Mount Nansen Mine Site, Yukon

Mill Area Geochemical Characterization
Summary of 2010 Field Investigations

Prepared for:
Lorax Environmental Services Ltd.

Altura Environmental Consulting

December 2010

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1.0 Introduction

1.1 Purpose of Document

This document presents a brief summary of field work completed by Altura Environmental Consulting (Altura) during 2010 with respect to the preliminary evaluation of the geochemical characteristics at the Mount Nansen Mine mill site area.

Results of this field work were later integrated with other related information on the mill site area and presented in the Lorax Environmental Services Ltd. reports entitled "Mt. Nansen Mine Geochemical Assessment in Support of Closure Options" and Mount Nansen Options for Closure (Lorax, 2010a and 2010b). The reader is referred to these reports for a more comprehensive review of other related site studies as well further detailed discussion and interpretation of the results of this investigation.

1.2 Scope

Site assessments to the end of 2009 (AECOM, 2010) indicated the mill area to be a potentially significant source of dissolved metals to the Dome Creek basin. As well, additional mill site geochemical information was required in order to support a conceptual mitigation plan and to complete a preliminary cost estimate for decommissioning of this area.

In May 2010, Altura was requested by Justin Stockwell, Environmental Hydrogeochemist with Lorax Environmental Services Ltd. to conduct a field investigation to provide this preliminary geochemical information. Work was carried out according to Altura's May 21 memorandum entitled "Mount Nansen: - Overview of 2010 Proposed Mill Site Characterization". To this end, the main objectives of Altura's work were to:

1. identify location, geochemical nature and extent of potential contaminant sources in the mill site area that are likely contributing to dissolved metal concentrations in the Dome Creek basin; and

2. improve understanding of water flow paths entering and exiting the mill area.

1.3 Background

The Mount Nansen Mine (Mt. Nansen) is a former gold and silver mine located in central Yukon, approximately 60 km west of Carmacks (Figure 1-1). The site was abandoned by the owner in 1999 with inadequate funding to implement an environmentally-responsible mine closure plan or the requisite post-closure monitoring program. Mt. Nansen is now classified as an Abandoned Type II site and is under the care of the Government of Yukon (Lorax, 2010a). Currently Assessment and Abandoned Mines Branch of the Department of Energy Mines and Resources is implementing a process to evaluate and develop a closure plan for the Mt. Nansen site.

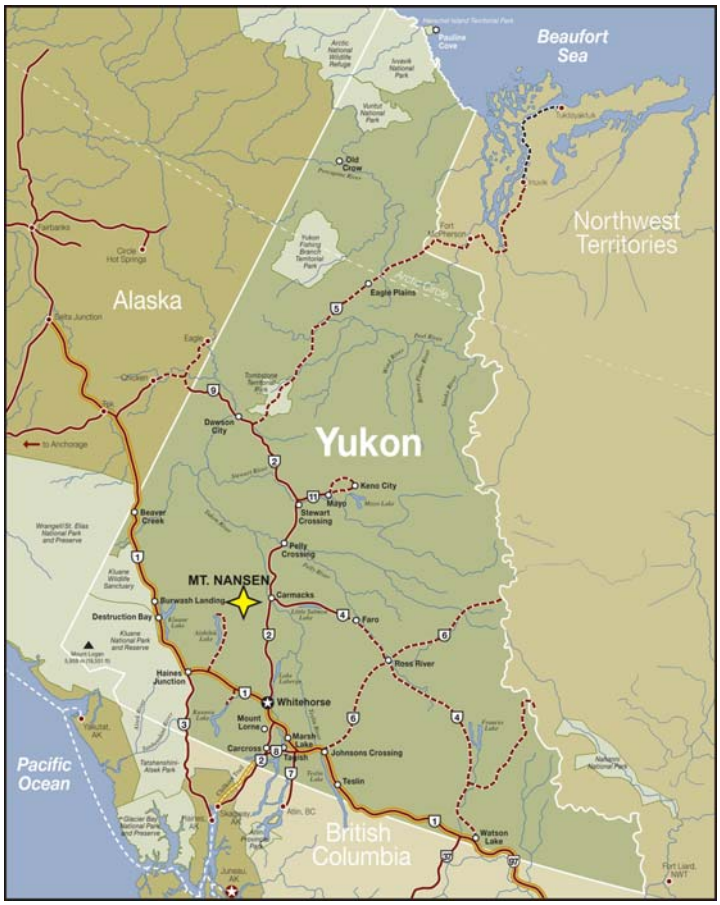

Figure 1-1 Location of Mount Nansen Mine

The Mount Nansen property is located within the Dawson Range, with the terrain consisting of rounded ridges and shallow valleys with a light cover of vegetation and small trees. Elevations range from 945 metres to 1525 metres above sea level. The major mine facilities are contained within an approximately 10 km^2 area as shown in Figure 1-2. The mill site is located in the southwest zone of the mine site near the base of upper Dome Creek on a northeast-facing hillside, just below treeline.

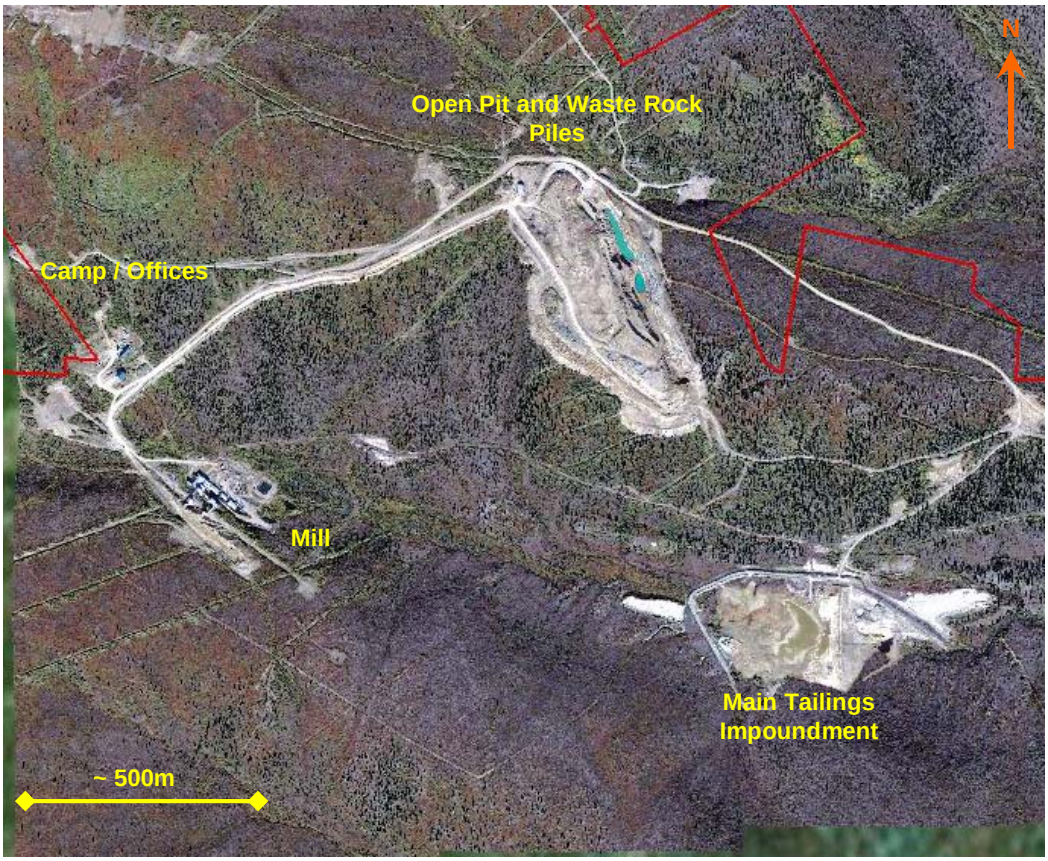

Figure 1-2. General Layout Mt. Nansen Mine Site

1.4 Relevant Previous Studies

Lorax (2010a) notes that although a thorough and extensive investigation into geochemical contamination issues in the mill area has not been conducted to date, there have been several studies that provide relevant data and direction for this investigation:

- Altura (2009b) – excavated and sampled seven pits (HR1 to HR7; Figure 3-1) along the upper access road to the mill. This work formed part of a program to geochemically characterize the 1.5km haul road from the open pit to the mill;
- Water quality monitoring of Dome Creek has been routinely carried out at surface water stations DX, upstream of the mill area, and D1, just below the mill complex (Figure 3-2) since August 2007; and
- Four shallow groundwater monitoring wells were installed in the lower platform areas of the mill complex (Figure 3-2) in 2009 as part of a site-wide groundwater investigation by AECOM, with groundwater sampling conducted in 2009 and 2010.

Other studies providing important information on the mill area include a site-wide "Historical Review, Site Assessment, and Field Sampling Program" (Conor Pacific, 2000), a "Limited Phase 2 Environmental Site Assessment" (Kearah & WERI, 2008).

2.0 Overview of Work Program

2.1 Study Area

The study area (Figure 2-1 on following page) encompasses approximately 20 ha and comprises the main mill site and the area below the mill that was potentially used to deposit tailings in during earlier phases of mining in the late 1960's and mid 1970's.

The main mill complex at Mt. Nansen consists of several buildings constructed on a series of platforms shown in the photograph in Figure 2-2.

Figure 2-2. View of mill site from the air, looking southwest. Photo taken August 2008.

During early mining in the 1960's and 1970's, ore was transported by rail from the nearby Huestis underground workings to a transfer point located on the lower mill platform. Older airphotos reviewed during the desktop portion of this study indicate a rail system emerging from an adit just to the northeast of the mill, and that a conveyor that was used to move the ore up to the crusher feed area at top of the mill complex (see Lorax, 2010a).

Based on information presented on a comprehensive site assessment carried out following mine closure, just over 22,000 tonnes of ore was reported milled during its two operating period from 1968 to 1969, and from 1975 to 1976 (Conor Pacific, 2000).

During processing of open pit ore from the Brown McDade pit in the 1990's, ore was hauled directly to the upper mill platform. The original lower ore transfer area, no longer required, was levelled and appears to have been subsequently used for a general lay down area for materials and some reagents.

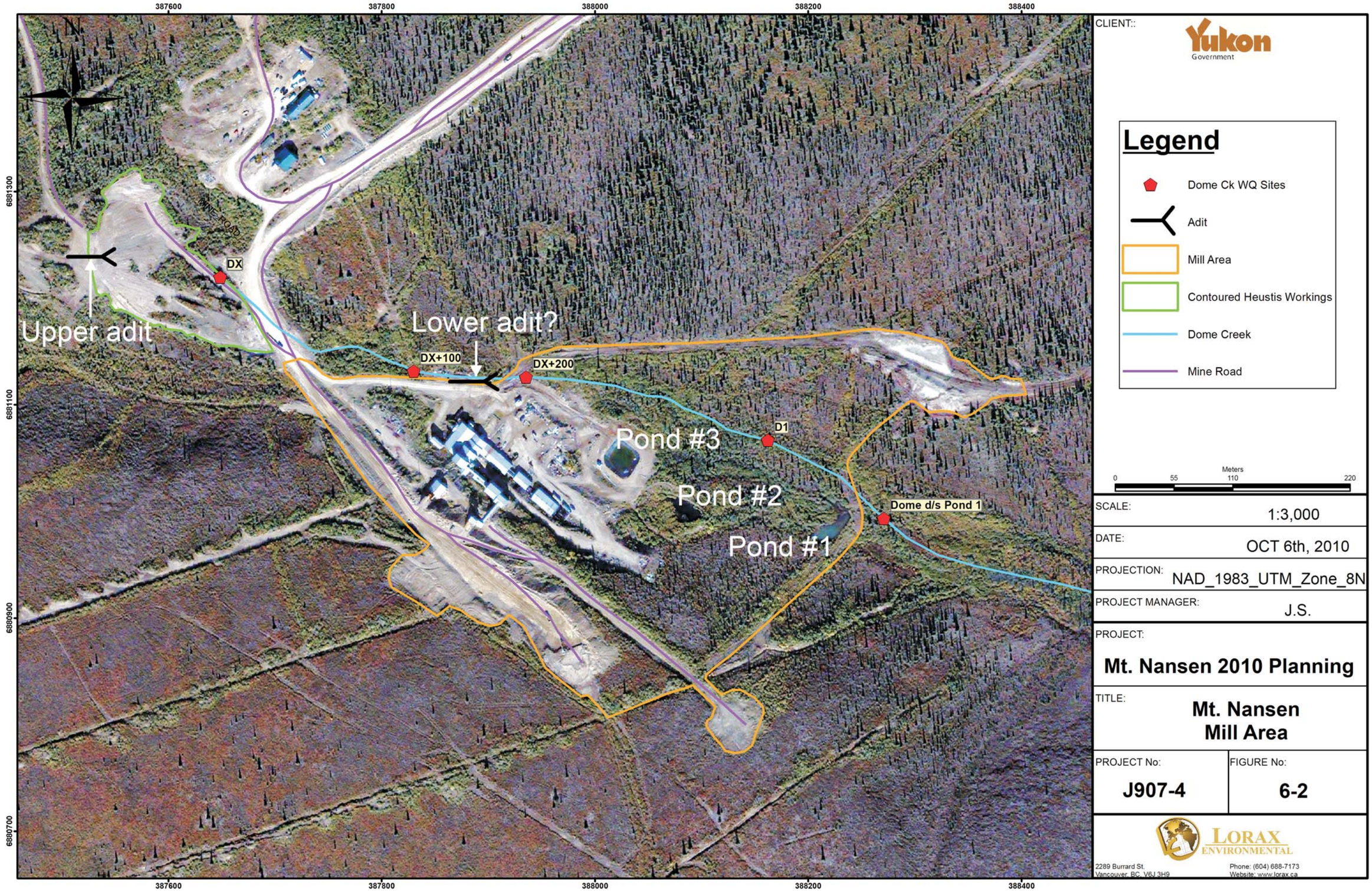

Figure 2-1: Mill Study Area and Major Features
(from Lorax, 2010)

Three ponds are also visible in the photograph in Figure 2-2, and in Figure 2-1. Based on late 1980's airphoto images, all three ponds appear to have been used in some way during the early mining phase, likely for capturing and settling of tailings.

