Archaeological and Heritage Consulting

Heritage Resources Overview Assessment of the Minto Mine Claim Area and Heritage Resources Impact Assessment of the Proposed Minto Mine Phase IV Expansion Conducted Under Permit 10-08ASR.

Prepared by: Matrix Research Ltd.

Prepared for: Minto Explorations Ltd.

March, 2011

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March, 2011

ACKNOWLEDGEMENTS

Matrix Research Ltd. would like to thank all of the people from the various organizations who contributed to the heritage assessment. The proposed development proponent was Minto Explorations Ltd. Thank you to Colleen Roche and Anne Labelle for logistical support.

Ruth Gotthardt and Chris Thomas at the Cultural Services Branch, Department of Tourism and Culture, Government of Yukon, discussed the heritage assessment with us and provided information on past heritage resources work in the study area. We thank them for their input and comments.

The opinions, recommendations, omissions, and / or errors in this report are those of Matrix Research Ltd. alone and do not necessarily reflect the positions held by Minto Explorations Ltd., Selkirk First Nation, or the Government of Yukon.

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MANAGEMENT SUMMARY

This report details the results of a Heritage Resources Overview Assessment (HROA) for the Minto Mine claim area and a Heritage Resources Impact Assessment (HRIA) for the proposed Minto Mine Phase IV Expansion within the broader Minto Mine claim area.

The HRIA was anticipated to be required as part of the Yukon Environmental and Socio-economic Assessment Board (YESAB) proposed development review process. The HROA was also requested for the purposes of managing potential conflicts with heritage resources during future mining related developments in the study area. The objectives of this heritage study were as follows: 1) classification of the study area land base into zones of heritage potential through the HROA, 2) refinement of the HROA through ground-truthing during the HRIA, and 3) identification and documentation of above- and below-ground heritage resources within the Minto Mine Phase IV Expansion area.

As a result of the HROA, the entire study area has been classified into zones of heritage resources potential, either high or low. Further heritage resources investigations are recommended for high heritage resources potential areas prior to any potentially ground-altering development activities. Following the HROA, HRIA fieldwork was conducted on August 20th and 21st, 2010. Two heritage sites, **KdVd-2** and **KdVd-3**, both consisting of pre-contact lithic artifacts, were identified within the Minto Mine claim area but outside of the Minto Mine Phase IV Expansion area.

Heritage resources are protected from non-permitted alterations or disturbance by the *Historic Resources Act* (Government of Yukon 2002) and the *Archaeological Sites Regulations* (Government of Yukon 2003). To ensure that the discovery of any unanticipated heritage resources is addressed, it is recommended that Minto Explorations Ltd. inform their personnel and contractors that, in the event that heritage resources are encountered, all development activities in the vicinity of the heritage resources must be suspended immediately. In such cases the Selkirk First Nation and the Cultural Services Branch, Department of Tourism and Culture, Government of Yukon must be contacted as soon as possible with information on the heritage remains and nature of the disturbance. Information on the identification of heritage resources can be found in a publication entitled *Handbook for the Identification of Heritage Sites and Features* (Gotthardt and Thomas 2005).

This study was designed as a heritage resources overview assessment and heritage resources impact assessment and was not intended to evaluate or comment on traditional Aboriginal use of the areas in which development is proposed. The results of this study, therefore, should not be considered valid for that purpose.

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List of Appendices

1.0 INTRODUCTION

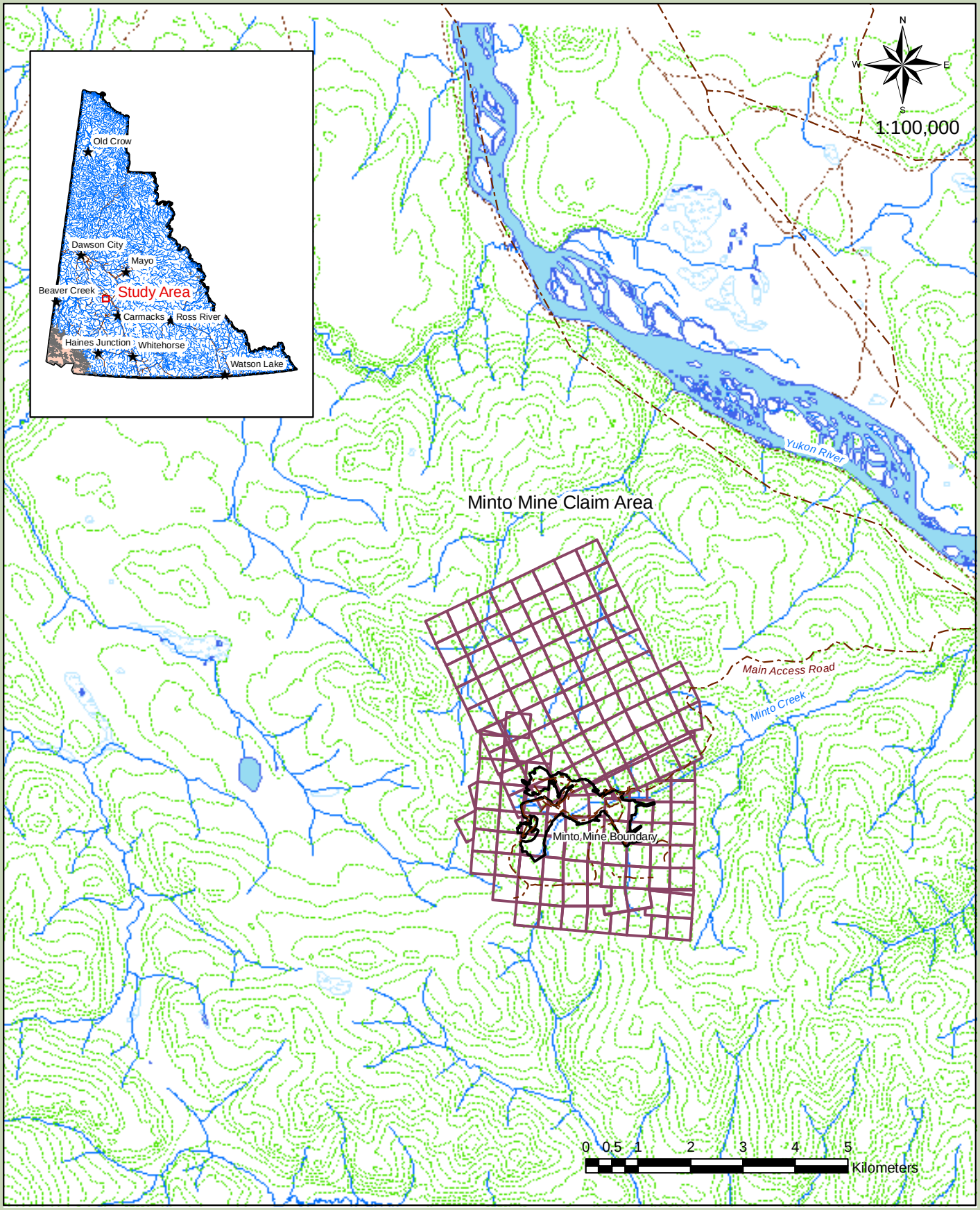
This report details the results of a Heritage Resources Overview Assessment (HROA) for the Minto Mine claim area and a Heritage Resource Impact Assessment (HRIA) of the proposed Minto Mine Phase IV Expansion area. This study was conducted at the request of Minto Explorations Ltd.

The Minto Mine property is located approximately 240 km north of Whitehorse and due west of Minto Landing between the communities of Carmacks and Pelly Crossing (Map 1). The current Minto Mine is a high grade copper-gold mine situated in the Minto Creek valley approximately 11 km west of the Yukon River and 9 km north of Big Creek. Exploration and development of the Minto claim area began in the early 1970s followed by commencement of mine construction in the mid-1990s. Construction was suspended in 1997. A dormant construction site was acquired by Minto Explorations Ltd. in 2005 and commercial production at the mine began October 1, 2007. Exploration drilling programs in the Minto Mine claim area have continued since 2005 and have resulted in the proposed Phase IV mine expansion plans.

The HRIA was anticipated to be required as part of the Yukon Environmental and Socio-economic Assessment Board (YESAB) proposed Phase IV expansion development review process. The HROA was also requested for the purposes of managing potential conflicts with heritage resources during future mining related development in the study area. The objectives of this heritage study were as follows:

1) classification of the study area land base into zones of heritage potential through the HROA, 2) refinement of the HROA through ground-truthing during the HRIA, and 3) identification and documentation of above- and below-ground heritage resources within the Minto Mine Phase IV Expansion area.

Fieldwork was conducted by Ty Heffner and James Alec of Matrix Research Ltd. and Daniel Alfred of Selkirk First Nation, on August 20th and 21st of 2010.



Quartz Claim
Mine Boundary
Road
Stream
30m Contour
Trail
River/Lake
Wetland

MAP 1: Minto Mine Claim Area

MATRIX Research Ltd

MAPSHEETS: NTS: 115 I/11

LOCATION: Yukon River

PROJECTION: NAD83 Zone 8

PROPONENT: Minto Explorations Ltd.

JOB #: M10-082-Minto-Expansion

1.1 Report Format and Distribution

This report is divided into seven sections and five appendices.

