056	<0.0015	0.0034	0.0031	0.00264	0.00620	0.00844
Lead (Pb)-Total	0.0000014	mg/dm2.day	0.0000049	0.0000093	0.0000032	0.0000051	0.0000058	0.0000050	0.0000102	0.0000081
Lithium (Li)-Total	0.00014	mg/dm2.day	<0.00029	<0.00051	<0.00025	<0.00025	<0.00017	<0.00015	<0.00014	<0.00014
Magnesium (Mg)-Total	0.00014	mg/dm2.day	0.00395	0.00632	0.00091	0.00119	0.00102	0.00113	0.00256	0.00430
Manganese (Mn)-Total	0.0000014	mg/dm2.day	0.000544	0.00206	0.000121	0.000139	0.000360	0.000131	0.000200	0.000439
Mercury (Hg)-Total	0.0000014	mg/dm2.day	<0.0000029	<0.0000051	<0.0000025	<0.0000025	<0.0000017	<0.0000015	<0.0000014	<0.0000014
Molybdenum (Mo)-Total	0.0000014	mg/dm2.day	<0.0000029	<0.0000051	<0.0000025	<0.0000025	<0.0000017	<0.0000015	<0.0000014	<0.0000014
Nickel (Ni)-Total	0.000014	mg/dm2.day	<0.000029	<0.000051	<0.000025	<0.000025	<0.000017	<0.000015	0.000021	0.000022
Phosphorus (P)-Total	0.0014	mg/dm2.day	0.0078	0.0274	<0.0025	<0.0025	<0.0017	<0.0015	0.0020	0.0140
Potassium (K)-Total	0.0014	mg/dm2.day	0.0225	0.0482	<0.0025	<0.0025	<0.0017	0.0037	0.0045	0.0250

Results Summary L1650553

Job Reference ENVMIN03048-01 2.001
Report To Kristina Gardner, Tetra Tech EBA Inc.
Date Received 30-Jul-2015 12:30
Report Date 10-Aug-2015 10:51
Report Revision 1

Client Sample ID			DD1	DD2	HG1	HG2	HI1	HI2	MET1	MET2
Date Sampled			22-Jul-2015	22-Jul-2015	23-Jul-2015	23-Jul-2015	23-Jul-2015	23-Jul-2015	22-Jul-2015	22-Jul-2015
Time Sampled			0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
ALS Sample ID			L1650553-1	L1650553-2	L1650553-3	L1650553-4	L1650553-5	L1650553-6	L1650553-7	L1650553-8
Parameter	Lowest Detection Limit	Units	Dustfall	Dustfall	Dustfall	Dustfall	Dustfall	Dustfall	Dustfall	Dustfall
Selenium (Se)-Total	0.000028	mg/dm2.day	<0.000058	<0.00010	<0.000051	<0.000049	<0.000034	<0.000030	<0.000028	<0.000029
Silicon (Si)-Total	0.0014	mg/dm2.day	0.0056	0.0077	<0.0025	0.0036	0.0026	0.0026	0.0084	0.0117
Silver (Ag)-Total	0.00000028	mg/dm2.day	<0.00000058	<0.0000010	<0.00000051	<0.00000049	<0.00000034	<0.00000030	<0.00000028	<0.00000029
Sodium (Na)-Total	0.0014	mg/dm2.day	0.0037	<0.0051	<0.0025	<0.0025	<0.0017	0.0022	0.0022	0.0038
Strontium (Sr)-Total	0.0000028	mg/dm2.day	0.0000314	0.000036	0.0000130	0.0000161	0.0000138	0.0000148	0.0000214	0.0000272
Thallium (Tl)-Total	0.0000028	mg/dm2.day	<0.0000058	<0.000010	<0.0000051	<0.0000049	<0.0000034	<0.0000030	<0.0000028	<0.0000029
Tin (Sn)-Total	0.0000028	mg/dm2.day	<0.0000058	<0.000010	<0.0000051	<0.0000049	<0.0000034	<0.0000030	<0.0000028	<0.0000029
Titanium (Ti)-Total	0.00028	mg/dm2.day	<0.00058	<0.0010	<0.00051	<0.00049	<0.00034	<0.00030	<0.00028	0.00035
Uranium (U)-Total	0.00000028	mg/dm2.day	<0.00000058	<0.0000010	<0.00000051	<0.00000049	<0.00000034	<0.00000030	0.00000035	0.00000044
Vanadium (V)-Total	0.000028	mg/dm2.day	<0.000058	<0.00010	<0.000051	<0.000049	<0.000034	<0.000030	<0.000028	<0.000029
Zinc (Zn)-Total	0.000083	mg/dm2.day	0.00050	0.00070	0.00025	0.00042	0.00028	0.000280	0.000385	0.000534