The left-most and centre ponds in the photograph (Ponds #1 and #2 respectively) are earthen berm structures, are well overgrown with vegetation. Remnants of an equipment house, possibly used to house a pump for recovering process water, is still visible at Pond #1. The right-most Pond #3 is today geomembrane lined, and it is understood that it was utilized during the 1990's mining phase and in the years following mine closure. Dome Creek flows from right to left in the photo in Figure 2-2, at the toe of the embankment of the access road to the lower mill platform, and exits the photo at the lower edge of Pond #1.

2.2 Study Components

The 2010 geochemical investigation of the mill is preliminary in nature. Major components of the field investigation were as follows:

1. General field reconnaissance in an effort to:
    a. locate and survey historic features; and
    b. understand the local surface and near-surface flow regime.
2. A detailed survey of conductivity/pH inflections within the main Dome Creek watercourse to better isolate potential contaminant source(s);
3. Water quality sampling of Dome Creek, selected seeps and ponds;
4. Excavations to determine rock fill characteristics, with sampling for static characterization as merited; and
5. Coring of sediment in historic ponds to determine general characteristics, with sampling for static characterization as merited.

2.3 Field Campaigns

Altura's field work was conducted from July 3 to 5, 2010. Skya Fawcett, Senior Environmental Geochemist of Lorax Environmental Services Ltd. collaborated in the mill area field work on July 4, and provided valuable feedback and investigative direction.

A total of 14 solid phase samples were taken during 2010 as part of the mill area characterization. Samples were typically only taken from those excavations containing zones of moderate to highly altered material, or where sulphides were visible in the rock samples examined. Twelve rock fill samples were taken from a total of 8 trenches around the immediate mill site, and one sediment core sample from Pond #1 and two sediment core samples from Pond #2 was also taken; Pond #3 (geomembrane-lined and closest to the mill) did not appear to have appreciable sediment accumulation.

Samples and sites were described and photographed. Analytical work consisted of acid base accounting, multi-element analysis, and in the case of the pond sediments, moisture content.

Water quality samples were taken from a total of 11 sites (three sites along Dome Creek, three ponds, and five seeps); in addition, numerous field pH and electrical conductivity measurements were taken of other seeps and at other points along the Dome Creek watercourse.

2.4 Methodology

Field and analytical methodology utilized during the 2010 field work program is given in Appendix C.

3.0 Results

3.1 Solids Characterization

3.1.1 Rock Fill

As previously mentioned, nine test excavation were completed during the 2010 campaign in various platform levels of the study area. This augments the seven test pits completed in 2009 in the upper platform (HR-1 through HR-7) and described in Altura (2009a and 2009b).

Figure 3-1 shows the locations of both the 2009 and 2010 excavations. Site investigation details of each excavation are given in Appendix B. Eleven rock fill samples were taken and analytical results are given in Appendix D. It is important to keep in mind that most analytical samples were taken from those excavations containing zones of moderate to highly altered material, or where sulphides were visible in the rock samples examined. Thus, the results presented in this report likely reflect the more reactive end of the spectrum of fill in the mill site area.

Seepage horizons or standing water were encountered in excavations MS-10-01, 02, 02A, and 04. These sites are all located in the lower sectors of the mill site. All other excavations, including the seven sites from 2009, were dry. Field measurements of intercepted water indicated circum-neutral to alkaline pH with electrical conductivity in the 1500 to 2000µS/cm range.

A significant quantity of ore material was encountered in the lower platform area of the mill site (trenches MS-10-01, 04 and 05); ore material was also encountered as a veneer up to 0.4m thick on running surfaces and platforms in various other sectors of the mill area. Other material types encountered included: i) the local amphibolitic metamorphic suite (country rock), and ii) mixed rock and refuse material.

Some amount of country rock was encountered at the base of many excavations. This rock is often very blocky, but in some excavations was weathered to a sandy-textured soil. The 2009 excavations HR-1 through HR-7 on the uppermost platform consistently encountered country rock material, as did some of the 2010 excavations including MS 10 08 just northwest of the clarifier, MS-10-07 on the crusher platform, MS-10-02/02A in the area of Pond #2, and the deeper sections of MS-10-05 on the main mill platform. The country rock was often overlain by a veneer of clayey ore, material that possibly spread to create a smooth running surface for local traffic.

Refuse was encountered in some excavations, notably in two areas:

- Below and northeast of the main mill building: fragments of wood and metal were encountered in an area that was likely an ore transfer site from the historic underground mining that took place in the 1960's and 1970's (see Site Investigation Records MS-10-01, MS-10-03, MS-10-05); and

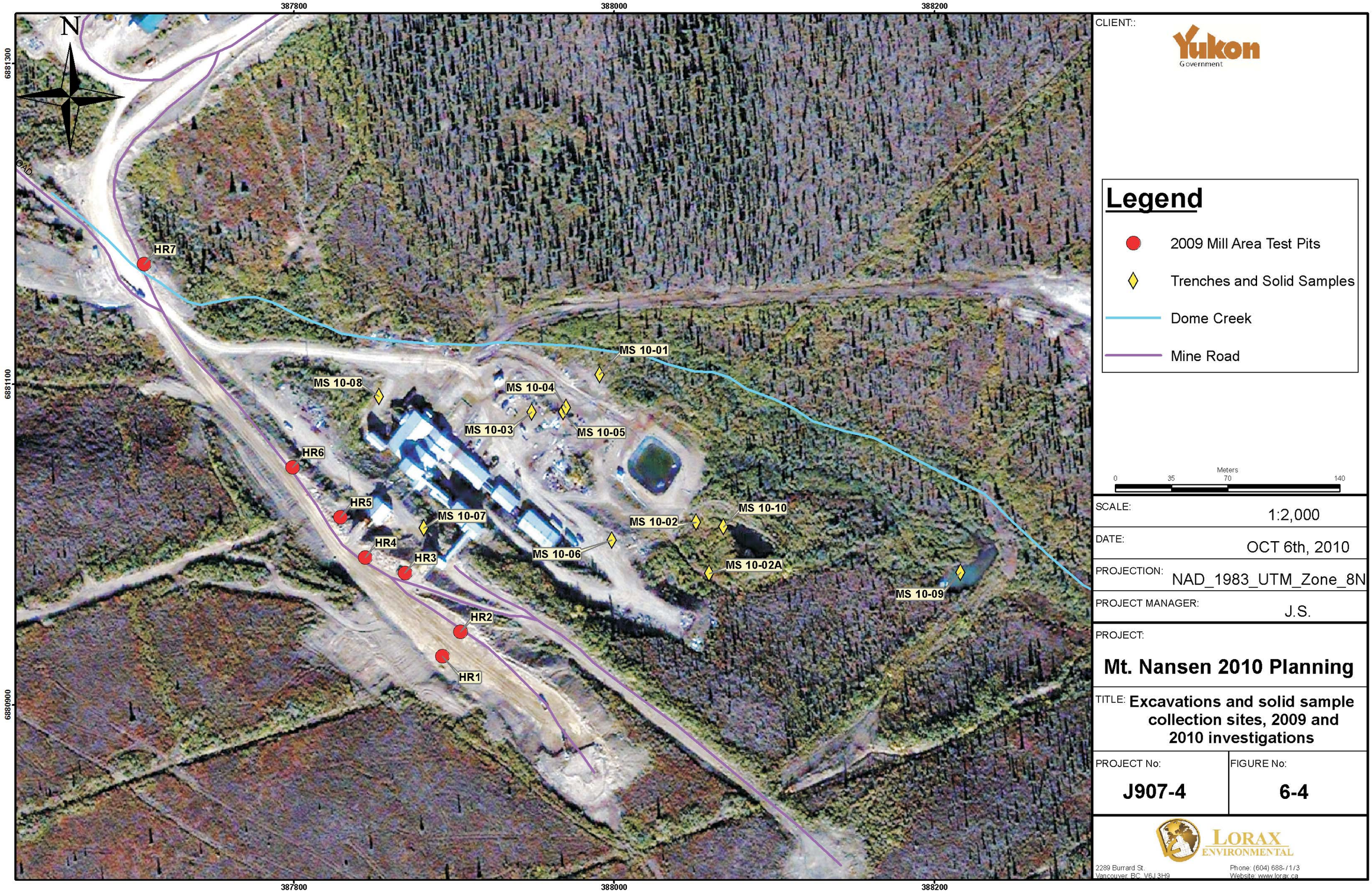

Figure 3-1: Excavations and Solid Sample Collection Sites, 2009 and 2010 Investigations (from Lorax, 2010)

- East side of mill platform: This sector, intersected by trench MS-10-06 is a combination of 1990's era refuse and mixed rock materials (mineralization and country rock). Refuse encountered in the excavation includes plastic, metal, wood and paper. A white granular product that appears to have been in 20kg paper sacks is likely ammonium nitrate (based on its appearance, pH 9 and high conductivity). See also Site Investigation Record MS-10-06. Much refuse and disused equipment and goods and used batteries are scattered on the surface in this general area. A partial drum of another white caked product was also observed and is likely caustic soda (based on its pH value of 11 and drum container, a common form of the product in the 1990's. See photo 565, Appendix A).

3.1.2 Pond Sediment

A hand auger was used to obtain two profile cores of sediment from Pond #1 (lower-most pond, approximately 250m below mill), and Pond #2 (mid-level pond, approximately 100m below mill). No sediment sampling of Pond #3 was conducted as at the time of the survey there was no visible accumulation of sediment in the bottom of this geomembrane-lined structure.

Pond #1 was augered to a depth of 45cm before encountering a frozen horizon that appeared to mark the sediment/natural ground interface. One sample from 5 to 40 cm (MS-10-09) was submitted for static testing and moisture content determination, returning elevated sulphur and highly anomalous levels of Au, Ag, and other heavy metals. Based on these results and the appearance of the sample, this material is interpreted to be tailings fines.

Pond #2 was augered to 75cm depth; coring was stopped due to inability to pull the auger out from any further depth. Sediments and organics of non-tailings origin were encountered. Two samples representing shallower and deeper sediments in the profile (MS-10-10A and MS-10-10B) were submitted for standard static analyses and moisture content determination.

Detailed descriptions and photographs for each of the two sites are found in the Site Investigation Records for MS-10-09 (Pond #1) and MS-10-10 (Pond #2) included in Appendix B, with sediment analytical results given in Appendix D. Water quality samples were also taken from each of the three ponds, and results are presented in Appendix D.

It should be noted that the samples obtained in this preliminary assessment should only be considered representative of the near-shore deposits in each of the respective two ponds. Additional sampling across representative transect(s) is recommended to more completely characterize the sediments stored in each of these ponds.

3.2 Water Phase Characterization

Water phase characterization entailed additional reconnaissance and sampling along the upper reach of Dome Creek, as well as observation, field measurement and sampling of several seeps within and down-gradient of the mill area. Figure 3-2 shows the water quality sites sampled or otherwise considered during this study.

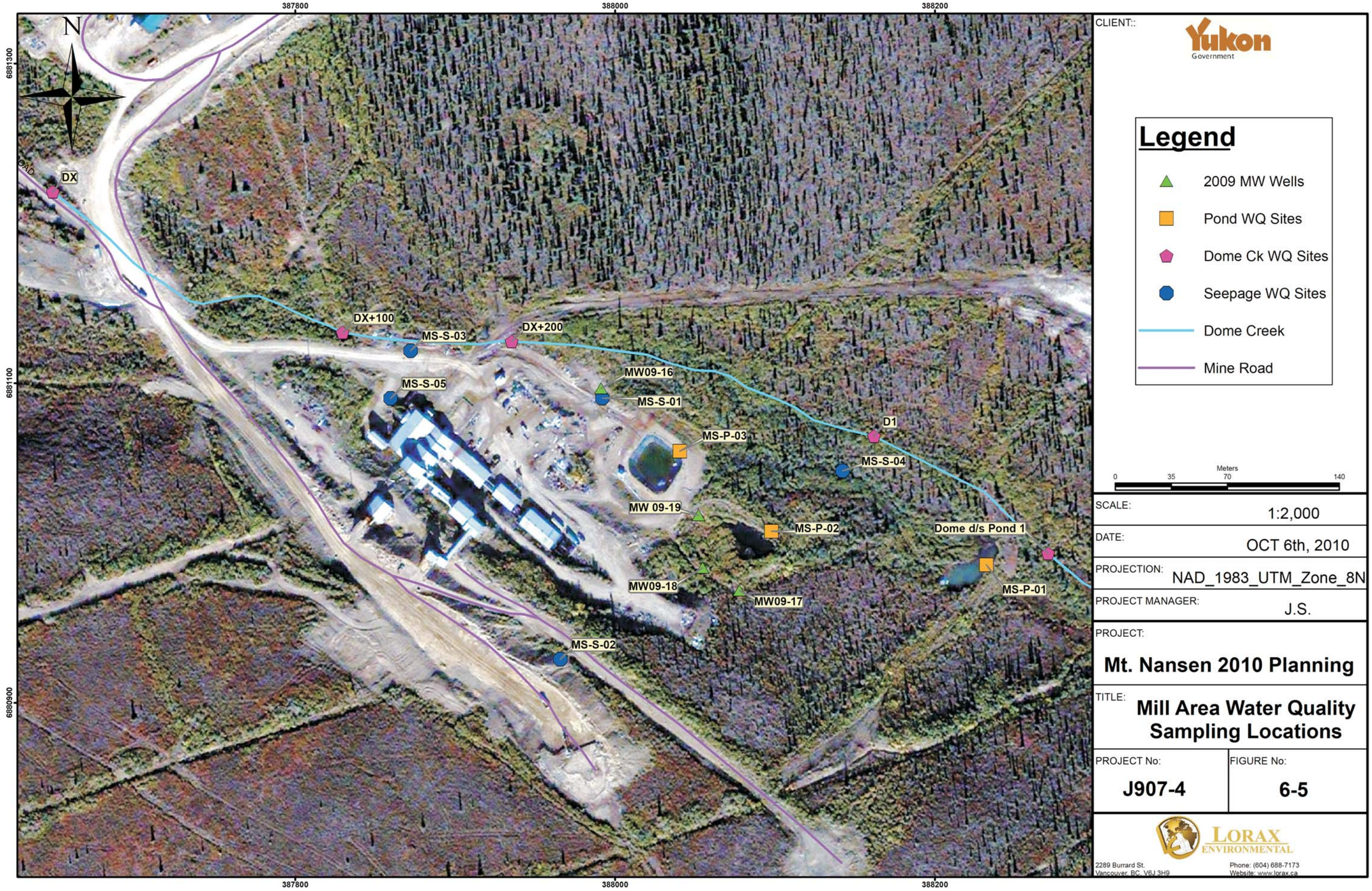

Figure 3-2: Mill Area Water Quality Sampling Locations
(from Lorax, 2010)

Salient field observations are discussed below, and the reader is also referred to Lorax (2010a) for a more complete discussion and interpretation of results.