Section 1: Introduction

This section introduces the heritage assessment study and discusses the work undertaken, duration of the study, relevant legislative references and definitions, and a summary of contacts made with First Nations.

Section 2: Heritage Assessment Description

This section discusses the intent of the heritage assessment in relation to the proposed development.

Section 3: Proposed Development Area

This section describes the location of the HROA study area and the specific HRIA expansion area and contains a map showing their geographical setting. A brief overview of previous archaeology within the area is also presented.

Section 4: Methodology

This section discusses the methods used while conducting the heritage assessment. Maps are provided that show the survey area and locations of survey transects.

Section 5: Results

This section summarizes the results of the HROA and contains descriptions of the locations assessed during the HRIA of the Minto Mine Phase IV Expansion, including details on the physical setting, methodology, and results. Two heritage sites were recorded during the HRIA.

Section 6: Recommendations

This section provides recommendations for the management of heritage resources and heritage potential identified during the HROA and HRIA.

Section 7: References Cited

This section lists bibliographic information for all references cited in the text.

Appendices

Included with this report are five appendices containing a glossary of archaeological terms, heritage site maps, pre-contact artifact photographs, heritage assessment photographs, and catalogues for pre-contact lithic artifacts.

1.2 Legislative References

Legislation that ensures the management and protection of archaeological and historical resources is found in the *Historic Resources Act* (Government of Yukon 2002) and *Archaeological Sites Regulations* (Government of Yukon 2003). This legislation applies to archaeological and historical sites older than 45 years whether they are located on public or private land. The permit for this Heritage Resources Impact Assessment (10-08ASR) was issued and administered by the Manager of Heritage Resource Unit, Cultural Services Branch, Department of Tourism and Culture.

1.3 First Nations Referral and Correspondence

The area assessed during this study is located within the traditional territory of Selkirk First Nation (SFN) and it is situated on SFN settlement land. Information on the proposed development was referred to SFN as part of the Yukon Environmental and Socio-economic Assessment Board (YESAB) proposed development review process. Matrix Research Ltd. contacted SFN to initiate discussion concerning the heritage resources overview assessment and to obtain any existing traditional land use information or oral history pertinent to the study area. A representative from the First Nation was requested to assist with fieldwork; Daniel Alfred of SFN participated in the fieldwork for its entire duration.

2.0 HERITAGE ASSESSMENT DESCRIPTION

The aim of a Heritage Resources Overview Assessment (HROA) is to assess the potential for a proposed development area to contain heritage resources (such as archaeological or historic sites) and to make recommendations concerning the need and scope for further heritage studies.

The aim of a Heritage Resources Impact Assessment is to:

1) Identify and evaluate heritage resources within the study area;

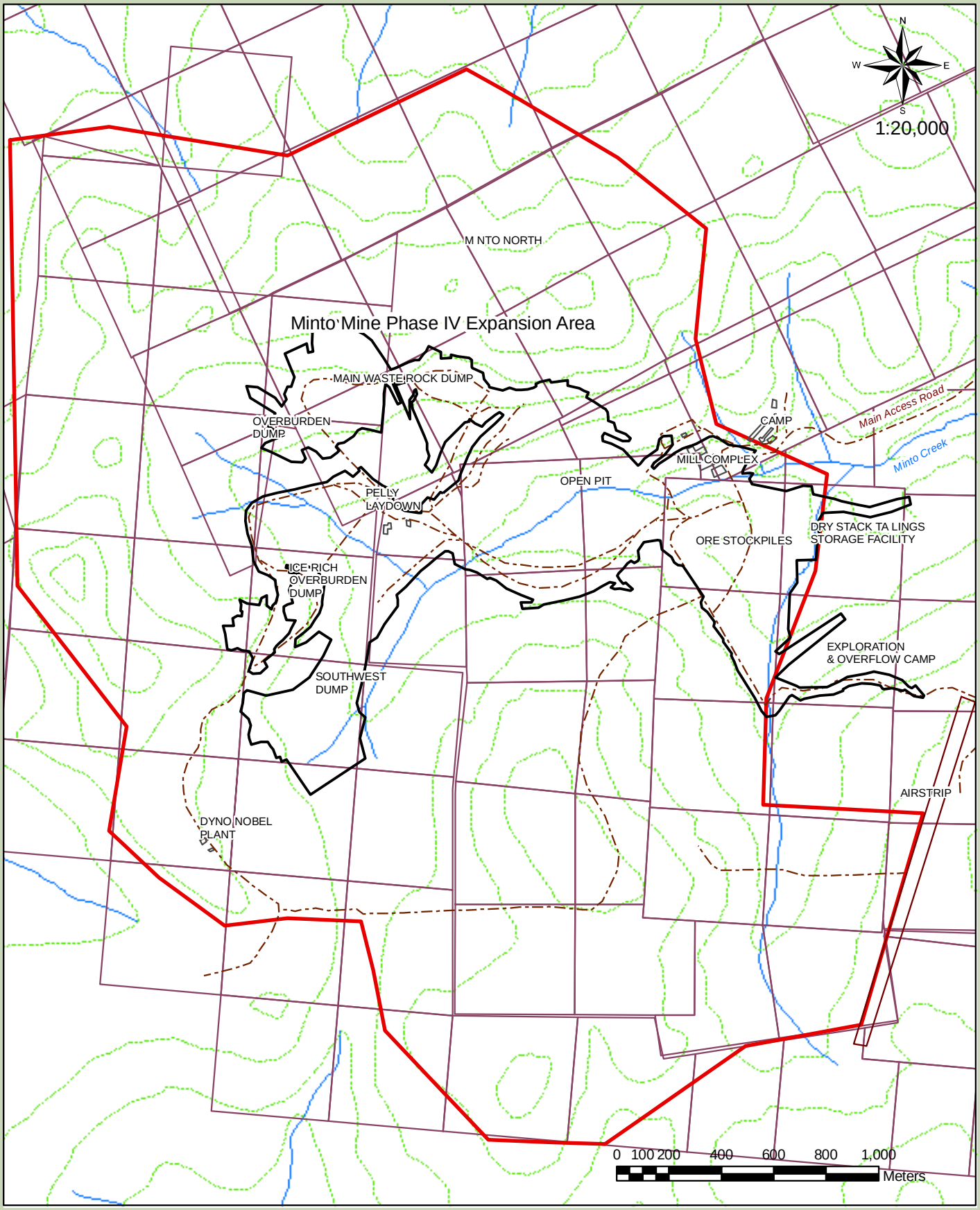
2) Identify and assess all impacts to heritage resources which might result from the proposed development; and

3) Recommend viable alternatives for managing unavoidable adverse impacts including a preliminary program to:

i. Implement and schedule impact management actions, and where necessary,
ii. Conduct surveillance and / or monitoring.

The HROA component of this study was intended to classify the land base within the Minto Mine claim area into zones of heritage potential, either high or low. Based on findings from the HROA, the Minto Mine Phase IV Expansion area contained areas of high heritage potential. This necessitated the completion of the HRIA component of this study, which was intended to identify heritage resources and assess potential impacts that may result from the proposed development.

The Minto Mine Phase IV Expansion (Map 2) is currently in the exploration stage. Hundreds of diamond drill holes are located across three areas of the proposed Phase IV expansion zone. Current facilities at the mine include a large semi-permanent camp with various storage facilities/repair sheds related to mine production; mill buildings; a small tent camp of 10-12 storage sheds/overflow accommodation; and one open pit mine. In addition, there are numerous access roads throughout the mine site/camp and roads linked to the 29 km main Minto Mine access road. This road joins the mine to the Klondike Highway at Minto Landing through a barge system that operates in the summer and an ice bridge that operates in the winter. An airstrip is also located southeast of the main camp.



Quartz Claim
Mine Boundary
Mine Expansion
Road
Stream
Wetland
30m Contour
Building
Runway

MAP 2: Minto Mine Phase IV Expansion Area

MATRIX Research Ltd

MAPSHEETS: NTS: 115 I/11

LOCATION: Yukon River

PROJECTION: NAD83 Zone 8

PROPONENT: Minto Explorations Ltd.

JOB #: M10-082-Minto-Expansion

3.0 PROPOSED DEVELOPMENT AREA

3.1 Natural and Cultural Setting

The proposed development area is located in the Yukon Plateau-Central Ecoregion approximately 240 km north of Whitehorse and due west of Minto Landing, between the communities of Carmacks and Pelly Crossing. This ecoregion is characterized by numerous lakes and broad valleys interspersed with rounded, rolling hills, and plateaus surrounded by higher mountain ranges. The current Minto Mine is situated in the Minto Creek valley approximately 11 km west of the Yukon River and 9 km north of Big Creek. The immediate area consists of a series of hills and valleys with a maximum elevation of approximately 914 m above sea level. Forest cover is comprised mainly of lodgepole pine and black and white spruce with the majority of the surrounding mountain tops completely forested. Soils in the ecoregion are mostly brunisols (generally immature soils with notable brown B horizons that are found in drier forested areas) while wetlands, north-facing slopes, and alpine areas are associated with cryosols (generally fine-textured soils associated with permafrost).