Results Summary L1663771

Job Reference
Report To Kristina Gardner, Tetra Tech EBA Inc.
Date Received 26-Aug-2015 15:45
Report Date 4-Sep-2015 15:02
Report Revision 1

Client Sample ID			DD#1	DD#2	MET STATION#1	MET STATION #2	H6 #1	H6 #2	H1 #1	H1 #2
Date Sampled			24-Aug-2015	24-Aug-2015	24-Aug-2015	24-Aug-2015	25-Aug-2015	25-Aug-2015	25-Aug-2015	25-Aug-2015
Time Sampled			0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
ALS Sample ID			L1663771-1	L1663771-2	L1663771-3	L1663771-4	L1663771-5	L1663771-6	L1663771-7	L1663771-8
Parameter	Lowest Detection Limit	Units	Dustfall	Dustfall	Dustfall	Dustfall	Dustfall	Dustfall	Dustfall	Dustfall
Particulates (Dustfall)										
Fixed Dustfall	0.10	mg/dm2.day	<0.10	0.11	<0.10	0.13	<0.10	<0.10	<0.10	<0.10
Volatile Dustfall	0.10	mg/dm2.day	<0.10	0.48	<0.10	0.19	<0.10	<0.10	<0.10	<0.10
Total Dustfall	0.10	mg/dm2.day	<0.10	0.60	<0.10	0.32	<0.10	<0.10	0.12	<0.10
Metals (Dustfall)										
Aluminum (Al)-Total	0.000031	mg/dm2.day	0.000603	0.00084	0.00177	0.00269	0.00051	0.00062	0.000654	0.000516
Antimony (Sb)-Total	0.0000010	mg/dm2.day	0.0000033	0.0000092	0.0000189	0.0000114	<0.0000046	<0.0000046	0.0000038	<0.0000031
Arsenic (As)-Total	0.0000010	mg/dm2.day	0.0000012	<0.0000043	<0.0000030	0.0000034	<0.0000046	<0.0000046	<0.0000033	<0.0000031
Barium (Ba)-Total	0.00000052	mg/dm2.day	0.0000128	0.0000573	0.0000363	0.0000440	0.0000093	0.0000145	0.0000133	0.0000115
Beryllium (Be)-Total	0.0000052	mg/dm2.day	<0.0000052	<0.000022	<0.000015	<0.000014	<0.000023	<0.000023	<0.000016	<0.000016
Bismuth (Bi)-Total	0.0000052	mg/dm2.day	<0.0000052	<0.000022	<0.000015	<0.000014	<0.000023	<0.000023	<0.000016	<0.000016
Boron (B)-Total	0.00010	mg/dm2.day	<0.00010	<0.00043	<0.00030	<0.00028	<0.00046	<0.00046	<0.00033	<0.00031
Cadmium (Cd)-Total	0.00000052	mg/dm2.day	<0.00000052	<0.0000022	<0.0000015	<0.0000014	<0.0000023	<0.0000023	<0.0000016	<0.0000016
Calcium (Ca)-Total	0.00021	mg/dm2.day	0.00077	0.00315	0.00267	0.00341	0.00137	0.00140	0.00203	0.00148
Chromium (Cr)-Total	0.0000052	mg/dm2.day	<0.0000052	<0.000022	<0.000015	<0.000014	<0.000023	<0.000023	<0.000016	<0.000016
Cobalt (Co)-Total	0.0000010	mg/dm2.day	<0.0000010	<0.0000043	<0.0000030	<0.0000028	<0.0000046	<0.0000046	<0.0000033	<0.0000031
Copper (Cu)-Total	0.0000052	mg/dm2.day	0.0000080	0.000220	0.000042	0.000371	0.000078	0.000348	0.000544	0.000156
Interval	1	days	0	0	0	0	0	0	0	0
Interval	1	days	0	0	0	0	0	0	0	0
Iron (Fe)-Total	0.00031	mg/dm2.day	0.00075	<0.0013	0.00227	0.00369	<0.0014	<0.0014	<0.00099	<0.00094
Lead (Pb)-Total	0.00000052	mg/dm2.day	0.00000065	<0.0000022	0.0000020	0.0000036	<0.0000023	0.0000026	0.0000032	0.0000019
Lithium (Li)-Total	0.000052	mg/dm2.day	<0.000052	<0.00022	<0.00015	<0.00014	<0.00023	<0.00023	<0.00016	<0.00016
Magnesium (Mg)-Total	0.000052	mg/dm2.day	0.000352	0.00312	0.00118	0.00131	0.00032	0.00051	0.00054	0.00037
Manganese (Mn)-Total	0.00000052	mg/dm2.day	0.0000513	0.000328	0.000101	0.000101	0.0000378	0.0000423	0.0000449	0.0000348
Mercury (Hg)-Total	0.00000052	mg/dm2.day	<0.00000052	<0.0000022	<0.0000015	<0.0000014	<0.0000023	<0.0000023	<0.0000016	<0.0000016
Molybdenum (Mo)-Total	0.00000052	mg/dm2.day	<0.00000052	<0.0000022	<0.0000015	<0.0000014	<0.0000023	<0.0000023	<0.0000016	<0.0000016
Nickel (Ni)-Total	0.0000052	mg/dm2.day	<0.0000052	<0.000022	<0.000015	<0.000014	<0.000023	<0.000023	<0.000016	<0.000016
Phosphorus (P)-Total	0.00052	mg/dm2.day	0.00064	0.0135	0.0021	<0.0014	<0.0023	<0.0023	<0.0016	<0.0016