3.2.1 Upper Dome Creek Watercourse

Reconnaissance and Field Measurements

The upper 600m reach of Dome Creek was traversed on July 4 in order to observe general terrain flow patterns and to carry out field water quality measurements to better isolate potential contaminant source(s).

In the sector up-gradient of the mill area, the Dome Creek watercourse has experienced historical disturbance as evidenced by occasional scrap metal and piles and ditches which in most areas are well overgrown by dense willow and young spruce (photo 561, Appendix A). The watercourse runs through culverts under at least two active roadways. In the mill area, Dome Creek emerges from dense vegetation cover sub-parallel to the road access down to the main mill platform (photo 562), flows through a small-diameter pipe under the trail access to lower Dome Creek, passes along the toe of the north extent of the mill platform for approximately 50m before continuing into the thick willow-dominated vegetation that spans the valley bottom. Proceeding downstream, ground conditions tend to be moist within a several metre wide zone surrounding the main Dome Creek channel. In some locations in this sector the creek appears to consist of two or more channels. Due to the thick brush it is difficult to determine if the main stream is bifurcating or is being fed by other tributaries.

Circum-neutral pH conditions were measured throughout the 600m stream reach. As expected from historical water quality monitoring, electrical conductivity increases in the downstream direction, ranging from 200-300 µS/cm above the mill area, and plateauing at the 900 µS/cm range throughout and downstream of the mill area. It should be noted that the site had received several days' of rainfall prior to the July 4 survey, and as a result electrical conductivity levels were below those typically encountered within the Dome Creek watercourse.

Two major electrical conductivity inflections were identified. Figure 3-3 illustrates the results along with a site photo cross-referencing the location of certain key readings. As can be seen, conductivity rises to elevated levels just up-gradient of the main mill area. From these results, interim points at approximately 110m and 200m along the reach (stations DX+100 and DX+200) were selected for detailed water quality sampling the following day.

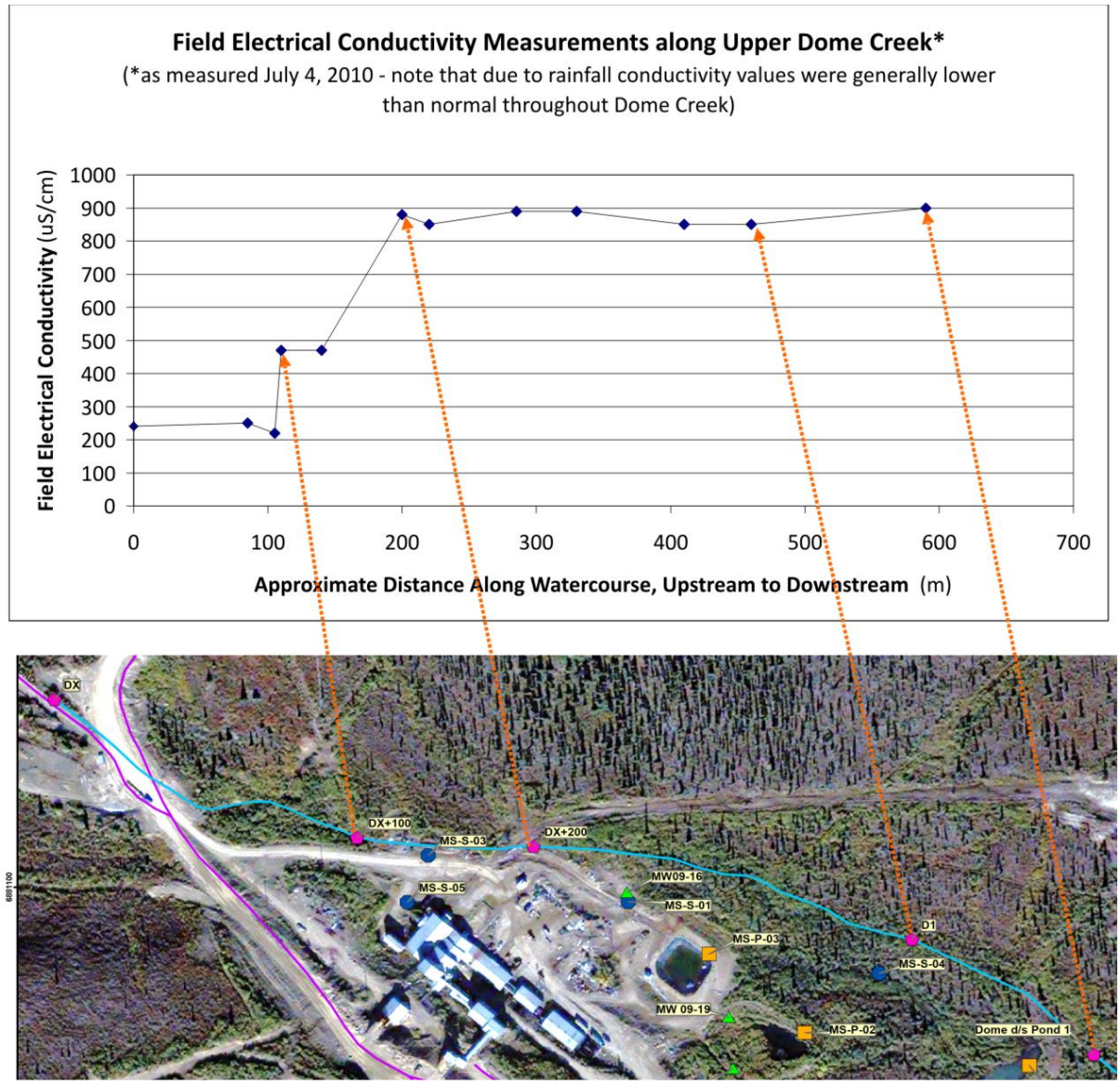

Figure 3-3. Field electrical conductivity measurements along upper Dome Creek on July 4, 2010.

Dome Creek Water Quality Sampling

Upper Dome Creek was sampled on July 5 at three sites: 'DX+100', 'DX+200', and 'Dome Ck d/s Pond 1'. This information is intended to augment water quality data from June 30 routine monitoring of stations DX and D1 in order to produce a representation of concentrations and approximate contaminant loadings along the upper Dome Creek reach.

Results for the July 5 Dome Creek samples as well as the June 30 DX and D1 samples are presented in Appendix D.

3.2.2 Selected Seeps and Ponds

Seeps

Five seeps (MS-S-01 through MS-S-05) identified in the study area were sampled for water quality parameters. The locations of these sites are shown in Figure 3-2. Flow rate was also visually estimated in order to evaluate approximate loadings for parameters of interest, and ranged widely from <2 to 300L/min. Further descriptions and photographs are given in the site investigation record for each of the seepage sites (Appendix B). Laboratory results are presented in Appendix D.

It is important to note that sampling was intended to give representation of the main seeps encountered. Several other seeps were noted in the study area, and were particularly abundant in Dome Creek valley down-gradient of the mill platform. In this area, one seep (MS-S-04) was sampled, and in a large zone up-gradient of this seep a substantial quantity of red-orange precipitate covered ground vegetation, indicating recent deposition from flooding or from over-ice flow. Follow-up sampling and analysis of this precipitate may yield important information on potential water quality attenuation mechanisms within this sector of Dome Creek.

Ponds

Water quality sampling was conducted at the three ponds at the sites shown in Figure 3-2. Results are given in Appendix D. Pond #1 was investigated in further detail during sampling and a site investigation record for this location (MS-P-01) is included in Appendix B.

4.0 Closure

This report was prepared for the Assessment and Abandoned Mines Branch, Department of Energy, Mines and Resources of the Government of Yukon. The report, which specifically includes all text, figures, tables and appendices, is based on information provided by the client, and on data and information collected during the investigations conducted by Altura Environmental Consulting.

The work described in this report was conducted in a manner consistent with that level of care and skill normally exercised by other members of the engineering and science professions currently practicing under similar conditions, subject to the time limits and financial and physical constraints applicable to the services.

Altura Environmental Consulting sincerely appreciates the opportunity to participate in and contribute to the decommissioning phase of the Mount Nansen site. Please direct any questions regarding the contents of this report to the undersigned at 867-335-2006.

Prepared by:

ALTURA ENVIRONMENTAL CONSULTING

Diane Lister, M.A.Sc., P.Eng.

5.0 References

AECOM, 2010. *Overview of Mt. Nansen Closure Alternatives Characterization.* Report prepared for Government of Yukon Assessment and Abandoned Mines Branch, Energy, Mines and Resources, 164 pp.

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Lorax Environmental Services Ltd., 2010a. *Mt. Nansen Mine, Geochemical Assessment in Support of Evaluating Closure Options* – October 2010 Draft. Report prepared for Government of Yukon Assessment and Abandoned Mines Branch, Energy, Mines and Resources, 338 pp.

Lorax Environmental Services Ltd., 2010b. *Mt. Nansen Options for Closure.* Report prepared for Government of Yukon Assessment and Abandoned Mines Branch, Energy, Mines and Resources, November, 2010.

Appendix A Photographs

(see also site Investigation Records, Appendix B, for additional photographs)

Photo No. N-08-715dp	Date August 2008
Taken From Air	Looking Northwest
Description Main mill area from air, August 2008. Ponds #2 and #3 visible in foreground. Photo taken by YG Assessment and Abandoned Mines	

Photo No. 607	Date 4-Jul-10
Taken From Bunk-house	Looking Southeast
Description Mill area (left), Dome Creek valley (centre), and main tailings impoundment (left).	

Photo No. 565	Date 4-Jul-10
Taken From East end of Mill Platform	Looking Southeast
Description Remnant refuse and product that appears to be caustic soda (NaOH, soluble pH of 11), east end of mill platform	

Photo No. 561	Date 4-Jul-10
Taken From Upper Dome Creek	Looking Southwest
Description Old overgrown disturbance in upper Dome Creek area above the mill site	

Photo No. 562	Date 4-Jul-10	
Taken From Dome Creek near mill site	Looking Southwest	
Description Dome Creek near mill site, emerging from dense vegetation prior to passing under trail access road to lower Dome Creek.		

Appendix B Site Investigation Records

- **Excavations**
  (MS-10-01 through MS-10-08)
- **Sediment Sample Sites Seeps**
  (MS-10-09 through MS-10-10)
- **Ponds**
  (MS-P-01)

Altura Environmental Consulting

SITE INVESTIGATION RECORD

Client	Project Location	Project Reference
Government of Yukon	Mount Nansen Mine, Yukon	Mill Geochem Characterization

Site Name – Location Description	Date	Datum
MS-10-01 – Mill Lower Platform	4-Jul-10	UTM Nad 83 Zone 8 V
Site Type	N	E
Trench	6881106	387991
Waypoint(s) #	Elev (masl)	Survey Instrument
444 ('Stn 0'); 445 ('Stn 11m'); 448 (s.end of trench)	1190	Garmin GPS 60CSx

Description:

Primary objective of trenching at this location was to determine general material characteristics, identify presence/absence of water table or seepage horizons, and investigate the potential source of elevated dissolved metals noted in nearby 2009 AECOM piezometer MW09-16 (9m to S).

N end of trench, 'Stn 0' @ wpt 444

Stn 0m to Stn 6m:

0-2m depth: mixed rock debris and dirt, trace scrap metal and wood. approximately 2 areal percent pods of sulphidic material in top 1m of fill.

2m-2.5m depth: dark muck (grey) mixed with wood scraps and timbers. Sulphurous odour. No water in bottom of trench.

Stn 6m to Stn 11m:

0-0.8m depth: as per Stn 0m-6m / 0-2m depth.

0.8-1.2m depth: grey muck lens, similar to Stn 0m-6m / 2-2.5m depth.

Stn 11m: marked increase in moisture content of fill

Stn 12m: seepage horizon at 1.5m depth, red-stained (see photo 569), conductivity 1700 uS/cm

Stn 11m @ wpt 445

S end of trench @ wpt 448

Samples:

Sample #	Sample Type	Description / Analysis / Other
MS-10-01A	Rock	Stn 0+12m, wet zone with red stain / Static Testing
MS-10-01B	Rock	Stn 0+00 to 0+12m / Static Testing
12m@1.5mdepth	Field Test - Seepage	pH ~7.2, conductivity 1700 uS/cm

Photographs:

Photo No. 567	Date 4-Jul-10
Taken From N. end of Tr.	Looking Southwest
Description Excavator and trench MS-10-01	

Photo No. 569	Date 4-Jul-10
Taken From trench	Looking northwest
Description Trench MS-10-01, seepage horizon at Stn 12m / 1.5m depth	

Photo No. 570	Date 4-Jul-10
Taken From Mid-trench	Looking Northeast
Description Trench MS-10-01, looking to northeast	

Photo No. 571	Date 4-Jul-10
Taken From Mid-trench	Looking Southwest
Description Trench MS-10-01, looking to southwest	

Photo No. 572	Date 4-Jul-10
Taken From Mid-trench	Looking
Description Trench MS-10-01, Stn 0+06m / 0.8m depth. Evidence of localized leaching.	