The area surrounding Minto Mine is within traditional territory of Selkirk First Nation (SFN). The SFN are members of the Northern Tutchone cultural group and belong to the Athapaskan language family (Gotthardt 1987). Traditional subsistence activities in the area include hunting, trapping, salmon fishing, and berry picking. The seasonal round of the SFN involved a high degree of mobility by groups of one or two families throughout much of the year with regular aggregations at summer salmon fishing camps and potlaches. In the spring, people hunted and trapped mammals and grouse in the lowlands, netted pike, grayling, and sucker, trapped beaver, and hunted ducks in the wetlands. Summer was a time for catching and drying salmon, collecting berries, and gathering medicinal plants. Big game such as moose, caribou, sheep, and bear were hunted in autumn along with migratory waterfowl and lake fish. The SFN dispersed in winter and relied on ice fishing, trapping small mammals, snaring grouse and ptarmigan, and hunting moose, beaver, and muskrat. Summer shelters typically consisted of a spruce pole tripod frame covered in spruce boughs, all of which was relatively easy to erect and move. In winter, these shelters were covered in moose or caribou hides, moss, snow, and/or ice for insulation.

The SFN maintained trade relations with the Coastal Tlingit and met at summer fish camps along the Yukon River (Gotthardt 1987). The area became an important fur trade centre with the establishment of a Hudson's Bay Company post at Fort Selkirk in 1848. Members of SFN became increasingly involved in trapping in the 19th century and eventually wood cutting for steamboats in the early 20th century as Fort Selkirk became an important northern outpost during the gold rush. First Nations heritage resources in the area include fish camps, trapline cabins, caches, burials, trails, and pre-contact stone tool workshops. Oral history from SFN Elders S. Jonathan and M. Van Bibber (Greer 1994: 22) indicate that the land around Minto Mine was used for hunting and trapping before a large forest fire burned the area in 1980 (Government of Yukon 2009). The Minto Landing area is considered an important part of the Selkirk First

Nation seasonal round with fish camps set up along the banks of the Yukon River during the salmon season. The mountains in the surrounding area were also hunting and berry picking grounds.

A concise description of the environmental and ethnographic cultural background of the study area and immediate surroundings is available in the report for Permit #94-6ASR (Greer 1994) on file at the Yukon Government Heritage Resources Unit.

3.2 Previous Heritage Work

Prior to the construction of Minto Mine, an archaeological impact assessment of the mine site, access road, and barge landing areas was undertaken by Sheila Greer in 1994 (Permit #94-6ASR). During Greer's (1994) study, no archaeological sites were identified at the proposed mine and mill site located at the headwaters of Minto Creek.

Greer (1994) identified heritage site **KdVd-1** (a.k.a. Trouble Hill) on the north side of the confluence of Minto Creek on the west bank of the Yukon River. The site was revisited in 2007 by Thomas (2008) under Permit 07-3ASR, however, the locality identified by Greer was not relocated. Two distinct features were identified by Thomas in 2007 on the north side of Minto Creek and were subsequently tested for subsurface cultural materials. These features consisted of a large bedrock outcrop and a terrace feature overlooking the Yukon River. From the cultural remains and hearth features present, the site appears to have been used and inhabited regularly over the last 4000 years. Further archaeological testing was undertaken during the 2009 field season (Farnell 2010). A total of 193 lithic artifacts and over 2500 animal bone fragments were recovered from two excavation areas in 2009. Identified species include caribou, moose, muskrat, hare, ground squirrel, and beaver. Fire-cracked rock from both areas suggests that hearths are also associated with **KdVd-1**. Farnell (2010) concluded on the basis of artifact distribution and a complex stratigraphic profile that the site witnessed reoccurring and prolonged pre-contact occupations.

Two archaeological sites have been recorded along the banks of the Yukon River around Minto Landing. Heritage site **KdVc-1** is located to the north of Minto Landing. According to the Yukon Archaeological Site Record, this site was initially recorded by S. Van Dyke in 1978. Sheila Greer revisited the site in 1994. The site is located along a bench feature on the east side of the Yukon River at the western end of the Minto airstrip. The site record indicates that a midden, hearth, scatters of lithic artifacts, fire cracked rock, and bone were identified.

Heritage site **KdVc-2** is located at Minto Landing. According to the Yukon Archaeological Site Record, heritage site **KdVc-2** was initially recorded by S. Van Dyke in 1978. Van Dyke recorded the site at the north end of a quarried area along the east side of the Yukon River, northwest of the northernmost structure at Minto Landing. He described the site as including a scatter of lithics and bone, midden, cabin, cache, cellar, and drying rack. In subsequent years, Sheila Greer (1994) and T.J. Hammer of Hammerstone Consulting (1996) revisited the site. Cultural material identified by Greer in 1994 included a midden, hearth, lithic scatter, fire cracked rock, and bone. The site extent, as recorded by Greer in

1994, was expanded to include approximately 1 km of river bank to the north-northwest of the current Minto Mine ice bridge approach. Since Greer's (1994) work, **KdVc-2** is now the Borden number designation generally accepted as applying to the entire heritage site at Minto Landing.

In 2005, an archaeological field inventory was conducted by Thomas Heritage Consulting for the Yukon Energy Corporation's proposed Carmacks-Stewart transmission line right-of-way (Permit 05-14ASR; Thomas 2006). The archaeological field inventory resulted in the discovery of numerous historical and archaeological sites. Two archaeological sites (**KdVc-10**, and **KdVc-11**), associated with Lhutsaw Creek are situated approximately 2.1 km and 2.2 km northeast of Minto Landing, respectively. Both sites comprise scatters of lithic tools and are situated on high terraces.

In 2007, a Heritage Resources Impact Assessment (HRIA) was conducted by Matrix Research Ltd. for the Yukon Energy Corporation proposed Carmacks-Stewart transmission line right-of-way (07-15ASR, Heffner & Burkmar 2009b; see Map 2) which identified a portion of heritage site **KdVc-2** in direct conflict with the proposed transmission line. Mitigative work was conducted in 2008 within portions of **KdVc-2** that overlapped with the proposed transmission line. Seven, 1 m x 1 m evaluative units and one 0.5 m x 0.5 m unit were excavated during this mitigation (08-03ASR, Heffner & Burkmar 2009a).

In 2009, Matrix Research Ltd. conducted a HRIA and systematic data recovery at that portion of **KdVc-2** located at the current ice bridge approach (09-16ASR, Davison 2010). During that study ten 1 m x 1 m evaluative units were excavated. Cultural material found above and below a previously dated layer of White River Ash (Smith *et al.* 2004) indicate occupations before and after AD 800. Excavation at **KdVc-2** resulted in the recovery of 323 lithic artifacts including stone tools of pre-contact or proto-contact age. Also found were 492 bone fragments consisting mostly of small, unidentifiable burned or calcined pieces. A buried hearth with associated lithic material was found below the layer of White River Ash and four possible cultural depressions were identified in the immediate area. Pre- and proto-contact artifact types at the site indicate general purpose activities such as tool maintenance and use, and subsistence activities (Davison 2010). A post contact component was also identified at **KdVc-2**, consisting of late nineteenth and twentieth century artifacts (*e.g.*, cans, nails, pottery, wire, glass, and unidentified metal).

4.0 METHODOLOGY

The following section describes the methods used for the Heritage Resources Overview Assessment (HROA) and Heritage Resource Impact Assessment (HRIA). During the HROA, background information was combined with aerial and previous ground observations to produce a preliminary assessment of heritage resources potential in the study area. The HROA resulted in the identification of high potential zones in the expansion area, which warranted an HRIA. Results of the HROA and subsequent HRIA of the Minto Mine Phase IV Expansion are presented in Section 5.0.

4.1 Heritage Resources Overview Assessment

All available maps, digital elevation models, satellite imagery, ethnographies, histories, and archaeological reports for the study area were examined. Criteria used to determine potential for heritage resources included: proximity to streams and water bodies, known heritage sites, known aboriginal or historic trails, topography, vegetation cover, and presence of fish and wildlife habitat. The entire claim area was classified into zones of high or low heritage resources potential. The Minto Mine Phase IV Expansion area within the broader claim area was found to contain zones of high heritage resources potential necessitating the recommendation and completion of an HRIA.

4.2 Limitations of the HROA

Given that there are no previously recorded sites within the specific study area the criteria used to determine heritage resources potential during this study was primarily derived from previous experience in terrain comparable to the Minto Mine area. Our current understanding of past settlement patterns and land use of the area is significantly limited by: the lack of detailed information on environmental and geomorphological changes throughout the glacial and post-glacial periods, meager ethnographic data, and the paucity of heritage studies and known sites recorded in the area.

When viewing the HROA results in the broader study area it is important to note that low potential does not mean **no** potential. It is possible for heritage sites to be located outside of areas identified as having high heritage resources potential. To ensure that the discovery of any unanticipated heritage resources is addressed, it is recommended that Minto Explorations Ltd. inform their personnel and contractors that, in the event that heritage resources are encountered, all development activities in the vicinity of the heritage resources must be suspended immediately. In such cases Selkirk First Nation and the Cultural Services Branch of the Government of Yukon Department of Tourism and Culture must be contacted as soon as possible with information on the heritage remains and the nature of the disturbance.