Results Summary   L1663771

Job Reference
Report To Kristina Gardner, Tetra Tech EBA Inc.
Date Received 26-Aug-2015 15:45
Report Date 4-Sep-2015 15:02
Report Revision 1

Client Sample ID			DD#1	DD#2	MET STATION#1	MET STATION #2	H6 #1	H6 #2	H1 #1	H1 #2
Date Sampled			24-Aug-2015	24-Aug-2015	24-Aug-2015	24-Aug-2015	25-Aug-2015	25-Aug-2015	25-Aug-2015	25-Aug-2015
Time Sampled			0:00	0:00	0:00	0:00	0:00	0:00	0:00	0:00
ALS Sample ID			L1663771-1	L1663771-2	L1663771-3	L1663771-4	L1663771-5	L1663771-6	L1663771-7	L1663771-8
Parameter	Lowest Detection Limit	Units	Dustfall	Dustfall	Dustfall	Dustfall	Dustfall	Dustfall	Dustfall	Dustfall
Potassium (K)-Total	0.00052	mg/dm2.day	0.00117	0.0233	0.0055	0.0025	<0.0023	<0.0023	<0.0016	<0.0016
Selenium (Se)-Total	0.000010	mg/dm2.day	<0.000010	<0.000043	<0.000030	<0.000028	<0.000046	<0.000046	<0.000033	<0.000031
Silicon (Si)-Total	0.00052	mg/dm2.day	0.00099	<0.0022	0.0026	0.0040	<0.0023	<0.0023	<0.0016	<0.0016
Silver (Ag)-Total	0.00000010	mg/dm2.day	<0.00000010	<0.00000043	<0.00000030	<0.00000028	<0.00000046	<0.00000046	<0.00000033	<0.00000031
Sodium (Na)-Total	0.00052	mg/dm2.day	<0.00052	<0.0022	0.0019	<0.0014	<0.0023	<0.0023	<0.0016	<0.0016
Strontium (Sr)-Total	0.0000010	mg/dm2.day	0.0000034	0.0000109	0.0000105	0.0000137	<0.0000046	0.0000051	0.0000087	0.0000038
Thallium (Tl)-Total	0.0000010	mg/dm2.day	<0.0000010	<0.0000043	<0.0000030	<0.0000028	<0.0000046	<0.0000046	<0.0000033	<0.0000031
Tin (Sn)-Total	0.0000010	mg/dm2.day	<0.0000010	<0.0000043	<0.0000030	<0.0000028	<0.0000046	<0.0000046	<0.0000033	<0.0000031
Titanium (Ti)-Total	0.00010	mg/dm2.day	<0.00010	<0.00043	<0.00030	<0.00028	<0.00046	<0.00046	<0.00033	<0.00031
Uranium (U)-Total	0.00000010	mg/dm2.day	<0.00000010	<0.00000043	<0.00000030	<0.00000028	<0.00000046	<0.00000046	<0.00000033	<0.00000031
Vanadium (V)-Total	0.000010	mg/dm2.day	<0.000010	<0.000043	<0.000030	<0.000028	<0.000046	<0.000046	<0.000033	<0.000031
Zinc (Zn)-Total	0.000031	mg/dm2.day	0.000063	0.00029	0.000152	0.000130	<0.00014	0.00025	0.000124	0.000102

APPENDIX D

QUALITY REVIEWED SOUND PRESSURE (NOISE) LEVEL DATA

An electronic copy of this file has been provided with the digital version of the Project Proposal. The digital file is an Excel spreadsheet and contains: *2 tabs, 4 columns and 2,738 rows <QAQCed Noise Data>*