Altura Environmental Consulting

SITE INVESTIGATION RECORD

Client	Project Location	Project Reference
Government of Yukon	Mount Nansen Mine, Yukon	Mill Geochem Characterization

Site Name – Location Description	Date	Datum
MS-10-02 – Above Pond #2	4-Jul-10	UTM Nad 83 Zone 8 V
Site Type	N	E
Trench	6881014	388051
Waypoint(s) #	Elev (masl)	Survey Instrument
447 (North end)	1187	Garmin GPS 60CSx

Description:

Primary objective of trenching at this location was to determine if old tailings were present at this site.

NE end of trench @ wpt 447
Excavation to approximately 2.5m depth
Tan to brown-weathering rock in silt/sand matrix.
2m depth: water seep/moist area (no field measurements).
No tailings encountered. No samples taken.

Samples:

Sample #	Sample Type	Description / Analysis / Other
No samples		

File: MS-10-02

Photographs:

Photo No. 574	Date 4-Jul-10
Taken From N. end of Tr.	Looking Southwest
Description Trench MS-10-02	

Altura Environmental Consulting

SITE INVESTIGATION RECORD

Client	Project Location	Project Reference
Government of Yukon	Mount Nansen Mine, Yukon	Mill Geochem Characterization

Site Name – Location Description	Date	Datum
MS-10-02A – Above and SW of Pond #2	4-Jul-10	UTM Nad 83 Zone 8 V
Site Type	N	E
Trench	6880982	388059
Waypoint(s) #	Elev (masl)	Survey Instrument
450 (w.end of trench)	1182	Garmin GPS 60CSx

Description:

Primary objective of trenching at this location was to determine if old tailings were present at this site; excavated between 2009 AECOM boreholes MW09-18 and MW09-19. Log MW09-18 noted the presence of silty sand tailings from 5 to 6m depth.

Appears to be mainly country rock (amphibolite?) with sandy matrix. Light brown colour.

Water intercepted at 3m depth. pH 8.1, conductivity 2000 uS/cm. Total depth of excavation ~3.5m.

No obvious oxidation except at level of seepage, where there is some mild iron staining

No tailings encountered. Possibly the tailings noted in well MW09-18 log are attributable to a natural sandy horizon of weathered country rock – or possibly deeper.

NW end of trench @ wpt 450

No static test samples taken.

Samples:

Sample #	Sample Type	Description / Analysis / Other
3mdepth	Field Test - Seepage	pH ~8.2, conductivity 2000 uS/cm, temp 4C

Photographs:

Photo No. 578	Date 4-Jul-10
Taken From NW end of Tr.	Looking Southeast
Description Trench MS-10-02A	

Photo No. 577	Date 4-Jul-10
Taken From Mid-trench	Looking Southeast
Description Trench MS-10-02A, south wall and ponded seepage	

Photo No. 576	Date 4-Jul-10
Taken From Mid-trench	Looking Southeast
Description Trench MS-10-02A, trench floor and ponded seepage	

Altura Environmental Consulting

SITE INVESTIGATION RECORD

Client	Project Location	Project Reference
Government of Yukon	Mount Nansen Mine, Yukon	Mill Geochem Characterization

Site Name – Location Description	Date	Datum
MS-10-03 – Mill Platform Area	4-Jul-10	UTM Nad 83 Zone 8 V
Site Type Trench	N 6881083	E 387949
Waypoint(s) # 463 (centre of trench)	Elev (masl) 1194	Survey Instrument Garmin GPS 60CSx

Description:

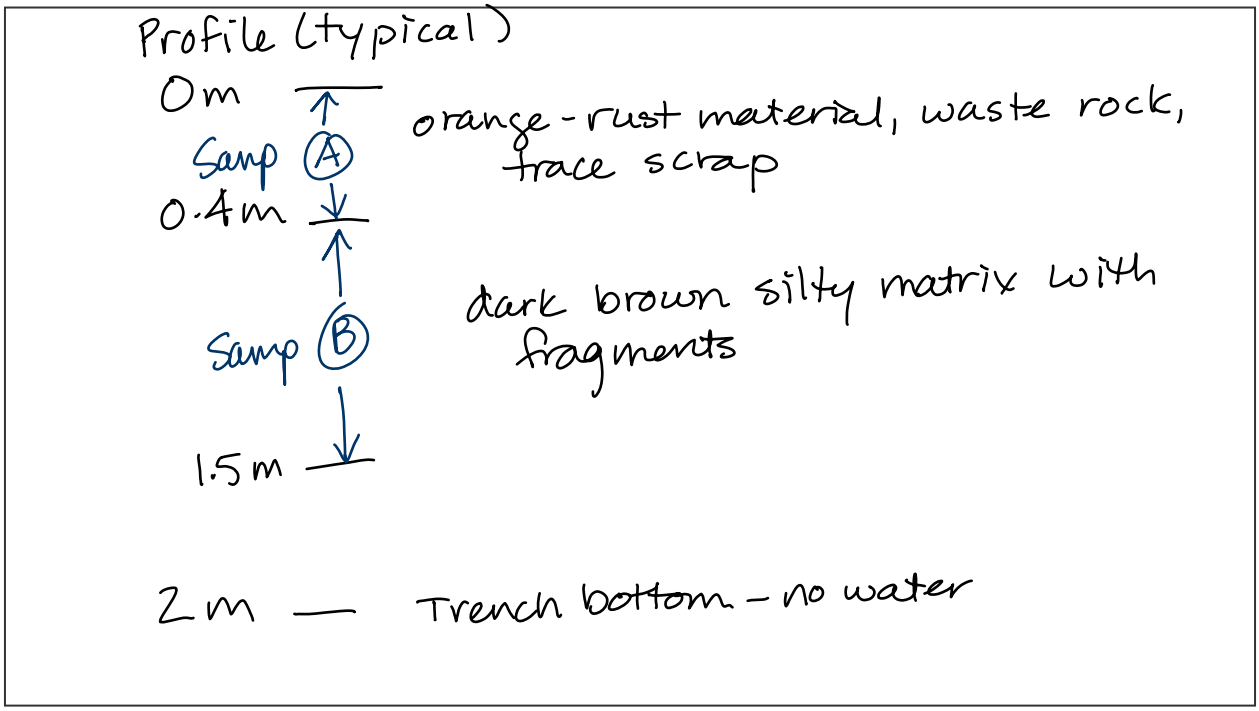
Primary objective of trenching at this location was to determine general material characteristics and identify presence/absence of water table or seepage horizons.

Approximately 5m long trench, oriented at 320/140°.

Looks like older material (dark brown) overlain by more recent workings (0.4m veneer of tan-orange material).

No water intercepted in trench.

2 rock samples taken (photo 585)



Samples:

Sample #	Sample Type	Description / Analysis / Other
MS-10-03A	Rock	0-0.4m depth. 60% intrusive and quartz fragments in tan-orange silt-sized matrix. Analyses – Std. ICP/ABA
MS-10-03B	Rock	0.4-1.5m depth. 60% quartz and amphibolite fragments in dark brown silt-sized matrix. Analyses – Std. ICP/ABA

Photographs:

Photo No. 584	Date 4-Jul-10
Taken From SW end of Tr.	Looking Northwest
Description Trench MS-10-03	

Photo No. 585	Date 4-Jul-10
Taken From Mid-trench	Looking Northeast
Description Trench MS-10-03, northeast wall showing site of sampling	

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SITE INVESTIGATION RECORD

Client	Project Location	Project Reference
Government of Yukon	Mount Nansen Mine, Yukon	Mill Geochem Characterization

Site Name – Location Description	Date	Datum
MS-10-04 – Pond #3 Platform Level (below Mill)	4-Jul-10	UTM Nad 83 Zone 8 V
Site Type	N	E
Trench	6881086	387970
Waypoint(s) #	Elev (masl)	Survey Instrument
464 (w.end of trench, approx 2m above ground)	1186 (ground surface)	Garmin GPS 60CSx

Description:

Primary objective of trenching at this location was to determine general material characteristics, identify presence/absence of water table or seepage horizons, and investigate the potential source of elevated dissolved metals noted during monitoring of nearby 2009 AECOM piezometer MW09-16 (20m to NE).

Trench approx 7m long x 2m deep, oriented at 280°.

Water intercepted in trench, pH 6.75 (check sample yielded 6.84pH), conductivity 1740 uS/cm. This water appears to form part of seep MS-S-01, which daylights approximately 15m downgradient and to south. Red-stained seepage line approximately 2m below surface.

2 static test samples taken.

Samples:

Sample #	Sample Type	Description / Analysis / Other
Trench bottom	Field Test - Seepage	pH ~6.8, conductivity 1740 uS/cm, appears to originate from seepage line approximately 2m below surface
MS-10-04A	Rock	Approximately 0.5x0.5m lens of sulphidic material; approximately 50% silicic-altered fragments with 0-5% sulphides, 50% matrix of green to green-yellow clay. Photo 587. Analyses – Std. ICP/ABA
MS-10-04B	Rock	Taken along approximately 4m horizontal interval, approximately 0.5m above red-stained seep line. Sample is damp. Approximately 60% fragments, mixed rock types (ambiphiboite, quartz, intrusive? observed). 40% matrix, mainly grey with sporadic (10%) pockets of tan-green fines. Photo 589. Analyses – Std. ICP/ABA

Photographs:

Photo No. 586	Date 4-Jul-10
Taken From SE end of Tr.	Looking Northwest
Description Trench MS-10-04	

Photo No. 587	Date 4-Jul-10
Taken From Mid-trench	Looking Northeast
Description Trench MS-10-04, area of sample MS-10-04A	

Photo No. 588	Date 4-Jul-10
Taken From Mid-trench	Looking Northeast
Description Trench MS-10-04, dark red-stained horizon indicating seepage line. Approximately 2m below ground surface.	

Photo No. 589	Date 4-Jul-10
Taken From Mid-trench	Looking Southeast
Description Trench MS-10-04, area of sample MS-10-04B (sample taken between the two orange flags in foreground)	

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SITE INVESTIGATION RECORD

Client	Project Location	Project Reference
Government of Yukon	Mount Nansen Mine, Yukon	Mill Geochem Characterization

Site Name – Location Description	Date	Datum
MS-10-05 – Mill Platform Level	4-Jul-10	UTM Nad 83 Zone 8 V
Site Type Trench	N 6881083	E 387968
Waypoint(s) # 465 (east end of trench, GPS at ground level)	Elev (masl) 1187 (ground surface)	Survey Instrument Garmin GPS 60CSx

Description:

Primary objective of trenching at this location was to determine general material characteristics, identify presence/absence of water table or seepage horizons, investigate possible location of ore loadout from underground rail system.

Trench oriented at 080°.

Possible ore spillage area intercepted at east end of trench (photo 590). Appears to extend to north and south approximately 15m in total, 1-2m veneer of ore material.

No water intercepted

2 static test samples taken.

Samples:

Sample #	Sample Type	Description / Analysis / Other
MS-10-05A	Rock	Appears to be old ore dump area. Sample taken from both walls of trench, east end of trench (photo 591). Approximately 60% fragments of phyllic to silicic-altered material, by remnant lineations/foliations appears to be altered metamorphic fragments, very fine-grained to 0.5mm sulphides, appear to be mainly silver-coloured (arsenopyrite or stibnite? – *note: ICP results indicate highly anomalous, Ag, Au, As, Pb, Sb*). Approximately 40% matrix tan/orange clayey silt. Sample has moisture level typical of unsaturated waste rock. Minor amounts of refuse (old wood scraps with occasional metal) within sample area. Analyses – Std. ICP/ABA
MS-10-05B	Rock	Photo 592. Sample taken along approximately 6m interval approximately 1m below ground surface, south wall. Approximately 50% fragments, mainly fine-grained amphibolite, manganese and unidentified green-coloured stain, possible trace of very fine-grained sulphides (no hand lens on hand). Matrix dark brown clayey silt, slightly damp. White clay lens approximately 1m long (see photo) at east end of site. Trace of wood scraps within sample area.. Analyses – Std. ICP/ABA

Photographs:

Photo No. 590	Date 4-Jul-10
Taken From E end of Tr.	Looking East
Description Trench MS-10-05, possible area of old ore loadout structure. Area of sample MS-10-05A. Appears to be area of ore spillage extending to north and south, 15m total extent, 1-2m deep veneer.	

Photo No. 591	Date 4-Jul-10
Taken From E. end of trench	Looking West
Description Trench MS-10-05, from 1m off of east end of trench. Ore zone in foreground.	

Photo No. 592	Date 4-Jul-10	
Taken From Mid-trench	Looking West	
Description Trench MS-10-05, area of sample MS-10-05B (between orange flags on trench wall).		