4.3 HRIA Field Procedures

Pedestrian Survey

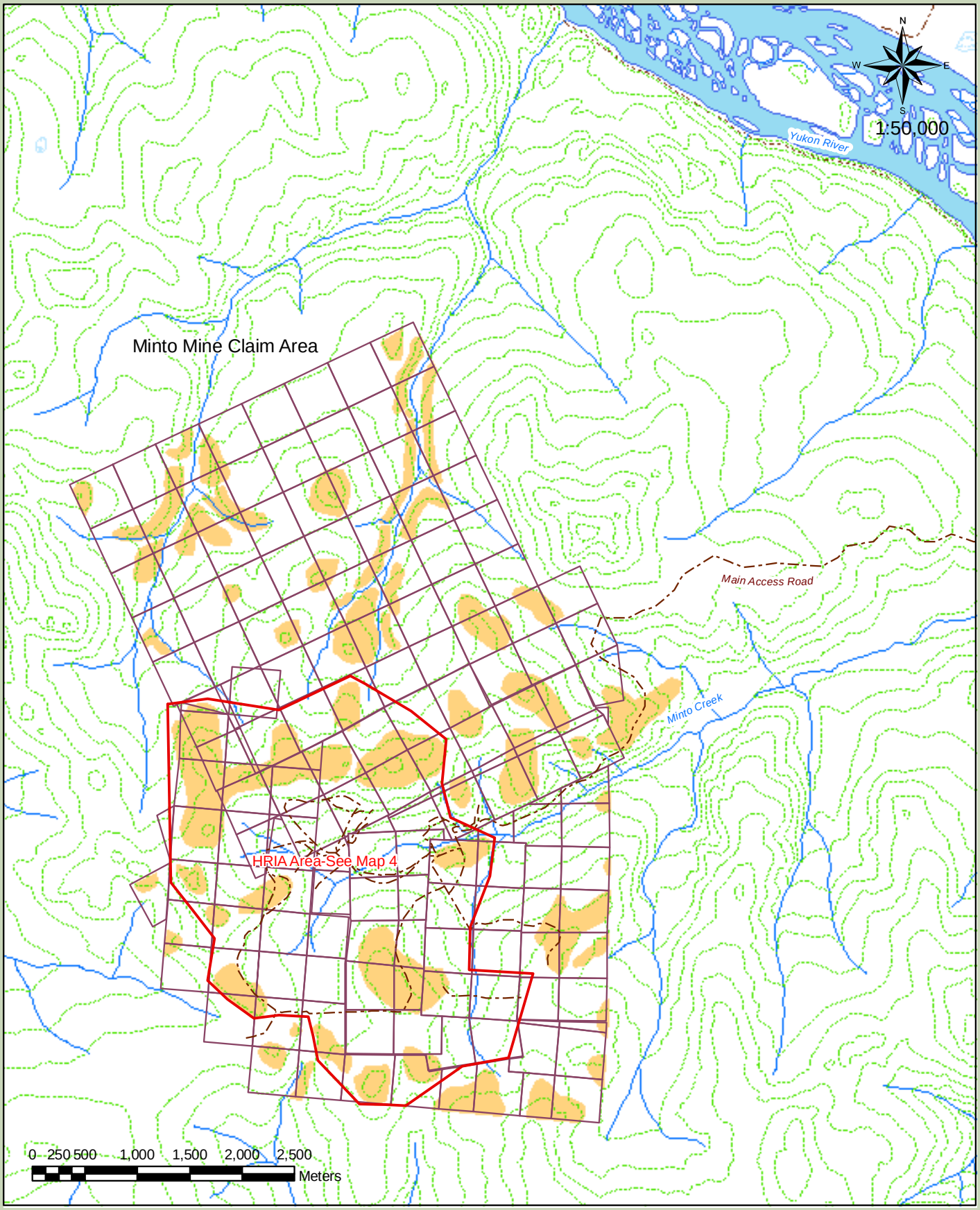
Based on the HROA, numerous areas of high heritage resources potential were identified within or adjacent to the proposed Minto Mine Phase IV Expansion area. These locations were investigated during the HRIA. Pedestrian survey transects were judgmental and traverses targeted notable exposures (*e.g.*, tree throws, cut banks, wind exposures, and areas with limited soil development) and noteworthy topographic features (*e.g.,* saddles, knolls, and ridge tops). Handheld GPS units were used to record pedestrian transects that are indicated on Map 4.

Visual inspection during the HRIA resulted in the identification of seven specific high potential areas that warranted subsurface testing identified as HPZ 1 to HPZ 7 on Map 4. The intent of the testing was to either determine the presence of subsurface heritage resources when none were visible on the surface, or to determine the presence of a subsurface component when heritage resources were identified on the surface. Subsurface tests were excavated by shovel and measured approximately 30 cm square and were excavated to sterile sediment, generally weathered bedrock located no more than 30 cm below surface. Sediments were passed through ¼ inch steel mesh screen. Subsurface testing was deemed unnecessary in low potential areas or in areas of high potential where surface or subsurface exposures were considered adequate and intensive examinations failed to produce any indication of past human activity.

5.0 RESULTS

5.1 HROA Results

The land base in the claim area has been classified into zones of heritage potential. Heritage potential is rated as high or low. It is important to note that the classification scheme is a predictive tool and that low potential does not mean no potential as it is possible for heritage resources to be encountered anywhere in the study area. Zones of high heritage potential are portrayed as polygons on Map 3. GIS shapefiles are provided so that these HROA polygons can be overlaid onto development planning maps.



Quartz Claim
Mine Expansion
Road
Stream
River/Lake
Wetland
30m Contour
High Potential

MAP 3: Minto Mine Claim Area HROA

MATRIX Research Ltd

MAPSHEETS:
NTS: 115 /11

LOCATION: Yukon River

PROPONENT: Minto Explorations Ltd.

PROJECTION: NAD83 Zone 8

JOB #: M10-082-Minto Expansion

5.2 HRIA Results

This section contains descriptions of the two heritage sites identified in the Minto Mine Phase IV Expansion area (Map 4) identified in HPZ 1 and HPZ 2. No heritage resources were identified in HPZ 3 to 7. Maps of the sites are provided in Appendix B. Photos of all sites identified during this study are provided in Appendix D.

5.2.1 Heritage Resource Site Summaries

Two newly recorded heritage sites were identified within the study area during this heritage assessment. The following is a summary of these sites.

KdVd-2 (Temporary Site Number M10-Minto-1)

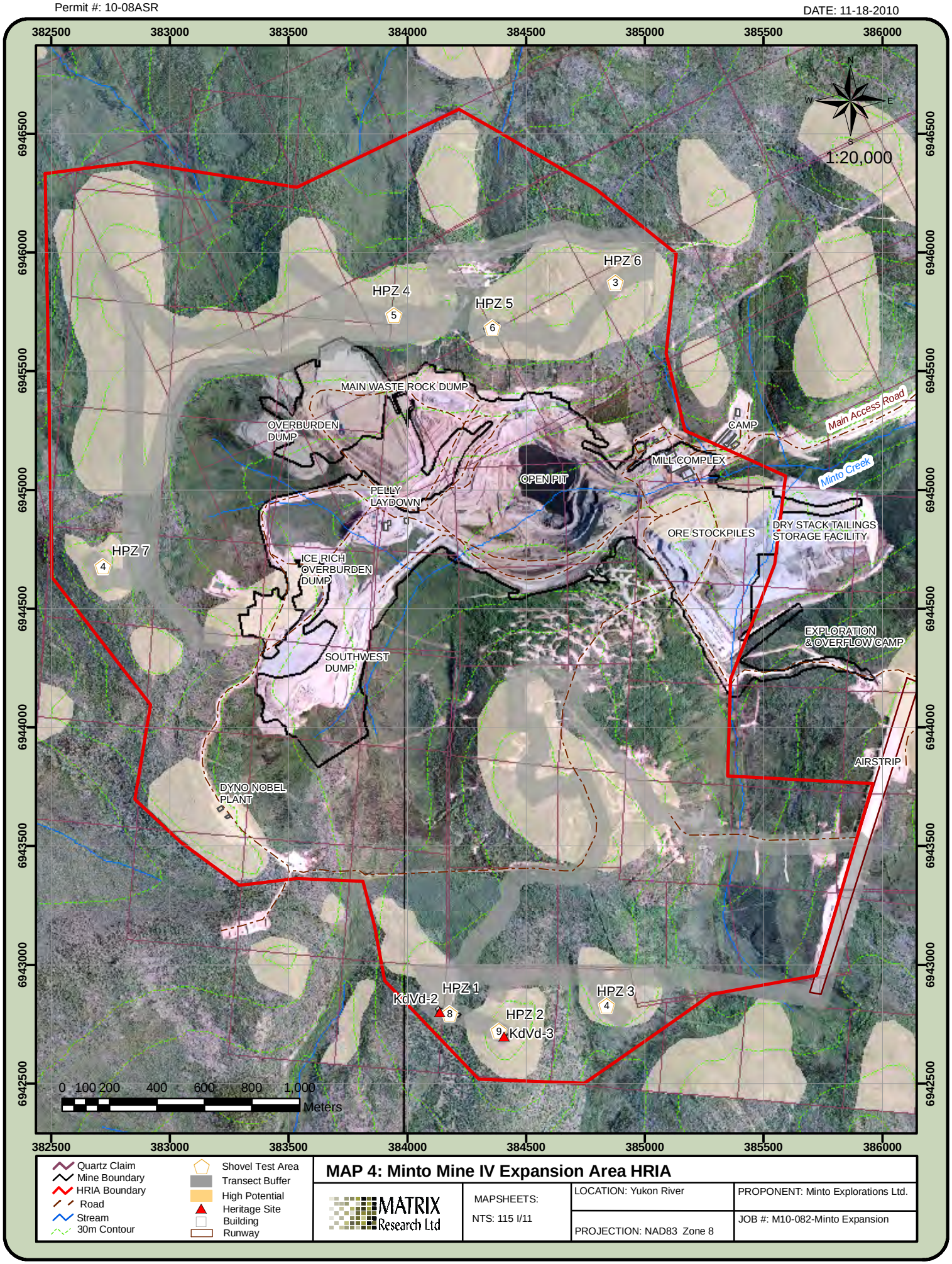
KdVd-2 is located approximately 2 km south of the Minto Mine open pit overlooking Minto Creek valley to the north and is approximately 8.7 km southwest of the Yukon River. The site is situated on a prominent knoll at the edge of a high ridge feature with a high degree of surface exposure owing to a recent forest fire. The site consists of pre-contact surface and subsurface cultural material including a lithic scatter with stone tools identified in two shovel tests and three surface find locations. One projectile point was found on the surface and a small scatter of stone flakes with a biface fragment were found 3 m to the northwest. Additional surface and subsurface stone flakes were found approximately 45 m to the northwest at the northwest extent of the knoll feature. Artifact types present at the site indicate general purpose activities such as tool use and maintenance as well as use of the knoll as a hunting lookout. A complete site assessment was not conducted and the site dimensions are unknown but the site is surrounded by sloped terrain and is likely confined to the knoll feature. Disturbance to the site is moderate to high on account of surface exposure resulting from the removal of surface vegetation during a recent forest fire. The site will be subject to continuing wind erosion. All artifacts were collected for recording purposes and will be forwarded to the Yukon Archaeology Program after cataloguing and analysis is complete. Site vegetation consists of low aspen, willow and alder with grass, kinnikinnick, and twinflower.