SITE INVESTIGATION RECORD

Client	Project Location	Project Reference
Government of Yukon	Mount Nansen Mine, Yukon	Mill Geochem Characterization

Site Name – Location Description	Date	Datum
MS-10-06 – Mill Platform Level, southeast end	4-Jul-10	UTM Nad 83 Zone 8 V
Site Type Trench	N 6881003	E 387998
Waypoint(s) # 469	Elev (masl) 1197	Survey Instrument Garmin GPS 60CSx

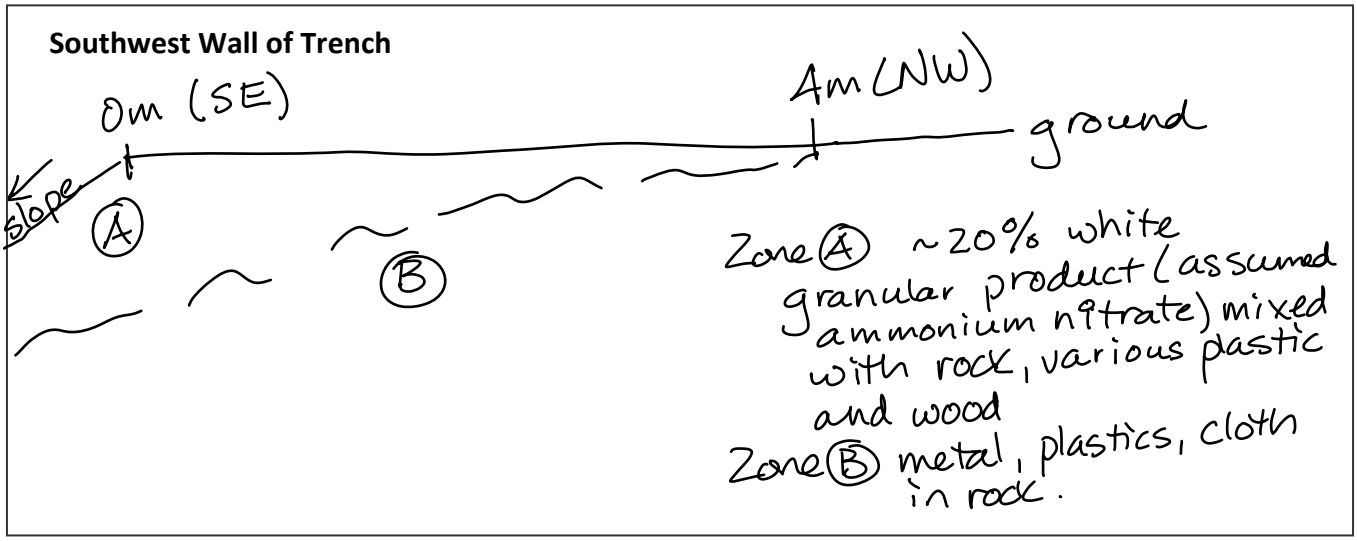
Description:

Primary objective of trenching at this location was to determine general material characteristics, identify presence/absence of water table or seepage horizons, investigate outer extent of refuse disposal area.

Trench oriented at 125°, approximately 1.5m deep. Old dump site, considerable proportion of refuse mixed with rock – plastics, metal, wood, paper, cloth.

Granular white product, originating from ~25kg paper sacks and possibly palletized with plastic wrap encountered at southeast end (crest of platform). Small amount of product was solubilized with deionized water to yield pH of 9.5 and conductivity of 8470 uS/cm.

Southwest Wall of Trench



No water intercepted.

1 static test sample taken.

Samples:

Sample #	Sample Type	Description / Analysis / Other
MS-10-06	Rock	Photo 596. Approximately 7m interval, approximately 1.5m below surface. Slightly moist, typical of unsaturated waste rock. Approximately 50% fragments, mainly fine-grained dark phyllic?-altered material, trace very fine-grained sulphides observed. Quartz-flooded intrusive fragments also seen. Matrix mainly orange clayey silt with some sandier brown lenses. Analyses – Std. ICP/ABA
Granular White Product	Product – field measurements	paste pH 9.5, conductivity 8470 uS/cm

Photographs:

Photo No. 593	Date 4-Jul-10
Taken From NW end of Tr.	Looking East-SE
Description Trench MS-10-06. Note white product (thought to be ammonium nitrate) at end of trench.	

Photo No. 594	Date 4-Jul-10
Taken From ESE end of trench	Looking North
Description Trench MS-10-06, downslope area at ESE end of trench. Pond #3 in right background.	

Photo No. 595	Date 4-Jul-10
Taken From ESE end of trench	Looking Southeast
Description Trench MS-10-06, white product at ESE end of trench (thought to be ammonium nitrate). Product appears to have been in paper sacks, and possibly palletized with plastic wrap. Product shown in sample bag was solubilized with deionized water to yield pH of 9.5 and conductivity of 8470 uS/cm.	

Photo No. 596	Date 4-Jul-10
Taken From NW end of trench	Looking Southeast
Description Trench MS-10-06, showing area of sample MS-10-06 (between orange flags on trench wall).	

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SITE INVESTIGATION RECORD

Client	Project Location	Project Reference
Government of Yukon	Mount Nansen Mine, Yukon	Mill Geochem Characterization

Site Name – Location Description	Date	Datum
MS-10-07 – Crusher Platform Level	4-Jul-10	UTM Nad 83 Zone 8 V
Site Type Trench	N 6881010	E 387881
Waypoint(s) # 466 (northwest end)	Elev (masl) 1214	Survey Instrument Garmin GPS 60CSx

Description:

Primary objective of trenching at this location was to determine general material characteristics, identify presence/absence of water table or seepage horizons.

Trench oriented at 125°, approximately 1.5m deep, 6m long.

Trench profile clearly shows an approximately 0.4m veneer of oxidized clayey rubble over main fill material in trench – veneer possibly spilled crushed ore that was locally graded over running surface of platform (*ICP analyses confirm, indicating 3600 ppb Au in veneer material, versus 20 ppb Au in underlying fill*). It was noted that this veneer material extends over much of the Crusher platform and on slope down to Mill platform.

Material notably dry on trench bottom, slightly loose and blocky.

No water intercepted.

2 static test samples taken.

Samples:

Sample #	Sample Type	Description / Analysis / Other
MS-10-07A	Rock	Photo 597, southeast end of trench, 0-0.4m depth, taken over approximately 2m horizontal section. Veneer of oxidized rock rubble over main fill material in trench. Approximately 70% fragments – angular 0.5-2" silic/phyllic? fragments, some manganese stain, trace very fine-grained sulphides, fragments almost gravel-like in appearance. Matrix tan-orange clayey silt. Slightly moist, akin to typical waste rock. Analyses – Std. ICP/ABA
MS-10-07B	Rock	Photo 598, from northwest end of trench, main fill material in trench, underlying veneer horizon (0.3m depth and deeper). Approximately 50% fragments, blocky amphibolite, some fragments weathered to crumbly texture, so sulphides observed. Matrix is variable – approximately 25% gray-tan lenses of sandy-textured dry and loose material, approximately 75% orange-weathering slightly clayey silt.

Photographs:

Photo No. 597	Date 4-Jul-10
Taken From SE end of trench	Looking West
Description Trench MS-10-07. close-up of approximately 0.4m thick veneer of material (likely crushed ore) overlying main platform fill. Area of sample MS-10-07A shown between two orange flags.	

Photo No. 598	Date 4-Jul-10
Taken From NW end of trench	Looking Southeast
Description Trench MS-10-07, showing area of sample MS-10-07B (between yellow arrows). Area of sample MS-10-07A is seen above the yellow arrow at the far end of the trench.	

SITE INVESTIGATION RECORD

Client	Project Location	Project Reference
Government of Yukon	Mount Nansen Mine, Yukon	Mill Geochem Characterization

Site Name – Location Description	Date	Datum
MS-10-08 – NW of thickener/clarifier	4-Jul-10	UTM Nad 83 Zone 8 V
Site Type Trench	N 6881092	E 387853
Waypoint(s) # none	Elev (masl) 1209	Survey Instrument Site Satellite Image (2008)

Description:

Primary objective of trenching at this location was to determine general material characteristics, identify presence/absence of water table or seepage horizons, and in particular, to investigate origin of seepages noted downgradient to NNE and to E (MS-S-03 and MS-S-05 by clarifier/thickener).

Trench oriented to northeast along the ramp access to buildings behind mill. Approximately 3m long and 2m deep.

Bedrock (amphibolite, blocky, hard digging) intercepted at 1m depth. Trench dug to 2m, dry.

Seep MS-S-05 possibly tracks further uphill around a metal pipe rising vertically from ground (photo 601, not included in this record). Digging not carried out in this area due to proximity to buildings and possible presence of buried pipe and powerlines.

No water intercepted.

No static test samples taken.

Samples:

Sample #	Sample Type	Description / Analysis / Other
No samples taken		

Photographs:

Photo No. 599	Date 4-Jul-10
Taken From NE end of trench	Looking Southwest
Description Trench MS-10-08.	

Photo No. 600	Date 4-Jul-10
Taken From SE edge of trench	Looking down
Description Trench MS-10-08, trench floor showing fresh country rock (amphibolite).	

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SITE INVESTIGATION RECORD

Client	Project Location	Project Reference
Government of Yukon	Mount Nansen Mine, Yukon	Mill Geochem Characterization

Site Name – Location Description	Date	Datum
MS-10-09 – Pond #1, ~250m below Mill Site	5-Jul-10	UTM Nad 83 Zone 8 V
Site Type Pond Sediment Core	N 6880983	E 388216
Waypoint(s) # 472 (gps held 1.5m above ground)	Elev (masl) 1164 (ground level)	Survey Instrument Garmin GPS 60CSx

Description:

Primary objective of sediment coring at this location was to determine general material characteristics and confirm presence/absence of tailings at the sample site. On reconnaissance on July 4/10, it was noted the thin tan-orange coloured surficial mud in the pond was underlain by a dark grey sediment.

An Edelman hand auger was used to obtain core. Sample site was the NW corner of the pond, within 30cm of the pond shoreline (see photos 614 and 617).

The pond margin is vegetated with hummocky grasses and sedges, with some shrub growth. There is limited vegetative growth within the pond.

Total depth of coring: 45cm.

See annotated photo 616 for profile details. An approximately 40cm layer of tailings (confirmed by ICP metals and sulphur values) was encountered at this site. Coring was stopped at 45cm depth due to inability to further penetrate the underlying frozen layer of mixed tailings and organics (assumed to be the tailings/original ground interface).

Sediment fully saturated throughout sample profile.

1 static test sample taken. Note that water sample MS-P-01 was taken from this pond on July 4/10.

Samples:

Sample #	Sample Type	Description / Analysis / Other
MS-10-09	Pond Sediment	Entire core sample from 5 to 40cm depth. See photo 616 for description. Analyses – Std. ICP/ABA, moisture content.

Photographs:

Photo No. 617	Date 5-Jul-10
Taken From Pond #1 old shack	Looking Northeast
Description Area of Pond Sediment Sample Site MS-10-09 (yellow arrow).	

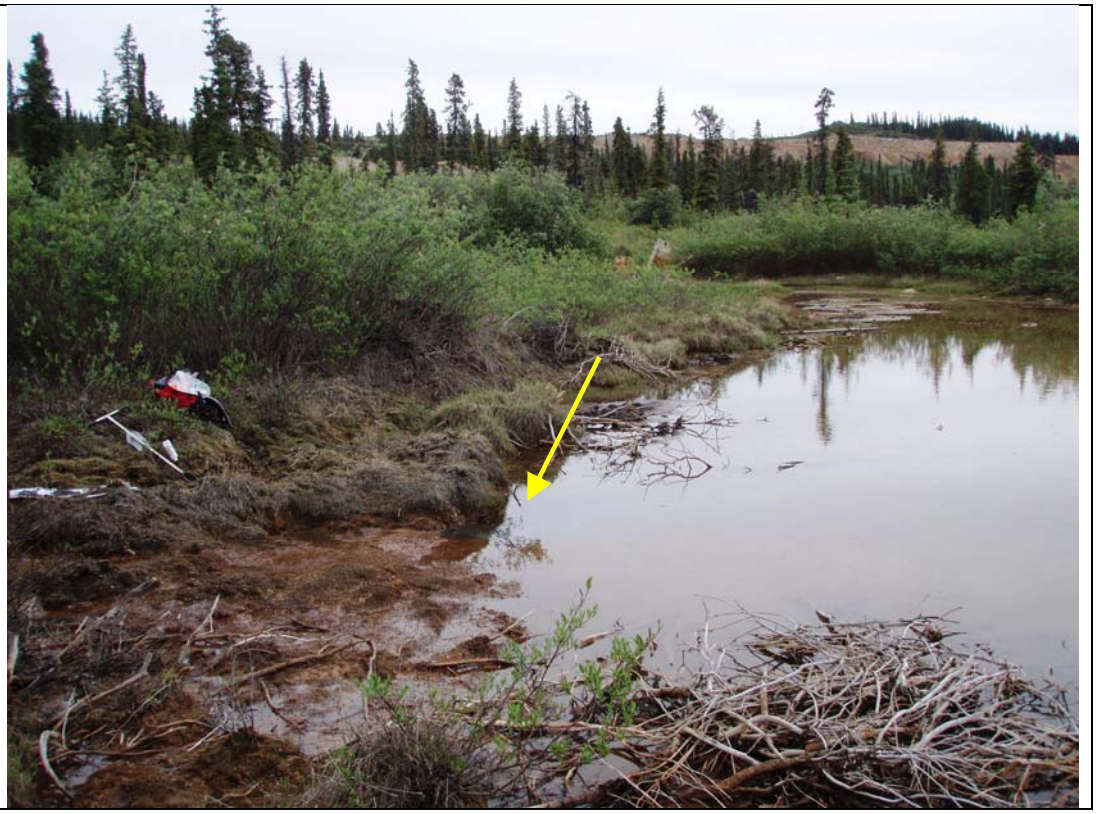

Photo No. 614	Date 5-Jul-10
Taken From Edge of Pond #1	Looking down
Description Pond Sediment Sample Site MS-10-09 (yellow arrow) showing thin surficial tan-orange mud underlain by grey sediment.	

Photo No. 616	Date 5-Jul-10
Taken From NA	Looking NA

Description
Pond Sediment Sample Site MS-10-09, core profile and description.

cm

0
2

0-2cm: organics and roots with a thin veneer of very fine-grained orange precipitate

2-42cm: Tailings. Dark grey, very fine-grained (clay and silt-sized particles), amorphous material, high plasticity. Trace of root hairs and fine woody debris (<<1%).

42
45

42-45cm: 60% tailings, 40% dark brown organics. Frozen, difficult to penetrate.

File: MS-10-09

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SITE INVESTIGATION RECORD

Client	Project Location	Project Reference
Government of Yukon	Mount Nansen Mine, Yukon	Mill Geochem Characterization

Site Name – Location Description	Date	Datum
MS-10-10 – Pond #2, ~100m below Mill Site	5-Jul-10	UTM Nad 83 Zone 8 V
Site Type Pond Sediment Core	N 6881011	E 388068
Waypoint(s) # none	Elev (masl) 1213	Survey Instrument Site Satellite Image (2008)

Description:

Primary objective of sediment coring at this location was to determine general material characteristics and confirm presence/absence of tailings at the sample site.

An Edelman hand auger was used to obtain core. Sample site was the NW corner of the pond, within 30cm of the pond shoreline (see photo 620). The margin of the pond is heavily overgrown with vegetation. Some grasses, sedges and other aquatic plants were observed within the pond.

Total depth of coring: 75cm.

See annotated photo 624 for profile details. No tailings were encountered in the sediment core (as confirmed by ICP metals and sulphur values). Coring was stopped at 75cm depth due to inability to pull the auger out from any further depth. Sediments appeared to continue.

Sediment fully saturated throughout sample profile.

2 static test samples taken. Note that water sample MS-P-02 was taken from this pond on July 4/10.

Samples:

Sample #	Sample Type	Description / Analysis / Other
MS-10-10A	Pond Sediment	Entire core sample from 16 to 45cm depth. See photo 624 for description. Analyses – Std. ICP/ABA, moisture content.
MS-10-10B	Pond Sediment	Entire core sample from 45 to 75cm depth. See photo 624 for description. Analyses – Std. ICP/ABA, moisture content.

Photographs:

Photo No. 620	Date 5-Jul-10
Taken From Edge of Pond #2	Looking down
Description Area of Pond Sediment Sample Site MS-10-10 (yellow arrow).	

Photo No. 624	Date 5-Jul-10
Taken From NA	Looking NA
Description Pond Sediment Sample Site MS-10-10 (Pond #2), core profile and description.	

cm

0

0-15cm: sandy silt and organic debris, minor rust-coloured precipitate

15

15-75cm: Brown-grey sandy silt texture, not as firm as at MS-10-09. 10% organic lenses with light-coloured sand akin to volcanic ash layer. Approximately 5% rock fragments.

75

75cm: End of hole, unable to pull auger from any deeper. Last core section shows sediments continue.

SITE INVESTIGATION RECORD

Client	Project Location	Project Reference
Government of Yukon	Mount Nansen Mine, Yukon	Mill Geochem Characterization

Site Name – Location Description	Date	Datum
MS-S-01 – Seep near piezometer MW09-16	4-Jul-10	UTM Nad 83 Zone 8 V
Site Type	N	E
Seepage sample site	6881091	387992
Waypoint(s) #	Elev (masl)	Survey Instrument
449	1188	Garmin GPS 60CSx

Description:

Primary objective of seepage investigation at this location was to map seepages in main mill area, and determine general water quality characteristics.

Sampled with disposible syringe and field-filtered as required for the various analyses. Flow rate visually estimated at 30-50 L/min.

Seepage approximately 6m southeast of piezometer MW09-16 (see photo 566), which returned anomalous dissolved metal concentrations in 2009-10 monitoring.

1 water sample taken.

Samples:

Sample #	Sample Type	Description / Analysis / Other
MS-S-01	Water	Field values: pH 7.6 (note: re-measured July 5 following re-calibration and obtained pH 6.9), conductivity 1710 uS/cm, temp 4.3C, flow 30-50 L/min. Analyses – Anions, general parameters, dissolved metals

Photographs:

Photo No. 575	Date 4-Jul-10
Taken From MS-S-01	Looking West
Description Sampling of seep MS-S-01. Trenches MS-10-04 and MS-10-05 are located in the upper left area of photo.	

Photo No. 566	Date 4-Jul-10
Taken From MS-S-01	Looking Northwest
Description Piezometer MW09-16 and seep MS-S-01 (foreground).	

Photo No. 573	Date 4-Jul-10	
Taken From MS-S-01	Looking West	
Description Piezometer MW09-16 and seep MS-S-01 (foreground). Trenches MS-10-04 and MS-10-05 are located in the upper left area of photo.		

SITE INVESTIGATION RECORD

Client	Project Location	Project Reference
Government of Yukon	Mount Nansen Mine, Yukon	Mill Geochem Characterization

Site Name – Location Description	Date	Datum
MS-S-02 – Old Ore Stockpile area, Upper Mill Platform Southeast of Crusher Feeder	4-Jul-10	UTM Nad 83 Zone 8 V
Site Type Seepage sample site	N 6880927	E 387966
Waypoint(s) # 461	Elev (masl) 1213	Survey Instrument Garmin GPS 60CSx

Description:

Primary objective of seepage investigation at this location was to map seepages in main mill area, and determine general water quality characteristics. In 2008 a large stockpile of ore was relocated from this area to the southeast end of Brown McDade pit.

Sampled with peristaltic pump and field-filtered as required for the various analyses. Flow rate visually estimated at 2 L/min.

1 water sample taken. *Water quality results indicate overall low dissolved metals and anions, circum-neutral pH*.

No photographs taken.

Samples:

Sample #	Sample Type	Description / Analysis / Other
MS-S-02	Water	Field values: pH >7.1, conductivity 650 uS/cm, temp not recorded, flow 2 L/min. Analyses – Anions, general parameters, dissolved metals

File: MS-S-02

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SITE INVESTIGATION RECORD

Client	Project Location	Project Reference
Government of Yukon	Mount Nansen Mine, Yukon	Mill Geochem Characterization

Site Name – Location Description	Date	Datum
MS-S-03 – Seep from road shoulder north of Mill	4-Jul-10	UTM Nad 83 Zone 8 V
Site Type	N	E
Seepage sample site	6881120	387872
Waypoint(s) #	Elev (masl)	Survey Instrument
462	1199	Garmin GPS 60CSx

Description:

Primary objective of seepage investigation at this location was to map seepages in main mill area, and determine their general water quality characteristics.

Sampled with peristaltic pump and field-filtered as required for the various analyses. Flow rate visually estimated at 50-100 L/min.

Seepage daylights at shoulder of access road down to Mill Platform, a few metres southeast of Dome Creek. Seep area is notably overgrown with stringy yellow-green gelatinous algae, a feature unique relative to other seeps in the mill area (photo 583). Flow from the seep migrates in a ditch parallel to the road and to Dome Creek (photo 564), flows under a large scrap metal pile (photo 563), and then joins Dome Creek approximately 30m downstream from the seep.

1 water sample taken.

Samples:

Sample #	Sample Type	Description / Analysis / Other
MS-S-03	Water	Field values: pH 7.6, conductivity 1050 uS/cm, temp 2.3C, flow 50-100 L/min. Analyses – Anions, general parameters, dissolved metals, plus ammonia (due to algal growth).

Photographs:

Photo No. 564	Date 4-Jul-10
Taken From Waypoint 435	Looking West
Description Channel draining seep MS-S-03, immediately before flowing under a scrap metal pile (photo 563). Seep daylights at location shown by yellow arrow.	

Photo No. 583	Date 4-Jul-10
Taken From MS-S-03	Looking Southwest
Description Seep MS-S-03, daylighting on shoulder of access road to Mill, with distinctive stringy gelatinous algae.	

Photo No. 563	Date 4-Jul-10
Taken From Mill Platform, NE end	Looking Northwest
Description Scrap metal pile across drainage channel from seep MS-S-03, approximately 10m prior to channel entering Dome Creek.	

SITE INVESTIGATION RECORD

Client	Project Location	Project Reference
Government of Yukon	Mount Nansen Mine, Yukon	Mill Geochem Characterization

Site Name – Location Description	Date	Datum
MS-S-04 – High flow seep below Pond #3	5-Jul-10	UTM Nad 83 Zone 8 V
Site Type Seepage sample site	N 6881045	E 388142
Waypoint(s) # 460, 473	Elev (masl) 1171	Survey Instrument Garmin GPS 60CSx

Description:

Primary objective of seepage investigation at this location was to map characterize a high volume flow encountered below the main mill area.

Sampled with disposable syringe and field-filtered as required for the various analyses. Flow rate visually estimated at 200-300 L/min.

Red-stained high-volume flow approximately 25m southwest of main Dome Creek channel (photo 619). Upstream evidence of high flows and/or over-ice flows (photo 582), as demonstrated by substantial deposits of orange precipitate overlying ground vegetation.

1 water sample taken.

Samples:

Sample #	Sample Type	Description / Analysis / Other
MS-S-04	Water	Field values: pH 7.6, conductivity 1410 uS/cm, temp 4.6C, flow 200-300 L/min. Analyses – Anions, general parameters, dissolved metals

Photographs:

Photo No. 619	Date 5-Jul-10
Taken From MS-S-04	Looking Northwest
Description Seep MS-S-04 sample site.	

Photo No. 582	Date 4-Jul-10
Taken From Upstream of MS-S-04	Looking Northwest
Description Terrain upstream of seep MS-S-03, showing extensive orange precipitate overlying ground vegetation – indicating recent deposition, possibly from over-ice flow during winter/spring.	

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SITE INVESTIGATION RECORD

Client	Project Location	Project Reference
Government of Yukon	Mount Nansen Mine, Yukon	Mill Geochem Characterization

Site Name – Location Description	Date	Datum
MS-S-05 – Toe of fill west of clarifier/thickener	5-Jul-10	UTM Nad 83 Zone 8 V
Site Type Seepage sample site	N 6881090	E 387860
Waypoint(s) # 467	Elev (masl) 1208	Survey Instrument Garmin GPS 60CSx

Description:

Primary objective of seepage investigation at this location was to map seepages in main mill area, and determine their general water quality characteristics.

Sampled with disposable syringe and field-filtered as required for the various analyses. Flow rate visually estimated at 10 L/min.

Low flow seep at base of slope immediately beside mill building and clarifier/thickener. Trace of surface oil released when slope in immediate area disturbed by steps.

Seep possibly tracks further uphill around a metal pipe rising vertically from ground (photo 601). Digging not carried out in this area due to proximity to buildings and possible presence of buried pipe and powerlines. No water encountered in trench MS-10-08, 7m uphill and to northwest.

1 water sample taken.

Samples:

Sample #	Sample Type	Description / Analysis / Other
MS-S-05	Water	Field values: pH 7.3, conductivity 2600 uS/cm, temp not recorded, flow approximately 10 L/min. Analyses – Anions, general parameters, dissolved metals, plus ammonia (due to algal growth).

Photographs:

Photo No.	Date
601	4-Jul-10
Taken From Mill Platform adjacent to clarifier/thickener	Looking Southwest
Description Seep MS-S-05 sample site (yellow arrow). Excavator is completing trench MS-10-08 (dry trench) on extreme right hand side of photo.	

File: MS-S-05

Altura Environmental Consulting

SITE INVESTIGATION RECORD

Client	Project Location	Project Reference
Government of Yukon	Mount Nansen Mine, Yukon	Mill Geochem Characterization

Site Name – Location Description	Date	Datum
MS-P-01 –Pond #1, ~250m below Mill Site	4-Jul-10	UTM Nad 83 Zone 8 V
Site Type	N	E
Pond, water sample site	6880986	388232
Waypoint(s) #	Elev (masl)	Survey Instrument
452	1167	Garmin GPS 60CSx

Description:

Primary objective of water quality sampling at this location was to ascertain the level of dissolved metals or other relevant contaminants in pond.

Sample site located near shoreline (available equipment did not permit ingress into centre of pond). Water obtained using disposable syringe and field-filtered as required for the various analyses. Depth of water at sample location approximately 10cm.

Water clear, sediment on bottom consisted of an orange-tan veneer underlain by very fine-grained dark grey muck, easily disturbed (see photo 580). Metals and sulphur results confirm that this underlying material is tailings (see Site Investigation Record MS-10-09).

An old shack (possibly a pump shack for returning process water to mill) located at southwest corner of pond (photos 611 and 579).

Various tributaries into pond include a watercourse near old pump shack, and an old pipe (approx 10cm diameter). Flow rates were not approximated, field conductivity ranged from 1600 to 2000 uS/cm. Dome Creek flows along the northeast margin of the pond via what appears to be an old control flume (conductivity 800-900 uS/cm), and was the only outlet seen from the pond. See photo 611.

1 water sample taken.

Samples:

Sample #	Sample Type	Description / Analysis / Other
MS-P-01	Water	Field values: pH 8.8, conductivity 1680 uS/cm, temp not recorded, depth 10cm. Analyses – Anions, general parameters, dissolved metals

Photographs:

Photo No. 611	Date 5-Jul-10
Taken From 10m Northwest of Dome Creek	Looking Southwest
Description Pond #1, approximately 250m below mill site. Yellow arrow: location of water sample MS-P-01; Red arrow: Dome Creek, flowing right to left through remnant wooden control structure; Blue arrow: area of tributaries into pond and sediment sample MS-10-09.	