KdVd-3 (Temporary Site Number M10-Minto-2)

KdVd-3 is located approximately 2.1 km south of the Minto Mine open pit overlooking Minto Creek valley to the north and is approximately 8.6 km southwest of the Yukon River. The site is situated on a prominent knoll with a high degree of surface exposure owing to a recent forest fire. The site consists of pre-contact cultural material found on the surface including several stone flakes and a roughly shaped quartzite projectile point identified in three surface find locations. Artifacts were found to extend for approximately 15 m northwest-southeast across the knoll feature. Nine shovel tests were excavated to determine if the site had a subsurface component but all were negative. Site function is difficult to determine based on the few artifacts present at the site but the lithic debris and tool suggest general tool use and maintenance as well as use of the knoll as a hunting lookout. A complete site assessment was not conducted and the site dimensions are unknown. Shovel tests on an immediately adjacent high potential feature failed to yield cultural material (see attached site map) suggesting that the site is likely confined to the knoll. Disturbance to the site is moderate to high as a result of a recent forest fire that removed surface vegetation and exposed the site to continuing wind erosion. All artifacts were collected for recording purposes and will be forwarded to the Yukon Archaeology Program after cataloguing and analysis is complete. Site vegetation consists of low aspen, willow and alder with grass, kinnikinnick, and twinflower.

Permit #: 10-08ASR

DATE: 11-18-2010



Quartz Claim
Mine Boundary
HRIA Boundary
Road
Stream
30m Contour

Shovel Test Area
Transect Buffer
High Potential
Heritage Site
Building
Runway

MAP 4: Minto Mine IV Expansion Area HRIA

MATRIX Research Ltd

MAPSHEETS:
NTS: 115 I/11

LOCATION: Yukon River

PROJECTION: NAD83 Zone 8

PROPONENT: Minto Explorations Ltd.

JOB #: M10-082-Minto Expansion

6.0 HERITAGE RESOURCE MANAGEMENT RECOMMENDATIONS

This section provides recommendations resulting from this study, including a discussion of gaps in heritage data, a prediction of the type and number of sites expected, and a discussion of options for managing heritage sites identified during development planning.

6.1 Gaps in the Heritage Resources Record of the Study Area

No archaeological sites were recorded during Greer's (1994) archaeological impact assessment in the vicinity of the present proposed Minto Mine Phase IV Expansion, however, a large forest fire in 1980 (Government of Yukon 2009) would have destroyed any surficial evidence of campsites or buildings. Additionally, there is a minimal amount of First Nations traditional land use information recorded for the study area to date so it is difficult to correlate geographic locations within the study area to traditional activity areas in the aboriginal economy. The majority of Greer's (1994) heritage assessment work consisted primarily of preliminary field survey with limited subsurface testing with the exception of work at **KdVd-1** and sites near Minto Landing. Consequently, regional site density and distribution is relatively unknown. Prior to the discovery of **KdVd-2** and **KdVd-3** in 2010, all previously identified archaeological sites were associated with the Yukon River and Minto Landing area.

6.2 Heritage Resource Potential and Resource Values

A relatively small portion of the study area is considered to have notable pre-contact heritage resources potential. Areas considered to have high pre-contact heritage resources potential are typically near hydrological features on distinct, well-drained topographic features or are in upland areas on prominent landforms that provide good vantage points or strategic hunting positions. Generally, high potential areas are more frequent in the upland portions of the study area and along the lower portion of the Minto Creek valley. This is because the upland areas provide easier travel and access to hunting locations whereas the upper Minto Creek valley is steeply sloped. From the archaeological record, it is inferred that larger, more permanent sites will be positioned adjacent to the major hydrological features (*i.e*., Yukon River).

Based on results of the HROA, it was expected that most heritage sites in the proposed study area will consist of small, short-term camps related to hunting, trapping, or travel activities. Sites resulting from these activities are normally manifested as small lithic scatters; however, local environmental and geological conditions such as aridity and calcareous sediments may support the preservation of some organic materials. The remains of structures were not expected to be readily visible in this area given the short-term settlement occupation and previous forest fires, but there may be evidence of cultural depressions.

6.3 Heritage Resource Management Options

The HROA is intended to facilitate the management of heritage resources and provide planning options for future mine developments. For this study, areas of low heritage resources potential are characterized by significant distances from natural resources and/or have terrain characteristics that are not commonly associated with heritage sites. Developments proposed for these areas are not anticipated to have an impact on heritage resources, therefore, pre-construction Heritage Resources Impact Assessments are not recommended for low potential areas.

Conversely, those areas identified as having high heritage resources potential can be managed to avoid having an impact on heritage sites. The preferred management option for areas with high heritage resources potential is avoidance until an HRIA can be completed. Heritage Resources Impact Assessments (HRIAs) are recommended in order to ground-truth heritage resources potential and negate or confirm the presence of heritage resources. In the event that heritage resources are discovered in the development area, mitigation options can be provided.

During this study, a Heritage Resources Impact Assessment (HRIA) was recommended and conducted for high potential portions of the Phase IV Expansion Area and resulted in the discovery of two pre-contact heritage sites, **KdVd-2** and **KdVd-3**. Management recommendations regarding the general study area as well as specific management recommendations regarding **KdVd-2** and **KdVd-3** are outlined below.

6.4 Recommendations

The areas identified as having high heritage resources potential in the HROA are shown on Map 3 (Section 5). It is recommended that an HRIA be carried out in the future prior to potentially land altering activities within all areas considered to have high heritage resources potential. Pre-development heritage resources investigations are not recommended for the remainder of the study area.

Several high potential areas were recommended for an HRIA prior to development of the Minto Mine Phase IV Expansion area. HRIA fieldwork was conducted in the Minto Mine Phase IV Expansion Area. Two pre-contact heritage sites were identified and management recommendations in order of preference are as follows:

1) Avoidance. If the site areas and appropriate buffers (100 m) can be avoided then no further heritage assessments are recommended.
2) If the site areas cannot be avoided, then further heritage work including detailed site assessments, and possibly mitigative data recovery, is recommended.

Heritage resources are protected from non-permitted alterations or disturbance by the *Historic Resources Act* (Government of Yukon 2002) and the *Archaeological Sites Regulations* (Government of Yukon 2003).

It should be noted that within the Minto Mine Phase IV Expansion Area, some areas considered to have low heritage potential may have potential for Pleistocene age palaeontological deposits and, in the event that palaeontological remains are encountered during development, the Yukon Palaeontologist should be contacted immediately.

This study was designed as a Heritage Resources Overview Assessment and Heritage Resources Impact Assessment for the management of heritage resources and was not intended to evaluate or comment on Traditional Aboriginal use of the areas in which the development is proposed. The results of this study, therefore, should not be considered valid for that purpose. It is recommended that concerns regarding Traditional Aboriginal use in the Minto Mine area are discussed with the Selkirk First Nation.

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APPENDIX A

Glossary of Archaeological Terms

ABORIGINAL; INDIGENOUS: Pertaining to the original occupants of a given region.

A-HORIZON: the uppermost, often dark-coloured natural level in a soil profile characterized by roots, humus, and a lack of clay, iron, carbonates and soluble salts which have leached to lower levels.

ARCHAEOLOGY: The science concerned with the recovery, analysis, description, and explanation of the remains of past human cultures.

ARCHAEOLOGICAL SURVEY OR SITE INVENTORY: Examination of a locality for evidence of past human activity and the recording of that evidence to produce an inventory of sites in that locality.

ARTIFACT: Any manually portable product of human workmanship. In its broadest sense includes tools, weapons, ceremonial items, art objects, all industrial waste, and all floral and faunal remains modified by human activity. In the Yukon, an artifact is an object that is older than 45 years and has been abandoned.

BARK-STRIPPED TREE: A tree which has had bark removed by First Nations people for a number of possible purposes (*e.g.,* fibre, food, medicine)

BASALT: A fine-grained volcanic rock used for the manufacture of chipped stone artifacts. Colour ranges from black to grey; texture granular to glass like.

B-HORIZON: That natural level within a soil profile which directly underlies the surficial A-horizon and which contains the clay, iron oxides and carbonates which have leached down from it.

BIFACE: A stone artifact flaked on both sides.

BORDEN NUMBER: A standardized number consisting of four letters and one number assigned to each archaeological site which identifies it and denotes its general location in Canada.

BORDEN SYSTEM: A code of 4 letters and a number used to designate archaeological sites in Canada (*e.g.,* GtRx 7; FlJr 10). Proposed by Charles E. Borden, University of British Columbia, in 1954. The alphabetic prefix refers to a block of l0 minutes by l0 minutes within a grid system that covers all of Canada south of 62 N latitude. The numerical suffix indicates the site within this block in numerical order of registration.

CACHE: A deliberate store of equipment, food, furs or other resources placed in, or on the ground (perhaps protected by a rock CAIRN), or raised above the ground on a platform.

CACHEPIT: Small circular depressions (less than 3 m) that were used to store food.

CHALCEDONY: A semi-translucent silicate (quartz) rock with a wax-like luster and a great range of colours, used as raw material for the manufacture of chipped stone artifacts. Commonly called agate.

CHERT: A mainly opaque, fairly granular, silicate rock with a dull shiny luster and a great range of colours, used as raw material for the manufacture of chipped stone artifacts. Varieties include jasper and flint.

CONCHOIDAL FLAKE: A type of spall resulting from the fracture of fine-grained, or glassy rocks. Characterized by a bulb of percussion, striking platform remnant, and extremely sharp edges. A predictable fracture pattern that allows the manufacture of predetermined tools from these materials.

CONTACT: The time of first prolonged direct contact between First Nations peoples and Europeans. The term is synonymous with the Historic period which is characterized by contemporary written works.

CONTEXT: The spatial relationships of archaeological items and samples within a site. "Primary Context" refers to materials found in their original position; "Secondary Context" refers to materials which have been displaced and redeposited by disturbance factors; "Geological Context" is the relationship of the archaeological finds to geological strata.

CONCENTRATION: A notable accumulation of archaeological materials in a small area, such as a "concentration of flakes" etc.

CORE: (1) A blocky nucleus of stone from which flakes or blades have been removed (see MICROBLADE CORE). (2) A column or lineal sample of materials obtained by "coring" the ground, trees, etc.

CORTEX: The naturally weathered outer surface of a pebble.

CULTURE: The distinctive lifeway – including language, technology, sustenance, social organization, customs, beliefs and rituals – practiced by a people. This term can also be used to refer to the culture of particular groups of people at a particular point in time. In an archaeological context, the term culture refers to materials or objects of human origin, in contract to natural.

CULTURAL DEPOSIT: Sediments and materials laid down by, or heavily modified by, human activity.

CULTURAL DEPRESSION: A pit excavated by people into natural sediments. Pits have been excavated for a variety of reasons including: houses (pithouses, house pit), food storage (cache, cache pit), food cooking (roasting pit, berry trenches, hearth) and burials.

CULTURALLY MODIFIED TREE (CMT): A tree that had been intentionally altered in some way. CMTs usually consists of bark-stripped trees, that is, trees that have had the bark to access the cambium for eating, for extracting tree sap, for manufacture, or for medicinal purposes, by First Nations people. Blazed trees may also be referred to as CMTs.

CULTURE SEQUENCE: The chronological succession of cultural traits, phases or traditions in a local area.

CULTURE TYPE: A chronologically limited cultural unit within a local culture sequence, characterized by sufficient descriptive traits to set it apart from all other units. A phase is generally represented by 2 or more components in several sites and is the basic classification of archaeological "cultures".

DACITE: Volcanic rock (or lava) that characteristically is light in color and contains 62% to 69% silica and moderate a mounts of sodium and potassium.

DATUM: A fixed reference point on an archaeological site from which measurements are taken.

DEBITAGE: Waste by-products from tool manufacture.

DETRITUS: Waste by-products from tool manufacture. Most frequently applied to chips and fragments resulting from stone flaking.

DISTURBANCE: A cultural deposit is said to be disturbed when the original sequence of deposition has been altered or upset by post-depositional factors. Agents of disturbance include natural forces such as stream or wind erosion, plant or animal activity, land-slides etc.; and cultural forces such as later excavations.

ETHNOGRAPHIC ANALOGY: Interpretation of archaeological remains by comparison to historical cultures.

ETHNOGRAPHY: That aspect of cultural anthropology concerned with the descriptive documentation of living cultures.

ETHNO-HISTORY: The study of ethnographic cultures through historical records.

ETHNOLOGY: The aspect of cultural anthropology concerned with the comparative and processional analysis of ethnographic cultures.

FAUNAL REMAINS: Bones and other animal parts found in archaeological sites. Important in the reconstruction of past ecosystems and cultural subsistence patterns (see: MICROFAUNAL REMAINS).

FEATURE: A non-portable product of human workmanship. Usually clusters of associated objects; pit houses, structures, hearths, cache pits, mining activities, cooking ovens, etc.

FLAKE: A fragment removed from a core or nucleus of cryptocrystaline or fine-grained rock by percussion or pressure. May be used as a tool with no further deliberate modification, may be RETOUCHED, or may serve as a PREFORM for further reduction.

FLINT: A microcrystaline silicate rock similar to CHERT, used for the manufacture of flaked stone tools. Colour most commonly grey, honey-brown, or black.

GROUND STONE: Stone artifacts shaped by sawing, grinding, and/or polishing with abrasive materials (*e.g.,* "ground slate knives", "polished soapstone pendants").

HEARTH: A fireplace, often circular and may be unlined, rock or clay-lined, or rock-filled. Minimally consists of fire-altered rock and charcoal.

HERITAGE RESOURCES IMPACT ASSESSMENT (HRIA): A study undertaken for a proposed development project to determine whether it will adversely affect historical, archaeological, or paleontological remains, generally indicated by the presence of shovel tests.

HERITAGE SITE: A location of archaeological or historical interest that contains evidence of past human activities. Heritage sites may consist of artifacts or features.

HISTORIC ARCHAEOLOGY: The archaeological investigation of POST-CONTACT sites.

HISTORIC PERIOD: The time after European contact or the beginning of written recording. In the Yukon, this period dates to the past 100 to 150 years.

HORIZON: Layers typical of the soil profile in a particular region.

HOUSE-PIT: An aboriginally excavated house floor. See PITHOUSE.

IN SITU: Archaeological items are said to be "*in situ*" when they are found in the location where they were last deposited.

LITHIC: Of/or pertaining to stone. A lithic artifact is one manufactured from stone.

LITHIC INDUSTRY: That part of an archaeological artifact assemblage manufactured of stone.

LITHIC SCATTER: An archaeological site consisting of two or more stone artifacts.

LITHIC TECHNOLOGY: The process of manufacturing tools etc., from stone. Most frequently refers to stone flaking.

LOCALITY: A very large site or site-area composed of 2 or more concentrations or clusterings of cultural remains.

MATRIX: An inclusive term for the natural and cultural sediments of an archaeological site.

MICROFAUNAL REMAINS: Very small animal remains, such as rodent bones, tiny bone fragments, insects, small molluscs, etc., discovered in an archaeological site.

MIDDEN: A deposit of camp refuse associated with human occupational sites. Most frequently refers to coastal SHELL-MIDDENS.

MUNSELL COLOUR CODE: A system of describing colours by a code of letters and numbers defining "hue", "value" and "chroma". Important in accurately describing the colours of archaeological soils and sediments.

OBSIDIAN: Natural volcanic glass. Colour ranges from nearly translucent through black, red and green. The most easily flaked raw material for the manufacture of flaked stone tools.

PALEOSOL: "Old Soil." Buried soil horizons indicative of past soil conditions different from that presently prevailing.

PETROGLYPH: Pictures, symbols, or other artwork pecked, carved or incised on natural rock surfaces.

PICTOGRAPH: Aboriginally painted designs on natural rock surfaces. Red ochre is the most frequently used pigment and natural or abstract designs may be represented.

PITHOUSE: A semi-subterranean "earth-lodge" winter dwelling. Usually consisted of an earth-covered log framework roof over a circular to rectangular excavation. The archaeological feature is called a housepit.

POST-CONTACT PERIOD (Also "Historic Period"): Refers to the period following the first arrival of Europeans.

POT-HUNTER: An "amateur archaeologist" who vandalizes and destroys sites to add to his private collection, or for monetary gain.

PRE-CONTACT: Refers to the period before the first arrival of Europeans in a given area.