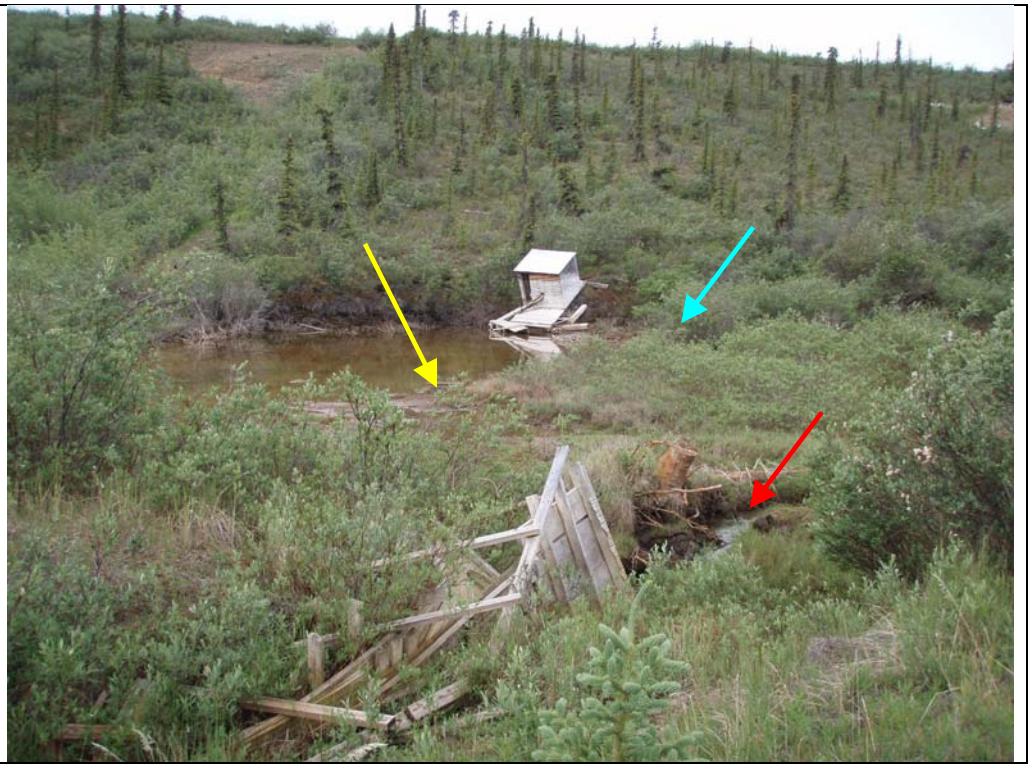

Photo No. 579	Date 4-Jul-10
Taken From 10m Northwest of Dome Creek	Looking Southwest
Description Pond #1, approximately 250m below mill site.	

Photo No. 580	Date 4-Jul-10	
Taken From Near MS-P-01	Looking down	
Description Sediments at water's edge of Pond #1 – orange/tan veneer underlain by very fine-grained dark grey clay/silt, confirmed by analyses to be tailings.		

Appendix C Field and Analytical Methodology

C1 Field Methodology

General Field Practices

Altura was provided with a georeferenced Tiff satellite photo file in January 2009 (*alpha_oMtNansen_QB_02Sept2008_utm8*); this photo was used for plotting sample and major feature information shown in several of the figures in the main report.

Field coordinates were determined on a NAD 83 datum using a Garmin 60CSx GPS, which for most all points reported accuracy of ±3-4 m horizontal and ±5 m vertical. Field water quality parameters were measurement using a Hanna HI 98130 Combo pH and EC meter, calibrated daily. Field paste pH measurements were determined by the Hanna meter.

Test Excavations

Test excavations were typically 1.5 to 2 metres depth, and 6 to 8 metres in length, and were completed on July 4, 2010 using a Caterpillar 320C excavator provided by Graceland Construction, the site caretakers. All excavations were generally described in terms of gross zoning and other dominant features, and photographed. Rock types encountered were described with respect to alteration, staining, estimated abundance of fines, and presence of sulphides. Where discernible, the original protolith was noted. The occurrence of any seeps or ponded water was also noted.

Rock Fill Sampling Practices

Rock fill samples were taken using a rock hammer to loosen and extract the sample, and then hand-loading into the sample bag. Samples were then double-bagged in heavy duty clear plastic sample bags. Samples were typically only taken from those excavations containing zones of moderate to highly altered material, or where sulphides were visible in the rock samples examined. Samples were shipped to SGS CEMI laboratory in Burnaby B.C. on July 9, 2010.

Pond Sediment Sampling Practices

Sediments from Ponds #1 and #2 were obtained from a location at the water's edge of each pond using an Edelman hand auger which allows for sediment cores to be taken in 15cm increments. Cores obtained were laid out in sequence, photographed, and described. The top few centimetres of core (at the solids/water interface) were set aside and the remainder taken for ABA and metals characterization. Samples were then double-bagged in heavy duty clear plastic sample bags, and were shipped to SGS CEMI laboratory in Burnaby B.C. on July 9, 2010.

Water Quality Sampling Practices

Water quality sample sites were included ponds, seeps, and sites along Dome Creek, and were sampled on July 4 and 5, 2010.

All three main water-retaining ponds were sampled (Ponds #1, #2, and #3). There were numerous seeps encountered over much of the study area and sites selected for sampling included those that: i) demonstrated potentially anomalous field characteristics (high amount of precipitate and/or algae, depressed pH, or elevated conductivity), ii) markedly high flow rate relative to other seeps, or iii) provided spatial representation over the study area. Sample sites along Dome Creek were selected based on measured inflections in field electrical conductivity during traverses down

the watercourse, with an additional sample taken to characterize water quality downstream of the lowest Pond (#1).

Samples were withdrawn from the pond or watercourse using a disposable syringe or a peristaltic pump with clean tubing and transferred into prepared bottles provided by the analytical laboratory. The bottles were triple rinsed with sample water prior to filling. Metals and nutrient samples were filtered through a 0.45µm syringe filter and then preserved in accordance with reagents provided by the laboratory. Samples were kept cool following sampling and shipped to Exova laboratory in Surrey, B.C. on July 5.

C2 Laboratory Methodology

Table C.1.1 provides details on analysis methodologies for solids.

All rock fill samples sampled and analysed in 2010 were air dried and then screened at the laboratory to remove the minus 3/8" fraction of waste rock, in order to get better representativity of the higher surface area particles. A split of the minus 3/8" fraction was then pulverized and analysed for geochemical parameters.

Pond sediments were analysed using the same parameters as for the rock fill samples; in addition, moisture content was determined gravimetrically.

Water quality analytical methodology is identical to that of the routine monitoring analysis conducted on established sites at Mount Nansen, and were carried out by Exova laboratory in Surrey, B.C.

Table C.1.1 Geochemical Physical Analysis Methodology

Analysis	Laboratory	Method(s)
Acid Base Accounting	Carried out by SGS CEMI, Vancouver , with subcontracting to other laboratories as required.	Paste pH: as per procedure by Sobek A., et. al. 1978 "Field and Laboratory Methods Applicable to Overburdens and Minesoils" (Report EPA-600/2-78-054) Paste Electrical Conductivity: measures electrical conductivity on same paste used for paste pH determination. Neutralization Potential: analyzed at SGS CEMI according to the procedure outlined in Leavitt, B. J., et al. 1995. "Effects of Siderite on the Neutralization Potential in the Acid-base Account" In: Proc. 17th Annual West Virginia Surface Mine Drainage Task Force Symposium, 4-5 April, West Virginia Univ., Morgantown. This procedure is basically the Sobek NP method followed by solid liquid separation (filtration) with peroxide addition to the leachate to convert ferrous to ferric prior to the back titration. Total Sulphur and Total Carbon: via Leco furnace Total Inorganic Carbon: a known weight of sample is placed into a glass test tube and acidified with 25% hydrochloric acid. The sample is boiled to evolve CO2 which is measured by coulometric titration with a UIC Carbon Dioxide Analyzer. Sulphate-sulphur: acid-soluble sulphate analysis according to ASTM D2492-02 "Standard Test Method for Forms of Sulfur in Coal". In this procedure, the sample is digested with 20% hydrochloric acid and the sulphur content measured by ICP. Sulphide-sulphur: procedure is based on a modified sulphide-sulphur method by Sobek, A. A., et al. 1978. "Field and Laboratory Methods Applicable to Overburdens And Minesoils", Report EPA-600/2-78-054. In this procedure, acid-soluble sulphate is first removed by treatment with 20% hydrochloric acid. The sulphide-sulphur in the residue is oxidized to sulphate in a 1:7 nitric acid to water solution, and the sulphur content is then measured by ICP. Insoluble sulphur: is the calculated difference between total sulphur and the sum of sulphate-sulphur and sulphide-sulphur (Total S – (Sulphate S + Sulphide S)). Insoluble sulphur is considered as acid-insoluble sulphur and is attributed to refractory sulphate compounds such as barite and alunite and to organic sulphur found in coal.

Analysis	Laboratory	Method(s)
Multi-Element ICP	Carried out by SGS CEMI, Vancouver , with subcontracting to other laboratories as required.	Total metals including Au were conducted on a pulverized sample by digesting 0.500 g in aqua regia at 95oC for 1 hour. The extract is then diluted to 10.0 mL and analyzed for metals by ICP-MS.

Appendix D Laboratory Analytical Results

				Pond			Seep					Dome Creek				
			Sample Site	MS-P-01	MS-P-02	MS-P-03	MS-S-01	MS-S-02	MS-S-03	MS-S-04	MS-S-05	DX	DX + 100	DX + 200	D1	Dome d/s Pond 1
			Sampled Date	7/4/2010	7/4/2010	7/4/2010	7/4/2010	7/4/2010	7/4/2010	7/5/2010	7/5/2010	6/30/2010	7/5/2010	7/5/2010	6/30/2010	7/5/2010
			Matrix	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water	Water
Parameter Name	Parameter Descripti	Unit	Detection Limit	Result Text	Result Text	Result Text	Result Text	Result Text	Result Text	Result Text	Result Text	Result Text	Result Text	Result Text	Result Text	Result Text
Aluminum	Dissolved	mg/L	0.005	0.007	<0.005	0.006	<0.005	0.007	<0.005	0.006	<0.005	0.006	0.015	0.01	<0.005	0.008
Antimony	Dissolved	mg/L	0.0002	0.013	0.0024	0.0077	0.0624	0.0016	0.0127	0.0035	0.0005	0.0007	0.0055	0.0111	0.0088	0.0063
Arsenic	Dissolved	mg/L	0.0002	0.0344	0.0384	0.0061	0.0173	0.0061	0.0246	0.0592	0.0218	0.0013	0.0056	0.0193	0.011	0.0134
Barium	Dissolved	mg/L	0.001	0.021	0.019	0.01	0.014	0.06	0.016	0.026	0.012	0.038	0.029	0.021	0.018	0.02
Beryllium	Dissolved	mg/L	0.00004	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004	<0.00004
Bismuth	Dissolved	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	Dissolved	mg/L	0.004	0.137	1.86	0.158	0.308	0.016	0.013	0.146	0.013	<0.004	0.007	0.01	0.004	0.07
Cadmium	Dissolved	mg/L	0.00001	0.00007	<0.00001	0.00015	0.0242	0.0011	0.00134	0.00061	0.00006	0.00001	0.00077	0.002	0.00057	0.00032
Chromium	Dissolved	mg/L	0.0004	0.0025	0.0015	0.0009	0.0031	0.0025	0.0024	0.0024	0.0044	<0.0004	0.002	0.0024	0.0007	0.002
Cobalt	Dissolved	mg/L	0.00002	0.0002	0.0003	0.00007	0.0004	0.00026	0.00047	0.00088	0.00023	0.00005	0.0003	0.00056	0.00008	0.00029
Copper	Dissolved	mg/L	0.001	0.002	<0.001	0.011	0.008	0.002	<0.001	0.001	0.001	<0.001	0.001	<0.001	<0.001	0.001
Iron	Dissolved	mg/L	0.01	0.03	0.16	0.06	<0.01	<0.01	0.24	5.83	0.05	<0.01	0.03	1.27	<0.01	0.26
Lead	Dissolved	mg/L	0.0001	0.0002	0.0003	0.0004	0.0107	0.0001	<0.0001	0.0002	0.0002	<0.0001	0.0001	0.0003	<0.0001	0.0001
Lithium	Dissolved	mg/L	0.001	0.011	0.005	0.002	0.01	0.007	0.009	0.005	0.021	<0.001	0.005	0.008	0.007	0.007
Manganese	Dissolved	mg/L	0.0002	0.0711	0.146	0.0014	0.0794	0.269	0.652	3.09	0.0673	0.0043	0.512	0.971	0.0099	0.618
Molybdenum	Dissolved	mg/L	0.0001	0.0002	0.0004	0.001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	0.0002	0.0001
Nickel	Dissolved	mg/L	0.001	0.002	0.001	<0.001	0.004	0.001	0.002	0.002	0.002	<0.001	0.001	0.002	0.001	0.002
Selenium	Dissolved	mg/L	0.0006	<0.0006	<0.0006	<0.0006	<0.0006	0.0007	<0.0006	<0.0006	0.001	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006
Silver	Dissolved	mg/L	0.00001	<0.00001	<0.00001	0.00006	0.00002	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Strontium	Dissolved	mg/L	0.001	0.646	0.344	0.178	0.628	0.306	0.414	0.594	1.08	0.194	0.294	0.402	0.421	0.453
Sulfur	Dissolved	mg/L	0.2	197	98	46.6	291	37.2	97	156	482	49.2	70.2	98.8	133	127
Thallium	Dissolved	mg/L	0.00001	0.00002	<0.00001	0.00002	0.00026	0.00004	0.00009	0.00002	0.00018	<0.00001	0.00005	0.00007	0.00003	0.00002
Thorium	Dissolved	mg/L	0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Tin	Dissolved	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium	Dissolved	mg/L	0.0004	0.0004	<0.0004	<0.0004	0.0005	0.0005	0.0007	0.0008	0.0005	0.0005	0.0007	0.0008	0.0005	0.0006
Uranium	Dissolved	mg/L	0.0004	0.0034	0.001	0.0005	0.0031	0.0012	0.0044	0.0011	0.0131	<0.0004	0.0027	0.0036	0.003	0.0024
Vanadium	Dissolved	mg/L	0.0001	0.0007	0.0003	0.0001	0.0008	0.0008	0.0008	0.0006	0.0012	0.0001	0.0005	0.0006	0.0003	0.0006
Zinc	Dissolved	mg/L	0.001	0.016	0.002	0.011	3.71	0.063	0.734	0.404	0.006	0.002	0.28	0.62	0.199	0.151
Zirconium	Dissolved	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury	Total Dissolved	mg/L	0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001