PREHISTORIC: The period prior to written records for any given area. In North America synonymous with PRE-CONTACT.

PRELIMINARY FIELD RECONNAISSANCE (PFR): A study undertaken for a proposed development project to determine whether it will adversely affect heritage remains, generally indicated by the lack of need for shovel tests.

PROJECTILE POINT: An inclusive term for arrow, spear or dart-points. Characterized by a symmetrical point, a relatively thin cross-section and some element to allow attachment to the projectile shaft. Flaked stone projectile points are usually classified by their outline form: triangular, leaf-shaped, lanceolate, stemmed, corner-notched, and side-notched.

PROVENIENCE: The horizontal and/or vertical position of an object in relation to a set of spatial coordinates.

QUARTZ CRYSTAL: Pure silicate rock-crystal. Usually perfectly clear with six crystal surfaces. May be used as a raw material for lithic tool manufacture.

RETOUCH: The removal of small secondary flakes along the edge of a lithic artifact to improve or alter the cutting properties of that edge. Retouch flaking may be BIFACIAL or UNIFACIAL.

RETOUCHED FLAKE: A stone flake which has had one or more edges modified by the deliberate removal of secondary chips.

ROCK-SHELTER: A shallow cave or rock overhang large enough to have allowed human occupancy at some time.

SCRAPER: A tool presumably used in scraping, scouring, or planing functions. Most frequently refers to flaked stone artifacts with one or more steep UNIFACIALLY RETOUCHED edge(s).

SETTLEMENT PATTERN: The spatial distribution of cultural activities across a landscape at a given moment in time.

SHOVEL-SCREENING: A rapid excavation procedure in which the site matrix is shoveled directly through a screen (usually 1/4" mesh).

SHOVEL TEST: a small scale, generally informal test excavation to ascertain the nature of the deposits, to determine the presence or absence of a heritage site, or to delimit the boundaries of a known site.

SITE: Any location with detectable evidence of past human activity. Includes HISTORICAL SITES, HABITATION SITES, KILL-SITES, QUARRY SITES, ROCK-ART SITES, BURIAL SITES, etc. See HERITAGE SITE.

SITE SURVEY: The process of searching for and describing heritage sites in a given area.

SOIL-SAMPLE: A quantity of soil, site matrix, or sediments collected for physical, or chemical analysis.

STORAGE-PIT (Also called CACHE-PITS): Circular excavations usually less than 3 m in diameter assumed to have aboriginally functioned as storage "cellars".

STRATA: Depositional units or layers of sediment distinguished by composition or appearance. (Singular: "stratum").

STRATIGRAPHY: The study of various deposits, built up over time, which form delineated layers (such as ash, charcoal or crushed shell) in the earth walls of a pit.

SURVEY(ING): (1) In Archaeology, the process of locating archaeological sites. (2) More generally, the process of mapping and measuring points on the ground surface.

SURVEY AREA: The region within which heritage sites are to be located.

TOOL: An artifact that has been intentionally modified or formed for a specific purpose (*e.g.*, projectile point, knife, scraper).

TYPE: A distinctive formal artifact class restricted in space and time, *e.g.,* the "Folsom Point" is a projectile point "type".

TYPOLOGY: The classification of artifacts according to analytical criteria, to determine and define significant trends or variations in time and space.

UNIFACE: A stone artifact flaked only on one surface.

USE-WEAR: Polish, striations, breakage, or minor flaking which develop on a tool's edge during use. Microscopic examination and study of the wear may indicate the past function of tools.

WETLAND: Areas of land that are inundated by surface water or ground water sufficient to support the growth and reproduction of vegetative and aquatic life.

WORKED: Having chips, flakes, scratches or other evidence of deliberate modification on stone, bone, antler, shell, etc.

ZOOARCHAEOLOGY: The study of faunal remains found in archaeological sites and their cultural significance.

Modified from:

A Glossary of Terms: Artifacts BC.
http://www.bcheritage.ca/artifacts/kosapsom/gloss.htm

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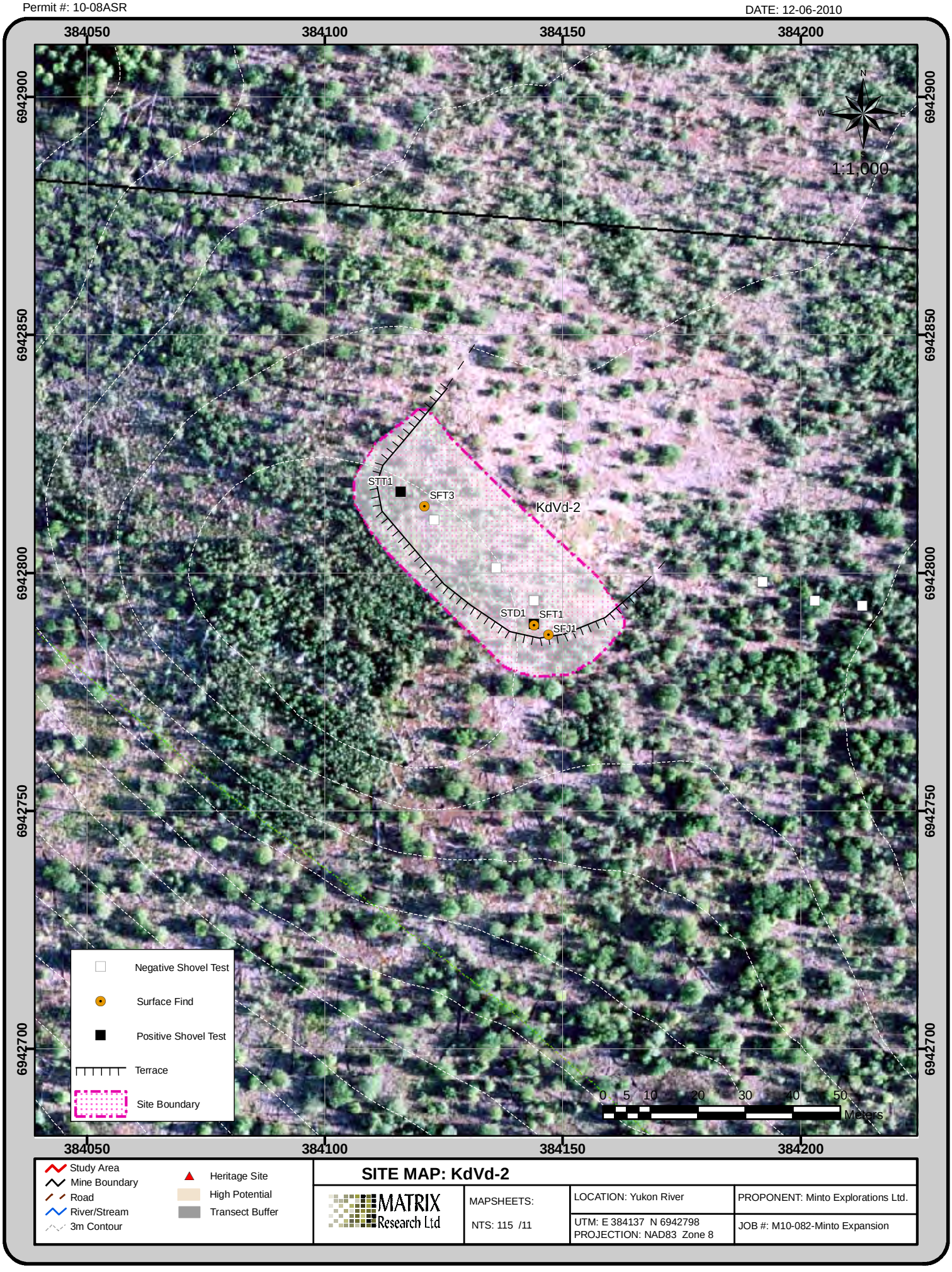
APPENDIX B

Heritage Site Maps

Permit #: 10-08ASR

DATE: 12-06-2010



Study Area
Mine Boundary
Road
River/Stream
3m Contour

Heritage Site
High Potential
Transect Buffer

SITE MAP: KdVd-2

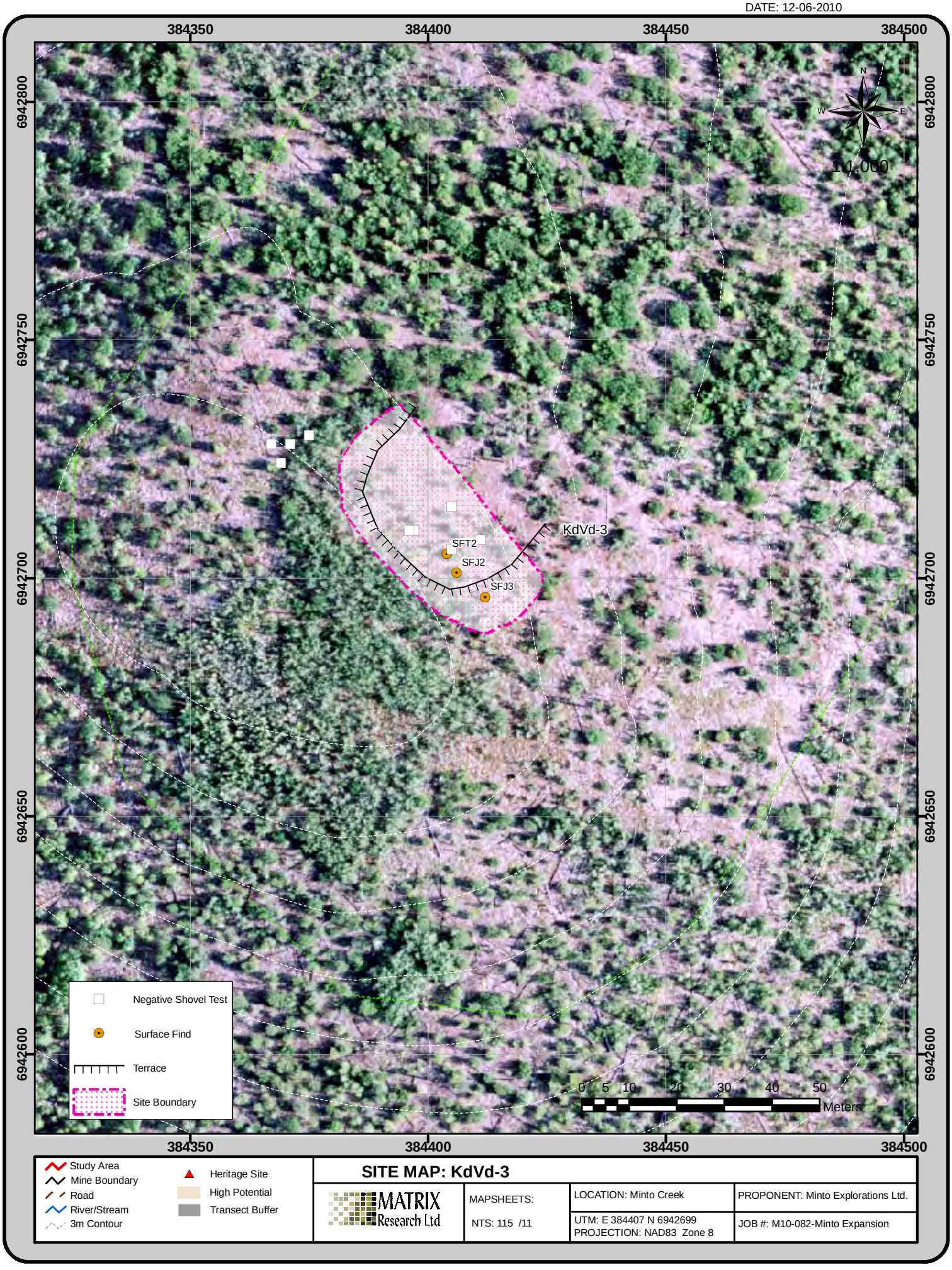
MATRIX Research Ltd

MAPSHEETS:
NTS: 115 /11

LOCATION: Yukon River
UTM: E 384137 N 6942798
PROJECTION: NAD83 Zone 8

PROPONENT: Minto Explorations Ltd.
JOB #: M10-082-Minto Expansion

DATE: 12-06-2010



Study Area
Mine Boundary
Road
River/Stream
3m Contour
Heritage Site
High Potential
Transect Buffer

SITE MAP: KdVd-3

MATRIX Research Ltd

MAPSHEETS:
NTS: 115 /11

LOCATION: Minto Creek
UTM: E 384407 N 6942699
PROJECTION: NAD83 Zone 8

PROPONENT: Minto Explorations Ltd.
JOB #: M10-082-Minto Expansion

APPENDIX C

Pre-contact Artifact Photographs

Plate 1: Small arrow point blank, identified at Surface Find T2 at heritage site KdVd-3 (Artifact # KdVd-3:1).

Plate 2: Lanceolate Point, identified at Surface Find J1 at heritage site KdVd-2 (Artifact # KdVd-2:1).

Plate 3: Biface artifact, identified at Surface Find T1 at heritage site KdVd-2 (Artifact # KdVd-2:2).

Plate 4: Stone flakes produced during tool manufacture, identified at Surface Find T1 at heritage site KdVd-2 (Artifact # KdVd-2:3).

APPENDIX D

Heritage Assessment Photographs

Plate 1: View south from heritage site KdVd-3. Red flagging tape marks artifact locations.

Plate 2: View southwest from heritage site KdVd-3.

Plate 3: View west at heritage site KdVd-2

Plate 4: View southwest from heritage site KdVd-2. Daniel Alfred in foreground, James Alec in background.

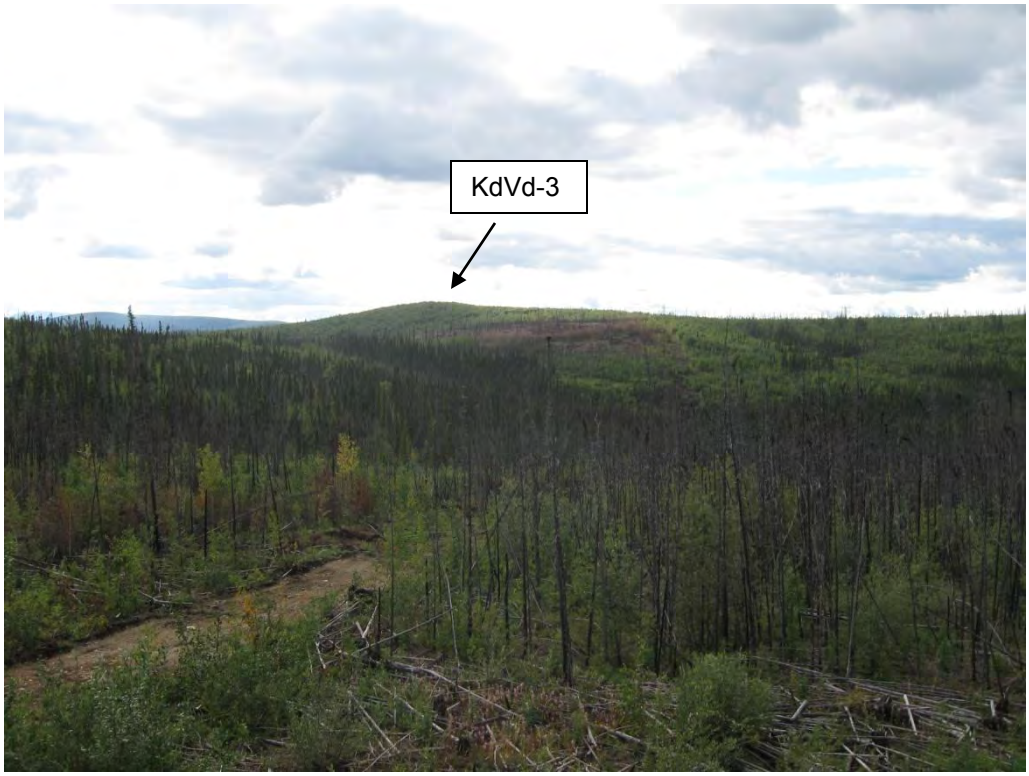


Plate 5: View west to heritage site KdVd-3 from south end of Minto Mine airstrip.

Plate 6: View southeast from KdVd-2 at KdVd-3, located on the knoll top.

Plate 7: Shovel test on rocky knoll at Minto North, looking south.

Plate 8: View east to mine from high point west of mine.

Plate 9: View northeast toward Fort Selkirk from high point west of mine.

Plate 10: View north to ridge top from road. Note effects of1980 forest fire and subsequent regenerative growth.

APPENDIX E

Modified Artifact and Debitage Catalogues

Modified Artifact Catalogue									
Borden #	**Artifact #**	**Shovel Test / Surface Find**	**Depth Below Surface (cm)**	**Raw Material**	**Artifact Type**	**Count**	**Excavator**	**Date**	**Comments**
KdVd-2	KdVd-2:1	Surface Find J1	0 dbs	Dacite	Lanceolate Point	1	James Alec	2010/08/20	
KdVd-2	KdVd-2:2	Surface Find T1	0 dbs	Chert	Biface	1	Ty Heffner	2010/08/20	
KdVd-3	KdVd-3:1	Surface Find T2	0 dbs	Quartzite	Arrow Point Blank	1	Ty Heffner	2010/08/20	

Debitage Catalogue									
Borden #	**Artifact #**	**Shovel Test / Surface Find**	**Depth Below Surface (cm)**	**Raw Material**	**Artifact Type**	**Count**	**Excavator**	**Date**	**Comments**
KdVd-2	KdVd-2:3	SF T1	0 dbs	19 chert, 1 dacite	Unmodified Flake	20	Ty Heffner	2010/08/20	
KdVd-2	KdVd-2:4	SF T3	0 dbs	31 chert	Unmodified Flake	31	Ty Heffner	2010/08/20	
KdVd-2	KdVd-2:5	ST D1	0-5 cm dbs	6 chert	Unmodified Flake	6	Daniel Alfred	2010/08/20	
KdVd-2	KdVd-2:6	ST T1	0-5 cm dbs	1 chert	Unmodified Flake	1	Ty Heffner	2010/08/20	
KdVd-3	KdVd-3:2	SF J3	0 dbs	1 metamorphosed siltstone	Primary Flake	1	James Alec	2010/08/20	
KdVd-3	KdVd-3:3	SF J2	0 dbs	1 chert	Unmodified Flake	1	James Alec	2010/08/20	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