Parameter Name	Parameter Descripti	Unit	Sample Site Sampled Date Matrix Detection Limit	MS-P-01 7/4/2010 Water Result Text	MS-P-02 7/4/2010 Water Result Text	MS-P-03 7/4/2010 Water Result Text	MS-S-01 7/4/2010 Water Result Text	MS-S-02 7/4/2010 Water Result Text	MS-S-03 7/4/2010 Water Result Text	MS-S-04 7/5/2010 Water Result Text	MS-S-05 7/5/2010 Water Result Text	DX 6/30/2010 Water Result Text	DX + 100 7/5/2010 Water Result Text	DX + 200 7/5/2010 Water Result Text	D1 6/30/2010 Water Result Text	Dome d/s Pond 1 7/5/2010 Water Result Text
pH	@ 25 °C			8.05	8.05	7.95	6.98	7.55	7.12	7.44	7.21	7.27	7.17	7.59	8.01	7.93
Electrical Conductivity		µS/cm at 2	1	1730	974	479	1820	755	1120	1490	2920	414	788	1060	1090	1220
Calcium	Dissolved	mg/L	0.1	196	130	60.3	249	95.2	158	204	465	56	109	152	170	162
Magnesium	Dissolved	mg/L	0.1	136	51.4	14.6	109	37.1	50.9	82.6	283	13.5	33.8	48.8	48.5	70.1
Phosphorus	Dissolved	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.1	0.01	<0.01	<0.01	<0.01	0.01
Potassium	Dissolved	mg/L	0.1	9.8	7.2	2.7	8.1	4.7	5	5.4	8	4.9	4.3	4.6	4.1	5
Silicon	Dissolved	mg/L	0.05	2.75	2.71	0.71	4.46	4.06	5.45	6.04	4.8	4.47	5.26	5.62	5.06	4.92
Sodium	Dissolved	mg/L	0.1	12	8.7	13.1	11.4	5.8	6.4	11.2	15	4.3	5.2	6.1	5.3	8.3
Bicarbonate		mg/L	5	300	170	50	330	330	290	290	660	70	200	270	280	250
Carbonate		mg/L	6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6
Hydroxide		mg/L	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
P-Alkalinity	as CaCO3	mg/L	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
T-Alkalinity	as CaCO3	mg/L	5	250	141	43	268	270	239	241	545	54	164	220	226	208
Chloride	Dissolved	mg/L	0.02	1.07	0.85	0.53	0.78	0.47	0.74	0.68	0.82	<0.02	0.39	0.78	0.78	0.69
Nitrate - N	Dissolved	mg/L	0.01	0.09	<0.01	<0.01	0.3	0.71	0.12	0.27	0.16	<0.01	0.11	0.12	<0.01	0.19
Nitrite - N	Dissolved	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	<0.01
Sulfate (SO4)	Dissolved	mg/L	0.6	592	294	140	874	112	291	469	1450	148	211	296	398	380
Hardness	as CaCO3	mg/L	5	1050	536	211	1070	391	605	850	2330	196	412	581	623	694
Total Dissolved Solids	Calculated Value	mg/L	1	1100	584	259	1430	431	671	936	2560	271	476	657	776	766
Ammonia - N		mg/L			<0.01				<0.01		<0.01	<0.01			<0.01	
Cyanide	Strong Acid Dissocia	mg/L										0.02			0.008	
Cyanide	Weak Acid Dissocial	mg/L										0.002			0.002	
Cyanate	Digested Sample	mg/L										<0.2			<0.2	
Thiocyanate		mg/L										0.2			0.1	

CLIENT : Altura Environmental Consulting / Lorax Environmental
PROJECT : Mount Nansen Mill Area Characterization
SGS PROJECT # : 0894
TEST : Moisture Content
Date : July 19, 2010

Sample ID	Wet Wt. (g)	Dry Wt. (g)	% Moisture
MS-10-09	100	70.92	29.08
MS-10-10A	100	73.65	26.35
MS-10-10B	100	73.36	26.64

CLIENT : Altura Environmental Consulting / Lorax Environmental
PROJECT : Mount Nansen Mill Area Characterization
SGS PROJECT # : 0894
Test : Acid-Base Accounting with Siderite Correction on the -3/8" Fraction
Date : July 28/29, 2010

Sample ID	Paste pH	Paste EC µS/cm	TIC %	CaCO3 NP	C(T) %	S(T) %	S(SO4) %	S(S-2) %	Insoluble S %	AP	NP	Net NP	Fizz Test
MS-10-01A	7.46	603	0.66	55.0	1.15	2.66	0.11	2.12	0.43	66.3	53.6	-12.7	Slight
MS-10-01B	6.86	828	0.31	25.8	0.95	1.5	0.19	1.25	0.06	39.1	35.8	-3.3	Slight
MS-10-03A	6.83	678	0.02	1.7	0.27	0.63	0.29	0.05	0.29	1.6	14.7	13.1	None
MS-10-03B	7.00	786	0.06	5.0	0.91	0.1	0.02	0.07	0.01	2.2	17.8	15.6	None
MS-10-04A	7.79	866	1.61	134.2	1.71	4.11	0.02	4.00	0.09	125.0	127.8	2.8	Moderate
MS-10-04B	7.86	749	1.34	111.7	1.42	0.57	<0.01	0.52	0.05	16.3	111.7	111.7	Moderate
MS-10-05A	2.89	2360	<0.01	<0.8	0.15	2.59	1.17	0.68	0.74	21.3	2.0	-19.3	None
MS-10-05B	6.58	1267	0.05	4.2	1.14	0.24	0.04	0.15	0.05	4.7	16.7	12.0	None
MS-10-06	6.66	1759	0.07	5.8	0.26	1.2	0.59	0.25	0.36	7.8	17.0	9.2	None
MS-10-07A	7.46	1518	0.26	21.7	0.4	1.33	0.27	0.92	0.14	28.8	29.3	0.6	Slight
MS-10-07B	7.51	527	<0.01	<0.8	0.08	0.05	0.01	0.03	0.01	0.9	21.8	20.9	None
MS-10-09	7.53	1484	0.53	44.2	0.86	2.96	0.16	2.26	0.54	70.6	40.9	-29.7	Slight
MS-10-10A	6.65	712	0.03	2.5	2.59	0.1	0.02	0.04	0.04	1.3	16.8	15.6	None
MS-10-10B	6.62	770	0.07	5.8	3.96	0.19	0.09	0.06	0.04	1.9	15.2	13.3	None
Duplicates													
MS-10-01A	7.64	601	0.67		1.16	2.68	0.11	2.12			53.2		Slight
MS-10-07A			0.26		0.39	1.35	0.26	0.91					

Note:

AP = Acid potential in tonnes CaCO3 equivalent per 1000 tonnes of material. AP is determined from the sulphide sulphur content.

NP = Neutralization potential in tonnes CaCO3 equivalent per 1000 tonnes of material.

NET NP = NP - AP

Carbonate NP is calculated from TIC originating from carbonate minerals and is expressed in kg CaCO3/tonne.

CLIENT : **Altura Environmental Consulting / Lorax Environmental**
PROJECT : **Mount Nansen Mill Area Characterization**
SGS PROJECT # : **0894**
Test : **Low-Level Metals by Aqua Regia Digestion with ICP-MS Finish on the -3/8" Fraction**
Date : **August 1, 2010**

		MS-10-01A	MS-10-01B	MS-10-03A	MS-10-03B	MS-10-04A	MS-10-04B	MS-10-05A	MS-10-05B	MS-10-06	MS-10-07A
Ag	**ppb**	60956	84720	2167	2713	1870	1696	>100000	6324	83886	52841
Al	**%**	0.56	0.6	1.04	0.99	0.36	1.1	0.3	0.95	0.58	0.6
As	**ppm**	6402.3	7933	283.4	408.1	6769	350.1	6393.5	972.6	4404	2910.7
Au	**ppb**	3676.2	4994.3	108.9	198.5	450.7	136.2	9092.2	477.1	4373.5	3601.9
B	**ppm**	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Ba	**ppm**	102.7	141.7	155.2	181.2	68.9	251	98.4	154.1	207.8	130.4
Bi	**ppm**	1.35	0.92	0.88	0.31	0.3	0.12	3.94	0.15	28.22	21.86
Ca	**%**	1.49	0.87	0.28	0.53	3.7	2.34	0.58	0.59	0.8	0.67
Cd	**ppm**	96	62.82	2.45	2.91	7.06	30.21	40.36	3.42	22.25	25.44
Co	**ppm**	9.4	8.7	5.3	9.6	15.6	15.5	2.4	11.5	5.9	6.8
Cr	**ppm**	49.1	51	69.2	48.6	30.6	36.5	60.5	62.1	43.2	55.7
Cu	**ppm**	221.73	215.93	33.39	38.69	28.39	39.01	587.46	49.92	255.38	515.59
Fe	**%**	5.02	4.17	4.25	3.01	5.06	4.1	3.6	2.89	4.5	4.5
Ga	**ppm**	2	2.3	7.8	3.7	1.1	3.8	1.1	3.6	2.4	2
Hg	**ppb**	209	245	26	68	60	114	507	74	385	371
K	**%**	0.17	0.22	0.21	0.17	0.2	0.36	0.24	0.16	0.37	0.27
La	**ppm**	8	10.4	17.6	12.1	6.4	12.2	4.8	13.3	7.4	7.8
Mg	**%**	0.54	0.41	0.65	0.5	0.91	1.01	0.04	0.46	0.21	0.29
Mn	**ppm**	1521	1559	305	721	2823	1898	172	571	1083	2740
Mo	**ppm**	1.32	1.48	1.3	1.08	0.55	2.32	1.71	0.82	2.94	1.46
Na	**%**	0.01	0.01	0.132	0.031	0.002	0.004	0.005	0.027	0.015	0.009
Ni	**ppm**	10.9	9.9	9.8	12.1	6.7	8.2	4.7	13.7	7.4	7.8
P	**%**	0.075	0.073	0.081	0.078	0.155	0.085	0.043	0.079	0.057	0.056
Pb	**ppm**	5276.73	3916.31	133.13	192.41	48.67	144.38	>10000.00	484.95	3879.9	2079.01
S	**%**	2.62	1.49	0.61	0.12	4.09	0.55	2.61	0.24	1.22	1.34
Sb	**ppm**	460.7	537.31	19.28	25.89	35.62	24.09	1049.99	46.13	411.53	181.88
Sc	**ppm**	5.8	5.5	5.4	6.8	6.1	11.3	2.1	6.7	3.6	3.6
Se	**ppm**	1.5	1.6	0.8	0.8	1.3	0.7	2.6	0.6	0.6	0.4
Sr	**ppm**	38.4	35	75.8	26.7	40.6	60.6	57.5	24.9	47.2	41.8
Te	**ppm**	0.5	0.23	0.24	0.09	0.09	0.04	0.76	0.06	0.62	0.33
Th	**ppm**	4.4	6.1	5.3	2.9	2.1	3	2.5	3.1	2.7	2.4
Ti	**%**	0.012	0.012	0.037	0.045	0.001	0.034	<0.001	0.054	0.009	0.008
Tl	**ppm**	0.72	0.95	0.2	0.66	0.78	0.57	1.77	0.44	1.16	0.98
U	**ppm**	0.9	1.1	1.2	0.7	0.6	0.8	1	0.7	1	1
V	**ppm**	32	32	55	55	18	57	11	54	27	26
W	**ppm**	1.1	0.7	0.2	0.2	0.1	<0.1	0.2	0.1	<0.1	<0.1
Zn	**ppm**	5901.3	3283.6	199.3	212.1	404.3	2437.6	2233.5	441.7	1454.4	1681

CLIENT
PROJECT
SGS PROJECT #
Test
Date

	MS-10-07B	MS-10-09	MS-10-10A	MS-10-10B
Ag	598	>100000	564	514
Al	1.36	0.57	1.02	0.97
As	54.3	>10000.0	74.9	74.3
Au	21.5	8120.8	49	41.3
B	<20	<20	<20	<20
Ba	281.1	97.9	162.4	163.8
Bi	0.11	2.28	0.12	0.11
Ca	0.61	1.08	0.64	0.71
Cd	0.44	97.35	0.45	0.41
Co	17.1	7	9.6	11
Cr	79.7	40.4	62.9	61.1
Cu	51.58	684.93	32.42	33.72
Fe	3.73	4.5	2.2	2.21
Ga	4.8	1.8	3.7	3.3
Hg	45	251	43	34
K	0.38	0.21	0.16	0.14
La	13.2	5.3	10.4	10.9
Mg	0.73	0.3	0.54	0.51
Mn	557	1675	286	474
Mo	0.73	2.41	0.62	0.55
Na	0.03	0.006	0.039	0.036
Ni	21.7	15	12	12.1
P	0.114	0.046	0.077	0.073
Pb	27.04	8215.8	34.25	25.62
S	0.04	2.82	0.1	0.18
Sb	5.29	716.84	6.39	5.28
Sc	10.7	4.6	5.2	4.6
Se	0.7	1.2	0.3	0.4
Sr	33.1	42	29.7	30.3
Te	0.04	0.55	<0.02	<0.02
Th	3.5	2.7	2	2
Ti	0.092	0.003	0.075	0.072
Tl	0.38	1.44	0.27	0.24
U	0.5	1.5	0.6	0.8
V	90	18	57	53
W	<0.1	0.5	0.1	0.1
Zn	94.7	5835.4	78.1	68.6